

# ARNO®

## WERKZEUGE

We have a passion for precision.

LANGDREHEN

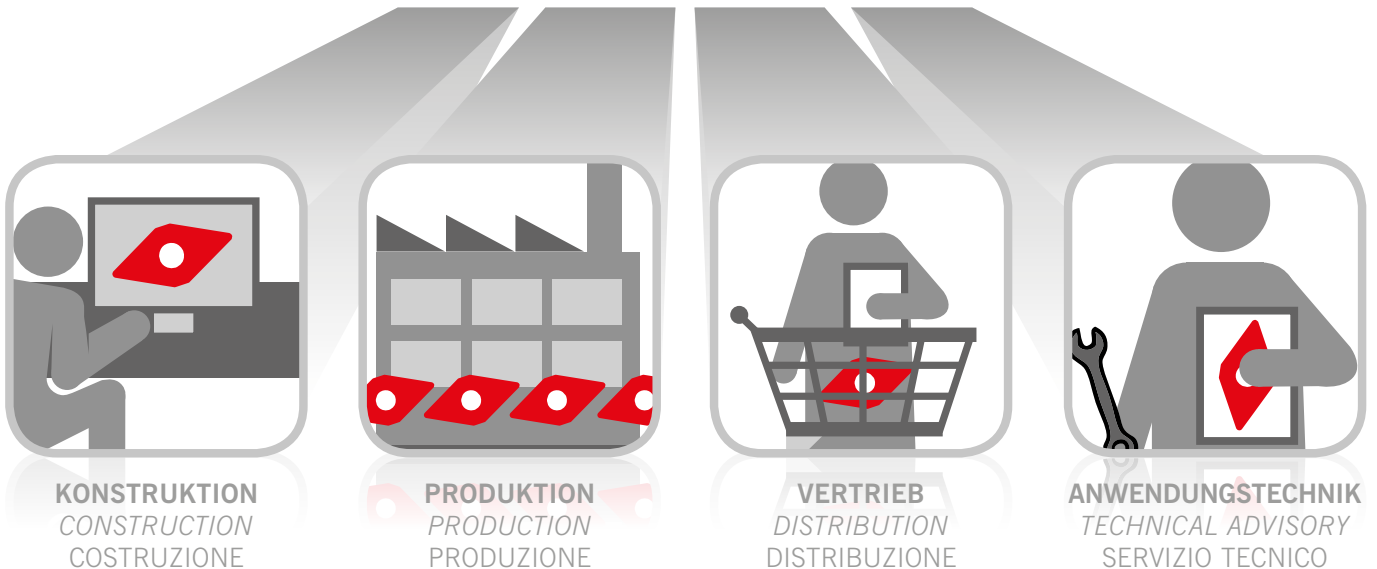
2016/2017

### Werkzeuge und Schneideinsätze zum Langdrehen

*Tools and inserts for  
sliding head auto lathes*

Utensili ed inserti per  
macchine a fantina mobile

# ARNO® WERKZEUGE



**Schnell, flexibel und individuell.**

*Quick, flexible and individual.*

*Veloce, flessibile e individuale.*

## **Konstruktion, Produktion und Vertrieb unter einem Dach.**

Das ist die perfekte Verbindung, um Ihnen Standard- und Sonderprodukte schnell und hochwertig anbieten zu können.

95 % der Standardprodukte sind sofort verfügbar: Bei Bestellung bis 18 Uhr erhalten Sie Ihre Produkte bereits am nächsten Tag.

Mit großer fachlicher Kompetenz betreut Sie unser Außendienst-Team, unsere Anwendungstechniker helfen Ihnen mit Spezialwissen gerne auch vor Ort.

## *To have design, production and service all under one roof*

*is the perfect way of providing standard and special products.*

*95 % of the standard programme is available from stock. Order received before 18.00 CET are dispatched the very same day and in most cases supplied next day.*

*Our competent team of technical sales engineers will be available to support you on site.*

## **Costruzione, Produzione e Distribuzione sotto un unico tetto.**

La sequenza perfetta per garantire un servizio di supporto cliente su prodotti Standard e Speciali di alta qualità.

Il 95 % dei prodotti Standard sono disponibili a stock; con ordini entro le 18:00 garantiamo la consegna il giorno successivo.

Il nostro team di vendita altamente qualificato si offre come supporto alla produzione presso i nostri clienti direttamente sul territorio.

**Weitere Informationen finden Sie unter:**

*For more information see:*

Altre informazioni su:

**[www.arno.de](http://www.arno.de)**



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### 1962

Karl-Heinz Arnold gründet am 1. April Karl-Heinz Arnold Werkzeuge im väterlichen Betrieb. Zweck: Vertrieb von Hartmetallwerkzeugen.

### 1965

Umfirmierung von „Emil Arnold“ zur „Emil Arnold KG“. Unternehmenszweck: Herstellung von Spezialwerkzeugen und Vorrichtungen für Sondermaschinen sowie Serienfertigung von Spannwerkzeugen.

### 1979

Gemeinsam mit der eigenen Fertigung bei Emil Arnold setzt ARNO konsequent auf Marktlücken: Nach einer Entwicklungszeit von nur einem Jahr wird das Mini-Kopiersystem mit einer neuartigen, patentrechtlich geschützten Klemmung entwickelt.

### 1941

Emil Arnold (\*24.7.1904), Meister bei Bosch, macht sich selbstständig und gründet Emil Arnold Lehrenbau in der Franziskanergasse 7 in Esslingen.

### 1966

Umzug der beiden Firmen in das Industriegebiet Ruit Zinsholz, Ostfildern bei Stuttgart.

### 1967

Beginn des Vertriebs von Wendschneidplatten aus Hartmetall für die Zerspaltung beim Drehen und beim Fräsen.

### 1981

Weitere Entwicklung von eigenen Werkzeugen, die Marktlücken schließen z. B. NC-Stechdrehsystem.

### 1989

Einstieg in die Schleiftechnik.

## Tradition in Präzision.

### „Vom lokalen Familienunternehmen zum weltweiten Vertrieb.“

**1941 gründet Emil Arnold** den „Lehrenbau“ in Esslingen am Neckar. Anfänglich fertigt er hauptsächlich Messvorrichtungen und Prüflehren. Schon damals hat er sich durch die hervorragende Qualität seiner Produkte einen Namen gemacht. Besonders, weil er auf die Kunden eingeht und deren Wünsche präzise erfüllt.

**Zusammen mit seinem Sohn Karl-Heinz Arnold** steckt er viel Herzblut in die Firma und ist immer offen für neue Entwicklungen. Er hat die Vision, mit seinen Werkzeugen in den Fertigungen aller Länder und Branchen vertreten zu sein. 1962 gründet sein Sohn die Firma Karl-Heinz Arnold GmbH, die sich fortan unter dem Namen ARNO®-Werkzeuge vor allem dem Vertrieb von Hartmetallwerkzeugen widmet. Zusammen beschäftigen sich die beiden Firmen konsequent mit Marktlücken, haben immer die Wünsche der Kunden im Auge.

**1987 tritt Klaus-Michael Arnold** in die Firma ein und wird 1992 Geschäftsführer. Zusammen mit Josef Storf, 2002 zum Geschäftsführer ernannt, werden im Sinne des Firmengründers das Produktsortiment ständig ausgebaut und neue Vertriebswege gesucht. 2004 ist es dann soweit: Im Ausland, bereits über Vertriebspartner etabliert, wird die erste Niederlassung in England gegründet. Bald darauf folgen Italien, Russland und die USA. Durch die stetige Weiterentwicklung des Programms und dank sehr gutem Serviceangebot ist ARNO®-Werkzeuge bis heute weltweit anerkannt für seine hochpräzisen Zerspanungswerkzeuge.

#### 2012

Der Kurzlochbohrer AKB wird auf der AMB vorgestellt, zusätzliche Wendschneidplatten beim SHARK-Drill<sup>2</sup> erschließen weitere Branchen.

#### 2010

Zur AMB werden mehrere Produktneuheiten vorgestellt: SA-Stechwerkzeuge, das ARNO®-Mini-System und die SIM-Bohrstangen. Die Frässysteme FTA, Duo-Mill und ROC-Mill schließen erneut eine Marktlücke.

#### 2008

Gründung einer Niederlassung in Russland.

#### 2004

Gründung einer Niederlassung in UK.

#### 2002

Expansion der Schleiferei. Umzug in den Neubau.

#### 2006

Gründung einer Niederlassung in Italien.

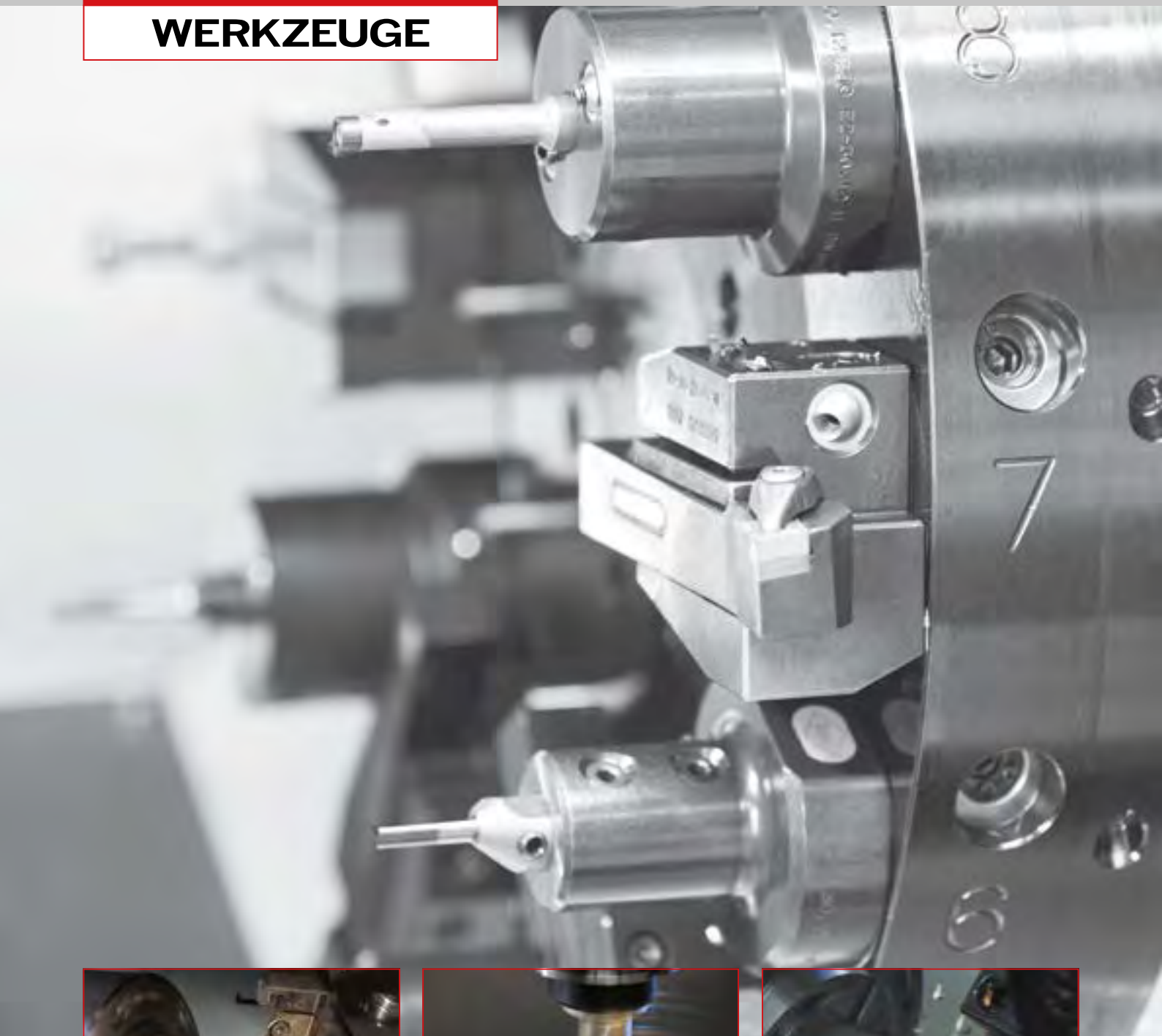
#### 2009

Gründung einer Niederlassung in den USA. Neubau eines Logistik- und Vertriebszentrums in Ostfildern.

#### 1995

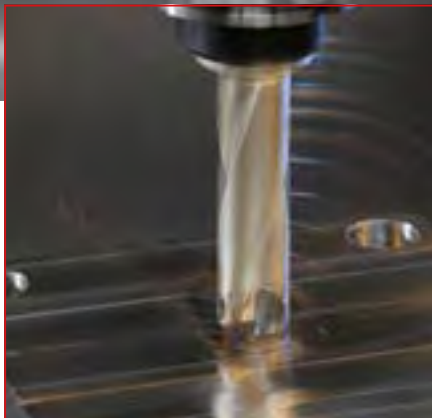
Zertifizierung Emil Arnold GmbH & Co KG nach DIN ISO 9002. Zertifizierung ARNO®-Werkzeuge nach DIN EN ISO 9001.





### Stechen

Ob Radial- oder Axial-Stechdrehen, Abstechen, Langdrehen oder Innenstechdrehen – Sie finden bei ARNO®-Werkzeuge für jede Anwendung das optimale Stechwerkzeug.



### Bohren

Von 1 mm bis 114 mm Durchmesser sind Bohrer mit auswechselbaren Schneidplatten und VHM-Spiralbohrer zur Innen- und Außenbearbeitung in unserem Produktportfolio vertreten.



### Drehen

ARNO®-Werkzeuge bietet zuverlässige Werkzeuge mit den unterschiedlichsten Wendschneidplatten für höchste Ansprüche in der Innen- und Außenbearbeitung sowie zum Gewindedrehen.

## Stärke durch Erfahrung, Kompetenz und Entwicklung.

### „Für die Zukunft brauchen Sie einen Partner mit Zukunft.“

Durch intensive Zusammenarbeit innerhalb und außerhalb der Firma sind wir in der Lage, individuelle Kundenwünsche mit unserem Know-how zu erfüllen. Dabei entwickeln wir ständig neue Sonderwerkzeuge, um diese dann später auch in unser Standardprogramm aufzunehmen.

**Neue Werkstoffe, ebenso wie die Anforderungen nach ständig steigenden Bearbeitungsgeschwindigkeiten, fordern uns, zu forschen und neue Produkte auf den Markt zu bringen.** Es gilt, modulare Werkzeugsysteme anzufertigen, die individuell für unterschiedlichste Einsatzbereiche angepasst werden. Unsere leistungsfähige und trotzdem wirtschaftliche Produktpalette beinhaltet vom Bohrsystem über Stechwerkzeuge, Fräsköpfe und einer Vielfalt an Wendeschneidplatten (nicht nur zum Drehen) auch Werkzeugaufnahmen und Werkzeugautomaten.

Neben qualitativ einwandfreien Produkten sind fachliche Beratung und Betreuung für uns selbstverständlich. **Unser kompetentes Team erfüllt Ihre Wünsche und hilft Ihnen mit Service nach Maß auch nach Ihrer Kaufentscheidung.**



### Fräsen

Planfräser, Eckfräser, Fasfräser, Fräser mit runden oder eckigen Wendeschneidplatten, Schrappfräser. Auch für Ihre Anwendung finden Sie einen passenden Fräser.



### Werkzeugautomaten

Sichere Werkzeugaufbewahrung, -verfolgung und -entnahme garantiert Ihnen der flexibel konfigurierbare StoreManager.



### Werkstückspannung

NC-Schraubstöcke in einfacher oder doppelter Ausführung für perfekt gespannte Werkstücke in der modernen Fertigung.



## Service nach Maß.

### Individuelle Sonderlösungen

Mit unserem breiten Produktsortiment sind wir bestens für nahezu jede Herausforderung gerüstet. **Sie haben dennoch eine ganz besondere Aufgabe, die besonderes Werkzeug verlangt?** Dann wenden Sie sich an uns, denn ARNO produziert auch kundenorientierte Sonderlösungen – optimal auf Ihre Bedürfnisse zugeschnitten. Das garantiert perfekte Ergebnisse ohne Einschränkungen.

### Lieferung über Nacht

Für Sie muss es richtig schnell gehen? Kein Problem, denn wenn Sie die **Bestellung Ihrer Produkte bis 18 Uhr (freitags bis 16 Uhr) abschließen, steht am nächsten Tag ein Fahrer vor Ihrer Tür.** Dieses Angebot gilt nur für unsere Lagerware, denn um die Qualität unserer individuellen Sonderlösungen zu garantieren, nehmen wir uns für diese auch etwas mehr Zeit.

### Alles unter einem Dach

**Die hohe Qualität unserer Produkte** basiert nicht zuletzt darauf, dass **die Konstruktion, die Produktion und der Vertrieb bei ARNO auf einem Gelände stattfinden.** Das ermöglicht uns ausgiebige Testverfahren, schnellere Reaktionszeiten, bessere Kontrolle und – einen günstigeren Preis.

### Großes Außendienst-Team

**Wir lassen Sie mit unseren Produkten nicht allein.** Das ARNO-Außendienst-Team besucht Sie regelmäßig und unterstützt Sie mit umfassendem Produktwissen.

### Unsere Anwendungstechniker

**Sie haben ein Problem in Ihrer Zerspanung festgestellt oder haben eine Frage, die Sie nur vor Ort klären können?** Unsere Anwendungstechniker besuchen Sie in Ihrem Werk und unterstützen Sie bei Technikfragen.

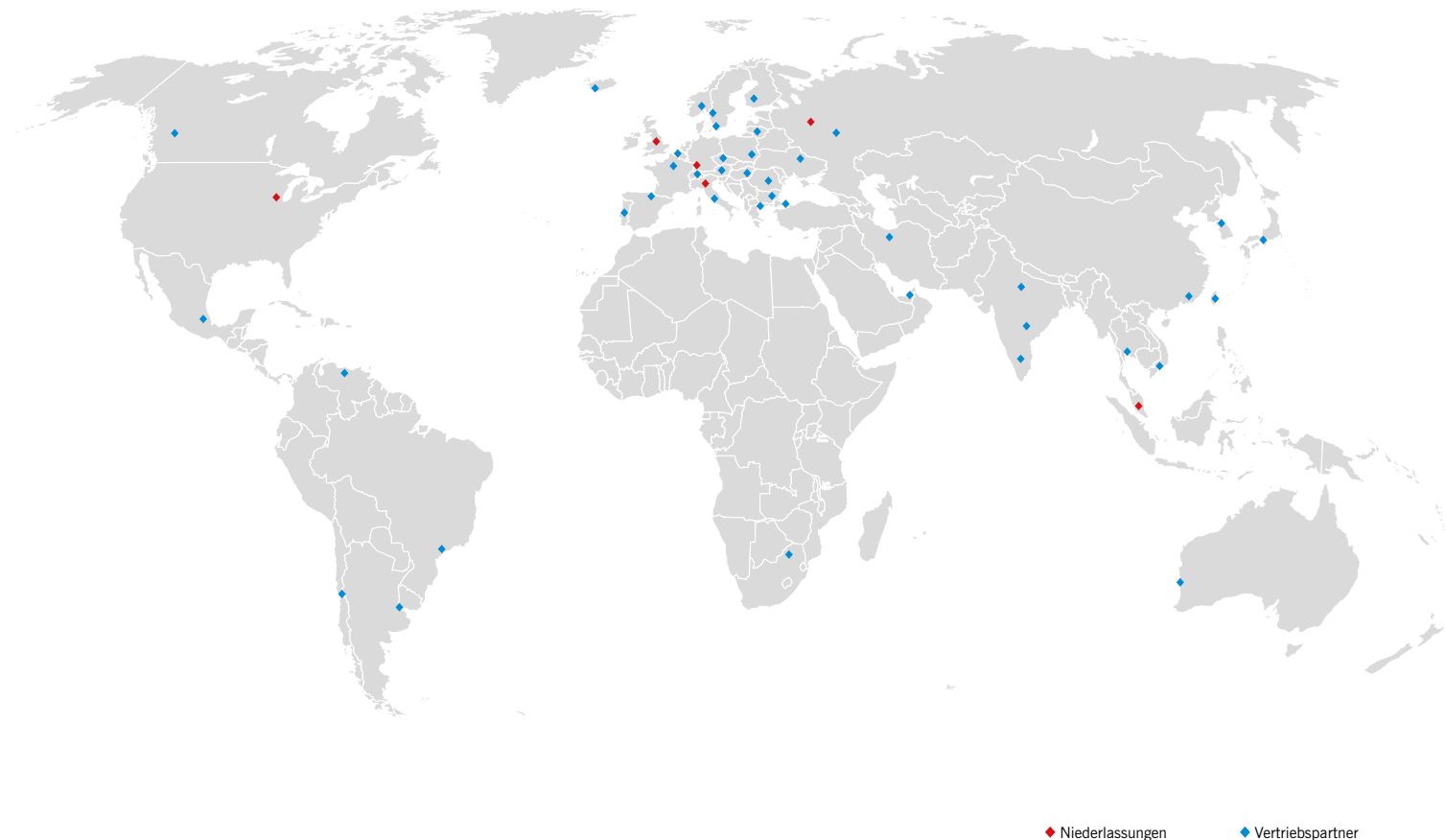
### Unsere Bestell-Hotline

**Sie haben die Möglichkeit in nahezu allen Ländern der Welt einen unserer ARNO-Mitarbeiter zu erreichen.** Profitieren Sie von unserer zuverlässigen und kompetenten Fachberatung am Telefon. Für komplexere Fragen stehen Ihnen persönliche Ansprechpartner zur Verfügung.



## Weltweit im Einsatz – Ihr Service direkt vor Ort.

**ARNO®-Werkzeuge finden Sie überall auf der Welt.** Uns ist es wichtig, nicht nur zentral von einem Punkt aus unsere Kunden zu betreuen. Vielmehr möchten wir Ihnen als Kunden einen lokalen Service bieten. Mit Vertriebspartnern und Niederlassungen in vielen Ländern der Welt sind wir für Sie einfach zu erreichen.



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D-73760 Ostfildern

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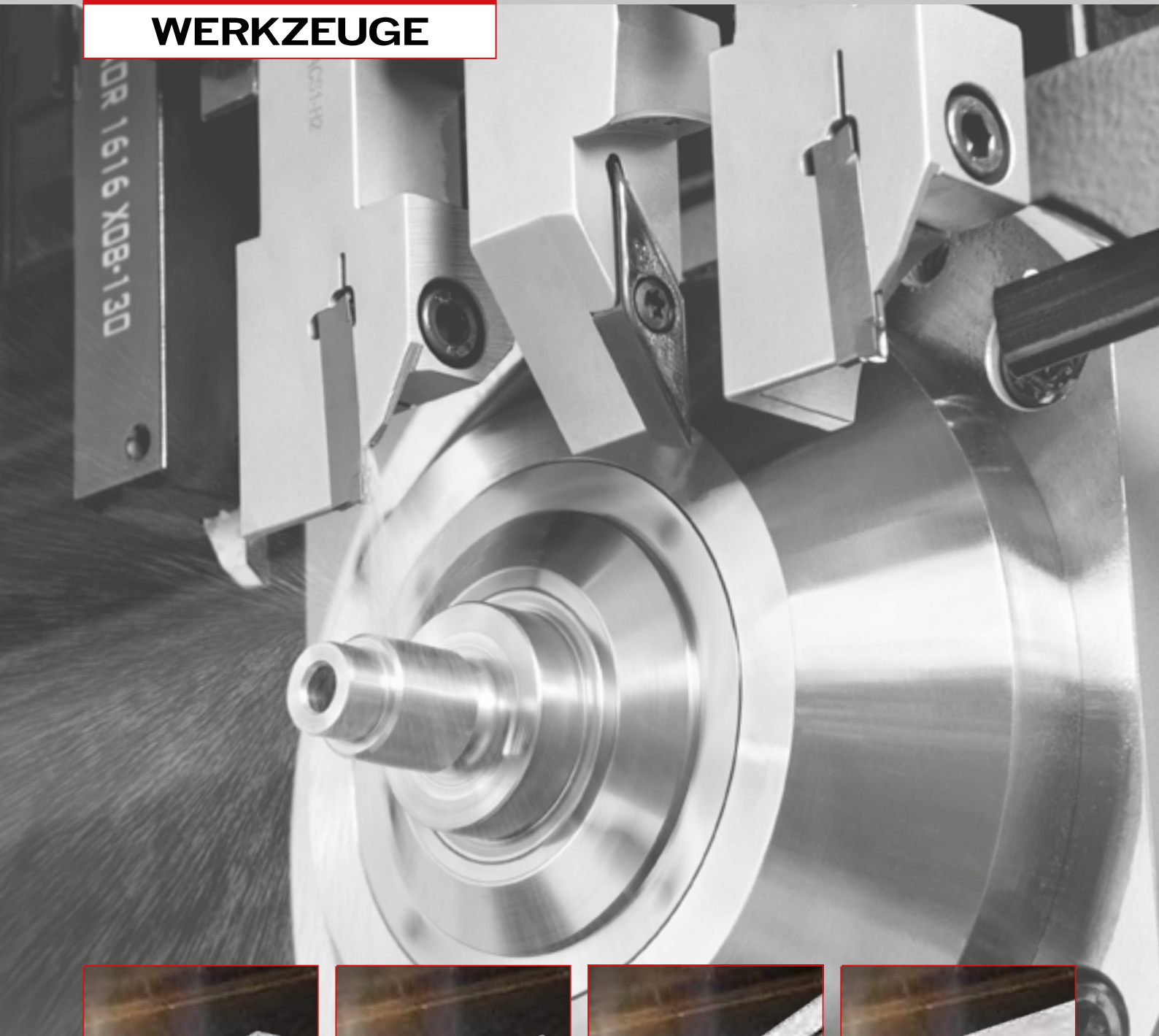
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Seite 31

### SA-Stecksystem

Lösungen für das Einstechen und Abstechen vereint in verschiedenen Werkzeugausführungen.



Seite 65

### SE-Stecksystem

Monoblockhalter zum Ein- und Abstechen und Kopierdrehen.



Seite 87

### ARNO<sup>®</sup>-Mini-System

AMS ist ein modulares System zur flexiblen Bohrungsbearbeitung ab Durchmesser 0,7 mm mit maximaler Bohrungstiefe bis zu 50 mm.



Seite 135

### Drehen

Klemmhalter und ISO-Wendeschneidplatten zum Langdrehen.

## ARNO-Werkzeuge zum Langdrehen

### Präzise – Vielseitig – Wirtschaftlich

Langdrehen hat seinen Ursprung in der Uhrenindustrie und dient dazu lange, schlanke Drehteile aus Stangenmaterial herzustellen. Heute findet dies auch in den Bereichen Automotive, der Elektronikindustrie, dem Maschinenbau sowie der Medizintechnik Anwendung.

Diese ARNO-Werkzeuge sind zur Herstellung von kleinen, dünnen und sehr genauen Massendrehteilen (ab ca. 2,5xD) optimal geeignet. Die scharfen, präzisionsgeschliffenen Schneidplatten mit kleinsten Eckenradien, die hohen Spanleistungen, schnelle Abgreifzeiten und sehr kurzen Werkzeugwechselzeiten lassen Werkstücke effektiv und kostengünstig fertigen. So sind Langdrehautomaten für eine rationelle und wirtschaftliche Serienfertigung sinnvoll.

**Verschaffen Sie Sich einen Überblick über die ARNO Langdrehwerkzeuge.**



Seite 245

### DECO-Cut

Spezielle Bohrstangen und Drehhalter zum Langdrehen.



Seite 279

### Shark-Cut

Die Multifunktions-Werkzeuge Shark-Cut kommen auch beim Langdrehen zum Einsatz.



### 1962

On April 1st, Karl-Heinz Arnold establishes "Karl-Heinz Arnold Werkzeuge" in his father's company. Purpose: Sales of carbide cutting tools.

### 1965

Company re-structuring from "Emil Arnold" to "Emil Arnold KG". More focus on manufacturing of special tools and jigs for special purpose machines as well as mass production of toolholders.

### 1979

Together, in a combined production facility with "Emil Arnold", ARNO starts focusing on market opportunities. After only one year of research and development a mini copy-turning system with a patented insert clamping is introduced.

### 1941

Emil Arnold (\*24.7.1904), decides to become self-employed and establishes "Emil Arnold Lehrenbau" in Franziskanergasse 7 in Esslingen.

### 1966

Both companies moving to the industrial area of "Ruit Zinsholz", Ostfildern near Stuttgart.

### 1967

Start of sales for indexable carbide inserts for turning and milling.

### 1981

More developments of own tools, for example the NC-grooving and turning system.

### 1989

Entering into grinding technology.



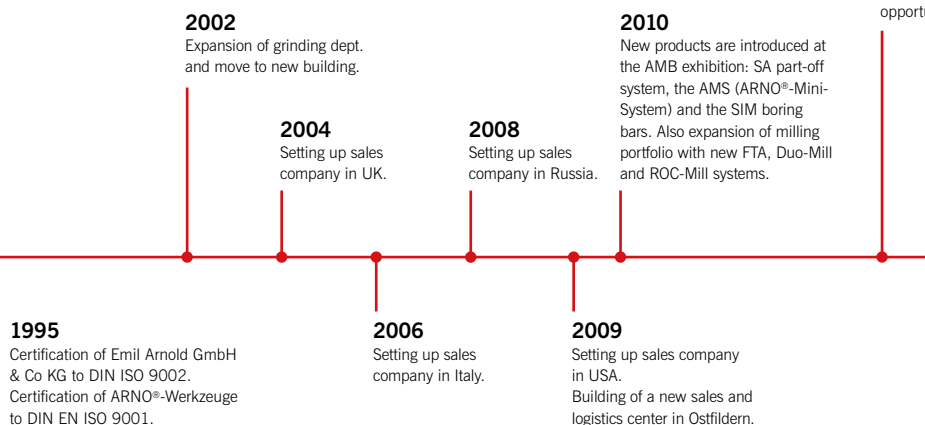
## Tradition in precision.

### “Local family business gains global position as a market leader.”

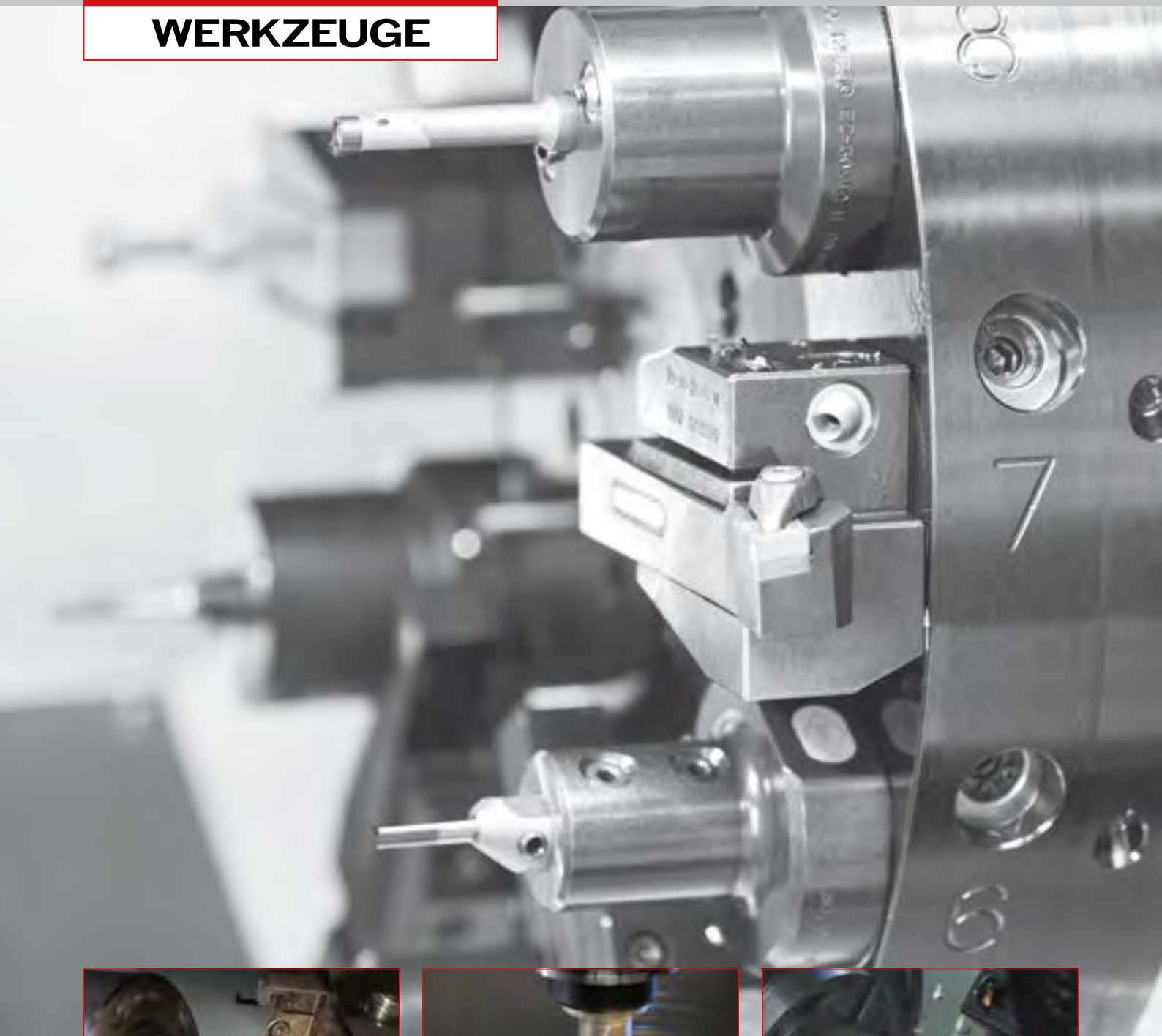
**In 1941 Emil Arnold establishes** “Lehrenbau” in Esslingen am Neckar. Initially manufacturing mainly measurement jigs and gauges. Because he always gave his customers exactly what they specified he established himself through the high quality of his products.

**Together with his son Karl-Heinz Arnold** they put their heart and soul into the company and were always open to new developments. He had a vision to be represented with his cutting tools in all industries all over the world. In 1962 his son forms the company Karl-Heinz Arnold GmbH which under the name ARNO®-Werkzeuge began focussing on sales of carbide tools. Both companies were constantly looking for market opportunities with the customers in mind.

**In 1987 Klaus-Michael Arnold joined** the company and became Managing Director in 1992. In 2002 Josef Storf became joint Managing Director. In the spirit of the company founder, the product portfolio is expanding and the search for new sales channels are constantly being explored. In 2004 ARNO (UK) Ltd becomes the first overseas sister company, followed by sister companies in Italy, Russia and the USA. Due to the constant developments of the product range and the high level of service provided, today ARNO®-Werkzeuge is globally renowned for its high quality cutting tools.







### Grooving

Whether it is radial or axial grooving, parting-off, groove turning or internal grooving, you will find the ideal tool from ARNO®-Werkzeuge.



### Drilling

From 1 mm to 114 mm diameter you will find a solid carbide drill or a solution with indexable inserts from our extensive product range.



### Turning

ARNO®-Werkzeuge offers reliable tools utilizing various inserts for your most demanding internal or external machining applications as well as tools and inserts for threading.

## Strength from experience, competence and development.

**“For the future you need a partner with future.”**

By working closely with partners inside and outside the company, we are very capable of satisfying individual requirements which often lead to special tooling. These tools are consistently improved and might find their way into our standard portfolio of catalogue tooling later.

New materials and expectations of constant improvement of machine time, motivate us to research and develop new tooling and cutting tool materials. That means developing modular tooling systems that are modified for each individual application. Our high performance but still affordable solutions include our extensive range of drilling systems, grooving systems, milling cutters and our huge range of indexable inserts (not just for turning) as well as tool holding and vending solutions.

Our technical support and advice follow any of our high quality tools. **Our highly competent team will support you with service even after you have made your decision to purchase.**



### Milling

Face-mills, square shoulder-mills, chamfer-mills, milling cutters with round inserts, roughing cutters and solid carbide cutters. We have the right cutter for your application.



### Tool Vending

Secure storage, monitoring and usage reporting guaranteed with our highly flexible StoreManager solution.



### Work Holding Equipment

NC-Machine vice in various executions of number of jaws and widths ensure maximum component clamping for the modern manufacturing.

## Service to Size.

### Individual solutions

Despite our wide range of standard tools which will cover a majority of applications, sometimes you may just need a solution for a specific request. ARNO can offer you a special tool which suits your application exactly. A perfect solution without any compromises.

### Overnight delivery

When urgency is required ARNO is there to help. Place your order for standard tools by 3:30 PM CET and our tools could be on your machine the next day. For special solutions we need a little longer but then you will also be getting a high quality tool just for your application.

### Everything under one roof

The high quality of our products is a result of having R&D, manufacturing and sales at one location. This also gives us the opportunity for testing, offering faster response time, better control and better prices.

### Experienced external sales team

You are never left alone with an ARNO product. Our experienced external ARNO sales team is always available for service and support.

### Our application engineers

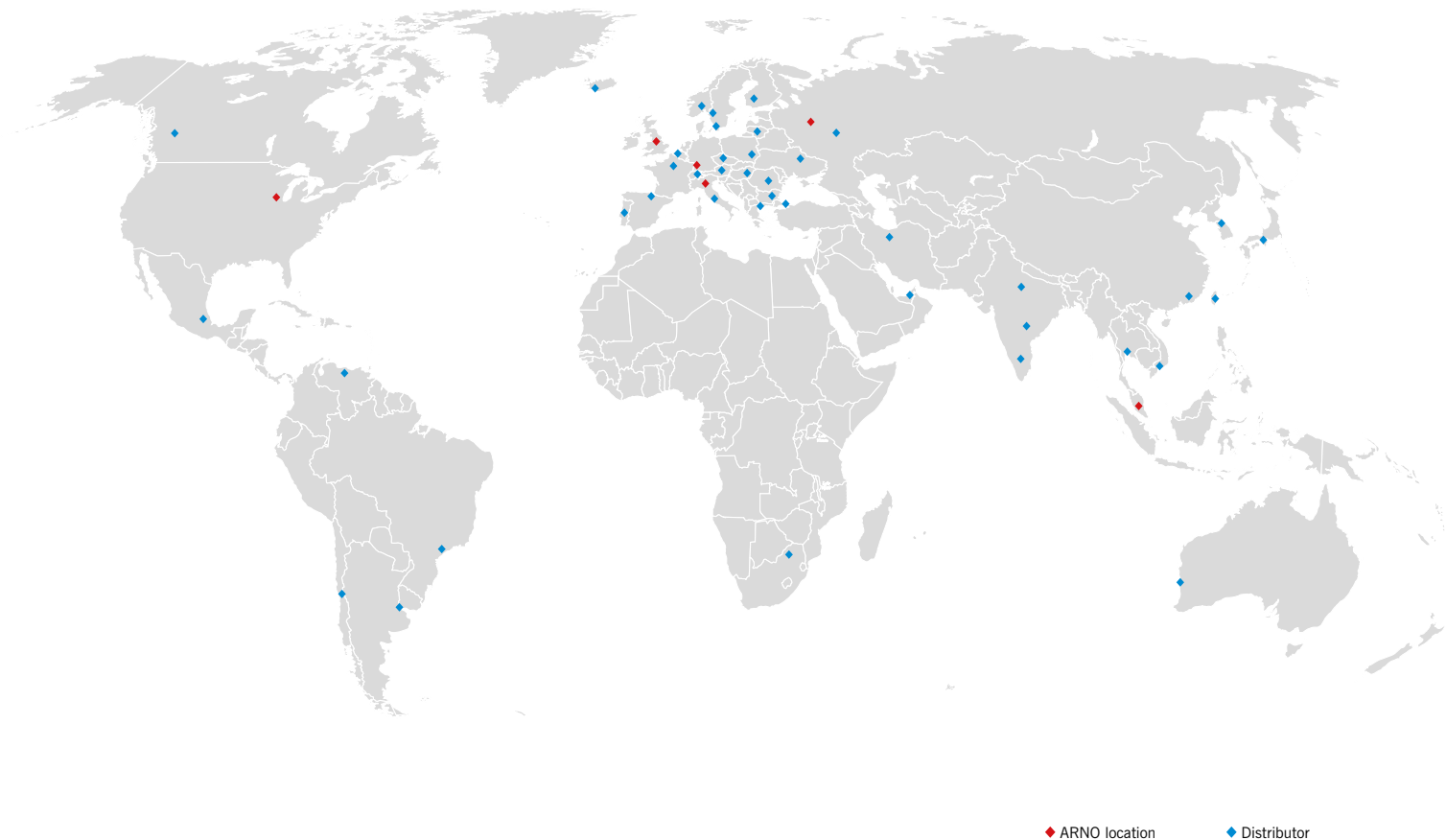
When you have a problem with an application our application engineers will be available to advise you on technical issues.

### Ordering hotline

Wherever you may be in the world you will be able to contact an ARNO representative. Take advantage of our competence, we look forward to being of service.

## Globally available – Service where you need it.

ARNO®-Werkzeuge is represented worldwide. It is important to us that we can service you where you need it. Our distributors and sister companies are always local and easy to contact.



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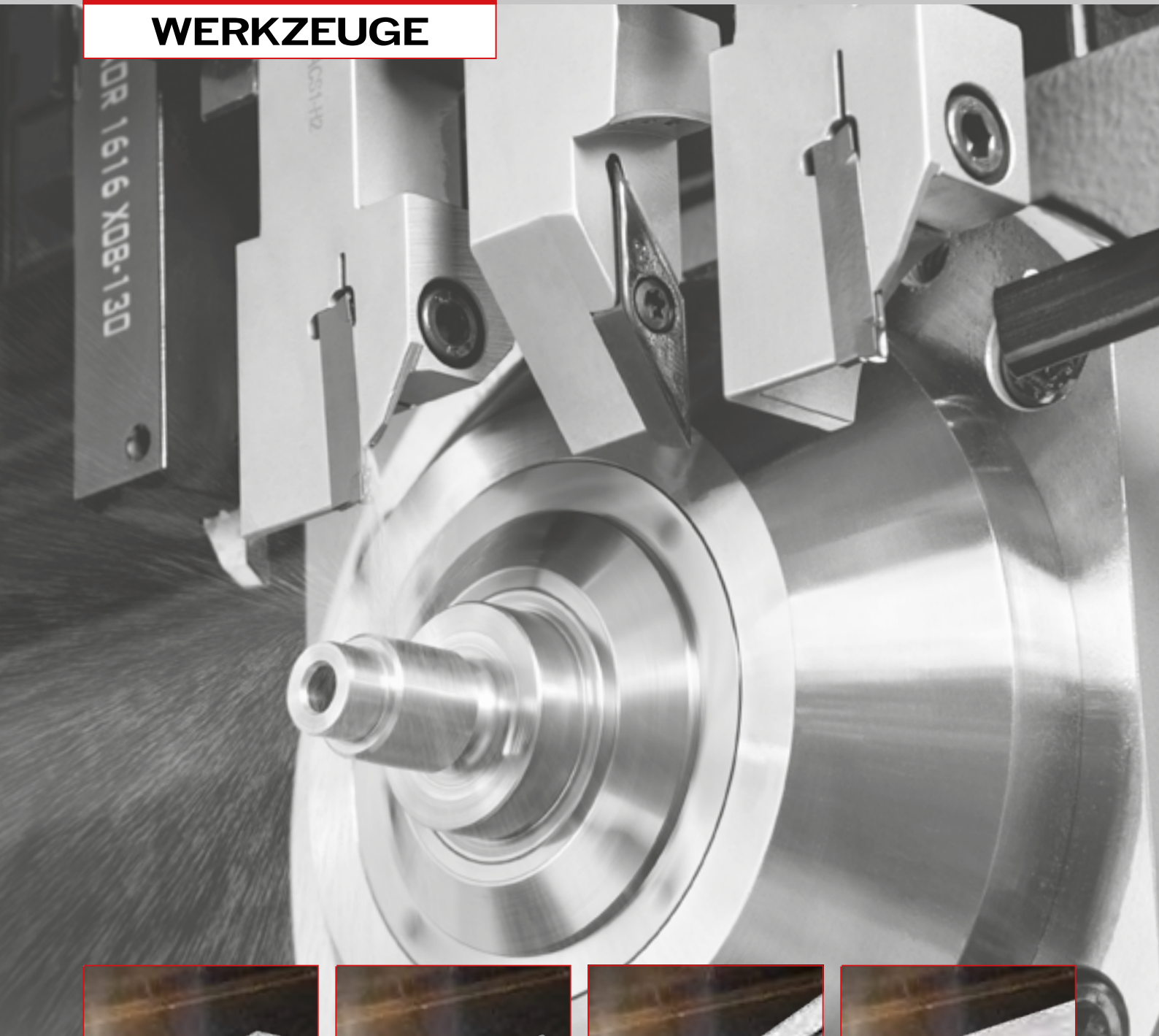
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# ARNO®

## WERKZEUGE



Page 31

### SA-Grooving system

Solutions for part-off and grooving with a number of different tooling designs.



Page 65

### SE-Grooving system

Monoblockholder for grooving, part-off and copy turning.



Page 87

### ARNO®-Mini-System

AMS is a modular boring system starting at Dmin 0,7 mm with a maximum reach of 50 mm.



Page 135

### Turning

Tool holder and ISO-inserts for swiss type machining.



## ARNO-Werkzeuge for sliding head auto lathes

### Accurate – versatile – efficient

Originating from the watchmaking industry sliding head auto turning is ideal for producing relatively long and slim components from bar material. Today components from sectors such as automotive, electronics, jewellery and medical are widely produced using this way of machining.

These ARNO tools are ideal for manufacturing small, thin-walled and accurate parts. The sharp and precision ground inserts with small nose radii, high cutting efficiency and excellent tool life ensure outstanding productivity, making sliding head auto lathes ideal for mass production.

**Have a look at the Arno sliding head auto tooling.**



Page 245

### DECO-Cut

Dedicated boring bars and turning holders for auto lathe turning.



Page 279

### Shark-Cut

The multi-function tools Shark-Cut can be used for drilling, turning and boring.



**1962**

Karl-Heinz Arnold fonda il primo aprile la Karl-Heinz Arnold Werkzeuge. Obiettivo: commercio di utensili in metallo duro.

**1965**

La Emil Arnold diventa Emil Arnols KG. Obiettivo: produzione di utensili speciali e dispositivi per macchine speciali oltre che la produzione in serie di utensili di serraggio.

**1979**

La Emil Arnold dopo uno sviluppo durato un anno mette sul mercato il nuovo sistema di copiatura mini con un nuovo sistema di bloccaggio brevettato.

**1941**

Emil Arnold, responsabile alla Bosch si rende indipendente e fonda la Emil Arnold ad Esslingen in via Franziskaner 7.

**1966**

Trasferimento di entrambe le aziende nella zona industriale di Ostfildern vicino a Stoccarda.

**1967**

Inizio della vendita di inserti in metallo duro per Fresatura e fresatura.

**1981**

Ulteriore sviluppo di propri utensili sul mercato per es. il sistema di scanalatura NC.

**1989**

Sviluppo della tecnica di affilatura.

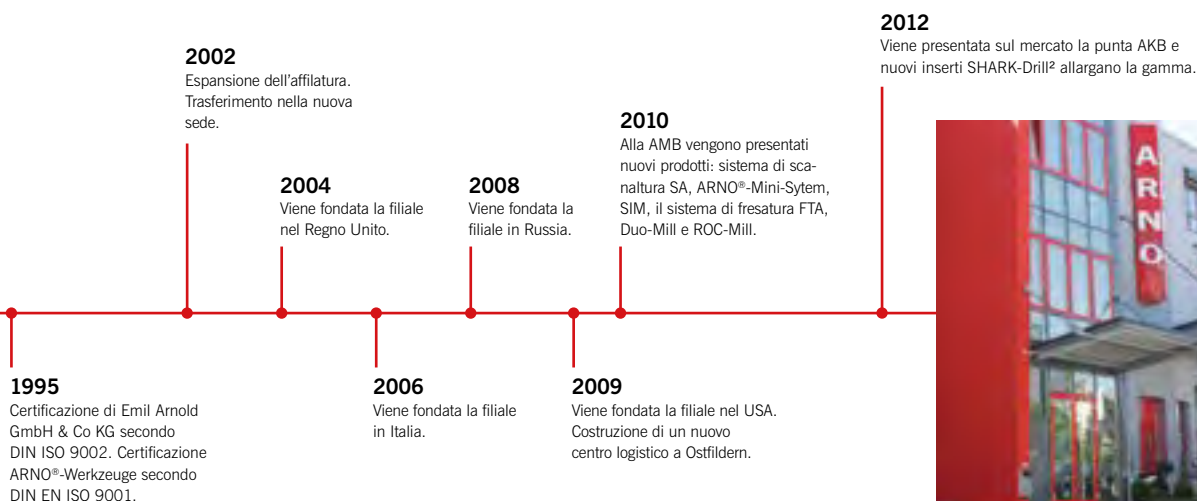
## Tradizione e precisione.

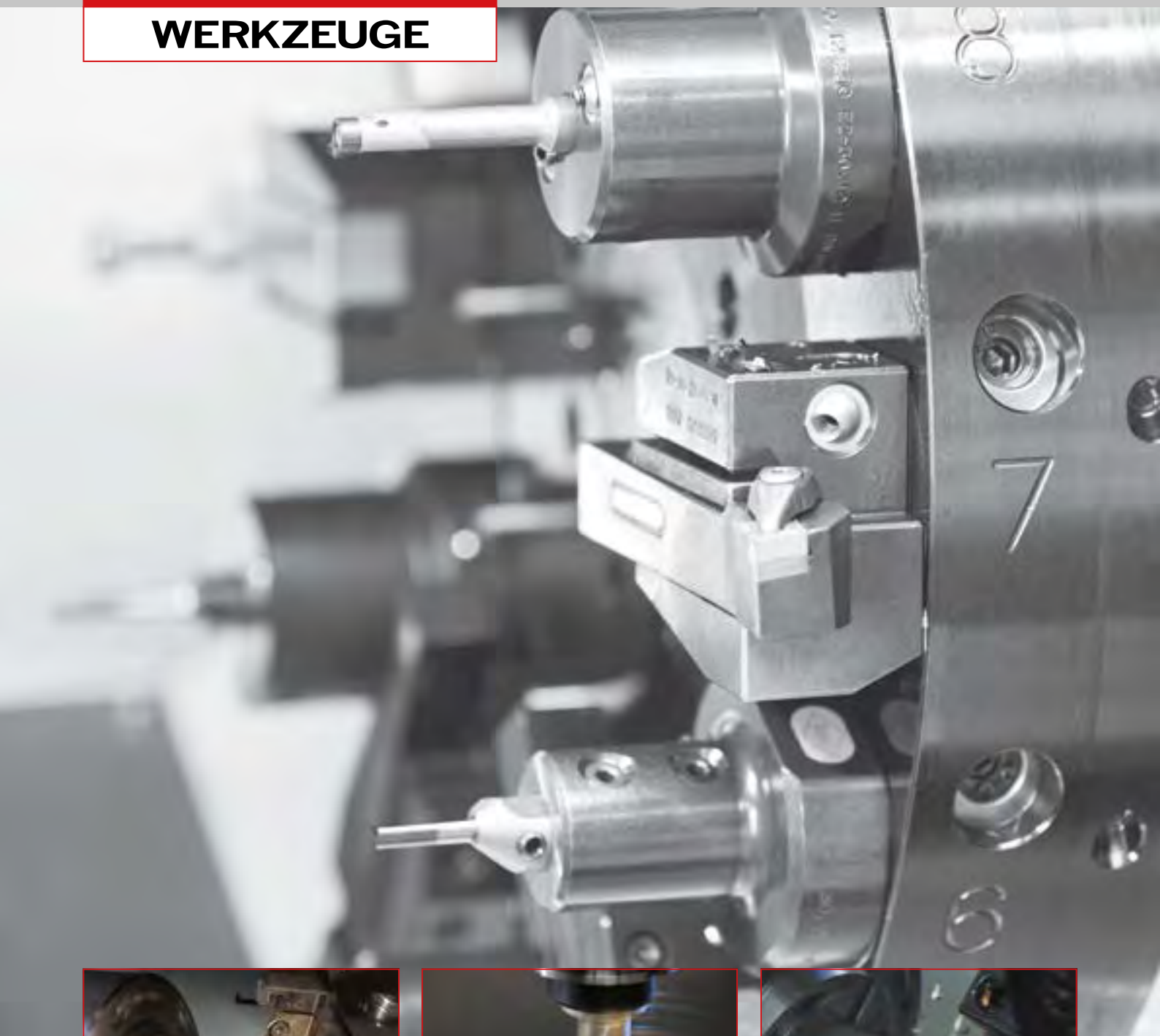
### “Da un’impresa familiare a impresa a livello mondiale.”

**1941 Emil Arnold fonda l'azienda ad Esslingen am Neckar.** La produzione iniziale è dedicata alla costruzione di strumenti di misura e controllo. L'azienda è riconosciuta per la qualità dei propri prodotti e per la soddisfazione presso i propri clienti.

**Insieme al figlio Karl-Heinz Arnold alla continua ricerca di innovazioni e sviluppi.** Ha l'obiettivo di vendere i suoi utensili in tutti i Paesi e in tutti i rami dell'industria. Nel 1962 suo figlio fonda la Karl-Heinz Arnold GmbH che successivamente col nome di ARNO®-Werkzeuge si dedicherà al commercio di gli utensili in metallo duro.

**1987 Klaus-Michael Arnold inizia la sua esperienza in azienda e nel 1992 ne acquisisce la proprietà.** Insieme a Josef Storf, nominato amministratore nel 2002, si pone nuovi obiettivi e definisce le basi per lo sviluppo di nuovi prodotti. Nel 2004 viene aperta la prima filiale in Inghilterra. Subito dopo seguono Italia, Stati Uniti e Russia. La distribuzione dei prodotti viene oggi garantita in tutto il mondo grazie ad una capillare distribuzione e ad un efficiente servizio.





### Scanalatura

Con ARNO®-Werkzeuge troverete il giusto utensile per ogni tipo di scanalatura: radiale, assiale, interna.



### Foratura

Nella nostra gamma prodotti troverete punte in HSS, Metallo duro, ad inserti e a cuspidi per diametri da 1 mm a 114 mm.



### Tornitura

ARNO®-Werkzeuge offre utensili affidabili con diversi inserti per le migliori prestazioni di lavorazione interna od esterna.

## Forza grazie all'esperienza, competenza e sviluppo.

**“Per il futuro avete bisogno di un partner con un futuro.”**

Grazie all'intensiva collaborazione dentro e fuori dall'azienda siamo in grado di esaudire ogni richiesta del cliente. Per questo siamo alla ricerca continua di prodotti da sviluppare da aggiungere alla nostra ampia gamma prodotti.

Nuovi materiali e nuove condizioni di lavorazione ci spingono a sviluppare nuovi prodotti da lanciare sul mercato come utensili modulari che possono essere adattati alle singole esigenze. La nostra gamma di prodotti spazia dalla foratura, alla scanalatura e fresatura, tornitura ad inserti, oltre a sistemi di bloccaggio e distributori automatici di utensili.

Oltre ai prodotti di qualità offriamo anche competenza e consulenza. Il nostro team esaudirà le vostre richieste e vi guiderà nella scelta.



### Fresatura

Fresatura piana, circolare, sgrossatura anche per queste applicazioni abbiamo l'utensile giusto.



### Distributori di utensili

Lo StoreManager garantisce sicurezza e flessibilità.



### Bloccaggio utensili

Morse NC semplici o doppie per un bloccaggio ottimale del pezzo.



## Servizio di qualità.

### Soluzioni speciali individuali

Con la nostra vasta gamma di prodotti siamo attrezzati per ogni richiesta. Avete bisogno di un utensile particolare per una lavorazione particolare? Rivolgetevi a noi e vi forniremo un prodotto studiato su misura per voi. Risultati perfetti senza limiti!

### Consegna in 24 ore

Avete fretta? Nessun problema, poiché se riceviamo i vostri ordini entro le 15:30 garantiamo la consegna il giorno successivo. Le situazioni di disponibilità dei prodotti standard sono visibili da tutti i nostri clienti tramite un innovativo accesso WEB.

### Tutto sotto lo stesso tetto

L'elevata qualità dei nostri prodotti è garantita dal fatto che la progettazione, la produzione e la distribuzione avvengono in un unico posto. Ciò permette tempistiche veloci, miglior controllo prezzo favorevole.

### Un grande team

Non vi lasciamo soli. Il nostro team vi visiterà regolarmente e vi supporterà nella scelta del prodotto più adatto a voi.

### I nostri tecnici

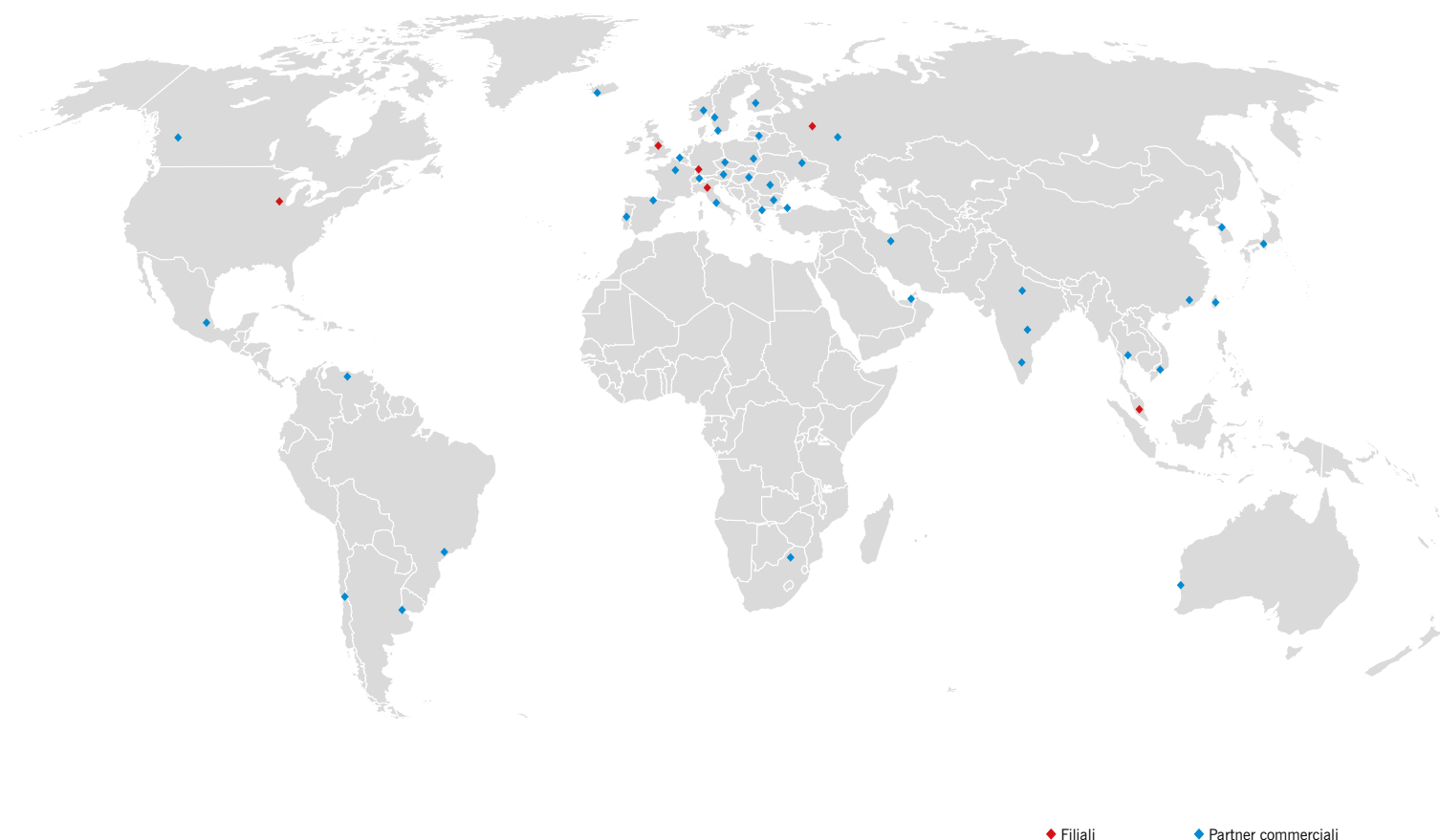
Avete una domanda o problemi di lavorazione? I nostri tecnici vi visiteranno e risponderanno ad ogni vostro quesito.

### Ordini Hot Line

Avete la possibilità di raggiungere un collaboratore ARNO in tutto il mondo. Approfittate del nostro help desk telefonico. Tecnici professionali sono a vostra completa disposizione.

## Utilizzati nel mondo, assistenza sul posto.

Potete trovare gli utensili ARNO in tutto il mondo. Per noi è importante offrire un servizio localizzato e grazie alle filiali e i vari partner commerciali siamo in grado di raggiungervi in tutto il mondo.



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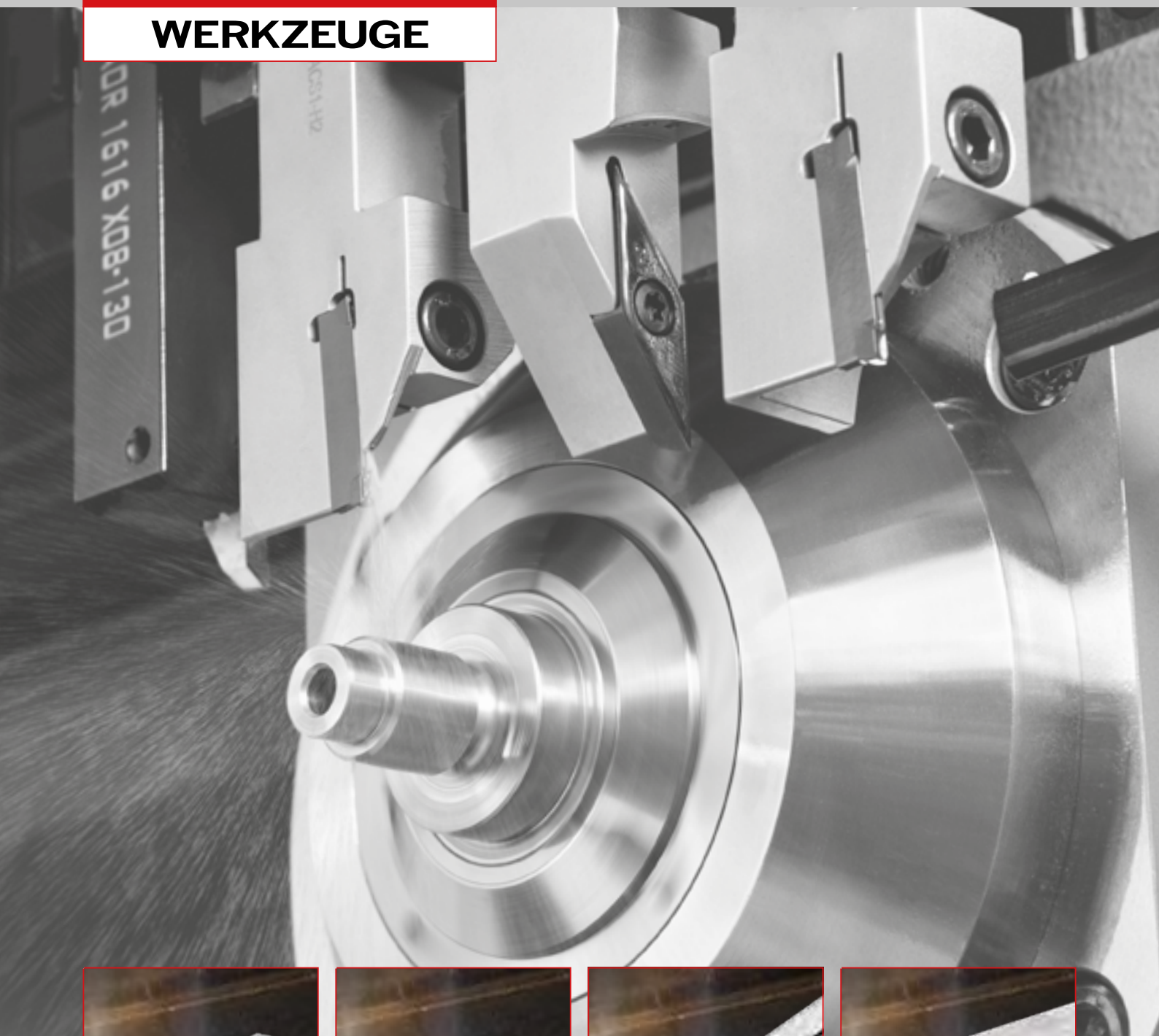
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Pagina 31

### SA-Sistema di troncatura

Soluzioni di troncatura in diverse combinazioni.



Pagina 65

### SE-Sistema di troncatura

Steli monoblocco per scanalatura, troncatura e scanalatura di copiatura.



Pagina 87

### ARNO<sup>®</sup>-Mini-Sistema

AMS è un sistema modulare per una lavorazione flessibile da diametri di 0,7 mm o con profondità del foro massima fino a 50 mm.



Pagina 135

### Tornitura

Steli ed inserti per torni a fantina mobile.

## Utensili ARNO per la tornitura a fantina mobile

### Preciso – versatile – economico

La tornitura di minuteria con macchine a fantina mobile ha le sue origini nel settore dell'orologeria per produrre da barra particolari lunghi e sottili. Oggi viene utilizzata anche nel campo dell'elettronica, della meccanica generica, nel settore medicale ed in quello automobilistico.

Gli utensili ARNO sono specifici per realizzare piccoli particolari, sottili e con tolleranze molto accurate per la produzione massiva di pezzi torniti (da circa 2,5xD). Gli inserti rettificati di precisione con preparazione del tagliente e con ridotti raggi di punta garantiscono elevate prestazioni di lavorazione, maggior vita inserti e tempi di cambio utensile molto brevi per una produzione efficace ed economica. Questo è il principio di una produzione con torni a fantina mobile, razionale ed economica.

**Ecco una panoramica degli utensili per fantina mobile ARNO.**



Pagina 245

### DECO-Cut

Bareni ed utensili specifici per lavorazioni su macchine automatiche o a fantina mobile.



Pagina 279

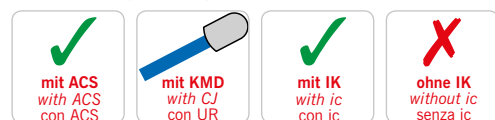
### Shark-Cut

Gli utensili multifunzione possono essere utilizzati in foratura, barenatura e anche in tornitura.

# Symbol-Navigator

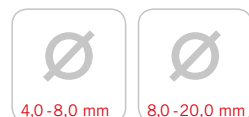
Symbol navigator  
Descrizione simboli

## Innenkühlung / Through tool coolant / Adduzione interna del refrigerante



mit Kühlmitteldüse  
with coolant jet  
con ugello refrigerante

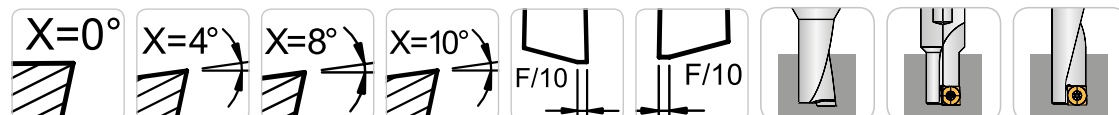
## Ø-Bereich / Diameter range / Gamma Diametri



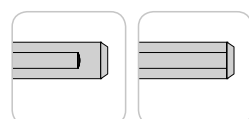
## Bereich / Zone / Zona



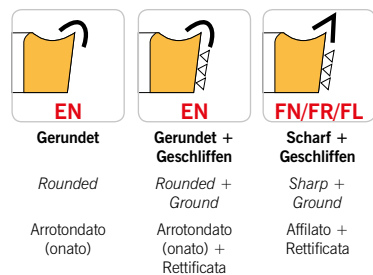
## Anwendung / Application / Applicazione



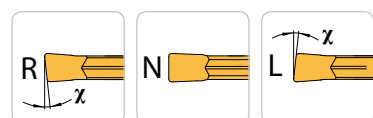
## Schaftform / Shank / Gambo



## Schneidkantenrichtung / Cutting edge condition / Preparazione tagliente



## Ausführung / Version / Versione



## Sonstige / Other / Altro





**SA-Steichsystem****SA-Grooving system****SA-Sistema di troncatura****Ein- und Absteichsystem****Grooving and parting system****Sistema di troncatura e scanalatura**

|                                  |                                      |                                      |                |
|----------------------------------|--------------------------------------|--------------------------------------|----------------|
| • <b>Systemvorstellung</b>       | • <i>Introduction</i>                | • <b>Caratteristiche del sistema</b> | <b>32 – 34</b> |
| • <b>Monoblockhalter</b>         | • <i>Monoblock holders</i>           | • <b>Utensili monoblocco</b>         |                |
| – <b>Bezeichnungssystem</b>      | – <i>Designation system</i>          | – <b>Sistema di identificazione</b>  | <b>35</b>      |
| – <b>Werkzeugauswahl</b>         | – <i>Tool shank options</i>          | – <b>Tipologie di corpo utensile</b> | <b>36</b>      |
| – <b>Monoblockhalter</b>         | – <i>Monoblock holders</i>           | – <b>Utensili monoblocco</b>         | <b>37 – 48</b> |
| • <b>Schneideinsätze</b>         | • <i>Inserts</i>                     | • <b>Inserti</b>                     |                |
| – <b>Geometrie</b>               | – <i>Geometry</i>                    | – <b>Geometria</b>                   | <b>50</b>      |
| – <b>Sortenbeschreibung</b>      | – <i>Grade description</i>           | – <b>Descrizione delle Qualità</b>   | <b>51</b>      |
| – <b>Schneideinsätze</b>         | – <i>Inserts</i>                     | – <b>Inserti</b>                     | <b>52 – 56</b> |
| • <b>Ersatzteile und Zubehör</b> | • <i>Spare parts and accessories</i> | • <b>Ricambi e accessori</b>         | <b>57</b>      |
| • <b>Schnittwerte</b>            | • <i>Cutting data</i>                | • <b>Parametri di taglio</b>         | <b>58 – 60</b> |
| • <b>Anwendungshinweise</b>      | • <i>Application reference</i>       | • <b>Suggerimenti tecnici</b>        | <b>61 – 64</b> |



### Lösungen für das Einstechen und Abstechen bis Ø 65 mm vereint in verschiedenen Werkzeugausführungen

*Solutions for part-off and grooving up-to 65 mm diameter, with a number of different tooling designs*

Soluzioni di troncatura e scanalatura fino a Ø 65 mm in diverse combinazioni di utensili

#### **Monoblockhalter** **8 × 8 bis 20 × 20 mm**

*Monoblock holders*  
*8 × 8 to 20 × 20 mm*

Utensili monoblocco  
da 8 × 8 a 20 × 20 mm



## Systemvorstellung

### Monoblockhalter

- Schäfte von 8 x 8 bis 20 x 20 mm
- Stechbreiten 1,5 bis 3,0 mm

## Fakten

- Monoblockausführung
  - Anwendungssicher, einfaches Handling – nur ein Ersatzteil
- Aktive Schneidplattenklemmung mit Fixanschlag
  - Genaue Schneidenpositionierung. Kein Herausziehen des Schneideinsatzes möglich
- Zweiseidige Schneideinsätze
  - Hohe Wirtschaftlichkeit
- Direkt gepresste Schneideinsätze mit speziellen Geometrien
  - Kostengünstige und optimale Lösung für sichere Stechprozesse

## Introduction

### Monoblock holders

- Shank sizes from 8 x 8 to 20 x 20 mm
- Groove widths from 1.5 to 3.0 mm

## Features

- Monoblock design
  - Reliable and user friendly – only one spare part
- Active insert clamping with fixed stop
  - Accurate insert positioning. Pulling out the insert is not possible
- Double edged inserts
  - High productivity
- Directly pressed inserts with dedicated geometries
  - Cost efficient and optimum solution for reliable groove production

## Descrizione

### Utensili monoblocco

- Steli da 8 x 8 fino a 20 x 20 mm
- Larghezza di taglio da 1,5 a 3,0 mm

## Caratteristiche

- Monoblocco
  - Sicuro e di semplice utilizzo – senza ricambi
- Bloccaggio assiale con fermo
  - Posizionamento preciso e sicuro dell' inserto impossibile lo spostamento in sede
- Bi-tagliente
  - Economico
- Inserti con geometrie specifiche
  - Forme specifiche per materiali e per una lavorazione affidabile

## ARNO-ACS cooling system®/ARNO-ACS cooling system®/ARNO-ACS cooling system®

Die neuen SA-Halter verfügen über eine patentierte, neue Technik der Kühlmittelzufuhr. Dabei erfolgt die Kühlung durch den Plattensitz und trifft direkt auf die Schnittzone. Der Kühlungsstrahl verursacht so eine Unterspülung des Spanes.

The new SA-holders introduce a patented new system for coolant. The coolant flows through the blade to the insert seating and therefore goes straight to the cutting area. From the coolant hole the pressure flows under the swarf and thereby offering the best machining conditions.

L'innovativo sistema di troncatura brevettato ARNO-ACS cooling system® permette al refrigerante di raggiungere il punto di taglio direttamente lungo la superficie dell'inserto oppure anche dalla parte inferiore alla zona di taglio raggiungendo il punto di massimo sviluppo di calore.

### Vorteile der Unterspülung:

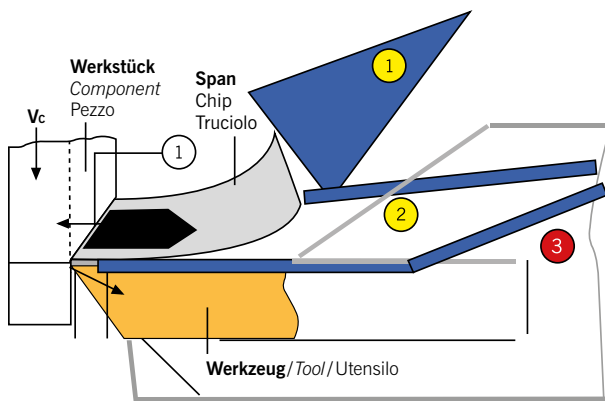
- Geführter Kühlmittelstrahl
- Sehr gute Kühl- und Spülwirkung
- Reduzierung von Aufbauschneidenbildung
- Kontrollierter Spanbruch
- Bessere Oberflächenqualität
- Höhere  $V_c$  und Vorschübe möglich
- Erhöhung der Produktivität

### Key benefits of blasting up the swarf:

- Controlled coolant stream
- Best cooling and drilling fluid circulation
- Reduced building-up edge and cutting edge breakages
- Controlled chip breaking
- Better surface quality
- Higher  $V_c$  and feed rates possible
- Higher productivity

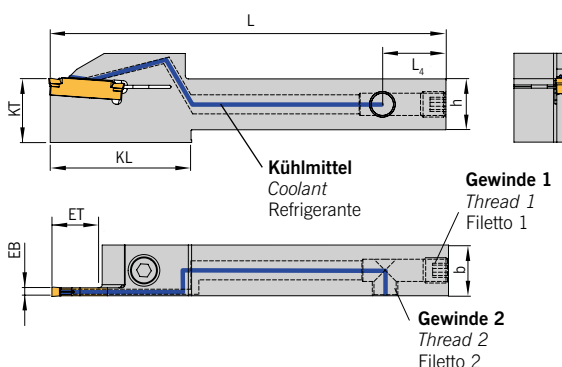
### Vantaggi del sistema:

- Liquido di raffreddamento a getto direzionato
- Ottimo raffreddamento del punto di taglio
- Riduzione del tagliante di riporto
- Miglior rottura del truciolo
- Migliore qualità superficiale
- Maggiore velocità di avanzamento e di taglio
- Aumento della produttività

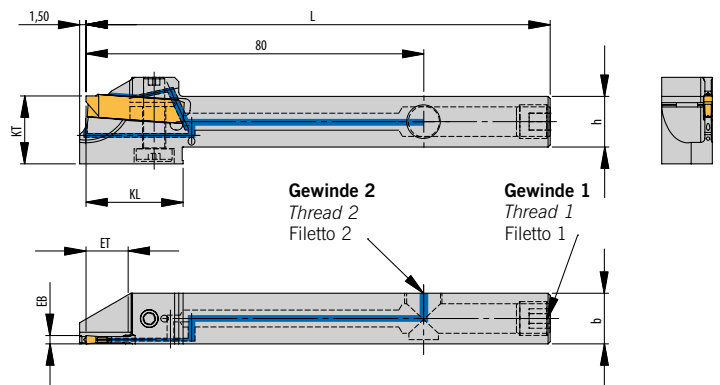


1. „Externe Kühlung“ über Spritzdüse/External coolant from coolant jet/Refrigerazione “estesa” dei sistemi tradizionali (su truciolo)
2. „Interne Kühlung“ über Halter oder Spannpratze/Through tool coolant/Refrigerazione direzionata tramite adduzioni interne classiche (su truciolo)
3. Neue „ACS-Kühlung“ direkt durch den Plattensitz/New ACS-coolant through the insert seat/Nuovo ACS cooling system direttamente sul filo tagliente

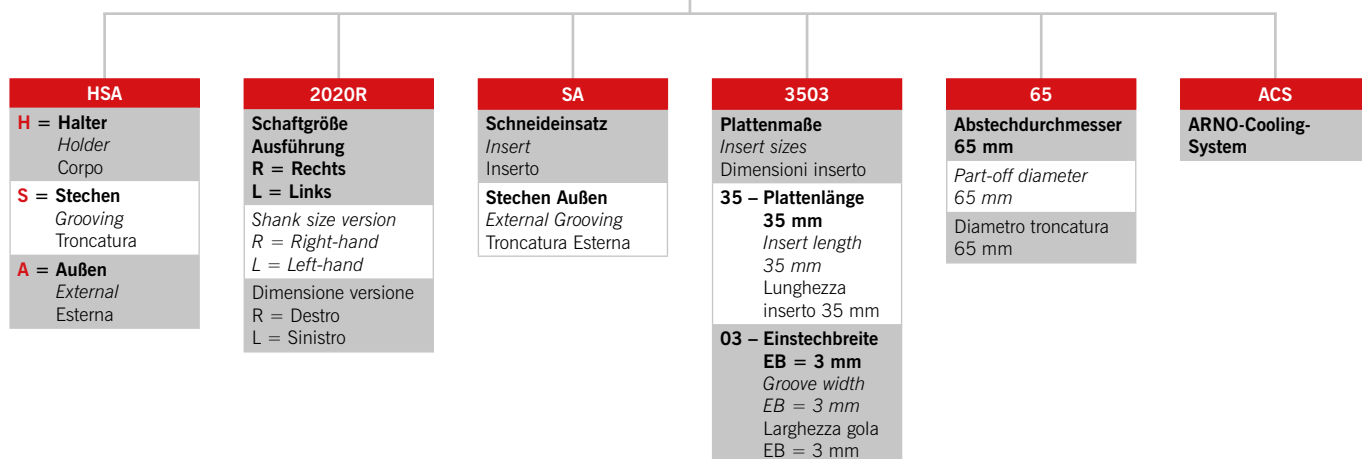
### - ACS1



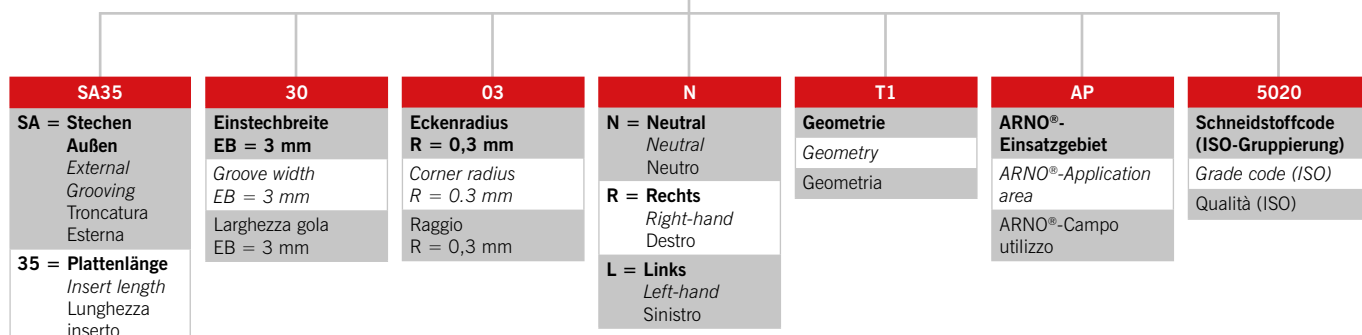
### - ACS2



## Monoblockhalter / Monoblock holders / Utensili monoblocco



## Schneideinsätze / Inserts / Inserti





1



## Monoblockhalter / Monoblock holders / Utensili monoblocco

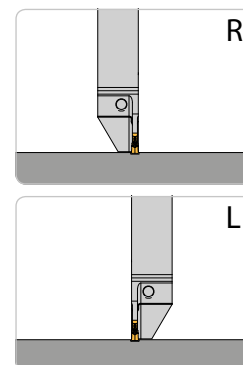
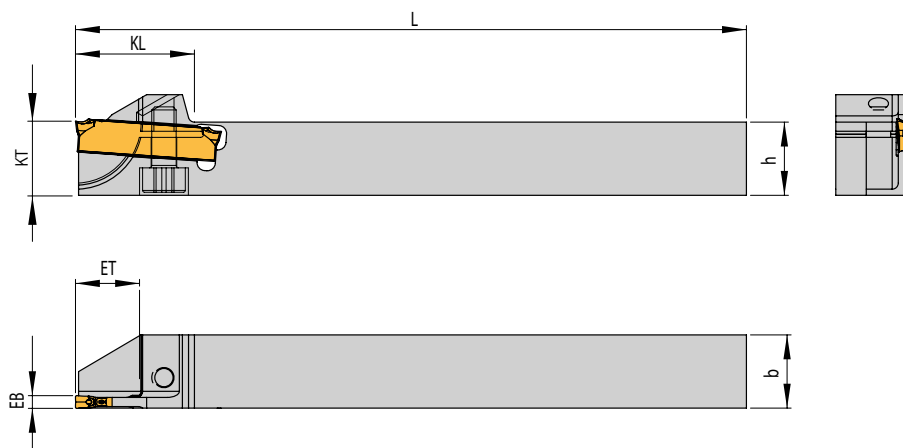
Seite / Page / Pagina **37 – 48**



## Schneideinsätze / Inserts / Inserti

Seite / Page / Pagina **52 – 56**

## HSA-U



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Für Langdrehautomaten (mit Klemmung von unten) – Für einfaches Handling

For sliding head auto lathes (with clamping from below) – For easier handling

Per fantina mobile (con bloccaggio da sotto) – Per un facile utilizzo

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | KL   | KT | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|------|----|-------|-------------------------------------|
| HSA 1212U-L-SA16015-20                 | 1,5 | 10   | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA16-15...                          |
| HSA 1212U-R-SA16015-20                 | 1,5 | 10   | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA16-15...                          |
| HSA 1212U-L-SA24015-20                 | 1,5 | 10,0 | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-15...                         |
| HSA 1212U-R-SA24015-20                 | 1,5 | 10,0 | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-15...                         |
| HSA 1212U-R-SA2402-06                  | 2,0 | 3,0  | 6                | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-20...                         |
| HSA 1212U-L-SA2402-12                  | 2,0 | 6,0  | 12               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-20...                         |
| HSA 1212U-R-SA2402-12                  | 2,0 | 6,0  | 12               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-20...                         |
| HSA 1212U-L-SA2402-20                  | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-20...                         |
| HSA 1212U-R-SA2402-20                  | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | 19,5 | 12 | ●     | SA 24-20...                         |
| HSA 1616U-L-SA2402-32                  | 2,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 25,5 | 16 | ●     | SA 24-20...                         |
| HSA 1616U-R-SA2402-32                  | 2,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 25,5 | 16 | ●     | SA 24-20...                         |

D<sub>max</sub> = Maximaler Durchmesser bei Vollmaterial

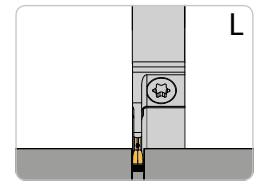
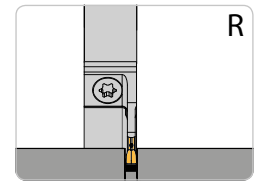
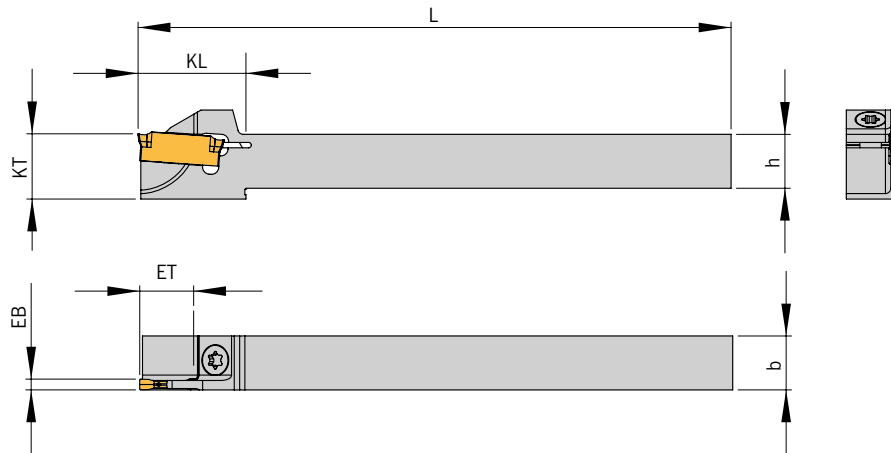
D<sub>max</sub> = Maximum diameter in solid

D<sub>max</sub> = Diametro massimo lavorazione dal pieno

## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| HSA 1212U...              | DIN912 M4x10-12.9         | KP 1111                    |
| HSA 1616U..               | DIN912 M4x14-12.9         | KP 1111                    |

## HSA



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Für Langdrehautomaten / For sliding head auto lathes / Per fantina mobile

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | KL | KT | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----|----|-------|-------------------------------------|
| HSA 0808L-SA16015-12                   | 1,5 | 6,0  | 12               | –              | 8  | 8  | 110 | 16 | 10 | ●     | SA 16-15...                         |
| HSA 0808R-SA16015-12                   | 1,5 | 6,0  | 12               | –              | 8  | 8  | 110 | 16 | 10 | ●     | SA 16-15...                         |
| HSA 0808L-SA16015-16                   | 1,5 | 8,0  | 16               | –              | 8  | 8  | 110 | 18 | 10 | ●     | SA 16-15...                         |
| HSA 0808R-SA16015-16                   | 1,5 | 8,0  | 16               | –              | 8  | 8  | 110 | 18 | 10 | ●     | SA 16-15...                         |
| HSA 0808L-SA24015-12                   | 1,5 | 6,0  | 12               | –              | 8  | 8  | 110 | 16 | 10 | ●     | SA 24-15...                         |
| HSA 0808R-SA24015-12                   | 1,5 | 6,0  | 12               | –              | 8  | 8  | 110 | 16 | 10 | ●     | SA 24-15...                         |
| HSA 0808L-SA24015-16                   | 1,5 | 8,0  | 16               | –              | 8  | 8  | 110 | 18 | 10 | ●     | SA 24-15...                         |
| HSA 0808R-SA24015-16                   | 1,5 | 8,0  | 16               | –              | 8  | 8  | 110 | 18 | 10 | ●     | SA 24-15...                         |
| HSA 1010L-SA16015-20                   | 1,5 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 16-15...                         |
| HSA 1010R-SA16015-20                   | 1,5 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 16-15...                         |
| HSA 1010L-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 16-20...                         |
| HSA 1010R-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 16-20...                         |
| HSA 1010L-SA24015-20                   | 1,5 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 24-15...                         |
| HSA 1010R-SA24015-20                   | 1,5 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 24-15...                         |
| HSA 1010L-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 24-20...                         |
| HSA 1010R-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 10 | 10 | 110 | 20 | 12 | ●     | SA 24-20...                         |
| HSA 1212L-SA16015-20                   | 1,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-15...                         |
| HSA 1212R-SA16015-20                   | 1,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-15...                         |
| HSA 1212L-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-20...                         |
| HSA 1212R-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-20...                         |
| HSA 1212L-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-30...                         |
| HSA 1212R-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 16-30...                         |
| HSA 1212L-SA24015-20                   | 1,5 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-15...                         |
| HSA 1212R-SA24015-20                   | 1,5 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-15...                         |
| HSA 1212L-SA24015-26                   | 1,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-15...                         |
| HSA 1212R-SA24015-26                   | 1,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-15...                         |
| HSA 1212L-SA24015-32                   | 1,5 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-15...                         |
| HSA 1212R-SA24015-32                   | 1,5 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-15...                         |
| HSA 1212L-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-20...                         |
| HSA 1212R-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-20...                         |
| HSA 1212L-SA2402-26                    | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-20...                         |
| HSA 1212R-SA2402-26                    | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-20...                         |
| HSA 1212L-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-20...                         |
| HSA 1212R-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-20...                         |
| HSA 1212L-SA24025-26                   | 2,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-25...                         |
| HSA 1212R-SA24025-26                   | 2,5 | 13,0 | 26               | –              | 12 | 12 | 110 | –  | –  | ●     | SA 24-25...                         |
| HSA 1212L-SA24025-32                   | 2,5 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-25...                         |
| HSA 1212R-SA24025-32                   | 2,5 | 16,0 | 32               | –              | 12 | 12 | 110 | 26 | 16 | ●     | SA 24-25...                         |

**Für Langdrehautomaten / For sliding head auto lathes / Per fantina mobile**

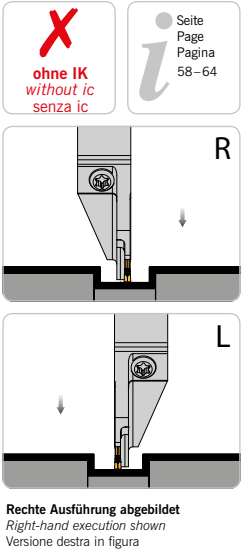
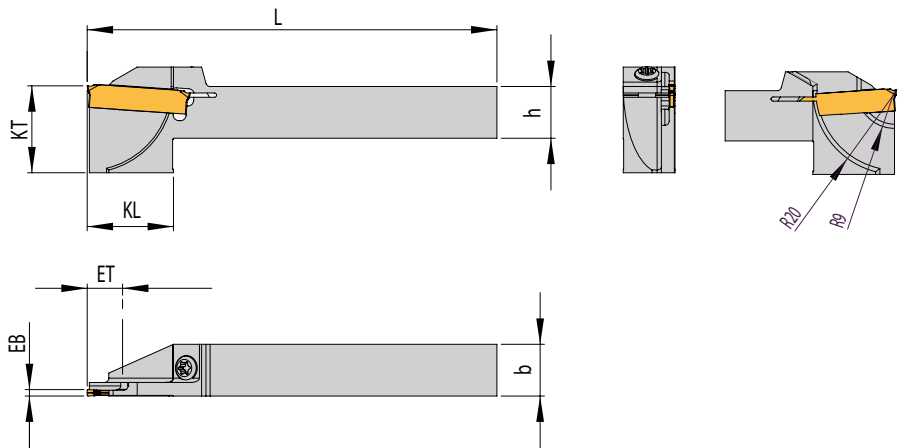
| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | KL   | KT | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|------|----|-------|-------------------------------------|
| HSA 1616L-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-20...                         |
| HSA 1616R-SA1602-20                    | 2,0 | 10,0 | 20               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-20...                         |
| HSA 1616L-SA1602-26                    | 2,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-20...                         |
| HSA 1616R-SA1602-26                    | 2,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-20...                         |
| HSA 1616L-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-30...                         |
| HSA 1616R-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 16-30...                         |
| HSA 1616L-SA24015-32                   | 1,5 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-15...                         |
| HSA 1616R-SA24015-32                   | 1,5 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-15...                         |
| HSA 1616L-SA2402-26                    | 2,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-26                    | 2,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 1616L-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 1616L-SA24025-32                   | 2,5 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-25...                         |
| HSA 1616R-SA24025-32                   | 2,5 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-25...                         |
| HSA 1616L-SA2403-20                    | 3,0 | 10,0 | 20               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-20                    | 3,0 | 10,0 | 20               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-26                    | 3,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-26                    | 3,0 | 13,0 | 26               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-32                    | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32                    | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 2020L-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 16-30...                         |
| HSA 2020R-SA1603-26                    | 3,0 | 13,0 | 26               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 16-30...                         |
| HSA 2020L-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 2020R-SA2402-20                    | 2,0 | 10,0 | 20               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 24-20...                         |
| HSA 2020L-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 20 | 20 | 110 | 25,5 | 20 | ●     | SA 24-20...                         |
| HSA 2020R-SA2402-32                    | 2,0 | 16,0 | 32               | –              | 20 | 20 | 110 | 25,5 | 20 | ●     | SA 24-20...                         |
| HSA 2020L-SA2403-32                    | 3,0 | 16,0 | 32               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32                    | 3,0 | 16,0 | 32               | –              | 20 | 20 | 110 | –    | –  | ●     | SA 24-30...                         |

D<sub>max</sub> = Maximaler Durchmesser bei Vollmaterial  
D<sub>max</sub> = Maximum diameter in solid  
D<sub>max</sub> = Diametro massimo lavorazione dal pieno

**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| HSA 0808...               | AS 0022-12                | KS 8000                    |
| HSA 1010... - HSA 2020... | AS 0022                   | KS 8000                    |

HSA



Für Traub TNL12 – Speziell auf diesen Maschinentyp angepasste Halter

For Traub TNL12 – Holder especially designed for this machine

Per Traub TNL12 – Utensile specifico per questa tipologia di macchina utensile

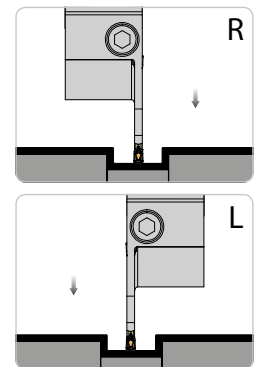
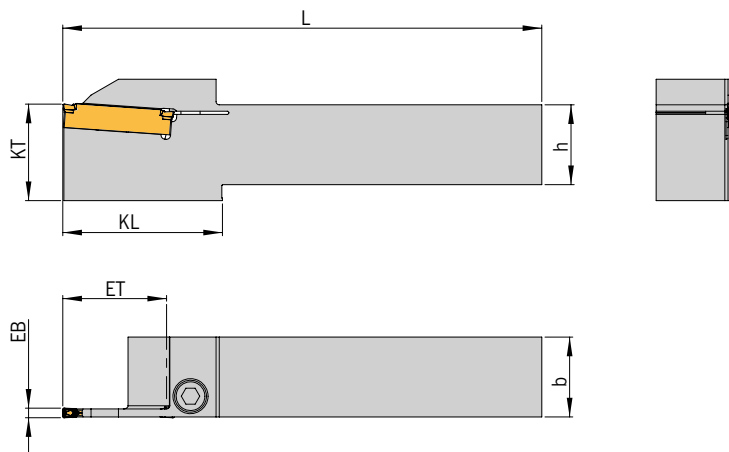
| Bezeichnung<br>Designation<br>Articolo | EB  | ET  | D <sub>max</sub> | h  | b  | L  | KL | KT | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|-----|------------------|----|----|----|----|----|-------|-------------------------------------|
| HSA 1212R-SA24015-S1-16                | 1,5 | 8,0 | 16               | 12 | 12 | 95 | 20 | 12 | ●     | SA 24-15...                         |

Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo  | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|----------------------------|---------------------------|----------------------------|
| HSA 1212... – HSA 24015... | AS 0022                   | KS 8000                    |



## HSA



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

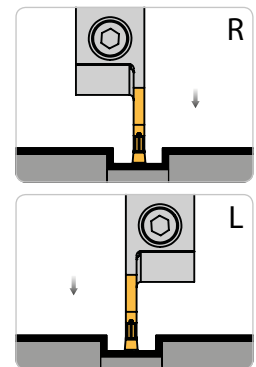
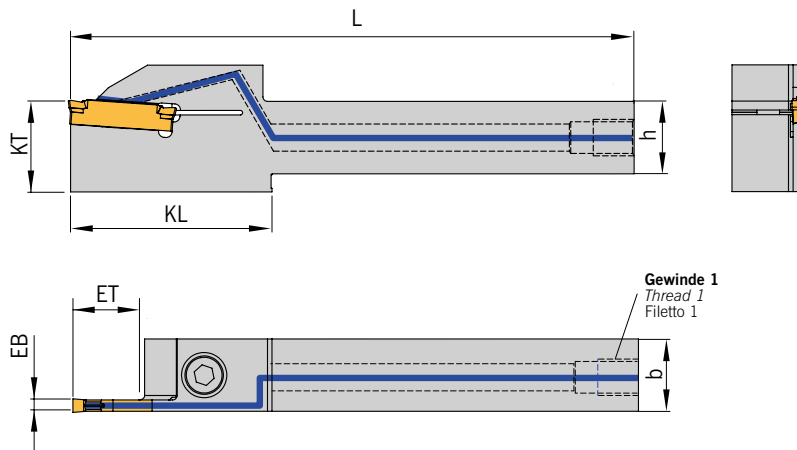
1

## Monoblockhalter / Monoblock holder / Utensile monoblocco

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | KL | KT | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----|----|-------|-------------------------------------|
| HSA 1616L-SA24015-44                   | 1,5 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-15...                         |
| HSA 1616R-SA24015-44                   | 1,5 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-15...                         |
| HSA 1616L-SA2402-44                    | 2,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-44                    | 2,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-44                    | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44                    | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 40 | 20 | ●     | SA 24-30...                         |
| HSA 2020L-SA24015-44                   | 1,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-15...                         |
| HSA 2020R-SA24015-44                   | 1,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-15...                         |
| HSA 2020L-SA2402-44                    | 2,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-20...                         |
| HSA 2020R-SA2402-44                    | 2,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-20...                         |
| HSA 2020L-SA24025-44                   | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44                   | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-44                    | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44                    | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | —  | —  | ●     | SA 24-30...                         |
| HSA 2020L-SA3502-52                    | 2,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 44 | 30 | ●     | SA 35-20...                         |
| HSA 2020R-SA3502-52                    | 2,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 44 | 30 | ●     | SA 35-20...                         |
| HSA 2020L-SA3502-65                    | 2,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 50 | 30 | ●     | SA 35-20...                         |
| HSA 2020R-SA3502-65                    | 2,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 50 | 30 | ●     | SA 35-20...                         |
| HSA 2020L-SA3503-52                    | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 44 | 30 | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52                    | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 44 | 30 | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65                    | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 50 | 30 | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65                    | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 50 | 30 | ●     | SA 35-30...                         |

## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo                     | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-----------------------------------------------|---------------------------|----------------------------|
| HSA 1616... - HSA 2020... D <sub>max</sub> 44 | DIN912 M5x16-12.9         | KP 1321                    |
| HSA 2020... D <sub>min</sub> 52/65            | DIN912 M6x20-12.9         | KP 5421                    |

**HSA-ACS1-H**


Rechte Ausführung abgebildet  
 Right-hand execution shown  
 Versione destra in figura

**Monoblockhalter mit Innenkühlung ACS1 von hinten**

Monoblock holder with through tool coolant ACS1 access from the back

Utensile monoblocco con adduzione interna ACS1 posteriore

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSA 1616L-SA2402-32-ACS1-H1            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | M8x1                               | –                                  | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32-ACS1-H1            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | M8x1                               | –                                  | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-32-ACS1-H1            | 3,0 | 16,0 | 32,0             | –              | 16 | 16 | 125 | –              | 38 | 20 | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32-ACS1-H1            | 3,0 | 16,0 | 32,0             | –              | 16 | 16 | 125 | –              | 38 | 20 | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-44-ACS1-H1            | 3,0 | 22,0 | 44,0             | 61             | 16 | 16 | 125 | –              | 45 | 20 | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44-ACS1-H1            | 3,0 | 22,0 | 44,0             | 61             | 16 | 16 | 125 | –              | 45 | 20 | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA24025-44-ACS1-H1           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44-ACS1-H1           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-32-ACS1-H1            | 3,0 | 16,0 | 32,0             | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32-ACS1-H1            | 3,0 | 16,0 | 32,0             | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA2403-44-ACS1-H1            | 3,0 | 22,0 | 44,0             | 61             | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44-ACS1-H1            | 3,0 | 22,0 | 44,0             | 61             | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA3503-52-ACS1-H1            | 3,0 | 26,0 | 52,0             | 68             | 20 | 20 | 150 | –              | 44 | 30 | M8x1                               | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52-ACS1-H1            | 3,0 | 26,0 | 52,0             | 68             | 20 | 20 | 150 | –              | 44 | 30 | M8x1                               | –                                  | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65-ACS1-H1            | 3,0 | 32,5 | 65,0             | 80             | 20 | 20 | 150 | –              | 50 | 30 | M8x1                               | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65-ACS1-H1            | 3,0 | 32,5 | 65,0             | 80             | 20 | 20 | 150 | –              | 50 | 30 | M8x1                               | –                                  | ●     | SA 35-30...                         |
|                                        |     |      |                  |                |    |    |     |                |    |    |                                    |                                    |       |                                     |
| HSA 1616L-SA2402-32-ACS1-H2            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/8"                             | –                                  | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32-ACS1-H2            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/8"                             | –                                  | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-32-ACS1-H2            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32-ACS1-H2            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-44-ACS1-H2            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | –              | 45 | 20 | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44-ACS1-H2            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | –              | 45 | 20 | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA24025-44-ACS1-H2           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44-ACS1-H2           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-32-ACS1-H2            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32-ACS1-H2            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA2403-44-ACS1-H2            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44-ACS1-H2            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA3503-52-ACS1-H2            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | –              | 44 | 30 | G 1/8"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52-ACS1-H2            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | –              | 44 | 30 | G 1/8"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65-ACS1-H2            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | –              | 50 | 30 | G 1/8"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65-ACS1-H2            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | –              | 50 | 30 | G 1/8"                             | –                                  | ●     | SA 35-30...                         |

## Monoblockhalter mit Innenkühlung ACS1 von hinten

*Monoblock holder with through tool coolant ACS1 access from the back*
*Utensile monoblocco con adduzione interna ACS1 posteriore*

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 3<br>Filetto 4 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSA 1616L-SA2402-32-ACS1-H3            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/4"                             | –                                  | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32-ACS1-H3            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/4"                             | –                                  | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-32-ACS1-H3            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32-ACS1-H3            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 125 | –              | 38 | 20 | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-44-ACS1-H3            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | –              | 45 | 20 | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44-ACS1-H3            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | –              | 45 | 20 | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA24025-44-ACS1-H3           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44-ACS1-H3           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-32-ACS1-H3            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32-ACS1-H3            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA2403-44-ACS1-H3            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44-ACS1-H3            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SA 24-30...                         |
| HSA 2020L-SA3503-52-ACS1-H3            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | –              | 44 | 30 | G 1/4"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52-ACS1-H3            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | –              | 44 | 30 | G 1/4"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65-ACS1-H3            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | –              | 50 | 30 | G 1/4"                             | –                                  | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65-ACS1-H3            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | –              | 50 | 30 | G 1/4"                             | –                                  | ●     | SA 35-30...                         |

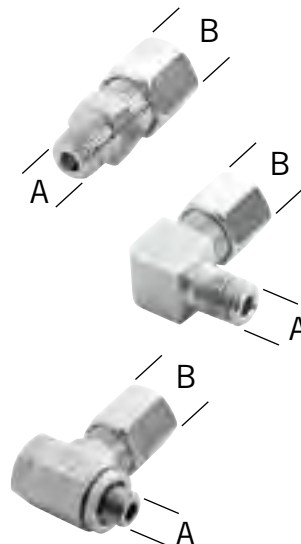
Hinweis: Zubehör muss separat bestellt werden.

Remark: Accessories must be ordered separately.

Nota: Gli accessori devono essere ordinati separatamente.

## Zubehör / Accessories / Accessori

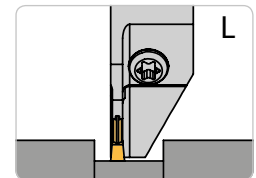
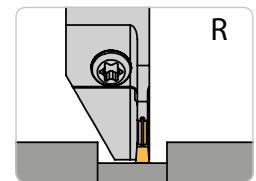
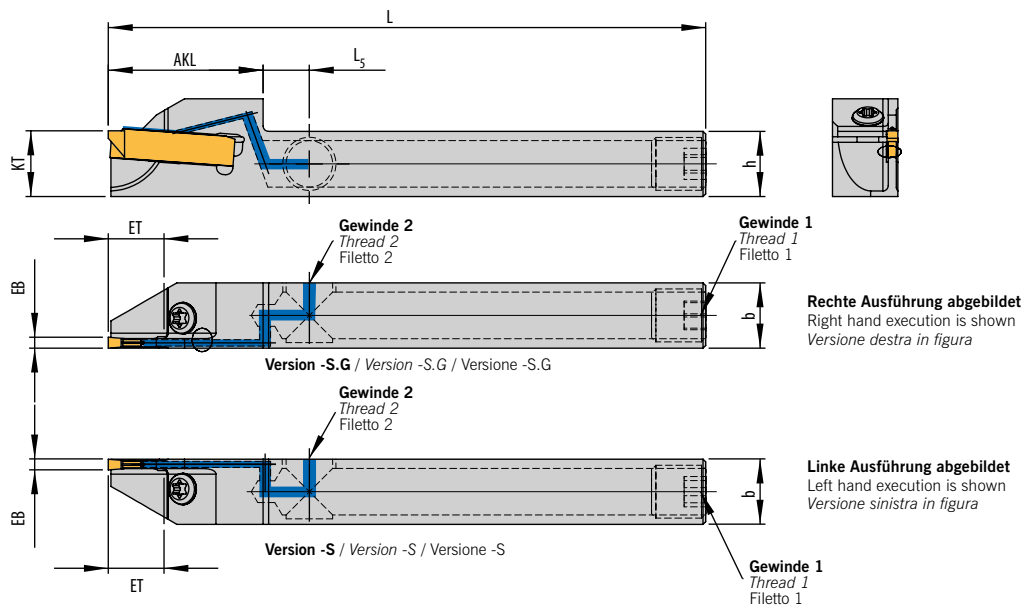
| Bezeichnung<br>Designation<br>Articolo |                                                                                                        | A    | B       |
|----------------------------------------|--------------------------------------------------------------------------------------------------------|------|---------|
| KA 001                                 | Kühlmittelanschluss – gerade<br><i>Coolant supply – straight</i><br>Raccordo – dritto                  | M8x1 | Ø 6 mm  |
| KA 002                                 |                                                                                                        | 1/8" | Ø 6 mm  |
| KA 003                                 |                                                                                                        | 1/4" | Ø 10 mm |
|                                        |                                                                                                        |      |         |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br><i>Coolant supply – angled and fixed</i><br>Raccordo – angolato | M8x1 | Ø 6 mm  |
| KA 005                                 |                                                                                                        | 1/8" | Ø 6 mm  |
|                                        |                                                                                                        |      |         |
| KA 006                                 | Schwenkverschraubung<br><i>Swivelling screw-fitting</i><br>Raccordo – orientabile                      | M8x1 | Ø 6 mm  |
| KA 007                                 |                                                                                                        | 1/8" | Ø 6 mm  |
| KA 008                                 |                                                                                                        | 1/4" | Ø 10 mm |



## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo                 | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------------|---------------------------|----------------------------|
| HSA 1616... - HSA 2020...-SA24...-ACS1... | DIN912 M5x16-12.9         | KP 1321                    |
| HSA 2020... -SA35...-52-ACS1...           | DIN912 M6x20-12.9         | KP 5421                    |
| HSA 2020... -SA35...-65-ACS1...           | DIN912 M6x20-12.9         | KP 5421                    |

## HSA-S-ACS1-S./S.G



## Monoblockhalter mit Innenkühlung ACS1 von der Seite für Langdrehautomaten

Monoblock holder with through tool coolant ACS1 access from the side for swiss type machines

Utensile monoblocco con adduzione interna ACS1 laterale per fantina mobile

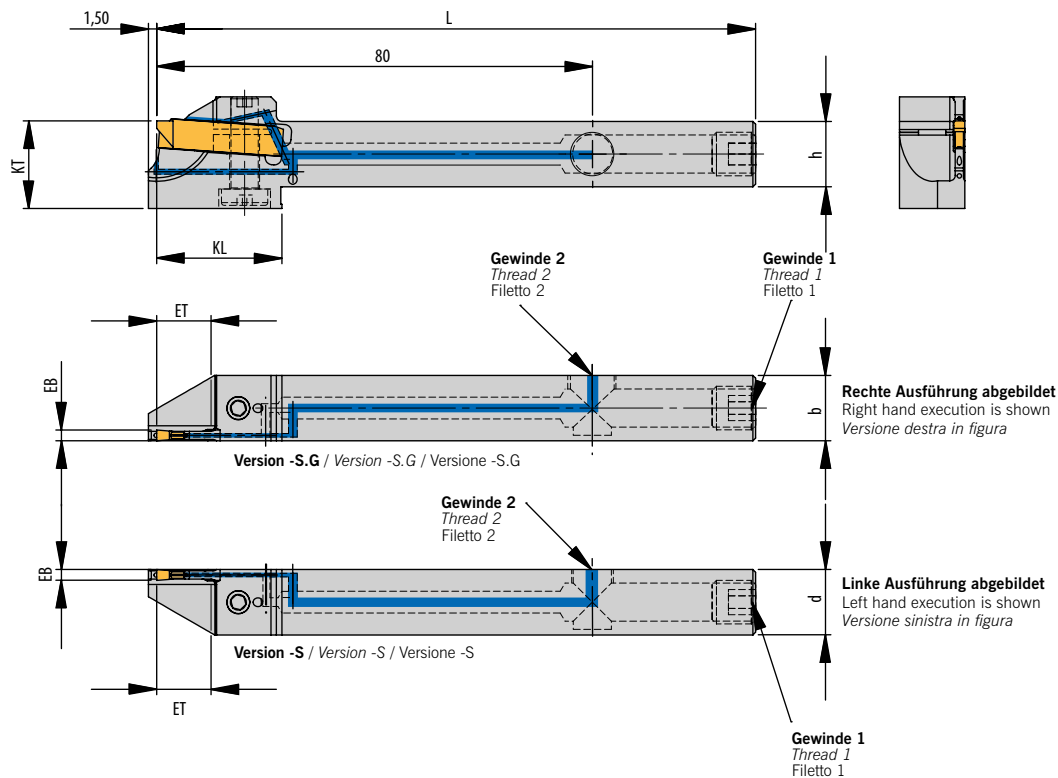
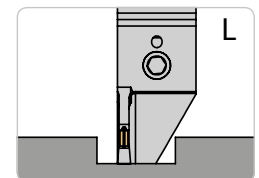
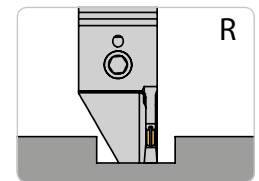
| Bezeichnung<br>Designation<br>Articolo                                                                                                                                                                                                               | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>5</sub> | AKL  | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| <b>Linke Ausführung, Kühlmittelanschluss auf der Seite der Schneide</b><br>Left hand execution, coolant access from the side of the cutting edge<br>Esecuzione sinistra, adduzione laterale da lato inserto                                          |     |      |                  |                |    |    |     |                |      |    |    |                                    |                                    |       |                                     |
| HSA 1212S-L-SA2402-20-ACS1-H2-S2                                                                                                                                                                                                                     | 2,0 | 10,0 | 20               | -              | 12 | 12 | 110 | 8,5            | 28,5 | -  | 12 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1212S-L-SA2402-26-ACS1-H2-S2                                                                                                                                                                                                                     | 2,0 | 13,0 | 26               | -              | 12 | 12 | 110 | 8,5            | 31,5 | -  | 12 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-L-SA2402-32-ACS1-H2-S2                                                                                                                                                                                                                     | 2,0 | 16,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 34,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-L-SA2402-36-ACS1-H2-S2*                                                                                                                                                                                                                    | 2,0 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-L-SA24025-32-ACS1-H2-S2                                                                                                                                                                                                                    | 2,5 | 16,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 34,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 1616S-L-SA24025-36-ACS1-H2-S2*                                                                                                                                                                                                                   | 2,5 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 1616S-L-SA2403-32-ACS1-H2-S2                                                                                                                                                                                                                     | 3,0 | 18,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 1616S-L-SA2403-36-ACS1-H2-S2*                                                                                                                                                                                                                    | 3,0 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-30...                         |
| <b>Rechte Ausführung, Kühlmittelanschluss auf der gegenüberliegenden Seite der Schneide</b><br>Right hand execution, coolant access from the opposite side of the cutting edge<br>Esecuzione destra, adduzione laterale dal lato opposto all'inserto |     |      |                  |                |    |    |     |                |      |    |    |                                    |                                    |       |                                     |
| HSA 1212S-R-SA2402-20-ACS1-H2-S2G                                                                                                                                                                                                                    | 2,0 | 10,0 | 20               | -              | 12 | 12 | 110 | 8,5            | 28,5 | -  | 12 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1212S-R-SA2402-26-ACS1-H2-S2G                                                                                                                                                                                                                    | 2,0 | 13,0 | 26               | -              | 12 | 12 | 110 | 8,5            | 31,5 | -  | 12 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-R-SA2402-32-ACS1-H2-S2G                                                                                                                                                                                                                    | 2,0 | 16,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 34,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-R-SA2402-36-ACS1-H2-S2G*                                                                                                                                                                                                                   | 2,0 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616S-R-SA24025-32-ACS1-H2-S2G                                                                                                                                                                                                                   | 2,5 | 16,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 34,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 1616S-R-SA24025-36-ACS1-H2-S2G*                                                                                                                                                                                                                  | 2,5 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 1616S-R-SA2403-32-ACS1-H2-S2G                                                                                                                                                                                                                    | 3,0 | 18,0 | 32               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 1616S-R-SA2403-36-ACS1-H2-S2G*                                                                                                                                                                                                                   | 3,0 | 18,0 | 36               | -              | 16 | 16 | 110 | 8,5            | 36,5 | -  | 16 | G 1/8"                             | G 1/8"                             | ●     | SA 24-30...                         |

\* Lieferbar ab Januar 2017 / Available from January 2017 / Disponibile da gennaio 2017

## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo               | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-----------------------------------------|---------------------------|----------------------------|
| HSA 1212S...HSA 1616S...-SA24...ACS1... | AS 0022                   | KS 8000                    |

Kühlmittelanschlüsse finden Sie auf Seite 43 / Coolant supply see page 43 / Raccordo vedere pagina 43

**HSA-UD-ACS2-S./S.G**

 Seite  
 Page  
 Pagina  
 58-64

**1**
**Monoblockhalter mit Innenkühlung ACS2 von der Seite –  
 Spannung von oben und unten**

 Monoblock holder with through tool coolant (ACS2) access from the side –  
 Locking from top and bottom

 Utensile monoblocco con adduzione interna ACS2 laterale –  
 Bloccaggio da sopra e sotto

| Bezeichnung<br>Designation<br>Articolo                                                                                                                                      | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------------------|----------------|----|----|-----|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| Kühlmittelschluss auf der Schneidenseite / Coolant access from the side of the cutting edge / Raccordo laterale su lato inserto                                             |     |      |                  |                |    |    |     |    |    |                                    |                                    |       |                                     |
| HSA 1212UD-L-SA2402-20-ACS2-S1                                                                                                                                              | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | 23 | 16 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |
| Kühlmittelschluss auf der gegenüberliegenden Seite der Schneide / Coolant access from the opposite side of the cutting edge / Raccordo laterale su lato opposto all'inserto |     |      |                  |                |    |    |     |    |    |                                    |                                    |       |                                     |
| HSA 1212UD-R-SA2402-20-ACS2-S1G                                                                                                                                             | 2,0 | 10,0 | 20               | –              | 12 | 12 | 110 | 23 | 16 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |

**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo    | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|------------------------------|---------------------------|----------------------------|
| HSA 1212UD...-SA24...ACS2... | AS 0084                   | KS 3111                    |

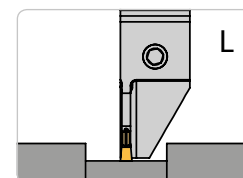
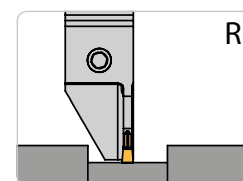
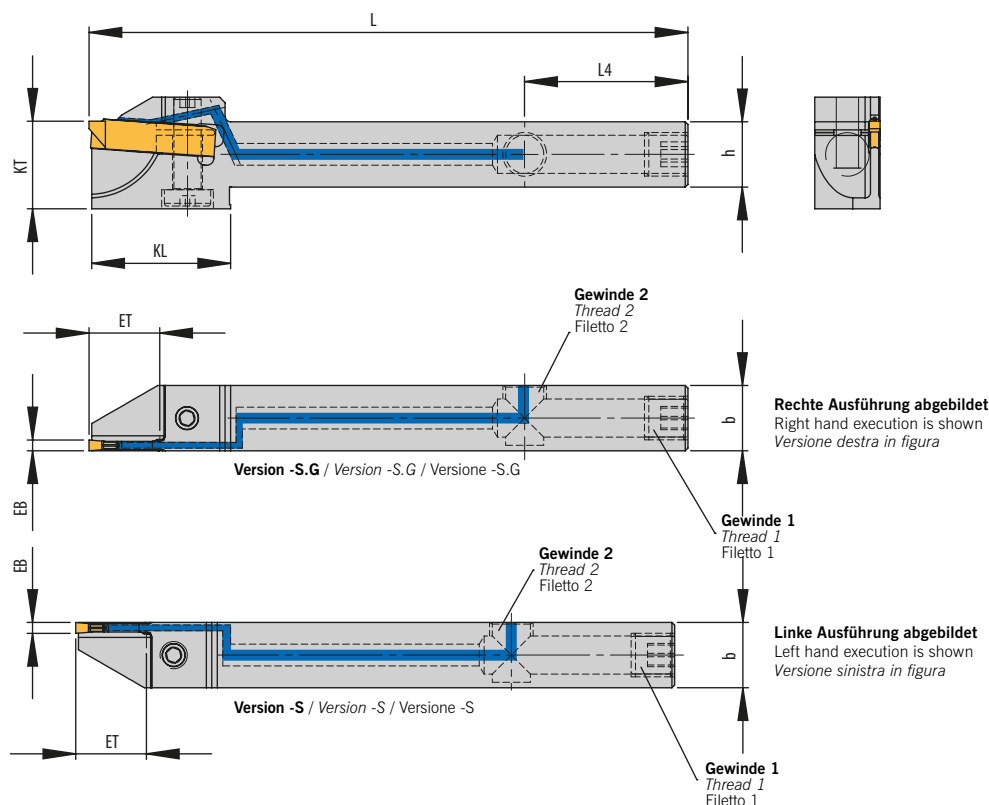
Kühlmittelschlüsse finden Sie auf Seite 43

Coolant supply see page 43

Raccordo vedere pagina 43

Alle Angaben in mm / Dimensions in mm / Tutte le dimensioni in mm

## HSA-UD-ACS1-S-/S.G



## Monoblockhalter mit Innenkühlung ACS1 von der Seite – Spannung von oben und unten

Monoblock holder with through tool coolant (ACS1) access from the side –  
Locking from top and bottom

Utensile monoblocco con adduzione interna ACS1 laterale –  
Bloccaggio da sopra e sotto

| Bezeichnung<br>Designation<br>Articolo                                                                                                                                        | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| Kühlmittelanschluss auf der Schneidenseite / Coolant access from the side of the cutting edge / Raccordo laterale su lato inserto                                             |     |      |                  |                |    |    |     |                |    |    |                                    |                                    |       |                                     |
| HSA 1212UD-L-SA2402-26-ACS1-S1                                                                                                                                                | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | 30             | 26 | 16 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |
| HSA 1212UD-L-SA2402-26-ACS1-S2                                                                                                                                                | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | 30             | 26 | 16 | M8x1                               | G1/8"                              | ●     | SA 24-20...                         |
| Kühlmittelanschluss auf der gegenüberliegenden Seite der Schneide / Coolant access from the opposite side of the cutting edge / Raccordo laterale su lato opposto all'inserto |     |      |                  |                |    |    |     |                |    |    |                                    |                                    |       |                                     |
| HSA 1212UD-R-SA2402-26-ACS1-S1G                                                                                                                                               | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | 30             | 26 | 16 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |
| HSA 1212UD-R-SA2402-26-ACS1-S2G                                                                                                                                               | 2,0 | 13,0 | 26               | –              | 12 | 12 | 110 | 30             | 26 | 16 | M8x1                               | G1/8"                              | ●     | SA 24-20...                         |

## Ersatzteile / Spare parts / Ricambi

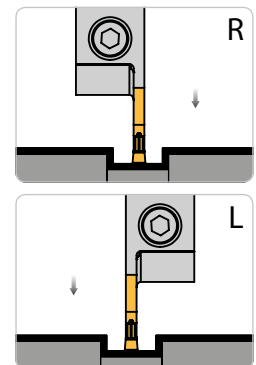
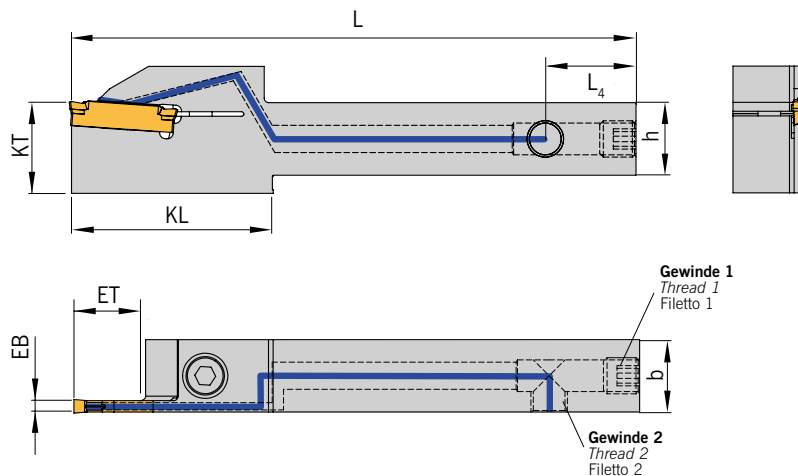
| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| HSA 1212UD...             | AS 0084                   | KP 3111                    |

Kühlmittelanschlüsse finden Sie auf Seite 43

Coolant supply see page 43

Raccordo vedere pagina 43



**HSA-ACS1-S**


Rechte Ausführung abgebildet  
 Right-hand execution shown  
 Versione destra in figura

**1**
**Monoblockhalter mit Innenkühlung ACS1 von der Seite**

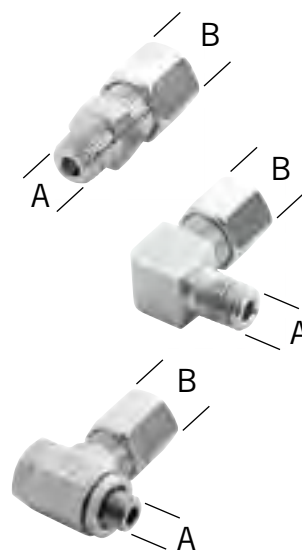
Monoblock holder with through tool coolant ACS1 access from the side

Utensile monoblocco con adduzione interna ACS1 laterale

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 37 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSA 1616L-SA2402-32-ACS1-S1            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | 20             | 38 | 20 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32-ACS1-S1            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | 20             | 38 | 20 | M8x1                               | M8x1                               | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-32-ACS1-S1            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 20             | 38 | 20 | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32-ACS1-S1            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 20             | 38 | 20 | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-44-ACS1-S1            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 20             | 45 | 20 | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44-ACS1-S1            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 20             | 45 | 20 | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 2020L-SA24025-44-ACS1-S1           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | 43 | 20 | M8x1                               | M8x1                               | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44-ACS1-S1           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | 43 | 20 | M8x1                               | M8x1                               | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-32-ACS1-S1            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32-ACS1-S1            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 2020L-SA2403-44-ACS1-S1            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44-ACS1-S1            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SA 24-30...                         |
| HSA 2020L-SA3503-52-ACS1-S1            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 20             | 44 | 30 | M8x1                               | M8x1                               | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52-ACS1-S1            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 20             | 44 | 30 | M8x1                               | M8x1                               | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65-ACS1-S1            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 20             | 50 | 30 | M8x1                               | M8x1                               | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65-ACS1-S1            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 20             | 50 | 30 | M8x1                               | M8x1                               | ●     | SA 35-30...                         |
|                                        |     |      |                  |                |    |    |     |                |    |    |                                    |                                    |       |                                     |
| HSA 1616L-SA2402-32-ACS1-S2            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | 20             | 38 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616R-SA2402-32-ACS1-S2            | 2,0 | 16,0 | 32               | –              | 16 | 16 | 125 | 20             | 38 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-20...                         |
| HSA 1616L-SA2403-32-ACS1-S2            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 20             | 38 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-32-ACS1-S2            | 3,0 | 16,0 | 32               | –              | 16 | 16 | 110 | 20             | 38 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 1616L-SA2403-44-ACS1-S2            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 20             | 45 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 1616R-SA2403-44-ACS1-S2            | 3,0 | 22,0 | 44               | 61             | 16 | 16 | 125 | 20             | 45 | 20 | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 2020L-SA24025-44-ACS1-S2           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 2020R-SA24025-44-ACS1-S2           | 2,5 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-25...                         |
| HSA 2020L-SA2403-32-ACS1-S2            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-32-ACS1-S2            | 3,0 | 16,0 | 32               | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 2020L-SA2403-44-ACS1-S2            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 2020R-SA2403-44-ACS1-S2            | 3,0 | 22,0 | 44               | 61             | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SA 24-30...                         |
| HSA 2020L-SA3503-52-ACS1-S2            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 20             | 44 | 30 | M8x1                               | G 1/8"                             | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-52-ACS1-S2            | 3,0 | 26,0 | 52               | 68             | 20 | 20 | 150 | 20             | 44 | 30 | M8x1                               | G 1/8"                             | ●     | SA 35-30...                         |
| HSA 2020L-SA3503-65-ACS1-S2            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 20             | 50 | 30 | M8x1                               | G 1/8"                             | ●     | SA 35-30...                         |
| HSA 2020R-SA3503-65-ACS1-S2            | 3,0 | 32,5 | 65               | 80             | 20 | 20 | 150 | 20             | 50 | 30 | M8x1                               | G 1/8"                             | ●     | SA 35-30...                         |

**Zubehör / Accessories / Accessori**

| Bezeichnung<br>Designation<br>Articolo |                                                                 | A    | B      |
|----------------------------------------|-----------------------------------------------------------------|------|--------|
| <b>KA 001</b>                          | <b>Kühlmittelanschluss – gerade</b>                             | M8x1 | Ø 6 mm |
| <b>KA 002</b>                          | <i>Coolant supply – straight</i><br>Raccordo – dritto           | 1/8" | Ø 6 mm |
| <b>KA 004</b>                          | <b>Kühlmittelanschluss – winklig, fest</b>                      | M8x1 | Ø 6 mm |
| <b>KA 005</b>                          | <i>Coolant supply – angled and fixed</i><br>Raccordo – angolato | 1/8" | Ø 6 mm |
| <b>KA 006</b>                          | <b>Schwenkverschraubung</b>                                     | M8x1 | Ø 6 mm |
| <b>KA 007</b>                          | <i>Swivelling screw-fitting</i><br>Raccordo – orientabile       | 1/8" | Ø 6 mm |


**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo                     | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-----------------------------------------------|---------------------------|----------------------------|
| HSA 1616... - HSA 2020...-SA24...-...-ACS1... | DIN912 M5x16-12.9         | KP 1321                    |
| HSA 2020... -SA35...-52-ACS1...               | DIN912 M6x20-12.9         | KP 5121                    |
| HSA 2020... -SA35...-65-ACS1...               | DIN912 M6x20-12.9         | KP 5121                    |

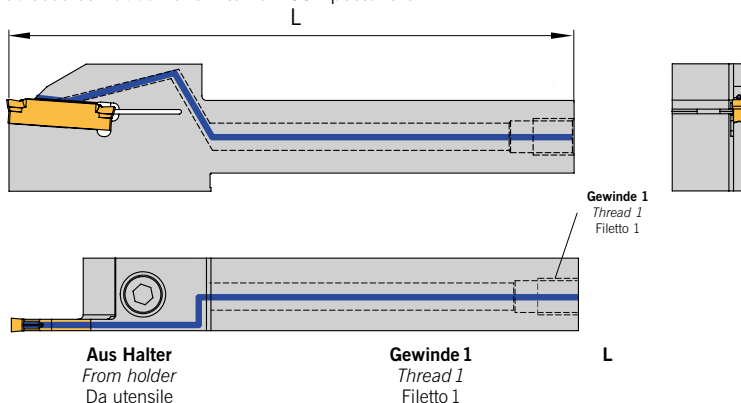
Enquiry holder HSA-ACS1 with special dimensions

Richiesta utensili HSA-ACS1 con dimensioni speciali

**Monoblockhalter mit Innenkühlung ACS1 von hinten**

Monoblock holder with through tool coolant access from the back

Utensile monoblocco con adduzione interna ACS1 posteriore

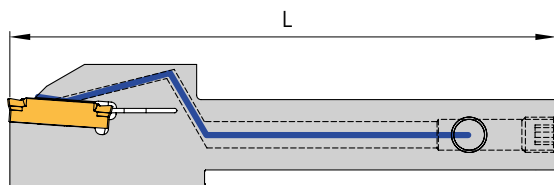
**ARNO® SpecialDesign**

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

**Monoblockhalter mit Innenkühlung ACS1 von der Seite**

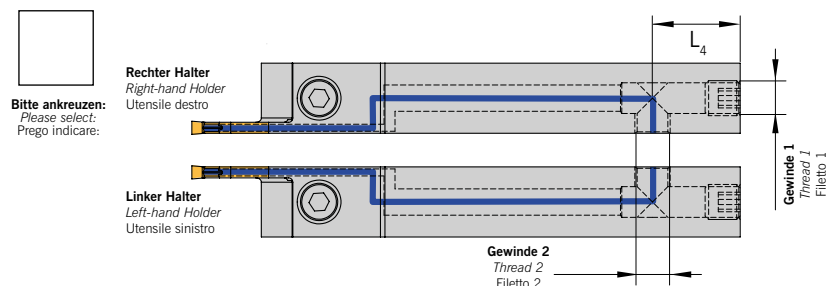
Monoblock holder with through tool coolant access from the side

Utensile monoblocco con adduzione interna ACS1 laterale

**Ausführung S. – Das Gewinde 2 ist auf der gleichen Seite wie die Schneide**

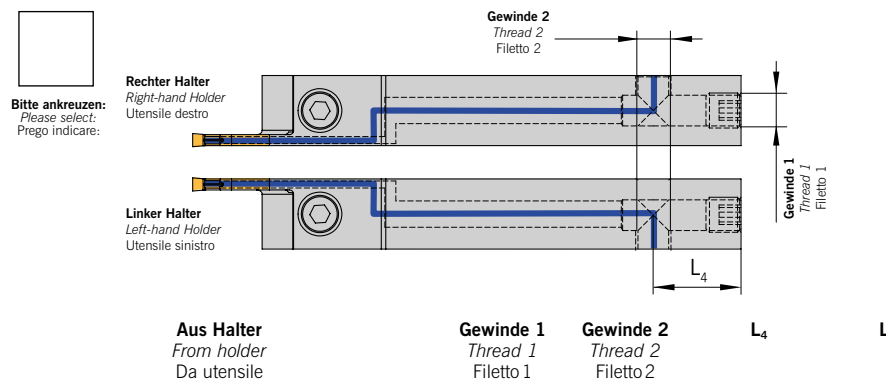
Design S. – Thread 2 is on the same side as the cutting edge

Versione S. – Filetto 2 sul medesimo lato dell'inserto

**Ausführung SG. – Das Gewinde 2 ist gegenüber der Schneide**

Design SG. – Thread 2 is on the opposite side of the cutting edge

Versione SG. – Filetto 2 sul lato opposto l'inserto



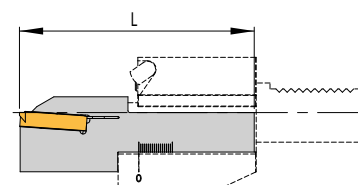
|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Diese Halter fertigen wir Ihnen zum Preis des Standardwerkzeuges.

This tool we produce to the price of the standard tool.

Questi utensili vengono realizzati al prezzo dello standard.

1

**Hinweis bei Verwendung auf KMH-Werkzeugaufnahme (VDI) Form C**

Remark by using the KMH holders (VDI) Form C

Nota sull'utilizzo adattatori KMH (VDI) Forma C

Beim Einsatz der Halter in VDI-Aufnahmen Form C bitte die Gesamtlänge (L) nach folgender Maximallänge festlegen:

When using VDI holders Form C, please set overall length (L) by following maximum lengths:

Con l'utilizzo di adattatori VDI forma C impostare la lunghezza totale (L) secondo la seguente tabella:

| Bezeichnung<br>Designation<br>Articolo | L     |
|----------------------------------------|-------|
| HSA 1616L-SA2403-32-ACS1-..            | 92,0  |
| HSA 1616R-SA2403-32-ACS1-..            | 92,0  |
| HSA 1616L-SA2403-44-ACS1-..            | 99,0  |
| HSA 1616R-SA2403-44-ACS1-..            | 99,0  |
| HSA 2020L-SA2403-32-ACS1-..            | 96,0  |
| HSA 2020R-SA2403-32-ACS1-..            | 96,0  |
| HSA 2020L-SA2403-44-ACS1-..            | 103,0 |
| HSA 2020R-SA2403-44-ACS1-..            | 103,0 |
| HSA 2020L-SA3503-52-ACS1-..            | 113,0 |
| HSA 2020R-SA3503-52-ACS1-..            | 113,0 |
| HSA 2020L-SA3503-65-ACS1-..            | 119,0 |
| HSA 2020R-SA3503-65-ACS1-..            | 119,0 |
| HSA 2525L-SA2403-44-ACS1-..            | 115,5 |
| HSA 2525R-SA2403-44-ACS1-..            | 115,5 |
| HSA 2525L-SA3503-52-ACS1-..            | 128,0 |
| HSA 2525R-SA3503-52-ACS1-..            | 128,0 |
| HSA 2525L-SA3503-65-ACS1-..            | 134,0 |
| HSA 2525R-SA3503-65-ACS1-..            | 134,0 |

**F1**

**Sehr schneidfreudige Geometrie mit geringen Schnittkräften**

- Für alle Werkstoffe im niedrigen bis mittleren Festigkeitsbereich
- Geringe Aufbauschneidenbildung
- Geeignet für dünnwandige Werkstücke

**F1**

*Very soft cutting geometry*

- For low to medium strength materials with low built-up edge tendency
- Suitable for thin-walled components

**F1**

La geometria per basse forze di taglio

- Per tutti materiali con durezza medio bassa
- Poca formazione di bava
- Adatto per pezzi sottili

**T1**

**Sehr gute Spankontrolle und Einschnürung**

- Für Stahl und Rostfreibearbeitung
- Universell einsetzbar – auch bei dünnwandigen Bauteilen

**T1**

*Very good swarf control and formation*

- For steel and stainless steel
- Universal geometry machining, for thin-walled components

**T1**

La geometria dall'ottimo controllo truciolo

- Per acciaio e materiali inossidabili
- Utilizzo universale, anche per pezzi sottili

**S1**

**Weichschneidende Geometrie**

- Spezielle Geometrie für rostfreie Stähle
- „Problemlöser“ bei der Stahlzerspanung

**S1**

*Soft cutting geometry*

- Especially for stainless steel
- Problem solver for steel machining

**S1**

Geometria di taglio dolce

- Geometria specifica per acciai inossidabili
- Il risolutore dei problemi nella lavorazione di acciaio

**M1**

**Geometrie mit schmaler Negativfase**

- Für Werkstoffe mit mittlerer bis hoher Festigkeit
- Universell einsetzbar bei Stahl (Rostfrei und Guss)
- Erste Wahl bei stabilen Verhältnissen

**M1**

*Geometry with small negative chamfer*

- For medium to high strength materials
- Suitable for all steels (stainless and cast)
- First choice where cutting conditions are solid

**M1**

La geometria robusta

- Per materiali con durezza medio alta
- Utilizzo universale per acciaio (anche inossidabile e ghisa)
- Prima scelta per condizioni stabili

**ALU**

**Geometrie mit scharfer Schneide**

- Erste Wahl für Aluminium und NE-Metalle
- Umseitig geschliffener Schneideinsatz
- Hochpositive Geometrie
- Polierte Spanflächen

**ALU**

*Geometry with a sharp edge*

- First choice for aluminium and non-ferrous materials
- Periphery ground insert
- High positive design
- Polished chip breakers

**ALU**

Geometria super positiva rettificata

- Prima scelta per Alluminio e materiali non ferrosi
- Inserto rettificato
- Spoglia di taglio molto positiva
- Vano truciolo lappato

## Beschichtet / Coated / Rivestito

### AM5040

#### PVD-beschichtete Hartmetallsorte

Eine zähe, universell einsetzbare Sorte für niedrige und mittlere Schnittgeschwindigkeiten. Hauptanwendungsbereich für rostfreie Stähle sowie für die Stahlbearbeitung. Gute Prozesssicherheit sowie beständig gegen Schneidkantenausbrüche.

#### PVD coated carbide

A tough but universal grade for low to medium cutting speeds. The main application area being stainless steel and steel.

#### Metallo duro rivestito PVD

Qualität universale per velocità medio basse. Campo di applicazione principale acciai inossidabili, superleghe, acciai legati. Noto per robustezza e resistenza alla scheggiatura.

### AP2220

#### CVD-Mehrlagenbeschichtung

Sorte mit ausgezeichneten Kombination von hoher Verschleißfestigkeit und guter Schneidkantenstabilität. Hauptanwendung für legierte Stahlwerkstoffe und Gusswerkstoffe. Nebenanwendung für rostfreien Stahl. Unter stabilen Bearbeitungsbedingungen bei mittleren bis hohen Schnittgeschwindigkeiten.

#### CVD-multilayer coating

Grade with excellent combination of wear resistance and cutting edge stability. Main application area is alloy steel and cast materials. But under stable conditions also suitable for stainless steel at medium to high cutting speeds.

#### Rivestimento multistrato CVD

Ottima resistenza all'usura e stabilità dei taglienti. Adatto per leghe d'acciaio e ghisa. Utilizzo secondario per acciaio inossidabile. Ideale in condizioni di lavoro stabili e elevate velocità di taglio.

### AP2240

#### CVD-beschichtete Hartmetallsorte

Die AP2240 überzeugt mit großer Zähigkeit und hoher Wärmebeständigkeit und erreicht dadurch außerordentliche Standzeiten. Durch die stabilen Schneidkanten wird die Prozesssicherheit deutlich höher. Hauptanwendung dieser Sorte liegt in der Stahl- und Gussbearbeitung. In der Nebenanwendung ist sie auch für rostfreie Stähle zu empfehlen.

#### CVD coated carbide grade

The AP2240 provides more toughness and heat resistance and thereby even more tool life. The strong cutting edge improves the process reliability. Main application area is steel and cast iron machining. Can also be used for stainless steel machining.

#### Grado rivestito CVD

La qualità AP2240 offre maggiore tenacità e resistenza alle temperature incrementando la vita inserto. Il robusto tagliente incrementa l'affidabilità di lavorazione. Campo principale di impiego su acciaio e ghise acciai. Idoneo anche per alcuni acciai inox.

### AP5020

#### PVD-beschichtete Hartmetallsorte

Eine sehr universell einsetzbare Sorte für niedrige und mittlere Schnittgeschwindigkeiten. Hauptanwendungsbereich für Stahl. Als Nebenanwendung geeignet für die Bearbeitung rostfreier Stähle und für das Ein- und Abstechen hochwarmfester Werkstoffe und NE-Metalle.

#### PVD coated carbide

A universal grade for low to medium cutting speed. Main application areas are steel and stainless steel, but also suitable for part-off and grooving of high temperature alloys and non-ferrous materials.

#### Metallo duro rivestito PVD

Qualität universale per velocità di taglio medie. Adatto principalmente per acciaio e secondariamente per acciaio inossidabile. Utilizzo secondario anche per metalli non ferrosi e refrattari.

### AP5030

#### PVD-beschichtete Hartmetallsorte

Eine universell einsetzbare Sorte im Bereich P30-P35 für die Einstech- und Abstechbearbeitungen. Hauptanwendungsbereich für die Stahlbearbeitung, Nebenanwendung für rostfreie Stähle.

#### PVD coated carbide

A universal grade mainly for steel applications. The slightly tougher substrate (ISO P30-P35) makes it suitable also for stainless steel.

#### Metallo duro rivestito PVD

Qualität molto versatile su campo ISO P30-P35 per lavorazioni in sicurezza. Ottima per la lavorazione di acciai in condizioni non perfette di lavoro. Secondaria scelta per acciai inossidabili.

### AP5820+

#### PVD-beschichtete Hartmetallsorte

Universelle Sorte mit hoher Verschleißfestigkeit. Hauptanwendungsbereich in der Stahlzerspanung sowie für hochwarmfeste Werkstoffe wie zum Beispiel Inconel. Nebenanwendung bei rostfreien Stählen. Geeignet auch für Kühlung mit Öl.

#### PVD coated carbide

Universal grade with high wear resistance. Main application area is steel machining, high temperature alloys such as inconel as well as stainless steel. Also suitable for coolant with oil.

#### Qualität di metallo duro con rivestimento PVD

Grado universale con elevata resistenza all'usura. Principali applicazioni in lavorazioni di leghe esotiche e ad alta temperatura come Inconel. Eccellente anche per acciai inossidabili. Adatto anche con refrigerante ad olio intero.

## Unbeschichtet / Uncoated / Non rivestito

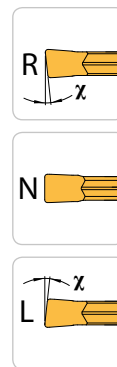
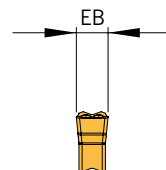
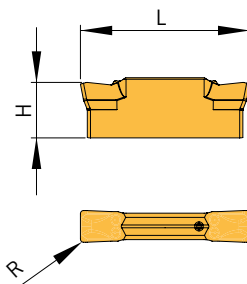
### AN1015

Unbeschichtete Hartmetallsorte zum Schlichten und Schruppen von Aluminiumlegierungen und bei NE-Metallen in Verbindung mit geschliffenen Schneidkanten. Zur Reduzierung der Aufbauschneidenbildung ist die Spanfläche hochglanzpoliert.

Uncoated carbide grade which in connection with a ground cutting edge is for finishing and roughing of aluminium alloys and non-ferrous materials. In order to reduce build up edge problems the insert is also highly polished.

Grado di metallo duro micrograna per tutte le lavorazioni di materiali non ferrosi e Alluminio. Tagliente rettificato super positivo e spoglia lappata per ridurre tagliente di riporto.

## SA16



### Sorten / Grades / Qualità PG 38

| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R   | χ   | beschichtet/<br>coated/rivestito |        |        |        |        |         | unbeschichtet<br>uncoated<br>non rivestito |
|----------------------------------------|-----|-----|-------|-----|-----|----------------------------------|--------|--------|--------|--------|---------|--------------------------------------------|
|                                        |     |     |       |     |     | AM5040                           | AP2220 | AP2240 | AP5020 | AP5030 | AP5820+ | AN1015                                     |
| SA16-1501R-S1-15**                     | 1,5 | 5,5 | 16,00 | 0,1 | 15° |                                  |        |        | ●      |        |         |                                            |
| SA16-1502N-S1                          | 1,5 | 5,5 | 16,00 | 0,2 | 0°  |                                  |        |        | ●      |        |         |                                            |
| SA16-2001L-S1-12**                     | 2,0 | 5,5 | 16,00 | 0,1 | 12° | ●                                |        |        |        |        |         |                                            |
| SA16-2001L-T1-15**                     | 2,0 | 5,5 | 16,00 | 0,1 | 15° |                                  |        |        | ●      |        |         |                                            |
| SA16-2001R-S1-12**                     | 2,0 | 5,5 | 16,00 | 0,1 | 12° | ●                                |        |        |        |        |         |                                            |
| SA16-2001R-T1-15**                     | 2,0 | 5,5 | 16,00 | 0,1 | 15° |                                  |        |        | ●      |        |         |                                            |
| SA16-2002N-F1                          | 2,0 | 5,5 | 16,00 | 0,2 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA16-2002N-S1                          | 2,0 | 5,5 | 16,00 | 0,2 | 0°  | ●                                |        |        | ●      |        |         |                                            |
| SA16-2002N-T1                          | 2,0 | 5,5 | 16,00 | 0,2 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA16-3002L-S1-12**                     | 3,0 | 5,5 | 16,00 | 0,2 | 12° | ●                                |        |        |        |        |         |                                            |
| SA16-3002R-S1-12**                     | 3,0 | 5,5 | 16,00 | 0,2 | 12° | ●                                |        |        |        |        |         |                                            |
| SA16-3003L-M1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  |        |        | ●      |        |         |                                            |
| SA16-3003L-S1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  | ●                                |        |        |        |        |         |                                            |
| SA16-3003L-T1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  |        |        | ●      |        |         |                                            |
| SA16-3003N-M1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA16-3003N-S1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  | ●                                |        |        | ●      |        |         |                                            |
| SA16-3003N-T1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA16-3003R-M1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  | ●      |        |        |        |         |                                            |
| SA16-3003R-S1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  | ●                                |        |        |        |        |         |                                            |
| SA16-3003R-T1                          | 3,0 | 5,5 | 16,00 | 0,3 | 0°  |                                  |        |        | ●      |        |         |                                            |

Hinweis: Bei linken und rechten Stechplatten muss ggf. das Trägerwerkzeug  
stirnseitig modifiziert werden.  
Remark: When using left- or right-handed inserts the holder may be needing modification.  
Nota: Con l'utilizzo di inserti sinistri o destri può essere necessario modificare la lama.

\*\*geschliffene Ausführung  
Ground version  
Versione rettificata

● Hauptanwendung  
Main application  
Applicazione principale  
○ Nebenanwendung  
Secondary application  
Applicazione secondaria

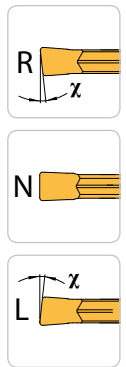
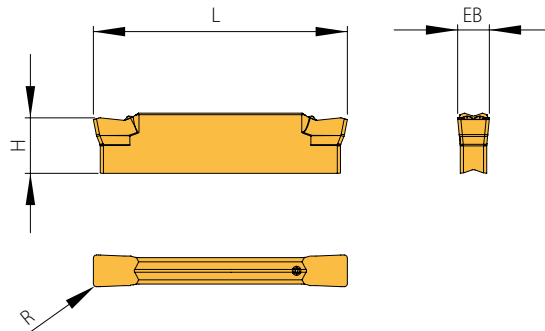
|   |   |   |   |  |
|---|---|---|---|--|
| P | ○ | ● | ● |  |
| M | ● | ○ | ○ |  |
| K |   | ● |   |  |
| N |   |   | ○ |  |
| S |   |   | ○ |  |
| H |   |   |   |  |

#### \* Toleranz EB

SA16... EB 2-3 +/- 0,04



## SA24



# 1

| Sorten / Grades / Qualità<br>PG 38     |     |     |       |      |     |        |        |        |        |        |                                            |        |
|----------------------------------------|-----|-----|-------|------|-----|--------|--------|--------|--------|--------|--------------------------------------------|--------|
| beschichtet/<br>coated/rivestito       |     |     |       |      |     |        |        |        |        |        | unbeschichtet<br>uncoated<br>non rivestito |        |
| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R    | χ   | AM5040 | AP2220 | AP2240 | AP5020 | AP5030 | AP5820+                                    | AN1015 |
| SA24-15005L-T1-15**                    | 1,5 | 5,5 | 24,00 | 0,05 | 15° |        |        |        | ●      |        |                                            |        |
| SA24-15005R-T1-15**                    | 1,5 | 5,5 | 24,00 | 0,05 | 15° |        |        |        | ●      |        |                                            |        |
| SA24-1500L-S1-15**                     | 1,5 | 5,5 | 24,00 | 0,0  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-1500R-S1-15**                     | 1,5 | 5,5 | 24,00 | 0,0  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-1501L-S1-15**                     | 1,5 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-1501R-S1-15**                     | 1,5 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-1502N-S1                          | 1,5 | 5,5 | 24,00 | 0,2  | 0°  |        |        |        | ●      |        |                                            |        |
| SA24-1502N-T1                          | 1,5 | 5,5 | 24,00 | 0,2  | 0°  |        |        |        | ●      |        |                                            |        |
|                                        |     |     |       |      |     |        |        |        |        |        |                                            |        |
| SA24-2000R-T1-15**                     | 2,0 | 5,5 | 24,00 | 0,0  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-2001L-S1-12**                     | 2,0 | 5,5 | 24,00 | 0,1  | 12° | ●      |        |        |        |        |                                            |        |
| SA24-2001L-S1-15**                     | 2,0 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-2001L-T1-15**                     | 2,0 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-2001R-S1-12**                     | 2,0 | 5,5 | 24,00 | 0,1  | 12° | ●      |        |        |        |        |                                            |        |
| SA24-2001R-S1-15**                     | 2,0 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-2001R-T1-15**                     | 2,0 | 5,5 | 24,00 | 0,1  | 15° |        |        |        | ●      |        |                                            |        |
| SA24-2002L-S1-8**                      | 2,0 | 5,5 | 24,00 | 0,2  | 8°  |        |        |        | ●      |        |                                            |        |
| SA24-2002R-S1-8**                      | 2,0 | 5,5 | 24,00 | 0,2  | 8°  |        |        |        | ●      |        |                                            |        |
| SA24-2002N-F1                          | 2,0 | 5,5 | 24,00 | 0,2  | 0°  |        | ●      |        | ●      |        |                                            |        |
| SA24-2002N-M1                          | 2,0 | 5,5 | 24,00 | 0,2  | 0°  |        | ●      | ●      | ●      |        |                                            |        |
| SA24-2002N-S1                          | 2,0 | 5,5 | 24,00 | 0,2  | 0°  | ●      |        | ●      | ●      | ●      |                                            |        |
| SA24-2002N-T1                          | 2,0 | 5,5 | 24,00 | 0,2  | 0°  |        | ●      | ●      | ●      |        | ●                                          |        |
|                                        |     |     |       |      |     |        |        |        |        |        |                                            |        |
| SA24-2502L-S1                          | 2,5 | 5,5 | 24,00 | 0,2  | 0°  | ●      |        |        | ●      |        |                                            |        |
| SA24-2502L-S1-8**                      | 2,5 | 5,5 | 24,00 | 0,2  | 8°  |        |        |        | ●      |        |                                            |        |
| SA24-2502L-T1                          | 2,5 | 5,5 | 24,00 | 0,2  | 0°  |        |        |        | ●      |        |                                            |        |
| SA24-2502R-S1                          | 2,5 | 5,5 | 24,00 | 0,2  | 0°  | ●      |        |        | ●      |        |                                            |        |
| SA24-2502R-S1-8**                      | 2,5 | 5,5 | 24,00 | 0,2  | 8°  |        |        |        | ●      |        |                                            |        |
| SA24-2502R-T1                          | 2,5 | 5,5 | 24,00 | 0,2  | 0°  |        |        |        | ●      |        |                                            |        |
| SA24-2502N-T1                          | 2,5 | 5,5 | 24,00 | 0,2  | 0°  |        |        |        |        |        | ●                                          |        |
| SA24-2503N-M1                          | 2,5 | 5,5 | 24,00 | 0,3  | 0°  |        |        |        | ●      |        |                                            |        |
| SA24-2503N-S1                          | 2,5 | 5,5 | 24,00 | 0,3  | 0°  | ●      |        |        | ●      | ●      |                                            |        |
| SA24-2503N-T1                          | 2,5 | 5,5 | 24,00 | 0,3  | 0°  |        |        |        | ●      | ●      |                                            |        |

Hinweis: Bei linken und rechten Stechplatten muss ggf. das Trägerwerkzeug  
stirnseitig modifiziert werden.  
Remark: When using left- or right-handed inserts the holder may be needing modification.  
Nota: Con l'utilizzo di inserti sinistri o destri può essere necessario modificare la lama.

\*\*geschliffene Ausführung / Ground version / Versione rettificata

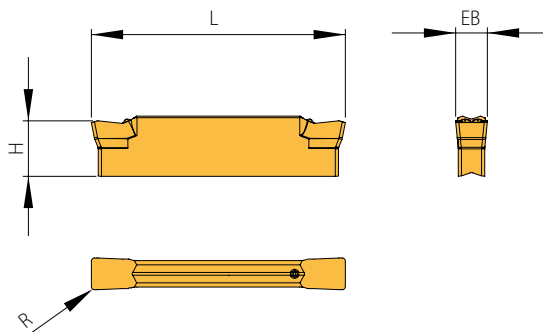
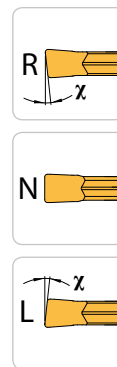
- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|--|
| P | ○ | ● | ● | ● | ● | ● |  |
| M | ● | ○ | ○ | ○ | ○ | ○ |  |
| K |   | ● | ● |   |   |   |  |
| N |   |   |   | ○ |   |   |  |
| S |   |   |   | ○ |   | ● |  |
| H |   |   |   |   |   |   |  |

\* Toleranz EB

SA24... EB 2-3 +/- 0,04

### SA24



#### Sorten / Grades / Qualità PG 38

| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R   | χ   | beschichtet/<br>coated/rivestito |        |        |        |        |         | unbeschichtet<br>uncoated<br>non rivestito |
|----------------------------------------|-----|-----|-------|-----|-----|----------------------------------|--------|--------|--------|--------|---------|--------------------------------------------|
|                                        |     |     |       |     |     | AM5040                           | AP2220 | AP2240 | AP5020 | AP5030 | AP5820+ | AN1015                                     |
| SA24-3002L-S1-12**                     | 3,0 | 5,5 | 24,00 | 0,2 | 12° | ●                                |        |        |        |        |         |                                            |
| SA24-3002L-T1-15**                     | 3,0 | 5,5 | 24,00 | 0,2 | 15° |                                  |        |        | ●      |        |         |                                            |
| SA24-3002R-S1-12**                     | 3,0 | 5,5 | 24,00 | 0,2 | 12° | ●                                |        |        |        |        |         |                                            |
| SA24-3003L-M1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      | ●      | ●      |        |         |                                            |
| SA24-3003L-S1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  | ●                                |        |        |        |        |         |                                            |
| SA24-3003L-T1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA24-3003N-M1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      | ●      | ●      |        |         |                                            |
| SA24-3003N-S1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  | ●                                |        | ●      | ●      | ●      |         |                                            |
| SA24-3003N-T1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      | ●      | ●      | ●      | ●       |                                            |
| SA24-3003R-M1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      | ●      | ●      |        |         |                                            |
| SA24-3003R-S1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  | ●                                |        |        |        |        |         |                                            |
| SA24-3003R-T1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  | ●      |        | ●      |        |         |                                            |
| SA24-2001L-ALU-15**                    | 2,0 | 5,5 | 24,00 | 0,1 | 15° |                                  |        |        |        |        |         | ●                                          |
| SA24-2001R-ALU-15**                    | 2,0 | 5,5 | 24,00 | 0,1 | 15° |                                  |        |        |        |        |         | ●                                          |
| SA24-2002N-ALU**                       | 2,0 | 5,5 | 24,00 | 0,2 | 0°  |                                  |        |        |        |        |         | ●                                          |
| SA24-3002L-ALU-15**                    | 3,0 | 5,5 | 24,00 | 0,2 | 15° |                                  |        |        |        |        |         | ●                                          |
| SA24-3002R-ALU-15**                    | 3,0 | 5,5 | 24,00 | 0,2 | 15° |                                  |        |        |        |        |         | ●                                          |
| SA24-3003N-ALU**                       | 3,0 | 5,5 | 24,00 | 0,3 | 0°  |                                  |        |        |        |        |         | ●                                          |

Hinweis: Bei linken und rechten Stechplatten muss ggf. das Trägerwerkzeug  
stirnseitig modifiziert werden.  
Remark: When using left- or right-handed inserts the holder may be needing modification.  
Nota: Con l'utilizzo di inserti sinistri o destri può essere necessario modificare la lama.

\*\*geschliffene Ausführung  
Ground version  
Versione rettificata

#### \* Toleranz EB

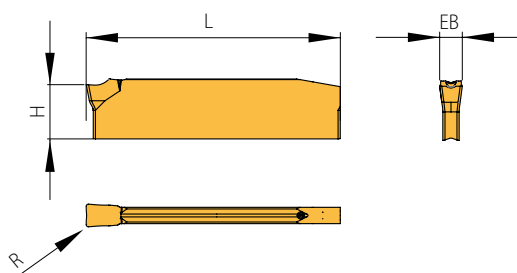
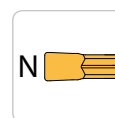
|              |        |          |
|--------------|--------|----------|
| SA24...      | EB 2-3 | +/- 0,04 |
|              | EB 4   | +/- 0,05 |
| SA24... -ALU | EB 2-3 | +/- 0,02 |

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| P | ○ | ● | ● | ● | ● | ● |   |
| M | ● | ○ | ○ | ○ | ○ | ○ |   |
| K |   | ● | ● |   |   |   | ○ |
| N |   |   |   | ○ |   |   | ● |
| S |   |   |   | ○ |   | ● | ○ |
| H |   |   |   |   |   |   |   |

## SA24E

(einseitiger Schneideinsatz)  
(single sided insert)  
(inserto lato singolo)



| Sorten / Grades / Qualità<br>PG 38     |     |     |       |     |    |                                  |        |        |        |        |                                             |
|----------------------------------------|-----|-----|-------|-----|----|----------------------------------|--------|--------|--------|--------|---------------------------------------------|
| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R   | χ  | beschichtet/<br>coated/rivestito |        |        |        |        | unbeschichtet/<br>uncoated<br>non rivestito |
|                                        |     |     |       |     |    | AM5040                           | AP2220 | AP2240 | AP5020 | AP5030 | AP5820+                                     |
| SA24E-2002N-S1                         | 2,0 | 5,5 | 23,35 | 0,2 | 0° |                                  |        |        | ●      |        |                                             |
| SA24E-3003N-S1                         | 3,0 | 5,5 | 23,35 | 0,3 | 0° |                                  |        |        | ●      |        |                                             |

Hinweis: Bei linken und rechten Stechplatten muss ggf. das Trägerwerkzeug stirnseitig modifiziert werden.

Remark: When using left- or right-handed inserts the holder may be needing modification.

Nota: Con l'utilizzo di inserti sinistri o destri può essere necessario modificare la lama.

☒ Hauptanwendung  
Main application  
Applicazione principale

☐ Nebenanwendung  
Secondary application  
Applicazione secondaria

P

M

K

N

S

H

●

○

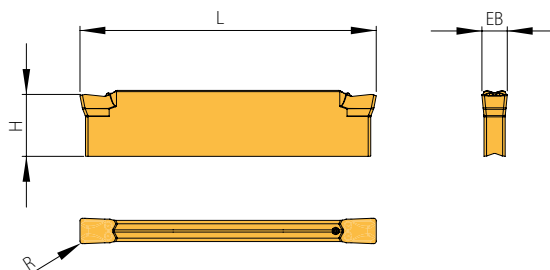
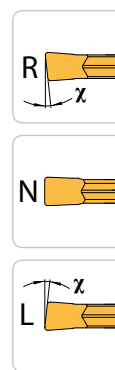
○

○

\* Toleranz EB

|         |        |          |
|---------|--------|----------|
| SA24... | EB 2–3 | +/- 0,04 |
|---------|--------|----------|

## SA35



| Sorten / Grades / Qualità<br>PG 38     |     |     |       |     |     |        |        |        |        |        |         | unbeschichtet<br>uncoated<br>non rivestito |
|----------------------------------------|-----|-----|-------|-----|-----|--------|--------|--------|--------|--------|---------|--------------------------------------------|
| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R   | χ   | AM5040 | AP2220 | AP2240 | AP5020 | AP5030 | AP5820+ |                                            |
| SA35-2001L-S1-12**                     | 2,0 | 7,5 | 35,00 | 0,1 | 12° | ●      |        |        |        |        |         |                                            |
| SA35-2001R-S1-12**                     | 2,0 | 7,5 | 35,00 | 0,1 | 12° | ●      |        |        |        |        |         |                                            |
| SA35-2002L-M1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        |        |        | ●      |        |         |                                            |
| SA35-2002N-F1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        | ●      |        | ●      |        |         |                                            |
| SA35-2002N-M1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        |        |        | ●      |        |         |                                            |
| SA35-2002N-S1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  | ●      |        | ●      | ●      |        |         |                                            |
| SA35-2002N-T1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        | ●      |        | ●      |        |         |                                            |
| SA35-2002R-M1                          | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        |        |        | ●      |        |         |                                            |
| SA35-3002L-S1-12**                     | 3,0 | 7,5 | 35,00 | 0,2 | 12° | ●      |        |        |        |        |         |                                            |
| SA35-3002R-S1-12**                     | 3,0 | 7,5 | 35,00 | 0,2 | 12° | ●      |        |        |        |        |         |                                            |
| SA35-3003L-M1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        | ●      | ●      | ●      |        |         |                                            |
| SA35-3003L-S1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        |        |        | ●      |        |         |                                            |
| SA35-3003L-T1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        | ●      |        | ●      |        |         |                                            |
| SA35-3003N-M1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  | ●      | ●      | ●      | ●      |        |         |                                            |
| SA35-3003N-S1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  | ●      |        | ●      | ●      | ●      |         |                                            |
| SA35-3003N-T1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        | ●      | ●      | ●      |        |         |                                            |
| SA35-3003R-M1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        | ●      | ●      | ●      |        |         |                                            |
| SA35-3003R-S1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        |        |        | ●      |        |         |                                            |
| SA35-3003R-T1                          | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        | ●      |        | ●      |        |         |                                            |
| SA35-2000L-ALU-15**                    | 2,0 | 7,5 | 35,00 | 0,0 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-2000R-ALU-15**                    | 2,0 | 7,5 | 35,00 | 0,0 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-2001L-ALU-15**                    | 2,0 | 7,5 | 35,00 | 0,1 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-2001R-ALU-15**                    | 2,0 | 7,5 | 35,00 | 0,1 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-2002N-ALU**                       | 2,0 | 7,5 | 35,00 | 0,2 | 0°  |        |        |        |        |        |         | ●                                          |
| SA35-3002L-ALU-15**                    | 3,0 | 7,5 | 35,00 | 0,2 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-3002R-ALU-15**                    | 3,0 | 7,5 | 35,00 | 0,2 | 15° |        |        |        |        |        |         | ●                                          |
| SA35-3003N-ALU**                       | 3,0 | 7,5 | 35,00 | 0,3 | 0°  |        |        |        |        |        |         | ●                                          |

Hinweis: Bei linken und rechten Stechplatten muss ggf. das Trägerwerkzeug  
stirnseitig modifiziert werden.  
Remark: When using left- or right-handed inserts the holder may be needing modification.  
Nota: Con l'utilizzo di inserti sinistri o destri può essere necessario modificare la lama.

\*\*geschliffene Ausführung  
Ground version  
Versione rettificata

● Hauptanwendung  
Main application  
Applicazione principale  
○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| P | ○ | ● | ● | ● | ● |   |
| M | ● | ○ | ○ | ○ | ○ |   |
| K |   | ● | ● |   |   | ○ |
| N |   |   |   | ○ |   | ● |
| S |   |   |   | ○ |   | ○ |
| H |   |   |   |   |   |   |

### \* Toleranz EB

|         |        |          |
|---------|--------|----------|
| SA35... | EB 2-3 | +/- 0,04 |
|         | EB 4-6 | +/- 0,05 |
| -ALU    |        | +/- 0,02 |

| Artikel / Item / Articolo                                                                                | PG 11 |
|----------------------------------------------------------------------------------------------------------|-------|
| <b>Schraube / Screw / Vite</b>                                                                           |       |
| AS 0022                                                                                                  | ●     |
| AS 0045                                                                                                  | ●     |
| DIN912-M4x10-12.9                                                                                        | ●     |
| DIN912-M4x14-12.9                                                                                        | ●     |
| DIN912-M5x16-12.9                                                                                        | ●     |
| DIN912-M6x20-12.9                                                                                        | ●     |
| <b>Schlüssel / Key / Chiave</b>                                                                          |       |
| KP 1111                                                                                                  | ●     |
| KP 1321                                                                                                  | ●     |
| KP 3111                                                                                                  | ●     |
| KP 5421                                                                                                  | ●     |
| KS 8000                                                                                                  | ●     |
| <b>Kühlmittelanschluss – gerade /<br/>Coolant supply – straight / Raccordo – dritto</b>                  |       |
| KA 001                                                                                                   | ●     |
| KA 002                                                                                                   | ●     |
| KA 003                                                                                                   | ●     |
| <b>Kühlmittelanschluss – winklig, fest / Coolant<br/>supply – angled and fixed / Raccordo – angolato</b> |       |
| KA 004                                                                                                   | ●     |
| KA 005                                                                                                   | ●     |
| <b>Schwenkverschraubung / Swivelling screw-fitting /<br/>Raccordo – orientabile</b>                      |       |
| KA 006                                                                                                   | ●     |
| KA 007                                                                                                   | ●     |
| KA 008                                                                                                   | ●     |

## Stechen

| ISO                         | Werkstoff                                     |                                                          | Zugfestigkeit<br>(N/mm²) | Schnittgeschwindigkeit Vc (m/min) |         |         |         |         |          | unbeschichtet |
|-----------------------------|-----------------------------------------------|----------------------------------------------------------|--------------------------|-----------------------------------|---------|---------|---------|---------|----------|---------------|
|                             |                                               |                                                          |                          | beschichtet                       |         |         |         |         |          |               |
|                             |                                               |                                                          |                          | AM5040                            | AP2220  | AP2240  | AP5020  | AP5030  | AP5820 + |               |
| P                           | Unlegierter Stahl und Stahlguss               | < 0,15 % C/vergütet                                      | 350                      | 120–200                           | 130–250 | 130–250 | 120–220 | 120–200 | 120–200  | –             |
|                             |                                               | 0,15 – 0,45 % C/vergütet                                 | 650                      | 80–150                            | 110–180 | 110–190 | 80–150  | 80–150  | 80–150   | –             |
|                             |                                               | > 0,45 % C/vergütet                                      | 1000                     | 60–140                            | 70–150  | 70–170  | 60–140  | 60–140  | 60–140   | –             |
|                             | Niedrig legierter Stahl und Stahlguss         | geglüht                                                  | 600                      | 80–160                            | 120–190 | 120–200 | 80–170  | 80–170  | 80–170   | –             |
|                             |                                               | vergütet                                                 | 900                      | 60–130                            | 110–150 | 110–180 | 60–130  | 60–130  | 60–130   | –             |
|                             |                                               |                                                          | 1200                     | 60–120                            | 70–130  | 70–150  | 60–120  | 60–120  | 60–120   | –             |
|                             | Hochlegierter Stahl                           | geglüht                                                  | 700                      | 80–140                            | 90–140  | 90–170  | 80–140  | 80–140  | 80–140   | –             |
|                             | Hochlegierter Werkzeugstahl und Stahlguss     | gehärtet und angelassen                                  | 1100                     | 50–120                            | 70–130  | 70–160  | 50–120  | 50–120  | 50–120   | –             |
| M                           | Nichtrostender Stahl                          | ferritisch, geglüht                                      | 700                      | 60–160                            | 110–200 | 120–200 | 60–170  | 60–170  | 60–170   | –             |
|                             | Stahlguss                                     | martensitisch, vergütet                                  | 1000                     | 50–100                            | 60–130  | 60–100  | 50–100  | 50–100  | 50–100   | –             |
| K                           | Nichtrostender Stahl                          | austenitisch und austenitisch / ferritisch, abgeschreckt | 450–600                  | 60–160                            | 100–200 | 100–170 | 60–180  | 60–170  | 60–170   | –             |
|                             |                                               |                                                          | 600–900                  | 50–90                             | 120–150 | 60–90   | 50–90   | 50–90   | 50–90    | –             |
|                             | Grauguss                                      | perlitisch / ferritisch                                  | 500–700                  | –                                 | 100–160 | 100–200 | –       | –       | –        | 120–160       |
|                             |                                               | perlitisch / martensitisch                               | 700–850                  | –                                 | 110–180 | 90–180  | –       | –       | –        | 100–150       |
|                             |                                               |                                                          | 800–1100                 | –                                 | 130–200 | 80–150  | –       | –       | –        | 90–140        |
|                             | Gusseisen mit Kugelgraphit                    | ferritisch                                               | 550                      | –                                 | 100–160 | 100–160 | –       | –       | –        | 130–170       |
|                             |                                               | perlitisch                                               | 800                      | –                                 | 120–220 | 70–140  | –       | –       | –        | 90–130        |
|                             | Temperguss                                    | ferritisch                                               | 450                      | –                                 | 90–180  | 100–200 | –       | –       | –        | 140–200       |
| perlitisch                  |                                               | 750                                                      | –                        | –                                 | 80–150  | –       | –       | –       | 120–160  |               |
| N                           | Aluminium-Knetlegierungen                     | nicht aushärtbar                                         | 200                      | –                                 | –       | –       | 100–500 | –       | –        | 300–500       |
|                             |                                               | aushärtbar, ausgehärtet                                  | 350                      | –                                 | –       | –       | 100–300 | –       | –        | 200–300       |
|                             | Aluminium-Gusslegierungen                     | ≤ 12 % Si, ausgehärtet                                   | 250                      | –                                 | –       | –       | 100–500 | –       | –        | 100–500       |
|                             |                                               | ≤ 12 % Si, aushärtbar, ausgehärtet                       | 300                      | –                                 | –       | –       | 100–300 | –       | –        | 100–300       |
|                             |                                               | ≤ 12 % Si, nicht aushärtbar                              | 450                      | –                                 | –       | –       | 100–200 | –       | –        | 100–200       |
|                             | Kupfer und Kupferlegierungen (Bronze/Messing) | Automatenlegierung, Pb > 1 %                             | 400                      | –                                 | –       | –       | 100–500 | –       | –        | 250–500       |
|                             |                                               | Messing, Rotguss                                         | 300                      | –                                 | –       | –       | 100–500 | –       | –        | 200–500       |
|                             |                                               | Aluminiumbronze                                          | 500                      | –                                 | –       | –       | 100–300 | –       | –        | 150–300       |
|                             |                                               | Kupfer und Elektrolytkupfer                              | 200                      | –                                 | –       | –       | 100–300 | –       | –        | 150–300       |
|                             | Nichtmetallische Werkstoffe                   | Duroplaste                                               | –                        | –                                 | –       | –       | 80–180  | –       | –        | 80–180        |
| Faserverstärkte Kunststoffe |                                               | –                                                        | –                        | –                                 | –       | 60–150  | –       | –       | 60–150   |               |
| Hartgummi                   |                                               | –                                                        | –                        | –                                 | –       | 100–220 | –       | –       | 100–200  |               |
| S                           | Warmfeste Legierungen                         | Fe-Basis, geglüht                                        | 700                      | –                                 | –       | –       | 20–50   | –       | 30–55    | 30–45         |
|                             |                                               | Fe-Basis, ausgehärtet                                    | 950                      | –                                 | –       | –       | 20–40   | –       | 30–50    | 20–35         |
|                             |                                               | Ni- oder Co-Basis, geglüht                               | 800                      | –                                 | –       | –       | 15–25   | –       | 25–35    | 15–25         |
|                             |                                               | Ni- oder Co-Basis, gegossen                              | 1100                     | –                                 | –       | –       | 10–20   | –       | 15–25    | 10–20         |
|                             |                                               | Ni- oder Co-Basis, ausgehärtet                           | 1200                     | –                                 | –       | –       | 10–20   | –       | 15–25    | 10–20         |
|                             | Titanlegierungen                              | Rein-Titan                                               | 500–700                  | –                                 | –       | –       | 50–120  | –       | 50–120   | 60–120        |
|                             | Alpha+Beta-Legierungen                        | ausgehärtet                                              | 700–1000                 | –                                 | –       | –       | 30–50   | –       | 35–60    | 30–50         |
| H                           | Gehärteter Stahl                              | gehärtet und angelassen                                  | 55 HRC                   | –                                 | –       | –       | –       | –       | –        | –             |
|                             |                                               |                                                          | 60 HRC                   | –                                 | –       | –       | –       | –       | –        | –             |
|                             | Hartguss                                      | gegossen                                                 | 41 HRC                   | –                                 | –       | –       | –       | –       | –        | –             |
|                             | Gehärtetes Gusseisen                          | gehärtet und angelassen                                  | 55 HRC                   | –                                 | –       | –       | –       | –       | –        | –             |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.



## Grooving

| ISO                    | Material                                   |                                                 | Tensile strength<br>(N/mm <sup>2</sup> ) | Cutting speed V <sub>c</sub> (m/min) |         |         |         |         |         | uncoated<br><br>AN1015 |
|------------------------|--------------------------------------------|-------------------------------------------------|------------------------------------------|--------------------------------------|---------|---------|---------|---------|---------|------------------------|
|                        |                                            |                                                 |                                          | coated                               |         |         |         |         |         |                        |
|                        |                                            |                                                 |                                          | AM5040                               | AP2220  | AP2240  | AP5020  | AP5030  | AP5820+ |                        |
| P                      | Unalloyed steel and cast steel             | < 0.15 % C/hardened and tempered                | 350                                      | 120–200                              | 130–250 | 130–250 | 120–220 | 120–200 | 120–200 | –                      |
|                        |                                            | 0.15–0.45 % C/hardened and tempered             | 650                                      | 80–150                               | 110–180 | 110–190 | 80–150  | 80–150  | 80–150  | –                      |
|                        |                                            | > 0.45 % C/hardened and tempered                | 1000                                     | 60–140                               | 70–150  | 70–170  | 60–140  | 60–140  | 60–140  | –                      |
|                        | Low alloyed steel and cast steel           | annealed                                        | 600                                      | 80–160                               | 120–190 | 120–200 | 80–170  | 80–170  | 80–170  | –                      |
|                        |                                            | hardened and tempered                           | 900                                      | 60–130                               | 110–150 | 110–180 | 60–130  | 60–130  | 60–130  | –                      |
|                        |                                            |                                                 | 1200                                     | 60–120                               | 70–130  | 70–150  | 60–120  | 60–120  | 60–120  | –                      |
|                        | High alloyed steel                         | annealed                                        | 700                                      | 80–140                               | 90–140  | 90–170  | 80–140  | 80–140  | 80–140  | –                      |
|                        | High alloyed tool steel and cast steel     | hardened                                        | 1100                                     | 50–120                               | 70–130  | 70–160  | 50–120  | 50–120  | 50–120  | –                      |
| Stainless steel        | ferritic, annealed                         | 700                                             | 60–160                                   | 110–200                              | 120–200 | 60–170  | 60–170  | 60–170  | –       |                        |
| Cast steel             | martensitic, hardened and tempered         | 1000                                            | 50–100                                   | 60–130                               | 60–100  | 50–100  | 50–100  | 50–100  | –       |                        |
| M                      | Stainless steel                            | austenitic and austenitic/<br>ferritic, chilled | 450–600                                  | 60–160                               | 100–200 | 100–170 | 60–180  | 60–170  | 60–170  | –                      |
|                        |                                            |                                                 | 600–900                                  | 50–90                                | 120–150 | 60–90   | 50–90   | 50–90   | 50–90   | –                      |
| K                      | Cast iron                                  | pearlitic/ferritic                              | 500–700                                  | –                                    | 100–160 | 100–200 | –       | –       | –       | 120–160                |
|                        |                                            | pearlitic/martensitic                           | 700–850                                  | –                                    | 110–180 | 90–180  | –       | –       | –       | 100–150                |
|                        |                                            |                                                 | 800–1100                                 | –                                    | 130–200 | 80–150  | –       | –       | –       | 90–140                 |
|                        | Cast iron with nodular graphite            | ferritic                                        | 550                                      | –                                    | 100–160 | 100–160 | –       | –       | –       | 130–170                |
|                        |                                            | pearlitic                                       | 800                                      | –                                    | 120–220 | 70–140  | –       | –       | –       | 90–130                 |
|                        | Malleable cast iron                        | ferritic                                        | 450                                      | –                                    | 90–180  | 100–200 | –       | –       | –       | 140–200                |
| pearlitic              |                                            | 750                                             | –                                        | –                                    | 80–150  | –       | –       | –       | 120–160 |                        |
| N                      | Aluminium alloys long chipping             | not heat treatable                              | 200                                      | –                                    | –       | –       | 100–500 | –       | –       | 300–500                |
|                        |                                            | heat treatable, heat treated                    | 350                                      | –                                    | –       | –       | 100–300 | –       | –       | 200–300                |
|                        | Casted aluminium alloys                    | ≤ 12 % Si, heat treated                         | 250                                      | –                                    | –       | –       | 100–500 | –       | –       | 100–500                |
|                        |                                            | ≤ 12 % Si, heat treatable, heat treated         | 300                                      | –                                    | –       | –       | 100–300 | –       | –       | 100–300                |
|                        |                                            | ≤ 12 % Si, not heat treatable                   | 450                                      | –                                    | –       | –       | 100–200 | –       | –       | 100–200                |
|                        | Copper and copper alloys<br>(Brass/Bronze) | Lead alloys, Pb > 1 %                           | 400                                      | –                                    | –       | –       | 100–500 | –       | –       | 250–500                |
|                        |                                            | Brass, Bronze                                   | 300                                      | –                                    | –       | –       | 100–500 | –       | –       | 200–500                |
|                        |                                            | Aluminium bronze                                | 500                                      | –                                    | –       | –       | 100–300 | –       | –       | 150–300                |
|                        |                                            | Copper and electrolyte copper                   | 200                                      | –                                    | –       | –       | 100–300 | –       | –       | 150–300                |
|                        | Non-ferrous materials                      | Duroplastic                                     | –                                        | –                                    | –       | –       | 80–180  | –       | –       | 80–180                 |
| Re-inforced plastics   |                                            | –                                               | –                                        | –                                    | –       | 60–150  | –       | –       | 60–150  |                        |
| Hard rubber            |                                            | –                                               | –                                        | –                                    | –       | 100–220 | –       | –       | 100–200 |                        |
| S                      | High temperature resistant alloys          | Fe-alloyed, annealed                            | 700                                      | –                                    | –       | –       | 20–50   | –       | 30–55   | 30–45                  |
|                        |                                            | Fe-alloyed, heat treated                        | 950                                      | –                                    | –       | –       | 20–40   | –       | 30–50   | 20–35                  |
|                        |                                            | Ni- or Co-alloyed, annealed                     | 800                                      | –                                    | –       | –       | 15–25   | –       | 25–35   | 15–25                  |
|                        |                                            | Ni- or Co-alloyed, casting                      | 1100                                     | –                                    | –       | –       | 10–20   | –       | 15–25   | 10–20                  |
|                        |                                            | Ni- or Co-alloyed, heat treated                 | 1200                                     | –                                    | –       | –       | 10–20   | –       | 15–25   | 10–20                  |
|                        | Titanium alloys                            | Pure titan                                      | 500–700                                  | –                                    | –       | –       | 50–120  | –       | 50–120  | 60–120                 |
| Alpha- and Beta-alloys | heat treated                               | 700–1000                                        | –                                        | –                                    | –       | 30–50   | –       | 35–60   | 30–50   |                        |
| H                      | Hardened steel                             | hardened                                        | 55 HRC                                   | –                                    | –       | –       | –       | –       | –       | –                      |
|                        |                                            |                                                 | 60 HRC                                   | –                                    | –       | –       | –       | –       | –       | –                      |
|                        | Hard cast iron                             | casting                                         | 41 HRC                                   | –                                    | –       | –       | –       | –       | –       | –                      |
|                        | Hardened cast iron                         | hardened                                        | 55 HRC                                   | –                                    | –       | –       | –       | –       | –       | –                      |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

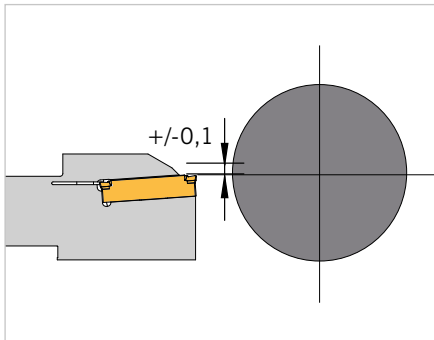
## Troncatura

| ISO                    | Materiale                                     |                                                              | Resistenza<br>(N/mm²) | Velocità di taglio Vc (m/min) |                    |                  |                 |                 |                 | non<br>rivestito<br><br>AN 1015 |
|------------------------|-----------------------------------------------|--------------------------------------------------------------|-----------------------|-------------------------------|--------------------|------------------|-----------------|-----------------|-----------------|---------------------------------|
|                        |                                               |                                                              |                       | rivestito                     |                    |                  |                 |                 |                 |                                 |
| P                      | Acciai non legati                             | < 0,15 % C/bonificato                                        | 350                   | 120–200                       | 130–250            | 130–250          | 120–220         | 120–200         | 120–200         | –                               |
|                        |                                               | 0,15 – 0,45 % C/bonificato                                   | 650                   | 80–150                        | 110–180            | 110–190          | 80–150          | 80–150          | 80–150          | –                               |
|                        |                                               | > 0,45 % C/bonificato                                        | 1000                  | 60–140                        | 70–150             | 70–170           | 60–140          | 60–140          | 60–140          | –                               |
|                        | Acciai debolmente legati e<br>Ghise acciaiOSE | ricotto                                                      | 600                   | 80–160                        | 120–190            | 120–200          | 80–170          | 80–170          | 80–170          | –                               |
|                        |                                               | bonificato                                                   | 900                   | 60–130                        | 110–150            | 110–180          | 60–130          | 60–130          | 60–130          | –                               |
|                        |                                               |                                                              | 1200                  | 60–120                        | 70–130             | 70–150           | 60–120          | 60–120          | 60–120          | –                               |
|                        | Acciai fortemente legati                      | ricotto                                                      | 700                   | 80–140                        | 90–140             | 90–170           | 80–140          | 80–140          | 80–140          | –                               |
|                        | Acciai da utensili e fusioni                  | temprato e rinvenuto                                         | 1100                  | 50–120                        | 70–130             | 70–160           | 50–120          | 50–120          | 50–120          | –                               |
|                        | Acciai inossidabili                           | ferritico, ricotto                                           | 700                   | 60–160                        | 110–200            | 120–200          | 60–170          | 60–170          | 60–170          | –                               |
| Ghisa acciaiosa        | martensitico, bonificato                      | 1000                                                         | 50–100                | 60–130                        | 60–100             | 50–100           | 50–100          | 50–100          | –               |                                 |
| M                      | Acciai inossidabili                           | austenitico e autenitico/<br>ferritico, trattato o temperato | 450–600<br>600–900    | 60–160<br>50–90               | 100–200<br>120–150 | 100–170<br>60–90 | 60–180<br>50–90 | 60–170<br>50–90 | 60–170<br>50–90 | –<br>–                          |
|                        |                                               | K                                                            | Ghisa grigia          | perlitica/ferritico           | 500–700            | –                | 100–160         | 100–200         | –               | –                               |
| perlitica/martensitico | 700–850                                       |                                                              |                       | –                             | 110–180            | 90–180           | –               | –               | –               | 100–150                         |
|                        | 800–1100                                      |                                                              |                       | –                             | 130–200            | 80–150           | –               | –               | –               | 90–140                          |
| Ghisa sferoidale       | ferritico                                     |                                                              | 550                   | –                             | 100–160            | 100–160          | –               | –               | –               | 130–170                         |
|                        | perlitica                                     |                                                              | 800                   | –                             | 120–220            | 70–140           | –               | –               | –               | 90–130                          |
| Ghisa temprata         | ferritico                                     |                                                              | 450                   | –                             | 90–180             | 100–200          | –               | –               | –               | 140–200                         |
|                        | perlitica                                     | 750                                                          | –                     | –                             | 80–150             | –                | –               | –               | 120–160         |                                 |
| N                      | Leghe di Alluminio stampato                   | non invecchiato                                              | 200                   | –                             | –                  | –                | 100–500         | –               | –               | 300–500                         |
|                        |                                               | invecchiato                                                  | 350                   | –                             | –                  | –                | 100–300         | –               | –               | 200–300                         |
|                        | Leghe di Alluminio da fusione                 | ≤ 12 % Si, invecchiato                                       | 250                   | –                             | –                  | –                | 100–500         | –               | –               | 100–500                         |
|                        |                                               | ≤ 12 % Si, rinvenuto, invecchiato                            | 300                   | –                             | –                  | –                | 100–300         | –               | –               | 100–300                         |
|                        |                                               | ≤ 12 % Si, non invecchiato                                   | 450                   | –                             | –                  | –                | 100–200         | –               | –               | 100–200                         |
|                        | Rame e Leghe di Rame<br>(Bronzo/Ottone)       | Automatici, Pb > 1 %                                         | 400                   | –                             | –                  | –                | 100–500         | –               | –               | 250–500                         |
|                        |                                               | Ottone, Bronzo                                               | 300                   | –                             | –                  | –                | 100–500         | –               | –               | 200–500                         |
|                        |                                               | Bronzoalluminio                                              | 500                   | –                             | –                  | –                | 100–300         | –               | –               | 150–300                         |
|                        |                                               | Rame e Rame Elettrolitico                                    | 200                   | –                             | –                  | –                | 100–300         | –               | –               | 150–300                         |
|                        | Materiali non metallici                       | Duroplastiche                                                | –                     | –                             | –                  | –                | 80–180          | –               | –               | 80–180                          |
|                        |                                               | Plastiche rinforzate                                         | –                     | –                             | –                  | –                | 60–150          | –               | –               | 60–150                          |
| Gomme dure             |                                               | –                                                            | –                     | –                             | –                  | 100–220          | –               | –               | 100–200         |                                 |
| S                      | Leghe resistenti al calore                    | Base-Fe, ricotto                                             | 700                   | –                             | –                  | –                | 20–50           | –               | 30–55           | 30–45                           |
|                        |                                               | Base-Fe, invecchiato                                         | 950                   | –                             | –                  | –                | 20–40           | –               | 30–50           | 20–35                           |
|                        |                                               | Base Ni o Co, ricotto                                        | 800                   | –                             | –                  | –                | 15–25           | –               | 25–35           | 15–25                           |
|                        |                                               | Base Ni o Co, da fusione                                     | 1100                  | –                             | –                  | –                | 10–20           | –               | 15–25           | 10–20                           |
|                        |                                               | Base Ni o Co, invecchiato                                    | 1200                  | –                             | –                  | –                | 10–20           | –               | 15–25           | 10–20                           |
|                        | Leghe di Titanio                              | Titanio puro                                                 | 500–700               | –                             | –                  | –                | 50–120          | –               | 50–120          | 60–120                          |
| Leghe Alpha+Beta       | invecchiato                                   | 700–1000                                                     | –                     | –                             | –                  | 30–50            | –               | 35–60           | 30–50           |                                 |
| H                      | Acciaio Temprato                              | temprato e rinvenuto                                         | 55 HRC<br>60 HRC      | –<br>–                        | –<br>–             | –<br>–           | –<br>–          | –<br>–          | –<br>–          | –<br>–                          |
|                        |                                               | Getti Temprati                                               | da fusione            | 41 HRC                        | –                  | –                | –               | –               | –               | –                               |
|                        | Ghisa Temprata                                | temprato e rinvenuto                                         | 55 HRC                | –                             | –                  | –                | –               | –               | –               | –                               |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

## Spitzenhöhe / Edge height / Altezza del filo di taglio

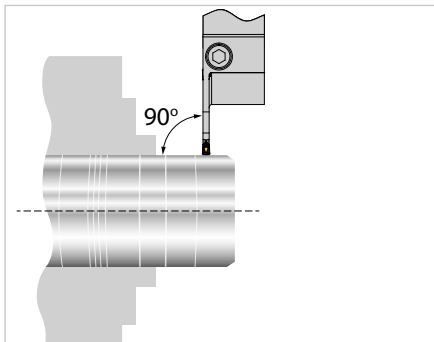


Die Spitzenhöhe sollte innerhalb einer Toleranz von  $\pm 0,1$  mm zur Werkzeugachse eingestellt sein. Dies ist besonders wichtig beim Abstechen ins Zentrum.

The edge height should be inside a tolerance of  $\pm 0.1$  mm from the centre line.

L'altezza del tagliente deve essere impostata entro una tolleranza di  $\pm 0,1$  mm dall'asse utensile. Questo accorgimento è indispensabile per tagli fino al centro.

## Werkzeugeinstellung / Tool positioning / Preparazione dell'utensile



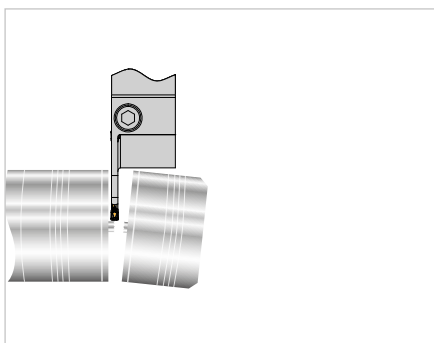
Das Stechwerkzeug muss unter einem Winkel von  $90^\circ$  zur Werkstückachse eingebaut sein.

The part-off tool should be positioned in  $90^\circ$  angle to the tool axis.

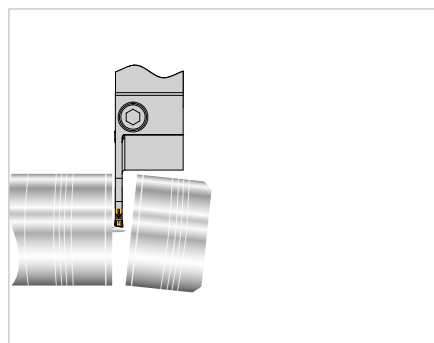
L'utensile di troncatura deve essere montato rispetto all'asse del pezzo con un angolo di  $90^\circ$ .

## Hinweise zum Abstechen / Recommendations for parting-off /

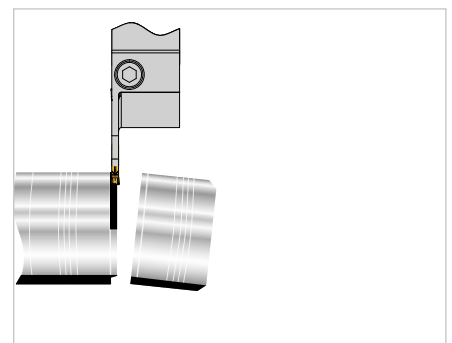
Suggerimenti per la troncatura



- Ab  $\varnothing 5$  mm den Vorschub „f“ um ca. 50% reduzieren. Nicht über Zentrum stechen (Bruchgefahr).
- Zum butzenfreien Abstechen rechte bzw. linke Schneidplatten verwenden. Zur Verringerung der seitlichen Abdrängkräfte den Vorschub um ca. 20% bis 50% reduzieren.
- Zur Verhinderung von Ringbildung rechte bzw. linke Schneidplatten verwenden. Vorschub „f“ aufgrund der seitlichen Abdrängkräfte um ca. 20% bis 50% reduzieren.



- From  $\varnothing 5$  mm reduce the feed rate “f” with approximately 50%. Do not cut over centre (risk of breakage).
- For “pip” free parting-off, use either right- or left-handed insert. To reduce deflection reduce the feed rate by 20 – 50%.
- To avoid ring formation use right- or left-handed inserts. Reduce feed rate by 20 – 50%.



- Da  $\varnothing 5$  mm a  $\varnothing 0$  mm ridurre avanzamento “f” di circa il 50%. Non proseguire oltre il centro (rischio di rottura).
- Per ottenere tagli sinistri utilizzare inserti destri. Per ridurre deviazione laterale, ridurre l'avanzamento di circa il 20 – 50%.
- Per un taglio sinistro di anelli utilizzare inserti destri. Ridurre l'avanzamento “F” tra il 20% e il 50% per ridurre la deviazione del taglio.

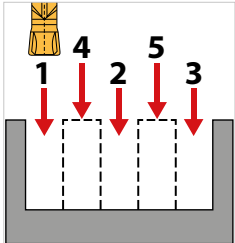
## Stechen von Außennuten / Machining of external grooves / Scanalatura radiale

Die häufigste Methode zur Herstellung von breiten Nuten zwischen 2 Schultern erfolgt durch Mehrfacheinsteichen, Stechdrehen, Schrägteilen und durch Auskammern.

The most popular way of producing wide grooves in between two shoulders are by multiple grooving, groove turning, ramping, and pocketing.

Il metodo più comune per produrre ampie gole fra due spalle è con la tornitura a tuffo, con scanalature affiancate, seguendo corrette sequenze.

## Mehrfacheinsteichen / Multiple grooving / Scanalatura a tuffo



Zuerst sind die vollen Nuten zu bearbeiten. Einstiche 1, 2 und 3. Danach werden die Stege 4 und 5 bearbeitet. Dadurch werden die Eckenradien geschützt und die Späne in die Mitte des Spanbrechers abgeführt. Stegbreite 0,6 bis 0,8 x Schneidplattenbreite EB.

First the full grooves are machined. Grooves 1, 2 and 3, thereafter 4 and 5. This protects the corner radius and the swarf comes of the centre of the chip breaker. Widths of 4 and 5 should be 0.6 – 0.8 x insert width (EB).

Prima di procedere, valutare il tipo di gola e scegliere la dimensione inserto adatta per larghezza e profondità. Eseguire scanalature 1, 2 e 3; successivamente 4 e 5. In tal modo l'inserto lavora con appoggio sui fianchi, in quelle successive senza appoggio ma solo sul rompitrucciolo centrale. Prevedere profondità di gola ridotte e ripetere l'operazione fino alla massima profondità.

## Allgemein / General / Generici

Grundsätzlich sollte darauf geachtet werden, dass das Stechwerkzeug so stabil wie möglich ausgewählt wird. Dadurch können Vibrationen verhindert und die Standzeit gesteigert werden.

Bei der Auswahl der Stechplatten ist zu beachten:

- Die Abstechbreite EB in mm
- Die Spanleitstufe für die Bearbeitung
- Den Einstellwinkel und den Eckenradius

Die Stechbreite sollte so schmal wie möglich und so breit wie nötig ausgewählt werden. Durch die Reduzierung der Stechbreite wird auch die Schnittkraft reduziert und kann in der Massenfertigung zudem auch zu enormen Einsparungen an Materialkosten führen. Nach Möglichkeit sind neutrale Schneiden einzusetzen, die eine bessere Spanbildung, geringere Abdrängkräfte und höhere Standzeiten erreichen.

Pay attention to selection of the correct tools. Tools should have minimum overhang to reduce vibrations and increase of tool life.

When selecting inserts, consider:

- Parting-off width in mm
- Chip breaker for the material
- Approach angle and corner radius

Select insert width as narrow as possible and as wide as necessary. By reducing the insert width, the cutting forces are reduced and especially important when mass producing less material is wasted. Whenever possible it is always recommended to use neutral inserts that offer better swarf control and tool life.

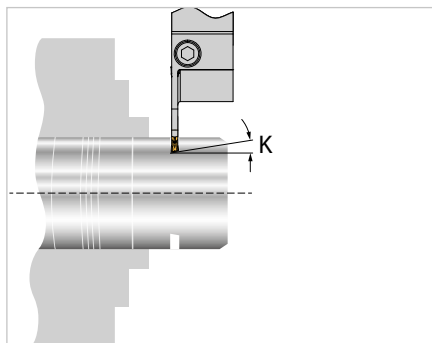
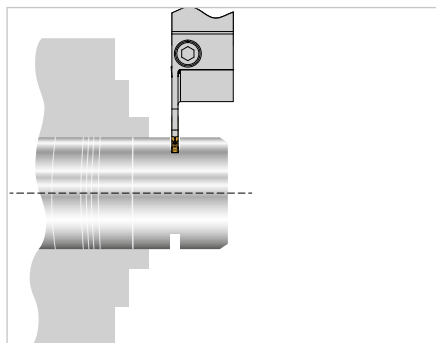
Scegliere sempre l'utensile più compatto possibile per una maggiore stabilità. Grazie a questo le vibrazioni vengono ridotte, la lavorazione è più stabile e la durata inserto aumentata.

Nella scelta dell'inserto di scanalatura è bene valutare:

- La larghezza di taglio in mm
- La forma di rompitrucciolo
- L'angolo di taglio ed il raggio di punta

La larghezza della troncatura deve essere il più stretto possibile – scegliere inserti proporzionati alla misura da realizzare. Riducendo la larghezza di taglio, si riduce la forza di taglio e può risultare in un enorme risparmio dei costi delle materie prime su grossi lotti produttivi.

## Auswirkungen auf die Bearbeitung / Effects on machining / Effetti sul ciclo



| Kriterien<br>Criteria<br>Criteri                         | Schneidplatte Neutral<br>Neutral insert<br>Inserto neutro | Schneidplatte rechts oder links<br>Right or left insert<br>Inserto destro o sinistro |
|----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------|
| Stabilität / Stability / Stabilità                       | Gut / Good / Buono                                        | Schlechter / Bad / Negativo                                                          |
| Restbutzen / Leftover pips / Testimone                   | Groß / Big / Grosso                                       | Gut / Good / Buono                                                                   |
| Gratbildung / Burr formation / Bave                      | Groß / Big / Grosso                                       | Gut / Good / Buono                                                                   |
| Vibrationen / Vibrations / Vibrazioni                    | Geringer / Less good / Minore                             | Hoch / High / Alto                                                                   |
| Oberflächengüte / Surface finish / Finitura superficiale | Gut / Good / Buono                                        | Schlechter / Bad / Negativo                                                          |
| Ebenheit / Straightness / Planarità                      | Gut / Good / Buono                                        | Schlechter / Bad / Negativo                                                          |
| Spanfluss / Chip flow / Evacuazione truciolo             | Gut / Good / Buono                                        | Schlechter / Bad / Negativo                                                          |
| Standzeit / Tool life / Vita inserto                     | Gut / Good / Buono                                        | Schlechter / Bad / Negativo                                                          |

Bei der Auswahl des Eckenradius ist zu beachten:

- ein kleiner Eckenradius reduziert die Belastung am Werkstück und führt zu geringerer Gratbildung.
- ein größerer Eckenradius ermöglicht höhere Vorschübe und führt zu längeren Standzeiten.

When selecting corner radius:

- A smaller radius reduces the pressure on the component and reduces burr formation
- A bigger radius offers higher feed rate potential and longer tool life.

Quando si seleziona il raggio di punta devono essere rispettate:

- Un piccolo raggio di punta riduce lo stress di taglio sul pezzo e porta a bave inferiori.
- Un raggio di punta più grande consente velocità di avanzamento superiore e porta a una maggior vita inserto.

## Butzenfreies Abstechen / Pip free parting-off / Troncatura

Um die Butzenbildung zu minimieren empfehlen wir geschliffene Stechplatten in Links- oder Rechtsausführung mit kleinst möglichem Einstellwinkel zu verwenden. Nur dadurch können Sie die gewünschte Werkstückqualität erzeugen.

Beachten Sie bitte, dass durch einen großen Einstellwinkel die Butzenbildung verbessert werden kann. Es kann jedoch zu einer nicht ebenen Fläche beim Abstechen führen, sich die Oberflächengüte verschlechtern und die Standzeit reduzieren wird. Bitte wählen Sie einen Halter mit kurzer Auskraglänge um eine hohe Stabilität zu erreichen.

In order to reduce the pip formation we recommend ground inserts in left- or right-hand execution with as small as possible approach angle. This may be the only way of achieving the desired surface requirement. Please note that a larger approach angle can reduce the pip formation, however can also lead to poor flatness, reduced surface finish and worse tool life. To obtain maximum stability always select a holder with minimum overhang.

Per ridurre al minimo il testimone consigliamo inserti rettificati nella versione sinistra o destra da utilizzare con il più piccolo angolo di impostazione possibile. Solo in questo modo è possibile ottenere una buona qualità del pezzo sia in termini di finitura che planarità. Il testimone può essere ridotto aumentando l'angolo di impostazione. Aumentando l'angolo di impostazione, può aumentare la deviazione del taglio portando ad una non planarità della faccia, ad una peggiore qualità superficiale e ad una durata ridotta. Scegliere sempre un utensile con il minor sbalzo per ottenere una elevata stabilità.

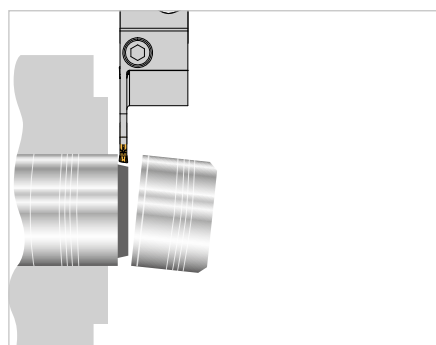
## Gratfreies Abstechen / Burr free parting-off / Troncatura senza bave

Um eine gute Werkstückqualität zu erzielen (und um die Gratbildung zu minimieren) setzen Sie bitte geschliffene Stechplatten in Links- oder Rechtsausführung mit kleinst möglichem stirnseitigen Einstellwinkel ein. Bitte beachten Sie, dass durch einen großen Einstellwinkel die Gratbildung minimiert wird. Durch kurze Ausspannlängen des Halters sowie sicherer Schraubenspannung der Stechplatte erreichen Sie eine gute Stabilität und somit eine optimale Geradheit beim Abstechen.

In order to obtain a good burr free surface finish we recommend ground inserts in left- or right-hand execution and with minimum approach angle. Please note that a larger approach angle can improve the burr formation. With short tool overhang and secure strong insert locking you achieve excellent stability and straightness while parting-off.

Al fine di ottenere una buona finitura superficiale (e ridurre al minimo la formazione di bave) scegliere inserti rettificati sinistri o destri con il minor angolo di impostazione anteriore. Notare che la formazione di bave è ridotto al minimo più è ampio l'angolo di impostazione. Per migliorare la rettilineità del taglio e quindi la planarità della superficie, scegliere staffaggi rigidi e utensili più corti possibile.

The image contains two technical drawings of a mechanical assembly. The top drawing is a cross-sectional view of a shaft with a key and a pulley. The shaft is shown in a grey block, and the pulley is shown in a grey block. The key is shown in a grey block. The pulley has a central hole and a surrounding ring. The bottom drawing is a side view of the pulley, showing its profile and the keyway. The pulley has a central hole and a surrounding ring. The keyway is shown as a rectangular slot in the shaft.



| <b>Wandstärke in mm</b><br><i>Wall thickness in mm</i><br>Spessore parete in mm | <b>Schneideinsatz</b><br><b>Stechbreite</b><br><i>Insert width</i><br>Larghezza inserto |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| < 5                                                                             | 1,5                                                                                     |
| 5–8                                                                             | 1,5–2                                                                                   |
| 8–12                                                                            | 2,5                                                                                     |
| 12–...                                                                          | 3                                                                                       |

*Excessive tool overhang often leads to instability, tool breakage and poor component finish. Always select tools as short and narrow as possible. Higher approach angle will lead to lower cutting forces.*

Lunghezze eccessive di utensili portano ad instabilità della lavorazione e ad una ridotta finitura superficiale. Scegliere sempre utensili più corti possibile e con larghezze di gola più piccole possibili. Angoli di impostazione alti riducono le forze di taglio.

### Parting-off small diameters and thin walled components

**Um die Schnittkräfte zu minimieren, setzen Sie bitte präzisionsgeschliffene Stechplatten ein. Schmale Abstechbreiten kombiniert mit scharfen Schneidkanten sind zu empfehlen.**

*In order to reduce cutting forces, we recommend ground inserts. Narrow part-off widths with sharp cutting edges is recommended.*

Per ridurre al minimo le forze di taglio utilizzare inserti di troncatura rettificati. Sono suggeriti inserti con larghezza minima e tagliente affilato.

Präzisionseinstechen ist die wirtschaftlichste und produktivste Methode zur Herstellung von Nuten. Im ARNO-Stechprogramm stehen Ihnen hier eine Vielfalt an Stechbreiten zur Verfügung. In der Breitentoleranz auf  $\pm 0.02$  mm geschliffen.

*Precision grooving is the most economical and productive method of groove production. In the ARNO grooving range you will find numerous groove widths, ground to +/- 0.02 mm width tolerance.*

La scanalatura con inserti di precisione è il metodo più economico e produttivo per la lavorazione di gole. Nel programma ARNO una varietà di larghezze di taglio sono disponibili con Tolleranza sulla larghezza  $\pm 0.02$  millimetri.

| Geometrie<br>Geometry<br>Geometria | Stechbreite ET (mm)<br>Groove width ET (mm)<br>Larghezza taglio ET (mm) | Vorschub (mm/U)<br>Feed rate (mm/rev)<br>Avanzamento (mm/U) |
|------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------|
| S1                                 | 1,5                                                                     | 0,1                                                         |
| F1                                 | 2                                                                       | 0,1                                                         |
| T1/S1                              | 2                                                                       | 0,125                                                       |
| M1                                 | 2                                                                       | 0,15                                                        |
| ALU                                | 2                                                                       | 0,1                                                         |
| T1/S1                              | 3                                                                       | 0,15                                                        |
| M1                                 | 3                                                                       | 0,18                                                        |
| ALU                                | 3                                                                       | 0,15                                                        |



**SE-Steichsystem***SE-Grooving system*

## SE-Sistema di troncatura

Ein- und Abstechen,  
Kopierdrehen*Grooving and parting,  
copy turning*Troncatura, scanalatura e  
scanalature di copiatura

|                           |                               |                               |         |
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## Monoblockhalter „SE“ für zweischneidige Wendeschneidplatten

*Monoblockholder “SE” for  
double sided inserts*

Steli monoblocco “SE” per  
inserti bitaglianti

2

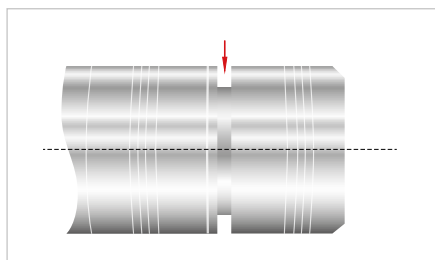
### Monoblockhalter 12 × 12 bis 20 × 20 mm

*Monoblock holders  
12 × 12 to 20 × 20 mm*

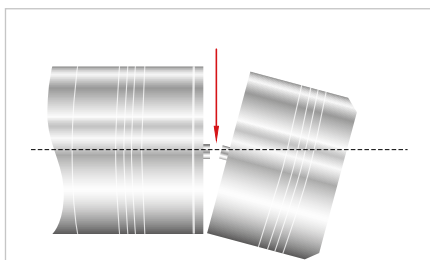
Utensili monoblocco  
da 12 × 12 a 20 × 20 mm



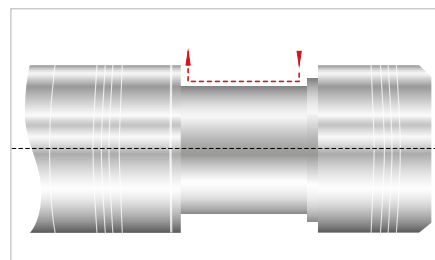
**Einstechen** / Grooving / Scanalatura



**Abstechen** / Parting-off / Troncatura



**Kopierdrehen** / Copy turning / Copiatura



## Systemvorstellung

Monoblockhalter „SE“ für zweiseitige Wendeschneidplatten in der Größe SE24 mit den Stechbreiten 2 bis 3 mm.

- Schneideinsätze mit EB = 2 bis 3 mm
- Grundhalter 12 × 12 bis 20 × 20 mm
- Zum Einstechen, Abstechen und Kopierdrehen

## Fakten

- Monoblockausführung
  - Anwendungssicher, einfaches Handling – nur ein Ersatzteil
- Aktive Wendeschneidplattenklemmung mit Fixanschlag
  - Genaue Schneidenpositionierung – kein Herausziehen der Wendeschneidplatte möglich
- Zweiseitige Wendeschneidplatten
  - Hohe Wirtschaftlichkeit
- Direkt gepresste Wendeschneidplatte mit speziellen Geometrien
  - Kostengünstige und optimale Lösung für sichere Stechprozesse
  - Geschliffene Ausführung

## Introduction

Monoblockholder "SE" for double sided inserts size SE24 with groove width from 2 – 3 mm

- Inserts with width = 2 to 3 mm
- Shank sizes from 12 × 12 to 20 × 20 mm
- For grooving, part-off and copy turning (-M2 geometry)

## Features

- Monoblock design
  - Reliable and user friendly – only one spare part
- Active insert clamping with fixed stop
  - Accurate insert positioning – pulling out the insert is not possible
- Double edged inserts
  - High productivity
- Directly pressed inserts with dedicated geometries
  - Cost efficient and optimum solution for reliable groove production
  - Ground version

## Descrizione

Steli monoblocco "SE" per inserti bitaglienti dimensione SE24 in larghezze da 2 a 3 mm

- Larghezza inserto EB = da 2 a 3 mm
- Steli da 12 × 12 fino a 20 × 20 mm
- Per scanalatura, troncatura e scanalatura di copiatura (Geometria -M2)

## Caratteristiche

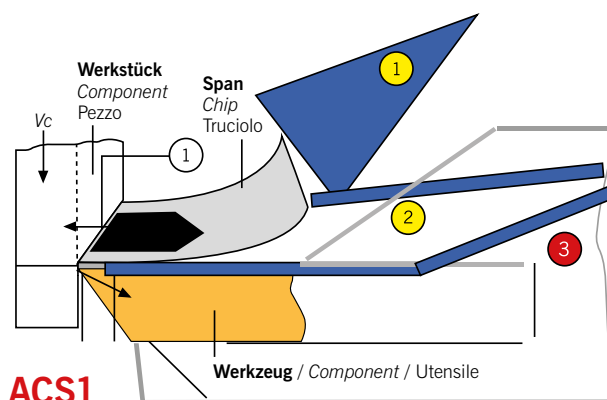
- Monoblocco
  - Sicuro e di semplice utilizzo – senza ricambi
- Bloccaggio assiale con fermo
  - Posizionamento preciso e sicuro dell'inserto – impossibile lo spostamento in sede
- Bi-tagliente
  - Economico
- Inserti con geometrie specifiche
  - Forme specifiche per materiali e per una lavorazione affidabile
  - Versione rettificata

# ARNO®-Stechdrehsystem SE

## ARNO®-SE-Grooving System

## ARNO®-SE-Sistema di Scanalatura

SE-Stechdrehsystem mit ARNO®-Cooling-System (ACS1) zum Einstechen, Abstechen, Längs- und Kopierdrehen für radiales Einstechen von 2–3 mm Einstechbreite und Einstechtiefen von 12 bzw. 21 mm. Durch das Doppelprisma der Schneideinsätze ist eine sichere Spannung garantiert. Der Fixanschlag verspricht dabei eine exakte Wiederholgenauigkeit. Die Schneideinsätze sind in drei Geometrien und fünf Sorten erhältlich. Die Geometrie M2 ist dabei speziell zum Einstechen-, Längs- und Kopierdrehen von Stahl und rostfreien Werkstoffen konzipiert, die Geometrie T1 ist für die Bearbeitung von Stahl und Gusswerkstoffen geeignet. Die Schneideinsätze mit diesen Geometrien sind präzisionsgesintert. Eine geschliffene Geometrie -ALU wird für die Aluminiumbearbeitung angeboten. Alle Klemmhalter verfügen über die ACS1 Innenkühlung.



### ACS1

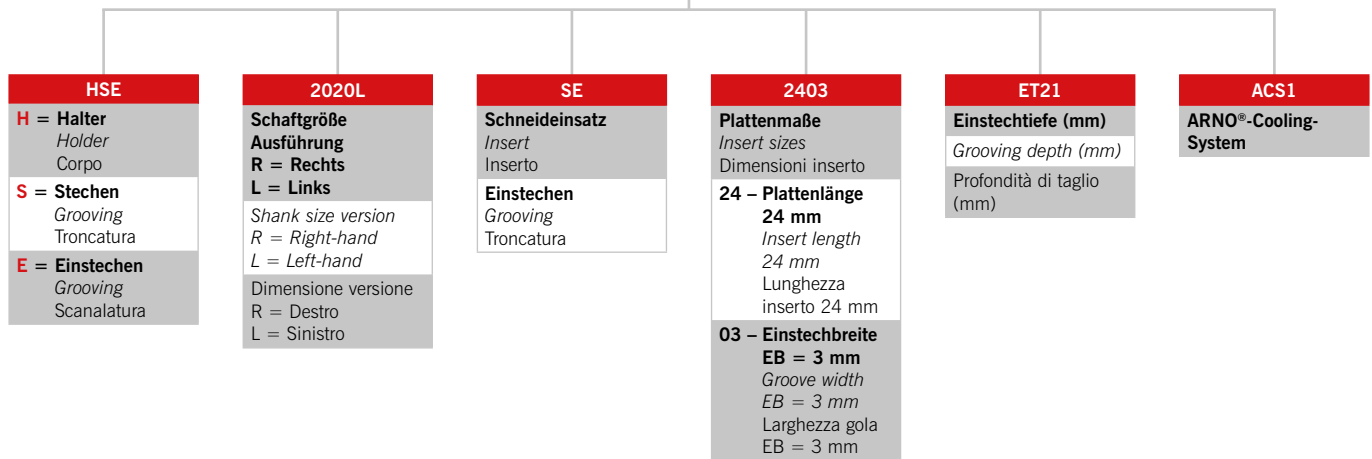
- 1 „Externe Kühlung“ über Spritzdüse  
External coolant from coolant jet  
Refrigerazione “estesa” dei sistemi tradizionali (su truciolo)
- 2 „Interne Kühlung“ über Halter oder Spannpratze  
Through tool coolant via holder or clamp  
Refrigerazione direzionata tramite adduzioni interne classiche (su truciolo)
- 3 Neue „ACS-Kühlung“ direkt durch den Plattensitz  
New ACS-coolant through the insert seat  
Nuovo ACS cooling system direttamente sul filo taglient



The SE groove turn system with through tool coolant (ACS1 = ARNO®-Cooling-System) for radial grooving applications is available in groove width from 2–3 mm and groove depth from 12 or 21 mm. Due to the double prism insert seat secure location is guaranteed. The fixed stop ensures precise insert repeatability. The inserts are available in 3 geometries and 5 grades. The M2 geometry is especially designed for grooving, turning and copy turning in steel and stainless steel materials, the T1 geometry is for machining steel and cast materials. Both these inserts are precision sintered. A ground -ALU geometry will be offered for aluminium machining. All tool holders are available with through tool coolant (ACS1).

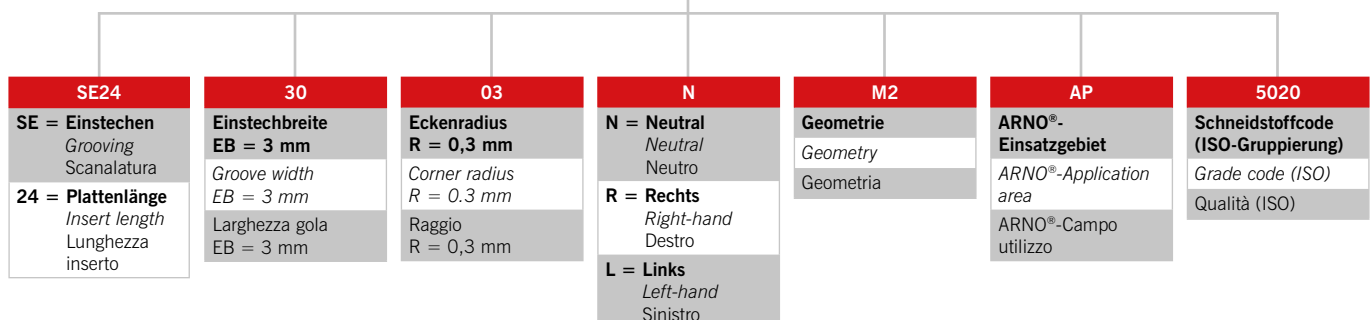
Sistema SE di scanalatura di tornitura ARNO®-Cooling-System (ACS1) con passaggio interno refrigerante per scanalatura, troncatura, scanalatura di copiatura con larghezza di taglio da 2 a 3 mm e profondità di gola utile di 12 o 21 mm. Grazie alla sede inserto a doppio prisma, gli inserti da taglio vengono serrati garantendo la massima stabilità. La battuta di appoggio garantisce ripetibilità di posizione tra gli inserti. Gli inserti sono disponibili in tre geometrie e cinque qualità. La geometria M2 è specificatamente progettata per la scanalatura di copiatura dell'acciaio e dell'acciaio inossidabile, la geometria T1 è adatta alla lavorazione di acciaio e fusioni. Queste geometrie di inserti da taglio vengono ottenute tramite sinterizzazione di precisione. Una terza geometria, lappata -ALU è disponibile per la lavorazione di alluminio e materiali non ferrosi. Tutti gli steli sono previsti con adduzione interna del refrigerante ACS1.

## Monoblockhalter / Monoblock holders / Utensili monoblocco

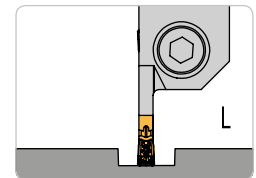
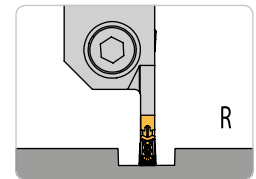
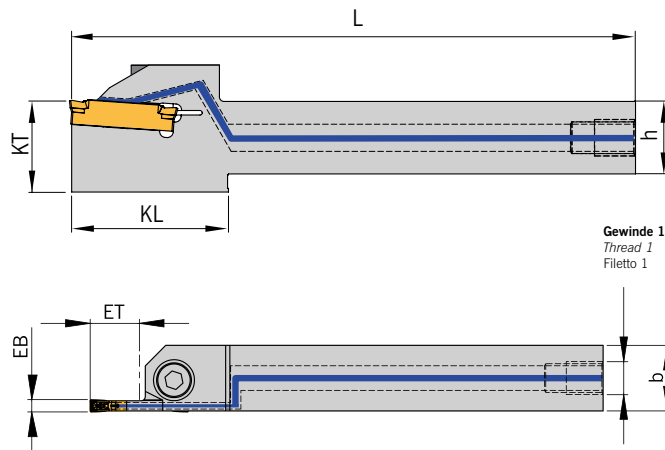


2

## Schneideinsätze / Inserts / Inserti



## HSE-ACS1-H..



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Monoblockhalter mit Innenkühlung ACS1 von hinten (ET = 12 mm)

Monoblock holder with through tool coolant ACS1 access from the back (ET = 12 mm)

Utensile monoblocco con adduzione interna ACS1 posteriore (ET = 12 mm)

| Bezeichnung<br>Designation<br>Articolo | EB  | ET | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|----|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1616L-SE2402-ET12-ACS1-H1          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET12-ACS1-H1          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET12-ACS1-H1          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET12-ACS1-H1          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET12-ACS1-H1          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET12-ACS1-H1          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET12-ACS1-H1          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET12-ACS1-H1          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET12-ACS1-H2          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET12-ACS1-H2          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET12-ACS1-H2          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET12-ACS1-H2          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET12-ACS1-H2          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET12-ACS1-H2          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET12-ACS1-H2          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET12-ACS1-H2          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET12-ACS1-H3          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET12-ACS1-H3          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET12-ACS1-H3          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET12-ACS1-H3          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | –              | 35 | 20 | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET12-ACS1-H3          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET12-ACS1-H3          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET12-ACS1-H3          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET12-ACS1-H3          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-30...                         |

Hinweis: Zubehör muss separat bestellt werden.  
Remark: Accessories must be ordered separately.  
Nota: Gli accessori devono essere ordinati separatamente.



**Monoblockhalter mit Innenkühlung ACS1 von hinten (ET = 21 mm)**
*Monoblock holder with through tool coolant ACS1 access from the back (ET = 21 mm)*
*Utensile monoblocco con adduzione interna ACS1 posteriore (ET = 21 mm)*

| Bezeichnung<br>Designation<br>Articolo | EB  | ET | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|----|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1616L-SE2402-ET21-ACS1-H1          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET21-ACS1-H1          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET21-ACS1-H1          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET21-ACS1-H1          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET21-ACS1-H1          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET21-ACS1-H1          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET21-ACS1-H1          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET21-ACS1-H1          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | M8x1                               | –                                  | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET21-ACS1-H2          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET21-ACS1-H2          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET21-ACS1-H2          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET21-ACS1-H2          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET21-ACS1-H2          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET21-ACS1-H2          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET21-ACS1-H2          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET21-ACS1-H2          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/8"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET21-ACS1-H3          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET21-ACS1-H3          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET21-ACS1-H3          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET21-ACS1-H3          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | –              | 44 | 20 | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET21-ACS1-H3          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET21-ACS1-H3          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET21-ACS1-H3          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET21-ACS1-H3          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | –              | –  | –  | G 1/4"                             | –                                  | ●     | SE 24-30...                         |

Hinweis: Zubehör muss separat bestellt werden.

Remark: Accessories must be ordered separately.

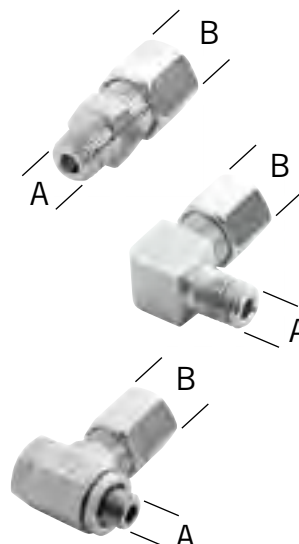
Nota: Gli accessori devono essere ordinati separatamente.

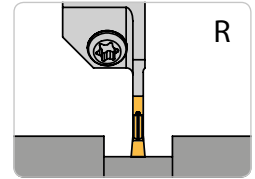
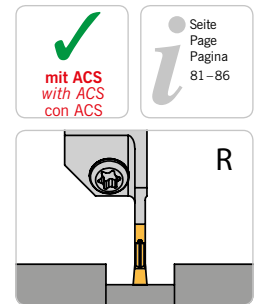
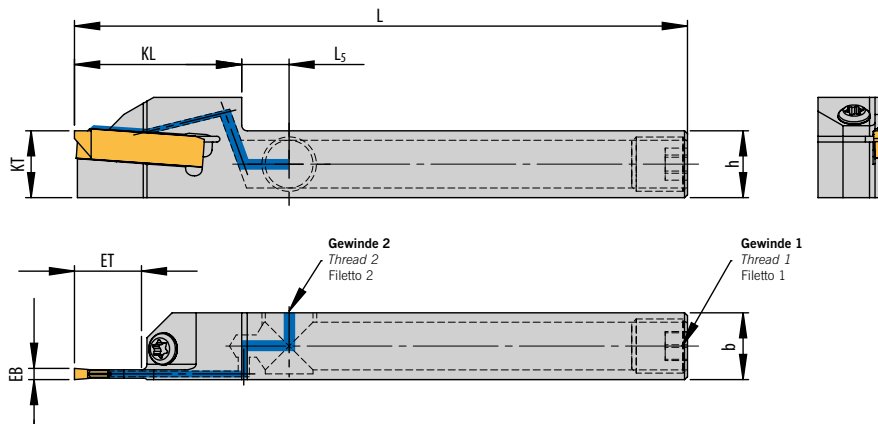
**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo                   | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------------------------|---------------------------|----------------------------|
| HSE 1616...HSE 2020... -SE24...ET...ACS1... | DIN912 M5x16–12.9         | KP 1321 (4 mm)             |

**Zubehör / Accessories / Accessori**

| Bezeichnung<br>Designation<br>Articolo | A    | B       |
|----------------------------------------|------|---------|
| KA 001                                 | M8x1 | Ø 6 mm  |
| KA 002                                 | 1/8" | Ø 6 mm  |
| KA 003                                 | 1/4" | Ø 10 mm |
| KA 004                                 | M8x1 | Ø 6 mm  |
| KA 005                                 | 1/8" | Ø 6 mm  |
| KA 006                                 | M8x1 | Ø 6 mm  |
| KA 007                                 | 1/8" | Ø 6 mm  |
| KA 008                                 | 1/4" | Ø 10 mm |



**HSE-S-ACS1-S..**

**Monoblockhalter mit Innenkühlung ACS1 von der Seite (ET=12 mm) – für Langdrehautomaten**

Monoblock holder with internal cooling ACS1 access from the side (ET=12 mm) – for swiss type machines

Utensile monoblocco con adduzione interna ACS1 laterale (ET=12 mm) – per fantina mobile

| Bezeichnung<br>Designation<br>Articolo | EB  | ET | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>5</sub> | AKL | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|----|------------------|----------------|----|----|-----|----------------|-----|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1212S-R-SE2402-ET12-ACS1-H2-S2G    | 2,0 | 12 | –                | –              | 12 | 12 | 110 | 8,5            | 30  | –  | 12 | G 1/8"                             | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1212S-R-SE2403-ET12-ACS1-H2-S2G    | 3,0 | 12 | –                | –              | 12 | 12 | 110 | 8,5            | 30  | –  | 12 | G 1/8"                             | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 1616S-R-SE2402-ET12-ACS1-H2-S2G    | 2,0 | 12 | –                | –              | 16 | 16 | 110 | 8,5            | 30  | –  | 16 | G 1/8"                             | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1616S-R-SE2403-ET12-ACS1-H2-S2G    | 3,0 | 12 | –                | –              | 16 | 16 | 110 | 8,5            | 30  | –  | 16 | G 1/8"                             | G 1/8"                             | ●     | SE 24-30...                         |

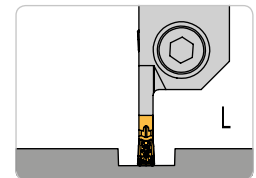
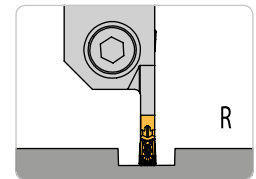
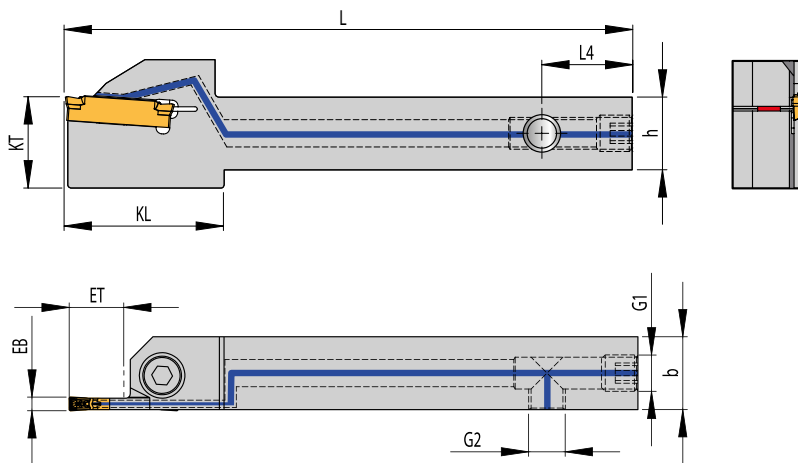
**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo                    | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|----------------------------------------------|---------------------------|----------------------------|
| HSE 1212S...HSE 1616S...-SE24...ET...ACS1... | AS 0022                   | KS 8000                    |

Kühlmittelanschlüsse finden Sie auf Seite 74

Coolant Supply see page 74

Raccordo vedere pagina 74

**HSE-ACS1-S..**


Rechte Ausführung abgebildet  
 Right-hand execution shown  
 Versione destra in figura

**Monoblockhalter mit Innenkühlung ACS1 von der Seite (ET = 12 mm)**

Monoblock holder with through tool coolant ACS1 access from the side (ET = 12 mm)

Utensile monoblocco con adduzione interna ACS1 laterale (ET = 12 mm)

| Bezeichnung<br>Designation<br>Articolo | EB  | ET | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|----|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1616L-SE2402-ET12-ACS1-S1          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET12-ACS1-S1          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET12-ACS1-S1          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET12-ACS1-S1          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET12-ACS1-S1          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET12-ACS1-S1          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET12-ACS1-S1          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET12-ACS1-S1          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET12-ACS1-S2          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET12-ACS1-S2          | 2,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET12-ACS1-S2          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET12-ACS1-S2          | 3,0 | 12 | –                | –              | 16 | 16 | 125 | 20             | 35 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET12-ACS1-S2          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET12-ACS1-S2          | 2,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET12-ACS1-S2          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET12-ACS1-S2          | 3,0 | 12 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |

 **ARNO® SpecialDesign**

Diese Monoblockhalter bekommen Sie mit Ihren spezifischen Kühlan schlüssen.

Ein Anfrageblatt hierzu finden Sie auf Seite 76 oder im Internet unter: [www.arno.de/service/downloads](http://www.arno.de/service/downloads)

**Bitte beachten Sie den Hinweis zur Verwendung des Halters auf KMH-Werkzeugaufnahme (VDI) Form C auf Seite „SE-Anfrage“ auf Seite 76!**

The coolant inlet can be supplied to your specification,

please complete enquiry sheet on page 76 or download this from: [www.arno.de/service/downloads](http://www.arno.de/service/downloads)

Please refer to notes for using KMH tool holder (VDI) Form C on page “76!”

Per altre richieste compilare modulo a pag. 76 “Richiesta utensili HSE-ACS1” o scaricarlo da: [www.arno.de/service/downloads](http://www.arno.de/service/downloads)

Vedere i suggerimenti di utilizzo degli adattatori KMH (VDI) forma C a pagina 76!

**Monoblockhalter mit Innenkühlung ACS1 von der Seite (ET = 21 mm)**
*Monoblock holder with through tool coolant ACS1 access from the side (ET = 21 mm)*
*Utensile monoblocco con adduzione interna ACS1 laterale (ET = 21 mm)*

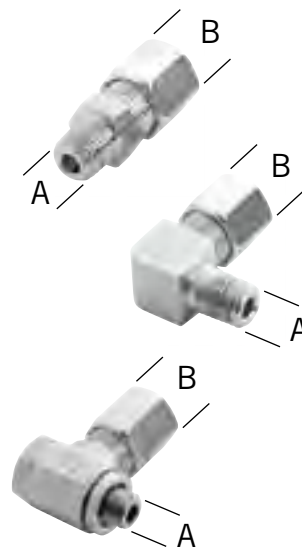
| Bezeichnung<br>Designation<br>Articolo | EB  | ET | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|----|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1616L-SE2402-ET21-ACS1-S1          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET21-ACS1-S1          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET21-ACS1-S1          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET21-ACS1-S1          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET21-ACS1-S1          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET21-ACS1-S1          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET21-ACS1-S1          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET21-ACS1-S1          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 1616L-SE2402-ET21-ACS1-S2          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1616R-SE2402-ET21-ACS1-S2          | 2,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1616L-SE2403-ET21-ACS1-S2          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 1616R-SE2403-ET21-ACS1-S2          | 3,0 | 21 | –                | –              | 16 | 16 | 125 | 20             | 44 | 20 | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 2020L-SE2402-ET21-ACS1-S2          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 2020R-SE2402-ET21-ACS1-S2          | 2,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 2020L-SE2403-ET21-ACS1-S2          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |
| HSE 2020R-SE2403-ET21-ACS1-S2          | 3,0 | 21 | –                | –              | 20 | 20 | 125 | 20             | –  | –  | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |

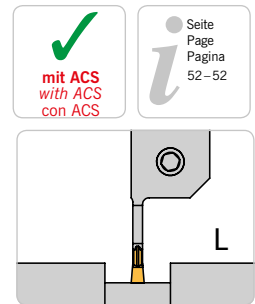
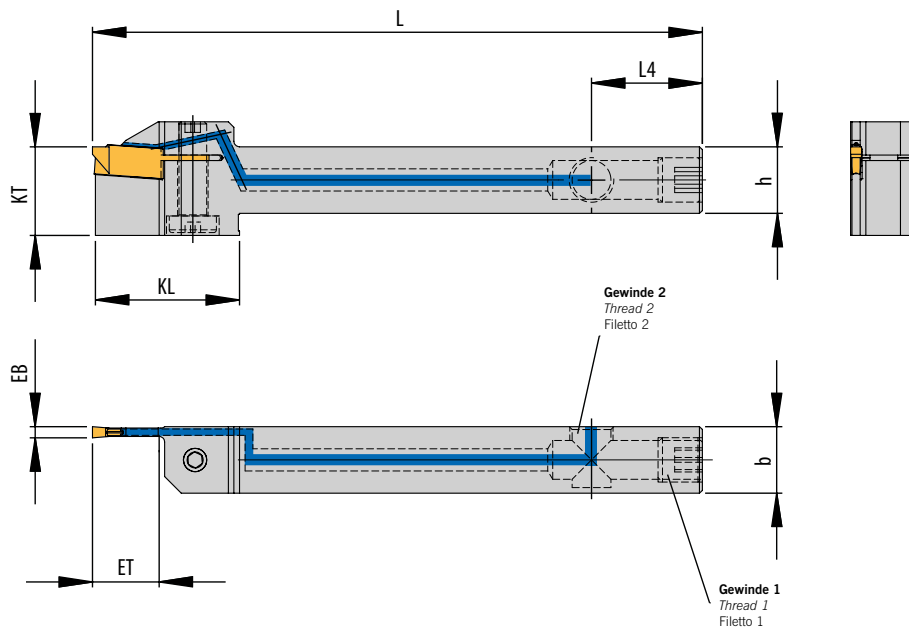
**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo                   | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------------------------|---------------------------|----------------------------|
| HSE 1616...HSE 2020... -SE24...ET...ACS1... | DIN912 M5x16–12.9         | KP 1321 (4 mm)             |

**Zubehör / Accessories / Accessori**

| Bezeichnung<br>Designation<br>Articolo                                                         | A    | B      |
|------------------------------------------------------------------------------------------------|------|--------|
| <b>KA 001</b> <b>Kühlmittelsanschluss – gerade</b><br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| <b>KA 002</b> <b>Raccordo – dritto</b>                                                         | 1/8" | Ø 6 mm |
| <b>KA 004</b> <b>Kühlmittelsanschluss – winklig, fest</b><br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| <b>KA 005</b> <b>Raccordo – angolato</b>                                                       | 1/8" | Ø 6 mm |
| <b>KA 006</b> <b>Schwenkverschraubung</b><br>Swivelling screw-fitting                          | M8x1 | Ø 6 mm |
| <b>KA 007</b> <b>Raccordo – orientabile</b>                                                    | 1/8" | Ø 6 mm |



**HSE-UD-ACS1-S..**

**Monoblockhalter mit Innenkühlung ACS1 von der Seite (ET=12 mm) – mit Spannung von oben und unten**

Monoblock holder with through tool coolant ACS1 access from the side (ET = 12 mm) – locking from top and bottom

Utensile monoblocco con adduzione interna ACS1 laterale (ET = 12 mm) – Bloccaggio da sopra e sotto

| Bezeichnung<br>Designation<br>Articolo | EB  | ET   | D <sub>max</sub> | D <sub>R</sub> | h  | b  | L   | L <sub>4</sub> | KL | KT | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 25 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|-----|------|------------------|----------------|----|----|-----|----------------|----|----|------------------------------------|------------------------------------|-------|-------------------------------------|
| HSE 1212UD-L-SE2402-ET12-ACS1-S1       | 2,0 | 12,0 | –                | –              | 12 | 12 | 110 | 20             | 26 | 16 | M8x1                               | M8x1                               | ●     | SE 24-20...                         |
| HSE 1212UD-L-SE2403-ET12-ACS1-S1       | 3,0 | 12,0 | –                | –              | 12 | 12 | 110 | 20             | 26 | 16 | M8x1                               | M8x1                               | ●     | SE 24-30...                         |
| HSE 1212UD-L-SE2402-ET12-ACS1-S2       | 2,0 | 12,0 | –                | –              | 12 | 12 | 110 | 20             | 26 | 16 | M8x1                               | G 1/8"                             | ●     | SE 24-20...                         |
| HSE 1212UD-L-SE2403-ET12-ACS1-S2       | 3,0 | 12,0 | –                | –              | 12 | 12 | 110 | 20             | 26 | 16 | M8x1                               | G 1/8"                             | ●     | SE 24-30...                         |

**Ersatzteile / Spare parts / Ricambi**

| Halter<br>Holder<br>Stelo    | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|------------------------------|---------------------------|----------------------------|
| HSE 1212UD...-SE24...ACS1... | AS 0084                   | KP 3111                    |

Kühlmittelanschlüsse finden Sie auf Seite 74

Coolant Supply see page 74

Raccordo vedere pagina 74

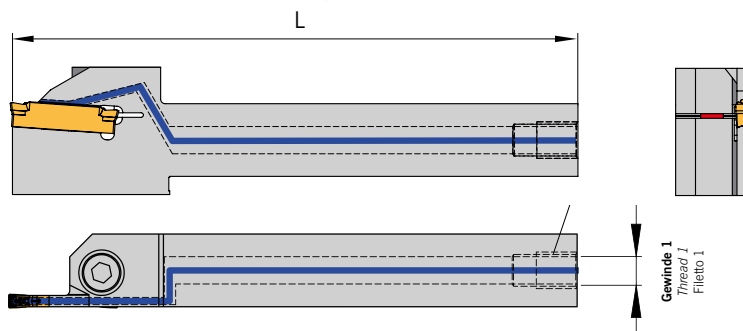
Enquiry holder HSE-ACS1 with special dimensions

Richiesta utensili HSE-ACS1 con dimensioni speciali

**Monoblockhalter mit Innenkühlung ACS1 von hinten**

Monoblock holder with through tool coolant access from the back

Utensile monoblocco con adduzione interna ACS1 posteriore

Aus Halter  
From holder  
Da utensileGewinde 1  
Thread 1  
Filetto 1

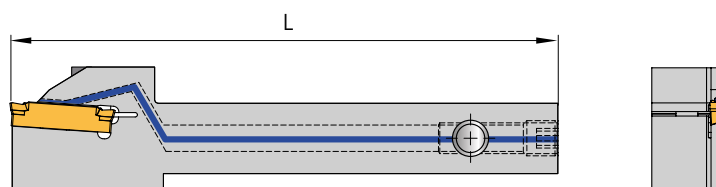
L

|  |      |       |       |  |
|--|------|-------|-------|--|
|  | M8x1 | G1/8" | G1/4" |  |
|--|------|-------|-------|--|

**Monoblockhalter mit Innenkühlung ACS1 von der Seite**

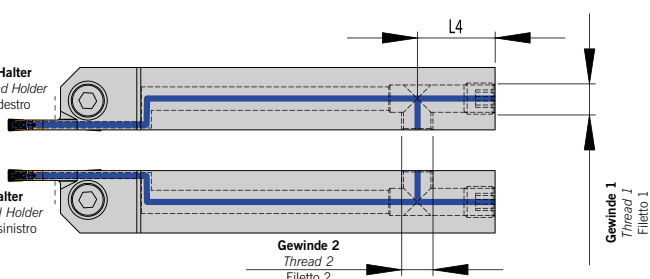
Monoblock holder with through tool coolant access from the side

Utensile monoblocco con adduzione interna ACS1 laterale

**Ausführung S. – Das Gewinde 2 ist auf der gleichen Seite wie die Schneide**

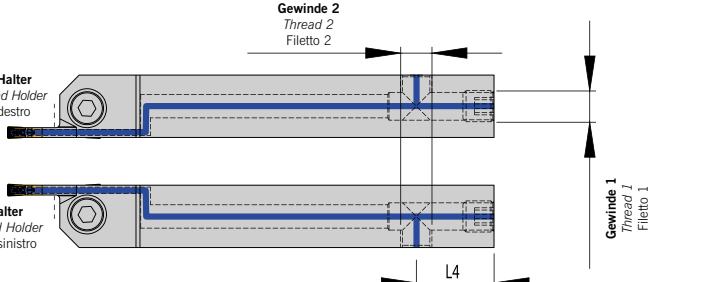
Design S. – Thread 2 is on the same side as the cutting edge

Versione S. – Filetto 2 sul medesimo lato dell'inserto

Bitte ankreuzen:  
Please select:  
Prego indicare:Rechter Halter  
Right-hand Holder  
Utensile destroLinker Halter  
Left-hand Holder  
Utensile sinistroGewinde 2  
Thread 2  
Filetto 2Gewinde 1  
Thread 1  
Filetto 1**Ausführung SG. – Das Gewinde 2 ist gegenüber der Schneide**

Design SG. – Thread 2 is on the opposite side of the cutting edge

Versione SG. – Filetto 2 sul lato opposto l'inserto

Bitte ankreuzen:  
Please select:  
Prego indicare:Rechter Halter  
Right-hand Holder  
Utensile destroLinker Halter  
Left-hand Holder  
Utensile sinistroGewinde 1  
Thread 1  
Filetto 1Gewinde 2  
Thread 2  
Filetto 2L<sub>4</sub>

L

|  |      |       |      |       |  |  |
|--|------|-------|------|-------|--|--|
|  | M8x1 | G1/8" | M8x1 | G1/8" |  |  |
|--|------|-------|------|-------|--|--|

Diese Halter fertigen wir Ihnen zum  
Preis des Standardwerkzeuges.This tool we produce to the price  
of the standard tool.Questi utensili vengono  
realizzati al prezzo dello standard.**Hinweis bei Verwendung auf KMH-Werkzeugaufnahme (VDI) Form C**Remark by using the KMH holders  
(VDI) Form CNota sull'utilizzo adattatori KMH  
(VDI) Forma CBeim Einsatz der Halter in VDI-Aufnahmen  
Form C bitte die Gesamtlänge (L) nach folgender  
Maximallänge festlegen:When using VDI holders Form C, please set overall  
length (L) by following maximum lengths:Con l'utilizzo di adattatori VDI forma C impostare la  
lunghezza totale (L) secondo la seguente tabella:

| ET12                            | L   |
|---------------------------------|-----|
| HSE 1616L-SE2402-ET.... ACS1... | 90  |
| HSE 1616R-SE2402-ET.... ACS1... |     |
| HSE 1616L-SE2403-ET.... ACS1... |     |
| HSE 1616R-SE2403-ET.... ACS1... |     |
| HSE 1616L-SE2404-ET.... ACS1... |     |
| HSE 1616R-SE2404-ET.... ACS1... |     |
| HSE 2020L-SE2402-ET.... ACS1... | 94  |
| HSE 2020R-SE2402-ET.... ACS1... |     |
| HSE 2020L-SE2403-ET.... ACS1... |     |
| HSE 2020R-SE2403-ET.... ACS1... |     |
| HSE 2020L-SE2404-ET.... ACS1... |     |
| HSE 2020R-SE2404-ET.... ACS1... |     |
| HSE 2525L-SE2403-ET.... ACS1... | 107 |
| HSE 2525R-SE2403-ET.... ACS1... |     |
| HSE 2525L-SE2404-ET.... ACS1... |     |
| HSE 2525R-SE2404-ET.... ACS1... |     |
| HSE 2525L-SE2405-ET.... ACS1... |     |
| HSE 2525R-SE2405-ET.... ACS1... |     |

| ET21                            | L   |
|---------------------------------|-----|
| HSE 1616L-SE2402-ET.... ACS1... | 99  |
| HSE 1616R-SE2402-ET.... ACS1... |     |
| HSE 1616L-SE2403-ET.... ACS1... |     |
| HSE 1616R-SE2403-ET.... ACS1... |     |
| HSE 1616L-SE2404-ET.... ACS1... |     |
| HSE 1616R-SE2404-ET.... ACS1... |     |
| HSE 2020L-SE2402-ET.... ACS1... | 103 |
| HSE 2020R-SE2402-ET.... ACS1... |     |
| HSE 2020L-SE2403-ET.... ACS1... |     |
| HSE 2020R-SE2403-ET.... ACS1... |     |
| HSE 2020L-SE2404-ET.... ACS1... |     |
| HSE 2020R-SE2404-ET.... ACS1... |     |
| HSE 2525L-SE2403-ET.... ACS1... | 116 |
| HSE 2525R-SE2403-ET.... ACS1... |     |
| HSE 2525L-SE2404-ET.... ACS1... |     |
| HSE 2525R-SE2404-ET.... ACS1... |     |
| HSE 2525L-SE2405-ET.... ACS1... |     |
| HSE 2525R-SE2405-ET.... ACS1... |     |

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## Beschichtet / Coated / Rivestito

### AM5040

PVD-beschichtete Hartmetallsorte.

Eine zähe, universell einsetzbare Sorte für niedrige und mittlere Schnittgeschwindigkeiten. Hauptanwendungsbereich für rostfreie Stähle sowie für die Stahlbearbeitung. Gute Prozesssicherheit sowie beständig gegen Schneidkantenausbrüche.

*PVD coated carbide.*

*A tough but universal grade for low to medium cutting speeds. The main application area being stainless steel and steel.*

Metallo duro rivestito PVD.

Qualità universale per velocità medio basse. Campo di applicazione principale acciai inossidabili, superleghe, acciai legati. Notevole robustezza e resistenza alla scheggiatura.

### AP2240

CVD-beschichtete Hartmetallsorte.

Die AP2240 überzeugt mit großer Zähigkeit und hoher Wärmebeständigkeit und erreicht dadurch außerordentliche Standzeiten. Durch die stabilen Schneidkanten wird die Prozesssicherheit deutlich höher. Hauptanwendung dieser Sorte liegt in der Stahl- und Gussbearbeitung. In der Nebenanwendung ist sie auch für rostfreie Stähle zu empfehlen.

*CVD coated carbide grade.*

*The AP2240 provides more toughness and heat resistance and thereby even more tool life. The strong cutting edge improves the process reliability. Main application area is steel and cast iron machining. Can also be used for stainless steel machining.*

Grado rivestito CVD.

La qualità AP2240 offre maggiore tenacità e resistenza alle temperature incrementando la vita inserto. Il robusto tagliente incrementa l'affidabilità di lavorazione. Campo principale di impiego su acciaio e ghise acciaiuse. Idoneo anche per alcuni acciai inox.

### AP5020

PVD-beschichtete Hartmetallsorte.

Eine sehr universell einsetzbare Sorte für niedrige und mittlere Schnittgeschwindigkeiten. Hauptanwendungsbereich für Stahl. Als Nebenanwendung geeignet für die Bearbeitung rostfreier Stähle und für das Ein- und Abstechen hochwarmfester Werkstoffe und NE-Metalle.

*PVD coated carbide grade.*

*A versatile grade for low to medium cutting speeds. Main application area is steel but can also be used on stainless steel and both high temperature and non-ferrous materials.*

Metallo duro rivestito PVD.

Qualità universale per velocità di taglio medie. Adatto principalmente per acciaio e secondariamente per acciaio inossidabile. Utilizzo secondario anche per metalli non ferrosi e refrattari.

### AP5030

PVD-beschichtete Hartmetallsorte.

Eine universell einsetzbare Sorte im Bereich P30-P35 für die Einstech- und Abstechbearbeitungen. Hauptanwendungsbereich für die Stahlbearbeitung, Nebenanwendung für rostfreie Stähle.

*PVD coated carbide.*

*A universal grade mainly for steel applications. The slightly tougher substrate (ISO P30-P35) makes it suitable also for stainless steel.*

Metallo duro rivestito PVD.

Qualità molto versatile su campo ISO P30-P35 per lavorazioni in sicurezza. Ottima per la lavorazione di acciai in condizioni non perfette di lavoro. Secondaria scelta per acciai inossidabili.

## Unbeschichtet / Uncoated / Non rivestito

### AN1015

Unbeschichtete Hartmetallsorte zum Schlichten und Schruppen von Aluminiumlegierungen und bei NE-Metallen in Verbindung mit geschliffenen Schneidkanten. Zur Reduzierung der Aufbauschneidenbildung ist die Spanfläche hochglanzpoliert.

*Uncoated carbide grade which in connection with a ground cutting edge is for finishing and roughing of aluminium alloys and non-ferrous materials. In order to reduce build up edge problems the insert is also highly polished.*

Grado di metallo duro micrograna per tutte le lavorazioni di materiali non ferrosi e Alluminio. Tagliente rettificato super positivo e spoglia lappata per ridurre tagliente di riporto.

**M2**

**Erste Wahl für das Stechen und Längsdrehen**

- **Hauptanwendung für Stahl- und rostfreie Werkstoffe**
- **Stabile Schneidkanten für max. Vorschübe und Spanntiefen**

*First choice for grooving and turning*

- *Main application for steel and stainless steel*
- *Strong cutting edge for maximum feed rates and cutting depths*

Prima scelta per la scanalatura e tornitura longitudinale

- Principale applicazione su acciaio e acciai inossidabili
- Geometria robusta per massima velocità di avanzamento e profondità di taglio

**T1**

**Sehr gute Spankontrolle und Einschnürung**

- **Für Stahl und Rostfreibearbeitung**
- **Universell einsetzbar – auch bei dünnwandigen Bauteilen**

*Very good swarf control and formation*

- *For steel and stainless steel*
- *Universal geometry machining, for thin-walled components*

La geometria dall'ottimo controllo truciolo

- Per acciaio e materiali inossidabili
- Utilizzo universale, anche per pezzi sottili

**ALU**

**Geometrie mit scharfer Schneide**

- **Erste Wahl für Aluminium und NE-Metalle**
- **Umseitig geschliffener Schneideinsatz**
- **Hochpositive Geometrie**
- **Polierte Spanflächen**

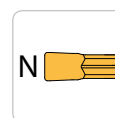
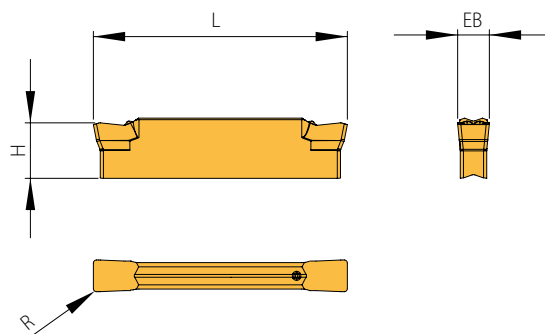
*Geometry with a sharp edge*

- *First choice for aluminium and non-ferrous materials*
- *Periphery ground insert*
- *High positive design*
- *Polished chip breakers*

Geometria super positiva rettificata

- Prima scelta per Alluminio e materiali non ferrosi
- Inserto rettificato
- Spoglia di taglio molto positiva
- Vano truciolo lappato

## SE24..



| Bezeichnung<br>Designation<br>Articolo | EB* | H   | L     | R   | λ  | PG 26  |        |        |        | AN1015 |
|----------------------------------------|-----|-----|-------|-----|----|--------|--------|--------|--------|--------|
|                                        |     |     |       |     |    | AM5040 | AP2240 | AP5020 | AP5030 |        |
| SE24-2002N-M2                          | 2,0 | 5,5 | 24,00 | 0,2 | 0° | ●      |        | ●      |        |        |
| SE24-2002N-T1                          | 2,0 | 5,5 | 24,00 | 0,2 | 0° |        | ●      | ●      |        |        |
| SE24-3002N-M2                          | 3,0 | 5,5 | 24,00 | 0,2 | 0° | ●      |        | ●      |        |        |
| SE24-3003N-M2                          | 3,0 | 5,5 | 24,00 | 0,3 | 0° | ●      |        | ●      |        |        |
| SE24-3003N-T1                          | 3,0 | 5,5 | 24,00 | 0,3 | 0° |        | ●      | ●      | ●      |        |
| SE24-2002N-ALU**                       | 2,0 | 5,5 | 24,00 | 0,2 | 0° |        |        |        |        | ●      |
| SE24-3003N-ALU**                       | 3,0 | 5,5 | 24,00 | 0,3 | 0° |        |        |        |        | ●      |

\*\*geschliffene Ausführung  
Ground version  
Versione rettificata

### \* Toleranz EB

|              |        |          |
|--------------|--------|----------|
| SA24...      | EB 2-3 | +/- 0,04 |
|              | EB 4-6 | +/- 0,05 |
| SA24... -ALU | EB 2-3 | +/- 0,02 |

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | ○ | ● | ● | ● |   |
| M | ● | ○ | ○ | ○ |   |
| K |   | ● |   |   | ○ |
| N |   |   | ○ |   | ● |
| S |   |   | ○ |   | ○ |
| H |   |   |   |   |   |

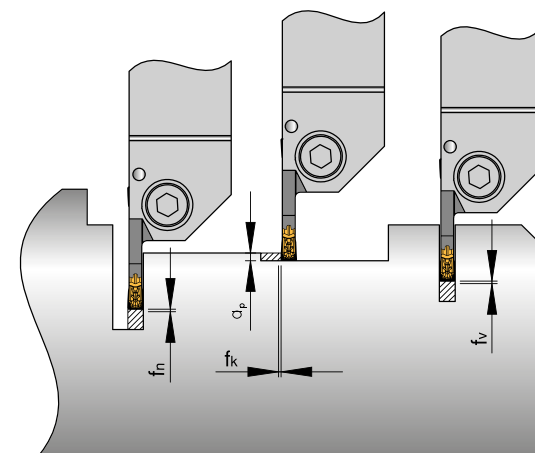
| Artikel / Item / Articolo                                                                            | PG 11 |
|------------------------------------------------------------------------------------------------------|-------|
| <b>Schraube / Screw / Vite</b>                                                                       |       |
| AS 0022                                                                                              | ●     |
| AS 0084                                                                                              | ●     |
| DIN912 M5X16-12,9                                                                                    | ●     |
| <b>Schlüssel / Key / Chiave</b>                                                                      |       |
| KP 1321                                                                                              | ●     |
| KP 3111                                                                                              | ●     |
| KS 8000                                                                                              | ●     |
| <b>Kühlmittelanschluss – gerade / Coolant supply – straight / Raccordo – dritto</b>                  |       |
| KA 001                                                                                               | ●     |
| KA 002                                                                                               | ●     |
| KA 003                                                                                               | ●     |
| <b>Kühlmittelanschluss – winklig, fest / Coolant supply – angled and fixed / Raccordo – angolato</b> |       |
| KA 004                                                                                               | ●     |
| KA 005                                                                                               | ●     |
| <b>Schwenkverschraubung / Swivelling screw-fitting / Raccordo – orientabile</b>                      |       |
| KA 006                                                                                               | ●     |
| KA 007                                                                                               | ●     |
| KA 008                                                                                               | ●     |

## Maximale Vorschübe und Spantiefen

Max. feed rate and depth of cut

Avanzamenti e profondità di taglio massimi

- $f_v$  (mm/U) = **Vorschub ins Volle** / Feed rate into solid / Avanzamento nel pieno
- $f_n$  (mm/U) = **Vorschub beim Einstechen** / Feed rate for re-grooving / Avanzamento di ripresa
- $f_k$  (mm/U) = **Vorschub beim Kopieren** / Feed rate for copying / Avanzamento per copiatura
- $a_p$  (mm) = **Spantiefe** / Depth of cut / Profondità di taglio



## Geometrie / Geometry / Geometria **M2**

|  | Schneideinsatz / Insert / Inserto |             |             |             |             |             |
|-----------------------------------------------------------------------------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|
|                                                                                   | SE24-20....                       | SE24-30.... | SE24-40.... | SE24-50.... | SE24-60.... |             |
|                                                                                   | $f_v$ mm/U                        | 0,04 – 0,12 | 0,08 – 0,18 | 0,12 – 0,24 | 0,12 – 0,30 | 0,15 – 0,35 |
|                                                                                   | $f_n$ mm/U                        | 0,04 – 0,20 | 0,08 – 0,30 | 0,12 – 0,35 | 0,16 – 0,40 | 0,20 – 0,45 |
|                                                                                   | $f_k$ mm/U                        | 0,06 – 0,16 | 0,08 – 0,24 | 0,12 – 0,30 | 0,16 – 0,40 | 0,20 – 0,45 |
|                                                                                   | $a_{p \max}$                      | 0,20 – 0,70 | 0,25 – 1,25 | 0,40 – 1,80 | 0,60 – 2,50 | 0,80 – 3,00 |

## Geometrie / Geometry / Geometria **T1**

|  | Schneideinsatz / Insert / Inserto |             |             |             |             |
|-------------------------------------------------------------------------------------|-----------------------------------|-------------|-------------|-------------|-------------|
|                                                                                     | SE24-20....                       | SE24-30.... | SE24-40.... | SE24-50.... |             |
|                                                                                     | $f_v$ mm/U                        | 0,03 – 0,12 | 0,05 – 0,20 | 0,10 – 0,24 | 0,12 – 0,30 |
|                                                                                     | $f_n$ mm/U                        | 0,03 – 0,20 | 0,05 – 0,25 | 0,10 – 0,30 | 0,16 – 0,40 |
|                                                                                     | $f_k$ mm/U                        | 0,06 – 0,20 | 0,08 – 0,30 | 0,12 – 0,40 | 0,16 – 0,50 |
|                                                                                     | $a_{p\max}$                       | 0,20 – 0,70 | 0,25 – 1,25 | 0,40 – 1,80 | 0,60 – 2,50 |

## Geometrie / Geometry / Geometria **ALU**

|  | Schneideinsatz / Insert / Inserto |             |
|-------------------------------------------------------------------------------------|-----------------------------------|-------------|
|                                                                                     | SE24-20....                       | SE24-30.... |
|                                                                                     | $f_v$ mm/U                        | 0,02 – 0,15 |
|                                                                                     | $f_n$ mm/U                        | 0,02 – 0,2  |
|                                                                                     | $f_k$ mm/U                        | 0,06 – 0,20 |
|                                                                                     | $a_{p \max}$                      | 0,20– 1,00  |

Die Tabellenwerte sind Richtwerte. Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

The recommended cutting data are only approximate values. It may be necessary to adjust them to each individual machining application.

I dati indicati in tabella sono valori approssimati. Può essere necessario adattarli alle singole applicazioni di lavorazione.

| ISO                         | Werkstoff                                        |                                                            | Zugfestigkeit<br>(N/mm <sup>2</sup> ) | Schnittgeschwindigkeit V <sub>c</sub> (m/min) |             |         |         | unbeschichtet |
|-----------------------------|--------------------------------------------------|------------------------------------------------------------|---------------------------------------|-----------------------------------------------|-------------|---------|---------|---------------|
|                             |                                                  |                                                            |                                       | AM5040                                        | beschichtet |         | AN1015  |               |
| P                           | Unlegierter Stahl und Stahlguss                  | < 0,15 % C/vergütet                                        | 350                                   | 120–200                                       | 130–250     | 120–220 | 120–200 | –             |
|                             |                                                  | 0,15 – 0,45 % C/vergütet                                   | 650                                   | 80–150                                        | 110–180     | 80–150  | 80–150  | –             |
|                             |                                                  | > 0,45 % C/vergütet                                        | 1000                                  | 60–140                                        | 70–150      | 60–140  | 60–140  | –             |
|                             | Niedrig legierter Stahl und Stahlguss            | geglüht                                                    | 600                                   | 80–160                                        | 120–190     | 80–170  | 80–170  | –             |
|                             |                                                  | vergütet                                                   | 900                                   | 60–130                                        | 110–150     | 60–130  | 60–130  | –             |
|                             |                                                  |                                                            | 1200                                  | 60–120                                        | 70–130      | 60–120  | 60–120  | –             |
|                             | Hochlegierter Stahl                              | geglüht                                                    | 700                                   | 80–140                                        | 90–140      | 80–140  | 80–140  | –             |
|                             | Hochlegierter Werkzeugstahl und Stahlguss        | gehärtet und angelassen                                    | 1100                                  | 50–120                                        | 70–130      | 50–120  | 50–120  | –             |
| M                           | Nichtrostender Stahl                             | ferritisch, geglüht                                        | 700                                   | 60–160                                        | 110–200     | 60–170  | 60–170  | –             |
|                             | Stahlguss                                        | martensitisch, vergütet                                    | 1000                                  | 50–100                                        | 60–130      | 50–100  | 50–100  | –             |
| K                           | Nichtrostender Stahl                             | austenitisch und austenitisch/<br>ferritisch, abgeschreckt | 450–600                               | 60–160                                        | 100–200     | 60–180  | 60–170  | –             |
|                             |                                                  |                                                            | 600–900                               | 50–90                                         | 120–150     | 50–90   | 50–90   | –             |
|                             | Grauguss                                         | perlitisch/ferritisch                                      | 500–700                               | –                                             | 100–160     | –       | –       | 120–160       |
|                             |                                                  | perlitisch/martensitisch                                   | 700–850                               | –                                             | 110–180     | –       | –       | 100–150       |
|                             |                                                  |                                                            | 800–1100                              | –                                             | 130–200     | –       | –       | 90–140        |
|                             | Gusseisen mit Kugelgraphit                       | ferritisch                                                 | 550                                   | –                                             | 100–160     | –       | –       | 130–170       |
|                             |                                                  | perlitisch                                                 | 800                                   | –                                             | 120–220     | –       | –       | 90–130        |
|                             | Temperguss                                       | ferritisch                                                 | 450                                   | –                                             | 90–180      | –       | –       | 140–200       |
| perlitisch                  |                                                  | 750                                                        | –                                     | 80–150                                        | –           | –       | 120–160 |               |
| N                           | Aluminium-Knetlegierungen                        | nicht aushärtbar                                           | 200                                   | –                                             | –           | 100–500 | –       | 300–500       |
|                             |                                                  | aushärtbar, ausgehärtet                                    | 350                                   | –                                             | –           | 100–300 | –       | 200–300       |
|                             | Aluminium-Gusslegierungen                        | ≤ 12 % Si, ausgehärtet                                     | 250                                   | –                                             | –           | 100–500 | –       | 100–500       |
|                             |                                                  | ≤ 12 % Si, aushärtbar, ausgehärtet                         | 300                                   | –                                             | –           | 100–300 | –       | 100–300       |
|                             |                                                  | ≤ 12 % Si, nicht aushärtbar                                | 450                                   | –                                             | –           | 100–200 | –       | 100–200       |
|                             | Kupfer und Kupferlegierungen<br>(Bronze/Messing) | Automatenlegierung, Pb > 1 %                               | 400                                   | –                                             | –           | 100–500 | –       | 250–500       |
|                             |                                                  | Messing, Rotguss                                           | 300                                   | –                                             | –           | 100–500 | –       | 200–500       |
|                             |                                                  | Aluminiumbronze                                            | 500                                   | –                                             | –           | 100–300 | –       | 150–300       |
|                             |                                                  | Kupfer und Elektrolytkupfer                                | 200                                   | –                                             | –           | 100–300 | –       | 150–300       |
|                             | Nichtmetallische Werkstoffe                      | Duroplaste                                                 | –                                     | –                                             | –           | 80–180  | –       | 80–180        |
| Faserverstärkte Kunststoffe |                                                  | –                                                          | –                                     | –                                             | 60–150      | –       | 60–150  |               |
| Hartgummi                   |                                                  | –                                                          | –                                     | –                                             | 100–220     | –       | 100–200 |               |
| S                           | Warmfeste Legierungen                            | Fe-Basis, geglüht                                          | 700                                   | –                                             | –           | 20–50   | –       | 30–45         |
|                             |                                                  | Fe-Basis, ausgehärtet                                      | 950                                   | –                                             | –           | 20–40   | –       | 20–35         |
|                             |                                                  | Ni- oder Co-Basis, geglüht                                 | 800                                   | –                                             | –           | 15–25   | –       | 15–25         |
|                             |                                                  | Ni- oder Co-Basis, gegossen                                | 1100                                  | –                                             | –           | 10–20   | –       | 10–20         |
|                             |                                                  | Ni- oder Co-Basis, ausgehärtet                             | 1200                                  | –                                             | –           | 10–20   | –       | 10–20         |
|                             | Titanlegierungen                                 | Rein-Titan                                                 | 500–700                               | –                                             | –           | 50–120  | –       | 60–120        |
| Alpha + Beta-Legierungen    | ausgehärtet                                      | 700–1000                                                   | –                                     | –                                             | 30–50       | –       | 30–50   |               |
| H                           | Gehärteter Stahl                                 | gehärtet und angelassen                                    | 55 HRC                                | –                                             | –           | –       | –       | –             |
|                             |                                                  |                                                            | 60 HRC                                | –                                             | –           | –       | –       | –             |
|                             | Hartguss                                         | gegossen                                                   | 41 HRC                                | –                                             | –           | –       | –       | –             |
|                             | Gehärtetes Gusseisen                             | gehärtet und angelassen                                    | 55 HRC                                | –                                             | –           | –       | –       | –             |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.



| ISO | Material                                |                                                 | Tensile strength<br>(N/mm <sup>2</sup> ) | Cutting speed V <sub>c</sub> (m/min) |                    |                 |                 |          |
|-----|-----------------------------------------|-------------------------------------------------|------------------------------------------|--------------------------------------|--------------------|-----------------|-----------------|----------|
|     |                                         |                                                 |                                          | coated                               |                    |                 |                 | uncoated |
|     |                                         |                                                 |                                          | AM5040                               | AP2240             | AP5020          | AP5030          | AN1015   |
| P   | Unalloyed steel and cast steel          | < 0.15 % C/hardened and tempered                | 350                                      | 120–200                              | 130–250            | 120–220         | 120–200         | –        |
|     |                                         | 0.15 - 0.45 % C/hardened and tempered           | 650                                      | 80–150                               | 110–180            | 80–150          | 80–150          | –        |
|     |                                         | > 0.45 % C/hardened and tempered                | 1000                                     | 60–140                               | 70–150             | 60–140          | 60–140          | –        |
|     | Low alloyed steel and cast steel        | annealed                                        | 600                                      | 80–160                               | 120–190            | 80–170          | 80–170          | –        |
|     |                                         | hardened and tempered                           | 900                                      | 60–130                               | 110–150            | 60–130          | 60–130          | –        |
|     |                                         |                                                 | 1200                                     | 60–120                               | 70–130             | 60–120          | 60–120          | –        |
|     | High alloyed steel                      | annealed                                        | 700                                      | 80–140                               | 90–140             | 80–140          | 80–140          | –        |
|     | High alloyed tool steel and cast steel  | hardened                                        | 1100                                     | 50–120                               | 70–130             | 50–120          | 50–120          | –        |
|     | Stainless steel                         | ferritic, annealed                              | 700                                      | 60–160                               | 110–200            | 60–170          | 60–170          | –        |
|     | Cast steel                              | martensitic, hardened and tempered              | 1000                                     | 50–100                               | 60–130             | 50–100          | 50–100          | –        |
| M   | Stainless steel                         | austenitic and austenitic/<br>ferritic, chilled | 450–600<br>600–900                       | 60–160<br>50–90                      | 100–200<br>120–150 | 60–180<br>50–90 | 60–170<br>50–90 | –<br>–   |
|     |                                         |                                                 |                                          |                                      |                    |                 |                 |          |
| K   | Cast iron                               | pearlitic/ferritic                              | 500–700                                  | –                                    | 100–160            | –               | –               | 120–160  |
|     |                                         | pearlitic/martensitic                           | 700–850                                  | –                                    | 110–180            | –               | –               | 100–150  |
|     |                                         |                                                 | 800–1100                                 | –                                    | 130–200            | –               | –               | 90–140   |
|     | Cast iron with nodular graphite         | ferritic                                        | 550                                      | –                                    | 100–160            | –               | –               | 130–170  |
|     |                                         | pearlitic                                       | 800                                      | –                                    | 120–220            | –               | –               | 90–130   |
|     | Malleable cast iron                     | ferritic                                        | 450                                      | –                                    | 90–180             | –               | –               | 140–200  |
|     |                                         | pearlitic                                       | 750                                      | –                                    | 80–150             | –               | –               | 120–160  |
| N   | Aluminium alloys long chipping          | not heat treatable                              | 200                                      | –                                    | –                  | 100–500         | –               | 300–500  |
|     |                                         | heat treatable, heat treated                    | 350                                      | –                                    | –                  | 100–300         | –               | 200–300  |
|     | Casted aluminium alloys                 | ≤ 12 % Si, heat treated                         | 250                                      | –                                    | –                  | 100–500         | –               | 100–500  |
|     |                                         | ≤ 12 % Si, heat treatable, heat treated         | 300                                      | –                                    | –                  | 100–300         | –               | 100–300  |
|     |                                         | ≤ 12 % Si, not heat treatable                   | 450                                      | –                                    | –                  | 100–200         | –               | 100–200  |
|     | Copper and copper alloys (Brass/Bronze) | Lead alloys, Pb > 1 %                           | 400                                      | –                                    | –                  | 100–500         | –               | 250–500  |
|     |                                         | Brass, Bronze                                   | 300                                      | –                                    | –                  | 100–500         | –               | 200–500  |
|     |                                         | Aluminium bronze                                | 500                                      | –                                    | –                  | 100–300         | –               | 150–300  |
|     |                                         | Copper and electrolyte copper                   | 200                                      | –                                    | –                  | 100–300         | –               | 150–300  |
|     | Non-ferrous materials                   | Duroplastic                                     | –                                        | –                                    | –                  | 80–180          | –               | 80–180   |
|     |                                         | Re-inforced plastics                            | –                                        | –                                    | –                  | 60–150          | –               | 60–150   |
|     |                                         | Hard rubber                                     | –                                        | –                                    | –                  | 100–220         | –               | 100–200  |
| S   | High temperature resistant alloys       | Fe-alloyed, annealed                            | 700                                      | –                                    | –                  | 20–50           | –               | 30–45    |
|     |                                         | Fe-alloyed, heat treated                        | 950                                      | –                                    | –                  | 20–40           | –               | 20–35    |
|     |                                         | Ni- or Co-alloyed, annealed                     | 800                                      | –                                    | –                  | 15–25           | –               | 15–25    |
|     |                                         | Ni- or Co-alloyed, casting                      | 1100                                     | –                                    | –                  | 10–20           | –               | 10–20    |
|     |                                         | Ni- or Co-alloyed, heat treated                 | 1200                                     | –                                    | –                  | 10–20           | –               | 10–20    |
|     | Titanium alloys                         | Pure titan                                      | 500–700                                  | –                                    | –                  | 50–120          | –               | 60–120   |
|     | Alpha- and Beta-alloys                  | heat treated                                    | 700–1000                                 | –                                    | –                  | 30–50           | –               | 30–50    |
| H   | Hardened steel                          | hardened                                        | 55 HRC                                   | –                                    | –                  | –               | –               | –        |
|     |                                         |                                                 | 60 HRC                                   | –                                    | –                  | –               | –               | –        |
|     | Hard cast iron                          | casting                                         | 41 HRC                                   | –                                    | –                  | –               | –               | –        |
|     | Hardened cast iron                      | hardened                                        | 55 HRC                                   | –                                    | –                  | –               | –               | –        |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

| ISO              | Materiale                                  |                                                              | Resistenza<br>(N/mm <sup>2</sup> ) | Velocità di taglio V <sub>c</sub> (m/min) |                    |                 |                 | non rivestito<br>AN1015 |
|------------------|--------------------------------------------|--------------------------------------------------------------|------------------------------------|-------------------------------------------|--------------------|-----------------|-----------------|-------------------------|
|                  |                                            |                                                              |                                    | rivestito                                 |                    |                 |                 |                         |
|                  |                                            |                                                              | AM5040                             | AP2240                                    | AP5020             | AP5030          |                 |                         |
| P                | Acciai non legati                          | < 0,15 % C/bonificato                                        | 350                                | 120–200                                   | 130–250            | 120–220         | 120–200         | –                       |
|                  |                                            | 0,15 – 0,45 % C/bonificato                                   | 650                                | 80–150                                    | 110–180            | 80–150          | 80–150          | –                       |
|                  |                                            | > 0,45 % C/bonificato                                        | 1000                               | 60–140                                    | 70–150             | 60–140          | 60–140          | –                       |
|                  | Acciai debolmente legati e Ghise acciaiose | ricotto                                                      | 600                                | 80–160                                    | 120–190            | 80–170          | 80–170          | –                       |
|                  |                                            | bonificato                                                   | 900                                | 60–130                                    | 110–150            | 60–130          | 60–130          | –                       |
|                  |                                            |                                                              | 1200                               | 60–120                                    | 70–130             | 60–120          | 60–120          | –                       |
|                  | Acciai fortemente legati                   | ricotto                                                      | 700                                | 80–140                                    | 90–140             | 80–140          | 80–140          | –                       |
|                  | Acciai da utensili e fusioni               | temprato e rinvenuto                                         | 1100                               | 50–120                                    | 70–130             | 50–120          | 50–120          | –                       |
|                  | Acciai inossidabili                        | ferritico, ricotto                                           | 700                                | 60–160                                    | 110–200            | 60–170          | 60–170          | –                       |
| M                | Ghisa acciaiosa                            | martensitico, bonificato                                     | 1000                               | 50–100                                    | 60–130             | 50–100          | 50–100          | –                       |
|                  |                                            |                                                              |                                    |                                           |                    |                 |                 |                         |
|                  | Acciai inossidabili                        | austenitico e autenitico/<br>ferritico, trattato o temperato | 450–600<br>600–900                 | 60–160<br>50–90                           | 100–200<br>120–150 | 60–180<br>50–90 | 60–170<br>50–90 | –<br>–                  |
| K                |                                            | Ghisa grigia                                                 | perlitica/ferritico                | 500–700                                   | –                  | 100–160         | –               | –                       |
|                  | perlitica/martensitico                     |                                                              | 700–850                            | –                                         | 110–180            | –               | –               | 100–150                 |
|                  |                                            |                                                              | 800–1100                           | –                                         | 130–200            | –               | –               | 90–140                  |
|                  | Ghisa sferoidale                           | ferritico                                                    | 550                                | –                                         | 100–160            | –               | –               | 130–170                 |
| perlitica        |                                            | 800                                                          | –                                  | 120–220                                   | –                  | –               | 90–130          |                         |
| Ghisa temprata   | ferritico                                  | 450                                                          | –                                  | 90–180                                    | –                  | –               | 140–200         |                         |
|                  | perlitica                                  | 750                                                          | –                                  | 80–150                                    | –                  | –               | 120–160         |                         |
| N                | Leghe di Alluminio stampato                | non invecchiato                                              | 200                                | –                                         | –                  | 100–500         | –               | 300–500                 |
|                  |                                            | invecchiato                                                  | 350                                | –                                         | –                  | 100–300         | –               | 200–300                 |
|                  | Leghe di Alluminio da fusione              | ≤ 12 % Si, invecchiato                                       | 250                                | –                                         | –                  | 100–500         | –               | 100–500                 |
|                  |                                            | ≤ 12 % Si, rinvenuto, invecchiato                            | 300                                | –                                         | –                  | 100–300         | –               | 100–300                 |
|                  |                                            | ≤ 12 % Si, non invecchiato                                   | 450                                | –                                         | –                  | 100–200         | –               | 100–200                 |
|                  | Rame e Leghe di Rame (Bronzo/Ottone)       | Automatici, Pb > 1 %                                         | 400                                | –                                         | –                  | 100–500         | –               | 250–500                 |
|                  |                                            | Ottone, Bronzo                                               | 300                                | –                                         | –                  | 100–500         | –               | 200–500                 |
|                  |                                            | Bronzoalluminio                                              | 500                                | –                                         | –                  | 100–300         | –               | 150–300                 |
|                  |                                            | Rame e Rame Elettrolitico                                    | 200                                | –                                         | –                  | 100–300         | –               | 150–300                 |
|                  | Materiali non metallici                    | Duroplastiche                                                | –                                  | –                                         | –                  | 80–180          | –               | 80–180                  |
|                  |                                            | Plastiche rinforzate                                         | –                                  | –                                         | –                  | 60–150          | –               | 60–150                  |
|                  |                                            | Gomme dure                                                   | –                                  | –                                         | –                  | 100–220         | –               | 100–200                 |
| S                | Leghe resistenti al calore                 | Base-Fe, ricotto                                             | 700                                | –                                         | –                  | 20–50           | –               | 30–45                   |
|                  |                                            | Base-Fe, invecchiato                                         | 950                                | –                                         | –                  | 20–40           | –               | 20–35                   |
|                  |                                            | Base Ni o Co, ricotto                                        | 800                                | –                                         | –                  | 15–25           | –               | 15–25                   |
|                  |                                            | Base Ni o Co, da fusione                                     | 1100                               | –                                         | –                  | 10–20           | –               | 10–20                   |
|                  |                                            | Base Ni o Co, invecchiato                                    | 1200                               | –                                         | –                  | 10–20           | –               | 10–20                   |
|                  | Leghe di Titanio                           | Titanio puro                                                 | 500–700                            | –                                         | –                  | 50–120          | –               | 60–120                  |
| Leghe Alpha+Beta | invecchiato                                | 700–1000                                                     | –                                  | –                                         | 30–50              | –               | 30–50           |                         |
| H                | Acciaio Temprato                           | temprato e rinvenuto                                         | 55 HRC                             | –                                         | –                  | –               | –               | –                       |
|                  |                                            |                                                              | 60 HRC                             | –                                         | –                  | –               | –               | –                       |
|                  | Getti Temprati                             | da fusione                                                   | 41 HRC                             | –                                         | –                  | –               | –               | –                       |
|                  | Ghisa Temprata                             | temprato e rinvenuto                                         | 55 HRC                             | –                                         | –                  | –               | –               | –                       |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

## Allgemein / General / Generici

Grundsätzlich sollte darauf geachtet werden, dass das Stechwerkzeug so stabil wie möglich ausgewählt wird. Dadurch können Vibrationen verhindert und die Standzeit gesteigert werden.

Bei der Auswahl der Stechplatten ist zu beachten:

- Die Abstechbreite EB in mm
- Die Spanleitstufe für die Bearbeitung
- Den Einstellwinkel und den Eckenradius

Die Stechbreite sollte so schmal wie möglich und so breit wie nötig ausgewählt werden. Durch die Reduzierung der Stechbreite wird auch die Schnittkraft reduziert und kann in der Massenfertigung zudem auch zu enormen Einsparungen an Materialkosten führen. Nach Möglichkeit sind neutrale Schneiden einzusetzen, die eine bessere Spanbildung, geringere Abdrängkräfte und höhere Standzeiten erreichen.

*Pay attention to selection of the correct tools. Tools should have minimum overhang to reduce vibrations and increase of tool life.*

*When selecting inserts, consider:*

- Parting-off width in mm
- Chip breaker for the material
- Approach angle and corner radius

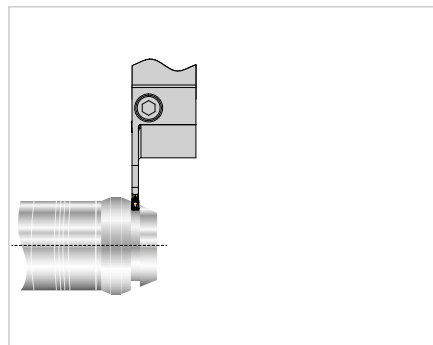
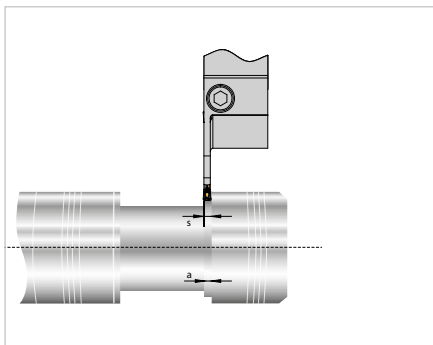
*Select insert width as narrow as possible and as wide as necessary. By reducing the insert width, the cutting forces are reduced and especially important when mass producing less material is wasted. Whenever possible it is always recommended to use neutral inserts that offer better swarf control and tool life.*

Scegliere sempre l'utensile più corto possibile per una maggiore stabilità. Grazie a questo le vibrazioni vengono ridotte, la lavorazione è più stabile e la durata inserto aumentata.

Nella scelta dell'inserto di scanalatura è bene valutare:

- La larghezza di taglio in mm
- La forma di rompitruciolo
- L'angolo di taglio ed il raggio di punta

La larghezza della troncatura deve essere il più stretta possibile – scegliere inserti proporzionati alla misura da realizzare. Riducendo la larghezza di taglio, si riduce la forza di taglio e può risultare in un enorme risparmio dei costi delle materie prime su grossi lotti produttivi.

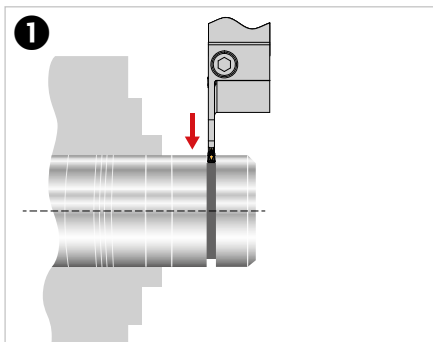
Hinweise zum Einstechen / Recommendations for grooving /  
Suggerimenti per la troncatura

- Beim seitlich versetzten Einstechen sollte die Breite „a“ mindestens 70 % der Stechbreite „s“ betragen.
- Beim Einstechen an schrägen Flächen muss der Vorschub beim Anschnitt um ca. 20 % bis 50 % reduziert werden.

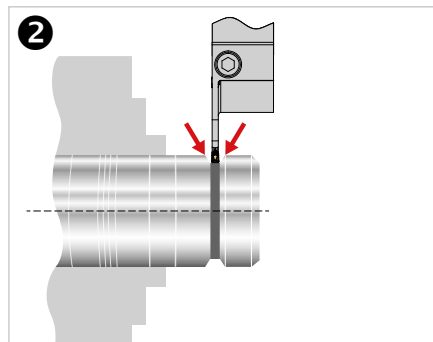
- When grooving with an axial displacement the width „a“ should be a minimum of 70 % of the groove width „s“.
- When grooving into an angled surface reduce feed rate by 20 – 50 % until in full cut.

- Per lavorazioni senza appoggio laterale assicurarsi che la larghezza di lavoro „a“ sia almeno il 70 % della larghezza inserto „s“.
- La scanalatura su superfici inclinate deve prevedere una riduzione dell'avanzamento tra il 20 % ed il 50 %.

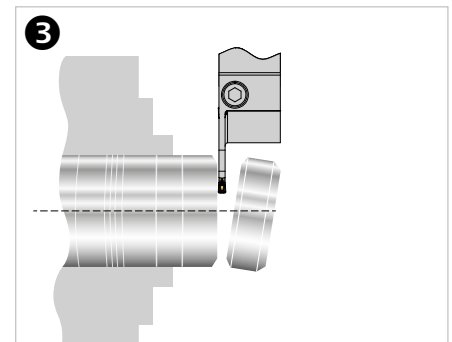
## Fasen und Abstechen / Chamfering and parting-off / Smussatura e troncatura



1. Vorstechen
2. Fasen
3. Abstechen



1. Pre-crooving
2. Chamfering
3. Parting-off



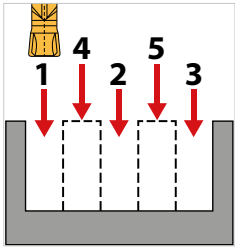
1. Pre-scanalatura
2. Smusso
3. Troncatura

**Stechen von Außennuten / Machining of external grooves / Scanalatura radiale**

Die häufigste Methode zur Herstellung von breiten Nuten zwischen 2 Schultern erfolgt durch Mehrfacheinsteichen, Stechdrehen, Schrägeintauchen und durch Auskammern.

The most popular way of producing wide grooves in between two shoulders are by multiple grooving, groove turning, ramping, and pocketing.

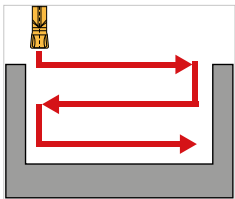
Il metodo più comune per produrre ampie gole fra due spalle è con la tornitura a tuffo, con scanalature affiancate, seguendo corrette sequenze.

**Mehrfacheinsteichen / Multiple grooving / Scanalatura a tuffo**

Zuerst sind die vollen Nuten zu bearbeiten. Einstiche 1, 2 und 3. Danach werden die Stege 4 und 5 bearbeitet. Dadurch werden die Eckenradien geschützt und die Späne in die Mitte des Spanbrechers abgeführt. Stegbreite 0,6 bis 0,8 x Schneidplattenbreite EB.

First the full grooves are machined. Grooves 1, 2 and 3, thereafter 4 and 5. This protects the corner radius and the swarf comes of the centre of the chip breaker. Widths of 4 and 5 should be  $0.6 - 0.8 \times$  insert width (EB).

Prima di procedere, valutare il tipo di gola e scegliere la dimensione inserto adatta per larghezza e profondità. Eseguire scanalature 1, 2 e 3; successivamente 4 e 5. In tal modo l'inserto lavora con appoggio sui fianchi, in quelle successive senza appoggio ma solo sul rompitrucciolo centrale. Prevedere profondità di gola ridotte e ripetere l'operazione fino alla massima profondità.

**Stechdrehen / Groove turning / Scanalatura di copiatura**

Die Schnitttiefe  $a_p$  richtet sich nach der Breite der Schneidplatte, dem zu zerspanenden Werkstoff und der Schneidkantenlänge bzw. Ausspannsituation.

Faustformel:

$$a_{p \text{ max.}} = EB \times 0,7$$

$$a_{p \text{ min.}} = \text{Eckenradius „r“}$$

The groove depth ( $a_p$ ) depends on the width of the insert, material and the edge length of the inserts.

General rule:

$$a_{p \text{ max.}} = EB \times 0.7$$

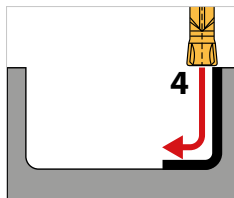
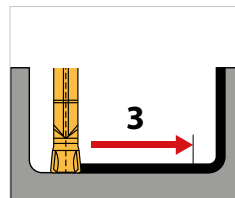
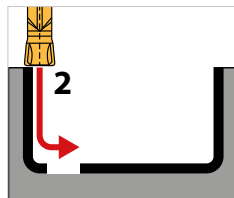
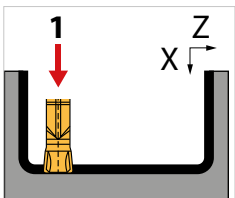
$$a_{p \text{ min.}} = \text{corner radius „r“}$$

La profondità di passata è determinata dalla larghezza dell'inserto, dalla tipologia di materiale e dalla lunghezza (stabilità) del portainserito.

Regola generale:

$$a_{p \text{ max.}} = EB \times 0,7$$

$$a_{p \text{ min.}} = \text{Raggio „r“}$$

**Nut-Fertigbearbeitung / Groove finishing machining / Finitura di gola**

Vorsicht ist geboten bei der Fertigbearbeitung, da die Schneidplatte um den Radiusbereich am Grund fährt und die meisten Bewegungen in der Z-Richtung erfolgen.

Dies führt zur Bildung dünner Späne und kann aufgrund von Vibrationen zur Behinderung des Prozesses führen.

Durch Einhaltung des dargestellten Bearbeitungsablaufes lässt sich dies verhindern, wobei die axiale und radiale Schnitttiefe zwischen 0,5 und 1,0 mm liegen muss.

Take care when finishing, the radius of the insert moves mainly in the z-axis and this can produce very thin swarf which can lead to vibrations and poor surface finish.

If using the machine path shown, this can be avoided, axial and radial cutting depth should be between 0.5 – 1.0 mm.

Il ciclo di finitura gola prevede una sequenza che eviti la formazione di anelli di bave. Scegliere forme di rompitrucciolo con controllo truciolo anche per avanzamenti composti e non solo in Z come per tutti gli inserti da troncatura. Evitare la formazione di trucioli sottili e lunghi e di vibrazioni.

La sequenza rappresentata indica il metodo suggerito di lavoro per una situazione tipo, prevedendo profondità di passata tra 0,5 e 1,0 mm.

## AMS ARNO®-Mini-System

## AMS ARNO®-Mini-System

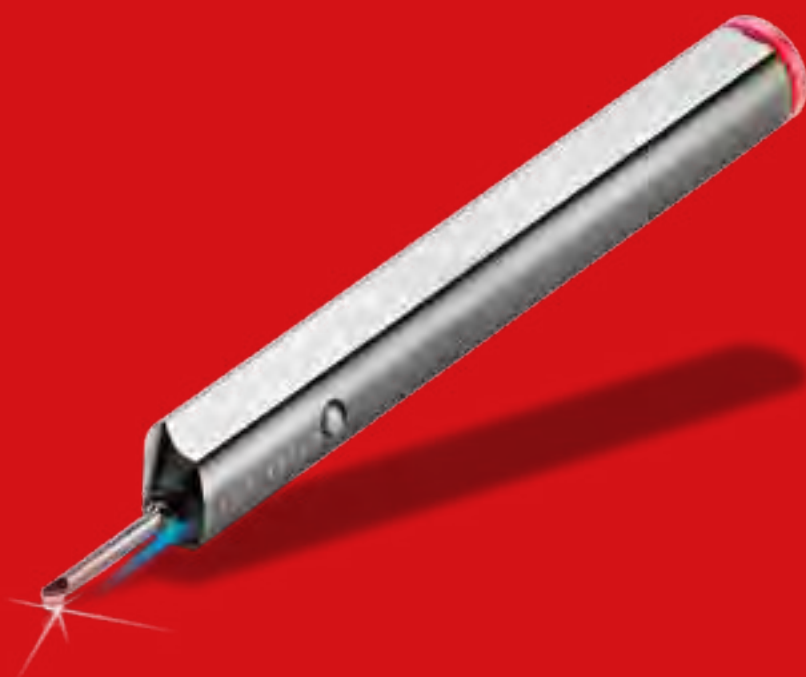
## AMS ARNO®-Mini-System

### Innenbearbeitungssystem

### Internal machining system

### Sistema di lavorazione interna

|                                   |                               |                               |           |
|-----------------------------------|-------------------------------|-------------------------------|-----------|
| • Systemvorstellung               | • Introduction                | • Caratteristiche del sistema | 88 – 89   |
| • Bezeichnungssystem              | • Designation system          | • Sistema di identificazione  | 90        |
| • Werkzeugauswahl                 | • Tool shank options          | • Tipologie di corpo utensile | 91 – 93   |
| • Klemmhalter und Schneideinsätze | • Holders and inserts         | • Adattatori e inserti        | 94 – 123  |
| • Sortenbeschreibung              | • Grade description           | • Descrizione delle Qualità   | 127       |
| • Ersatzteile und Zubehör         | • Spare parts and accessories | • Ricambi e accessori         | 127       |
| • Schnittwerte                    | • Cutting data                | • Parametri di taglio         | 128 – 132 |
| • Anwendungshinweise              | • Application reference       | • Suggerimenti tecnici        | 133       |



### ARNO®-Mini-System

**Durchmesser ab 0,7 mm, Bohrtiefe bis 50 mm**

*ARNO® Mini-System*

*Diameter from 0.7 mm, depth up to 50 mm*

ARNO® Mini-System

Diametri da 0,7 mm, profondità  
del foro massima fino a 50 mm

3

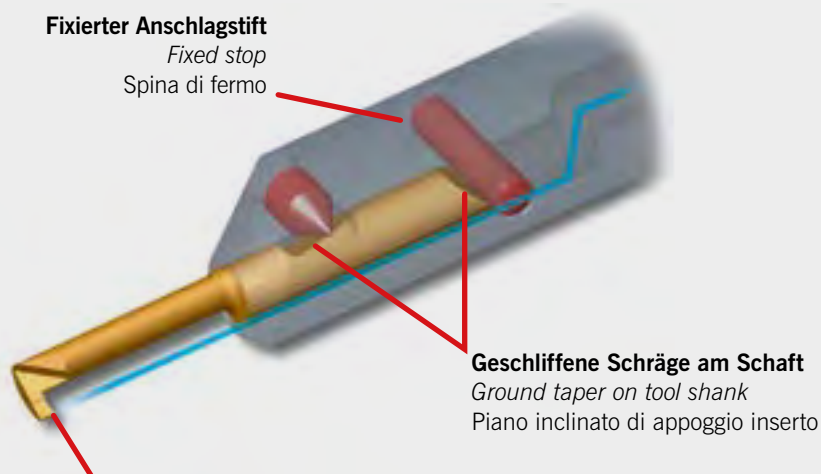


## Systemvorstellung

AMS ist ein modulares System zur flexiblen Bohrungsbearbeitung ab Durchmesser 0,7 mm mit maximaler Bohrungstiefe bis zu 50 mm (abhängig von der Bearbeitung). Durch die geschliffene Schräge am Schaft des Schneideinsatzes und den fixierten Anschlagstift im Halter wird eine exakte Bestimmung der Länge sowie eine garantierte Wiederholgenauigkeit der Spitzenhöhe erreicht. Der Kegel des Gewindestiftes ermöglicht eine sichere Spannung und reduziert somit die auftretenden Schwingungen im Schneidenbereich. Das Ergebnis ist maximale Stabilität für prozesssichere Bohrungsbearbeitung.

## Fakten

- Bohrungen Ausdrehen ab Durchmesser 0,7 mm
- Einstechen ab Breite 0,8 mm
- Radieneinstich ab R 0,5 mm
- Rückwärtsdrehen und Fasen
- Vorstechen und Fasen
- Zentrum Fasen
- Kopieren
- Gewindedrehen ab M3
- Axial-Stechen ab Durchmesser 5 mm
- Seegering DIN 471/472



**Garantierte Spitzenhöhe durch komplett geschliffene Schneideinsätze**

*Guaranteed tip height due to fully ground inserts*

Garanzia del centraggio del filo di taglio grazie all'inserto completamente rettificato

## Introduction

AMS is a modular boring system starting at Dmin 0,7 mm with a maximum reach of 50 mm (depending on application). With the ground taper on the tool shank and the fixed stop in the sleeve the length remains accurately constant and guaranteed cutting edge repeatability is achieved. The cone of the threaded pin ensures secure tool locking and reduces cutting edge vibrations.

## Features

- Boring from diameter 0,7 mm
- Groove width starting at 0.8 mm
- Full radius grooving starting at R 0.5 mm
- Back turning and chamfering
- Pre-grooving and chamfering
- Centre chamfering
- Copying
- Threading from M3
- Face grooving starting at Ø 5 mm
- Cir-clip DIN 471/472

## Descrizione

AMS è un sistema modulare per una lavorazione flessibile da diametri di 0,7 mm con profondità del foro massima fino a 50 mm (in base alla lavorazione). Il gambo rettificato ed il piano di fermo garantiscono perfetta ripetibilità di posizione ed altezza del filo di taglio. Il metodo di bloccaggio garantisce un bloccaggio sicuro e privo di vibrazioni.

## Caratteristiche

- Lavorazione fori da diametro 0,7 mm
- Gole da larghezza 0,8 mm
- Raggio da R 0,5 mm
- Pre-scanalatura e smusso
- Lavorazione in tirata
- Smussatura centrale
- Copiatura
- Filettatura da M3
- Gole assiali da diametro 5 mm
- Sedi Seeger DIN 471/472



### Klemmhalter / Holders / Adattatori

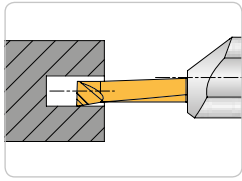


| HAMS                                          | 16                                                                             | 06                                                                                                 | R/L                                                                                                                                                |
|-----------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>H</b> = Halter<br>Sleeve<br>Stelo          | <b>Schaftdurchmesser 16 mm</b><br>Shank diameter 16 mm<br>Diametro gambo 16 mm | <b>Schneideinsatzdurchmesser 6 mm</b><br>Inserts shank diameter 6 mm<br>Diametro foro inserto 6 mm | <b>Ausführung</b><br><b>R</b> = Rechts<br><b>L</b> = Links<br>Version<br>R = Right-hand<br>L = Left-hand<br>Versione<br>R = Destro<br>L = Sinistro |
| <b>A</b> = ARNO®                              |                                                                                |                                                                                                    |                                                                                                                                                    |
| <b>M</b> = Mini                               |                                                                                |                                                                                                    |                                                                                                                                                    |
| <b>S</b> = Stechen<br>Grooving<br>Scanalatura |                                                                                |                                                                                                    |                                                                                                                                                    |

### Schneideinsätze / Inserts / Inserti

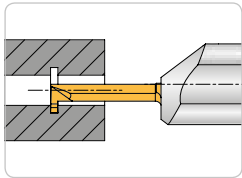


| AMS                                           | D                                                                               | 25                              | 08                                   | 06                                  | 01                            | 100                                | 40R                                                                                                                                                |
|-----------------------------------------------|---------------------------------------------------------------------------------|---------------------------------|--------------------------------------|-------------------------------------|-------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A</b> = ARNO®                              | <b>D</b> = Drehen / Turning / Tornitura                                         | <b>D<sub>min</sub></b> = 2,5 mm | <b>Einstechbreite</b><br>EB = 0,8 mm | <b>Einstechtiefe</b><br>ET = 0,6 mm | <b>Radius</b><br>R = 0,1 mm   | <b>Auskraglänge</b><br>AKL = 10 mm | <b>Schaftdurchmesser</b><br>4 mm                                                                                                                   |
| <b>M</b> = Mini                               | <b>D20</b> = Drehen / Turning / Tornitura                                       |                                 | Groove width<br>EB = 0,8 mm          | Groove depth<br>ET = 0,6 mm         | Radius<br>R = 0,1 mm          | Maximum work length<br>AKL = 10 mm | Shank diameter<br>4 mm                                                                                                                             |
| <b>S</b> = Stechen<br>Grooving<br>Scanalatura | <b>S</b> = Stechen/Grooving/Scanalatura                                         |                                 | Larghezza gola<br>EB = 0,8 mm        | Profondità gola<br>ET = 0,6 mm      | Raggio di punta<br>R = 0,1 mm | Utile di lavoro<br>AKL = 10 mm     | Diametro gambo<br>4 mm                                                                                                                             |
|                                               | <b>472</b> = Seegering 471/472<br>Cir-clip 471/472<br>Sedi Seeger 471/472       |                                 |                                      |                                     |                               |                                    | <b>Ausführung</b><br><b>R</b> = Rechts<br><b>L</b> = Links<br>Version<br>R = Right-hand<br>L = Left-hand<br>Versione<br>R = Destro<br>L = Sinistro |
|                                               | <b>K</b> = Kopieren / Copying / Copiatura                                       |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>K45</b> = Kopieren 45° / Copying 45° / Copiatura 45°                         |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>V</b> = Vorstechen / Pre-grooving / Pre-scanalatura                          |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>ZF</b> = Zentrum Fasen / Centre chamfering / Smussatura centrale             |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>F</b> = Fasen / Chamfering / Smusso                                          |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>R</b> = Rückwärtsdrehen / Back turning / Lavorazione in tirata               |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>G</b> = Gewinde/Threading/Filettatura                                        |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>GV</b> = Gewinde Vollprofil / Full profile threading / Filettatura           |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>WF</b> = Whitworth Gewinde<br>Whitworth thread<br>Filettatura Whitworth      |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>TR</b> = Trapezgewinde<br>Trapezoidal thread<br>Filettatura Trapezoidale     |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>UN</b> = Amer. ISO-Zollgewinde<br>American std. thread<br>Americana Standard |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |
|                                               | <b>A</b> = Axial-Steichen / Axial grooving turning / Scanalatura assiale        |                                 |                                      |                                     |                               |                                    |                                                                                                                                                    |

Übersicht Klemmhalter und Schneideinsätze / Program overview holders and inserts /  
Gamma prodotti adattatori e inserti**Drehen***Turning*

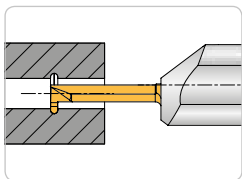
Barenatura

Seite/ Page/ Pagina 94 – 96

**Stechen***Grooving*

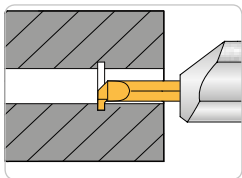
Scanalatura

Seite/ Page/ Pagina 97

**Radius-Einstich***Radius grooving*

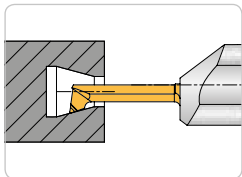
Profilo a raggio pieno

Seite/ Page/ Pagina 98

**Seegering DIN 471/472***Cir-clip DIN 471/472*

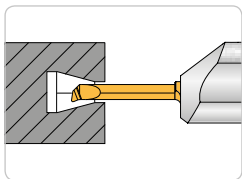
Sedi seeger DIN 471/472

Seite/ Page/ Pagina 99

**Kopieren***Copying*

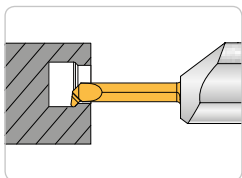
Copiatura

Seite/ Page/ Pagina 100 – 101

**Kopieren – verstärkte Ausführung***Copying – Re-inforced execution*

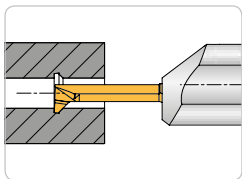
Copiatura – Versione rinforzata

Seite/ Page/ Pagina 102

**Kopieren 45°***Copying 45°*

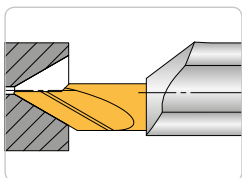
Copiatura 45°

Seite/ Page/ Pagina 103

**Vorstechen und Fasen***Pre-grooving and chamfering*

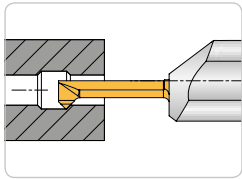
Pre-scanalatura e smusso

Seite/ Page/ Pagina 104

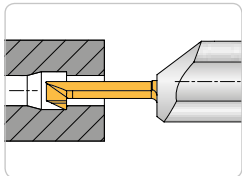
**Zentrum Fasen 45°/60°***Centre chamfering 45°/60°*

Smussatura centrale 45°/60°

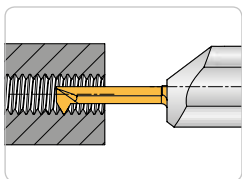
Seite/ Page/ Pagina 105

**Übersicht Klemmhalter und Schneideinsätze** / *Program overview holders and inserts* /  
Gamma prodotti adattatori e inserti**Fasen 45°***Chamfering 45°*

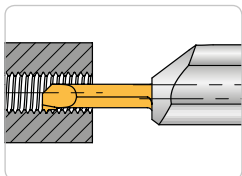
Smusso 45°

Seite/Page/Pagina **106****Rückwärtsdrehen***Back turning*

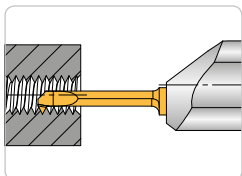
Lavorazione in tirata

Seite/Page/Pagina **107****Gewinde 60° – Metrisch-Teilprofil***Threading 60° – Metric partial profile*

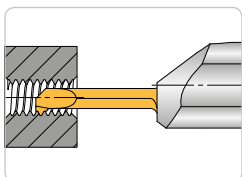
Filettatura 60° – Metrica - Profilo parziale

Seite/Page/Pagina **108****Gewinde 60° – Metrisch-Vollprofil***Threading 60° – Metric full profile*

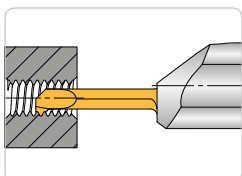
Filettatura 60° – Metrica - Profilo completo

Seite/Page/Pagina **109****Whitworth Gewinde 55° – Teilprofil***Whitworth thread 55° – Partial profile*

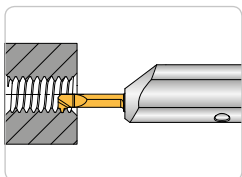
Filettatura Whitworth 55° – Profilo parziale

Seite/Page/Pagina **110****Whitworth Rohrgewinde 55° DIN-ISO 228 – Vollprofil***Whitworth pipe thread 55° DIN ISO 228 – Full profile*

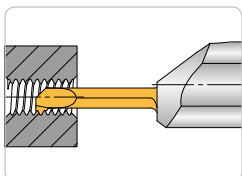
Filettatura Whitworth 55° DIN ISO 228 – Profilo completo

Seite/Page/Pagina **111****Whitworth Rohrgewinde 55° BSW – Vollprofil***Whitworth pipe thread 55° BSW – Full profile*

Filettatura Whitworth 55° BSW – Profilo completo

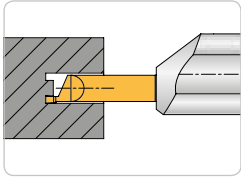
Seite/Page/Pagina **112****Trapezgewinde 30° DIN-ISO 103 – Teilprofil***Trapezoidal 30° DIN ISO 103 – Partial profile*

Filettatura Trapezoidale 30° DIN ISO 103 – Profilo parziale

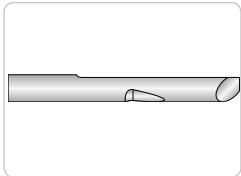
Seite/Page/Pagina **113****Amerikanisches ISO-Zollgewinde 60° UN – Vollprofil***American standard thread 60° UN – full profile*

Filettatura Americana standard 60° UN – Profilo completo

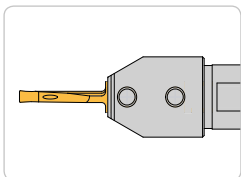
Seite/Page/Pagina **114**

**Übersicht Klemmhalter und Schneideinsätze** / *Program overview holders and inserts* /  
Gamma prodotti adattatori e inserti**Axial-Steichen***Axial grooving*

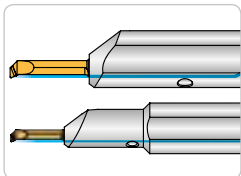
Scanalatura assiale

Seite/ Page/ Pagina **115****Halbzeuge zur Eigenprofilierung***Blanks for special profiles*

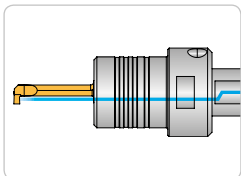
Semilavorato per la realizzazione di speciali

Seite/ Page/ Pagina **116****SAV – Axial Steichen – Klemmhalter und Schneideinsätze***SAV – Axial grooving – Holders and inserts*

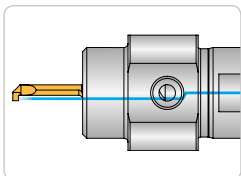
SAV – Scanalatura assiale – Adattatori e inserti

Seite/ Page/ Pagina **117****Klemmhalter – Standard / Klemmhalter – Abgesetzt***Holder - Standard / Holder - Off-set*

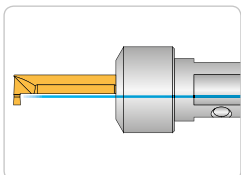
Stelo - Standard / Stelo - Off-Set

Seite/ Page/ Pagina **118****Hydro-Dehn Klemmhalter für Drehmaschinen***Hydraulic holder for lathes*

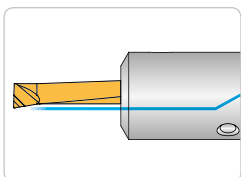
Adattatore idraulico per tornio

Seite/ Page/ Pagina **119****Klemmhalter zum Ausspindeln für STAR-Drehmaschinen***Finishing holders for STAR - lathes*

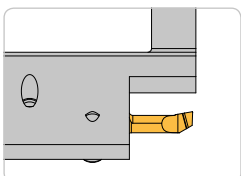
Utensile di finitura per torni STAR

Seite/ Page/ Pagina **120****Klemmhalter für Drehmaschinen***Holders for lathes*

Adattatori per torni

Seite/ Page/ Pagina **121****Klemmhalter zum Ausspindeln***Holders for finishing*

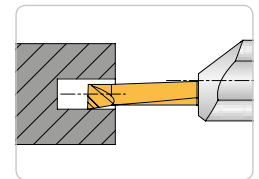
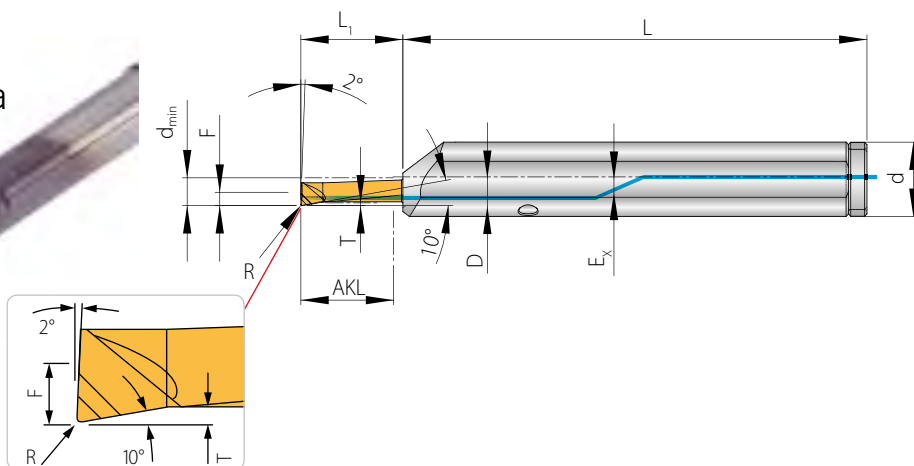
Adattatori corti per contromandrino

Seite/ Page/ Pagina **122****Klemmhalter für Langdrehmaschinen und Mehrspindler***Holders for sliding head auto lathes and multi spindle machines*

Adattatori per fantina mobile e plurimandrino

Seite/ Page/ Pagina **123**

## Drehen Turning Barenatura



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

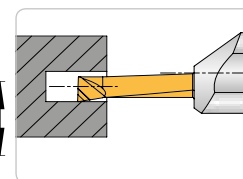
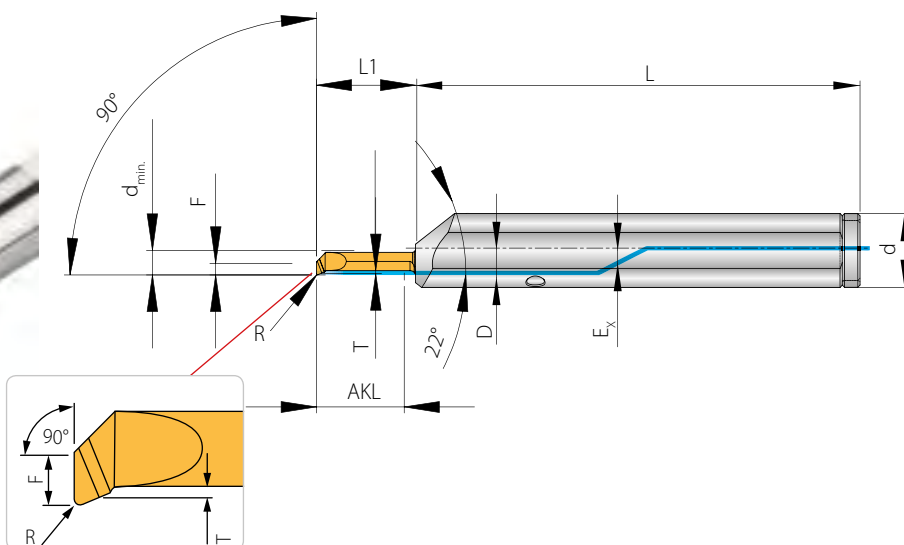
| Schneideinsatz / Insert / Inserto |                        |             |    |                      |                                        |               |      | Klemmhalter / Holder / Adattatore |   |    |     |                |                |                                        |       |
|-----------------------------------|------------------------|-------------|----|----------------------|----------------------------------------|---------------|------|-----------------------------------|---|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL                    | T           | EB | R                    | Bezeichnung<br>Designation<br>Articolo | PG 44         | F    |                                   | D | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 0,7                               | 2                      | 0,05        | –  | 0,05                 | AMS-D-07005005-020.40R                 | ●             | 0,3  |                                   | 4 | 12 | 100 | 4              | 2,35           | HAMS 1204 R                            | ●     |
| 0,7                               | 2                      | 0,05        | –  | 0,05                 | AMS-D-07005005-020.40R                 | ●             | 0,3  |                                   | 4 | 16 | 120 | 4              | 2,8            | HAMS 1604 R                            | ●     |
| 2,0                               | 6<br>10                | 0,15        | –  | 0,02                 | AMS-D-20015002-060.40R                 | ●             | 0,9  |                                   | 4 | 12 | 100 | 8<br>12        | 2,35           | HAMS 1204 R                            | ●     |
|                                   | AMS-D-20015002-100.40R |             |    |                      | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 2,0                               | 6<br>10                | 0,15        | –  | 0,02                 | AMS-D-20015002-060.40R                 | ●             | 0,9  |                                   | 4 | 16 | 120 | 8<br>12        | 2,8            | HAMS 1604 R                            | ●     |
|                                   | AMS-D-20015002-100.40R |             |    |                      | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 2,2                               | 6                      | 0,4         | –  | 0,1                  | AMS-D-220401-060.40R                   | ●             | 1,05 |                                   | 4 | 12 | 100 | 8              | 2,35           | HAMS 1204 R                            | ●     |
| 2,2                               | 6                      | 0,4         | –  | 0,1                  | AMS-D-220401-060.40R                   | ●             | 1,05 |                                   | 4 | 16 | 120 | 8              | 2,8            | HAMS 1604 R                            | ●     |
| 2,5                               | 10<br>15<br>20         | 0,4         | –  | 0,1                  | AMS-D-250401-100.40R                   | ●             | 1,15 |                                   | 4 | 12 | 100 | 12<br>17<br>22 | 2,35           | HAMS 1204 R                            | ●     |
|                                   | AMS-D-250401-150.40R   |             |    |                      | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-250401-200.40R   |             |    |                      | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 2,5                               | 10<br>15<br>20         | 0,4         | –  | 0,1                  | AMS-D-250401-100.40R                   | ●             | 1,15 |                                   | 4 | 16 | 120 | 12<br>17<br>22 | 2,8            | HAMS 1604 R                            | ●     |
|                                   | AMS-D-250401-150.40R   |             |    |                      | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-250401-200.40R   |             |    |                      | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 3,0                               | 10<br>15<br>20         | 0,4         | –  | 0,1                  | AMS-D-300401-100.40R                   | ●             | 1,4  |                                   | 4 | 12 | 100 | 12<br>17<br>22 | 2,35           | HAMS 1204 R                            | ●     |
|                                   | AMS-D-300401-150.40R   |             |    |                      | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-300401-200.40R   |             |    |                      | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 3,0                               | 10<br>15<br>20         | 0,4         | –  | 0,1                  | AMS-D-300401-100.40R                   | ●             | 1,4  |                                   | 4 | 16 | 120 | 12<br>17<br>22 | 2,8            | HAMS 1604 R                            | ●     |
|                                   | AMS-D-300401-150.40R   |             |    |                      | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-300401-200.40R   |             |    |                      | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 3,9                               | 10<br>15<br>20         | 0,6         | –  | 0,2                  | AMS-D-390602-100.40R                   | ●             | 1,9  |                                   | 4 | 12 | 100 | 12<br>17<br>22 | 2,35           | HAMS 1204 R                            | ●     |
|                                   | AMS-D-390602-150.40R/L |             |    |                      | ●                                      | HAMS 1204 R/L |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-390602-200.40R/L |             |    |                      | ●                                      | HAMS 1204 R/L |      |                                   |   |    |     | ●              |                |                                        |       |
| 3,9                               | 10<br>15<br>20         | 0,6         | –  | 0,2                  | AMS-D-390602-100.40R                   | ●             | 1,9  |                                   | 4 | 16 | 120 | 12<br>17<br>22 | 2,8            | HAMS 1604 R                            | ●     |
|                                   | AMS-D-390602-150.40R/L |             |    |                      | ●                                      | HAMS 1604 R/L |      |                                   |   |    |     | ●              |                |                                        |       |
|                                   | AMS-D-390602-200.40R/L |             |    |                      | ●                                      | HAMS 1604 R/L |      |                                   |   |    |     | ●              |                |                                        |       |
| 4,0                               | 25<br>25               | 0,15<br>0,3 | –  | 0,05<br>0,1          | AMS-D-40015005-250.40R/L               | ●             | 1,9  |                                   | 4 | 12 | 100 | 27<br>27       | 2,35           | HAMS 1204 R/L                          | ●     |
|                                   |                        |             |    | AMS-D-400301-250.40R | ●                                      | HAMS 1204 R   |      |                                   |   |    |     | ●              |                |                                        |       |
| 4,0                               | 25<br>25               | 0,15<br>0,3 | –  | 0,05<br>0,1          | AMS-D-40015005-250.40R/L               | ●             | 1,9  |                                   | 4 | 16 | 120 | 27<br>27       | 2,8            | HAMS 1604 R/L                          | ●     |
|                                   |                        |             |    | AMS-D-400301-250.40R | ●                                      | HAMS 1604 R   |      |                                   |   |    |     | ●              |                |                                        |       |

| Schneideinsatz / Insert / Inserto |     |     |    |      |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|-----|----|------|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T   | EB | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 5,9                               | 10  | 0,8 | –  | 0,2  | AMS-D-590802-100.60R                   | ●     | 2,9 |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R                            | ●     |
|                                   | 15  |     |    | 0,1  | AMS-D-590801-150.60R                   | ●     |     |  |                                   |    |     | 17             |                | HAMS 1206 R                            | ●     |
|                                   | 20  |     |    | 0,2  | AMS-D-590802-200.60R/L                 | ●     |     |  |                                   |    |     | 22             |                | HAMS 1206 R/L                          | ●     |
|                                   | 20  |     |    | 0,4  | AMS-D-590804-200.60R                   | ●     |     |  |                                   |    |     | 22             |                | HAMS 1206 R                            | ●     |
|                                   | 30  |     |    | 0,2  | AMS-D-590802-300.60R/L                 | ●     |     |  |                                   |    |     | 32             |                | HAMS 1206 R/L                          | ●     |
| 5,9                               | 10  | 0,8 | –  | 0,2  | AMS-D-590802-100.60R                   | ●     | 2,9 |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R                            | ●     |
|                                   | 15  |     |    | 0,1  | AMS-D-590801-150.60R                   | ●     |     |  |                                   |    |     | 17             |                | HAMS 1606 R                            | ●     |
|                                   | 20  |     |    | 0,2  | AMS-D-590802-200.60R/L                 | ●     |     |  |                                   |    |     | 22             |                | HAMS 1606 R/L                          | ●     |
|                                   | 20  |     |    | 0,4  | AMS-D-590804-200.60R                   | ●     |     |  |                                   |    |     | 22             |                | HAMS 1606 R                            | ●     |
|                                   | 30  |     |    | 0,2  | AMS-D-590802-300.60R/L                 | ●     |     |  |                                   |    |     | 32             |                | HAMS 1606 R/L                          | ●     |
| 6,0                               | 42  | 0,5 | –  | 0,15 | AMS-D-6005015-420.60R                  | ●     | 2,9 |  | 6                                 | 12 | 100 | 44             | 2,35           | HAMS 1206 R                            | ●     |
| 6,0                               | 42  | 0,5 | –  | 0,15 | AMS-D-6005015-420.60R                  | ●     | 2,9 |  | 6                                 | 16 | 120 | 44             | 2,8            | HAMS 1606 R                            | ●     |
| 7,9                               | 10  | 1,0 | –  | 0,2  | AMS-D-791002-100.80R                   | ●     | 3,9 |  | 8                                 | 16 | 120 | 12             | 2,8            | HAMS 1608 R                            | ●     |
|                                   | 25  |     |    |      | AMS-D-791002-250.80R/L                 | ●     |     |  |                                   |    |     | 27             |                | HAMS 1608 R/L                          | ●     |
| 8,2                               | 30  | 0,4 | –  | 0,2  | AMS-D-820402-300.80R                   | ●     | 3,9 |  | 8                                 | 16 | 120 | 32             | 2,8            | HAMS 1608 R                            | ●     |
| 10,2                              | 20  | 1,0 | –  | 0,2  | AMS-D-1021002-200.100R                 | ●     | 4,9 |  | 10                                | 20 | 120 | 22             | 2,8            | HAMS 2010R                             | ●     |
|                                   | 30  |     |    |      | AMS-D-1021002-300.100R                 | ●     |     |  |                                   |    |     | 32             |                | HAMS 2010R                             | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlusring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                     |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                     |
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                     |
| HAMS 2010 R                         | AS 0044                   | KVR 20                                                                     |

## Drehen Turning Barenatura



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |      |    |     |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|------|----|-----|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T    | EB | R   | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,0                               | 15  | 0,15 | –  | 0,2 | AMS-D20-3001502-150.40R                | ●     | 1,3 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 3,0                               | 15  | 0,15 | –  | 0,2 | AMS-D20-3001502-150.40R                | ●     | 1,3 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 4,0                               | 15  | 0,3  | –  | 0,2 | AMS-D20-400302-150.40R                 | ●     | 1,9 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 4,0                               | 15  | 0,3  | –  | 0,2 | AMS-D20-400302-150.40R                 | ●     | 1,9 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 5,0                               | 10  | 0,5  | –  | 0,2 | AMS-D20-500502-100.60R                 | ●     | 2,3 |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R                            | ●     |
| 5,0                               | 10  | 0,5  | –  | 0,2 | AMS-D20-500502-100.60R                 | ●     | 2,3 |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R                            | ●     |
| 5,0                               | 15  | 0,5  | –  | 0,2 | AMS-D20-500502-150.60R                 | ●     | 2,3 |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 5,0                               | 15  | 0,5  | –  | 0,2 | AMS-D20-500502-150.60R                 | ●     | 2,3 |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |

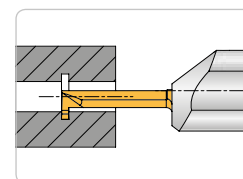
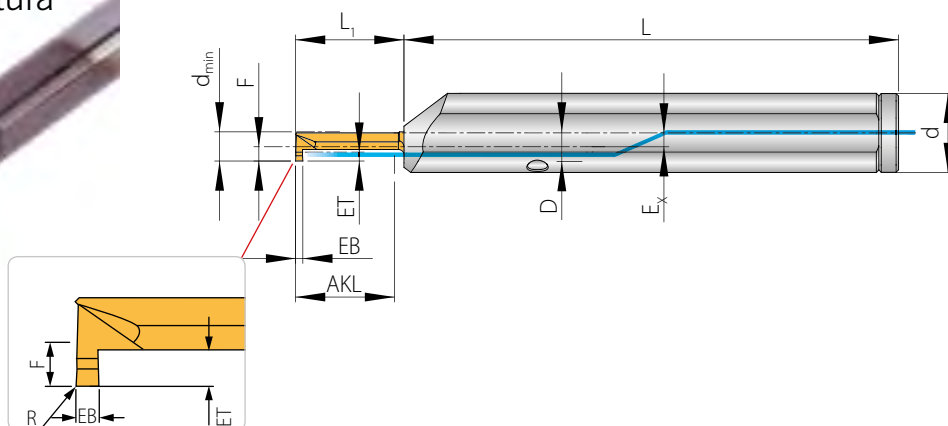
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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For your special solutions see page 125  
Per richieste di soluzioni speciali vedere pagina 126



## Stechen Grooving Scanalatura

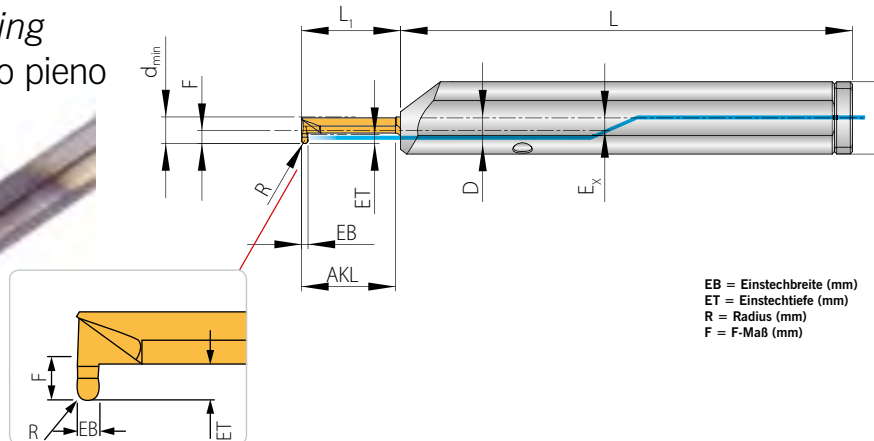


EB = Einstechbreite (mm)  
ET = Einstechtiefe (mm)  
F = F-Maß (mm)  
EB = Groove width (mm)  
ET = Groove depth (mm)  
F = F-Dimension (mm)  
EB = Larghezza gola (mm)  
ET = Profondità gola (mm)  
F = Dimensione F (mm)

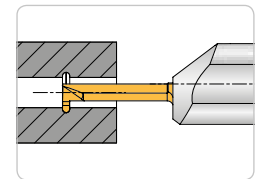
| Schneideinsatz / Insert / Inserto |     |              |     |   |                                        |       |      |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |  |
|-----------------------------------|-----|--------------|-----|---|----------------------------------------|-------|------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|--|
| d <sub>min</sub>                  | AKL | EB<br>+ 0,03 | ET  | R | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |  |
| 2,5                               | 10  | 0,8          | 0,6 | – | AMS-S-25080600-100.40R                 | ●     | 1,15 |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-25080600-150.40R                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-25080600-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |  |
| 2,5                               | 10  | 0,8          | 0,6 | – | AMS-S-25080600-100.40R                 | ●     | 1,15 |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-25080600-150.40R                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-25080600-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |  |
| 3,0                               | 10  | 0,8          | 0,6 | – | AMS-S-30080600-100.40R                 | ●     | 1,4  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-30080600-150.40R                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-30080600-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |  |
| 3,0                               | 10  | 0,8          | 0,6 | – | AMS-S-30080600-100.40R                 | ●     | 1,4  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-30080600-150.40R                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-30080600-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |  |
| 3,9                               | 10  | 1,0          | 0,8 | – | AMS-S-39100800-100.40R                 | ●     | 1,4  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-39100800-150.40R/L               | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R/L                          | ●     |  |
|                                   | 20  |              |     | – | AMS-S-39100800-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |  |
| 3,9                               | 10  | 1,0          | 0,8 | – | AMS-S-39100800-100.40R                 | ●     | 1,4  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |  |
|                                   | 15  |              |     | – | AMS-S-39100800-150.40R/L               | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R/L                          | ●     |  |
|                                   | 20  |              |     | – | AMS-S-39100800-200.40R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |  |
| 5,9                               | 20  | 1,0          | 1,8 | – | AMS-S-59101800-200.60R                 | ●     | 2,9  |  | 6                                 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |  |
|                                   | 10  | 1,5          |     | – | AMS-S-59151800-100.60R                 | ●     |      |  |                                   |    |     | 12             |                | HAMS 1206 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-59151800-200.60R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1206 R                            | ●     |  |
|                                   | 30  |              |     | – | AMS-S-59151800-300.60R                 | ●     |      |  |                                   |    |     | 32             |                | HAMS 1206 R                            | ●     |  |
| 5,9                               | 20  | 1,0          | 1,8 | – | AMS-S-59101800-200.60R                 | ●     | 2,9  |  | 6                                 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |  |
|                                   | 10  | 1,5          |     | – | AMS-S-59151800-100.60R                 | ●     |      |  |                                   |    |     | 12             |                | HAMS 1606 R                            | ●     |  |
|                                   | 20  |              |     | – | AMS-S-59151800-200.60R                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1606 R                            | ●     |  |
|                                   | 30  |              |     | – | AMS-S-59151800-300.60R                 | ●     |      |  |                                   |    |     | 32             |                | HAMS 1606 R                            | ●     |  |
| 6,9                               | 15  | 2,0          | 2,5 | – | AMS-S-69202500-150.80R/L               | ●     | 3,9  |  | 8                                 | 16 | 120 | 17             | 2,8            | HAMS 1608 R/L                          | ●     |  |
| 7,9                               | 10  | 1,8          | 2,5 | – | AMS-S-79182500-100.80R                 | ●     | 3,9  |  | 8                                 | 16 | 120 | 12             | 2,8            | HAMS 1608 R                            | ●     |  |
|                                   | 25  |              |     | – | AMS-S-79182500-250.80R                 | ●     |      |  |                                   |    |     | 27             |                | HAMS 1608 R                            | ●     |  |

## Radius-Einstich

Radius grooving  
Profilo a raggio pieno



EB = Einstechbreite (mm)  
ET = Einstichtiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)



EB = Groove width (mm)  
ET = Groove depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
EB = Larghezza gola (mm)  
ET = Profondità gola (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |      |              |     |                          |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|------|--------------|-----|--------------------------|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL  | EB<br>+ 0,03 | ET  | R                        | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,9                               | 10   | 1,0          | 0,8 | 0,5                      | AMS-S-39100805-100.40R                 | ●     | 1,9 |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 0,5  |              |     | AMS-S-39100805-150.40R/L | ●                                      | 17    |     |  |                                   |    |     | HAMS 1204 R/L  |                | ●                                      |       |
|                                   | 0,5  |              |     | AMS-S-39100805-200.40R   | ●                                      | 22    |     |  |                                   |    |     | HAMS 1204 R    |                | ●                                      |       |
| 3,9                               | 10   | 1,0          | 0,8 | 0,5                      | AMS-S-39100805-100.40R                 | ●     | 1,9 |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 0,5  |              |     | AMS-S-39100805-150.40R/L | ●                                      | 17    |     |  |                                   |    |     | HAMS 1604 R/L  |                | ●                                      |       |
|                                   | 0,5  |              |     | AMS-S-39100805-200.40R   | ●                                      | 22    |     |  |                                   |    |     | HAMS 1604 R    |                | ●                                      |       |
| 5,9                               | 10   | 1,5          | 1,8 | 0,75                     | AMS-S-59151875-100.60R                 | ●     | 2,9 |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R                            | ●     |
|                                   | 0,75 |              |     | AMS-S-59151875-200.60R   | ●                                      | 22    |     |  |                                   |    |     | HAMS 1206 R    |                | ●                                      |       |
|                                   | 0,75 |              |     | AMS-S-59151875-300.60R   | ●                                      | 32    |     |  |                                   |    |     | HAMS 1206 R    |                | ●                                      |       |
| 5,9                               | 10   | 1,5          | 1,8 | 0,75                     | AMS-S-59151875-100.60R                 | ●     | 2,9 |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R                            | ●     |
|                                   | 0,75 |              |     | AMS-S-59151875-200.60R   | ●                                      | 22    |     |  |                                   |    |     | HAMS 1606 R    |                | ●                                      |       |
|                                   | 0,75 |              |     | AMS-S-59151875-300.60R   | ●                                      | 32    |     |  |                                   |    |     | HAMS 1606 R    |                | ●                                      |       |
| 8,2                               | 20   | 2,0          | 2,0 | 1,0                      | AMS-S-82202010-200.80R                 | ●     | 3,9 |  | 8                                 | 16 | 120 | 22             | 2,8            | HAMS 1608 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                      |

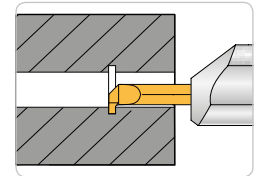
ARNO® SpecialDesign | Für Ihre individuelle Ausführung siehe Seite 124

For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Seegering DIN 471/472

Cir-clip DIN 471/472 / Sedi seeger DIN 471/472



ET = Einstechtiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
ET = Groove depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
ET = Profondità gola (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |               |     |      |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|---------------|-----|------|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | EB<br>± 0,025 | ET  | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 4,1                               | 15  | 0,99          | 1,1 | 0,05 | AMS-472-41099110-150.40R               | ●     | 1,9 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
|                                   |     | 1,19          |     |      | AMS-472-41119110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1204 R                            | ●     |
|                                   |     | 1,39          |     |      | AMS-472-41139110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1204 R                            | ●     |
|                                   |     | 1,69          |     |      | AMS-472-41169110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1204 R                            | ●     |
|                                   |     |               |     |      |                                        |       |     |  |                                   |    |     |                |                |                                        |       |
| 4,1                               | 15  | 0,99          | 1,1 | 0,05 | AMS-472-41099110-150.40R               | ●     | 1,9 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
|                                   |     | 1,19          |     |      | AMS-472-41119110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1604 R                            | ●     |
|                                   |     | 1,39          |     |      | AMS-472-41139110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1604 R                            | ●     |
|                                   |     | 1,69          |     |      | AMS-472-41169110-150.40R               | ●     |     |  |                                   |    |     |                |                | HAMS 1604 R                            | ●     |
| 6,1                               | 15  | 0,99          | 1,5 | 0,05 | AMS-472-61099150-150.60R               | ●     | 2,9 |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
|                                   |     | 1,19          |     |      | AMS-472-61119150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1206 R                            | ●     |
|                                   |     | 1,39          |     |      | AMS-472-61139150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1206 R                            | ●     |
|                                   |     | 1,69          |     |      | AMS-472-61169150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1206 R                            | ●     |
|                                   |     | 1,94          |     |      | AMS-472-61194150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1206 R                            | ●     |
|                                   |     |               |     |      |                                        |       |     |  |                                   |    |     |                |                |                                        |       |
| 6,1                               | 15  | 0,99          | 1,5 | 0,05 | AMS-472-61099150-150.60R               | ●     | 2,9 |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
|                                   |     | 1,19          |     |      | AMS-472-61119150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1606 R                            | ●     |
|                                   |     | 1,39          |     |      | AMS-472-61139150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1606 R                            | ●     |
|                                   |     | 1,69          |     |      | AMS-472-61169150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1606 R                            | ●     |
|                                   |     | 1,94          |     |      | AMS-472-61194150-150.60R               | ●     |     |  |                                   |    |     |                |                | HAMS 1606 R                            | ●     |
|                                   |     |               |     |      |                                        |       |     |  |                                   |    |     |                |                |                                        |       |
| 8,4                               | 20  | 1,19          | 2,0 | 0,05 | AMS-472-84119200-200.80R               | ●     | 3,9 |  | 8                                 | 16 | 120 | 22             | 2,8            | HAMS 1608 R                            | ●     |
|                                   |     | 1,39          | 2,0 |      | AMS-472-84139200-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
|                                   |     | 1,69          | 2,5 |      | AMS-472-84169250-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
|                                   |     | 1,94          | 2,5 |      | AMS-472-84194250-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
|                                   |     | 2,24          | 3,0 |      | AMS-472-84224300-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
|                                   |     | 2,74          | 3,5 |      | AMS-472-84274350-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
|                                   |     | 3,28          | 3,5 |      | AMS-472-84328350-200.80R               | ●     |     |  |                                   |    |     |                |                | HAMS 1608 R                            | ●     |
| 10,4                              | 25  | 1,39          | 3,5 | 0,05 | AMS-472-104139350-250.100R             | ●     | 4,9 |  | 10                                | 20 | 120 | 27             | 2,8            | HAMS 2010 R                            | ●     |
|                                   |     | 1,69          |     |      | AMS-472-104169350-250.100R             | ●     |     |  |                                   |    |     |                |                | HAMS 2010 R                            | ●     |
|                                   |     | 1,94          |     |      | AMS-472-104194350-250.100R             | ●     |     |  |                                   |    |     |                |                | HAMS 2010 R                            | ●     |
|                                   |     | 2,24          |     |      | AMS-472-104224350-250.100R             | ●     |     |  |                                   |    |     |                |                | HAMS 2010 R                            | ●     |
|                                   |     | 2,74          |     |      | AMS-472-104274350-250.100R             | ●     |     |  |                                   |    |     |                |                | HAMS 2010 R                            | ●     |
|                                   |     | 3,28          |     |      | AMS-472-104328350-250.100R             | ●     |     |  |                                   |    |     |                |                | HAMS 2010 R                            | ●     |
|                                   |     |               |     |      |                                        |       |     |  |                                   |    |     |                |                |                                        |       |

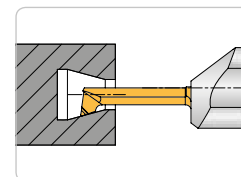
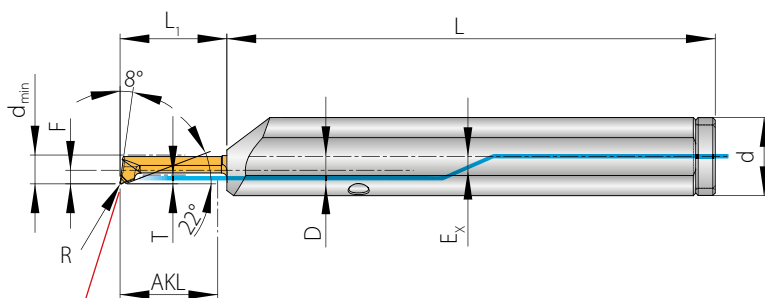
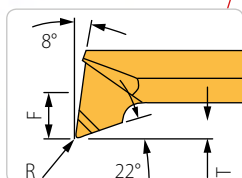
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                      |
| HAMS 2010 R                         | AS 0044                   | KVR 20                                                                      |

## Kopieren

Copying  
 Copiatura



T = Nutztiefe (mm)  
 R = Radius (mm)  
 F = F-Maß (mm)  
 T = Depth (mm)  
 R = Radius (mm)  
 F = F-Dimension (mm)  
 T = Profondità massima di lavoro (mm)  
 R = Raggio di punta (mm)  
 F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |      |    |      |                                        |       |      |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|------|----|------|----------------------------------------|-------|------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T    | EB | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 1,5                               | 11  | 0,1  | –  | 0,05 | AMS-K-1501005-110.40R                  | ●     | 1,3  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 3   | 0,15 |    | 0,1  | AMS-K-1501501-060.40R                  | ●     |      |  |                                   |    |     | 7              |                | HAMS 1204 R                            | ●     |
| 1,5                               | 11  | 0,1  | –  | 0,05 | AMS-K-1501005-110.40R                  | ●     | 1,3  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 3   | 0,15 |    | 0,1  | AMS-K-1501501-060.40R                  | ●     |      |  |                                   |    |     | 7              |                | HAMS 1604 R                            | ●     |
| 2,0                               | 10  | 0,1  | –  | 0,05 | AMS-K-20015005-100.40R/L               | ●     | 0,9  |  | 4                                 | 12 | 100 | 11             | 2,35           | HAMS 1204 R/L                          | ●     |
|                                   | 6   | 0,3  |    |      | AMS-K-2003005-060.40R                  | ●     |      |  |                                   |    |     | 7              |                | HAMS 1204 R                            | ●     |
|                                   | 10  | 0,3  |    |      | AMS-K-2003005-100.40R                  | ●     |      |  |                                   |    |     | 11             |                | HAMS 1204 R                            | ●     |
| 2,0                               | 10  | 0,1  | –  | 0,05 | AMS-K-20015005-100.40R/L               | ●     | 0,9  |  | 4                                 | 16 | 120 | 11             | 2,8            | HAMS 1604 R/L                          | ●     |
|                                   | 6   | 0,3  |    |      | AMS-K-2003005-060.40R                  | ●     |      |  |                                   |    |     | 7              |                | HAMS 1604 R                            | ●     |
|                                   | 10  | 0,3  |    |      | AMS-K-2003005-100.40R                  | ●     |      |  |                                   |    |     | 11             |                | HAMS 1604 R                            | ●     |
| 2,2                               | 15  | 0,2  | –  | 0,1  | AMS-K-220201-150.40R                   | ●     | 0,95 |  | 4                                 | 12 | 100 | 16             | 2,35           | HAMS 1204 R                            | ●     |
| 2,2                               | 15  | 0,2  | –  | 0,1  | AMS-K-220201-150.40R                   | ●     | 0,95 |  | 4                                 | 16 | 120 | 16             | 2,8            | HAMS 1604 R                            | ●     |
| 2,5                               | 10  | 0,4  | –  | 0,1  | AMS-K-250401-100.40R                   | ●     | 1,15 |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-250401-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |
|                                   | 20  |      |    |      | AMS-K-250401-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |
| 2,5                               | 10  | 0,4  | –  | 0,1  | AMS-K-250401-100.40R                   | ●     | 1,15 |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-250401-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |
|                                   | 20  |      |    |      | AMS-K-250401-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |
| 3,0                               | 10  | 0,4  | –  | 0,1  | AMS-K-300401-100.40R                   | ●     | 1,4  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-300401-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |
|                                   | 20  |      |    |      | AMS-K-300401-200.40 R/L                | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R/L                          | ●     |
| 3,0                               | 10  | 0,4  | –  | 0,1  | AMS-K-300401-100.40R                   | ●     | 1,4  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-300401-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |
|                                   | 20  |      |    |      | AMS-K-300401-200.40 R/L                | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R/L                          | ●     |
| 3,9                               | 10  | 0,8  | –  | 0,2  | AMS-K-390802-100.40R                   | ●     | 1,9  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-390802-150.40R/L                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R/L                          | ●     |
|                                   | 20  |      |    |      | AMS-K-390802-200.40R/L                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R/L                          | ●     |
|                                   | 20  | 1,3  |    | 0,4  | AMS-K-391304-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |
| 3,9                               | 10  | 0,8  | –  | 0,2  | AMS-K-390802-100.40R                   | ●     | 1,9  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 15  |      |    |      | AMS-K-390802-150.40R/L                 | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R/L                          | ●     |
|                                   | 20  |      |    |      | AMS-K-390802-200.40R/L                 | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R/L                          | ●     |
|                                   | 20  | 1,3  |    | 0,4  | AMS-K-391304-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |

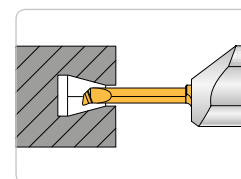
| Schneideinsatz / Insert / Inserto |     |     |    |      |                                        |       |      |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |  |
|-----------------------------------|-----|-----|----|------|----------------------------------------|-------|------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|--|
| d <sub>min</sub>                  | AKL | T   | EB | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |  |
| 4,0                               | 12  | 0,6 | –  | 0,4  | AMS-K-400604-120.40R                   | ●     | 1,9  |  | 4                                 | 12 | 100 | 14             | 2,35           | HAMS 1204 R                            | ●     |  |
|                                   | 15  |     |    |      | AMS-K-400604-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-400602-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1204 R                            | ●     |  |
| 4,0                               | 12  | 0,6 | –  | 0,4  | AMS-K-400604-120.40R                   | ●     | 1,9  |  | 4                                 | 16 | 120 | 14             | 2,8            | HAMS 1604 R                            | ●     |  |
|                                   | 15  |     |    |      | AMS-K-400604-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-400602-200.40R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1604 R                            | ●     |  |
| 5,0                               | 10  | 0,5 | –  | 0,2  | AMS-K-500502-100.60R/L                 | ●     | 2,3  |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R/L                          | ●     |  |
|                                   | 15  |     |    |      | AMS-K-500502-150.60R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1206 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-500502-200.60R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1206 R                            | ●     |  |
|                                   | 25  |     |    |      | AMS-K-500502-250.60R/L                 | ●     |      |  |                                   |    |     | 26             |                | HAMS 1206 R/L                          | ●     |  |
|                                   | 30  |     |    |      | AMS-K-500502-300.60R                   | ●     |      |  |                                   |    |     | 31             |                | HAMS 1206 R                            | ●     |  |
| 5,0                               | 10  | 0,5 | –  | 0,2  | AMS-K-500502-100.60R/L                 | ●     | 2,3  |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R/L                          | ●     |  |
|                                   | 15  |     |    |      | AMS-K-500502-150.60R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1606 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-500502-200.60R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1606 R                            | ●     |  |
|                                   | 25  |     |    |      | AMS-K-500502-250.60R/L                 | ●     |      |  |                                   |    |     | 26             |                | HAMS 1606 R/L                          | ●     |  |
|                                   | 30  |     |    |      | AMS-K-500502-300.60R                   | ●     |      |  |                                   |    |     | 31             |                | HAMS 1606 R                            | ●     |  |
| 5,9                               | 35  | 0,5 | –  | 0,2  | AMS-K-590502-350.60R                   | ●     | 2,9  |  | 6                                 | 12 | 100 | 37             | 2,35           | HAMS 1206 R                            | ●     |  |
|                                   | 40  |     |    |      | AMS-K-590502-400.60R                   | ●     |      |  |                                   |    |     | 42             |                | HAMS 1206 R                            | ●     |  |
|                                   | 50  |     |    |      | AMS-K-590502-500.60R                   | ●     |      |  |                                   |    |     | 52             |                | HAMS 1206 R                            | ●     |  |
|                                   | 10  | 1,8 |    |      | AMS-K-591802-100.60R                   | ●     |      |  |                                   |    |     | 12             |                | HAMS 1206 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-591802-200.60R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1206 R                            | ●     |  |
|                                   | 30  |     |    |      | AMS-K-591802-300.60 R/L                | ●     |      |  |                                   |    |     | 32             |                | HAMS 1206 R/L                          | ●     |  |
| 5,9                               | 35  | 0,5 | –  | 0,2  | AMS-K-590502-350.60R                   | ●     | 2,9  |  | 6                                 | 16 | 120 | 37             | 2,8            | HAMS 1606 R                            | ●     |  |
|                                   | 40  |     |    |      | AMS-K-590502-400.60R                   | ●     |      |  |                                   |    |     | 42             |                | HAMS 1606 R                            | ●     |  |
|                                   | 50  |     |    |      | AMS-K-590502-500.60R                   | ●     |      |  |                                   |    |     | 52             |                | HAMS 1606 R                            | ●     |  |
|                                   | 10  | 1,8 |    |      | AMS-K-591802-100.60R                   | ●     |      |  |                                   |    |     | 12             |                | HAMS 1606 R                            | ●     |  |
|                                   | 20  |     |    |      | AMS-K-591802-200.60R                   | ●     |      |  |                                   |    |     | 22             |                | HAMS 1606 R                            | ●     |  |
|                                   | 30  |     |    |      | AMS-K-591802-300.60 R/L                | ●     |      |  |                                   |    |     | 32             |                | HAMS 1606 R/L                          | ●     |  |
| 6,0                               | 42  | 0,5 | –  | 0,15 | AMS-K-6005015-420.60R                  | ●     | 2,3  |  | 6                                 | 12 | 100 | 44             | 2,35           | HAMS 1206 R                            | ●     |  |
| 6,0                               | 42  | 0,5 | –  | 0,15 | AMS-K-6005015-420.60R                  | ●     | 2,3  |  | 6                                 | 16 | 120 | 44             | 2,8            | HAMS 1606 R                            | ●     |  |
| 7,2                               | 45  | 0,5 | –  | 0,2  | AMS-K-720502-450.80R                   | ●     | 3,45 |  | 8                                 | 16 | 120 | 47             | 2,8            | HAMS 1608 R                            | ●     |  |
| 8,0                               | 50  | 0,5 | –  | 0,2  | AMS-K-800502-500.80R                   | ●     | 3,9  |  | 8                                 | 16 | 120 | 52             | 2,8            | HAMS 1608 R                            | ●     |  |
| 8,9                               | 20  | 3,9 | –  | 0,2  | AMS-K-893902-200.80R                   | ●     | 3,9  |  | 8                                 | 16 | 120 | 22             | 2,8            | HAMS 1608 R                            | ●     |  |
|                                   | 30  |     |    |      | AMS-K-893902-300.80R                   | ●     |      |  |                                   |    |     | 32             |                | HAMS 1608 R                            | ●     |  |
| 10,8                              | 25  | 4,9 | –  | 0,2  | AMS-K-1084902-250.100R                 | ●     | 4,9  |  | 10                                | 20 | 120 | 27             | 2,8            | HAMS 2010R                             | ●     |  |
|                                   | 35  |     |    |      | AMS-K-1084902-350.100R                 | ●     |      |  |                                   |    |     | 37             |                | HAMS 2010R                             | ●     |  |

## Ersatzteile / Spare parts / Ricambi

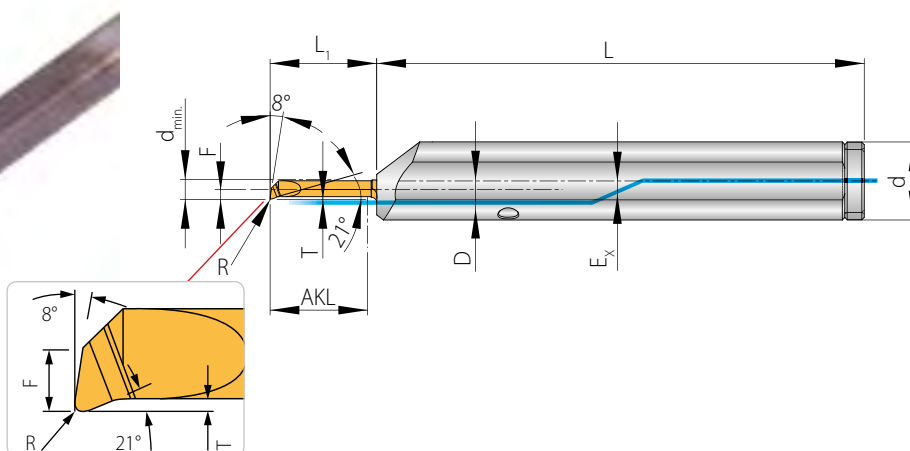
| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                      |
| HAMS 2010 R                         | AS 0044                   | KVR 20                                                                      |

## Kopieren – verstärkte Ausführung

Copying – Re-inforced execution / Copiatura – Versione rinforzata



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)



| Schneideinsatz / Insert / Inserto |     |     |    |      |                                        |       |      |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|-----|----|------|----------------------------------------|-------|------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T   | EB | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,0                               | 10  | 0,2 | –  | 0,2  | AMS-K-300202-100.40R/L                 | ●     | 1,3  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R/L                          | ●     |
|                                   | 15  |     |    |      | AMS-K-300202-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |
| 3,0                               | 10  | 0,2 | –  | 0,2  | AMS-K-300202-100.40R/L                 | ●     | 1,3  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R/L                          | ●     |
|                                   | 15  |     |    |      | AMS-K-300202-150.40R                   | ●     |      |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |
| 3,2                               | 10  | 0,2 | –  | 0,15 | AMS-K-3202015-100.40R                  | ●     | 1,45 |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R                            | ●     |
| 3,2                               | 10  | 0,2 | –  | 0,15 | AMS-K-3202015-100.40R                  | ●     | 1,45 |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R                            | ●     |
| 4,0                               | 10  | 0,3 | –  | 0,2  | AMS-K-400302-100.40R/L                 | ●     | 1,9  |  | 4                                 | 12 | 100 | 12             | 2,35           | HAMS 1204 R/L                          | ●     |
|                                   | 25  |     |    | 0,1  | AMS-K-400301-250.40R                   | ●     | 1,5  |  |                                   |    |     | 27             |                | HAMS 1204 R                            | ●     |
| 4,0                               | 10  | 0,3 | –  | 0,2  | AMS-K-400302-100.40R/L                 | ●     | 1,9  |  | 4                                 | 16 | 120 | 12             | 2,8            | HAMS 1604 R/L                          | ●     |
|                                   | 25  |     |    | 0,1  | AMS-K-400301-250.40R                   | ●     | 1,5  |  |                                   |    |     | 27             |                | HAMS 1604 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L                       | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |

ARNO® SpecialDesign | Für Ihre individuelle Ausführung siehe Seite 124

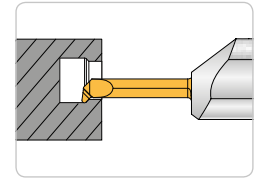
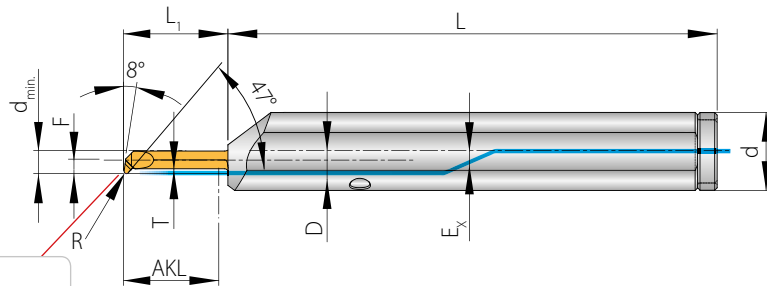
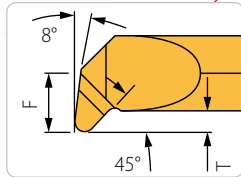
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Kopieren 45°

Copying 45°

Copiatura 45°



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)

T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)

T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

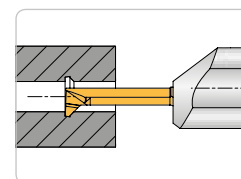
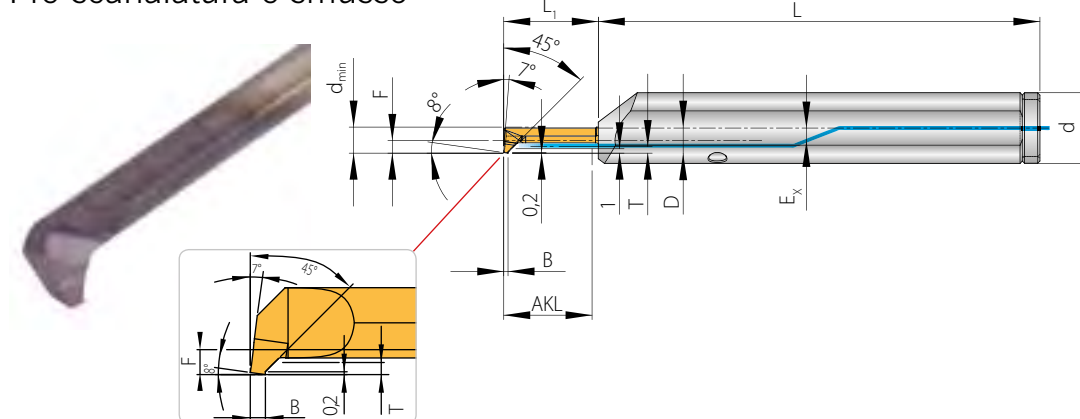
| Schneideinsatz / Insert / Inserto |     |     |    |      |                                        |       |      | Klemmhalter / Holder / Adattatore |    |     |     |                |                |                                        |       |
|-----------------------------------|-----|-----|----|------|----------------------------------------|-------|------|-----------------------------------|----|-----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T   | EB | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |                                   | D  | d   | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,9                               | 20  | 0,6 | –  | 0,15 | AMS-K45-3906015-200.40R                | ●     | 1,9  |                                   | 4  | 12  | 100 | 22             | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 20  | 1,3 | –  | 0,4  | AMS-K45-391304-200.40R                 | ●     |      |                                   |    |     |     | 22             |                | HAMS 1204 R                            | ●     |
| 3,9                               | 20  | 0,6 | –  | 0,15 | AMS-K45-3906015-200.40R                | ●     | 1,9  |                                   | 4  | 16  | 120 | 22             | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 20  | 1,3 | –  | 0,4  | AMS-K45-391304-200.40R                 | ●     |      |                                   |    |     |     | 22             |                | HAMS 1604 R                            | ●     |
| 4,0                               | 12  | 0,6 | –  | 0,4  | AMS-K45-400604-120.40R                 | ●     | 1,9  | 4                                 | 12 | 100 | 14  | 2,35           | HAMS 1204 R    | ●                                      |       |
|                                   | 15  |     |    |      | AMS-K45-400604-150.40R                 | ●     |      |                                   |    |     | 17  |                | HAMS 1204 R    | ●                                      |       |
|                                   | 20  |     |    |      | AMS-K45-4008015-200.40R                | ●     |      |                                   |    |     | 22  |                | HAMS 1204 R    | ●                                      |       |
| 4,0                               | 12  | 0,6 | –  | 0,4  | AMS-K45-400604-120.40R                 | ●     | 1,9  | 4                                 | 16 | 120 | 14  | 2,8            | HAMS 1604 R    | ●                                      |       |
|                                   | 15  |     |    |      | AMS-K45-400604-150.40R                 | ●     |      |                                   |    |     | 17  |                | HAMS 1604 R    | ●                                      |       |
|                                   | 20  |     |    |      | AMS-K45-4008015-200.40R                | ●     |      |                                   |    |     | 22  |                | HAMS 1604 R    | ●                                      |       |
| 5,0                               | 25  | 1,0 | –  | 0,15 | AMS-K45-5010015-250.60R                | ●     | 2,45 |                                   | 6  | 12  | 100 | 27             | 2,35           | HAMS 1206 R                            | ●     |
| 5,0                               | 25  | 1,0 | –  | 0,15 | AMS-K45-5010015-250.60R                | ●     | 2,45 |                                   | 6  | 16  | 120 | 27             | 2,8            | HAMS 1606 R                            | ●     |
| 5,9                               | 30  | 1,8 | –  | 0,15 | AMS-K45-5918015-300.60R                | ●     | 2,9  |                                   | 6  | 12  | 100 | 32             | 2,35           | HAMS 1206 R                            | ●     |
| 5,9                               | 30  | 1,8 | –  | 0,15 | AMS-K45-5918015-300.60R                | ●     | 2,9  |                                   | 6  | 16  | 120 | 32             | 2,8            | HAMS 1606 R                            | ●     |
| 6,9                               | 10  | 2,9 | –  | 0,2  | AMS-K45-692902-100.60R                 | ●     | 2,9  | 6                                 | 12 | 100 | 12  | 2,35           | HAMS 1206 R    | ●                                      |       |
|                                   | 15  |     |    |      | AMS-K45-692902-150.60R                 | ●     |      |                                   |    |     | 17  |                | HAMS 1206 R    | ●                                      |       |
|                                   | 20  |     |    |      | AMS-K45-692902-200.60R                 | ●     |      |                                   |    |     | 22  |                | HAMS 1206 R    | ●                                      |       |
|                                   | 30  |     |    |      | AMS-K45-692902-300.60R                 | ●     |      |                                   |    |     | 32  |                | HAMS 1206 R    | ●                                      |       |
| 6,9                               | 10  | 2,9 | –  | 0,2  | AMS-K45-692902-100.60R                 | ●     | 2,9  | 6                                 | 16 | 120 | 12  | 2,8            | HAMS 1606 R    | ●                                      |       |
|                                   | 15  |     |    |      | AMS-K45-692902-150.60R                 | ●     |      |                                   |    |     | 17  |                | HAMS 1606 R    | ●                                      |       |
|                                   | 20  |     |    |      | AMS-K45-692902-200.60R                 | ●     |      |                                   |    |     | 22  |                | HAMS 1606 R    | ●                                      |       |
|                                   | 30  |     |    |      | AMS-K45-692902-300.60R                 | ●     |      |                                   |    |     | 32  |                | HAMS 1606 R    | ●                                      |       |
| 8,9                               | 15  | 3,9 | –  | 0,2  | AMS-K45-893902-150.80R*                | ●     | 3,9  | 8                                 | 16 | 120 | 17  | 2,8            | HAMS 1608 R    | ●                                      |       |
|                                   | 20  |     |    |      | AMS-K45-893902-200.80R*                | ●     |      |                                   |    |     | 22  |                | HAMS 1608 R    | ●                                      |       |
|                                   | 30  |     |    |      | AMS-K45-893902-300.80R*                | ●     |      |                                   |    |     | 32  |                | HAMS 1608 R    | ●                                      |       |



## Vorstechen und Fasen

Pre-grooving and chamfering

Pre-scanalatura e smusso



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |                    |     |                                        |       |     | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|--------------------|-----|----------------------------------------|-------|-----|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | B <sup>+0,03</sup> | T   | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 5,0                               | 20  | 1,0                | 0,8 | AMS-V-50100800-200.60R                 | ●     | 2,4 | 6                                 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |
| 5,9                               | 20  |                    |     | AMS-V-59100800-200.60R                 | ●     | 2,9 |                                   |    |     |                |                | HAMS 1206 R                            | ●     |
| 5,0                               | 20  | 1,0                | 0,8 | AMS-V-50100800-200.60R                 | ●     | 2,4 | 6                                 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |
| 5,9                               | 20  |                    |     | AMS-V-59100800-200.60R                 | ●     | 2,9 |                                   |    |     |                |                | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1206 R/L                       | AS 0043                   | KVR 12                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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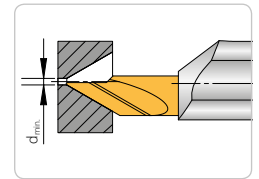
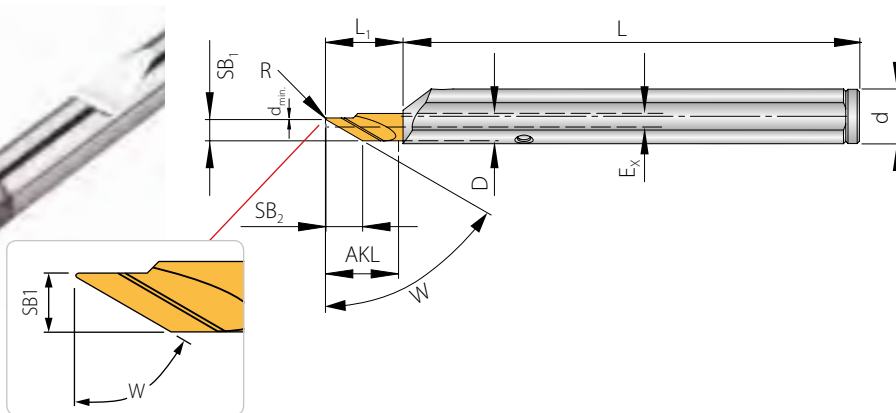
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Zentrum Fasen 45°/60°

Centre chamfering 45°/60°

Smussatura centrale 45°/60°



T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |                 |                 |     |     |     |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----------------|-----------------|-----|-----|-----|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | SB <sub>1</sub> | SB <sub>2</sub> | W   | AKL | R   | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 1,0                               | 4,5             | 4,5             | 45° | 15  | 0,2 | AMS-ZF45-104502-150.60R/L              | ●     | 2,0 |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R/L                          | ●     |
|                                   |                 | 7,9             | 60° |     |     | AMS-ZF60-108002-150.60R/L              | ●     |     |  |                                   |    |     | HAMS 1206 R/L  |                | ●                                      |       |
|                                   |                 |                 |     |     |     |                                        |       |     |  |                                   |    |     |                |                |                                        |       |
| 1,0                               | 4,5             | 4,5             | 45° | 15  | 0,2 | AMS-ZF45-104502-150.60R/L              | ●     | 2,0 |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R/L                          | ●     |
|                                   |                 | 7,9             | 60° |     |     | AMS-ZF60-108002-150.60R/L              | ●     |     |  |                                   |    |     | HAMS 1606 R/L  |                | ●                                      |       |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1206 R/L                       | AS 0043                   | KVR 12                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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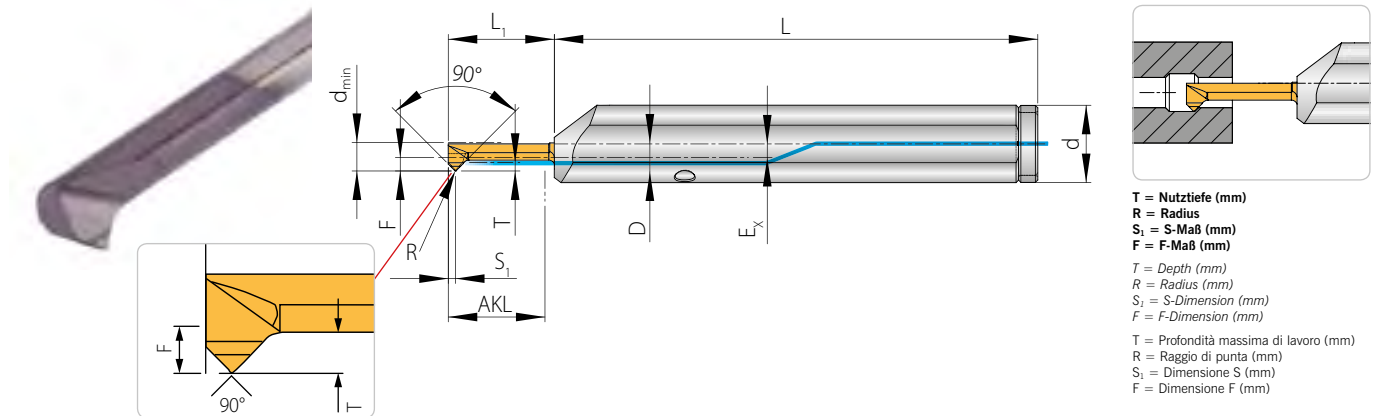
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Fasen 45°

Chamfering 45°

Smusso 45°



| Schneideinsatz / Insert / Inserto |     |     |                |     |                                        |       |      |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|-----|----------------|-----|----------------------------------------|-------|------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | T   | S <sub>1</sub> | R   | Bezeichnung<br>Designation<br>Articolo | PG 44 | F    |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 2,5                               | 15  | 0,4 | 1,0            | 0,1 | AMS-F-250401-150.40R                   | ●     | 1,15 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 2,5                               | 15  | 0,4 | 1,0            | 0,1 | AMS-F-250401-150.40R                   | ●     | 1,15 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 3,0                               | 15  | 0,4 | 1,0            | 0,1 | AMS-F-300401-150.40R                   | ●     | 1,4  |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 3,0                               | 15  | 0,4 | 1,0            | 0,1 | AMS-F-300401-150.40R                   | ●     | 1,4  |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 3,9                               | 15  | 0,8 | 1,2            | 0,2 | AMS-F-390802-150.40R                   | ●     | 1,9  |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 3,9                               | 15  | 0,8 | 1,2            | 0,2 | AMS-F-390802-150.40R                   | ●     | 1,9  |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 5,9                               | 20  | 1,8 | 2,0            | 0,2 | AMS-F-591802-200.60R                   | ●     | 2,9  |  | 6                                 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |
| 5,9                               | 20  | 1,8 | 2,0            | 0,2 | AMS-F-591802-200.60R                   | ●     | 2,9  |  | 6                                 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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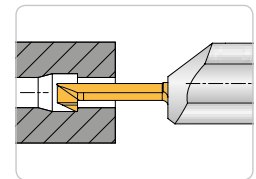
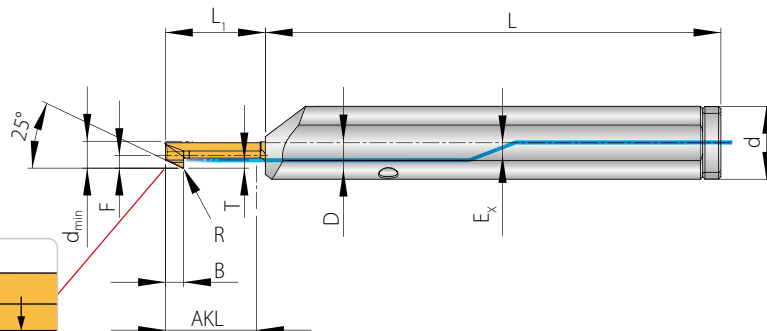
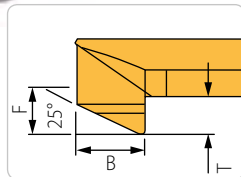
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Rückwärtsdrehen

Back turning

Lavorazione in tirata



B = Breite (mm)  
T = Nutztiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)  
B = Width (mm)  
T = Depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
B = Larghezza (mm)  
T = Profondità massima di lavoro (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |   |   |     |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|---|---|-----|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | B | T | R   | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,9                               | 15  | 4 | 1 | 0,2 | AMS-R-39401002-150.40R                 | ●     | 1,9 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 3,9                               | 15  | 4 | 1 | 0,2 | AMS-R-39401002-150.40R                 | ●     | 1,9 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 5,9                               | 20  | 4 | 2 | 0,2 | AMS-R-59402002-200.60R                 | ●     | 2,9 |  | 6                                 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |
| 5,9                               | 20  | 4 | 2 | 0,2 | AMS-R-59402002-200.60R                 | ●     | 2,9 |  | 6                                 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |

3

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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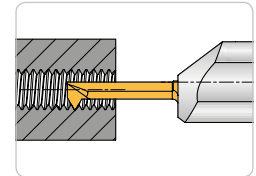
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Gewinde 60° – Metrisch-Teilprofil

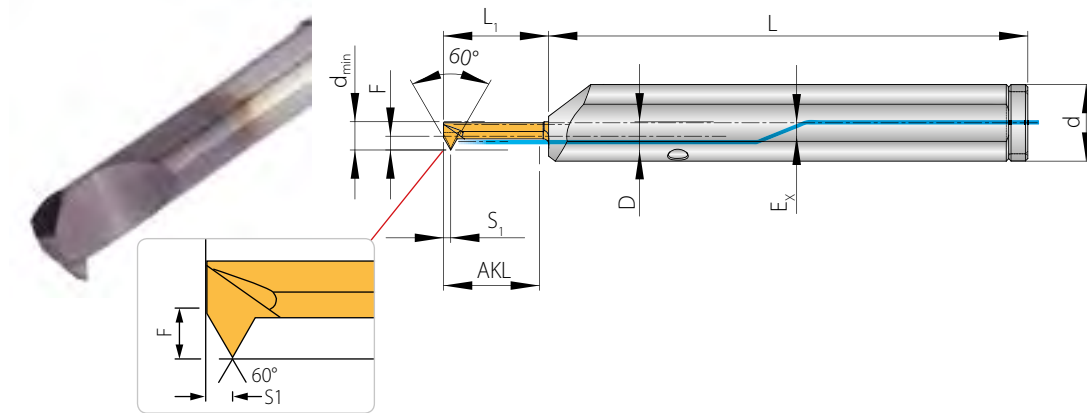
Threading 60° – Metric partial profile

Filettatura 60° – Metrica profilo parziale



$S_1 = S\text{-Maß (mm)}$   
 $F = F\text{-Maß (mm)}$   
 $S_1 = S\text{-Dimension (mm)}$   
 $F = F\text{-Dimension (mm)}$   
 $S_1 = \text{Dimensione S (mm)}$   
 $F = \text{Dimensione F (mm)}$

MF – ISO-Innengewinde Metrisch Fein  
MF – ISO-Metric – Fine  
MF – Filettatura Metrica ISO – Passo Fine



| Schneideinsatz / Insert / Inserto |     |                              |                                 |       |                                        |       |     | Klemmhalter / Holder / Adattatore |   |    |     |       |       |                                        |       |
|-----------------------------------|-----|------------------------------|---------------------------------|-------|----------------------------------------|-------|-----|-----------------------------------|---|----|-----|-------|-------|----------------------------------------|-------|
| $d_{\min}$                        | AKL | Gewinde<br>Thread<br>Filetto | P<br>Steigung<br>Pitch<br>Passo | $S_1$ | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |                                   | D | d  | L   | $L_1$ | $E_x$ | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 2,3                               | 5   | –                            | 0,2–0,5                         | 0,45  | AMS-G-MF020050-050.40R                 | ●     | 1,1 |                                   | 4 | 12 | 100 | 6,5   | 2,35  | HAMS 1204 R                            | ●     |
| 2,3                               | 5   | –                            | 0,2–0,5                         | 0,45  | AMS-G-MF020050-050.40R                 | ●     | 1,1 |                                   | 4 | 16 | 120 | 6,5   | 2,8   | HAMS 1604 R                            | ●     |
| 3,0                               | 15  | M4                           | 0,5–0,7                         | 0,7   | AMS-G-MF050070-150.40R                 | ●     | 1,4 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 3,0                               | 15  | M4                           | 0,5–0,7                         | 0,7   | AMS-G-MF050070-150.40R                 | ●     | 1,4 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 4,0                               | 15  | M5                           | 0,5–1,0                         | 0,7   | AMS-G-MF050100-150.40R                 | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 4,0                               | 15  | M5                           | 0,5–1,0                         | 0,7   | AMS-G-MF050100-150.40R                 | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 6,0                               | 20  | M8                           | 0,5–1,5                         | 0,8   | AMS-G-MF050150-200.60R                 | ●     | 2,9 |                                   | 6 | 12 | 100 | 22    | 2,35  | HAMS 1206 R                            | ●     |
| 6,0                               | 20  | M8                           | 0,5–1,5                         | 0,8   | AMS-G-MF050150-200.60R                 | ●     | 2,9 |                                   | 6 | 16 | 120 | 22    | 2,8   | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

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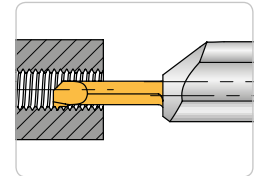
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

## Gewinde 60° – Metrisch-Vollprofil

Threading 60° – Metric full profile

Filettatura 60° – Metrica profilo completo



$S_1$  = S-Maß (mm)  
 $F$  = F-Maß (mm)  
 $S_1$  = S-Dimension (mm)  
 $F$  = F-Dimension (mm)  
 $S_1$  = Dimensione S (mm)  
 $F$  = Dimensione F (mm)

M – ISO-Innengewinde Metrisch  
M – ISO-Metric  
M – Filettatura Metrica ISO

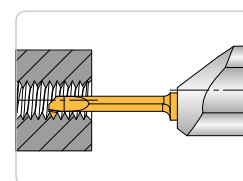
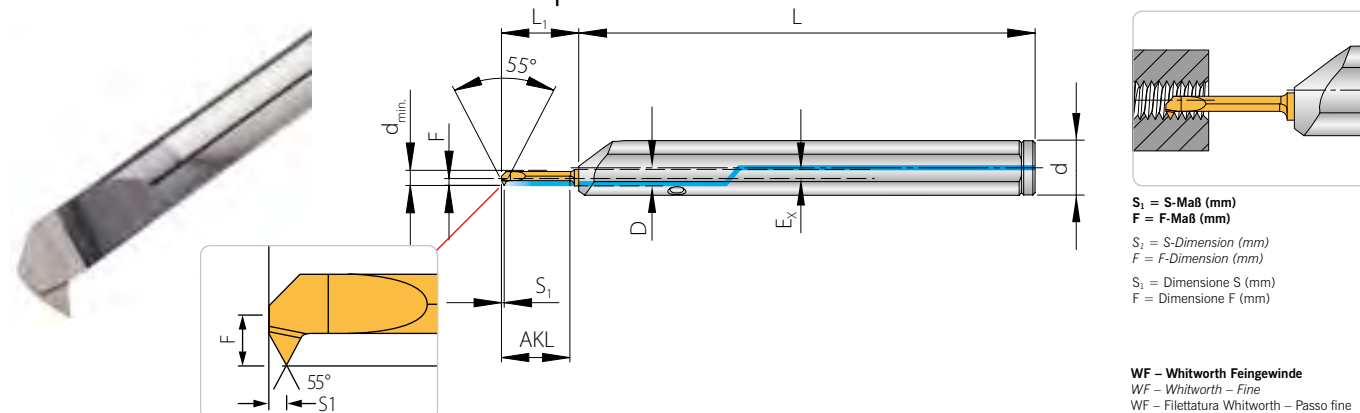
MF – ISO-Innengewinde Metrisch Fein  
MF – ISO-Metric – Fine  
MF – Filettatura Metrica ISO – Passo Fine

| Schneideinsatz / Insert / Inserto |     |                              |                                 |       |                                        |       |     | Klemmhalter / Holder / Adattatore |   |    |     |       |       |                                        |       |
|-----------------------------------|-----|------------------------------|---------------------------------|-------|----------------------------------------|-------|-----|-----------------------------------|---|----|-----|-------|-------|----------------------------------------|-------|
| $d_{min}$                         | AKL | Gewinde<br>Thread<br>Filetto | P<br>Steigung<br>Pitch<br>Passo | $S_1$ | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |                                   | D | d  | L   | $L_1$ | $E_x$ | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 4,8                               | 20  | M6                           | 1,0                             | 0,7   | AMS-GV-M100-200.60R*                   | ●     | 2,9 |                                   | 6 | 12 | 100 | 22    | 2,35  | HAMS 1206 R                            | ●     |
| 4,8                               | 20  | M6                           | 1,0                             | 0,7   | AMS-GV-M100-200.60R*                   | ●     | 2,9 |                                   | 6 | 16 | 120 | 22    | 2,8   | HAMS 1606 R                            | ●     |
| 5,0                               | 15  | M6                           | 1,0                             | 0,7   | AMS-GV-M100-150.40R*                   | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 5,0                               | 15  | M6                           | 1,0                             | 0,7   | AMS-GV-M100-150.40R*                   | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 6,0                               | 20  | M8                           | 1,25                            | 0,8   | AMS-GV-M125-200.60R*                   | ●     | 2,9 |                                   | 6 | 12 | 100 | 22    | 2,35  | HAMS 1206 R                            | ●     |
|                                   |     | M12                          | 1,5                             | 1,0   | AMS-GV-M150-200.60R*                   | ●     |     |                                   |   |    |     |       |       | HAMS 1206 R                            | ●     |
| 6,0                               | 20  | M8                           | 1,25                            | 0,8   | AMS-GV-M125-200.60R*                   | ●     | 2,9 |                                   | 6 | 16 | 120 | 22    | 2,8   | HAMS 1606 R                            | ●     |
|                                   |     | M12                          | 1,5                             | 1,0   | AMS-GV-M150-200.60R*                   | ●     |     |                                   |   |    |     |       |       | HAMS 1606 R                            | ●     |
| 4,0                               | 15  | MF                           | 0,5                             | 0,4   | AMS-GV-MF050-150.40R                   | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
|                                   |     |                              | 0,6                             |       | AMS-GV-MF060-150.40R                   | ●     |     |                                   |   |    |     |       |       | HAMS 1204 R                            | ●     |
| 4,0                               | 15  | MF                           | 0,5                             | 0,4   | AMS-GV-MF050-150.40R                   | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
|                                   |     |                              | 0,6                             |       | AMS-GV-MF060-150.40R                   | ●     |     |                                   |   |    |     |       |       | HAMS 1604 R                            | ●     |
| 4,1                               | 15  | MF                           | 0,7                             | 0,5   | AMS-GV-MF070-150.40R                   | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 4,1                               | 15  | MF                           | 0,7                             | 0,5   | AMS-GV-MF070-150.40R                   | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 4,2                               | 15  | MF                           | 0,75                            | 0,5   | AMS-GV-MF075-150.40R                   | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 4,2                               | 15  | MF                           | 0,75                            | 0,5   | AMS-GV-MF075-150.40R                   | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 5,4                               | 15  | MF                           | 0,5                             | 0,4   | AMS-GV-MF050-150.60R                   | ●     | 2,5 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 5,4                               | 15  | MF                           | 0,5                             | 0,4   | AMS-GV-MF050-150.60R                   | ●     | 2,5 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |
| 5,6                               | 15  | MF                           | 0,75                            | 0,5   | AMS-GV-MF075-150.60R                   | ●     | 2,6 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 5,6                               | 15  | MF                           | 0,75                            | 0,5   | AMS-GV-MF075-150.60R                   | ●     | 2,6 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |
| 5,7                               | 15  | M100                         | 1,0                             | 0,7   | AMS-GV-M100-150.60R                    | ●     | 2,6 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 5,7                               | 15  | M100                         | 1,0                             | 0,7   | AMS-GV-M100-150.60R                    | ●     | 2,6 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |

## Whitworth Gewinde 55° – Teilprofil

Whitworth thread 55° – Partial profile

Filettatura Whitworth 55° – Profilo parziale



$S_1$  = S-Maß (mm)  
F = F-Maß (mm)  
 $S_1$  = S-Dimension (mm)  
F = F-Dimension (mm)  
 $S_1$  = Dimensione S (mm)  
F = Dimensione F (mm)

WF – Whitworth Feingewinde  
WF – Whitworth – Fine  
WF – Filettatura Whitworth – Passo fine

| Schneideinsatz / Insert / Inserto |     |                              |                                 |       |                                        |       |     | Klemmhalter / Holder / Adattatore |   |    |     |       |       |                                        |       |
|-----------------------------------|-----|------------------------------|---------------------------------|-------|----------------------------------------|-------|-----|-----------------------------------|---|----|-----|-------|-------|----------------------------------------|-------|
| $d_{min}$                         | AKL | Gewinde<br>Thread<br>Filetto | p<br>Steigung<br>Pitch<br>Passo | $S_1$ | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |                                   | D | d  | L   | $L_1$ | $E_x$ | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,3                               | 15  | WF                           | 0,25–1,0                        | 0,6   | AMS-G-WF33025100-150.40R               | ●     | 1,5 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 3,3                               | 15  | WF                           | 0,25–1,0                        | 0,6   | AMS-G-WF33025100-150.40R               | ●     | 1,5 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 4,3                               | 15  | WF                           | 0,25–1,0                        | 0,6   | AMS-G-WF43025100-150.40R               | ●     | 1,9 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 4,3                               | 15  | WF                           | 0,25–1,0                        | 0,6   | AMS-G-WF43025100-150.40R               | ●     | 1,9 |                                   | 4 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 6,0                               | 15  | WF                           | 0,5–1,5                         | 0,8   | AMS-G-WF60050150-150.60R               | ●     | 2,9 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 6,0                               | 15  | WF                           | 0,5–1,5                         | 0,8   | AMS-G-WF60050150-150.60R               | ●     | 2,9 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelschlossring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|--------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                   |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                   |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                   |

ARNO® SpecialDesign | Für Ihre individuelle Ausführung siehe Seite 124

For your special solutions see page 125

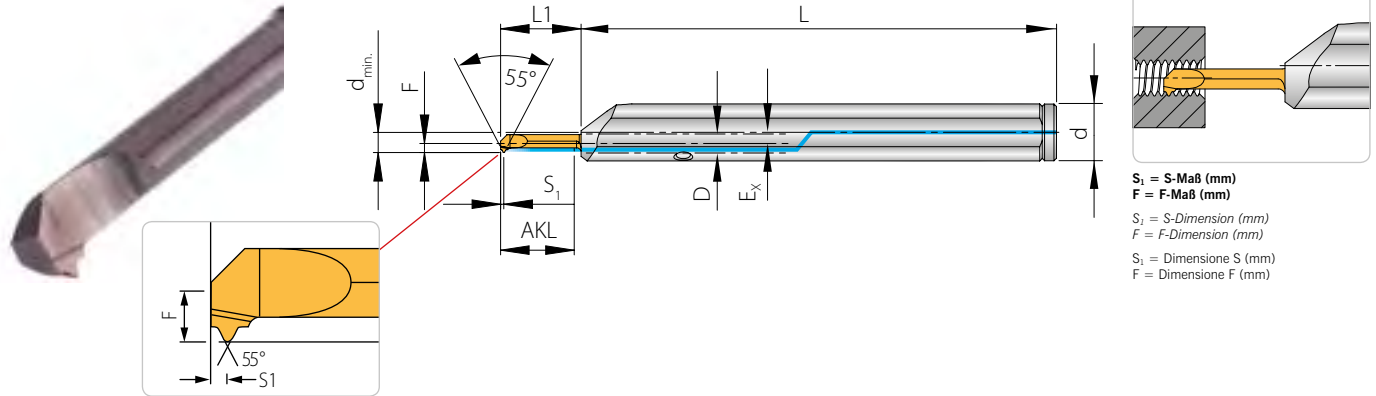
Per richieste di soluzioni speciali vedere pagina 126



## Whitworth Rohrgewinde 55° DIN ISO 228 – Vollprofil

Whitworth pipe thread 55° DIN ISO 228 – Full profile

Filettatura Whitworth 55° DIN ISO 228 – Profilo completo



| Schneideinsatz / Insert / Inserto |     |                              |                                 |            |                |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|------------------------------|---------------------------------|------------|----------------|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | Gewinde<br>Thread<br>Filetto | P<br>Steigung<br>Pitch<br>Passo | G/<br>Inch | S <sub>1</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 4                                 | 15  | W228                         | 1,27                            | 20         | 0,7            | AMS-GV-W228/20-150.40R                 | ●     | 1,9 |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 4                                 | 15  | W228                         | 1,27                            | 20         | 0,7            | AMS-GV-W228/20-150.40R                 | ●     | 1,9 |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 11                                | 15  | 1/4"-19 BSP                  | 1,33                            | 19         | 0,95           | AMS-GV-W228/19-150.60R                 | ●     | 2,9 |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 11                                | 15  | 1/4"-19 BSP                  | 1,33                            | 19         | 0,95           | AMS-GV-W228/19-150.60R                 | ●     | 2,9 |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelschlossring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|--------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                   |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                   |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                   |

❖ ARNO® SpecialDesign | Für Ihre individuelle Ausführung siehe Seite 124

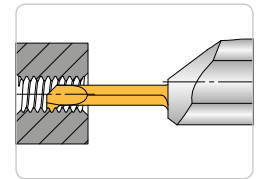
For your special solutions see page 125

Per richieste di soluzioni speciali vedere pagina 126

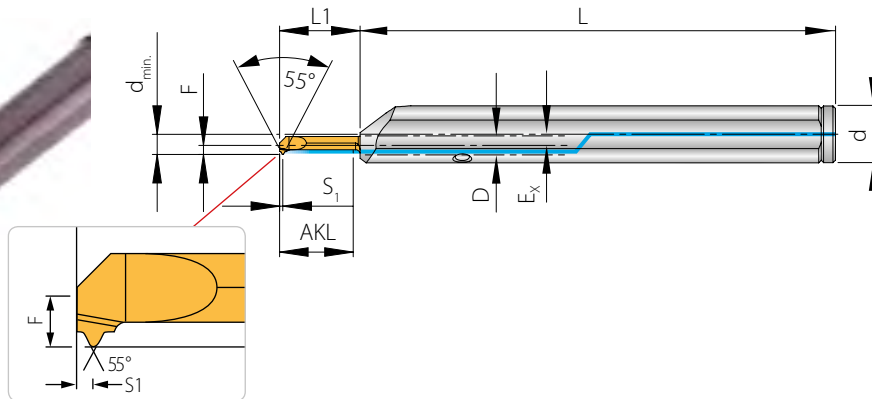
## Whitworth Rohrgewinde 55° BSW – Vollprofil

Whitworth pipe thread 55° BSW – Full profile

Filettatura Whitworth 55° BSW – Profilo completo



$S_1$  = S-Maß (mm)  
 $F$  = F-Maß (mm)  
 $S_1$  = S-Dimension (mm)  
 $F$  = F-Dimension (mm)  
 $S_1$  = Dimensione S (mm)  
 $F$  = Dimensione F (mm)



| Schneideinsatz / Insert / Inserto |     |                              |            |       |                                        |       |     | Klemmhalter / Holder / Adattatore |   |    |     |       |       |                                        |       |
|-----------------------------------|-----|------------------------------|------------|-------|----------------------------------------|-------|-----|-----------------------------------|---|----|-----|-------|-------|----------------------------------------|-------|
| $d_{min}$                         | AKL | Gewinde<br>Thread<br>Filetto | G/<br>Inch | $S_1$ | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |                                   | D | d  | L   | $L_1$ | $E_x$ | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 3,4                               | 15  | 3/16"-24 BSW                 | 24         | 0,75  | AMS-GV-BSW24-150.40R                   | ●     | 1,3 |                                   | 4 | 12 | 100 | 17    | 2,35  | HAMS 1204 R                            | ●     |
| 3,4                               | 15  | 3/16"-24 BSW                 | 24         | 0,75  | AMS-GV-BSW24-150.40R                   | ●     | 1,3 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1604 R                            | ●     |
| 3,4                               | 15  | 3/16"-24 BSW                 | 24         | 0,75  | AMS-GV-BSW24-150.60R                   | ●     | 0,3 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 3,4                               | 15  | 3/16"-24 BSW                 | 24         | 0,75  | AMS-GV-BSW24-150.60R                   | ●     | 0,3 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |
| 4,4                               | 15  | 7/32"-28 BSF                 | 28         | 0,65  | AMS-GV-BSW28-150.60R                   | ●     | 1,2 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 4,4                               | 15  | 7/32"-28 BSF                 | 28         | 0,65  | AMS-GV-BSW28-150.60R                   | ●     | 1,2 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |
| 6,5                               | 15  | 5/16"-22 BSF                 | 22         | 0,9   | AMS-GV-BSW22-150.60R                   | ●     | 2,9 |                                   | 6 | 12 | 100 | 17    | 2,35  | HAMS 1206 R                            | ●     |
| 6,5                               | 15  | 5/16"-22 BSF                 | 22         | 0,9   | AMS-GV-BSW22-150.60R                   | ●     | 2,9 |                                   | 6 | 16 | 120 | 17    | 2,8   | HAMS 1606 R                            | ●     |

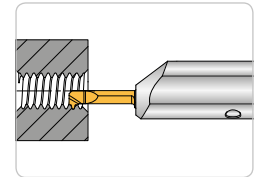
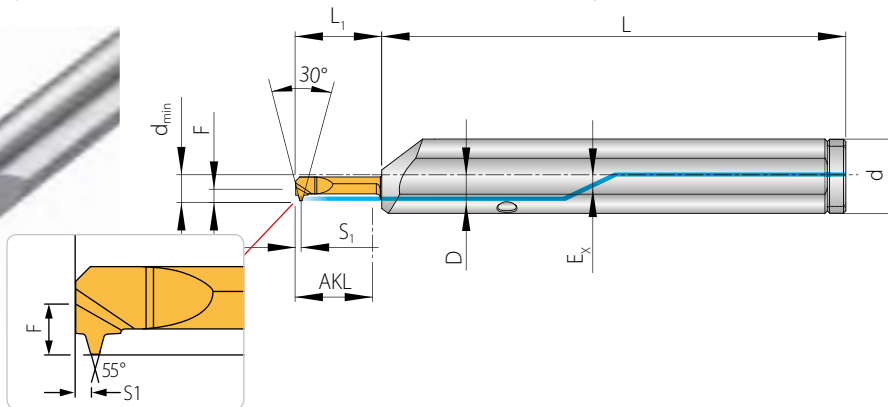
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

## Trapezgewinde 30° DIN ISO 103 – Teilprofil

Trapezoidal 30° DIN ISO 103 – Partial profile

Filettatura trapezoidale 30° DIN ISO 103 – Profilo parziale



S<sub>1</sub> = S-Maß (mm)  
F = F-Maß (mm)  
S<sub>1</sub> = S-Dimension (mm)  
F = F-Dimension (mm)  
S<sub>1</sub> = Dimensione S (mm)  
F = Dimensione F (mm)

| Schneideinsatz / Insert / Inserto |     |                              |                                 |                |                                        |       |     | Klemmhalter / Holder / Adattatore |   |    |     |                |                |                                        |       |
|-----------------------------------|-----|------------------------------|---------------------------------|----------------|----------------------------------------|-------|-----|-----------------------------------|---|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | Gewinde<br>Thread<br>Filetto | P<br>Steigung<br>Pitch<br>Passo | S <sub>1</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |                                   | D | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 6,5                               | 20  | TR 8x1.5                     | 1,5                             | 0,85           | AMS-G-TR103/1.5R-200.60R               | ●     | 2,9 |                                   | 6 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |
| 6,5                               | 20  | TR 8x1.5                     | 1,5                             | 0,85           | AMS-G-TR103/1.5R-200.60R               | ●     | 2,9 |                                   | 6 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |
| 7,0                               | 20  | TR 9x2.0                     | 2,0                             | 1,3            | AMS-G-TR103/2.0R-200.60R               | ●     | 2,9 |                                   | 6 | 12 | 100 | 22             | 2,35           | HAMS 1206 R                            | ●     |
| 7,0                               | 20  | TR 9x2.0                     | 2,0                             | 1,3            | AMS-G-TR103/2.0R-200.60R               | ●     | 2,9 |                                   | 6 | 16 | 120 | 22             | 2,8            | HAMS 1606 R                            | ●     |
| 7,0                               | 20  | TR 9x2.0                     | 2,0                             | 1,3            | AMS-G-TR103/2.0R-200.80R               | ●     | 2,6 |                                   | 8 | 16 | 120 | 22             | 2,8            | HAMS 1608 R                            | ●     |
| 8,0                               | 20  | TR 11x3.0                    | 3,0                             | 1,4            | AMS-G-TR103/3.0R-200.80R               | ●     | 3,6 |                                   | 8 | 16 | 120 | 22             | 2,8            | HAMS 1608 R                            | ●     |

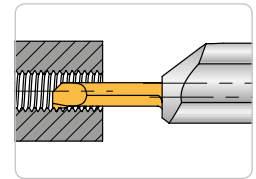
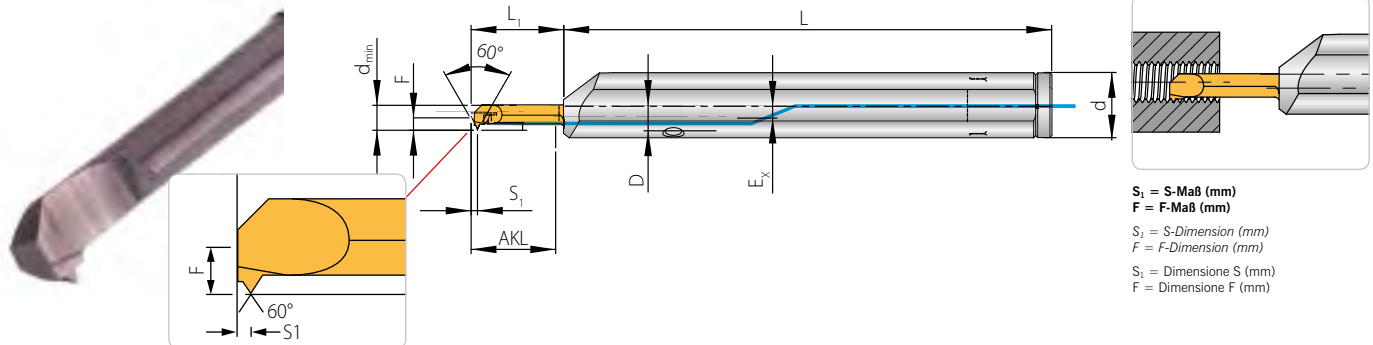
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1206 R/L                       | AS 0043                   | KVR 12                                                                      |
| HAMS 1606 R/L / HAMS 1608 R/L       | AS 0044                   | KVR 16                                                                      |

## Amerikanisches ISO-Zollgewinde 60° UN – Vollprofil

Amerikanisches ISO-Zollgewinde 60° UN – Vollprofil

Filettatura norme americane 60° UN – Profilo completo



$S_1$  = S-Maß (mm)  
F = F-Maß (mm)  
 $S_1$  = S-Dimension (mm)  
F = F-Dimension (mm)  
 $S_1$  = Dimensione S (mm)  
F = Dimensione F (mm)

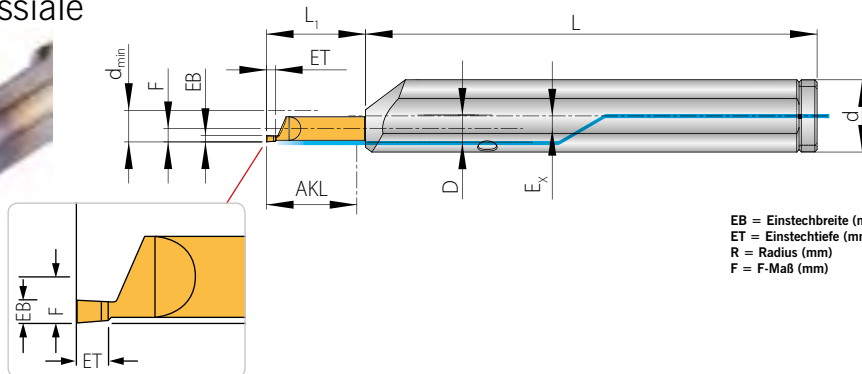
| Schneideinsatz / Insert / Inserto |     |                              |            |                |                                        |       |       |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|------------------------------|------------|----------------|----------------------------------------|-------|-------|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | Gewinde<br>Thread<br>Filetto | G/<br>Inch | S <sub>1</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 | F     |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 2,6                               | 15  | No.6-32 UNC                  | 32         | 0,6            | AMS-GV-UN32-150.40R                    | ●     | 0,45  |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 2,6                               | 15  | No.6-32 UNC                  | 32         | 0,6            | AMS-GV-UN32-150.40R                    | ●     | 0,45  |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 2,6                               | 15  | No.6-32 UNC                  | 32         | 0,6            | AMS-GV-UN32-150.60R                    | ●     | -0,55 |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 2,6                               | 15  | No.6-32 UNC                  | 32         | 0,6            | AMS-GV-UN32-150.60R                    | ●     | -0,55 |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
| 3,6                               | 15  | No.10-24 UNC                 | 24         | 0,75           | AMS-GV-UN24-150.40R                    | ●     | 1,4   |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 3,6                               | 15  | No.10-24 UNC                 | 24         | 0,75           | AMS-GV-UN24-150.40R                    | ●     | 1,4   |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 3,6                               | 15  | No.10-24 UNC                 | 24         | 0,75           | AMS-GV-UN24-150.60R                    | ●     | 0,4   |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 3,6                               | 15  | No.10-24 UNC                 | 24         | 0,75           | AMS-GV-UN24-150.60R                    | ●     | 0,4   |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
| 4,4                               | 15  | No.12-28 UNF                 | 28         | 0,65           | AMS-GV-UN28-150.40R                    | ●     | 1,9   |  | 4                                 | 12 | 100 | 17             | 2,35           | HAMS 1204 R                            | ●     |
| 4,4                               | 15  | No.12-28 UNF                 | 28         | 0,65           | AMS-GV-UN28-150.40R                    | ●     | 1,9   |  | 4                                 | 16 | 120 | 17             | 2,8            | HAMS 1604 R                            | ●     |
| 4,8                               | 15  | 1/4"-20 UNC                  | 20         | 0,9            | AMS-GV-UN18-150.60R                    | ●     | 1,5   |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 4,8                               | 15  | 1/4"-20 UNC                  | 20         | 0,9            | AMS-GV-UN18-150.60R                    | ●     | 1,5   |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
| 5,3                               | 15  | 1/4"-27 UNS                  | 27         | 0,75           | AMS-GV-UN27-150.60R                    | ●     | 1,9   |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 5,3                               | 15  | 1/4"-27 UNS                  | 27         | 0,75           | AMS-GV-UN27-150.60R                    | ●     | 1,9   |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
| 6,2                               | 15  | 5/16"-18 UNC                 | 18         | 1,0            | AMS-GV-UN20-150.60R                    | ●     | 2,9   |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 6,2                               | 15  | 5/16"-18 UNC                 | 18         | 1,0            | AMS-GV-UN20-150.60R                    | ●     | 2,9   |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |
| 7,6                               | 15  | 3/8"-16 UNC                  | 16         | 1,05           | AMS-GV-UN16-150.60R                    | ●     | 2,9   |  | 6                                 | 12 | 100 | 17             | 2,35           | HAMS 1206 R                            | ●     |
| 7,6                               | 15  | 3/8"-16 UNC                  | 16         | 1,05           | AMS-GV-UN16-150.60R                    | ●     | 2,9   |  | 6                                 | 16 | 120 | 17             | 2,8            | HAMS 1606 R                            | ●     |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L                       | AS 0044                   | KVR 16                                                                      |

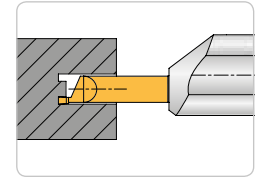
## Axial-Stecken

Axial grooving  
Scanalatura assiale



EB = Einstechbreite (mm)  
ET = Einstechtiefe (mm)  
R = Radius (mm)  
F = F-Maß (mm)

EB = Groove width (mm)  
ET = Groove depth (mm)  
R = Radius (mm)  
F = F-Dimension (mm)  
EB = Larghezza gola (mm)  
ET = Profondità gola (mm)  
R = Raggio di punta (mm)  
F = Dimensione F (mm)



| Schneideinsatz / Insert / Inserto |     |                     |     |      |                                        |       |     |  | Klemmhalter / Holder / Adattatore |    |     |                |                |                                        |       |
|-----------------------------------|-----|---------------------|-----|------|----------------------------------------|-------|-----|--|-----------------------------------|----|-----|----------------|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | AKL | EB <sup>+0.03</sup> | ET  | R    | Bezeichnung<br>Designation<br>Articolo | PG 44 | F   |  | D                                 | d  | L   | L <sub>1</sub> | E <sub>x</sub> | Bezeichnung<br>Designation<br>Articolo | PG 44 |
| 5,0                               | 7,5 | 0,7                 | 1,1 | –    | AMS-A-50071100-075.40R                 | ●     | 1,9 |  | 4                                 | 12 | 100 | 9,7            | 2,35           | HAMS 1204 R                            | ●     |
|                                   | 7,5 | 0,77                | 1,1 | 0,05 | AMS-A-5007711005-075.40R               | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1204 R                            | ●     |
|                                   | 7,5 | 0,8                 | 1,2 | –    | AMS-A-50081200-075.40R                 | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1204 R                            | ●     |
|                                   | 7,5 | 0,9                 | 1,3 | –    | AMS-A-50091300-075.40R                 | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1204 R                            | ●     |
|                                   | 7,5 | 1,0                 | 1,5 | –    | AMS-A-50101500-075.40R                 | ●     |     |  |                                   |    |     | 10             |                | HAMS 1204 R                            | ●     |
|                                   | 7,5 | 1,2                 | 1,5 | –    | AMS-A-50121500-075.40R                 | ●     |     |  |                                   |    |     | 10             |                | HAMS 1204 R                            | ●     |
|                                   | 10  | 2,0                 | 5,0 | 0,05 | AMS-A-502050005-100.40R/L              | ●     |     |  |                                   |    |     | 12             |                | HAMS 1204 R/L                          | ●     |
|                                   | 15  | 1,2                 | 1,5 | –    | AMS-A-50121500-150.40R                 | ●     |     |  |                                   |    |     | 17             |                | HAMS 1204 R                            | ●     |
| 5,0                               | 7,5 | 0,7                 | 1,1 | –    | AMS-A-50071100-075.40R                 | ●     | 1,9 |  | 4                                 | 16 | 120 | 9,7            | 2,8            | HAMS 1604 R                            | ●     |
|                                   | 7,5 | 0,77                | 1,1 | 0,05 | AMS-A-5007711005-075.40R               | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1604 R                            | ●     |
|                                   | 7,5 | 0,8                 | 1,2 | –    | AMS-A-50081200-075.40R                 | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1604 R                            | ●     |
|                                   | 7,5 | 0,9                 | 1,3 | –    | AMS-A-50091300-075.40R                 | ●     |     |  |                                   |    |     | 9,7            |                | HAMS 1604 R                            | ●     |
|                                   | 7,5 | 1,0                 | 1,5 | –    | AMS-A-50101500-075.40R                 | ●     |     |  |                                   |    |     | 10             |                | HAMS 1604 R                            | ●     |
|                                   | 7,5 | 1,2                 | 1,5 | –    | AMS-A-50121500-075.40R                 | ●     |     |  |                                   |    |     | 10             |                | HAMS 1604 R                            | ●     |
|                                   | 10  | 2,0                 | 5,0 | 0,05 | AMS-A-502050005-100.40R/L              | ●     |     |  |                                   |    |     | 12             |                | HAMS 1604 R/L                          | ●     |
|                                   | 15  | 1,2                 | 1,5 | –    | AMS-A-50121500-150.40R                 | ●     |     |  |                                   |    |     | 17             |                | HAMS 1604 R                            | ●     |
| 6,0                               | 10  | 0,97                | 1,5 | –    | AMS-A-600971500-100.60R                | ●     | 2,4 |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R                            | ●     |
|                                   | 10  | 1,2                 |     |      | AMS-A-60121500-100.60R                 | ●     |     |  |                                   |    |     | 20             |                | HAMS 1206 R                            | ●     |
|                                   | 18  | 1,2                 |     |      | AMS-A-60121500-180.60R                 | ●     |     |  |                                   |    |     | 20             |                | HAMS 1206 R                            | ●     |
| 6,0                               | 10  | 0,97                | 1,5 | –    | AMS-A-600971500-100.60R                | ●     | 2,4 |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R                            | ●     |
|                                   | 10  | 1,2                 |     |      | AMS-A-60121500-100.60R                 | ●     |     |  |                                   |    |     | 20             |                | HAMS 1606 R                            | ●     |
|                                   | 18  | 1,2                 |     |      | AMS-A-60121500-180.60R                 | ●     |     |  |                                   |    |     | 20             |                | HAMS 1606 R                            | ●     |
| 7,0                               | 10  | 1,5                 | 2,0 | –    | AMS-A-70152000-100.60R                 | ●     | 2,9 |  | 6                                 | 12 | 100 | 12             | 2,35           | HAMS 1206 R                            | ●     |
|                                   | 20  |                     |     |      | AMS-A-70152000-200.60R                 | ●     |     |  |                                   |    |     | 22             |                | HAMS 1206 R                            | ●     |
| 7,0                               | 10  | 1,5                 | 2,0 | –    | AMS-A-70152000-100.60R                 | ●     | 2,9 |  | 6                                 | 16 | 120 | 12             | 2,8            | HAMS 1606 R                            | ●     |
|                                   | 20  |                     |     |      | AMS-A-70152000-200.60R                 | ●     |     |  |                                   |    |     | 22             |                | HAMS 1606 R                            | ●     |
| 8,0                               | 10  | 1,5                 | 3,0 | 0,15 | AMS-A-801530015-100.80R                | ●     | 2   |  | 8                                 | 16 | 120 | 12             | 2,8            | HAMS 1608 R                            | ●     |
| 9,0                               | 10  | 1,5                 | 2,0 | –    | AMS-A-90152000-100.80R                 | ●     | 3,8 |  | 8                                 | 16 | 120 | 12             | 2,8            | HAMS 1608 R                            | ●     |
|                                   | 25  |                     |     |      | AMS-A-90152000-250.80R                 | ●     |     |  |                                   |    |     | 27             |                | HAMS 1608 R                            | ●     |

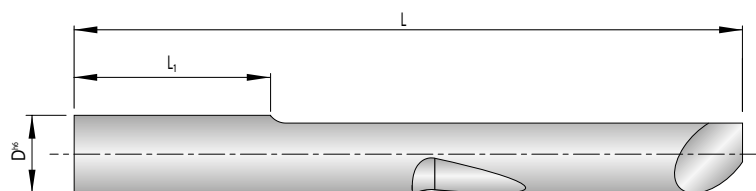
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                      |

## Halbzeuge zur Eigenprofilierung

Blanks for special profiles

Semilavorato per la realizzazione di speciali



D = Ø Profalseite (mm)  
L<sub>1</sub> = Auskraglänge (mm)  
Linke Ausführung abgebildet

D = Ø Profile side (mm)  
L<sub>1</sub> = Maximum work length (mm)  
Left-hand execution shown

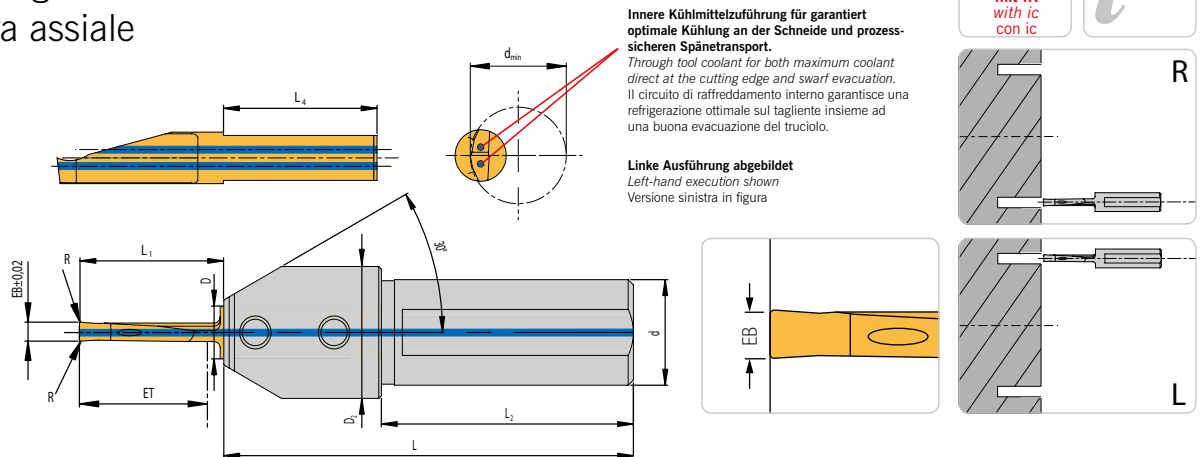
D = Ø Diametro accoppiamento (mm)  
L<sub>1</sub> = Utile di lavoro (mm)  
Versione sinistra in figura

Halbzeuge R/L / Blanks R/L / Semilavorato R/L

| Bezeichnung<br>Designation<br>Articolo | D <sup>h6</sup> | L    | L <sub>1</sub> | PG 44 |
|----------------------------------------|-----------------|------|----------------|-------|
| H-AMS-100-40R                          | 4,00            | 34,4 | 12             | ●     |
| H-AMS-100-60R                          | 6,00            | 40,6 | 12             | ●     |
| H-AMS-100-80R                          | 8,00            | 40,4 | 12             | ●     |
| H-AMS-150-40R                          | 4,00            | 39,4 | 17             | ●     |
| H-AMS-200-40R                          | 4,00            | 44,4 | 22             | ●     |
| H-AMS-200-60R                          | 6,00            | 50,6 | 22             | ●     |
| H-AMS-300-60R                          | 6,00            | 60,6 | 32             | ●     |
| H-AMS-400-40R                          | 4,00            | 64,4 | 42             | ●     |
| H-AMS-500-80L                          | 8,00            | 80,4 | 52             | ●     |
| H-AMS-600-60R/L                        | 6,00            | 90,6 | 62             | ●     |

## Axial-Stecken

Axial grooving  
Scanalatura assiale



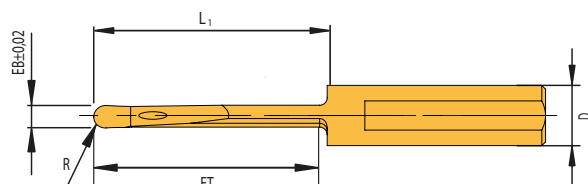
| Schneideinsatz / Insert / Inserto |     |    |                |                |                    |                                        |                                    |                                            |  | Klemmhalter / Holder / Adattatore |                |    |    |                |                                        |       |
|-----------------------------------|-----|----|----------------|----------------|--------------------|----------------------------------------|------------------------------------|--------------------------------------------|--|-----------------------------------|----------------|----|----|----------------|----------------------------------------|-------|
| d <sub>min</sub>                  | EB  | ET | L <sub>1</sub> | L <sub>4</sub> | R                  | Bezeichnung<br>Designation<br>Articolo | beschichtet<br>coated<br>rivestito | unbeschichtet<br>uncoated<br>non rivestito |  | D                                 | D <sub>2</sub> | d  | L  | L <sub>1</sub> | Bezeichnung<br>Designation<br>Articolo | PG 19 |
|                                   |     |    |                |                |                    |                                        | AL40                               | AK40                                       |  |                                   |                |    |    |                |                                        |       |
| 10                                | 1,5 | 10 | 13             | 16             | 0,1                | SAV151006-IK-R/L                       | ●                                  | ●                                          |  | 6                                 | 25             | 20 | 78 | 48             | HSAV 2006                              | ●     |
|                                   |     | 15 | 18             |                |                    | SAV151506-IK-R/L                       | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |
| 12                                | 2,0 | 12 | 16             |                | 0,2                | SAV201206-IK-R/L                       | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |
|                                   |     | 20 | 23             |                |                    | SAV202006-IK-R/L                       | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |
|                                   |     | 20 | 23             | 1,0            | SAV202006-V-IK-R/L | ●                                      | ●                                  |                                            |  |                                   |                |    |    |                |                                        |       |
| 15                                | 2,5 | 20 | 22             | 24             | 0,2                | SAV252008-IK-R/L                       | ●                                  | ●                                          |  | 8                                 | 25             | 20 | 78 | 48             | HSAV 2008                              | ●     |
|                                   |     | 20 | 22             |                |                    | SAV302008-IK-R/L                       | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |
|                                   | 3,0 | 30 | 34             |                | 1,5                | SAV303008-IK-R/L                       | ●                                  | ●                                          |  |                                   | HSAV 2508      | ●  |    |                |                                        |       |
|                                   |     | 30 | 34             |                |                    | SAV303008-V-IK-R/L                     | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |
| 30                                | 4,0 | 30 | 34             | 24             | 0,2                | SAV403010-IK-R/L                       | ●                                  | ●                                          |  | 10                                | 25             | 20 | 78 | 48             | HSAV 2010                              | ●     |
|                                   |     | 40 | 44             |                |                    | SAV404010-IK-R/L                       | ●                                  | ●                                          |  |                                   |                |    |    |                |                                        |       |

Beim Axial-Stecken ins Volle ist die komplette Stechtiefe nur im Durchmesserbereich bis 50 mm erreichbar.  
When face grooving into solid the overall groove depth can only be obtained in diameter range up to 50 mm.  
Con la scanalatura assiale dal pieno la profondità completa di scanalatura si ottiene solamente per una gamma di diametri fino a 50 mm.

V = Vollradiusausführung  
V = Full radius execution  
V = Esecuzione a raggio completo

L<sub>4</sub> = Spannfläche  
L<sub>4</sub> = Clamping flat  
L<sub>4</sub> = Piano bloccaggio

## Vollradiusausführung / Full radius execution / Esecuzione a raggio completo:



## Zubehör / Spare parts / Ricambi

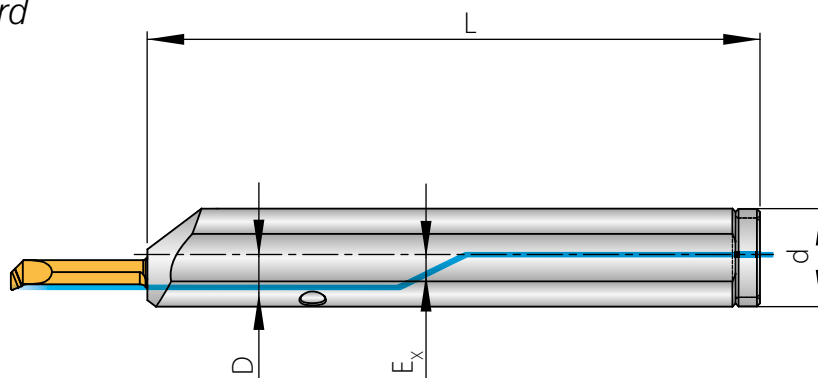
| Schneideinsatz<br>Insert<br>Inserto | Klemmhalter<br>Holder<br>Adattatore |
|-------------------------------------|-------------------------------------|
| SAV...06-IK-L/R                     | HSAV...06                           |
| SAV...08-IK-L/R                     | HSAV...08                           |
| SAV...10-IK-L/R                     | HSAV...10                           |



## Klemmhalter – Standard

Holder – Standard

Stelo – Standard



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

| Klemmhalter / Holder / Adattatore      |    |    |     |                |       |
|----------------------------------------|----|----|-----|----------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D  | d  | L   | E <sub>x</sub> | PG 44 |
| HAMS 1204 R                            | 4  | 12 | 100 | 2,35           | ●     |
| HAMS 1204 L                            | 4  |    |     |                | ●     |
| HAMS 1206 R                            | 6  |    |     |                | ●     |
| HAMS 1206 L                            | 6  |    |     |                | ●     |
| HAMS 1606 R                            | 6  | 16 | 120 | 2,8            | ●     |
| HAMS 1606 L                            | 6  |    |     |                | ●     |
| HAMS 1608 R                            | 8  |    |     |                | ●     |
| HAMS 1608 L                            | 8  |    |     |                | ●     |
| HAMS 2010 R                            | 10 | 20 | 120 | 2,8            | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!

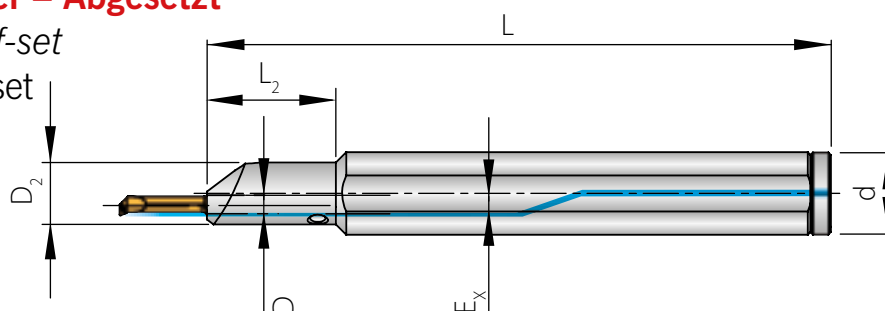
Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement "D"!

Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura "D"!

## Klemmhalter – Abgesetzt

Holder – Off-set

Stelo – Off-set



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

| Klemmhalter / Holder / Adattatore      |   |                |    |     |                |                |       |
|----------------------------------------|---|----------------|----|-----|----------------|----------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D | D <sub>2</sub> | d  | L   | L <sub>2</sub> | E <sub>x</sub> | PG 44 |
| HAMS 1604 R                            | 4 | 12             | 16 | 120 | 25             | 2,35           | ●     |
| HAMS 1604 L                            |   |                |    |     |                |                | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!

Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement "D"!

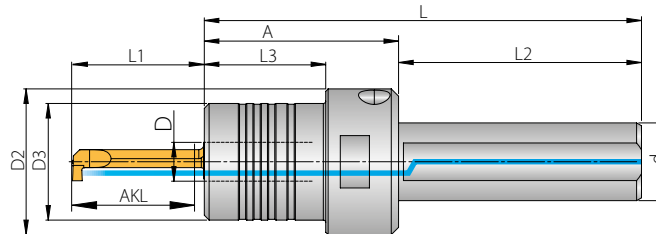
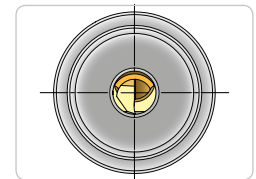
Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura "D"!

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Kühlmittelverschlussring<br>Coolant seal ring<br>Anello tenuta refrigerante |
|-------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| HAMS 1204 R/L / 1206 R/L            | AS 0043                   | KVR 12                                                                      |
| HAMS 1604 R/L                       | AS 0043                   | KVR 16                                                                      |
| HAMS 1606 R/L / 1608 R/L            | AS 0044                   | KVR 16                                                                      |
| HAMS 2010 R                         | AS 0044                   | KVR 20                                                                      |

## Hydro-Dehn Klemmhalter

Hydraulic holder  
Adattatori idraulici



AKL = Auskraglänge (mm)  
L<sub>1</sub> = Ausspannlänge (mm)  
D = Schaftdurchmesser (mm)  
AKL = Maximum work length (mm)  
L<sub>1</sub> = Overhang (mm)  
D = Shank diameter (mm)  
AKL = Utile di lavoro (mm)  
L<sub>1</sub> = Sporgenza (mm)  
D = Diametro accoppiamento (mm)

| Auskraglänge<br>Maximum work length<br>Utile di lavoro |      |                |
|--------------------------------------------------------|------|----------------|
| D                                                      | AKL  | L <sub>1</sub> |
| 4                                                      | 2,0  | 4              |
| 4                                                      | 5,0  | 6,5            |
| 4                                                      | 6,0  | 8              |
| 4                                                      | 7,5  | 10             |
| 4                                                      | 10,0 | 12             |
| 4                                                      | 15,0 | 17             |
| 4                                                      | 20,0 | 22             |
| 6                                                      | 10,0 | 12             |
| 6                                                      | 18,0 | 20             |
| 6                                                      | 20,0 | 22             |
| 6                                                      | 30,0 | 32             |
| 6                                                      | 40,0 | 42             |
| 6                                                      | 50,0 | 52             |
| 8                                                      | 10,0 | 12             |
| 8                                                      | 25,0 | 27             |
| 8                                                      | 30,0 | 32             |
| 8                                                      | 42,0 | 44             |
| 8                                                      | 45,0 | 47             |
| 8                                                      | 50,0 | 52             |

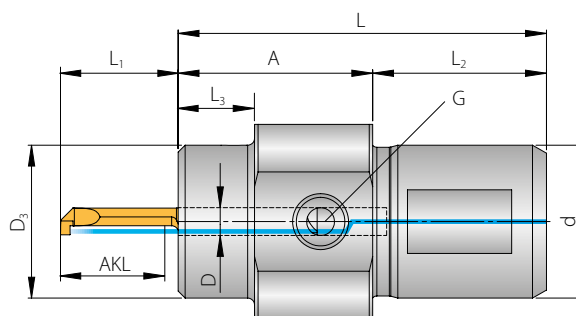
| Klemmhalter / Holder / Adattatore      |   |                |                |    |      |                |                |       |
|----------------------------------------|---|----------------|----------------|----|------|----------------|----------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D | D <sub>2</sub> | D <sub>3</sub> | d  | L    | L <sub>2</sub> | L <sub>3</sub> | PG 47 |
| HAMS 1604R-HYD.                        | 4 | 30             | 18             | 16 | 82,5 | 50             | 18             | ●     |
| HAMS 1606R-HYD.                        | 6 |                | 20             |    | 90,0 |                | 25             | ●     |
| HAMS 1608R-HYD.                        | 8 |                | 24             |    | 90,0 |                | 25             | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!  
Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement “D”!  
Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura “D”!

## Klemmhalter für STAR-Drehmaschinen

Holders for STAR-lathes

Adattatori per STAR - torni



AKL = Auskraglänge (mm)  
 L<sub>1</sub> = Ausspannlänge (mm)  
 D = Schaftdurchmesser (mm)  
 AKL = Maximum work length (mm)  
 L<sub>1</sub> = Overhang (mm)  
 D = Shank diameter (mm)  
 AKL = Utile di lavoro (mm)  
 L<sub>1</sub> = Sporgenza (mm)  
 D = Diametro accoppiamento (mm)

| Auskraglänge<br>Maximum work length<br>Utile di lavoro |      |                |
|--------------------------------------------------------|------|----------------|
| D                                                      | AKL  | L <sub>1</sub> |
| 4                                                      | 2,0  | 4              |
| 4                                                      | 5,0  | 6,5            |
| 4                                                      | 6,0  | 8              |
| 4                                                      | 7,5  | 10             |
| 4                                                      | 10,0 | 12             |
| 4                                                      | 15,0 | 17             |
| 4                                                      | 20,0 | 22             |
| 6                                                      | 10,0 | 12             |
| 6                                                      | 18,0 | 20             |
| 6                                                      | 20,0 | 22             |
| 6                                                      | 30,0 | 32             |
| 6                                                      | 40,0 | 42             |
| 6                                                      | 50,0 | 52             |

| Klemmhalter / Holder / Adattatore      |   |                |                |    |    |    |                |                               |       |
|----------------------------------------|---|----------------|----------------|----|----|----|----------------|-------------------------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D | D <sub>2</sub> | D <sub>3</sub> | d  | L  | A  | L <sub>2</sub> | G                             | PG 44 |
| HAMS 2204-A28-SR                       | 4 | 28 x 50        | 22             | 22 | 53 | 28 | 25             | M8x1                          | ●     |
| HAMS 2206-A33-SR                       | 6 | 28 x 50        | 22             | 22 | 58 | 33 | 25             | M8x1                          | ●     |
| HAMS 2204-A50-S2-SR                    | 4 | 28 x 50        | 22             | 22 | 75 | 50 | 25             | G <sup>1</sup> / <sub>8</sub> | ●     |
| HAMS 2206-A50-S2-SR                    | 6 | 28 x 50        | 22             | 22 | 75 | 50 | 25             | G <sup>1</sup> / <sub>8</sub> | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!

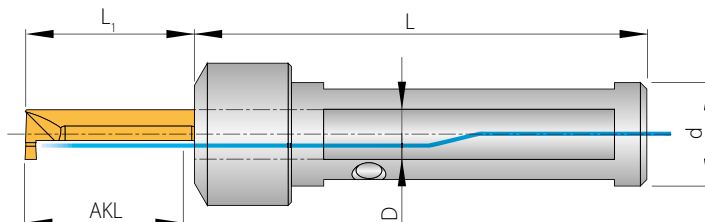
Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement "D"!

Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura "D"!

## Klemmhalter für Drehmaschinen

Holders for sliding head lathes

Adattatori per torni



AKL = Auskraglänge (mm)  
 L<sub>1</sub> = Ausspannlänge (mm)  
 D = Schaftdurchmesser (mm)  
 AKL = Maximum work length (mm)  
 L<sub>1</sub> = Overhang (mm)  
 D = Shank diameter (mm)  
 AKL = Utile di lavoro (mm)  
 L<sub>1</sub> = Sporgenza (mm)  
 D = Diametro accoppiamento (mm)

| Auskraglänge<br>Maximum work length<br>Utile di lavoro |      |                |
|--------------------------------------------------------|------|----------------|
| D                                                      | AKL  | L <sub>1</sub> |
| 4                                                      | 2,0  | 4              |
| 4                                                      | 5,0  | 6,5            |
| 4                                                      | 6,0  | 8              |
| 4                                                      | 7,5  | 10             |
| 4                                                      | 10,0 | 12             |
| 4                                                      | 15,0 | 17             |
| 4                                                      | 20,0 | 22             |
| 6                                                      | 10,0 | 12             |
| 6                                                      | 18,0 | 20             |
| 6                                                      | 20,0 | 22             |
| 6                                                      | 30,0 | 32             |
| 6                                                      | 40,0 | 42             |
| 6                                                      | 50,0 | 52             |
| 8                                                      | 10,0 | 12             |
| 8                                                      | 25,0 | 27             |
| 8                                                      | 30,0 | 32             |
| 8                                                      | 42,0 | 44             |
| 8                                                      | 45,0 | 47             |
| 8                                                      | 50,0 | 52             |

| Klemmhalter / Holder / Adattatore      |   |      |     |           |                              |       |
|----------------------------------------|---|------|-----|-----------|------------------------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D | d    | L   | Anschluss | Maschine                     | PG 44 |
| HAMS 3/4"04-CR                         | 4 | 3/4" | 100 | G 1/8"    | CITIZEN                      | ●     |
| HAMS 3/4"06-CR                         | 6 |      |     |           |                              | ●     |
| HAMS 3/4"08-CR                         | 8 |      |     |           |                              | ●     |
| HAMS 1"04-CR                           | 4 | 1"   | 100 | G 1/4"    | CITIZEN                      | ●     |
| HAMS 1"06-CR                           | 6 |      |     |           |                              | ●     |
| HAMS 1"08-CR                           | 8 |      |     |           |                              | ●     |
| HAMS 1604-SR                           | 4 | 16   | 70  | G 1/8"    | STAR                         | ●     |
| HAMS 1606-SR                           | 6 |      |     |           |                              | ●     |
| HAMS 1608-SR                           | 8 |      |     |           |                              | ●     |
| HAMS 2204-SR G1/4"                     | 4 | 22   | 110 | G 1/4"    | STAR                         | ●     |
| HAMS 2206-SR G1/4"                     | 6 |      |     |           |                              | ●     |
| HAMS 2204-SR                           | 4 | 22   | 110 | G 1/8"    | STAR                         | ●     |
| HAMS 2206-SR                           | 6 |      |     |           |                              | ●     |
| HAMS 2208-SR                           | 8 |      |     |           |                              | ●     |
| HAMS 2004-TOR                          | 4 | 20   | 90  | G 1/8"    | TORNOS,<br>TSUGAMI,<br>HANWA | ●     |
| HAMS 2006-TOR                          | 6 |      |     |           |                              | ●     |
| HAMS 2008-TOR                          | 8 |      |     |           |                              | ●     |
| HAMS 2504-TOR                          | 4 | 25   | 100 | G 1/8"    | TORNOS,<br>TSUGAMI,<br>HANWA | ●     |
| HAMS 2506-TOR                          | 6 |      |     |           |                              | ●     |
| HAMS 2508-TOR                          | 8 |      |     |           |                              | ●     |
| HAMS 2804-TR                           | 4 | 28   | 120 | G 1/4"    | TRAUB                        | ●     |
| HAMS 2806-TR                           | 6 |      |     |           |                              | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!

Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement "D"!

Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura "D"!

Halter mit 2 Spannflächen = CITIZEN, TORNOS, TRAUB, TSUGAMI und HANWA

Halter mit 4 Spannflächen = STAR

Holders with 2 flats = CITIZEN, TORNOS, TRAUB, TSUGAMI and HANWA.

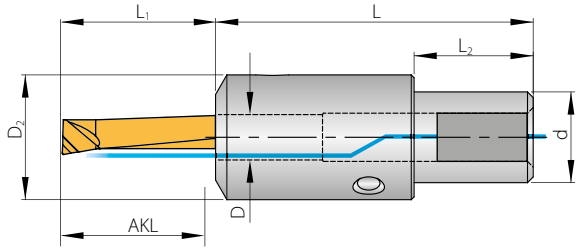
Holders with 4 flats = STAR

Adattatori con 2 piani di bloccaggio = CITIZEN, TORNOS, TRAUB, TSUGAMI und HANWA.

Adattatori con 4 piani di bloccaggio = STAR

Klemmhalter zum Ausspindeln

Holders for finishing  
Adattatori corti per contromandrino



AKL = Auskraglänge (mm)  
L<sub>1</sub> = Ausspannlänge (mm)  
D = Schaftdurchmesser (mm)  
AKL = Maximum work length (mm)  
L<sub>1</sub> = Overhang (mm)  
D = Shank diameter (mm)  
AKL = Utile di lavoro (mm)  
L<sub>1</sub> = Sporgenza (mm)  
D = Diametro accoppiamento (mm)

| Auskraglänge<br>Maximum work length<br>Utile di lavoro |      |                |
|--------------------------------------------------------|------|----------------|
| D                                                      | AKL  | L <sub>1</sub> |
| 4                                                      | 7,5  | 10             |
| 4                                                      | 10,0 | 12             |
| 4                                                      | 15,0 | 17             |
| 4                                                      | 20,0 | 22             |
| 6                                                      | 10,0 | 12             |
| 6                                                      | 18,0 | 20             |
| 6                                                      | 20,0 | 22             |
| 6                                                      | 30,0 | 32             |
| 8                                                      | 10,0 | 12             |
| 8                                                      | 25,0 | 27             |

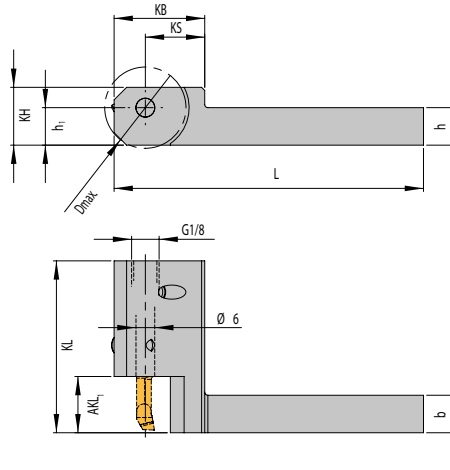
| Klemmhalter / Holder / Adattatore      |   |    |                |    |                |       |
|----------------------------------------|---|----|----------------|----|----------------|-------|
| Bezeichnung<br>Designation<br>Articolo | D | d  | D <sub>2</sub> | L  | L <sub>2</sub> | PG 44 |
| HAMS 1604-AR                           | 4 | 16 | 22             | 56 | 21             | ●     |
| HAMS 1606-AR                           | 6 |    |                |    |                | ●     |
| HAMS 1608-AR                           | 8 |    |                |    |                | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze von den Seiten 94 bis 115. Maß „D“ beachten!  
Remark: The inserts for these holders you will find on pages 94 to 115. Note measurement “D”!  
Nota: Inserti per questi adattatori a pagg da 94 a 115. Fare attenzione alla misura “D”!

## Klemmhalter für Langdrehmaschinen und Mehrspindler

Holders for sliding head auto lathes and multi spindle machines

Adattatori per torni a fantina mobile e plurimandrino



| Klemmhalter / Holder / Adattatore      |       |    |    |      |      |                  |      |                |                  |           |       |
|----------------------------------------|-------|----|----|------|------|------------------|------|----------------|------------------|-----------|-------|
| Bezeichnung<br>Designation<br>Articolo | hxb   | L  | KB | KS   | KL   | AKL <sub>1</sub> | KH   | h <sub>1</sub> | D <sub>max</sub> | Anschluss | PG 44 |
| HAMS 121206-R                          | 12x12 | 99 | 29 | 19,0 | 55,0 | 18               | 18,5 | 12             | 26               | G 1/8"    | ●     |

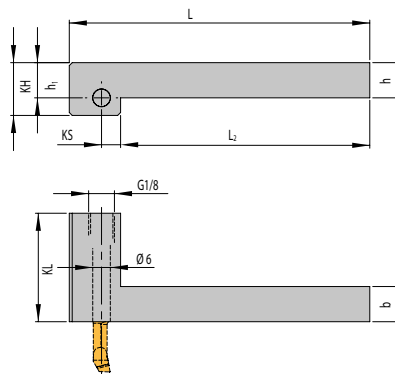
Hinweis: Auf diese Halter passen alle Schneideinsätze AMS-... .60R.  
Information: please use AMS-... .60R for these holders.  
Nota: utilizzare inserti AMS-... .60R. con questi adattatori.

3

## Klemmhalter für Langdrehmaschinen an Gegenspindel

Holder for sliding head lathes on counter spindle

Adattatori per torni a fantina mobile su contromandrino



| Klemmhalter / Holder / Adattatore      |       |       |                |     |      |    |                |           |       |
|----------------------------------------|-------|-------|----------------|-----|------|----|----------------|-----------|-------|
| Bezeichnung<br>Designation<br>Articolo | hxb   | L     | L <sub>2</sub> | KS  | KL   | KH | h <sub>1</sub> | Anschluss | PG 44 |
| HAMS 121206-R-GS                       | 12x12 | 102,5 | 85             | 6,5 | 37,0 | 18 | 12             | G 1/8"    | ●     |

Hinweis: Auf diese Halter passen alle Schneideinsätze AMS-... .60R.  
Information: please use AMS-... .60R for these holders.  
Nota: utilizzare inserti AMS-... .60R. con questi adattatori.



## Sie brauchen eine Sonderausführung?

Wenn besondere Aufgaben individuelle Lösungen erfordern, sind Sie bei uns genau richtig.  
Als Hersteller können wir AMS-Schneideinsätze schnell und zuverlässig nach Ihren Vorgaben fertigen.  
Nennen Sie uns dazu einfach den Standard-Schneideinsatz und die Maße, die Sie gerne geändert hätten:

Standard-Schneideinsatz AMS- \_\_\_\_\_

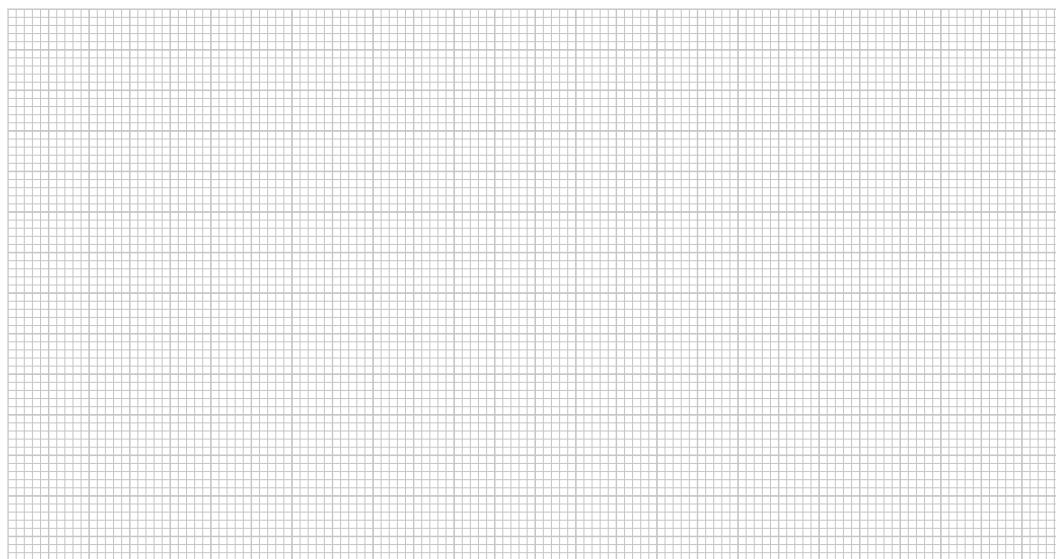
Diese Maße bitte ändern: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Skizze:



Adresse: Firma: \_\_\_\_\_

Anschrift: \_\_\_\_\_

Ansprechpartner: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Telefon: \_\_\_\_\_

Auf [www.arno.de/service/downloads](http://www.arno.de/service/downloads) gibt es diese Vorlage auch zum Herunterladen. Sie können uns auch gerne eine E-Mail mit den entsprechenden Angaben an [anfrage@arno.de](mailto:anfrage@arno.de) senden.





## Do you need a special solution?

Should your application require a purpose made tool, we can quote that too.  
As the manufacturer we can offer special AMS inserts, accurately and quickly.  
Please tell us the standard inserts and the dimensions you would like to have changed:

Standard insert AMS- \_\_\_\_\_

Please change this dimensions: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Draft drawing:



Address: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Contact: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Phone: \_\_\_\_\_

On [www.arno.de/service/downloads](http://www.arno.de/service/downloads) you will find form for downloading.  
Or send an e-mail with the relevant information to [anfrage@arno.de](mailto:anfrage@arno.de)



## Serve una soluzione speciale?

Se vi dovesse servire una soluzione speciale non esitate a chiederci quotazione e studio.  
Come produttori di questi utensili siamo in grado di darvi le migliori soluzioni per le vostre applicazioni.  
Dateci tutte le misure richieste o le modifiche da apportare ad utensili standard:

Inserto standard AMS- \_\_\_\_\_

Dimensioni di riferimento: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Abbozzo:

Indirizzo: Azienda: \_\_\_\_\_

Indirizzo: \_\_\_\_\_

Persona di contatto: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Telefono: \_\_\_\_\_

Su [www.arno.de/service/downloads](http://www.arno.de/service/downloads) è possibile scaricare questo modulo di richiesta. Oppure inviare via e-mail tutte le informazioni necessarie alla quotazione all'indirizzo [info@arno-italia.it](mailto:info@arno-italia.it)

**AMS – Beschichtet / Coated / Rivestito****PVD-Mehrlagenbeschichtung**

**PVD beschichtetes Hartmetallsubstrat mit hoher Hitze- und Oxidationsbeständigkeit.**

**Universelle Sorten zur Bearbeitung von Stählen, rostfreien Stählen und Gusswerkstoffen.**

*PVD-multilayer coating*

*PVD coated carbide substrate with high heat and oxidation resistance. Universal grade for machining steel, stainless steel and cast materials.*

## Rivestimento multiplo PVD

Tutti gli inserti sono previsti in una unica qualità di metallo duro universale molto resistente alle alte temperature con rivestimento PVD. Grado universale per la lavorazione di acciai, acciai inossidabile e fusioni oltre a materiali non ferrosi.

**SAV – Beschichtet / Coated / Rivestito****AL40****PVD-Mehrlagenbeschichtung**

**Hochwarmfeste Beschichtung zur Bearbeitung von Stählen, austenitischen Stählen, sämtlichen Gusswerkstoffen, warmfesten Legierungen und Titanlegierungen.**

*PVD multilayer coating*

*High temperature resistant coating for machining steel, austenetic steel, all cast steels, high temperature alloys and titanium alloys.*

## Rivestimento PVD multistrato

Rivestimento per la lavorazione di acciai, acciai austenitici, ghisa, leghe di titanio e leghe refrattarie.

**SAV – Unbeschichtet / Uncoated / Non rivestito****AK40**

**Unbeschichtete Feinkorn-Hartmetallsorte mit guter Kantenstabilität und hoher Zuverlässigkeit zur Bearbeitung von Stahl, sämtlichen Gusswerkstoffen und NE-Metallen.**

*Micrograin carbide grade with strong edge stability and high toughness for machining steel, all cast steels and non-ferrous materials.*

Metallo duro a grana fine con elevata stabilità e tenacità per la lavorazione di acciaio, ghisa e metalli non ferrosi.

**Ersatzteile und Zubehör**

*Spare parts and accessories*

Ricambi e accessori

| Artikel / Item / Articolo                                                        | PG 11 |
|----------------------------------------------------------------------------------|-------|
| <b>Schraube / Screw / Vite</b>                                                   |       |
| AS 0043                                                                          | ●     |
| AS 0044                                                                          | ●     |
| <b>Kühlmittelverschlussring / Coolant seal ring / Anello tenuta refrigerante</b> |       |
| KVR 12                                                                           | ●     |
| KVR 16                                                                           | ●     |
| KVR 20                                                                           | ●     |

## Stechen

## beschichtet

| ISO | Werkstoff                                     |                                                            | Zugfestigkeit<br>(N/mm <sup>2</sup> ) | Schnittgeschwindigkeit V <sub>c</sub> (m/min)<br><br>AMS |
|-----|-----------------------------------------------|------------------------------------------------------------|---------------------------------------|----------------------------------------------------------|
| P   | Unlegierter Stahl und Stahlguss               | < 0,15 % C/vergütet                                        | 350                                   | 20–180                                                   |
|     |                                               | 0,15 – 0,45 % C/vergütet                                   | 650                                   | 20–180                                                   |
|     |                                               | > 0,45 % C/vergütet                                        | 1000                                  | 20–180                                                   |
|     | Niedrig legierter Stahl und Stahlguss         | geglüht                                                    | 600                                   | 15–160                                                   |
|     |                                               | vergütet                                                   | 900                                   | 15–160                                                   |
|     |                                               |                                                            | 1200                                  | 15–160                                                   |
|     | Hochlegierter Stahl                           | geglüht                                                    | 700                                   | 20–120                                                   |
|     | Hochlegierter Werkzeugstahl und Stahlguss     | gehärtet und angelassen                                    | 1100                                  | 20–120                                                   |
| M   | Nichtrostender Stahl                          | ferritisch, geglüht                                        | 700                                   | 20–90                                                    |
|     | Stahlguss                                     | martensitisch, vergütet                                    | 1000                                  | 20–180                                                   |
|     |                                               |                                                            |                                       |                                                          |
|     | Nichtrostender Stahl                          | austenitisch und austenitisch/<br>ferritisch, abgeschreckt | 450–600                               | 20–90                                                    |
|     |                                               |                                                            | 600–900                               | 15–80                                                    |
|     | Grauguss                                      | perlitisches/ferritisches                                  | 500–700                               | 20–140                                                   |
|     |                                               |                                                            | 700–850                               | 20–140                                                   |
|     |                                               | perlitisches/martensitisches                               | 800–1100                              | 20–140                                                   |
| K   | Gusseisen mit Kugelgraphit                    | ferritisch                                                 | 550                                   | 20–130                                                   |
|     |                                               | perlitisches                                               | 800                                   | 20–130                                                   |
|     | Temperguss                                    | ferritisch                                                 | 450                                   | 20–120                                                   |
|     |                                               | perlitisches                                               | 750                                   | 20–120                                                   |
|     | Aluminium-Knetlegierungen                     | nicht aushärtbar                                           | 200                                   | 20–500                                                   |
|     |                                               | aushärtbar, ausgehärtet                                    | 350                                   | 20–500                                                   |
| N   | Aluminium-Gusslegierungen                     | ≤ 12 % Si, ausgehärtet                                     | 250                                   | 20–500                                                   |
|     |                                               | ≤ 12 % Si, aushärtbar, ausgehärtet                         | 300                                   | 20–500                                                   |
|     |                                               | ≤ 12 % Si, nicht aushärtbar                                | 450                                   | 20–500                                                   |
|     |                                               |                                                            |                                       |                                                          |
|     | Kupfer und Kupferlegierungen (Bronze/Messing) | Automatenlegierung, Pb > 1 %                               | 400                                   | 20–600                                                   |
|     |                                               | Messing, Rotguss                                           | 300                                   | 20–600                                                   |
|     |                                               | Aluminiumbronze                                            | 500                                   | 20–600                                                   |
|     |                                               | Kupfer und Elektrolytkupfer                                | 200                                   | 20–600                                                   |
|     | Nichtmetallische Werkstoffe                   | Duroplaste                                                 | –                                     | –                                                        |
|     |                                               | Faserverstärkte Kunststoffe                                | –                                     | –                                                        |
|     |                                               | Hartgummi                                                  | –                                     | –                                                        |
| S   | Warmfeste Legierungen                         | Fe-Basis, geglüht                                          | 700                                   | 15–75                                                    |
|     |                                               | Fe-Basis, ausgehärtet                                      | 950                                   | 15–75                                                    |
|     |                                               | Ni- oder Co-Basis, geglüht                                 | 800                                   | 15–40                                                    |
|     |                                               | Ni- oder Co-Basis, gegossen                                | 1100                                  | 15–40                                                    |
|     |                                               | Ni- oder Co-Basis, ausgehärtet                             | 1200                                  | 15–40                                                    |
|     | Titanlegierungen                              | Rein-Titan                                                 | 500–700                               | –                                                        |
|     | Alpha+Beta-Legierungen                        | ausgehärtet                                                | 700–1000                              | –                                                        |
| H   | Gehärteter Stahl                              | gehärtet und angelassen                                    | 55 HRC                                | –                                                        |
|     |                                               |                                                            | 60 HRC                                | –                                                        |
|     | Hartguss                                      | gegossen                                                   | 41 HRC                                | –                                                        |
|     | Gehärtetes Gusseisen                          | gehärtet und angelassen                                    | 55 HRC                                | –                                                        |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

## Grooving

coated

| ISO                                         | Material                               |                                                 | Tensile strength<br>(N/mm²) | Cutting speed Vc (m/min) |
|---------------------------------------------|----------------------------------------|-------------------------------------------------|-----------------------------|--------------------------|
|                                             |                                        |                                                 |                             | AMS                      |
| P                                           | Unalloyed steel and cast steel         | < 0.15 % C/hardened and tempered                | 350                         | 20–180                   |
|                                             |                                        | 0,15–0,45 % C/hardened and tempered             | 650                         | 20–180                   |
|                                             |                                        | > 0,45 % C/hardened and tempered                | 1000                        | 20–180                   |
|                                             | Low alloyed steel and cast steel       | annealed                                        | 600                         | 15–160                   |
|                                             |                                        | hardened and tempered                           | 900                         | 15–160                   |
|                                             |                                        |                                                 | 1200                        | 15–160                   |
|                                             | High alloyed steel                     | annealed                                        | 700                         | 20–120                   |
|                                             | High alloyed tool steel and cast steel | hardened                                        | 1100                        | 20–120                   |
|                                             | Stainless steel                        | ferritic, annealed                              | 700                         | 20–90                    |
| Cast steel                                  | martensitic, hardened and tempered     | 1000                                            | 20–180                      |                          |
| M                                           | Stainless steel                        | austenitic and austenitic/<br>ferritic, chilled | 450–600                     | 20–90                    |
|                                             |                                        |                                                 | 600–900                     | 15–80                    |
| K                                           | Cast iron                              | pearlitic/ferritic                              | 500–700                     | 20–140                   |
|                                             |                                        | pearlitic/martensitic                           | 700–850                     | 20–140                   |
|                                             |                                        |                                                 | 800–1100                    | 20–140                   |
|                                             | Cast iron with nodular graphite        | ferritic                                        | 550                         | 20–130                   |
|                                             |                                        | pearlitic                                       | 800                         | 20–130                   |
|                                             | Malleable cast iron                    | ferritic                                        | 450                         | 20–120                   |
|                                             |                                        | pearlitic                                       | 750                         | 20–120                   |
|                                             | N                                      | Aluminium alloys long chipping                  | not heat treatable          | 200                      |
| heat treatable, heat treated                |                                        |                                                 | 350                         | 20–500                   |
| Casted aluminium alloys                     |                                        | ≤ 12 % Si, heat treated                         | 250                         | 20–500                   |
|                                             |                                        | ≤ 12 % Si, heat treatable, heat treated         | 300                         | 20–500                   |
|                                             |                                        | ≤ 12 % Si, not heat treatable                   | 450                         | 20–500                   |
| Copper and copper alloys<br>(Brass/ Bronze) |                                        | Lead alloys, Pb > 1 %                           | 400                         | 20–600                   |
|                                             |                                        | Brass, Bronze                                   | 300                         | 20–600                   |
|                                             |                                        | Aluminium bronze                                | 500                         | 20–600                   |
|                                             |                                        | Copper and elektrolyte copper                   | 200                         | 20–600                   |
| Non-ferrous materials                       |                                        | Duroplastic                                     | –                           | –                        |
|                                             |                                        | Re-inforced plastics                            | –                           | –                        |
|                                             | Hard rubber                            | –                                               | –                           |                          |
| S                                           | High temperature resistant alloys      | Fe-alloyed, annealed                            | 700                         | 15–75                    |
|                                             |                                        | Fe-alloyed, heat treated                        | 950                         | 15–75                    |
|                                             |                                        | Ni- or Co-alloyed, annealed                     | 800                         | 15–40                    |
|                                             |                                        | Ni- or Co-alloyed, casting                      | 1100                        | 15–40                    |
|                                             |                                        | Ni- or Co-alloyed, heat treated                 | 1200                        | 15–40                    |
|                                             | Titanium alloys                        | Pure titan                                      | 500–700                     | –                        |
|                                             | Alpha- and Beta-alloys                 | heat treated                                    | 700–1000                    | –                        |
| H                                           | Hardened steel                         | hardened                                        | 55 HRC                      | –                        |
|                                             |                                        |                                                 | 60 HRC                      | –                        |
|                                             | Hard cast iron                         | casting                                         | 41 HRC                      | –                        |
|                                             | Hardened cast iron                     | hardened                                        | 55 HRC                      | –                        |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

## Scanalatura

## rivestito

| ISO | Materiale                                  |                                                              | Resistenza<br>(N/mm <sup>2</sup> ) | Velocità di taglio V <sub>c</sub> (m/min)<br><br>AMS |
|-----|--------------------------------------------|--------------------------------------------------------------|------------------------------------|------------------------------------------------------|
| P   | Acciai non legato                          | < 0,15 % C/bonificato                                        | 350                                | 20–180                                               |
|     |                                            | 0,15 – 0,45 % C/bonificato                                   | 650                                | 20–180                                               |
|     |                                            | > 0,45 % C/bonificato                                        | 1000                               | 20–180                                               |
|     | Acciai debolmente legati e Ghise acciaiose | ricotto                                                      | 600                                | 15–160                                               |
|     |                                            | bonificato                                                   | 900                                | 15–160                                               |
|     |                                            |                                                              | 1200                               | 15–160                                               |
|     | Acciai fortemente legati                   | ricotto                                                      | 700                                | 20–120                                               |
|     | Acciai da utensili e fusioni               | temprato e rinvenuto                                         | 1100                               | 20–120                                               |
| M   | Acciai inossidabili                        | ferritico, ricotto                                           | 700                                | 20–90                                                |
|     |                                            | martensitico, bonificato                                     | 1000                               | 20–180                                               |
| K   | Ghisa grigia                               | austenitico e autenitico/<br>ferritico, trattato o temperato | 450–600                            | 20–90                                                |
|     |                                            | perlitica/ferritico                                          | 600–900                            | 15–80                                                |
|     |                                            |                                                              | 500–700                            | 20–140                                               |
|     | Ghisa sferoidale                           | perlitica/martensitico                                       | 700–850                            | 20–140                                               |
|     |                                            |                                                              | 800–1100                           | 20–140                                               |
|     |                                            | ferritico                                                    | 550                                | 20–130                                               |
|     | Ghisa temprata                             | perlitica                                                    | 800                                | 20–130                                               |
|     |                                            | ferritico                                                    | 450                                | 20–120                                               |
| N   | Leghe di Alluminio stampato                | ferritico                                                    | 750                                | 20–120                                               |
|     |                                            | perlitica                                                    | 200                                | 20–500                                               |
|     | Leghe di Alluminio da fusione              | non invecchiato                                              | 350                                | 20–500                                               |
|     |                                            | invecchiato                                                  | 250                                | 20–500                                               |
|     |                                            | ≤ 12 % Si, invecchiato                                       | 250                                | 20–500                                               |
|     |                                            | ≤ 12 % Si, rinvenuto, invecchiato                            | 300                                | 20–500                                               |
|     | Rame e Leghe di Rame (Bronzo/Ottone)       | ≤ 12 % Si, non invecchiato                                   | 450                                | 20–500                                               |
|     |                                            | Automatici, Pb > 1 %                                         | 400                                | 20–600                                               |
|     |                                            | Ottone, Bronzo                                               | 300                                | 20–600                                               |
|     |                                            | Bronzoalluminio                                              | 500                                | 20–600                                               |
| S   | Materiali non metallici                    | Rame e Rame Elettrolitico                                    | 200                                | 20–600                                               |
|     |                                            | Duroplastiche                                                | –                                  | –                                                    |
|     |                                            | Plastiche rinforzate                                         | –                                  | –                                                    |
| H   | Leghe resistenti al calore                 | Gomme dure                                                   | –                                  | –                                                    |
|     |                                            | Base-Fe, ricotto                                             | 700                                | 15–75                                                |
|     |                                            | Base-Fe, invecchiato                                         | 950                                | 15–75                                                |
|     | Leghe di Titanio                           | Base Ni o Co, ricotto                                        | 800                                | 15–40                                                |
|     |                                            | Base Ni o Co, da fusione                                     | 1100                               | 15–40                                                |
|     |                                            | Base Ni o Co, invecchiato                                    | 1200                               | 15–40                                                |
| H   | Leghe Alpha+Beta                           | Titanio puro                                                 | 500–700                            | –                                                    |
|     | Acciaio Temprato                           | invecchiato                                                  | 700–1000                           | –                                                    |
|     |                                            | temprato e rinvenuto                                         | 55 HRC                             | –                                                    |
|     | Getti Temprati                             | da fusione                                                   | 60 HRC                             | –                                                    |
| H   | Ghisa Temprata                             | da fusione                                                   | 41 HRC                             | –                                                    |
|     |                                            | temprato e rinvenuto                                         | 55 HRC                             | –                                                    |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

## SAV – Axial-Steichen

SAV – Axial grooving

SAV – Scanalatura assiale

| Material<br>Material<br>Materiali                                                                                                                     | Zugfestigkeit<br>Hardness<br>Durezza<br>(HB) | AL40                                           |                                                                          | AK40                                           |                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------|
|                                                                                                                                                       |                                              | Vorschub<br>Feed rate<br>Avanzamento<br>(mm/U) | Schnittgeschwindigkeit<br>Cutting speed<br>Velocità di taglio<br>(m/min) | Vorschub<br>Feed rate<br>Avanzamento<br>(mm/U) | Schnittgeschwindigkeit<br>Cutting speed<br>Velocità di taglio<br>(m/min) |
| <b>Legierter Stahl, Werkzeugstahl</b><br><i>Alloyed steel, tool steel</i><br>Acciaio legati, acciaio da utensili                                      | 250                                          | 0,01 – 0,03                                    | 80 – 100                                                                 | 0,01 – 0,02                                    | 50 – 60                                                                  |
| <b>Legierter Stahl, Werkzeugstahl</b><br><i>Alloyed steel, tool steel</i><br>Acciaio legati, acciaio da utensili                                      | 300                                          | 0,01 – 0,03                                    | 70 – 90                                                                  | 0,01 – 0,02                                    | 50 – 60                                                                  |
| <b>Legierter Stahl, Werkzeugstahl</b><br><i>Alloyed steel, tool steel</i><br>Acciaio legati, acciaio da utensili                                      | 400                                          | 0,01 – 0,02                                    | 50 – 60                                                                  | 0,01 – 0,02                                    | 30 – 40                                                                  |
| <b>Warmfeste Legierungen</b><br><i>High temperature resistant alloys</i><br>Leghe resistenti al calore                                                | 150 – 200                                    | 0,01 – 0,02                                    | 50 – 80                                                                  | 0,01 – 0,02                                    | 40 – 60                                                                  |
| <b>Guss</b><br><i>Cast iron</i><br>Ghisa                                                                                                              | 200 – 250                                    | 0,01 – 0,03                                    | 50 – 70                                                                  | 0,01 – 0,02                                    | 40 – 60                                                                  |
| <b>Aluminiumlegierungen</b><br><i>Aluminum alloys</i><br>Leghe d'alluminio                                                                            | 100                                          | 0,02 – 0,05                                    | 120 – 180                                                                | 0,02 – 0,05                                    | 100 – 150                                                                |
| <b>Kupferlegierungen, Messing, Nichteisenmetalle</b><br><i>Copper alloys, Brass, non-ferrous metals</i><br>Leghe di rame, ottone, metalli non ferrosi | 100                                          | 0,02 – 0,05                                    | 120 – 180                                                                | 0,02 – 0,05                                    | 100 – 150                                                                |

Die Tabellenwerte sind Richtwerte. Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

The recommended cutting data are only approximate values. It may be necessary to adjust them to each individual machining application.

I dati indicati in tabella sono valori approssimati. Può essere necessario adattarli alle singole applicazioni di lavorazione.



**Schnittdatenrichtwerte Gewindedrehen – Anzahl der Durchgänge**

Recommended cutting data – Threading – Number of passes

Parametri di taglio suggeriti – Filettatura – Numero di passate

| Steigung<br>Pitch<br>Passo |                                            | Anzahl der Schnitte<br>Number of passes<br>Numero di passate                     |           |         |                                                        |                       |                                     |
|----------------------------|--------------------------------------------|----------------------------------------------------------------------------------|-----------|---------|--------------------------------------------------------|-----------------------|-------------------------------------|
| V <sub>c</sub> m/min       |                                            | 110–140                                                                          | 80–110    | 65–80   | 70–90                                                  | 80–100                | 200–250                             |
| (mm)                       | Gang/Zoll<br>Pitch/Inch<br>Filetti/Pollice | Stahl Festigkeit<br>Steel strength<br>Acciaio resistenza<br>(N/mm <sup>2</sup> ) |           |         | Rostfrei<br>Stainless steel<br>Acciaio<br>inossidabile | Guss<br>Cast<br>Ghisa | Aluminium<br>Aluminium<br>Alluminio |
|                            |                                            | 400–700                                                                          | 700–1.000 | > 1.000 |                                                        |                       |                                     |
| 0,5                        | 48                                         | 6                                                                                | 7         | 7       | 8                                                      | 7                     | 6                                   |
| 0,75                       | 32                                         | 8                                                                                | 9         | 9       | 10                                                     | 9                     | 8                                   |
| 0,8                        | 32                                         | 8                                                                                | 9         | 10      | 10                                                     | 9                     | 8                                   |
| 1                          | 24                                         | 10                                                                               | 11        | 12      | 12                                                     | 12                    | 10                                  |
| 1,25                       | 20–19                                      | 12                                                                               | 14        | 15      | 15                                                     | 14                    | 12                                  |
| 1,5                        | 16                                         | 15                                                                               | 17        | 18      | 18                                                     | 17                    | 15                                  |
| 1,75                       | 14                                         | 17                                                                               | 19        | 21      | 21                                                     | 18                    | 17                                  |
| 2                          | 12                                         | 19                                                                               | 22        | 25      | 25                                                     | 20                    | 18                                  |
| 2,5                        | 10                                         | 22                                                                               | 26        | 31      | 31                                                     | 22                    | 20                                  |
| 3,0–3,5                    | 8                                          | 28                                                                               | 32        | 38      | 38                                                     | 24                    | 22                                  |

Die hier aufgeführten Werte sind allgemeine Empfehlungen für die Anzahl der Durchgänge bei der Bearbeitung von normalen Stahl- und NE-Werkstoffen. Bei harten Werkstoffen ist die Schnitttiefe zu reduzieren und die Anzahl der Schnitte zu erhöhen.

Bei Plattenbruch ist die Anzahl der Durchgänge zu erhöhen, bei hohem Verschleiß zu verringern.

**HINWEIS:** Der Spanquerschnitt sollte bei jedem Durchgang gleich groß sein, das heißt mit zunehmender Schnitttiefe ist die Zustellung zu reduzieren, um konstante Schnittkräfte zu erreichen.

The above mentioned data are general recommendations for machining steel and non-ferrous materials. With hard materials we recommend to reduce cutting speed and increase number of passes.

By cutting edge breakage we suggest to increase number of passes, by edge wear reduce the number of passes.

Remark: The chip thickness should be constant at every pass, so with more cutting depth reduce the in-feed in order to obtain constant cutting forces.

I valori sopra indicati sono per materiali non trattati termicamente. Per materiali più duri ridurre le velocità di taglio e aumentare il numero di passate.

In caso di scheggiature del tagliente si suggerisce di aumentare il numero delle passate, in caso di usura invece si suggerisce di ridurre il numero di passate.

NOTA: Lo spessore truciolo deve essere costante ad ogni passata. Per avere una sezione truciolo ed una forza di taglio costante durante la lavorazione adattare avanzamenti e profondità di passate.

**Werkstoff und Bearbeitung**

Material and application

Materiale e applicazione

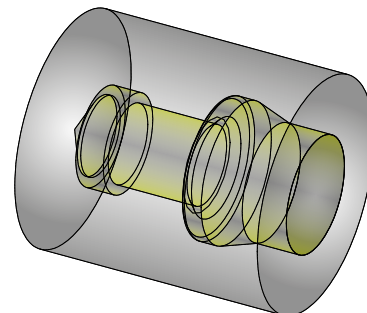
| ISO | Werkstoff<br>Material<br>Materiale                                                   | Max. Spantiefe a <sub>p</sub> [mm]<br>Max. depth of cut a <sub>p</sub> [mm]<br>Max prof. di taglio a <sub>p</sub> [mm] | Bearbeitung<br>Application<br>Applicazione                                                                             | Vorschubbereich<br>Feed rate range<br>Avanzamento |
|-----|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| P   | Stahl<br>Steel<br>Acciaio                                                            | 0,5                                                                                                                    | Stechen, Einstecken<br>Grooving<br>Scanalatura                                                                         | 0,01 – 0,02                                       |
| M   | Rostfreier Stahl<br>Stainless Steel<br>Acciaio inossidabile                          | 0,3                                                                                                                    | Bohrung ausdrehen und kopieren<br>Boring, turning and copying<br>Foratura, tornitura e copiatura                       | 0,02 – 0,05                                       |
| K   | Guss<br>Cast<br>Fusioni                                                              | 0,3                                                                                                                    | Vorstechen, Fasen, Rückwärtsdrehen<br>Pre-grooving, chamfering and back turning<br>Pre-scanalatura, smusso e in tirata | 0,02 – 0,05                                       |
| N   | NE-Metalle, Aluminium<br>Non-ferrous, Aluminium<br>Alluminio e materiali non ferrosi | 1,0                                                                                                                    | Axial-Stechdrehen<br>Axial groove turning<br>Scanalatura assiale                                                       | 0,02 – 0,05                                       |

**Einsatz-Beispiel**

Application example

Esempio di applicazione

| Bearbeitung<br>Material 1.2343 mit 800 N/mm <sup>2</sup><br>Application<br>Material 1.2343 with 800 N/mm <sup>2</sup><br>Applicazione<br>Materiale 1.2343 con 800 N/mm <sup>2</sup> | Gruppe<br>Solution<br>Utensile | Empfohlene Schnittwerte<br>Recommended cutting data<br>Parametri di taglio suggeriti |                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                                                                                                                                                                                     |                                | Drehzahl n (U/min)<br>Revolution n (U/min)<br>Giri n (U/min)                         | Vorschubbereich f (mm/U)<br>Feed rate range f (mm/U)<br>Avanzamento f (mm/U) |
| Vorbearbeitung Bohren Ø 10 mm<br>Pre-machining, drilling Ø 10 mm<br>Prelavorazione, foratura Ø 10 mm                                                                                | SC10L-0023SP-05                | 3800                                                                                 | 0,03                                                                         |
| Vorbearbeitung Bohren Ø 6 mm<br>Pre-machining, drilling Ø 6 mm<br>Prelavorazione, foratura Ø 6 mm                                                                                   | SPC0060-0300 VHM / TiAIN       | 4200                                                                                 | 0,1                                                                          |
| Drehen, Kerndurchmesser M8<br>Turning to core diameter for M8<br>Tornitura preforo per M8                                                                                           | AMS-D-590802-200.60R           | 4200                                                                                 | 0,04                                                                         |
| Freistich, Gewinde<br>Relief groove, thread<br>Scanalatura, filettatura                                                                                                             | AMS-S-59151800-200.60R         | 4200                                                                                 | 0,02                                                                         |
| Gewinde M8<br>Thread M8<br>Filettatura M8                                                                                                                                           | AMS-G-M8-200.60R               | 1640                                                                                 | 1,25                                                                         |
| Drehen, Kontur<br>Turning, form<br>Tornitura, copiatura                                                                                                                             | AMS-K-591802-200.60R           | 3800                                                                                 | 0,02 – 0,04                                                                  |

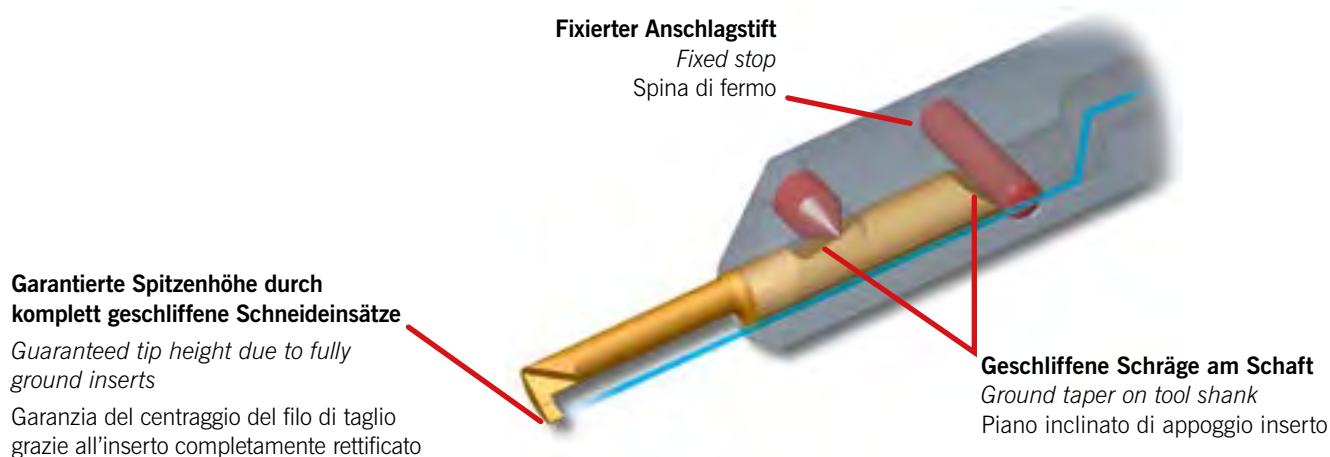


3

**Montage ARNO®-Mini-System**

Assembling of ARNO®-Mini-System

Montaggio di ARNO®-Mini-System



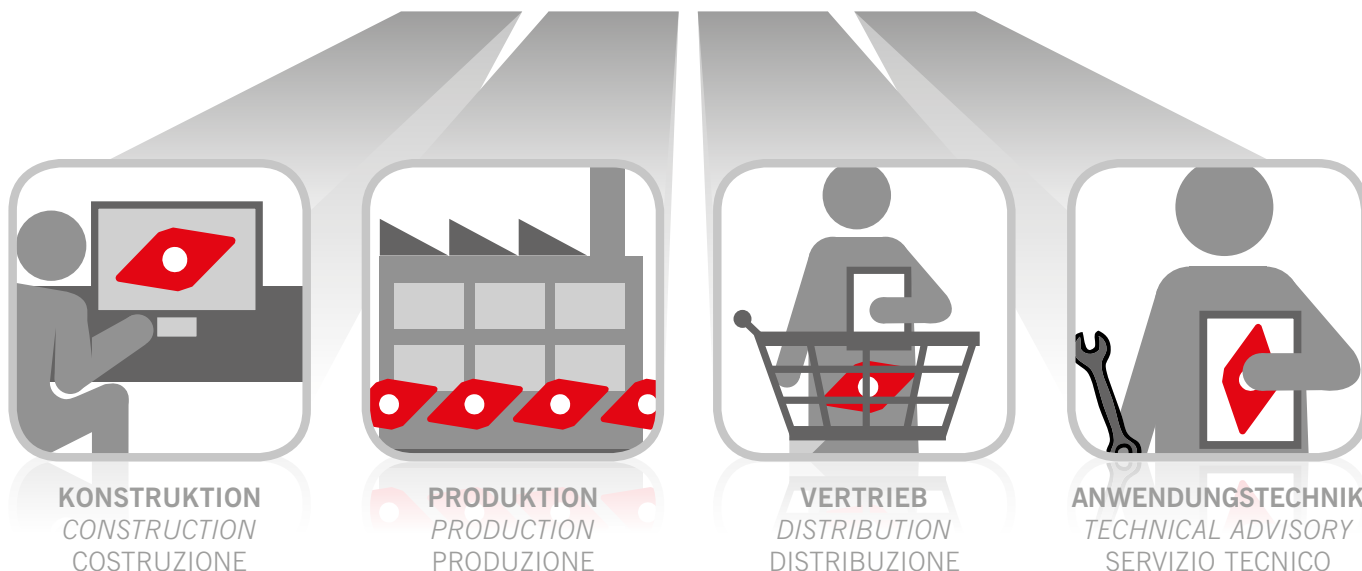
Die geschliffene Schräge am Schaft kombiniert mit dem Anschlagstift garantiert eine exakte radiale Fixierung des Schneideinsatzes bezüglich der Spitzenhöhe. Eine optimale Spannung des Schneideinsatzes erreichen Sie mittels Spannung des Gewindestiftes über die Kegelfläche.

With the ground taper on the tool shank and the fixed stop in the sleeve the length remains accurately constant and guaranteed cutting edge repeatability is achieved. The cone of the threaded pin ensures secure tool locking and reduces cutting edge vibrations.

Il piano inclinato di fermo oltre a garantire la perfetta ripetibilità dimensionale, assicura il posizionamento del tagliente in asse. Il piano di bloccaggio inclinato e la vite conica assicurano la massima tenuta e riducono la possibilità di vibrazioni.

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## 4

## Drehen

## Turning

## Tornitura

## ISO Klemmhalter zur Außenbearbeitung

## ISO toolholder for external machining

## Steli ISO per tornitura esterna

- ISO-Bezeichnungssystem
- Werkzeugauswahl
- Klemmhalter mit Schraubenklammung
- Set Drehmoment-Schraubendreher
- Spanformgeometrien

- ISO-Designation System
- Tool shank options
- Holders with screw clamping
- Torque Screwdriver Sets
- Chip Breaker Geometries

- Sistema di identificazione ISO **136 – 137**
- Tipologie di corpo utensile **138 – 139**
- Adattatori con bloccaggio a vite **140 – 162**
- Set chiavi dinamometriche **164**
- Geometrie rompitruciolo **166 – 175**

## • Wendeschneidplatten – Hartmetall

## • Inserts – Carbide

## • Inserti – Metallo duro

**177 – 182****184 – 199****200 – 208**

- Sortenbeschreibung

- Grade description

- Descrizione delle Qualità

- Wendeschneidplatten

- Inserts

- Inserti

- Schnittwerte

- Cutting data

- Parametri di taglio

## • Wendeschneidplatten – Hochpositiv

## • Inserts – High positive

## • Inserti – Ultra positivi

**210 – 212****214 – 221****222 – 230**

- Sortenbeschreibung

- Grade description

- Descrizione delle Qualità

- Wendeschneidplatten

- Inserts

- Inserti

- Schnittwerte

- Cutting data

- Parametri di taglio

## • Wendeschneidplatten – CERMET

## • Inserts – CERMET

## • Inserti – CERMET

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- Sortenbeschreibung

- Grade description

- Descrizione delle Qualità

- Wendeschneidplatten

- Inserts

- Inserti

- Schnittwerte

- Cutting data

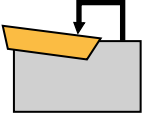
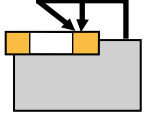
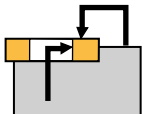
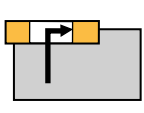
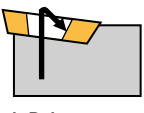
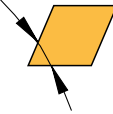
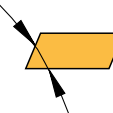
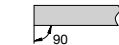
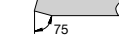
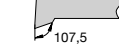
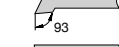
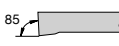
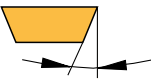
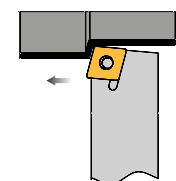
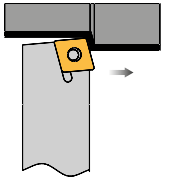
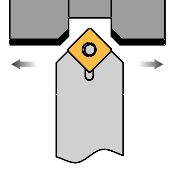
- Parametri di taglio

## • Ersatzteile und Zubehör

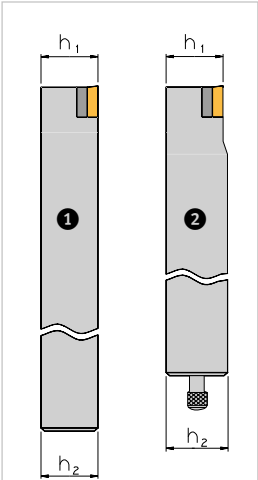
## • Spare parts and accessories

## • Ricambi e accessori

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>C</b><br/>Von oben geklemmt<br/>Top clamping<br/>Bloccaggio da sopra</p>  <p><b>D</b><br/>Von oben und über Bohrung geklemmt<br/>Top and hole clamping<br/>Bloccaggio combinato da sopra</p>  <p><b>M</b><br/>Von oben und über Bohrung geklemmt<br/>Top and hole clamping<br/>Bloccaggio combinato da sopra</p>  <p><b>P</b><br/>Über Bohrung geklemmt<br/>Lever lock clamping<br/>Bloccaggio da sotto</p>  <p><b>S</b><br/>Durch Bohrung aufgeschraubt<br/>Screw clamping<br/>Bloccaggio a vite</p> |  <p>80° <b>C</b><br/>55° <b>D</b><br/>75° <b>E</b><br/>86° <b>M</b><br/>35° <b>V</b></p>  <p>85° <b>A</b><br/>82° <b>B</b><br/>55° <b>K</b></p> <p> <b>H</b><br/> <b>L</b><br/> <b>O</b><br/> <b>P</b><br/> <b>R</b><br/> <b>S</b><br/> <b>T</b><br/> <b>W</b></p> |  <p><b>A</b><br/>90</p>  <p><b>B</b><br/>75</p>  <p><b>C</b><br/>90</p>  <p><b>D</b><br/>45</p>  <p><b>E</b><br/>60</p>  <p><b>F</b><br/>90</p>  <p><b>G</b><br/>90</p>  <p><b>H</b><br/>107,5</p>  <p><b>J</b><br/>93</p>  <p><b>K</b><br/>75</p>  <p><b>L</b><br/>95</p>  <p><b>M</b><br/>50</p>  <p><b>N</b><br/>63</p>  <p><b>R</b><br/>75</p>  <p><b>S</b><br/>45</p>  <p><b>T</b><br/>60</p>  <p><b>U</b><br/>93</p>  <p><b>V</b><br/>72,5</p>  <p><b>W</b><br/>60</p>  <p><b>Y</b><br/>85</p> |  <p>3° <b>A</b><br/>5° <b>B</b><br/>7° <b>C</b><br/>15° <b>D</b><br/>20° <b>E</b><br/>25° <b>F</b><br/>30° <b>G</b><br/>0° <b>N</b><br/>11° <b>P</b></p> <p>Sonstige → <b>O</b><br/>Others<br/>Altro</p> | <p><b>R</b></p>  <p><b>L</b></p>  <p><b>N</b></p>  |
| <b>S</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>C</b>                                                                                                                                                                                                                                                                                   | <b>L</b>                                                                                                                                                                                                                                                                                                     |
| <b>Klemmsystem</b><br>Clamping method<br>Metodo di bloccaggio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Plattenform</b><br>Insert shape<br>Forma inserto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Halterform</b><br>Style<br>Forma stelo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Freiwinkel</b><br>Clearance angle<br>Spoglia inferiore                                                                                                                                                                                                                                  | <b>Halterausführung</b><br>Holder execution<br>Versione utensile                                                                                                                                                                                                                                             |

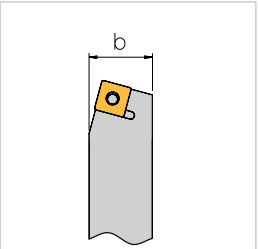
ISO-Designation System for holders  
Sistema di identificazione ISO per adattatori



**Höhe der Schneidenecke „h1“ in mm.**  
Bei Klemmhaltern ① ist die Höhe der Schneidenecke „h1“ gleich und bei Kurzklemmhaltern ② in der Regel ungleich der Schafthöhe „h2“.

Height of cutting edge “h1” in mm.  
For toolholders ① the height of the cutting edge “h1” is equal to the height of the shank “h2”.  
For toolholders ② the height of the cutting edge “h1” is unequal to the height of the shank “h2”.

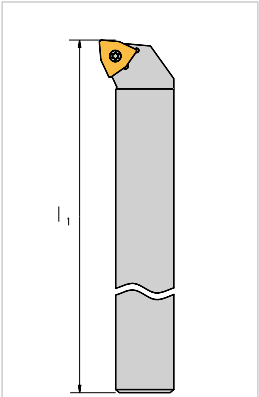
Altezza al tagliente “h1” in mm.  
Per steli tipo ① la altezza corrisponde all'altezza dello stelo mentre per steli tipo ② (cartucce) le altezze non corrispondono.



**Schaftbreite „b“ in mm.**  
Bei Kurzklemmhaltern entfällt die Angabe der Schaftbreite. Sie ist durch die Buchstaben „CA“ ersetzt.

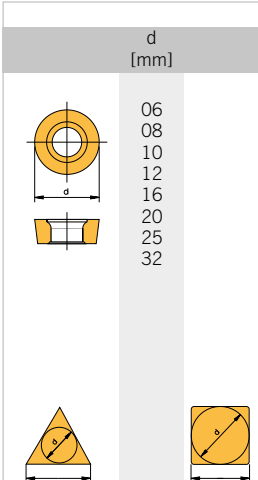
Width “b” in mm.  
For cartridges the dimension “b” does not exist. It is replaced by the letters “CA”.

Cartucce non indicano nessuna larghezza. Il valore è sostituito da “CA”



|   | l <sub>1</sub><br>[mm] | l <sub>1</sub><br>[mm] |
|---|------------------------|------------------------|
| A | 32                     | M 150                  |
| B | 40                     | N 160                  |
| C | 50                     | P 170                  |
| D | 60                     | Q 180                  |
| E | 70                     | R 200                  |
| F | 80                     | S 250                  |
| G | 90                     | T 300                  |
| H | 100                    | U 350                  |
| J | 110                    | V 400                  |
| K | 125                    | W 450                  |
| L | 140                    | Y 500                  |

**Sonderlänge → X**  
Special length  
Lunghezza speciale



| d<br>[mm]                                    |      |        |    |
|----------------------------------------------|------|--------|----|
| 06<br>08<br>10<br>12<br>16<br>20<br>25<br>32 |      |        |    |
| d<br>[mm] [inch] [mm] [mm]                   |      |        |    |
| 06                                           | 5/32 | 3,97   | 03 |
| 08                                           | 3/16 | 4,76   | 04 |
| 09                                           | 7/32 | 5,56   | 05 |
| 11                                           | 1/4  | 6,35   | 06 |
| 16                                           | 3/8  | 9,525  | 09 |
| 22                                           | 1/2  | 12,7   | 12 |
| 27                                           | 5/8  | 15,875 | 15 |
| 33                                           | 3/4  | 19,05  | 19 |
| 44                                           | 1    | 25,4   | 25 |

Für besondere Produktmerkmale kann an der 10. Stelle ein firmeninterner Code angeführt werden.  
*Special product information can be indicated by an internal company coding system at the 10th position.*  
Ulteriori codifiche prodotto personalizzate possono venire aggiunte alla 10ma posizione.

16

Schafthöhe  
Shank height  
Altezza stelo

16

Schaftbreite  
Shank width  
Larghezza stelo

X

Halterlänge  
Length  
Lunghezza totale

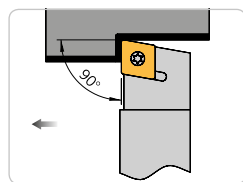
09

Schneidenlänge  
Insert size  
Lunghezza lato inserto

...

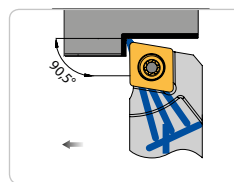
Zusatzangabe  
Additional coding system  
Codifica addizionale

## Schraubenklammung – positiv / Screw Clamping – positive / Bloccaggio a vite – positivi



### SCAC R/L

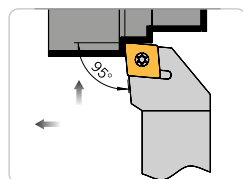
Seite/Page/Pagina 140



### SCAC R

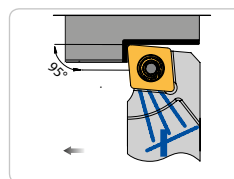
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 141



### SCLC R/L

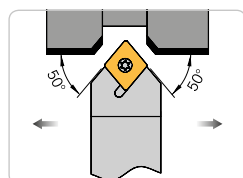
Seite/Page/Pagina 142



### SCLC R

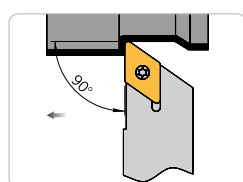
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 143



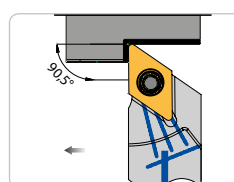
### SCMC N

Seite/Page/Pagina 144



### SDAC R/L

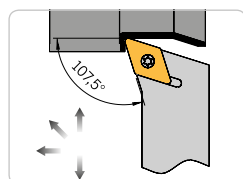
Seite/Page/Pagina 146



### SDAC R

mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 147



### SDHC R/L

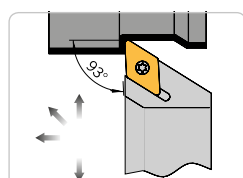
Seite/Page/Pagina 148



### SDHC R

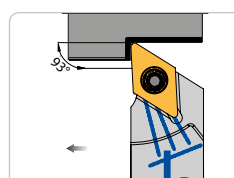
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 149



### SDJC R/L

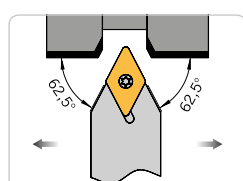
Seite/Page/Pagina 150



### SDJC R

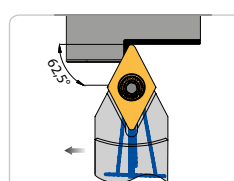
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 151



### SDNC N

Seite/Page/Pagina 152



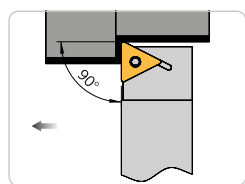
### SDNC R

mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 153

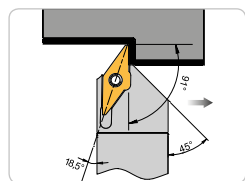


## Schraubenklammung – positiv / Screw Clamping – positive / Bloccaggio a vite – positivi



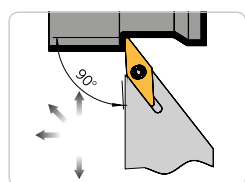
### STAC R/L

Seite/Page/Pagina 154



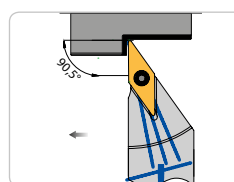
### SV91C R/L

Seite/Page/Pagina 155



### SVAC R/L

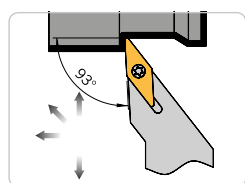
Seite/Page/Pagina 156



### SVAC R

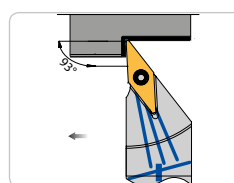
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 157



### SVJC R/L

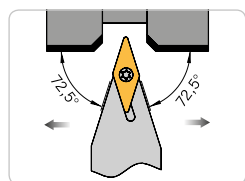
Seite/Page/Pagina 158



### SVJC R

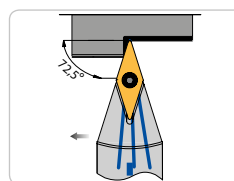
mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 159



### SVVC N

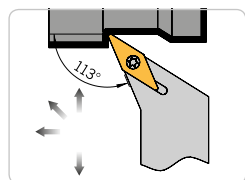
Seite/Page/Pagina 160



### SVVC N

mit Innenkühlung  
with through tool coolant  
con adduzione interna

Seite/Page/Pagina 161



### SVXC R/L

Seite/Page/Pagina 162



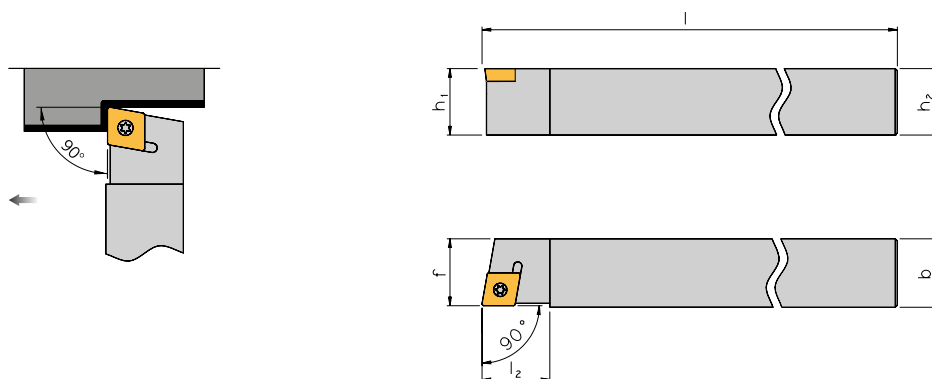
### Set Drehmoment-Schraubendreher

Torque Screwdriver Set  
Set chiavi dinamometriche

Seite/Page/Pagina 164

Holders with screw clamping  
Adattatori con bloccaggio a vite

**SCAC R/L Anstellwinkel / Approach angle / Angolo di attacco: 90°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SCAC R/L 0808 X06-A                    | 8           | 8  | 115 | 8,0  | ●     | CC.. 0602..                             |
| SCAC R/L 1010 X06-A                    | 10          | 10 | 115 | 10,0 | ●     | CC.. 0602..                             |
| SCAC R/L 1212 X06-A                    | 12          | 12 | 130 | 12,0 | ●     | CC.. 0602..                             |
| SCAC R/L 1212 X09-A                    | 12          | 12 | 130 | 12,0 | ●     | CC.. 09T3..                             |
| SCAC R/L 1616 X09-A                    | 16          | 16 | 130 | 16,0 | ●     | CC.. 09T3..                             |
| SCAC R/L 2020 X09-A                    | 20          | 20 | 120 | 20,0 | ●     | CC.. 09T3..                             |

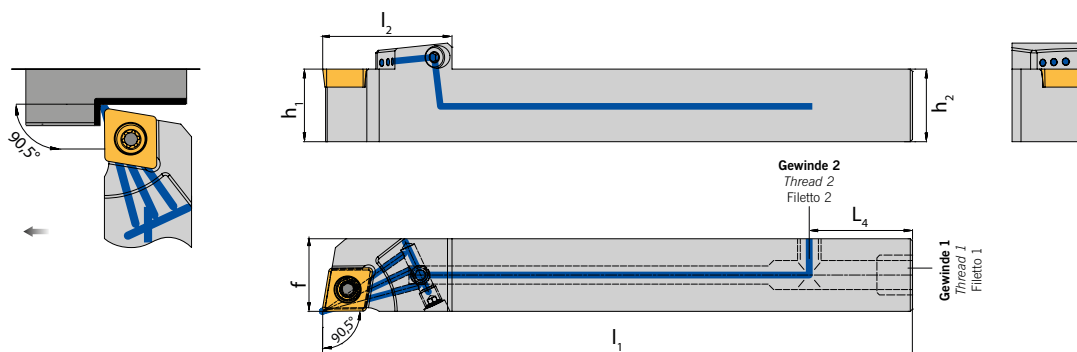
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SCAC R/L.. X06-A                    | SS 1751                   | KS 1751                    |
| SCAC R/L.. X09-A                    | V-M4-2200                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holders with screw clamping  
Adattatori con bloccaggio a vite

## SCAC R Anstellwinkel / Approach angle / Angolo di attacco: 90,5°



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

Ausführung SG. – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

Design SG. – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

Versione SG. – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SCACR 1212 X06-A-IK-S1G                | 12          | 12 | 130   | 24    | 20    | 12 | M8x1                               | M8x1                               | ●      | CC.. 0602..                             |
| SCACR 1212 X09-A-IK-S1G                | 12          | 12 | 130   | 25    | 20    | 12 | M8x1                               | M8x1                               | ●      | CC.. 09T3..                             |
| SCACR 1616 X09-A-IK-S1G                | 16          | 16 | 130   | 28,5  | 20    | 16 | M8x1                               | M8x1                               | ●      | CC.. 09T3..                             |
| SCACR 1212 X06-A-IK-S2G                | 12          | 12 | 130   | 24    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | CC.. 0602..                             |
| SCACR 1212 X09-A-IK-S2G                | 12          | 12 | 130   | 25    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | CC.. 09T3..                             |
| SCACR 1616 X09-A-IK-S2G                | 16          | 16 | 130   | 28,5  | 20    | 16 | M8x1                               | G 1/8"                             | ●      | CC.. 09T3..                             |

\*Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\*An overview of varieties can be found on page 163

\*Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SCAC R.. X06-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SCAC R.. X09-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

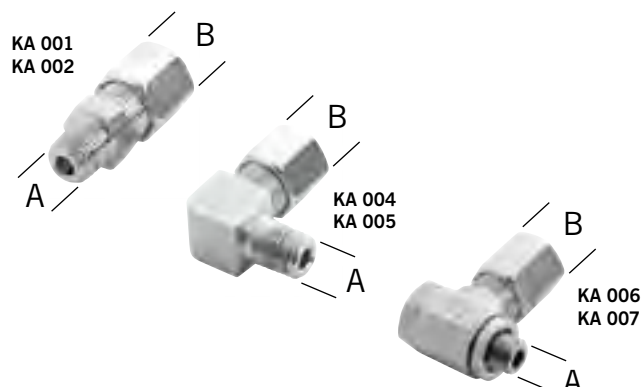
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

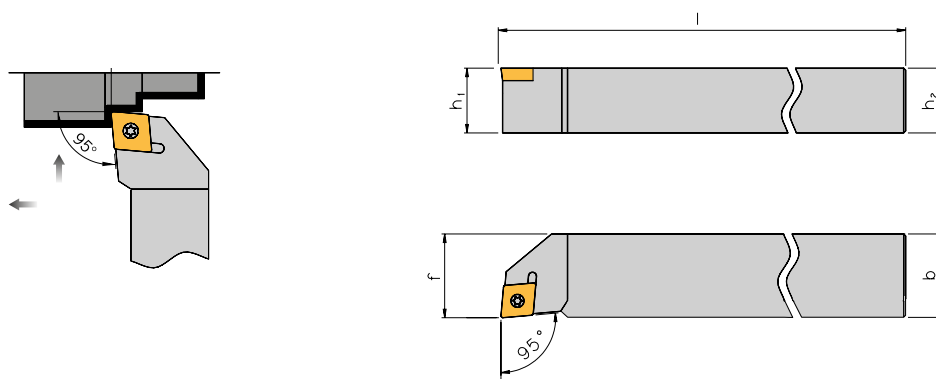
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SCLC R/L Anstellwinkel / Approach angle / Angolo di attacco: 95°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SCLC R/L 0808 X06-A                    | 8           | 8  | 115 | 8,0  | ●     | CC.. 0602..                             |
| SCLC R/L 1010 X06-A                    | 10          | 10 | 115 | 10,0 | ●     | CC.. 0602..                             |
| SCLC R/L 1212 X06-A                    | 12          | 12 | 130 | 12,0 | ●     | CC.. 0602..                             |
| SCLC R/L 1212 X09-A                    | 12          | 12 | 130 | 12,0 | ●     | CC.. 09T3..                             |
| SCLC R/L 1616 X06-A                    | 16          | 16 | 130 | 16,0 | ●     | CC.. 0602..                             |
| SCLC R/L 1616 X09-A                    | 16          | 16 | 130 | 16,0 | ●     | CC.. 09T3..                             |
| SCLC R/L 2020 X09-A                    | 20          | 20 | 120 | 20,0 | ●     | CC.. 09T3..                             |

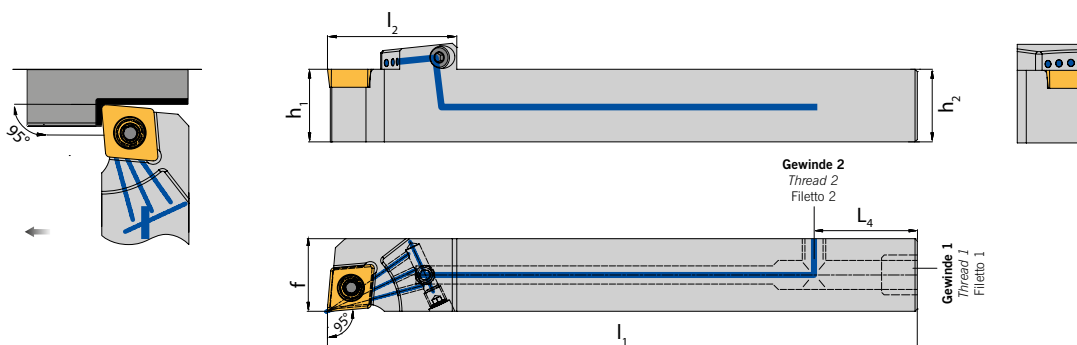
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SCLC R/L.. X06-A                    | SS 1751                   | KS 1751                    |
| SCLC R/L.. X09-A                    | V-M4-2200                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holder with screw clamping  
Adattatori con bloccaggio a vite

## SCLC R Anstellwinkel / Approach angle / Angolo di attacco: 95°



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

**Design SG.** – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

**Versione SG.** – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SCLCR 1212 X06-A-IK-S1G                | 12          | 12 | 130   | 24    | 20    | 12 | M8x1                               | M8x1                               | ●      | CC.. 0602..                             |
| SCLCR 1212 X09-A-IK-S1G                | 12          | 12 | 130   | 25    | 20    | 12 | M8x1                               | M8x1                               | ●      | CC.. 09T3..                             |
| SCLCR 1616 X09-A-IK-S1G                | 16          | 16 | 130   | 28,5  | 20    | 16 | M8x1                               | M8x1                               | ●      | CC.. 09T3..                             |
| SCLCR 1212 X06-A-IK-S2G                | 12          | 12 | 130   | 24    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | CC.. 0602..                             |
| SCLCR 1212 X09-A-IK-S2G                | 12          | 12 | 130   | 25    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | CC.. 09T3..                             |
| SCLCR 1616 X09-A-IK-S2G                | 16          | 16 | 130   | 28,5  | 20    | 16 | M8x1                               | G 1/8"                             | ●      | CC.. 09T3..                             |

\*Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\*An overview of varieties can be found on page 163

\*Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SCLC R.. X06-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SCLC R.. X09-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

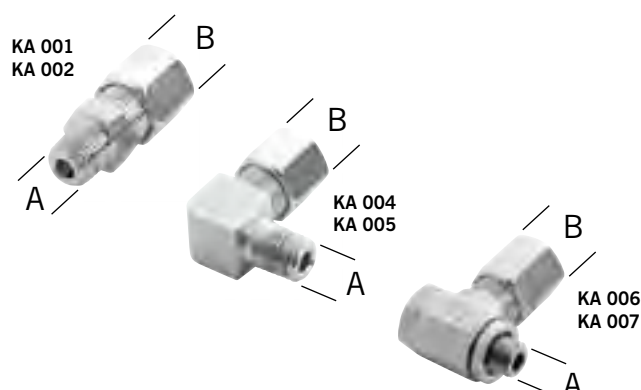
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

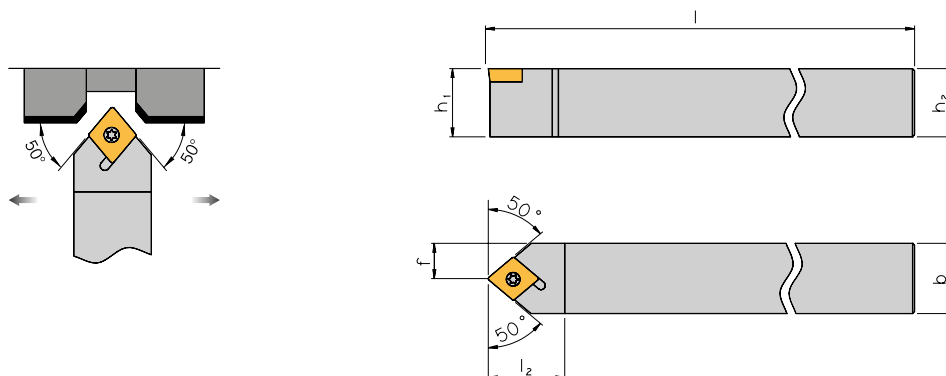
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SCMC N Anstellwinkel / Approach angle / Angolo di attacco: 50°**



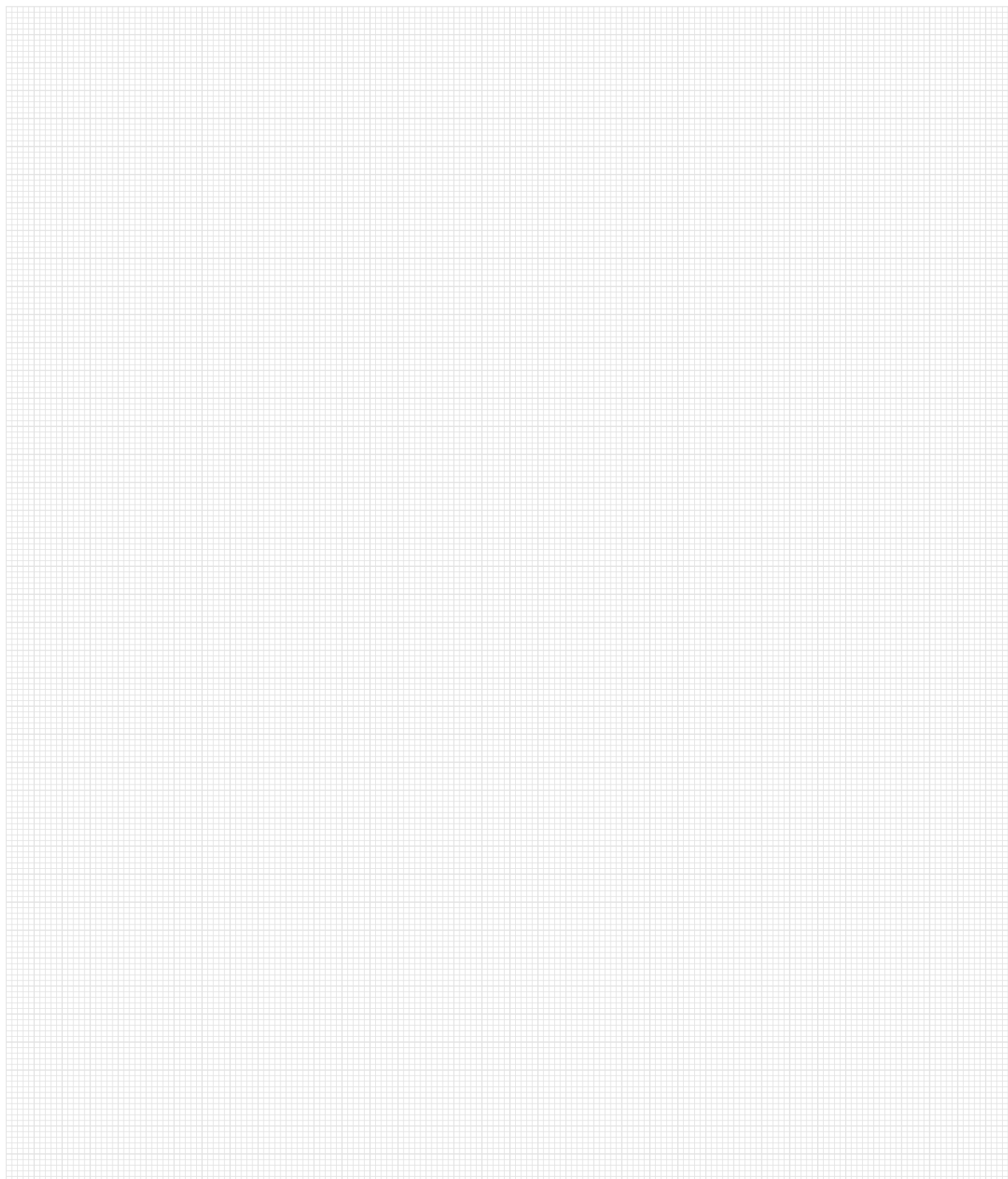
**Klemmhalter / Holder / Adattatore**

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SCMC N 0808 X06-A                      | 8           | 8  | 115 | 4,0  | ●     | CC.. 0602..                             |
| SCMC N 1010 X06-A                      | 10          | 10 | 115 | 5,0  | ●     | CC.. 0602..                             |
| SCMC N 1212 X06-A                      | 12          | 12 | 130 | 6,0  | ●     | CC.. 0602..                             |
| SCMC N 1212 X09-A                      | 12          | 12 | 130 | 6,0  | ●     | CC.. 09T3..                             |
| SCMC N 1616 X09-A                      | 16          | 16 | 130 | 8,0  | ●     | CC.. 09T3..                             |
| SCMC N 2020 X09-A                      | 20          | 20 | 120 | 10,0 | ●     | CC.. 09T3..                             |

**Ersatzteile / Spare parts / Ricambi**

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SCMC N.. X06-A                      | SS 1751                   | KS 1751                    |
| SCMC N.. X09-A                      | V-M4-2200                 | KS 1111                    |

**Hinweis: Auflage- und Anlageflächen geschliffen.**  
Remark: All flats ground.  
Nota: tutti i piani rettificati.



**Weitere Informationen finden Sie unter:**

*For more information see:*

Per maggiori informazioni visita il sito:

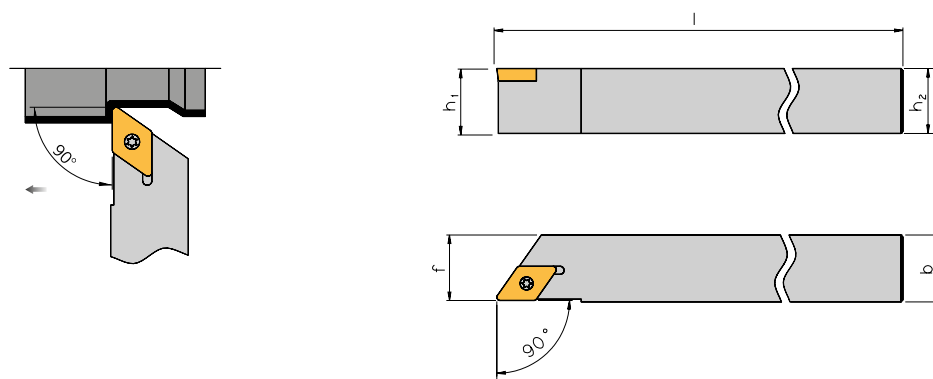
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Holders with screw clamping  
Adattatori con bloccaggio a vite

**SDAC R/L Anstellwinkel / Approach angle / Angolo di attacco: 90°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | $b$ | $l$ | $f$  | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|-----|-----|------|-------|-----------------------------------------|
| SDAC R/L 0808 X07-A                    | 8           | 8   | 115 | 8,0  | ●     | DC.. 0702..                             |
| SDAC R/L 1010 X07-A                    | 10          | 10  | 115 | 10,0 | ●     | DC.. 0702..                             |
| SDAC R/L 1212 X07-A                    | 12          | 12  | 130 | 12,0 | ●     | DC.. 0702..                             |
| SDAC R/L 1212 X11-A                    | 12          | 12  | 130 | 12,0 | ●     | DC.. 11T3..                             |
| SDAC R/L 1616 X07-A                    | 16          | 16  | 130 | 16,0 | ●     | DC.. 0702..                             |
| SDAC R/L 1616 X11-A                    | 16          | 16  | 130 | 16,0 | ●     | DC.. 11T3..                             |
| SDAC R/L 2020 X11-A                    | 20          | 20  | 120 | 20,0 | ●     | DC.. 11T3..                             |

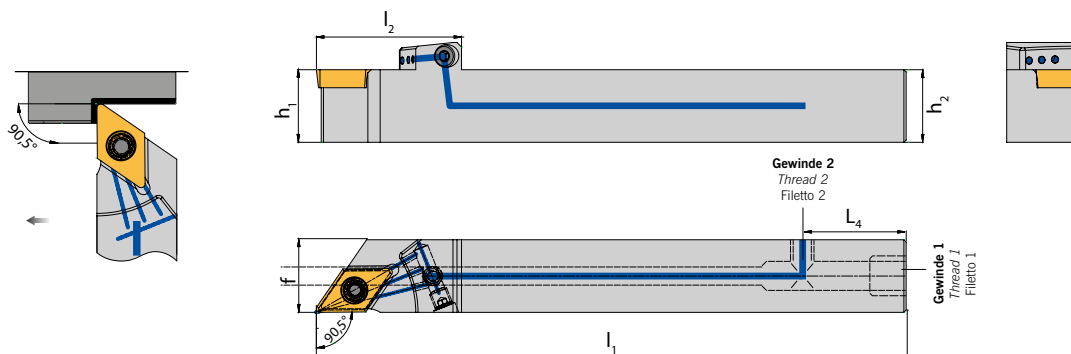
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SDAC R/L.. X07-A                    | SS 1751                   | KS 1751                    |
| SDAC R/L.. X11-A                    | V-M4-2400                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holders with screw clamping  
Adattatori con bloccaggio a vite

## SDAC R Anstellwinkel / Approach angle / Angolo di attacco: 90,5°



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

Ausführung SG. – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

Design SG. – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

Versione SG. – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SDACR 1212 X07-A-IK-S1G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | M8x1                               | ●      | DC.. 0702..                             |
| SDACR 1212 X11-A-IK-S1G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDACR 1616 X11-A-IK-S1G                | 16          | 16 | 130   | 32    | 20    | 16 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDACR 1212 X07-A-IK-S2G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | DC.. 0702..                             |
| SDACR 1212 X11-A-IK-S2G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |
| SDACR 1616 X11-A-IK-S2G                | 16          | 16 | 130   | 32    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |

\* Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\* An overview of varieties can be found on page 163

\* Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SDAC R.. X07-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SDAC R.. X11-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

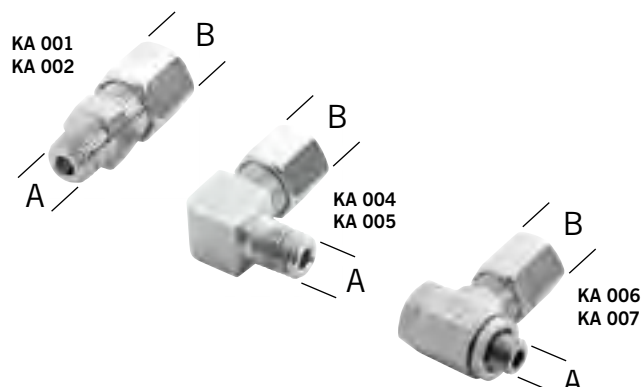
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

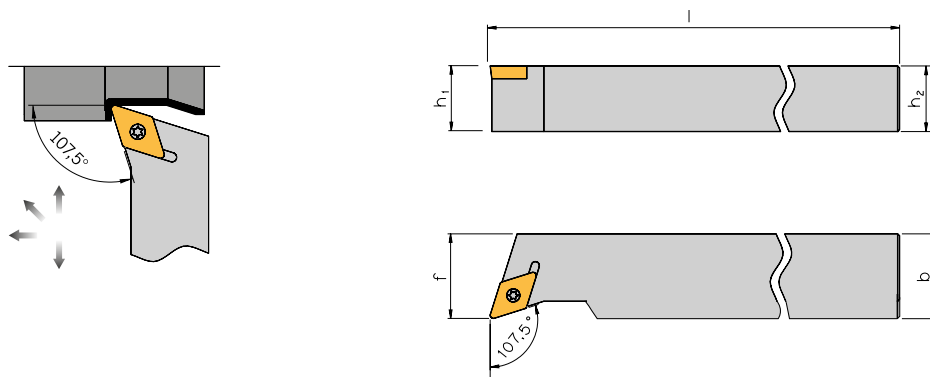
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SDHC R/L Anstellwinkel / Approach angle / Angolo di attacco: 107,5°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

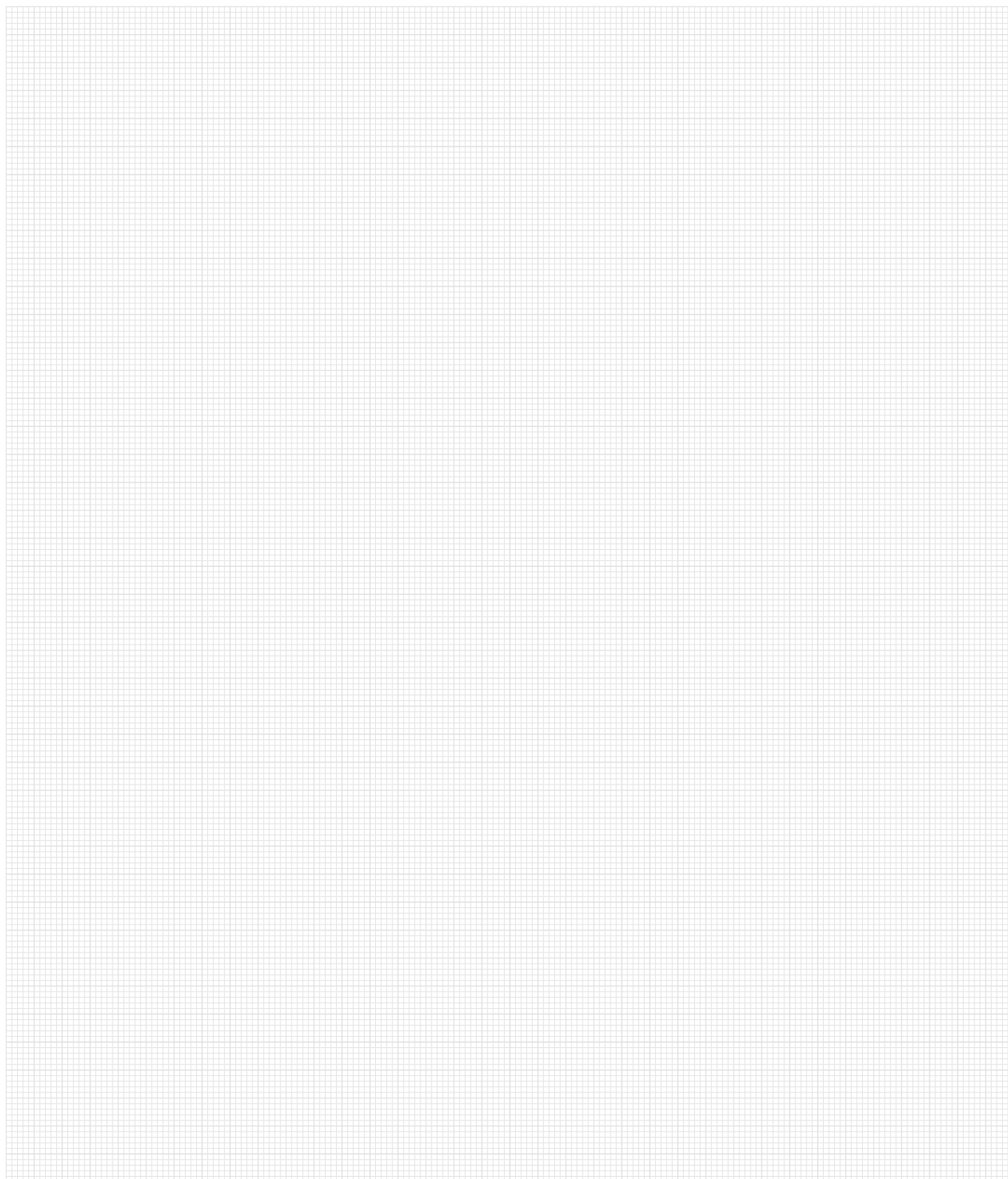
## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SDHC R/L 1010 X07-A                    | 10          | 10 | 115 | 10,0 | ●     | DC.. 0702..                             |
| SDHC R/L 1212 X07-A                    | 12          | 12 | 130 | 12,0 | ●     | DC.. 0702..                             |
| SDHC R/L 1616 X07-A                    | 16          | 16 | 130 | 16,0 | ●     | DC.. 0702..                             |
| SDHC R/L 1616 X11-A                    | 16          | 16 | 130 | 16,0 | ●     | DC.. 11T3..                             |
| SDHC R/L 2020 X11-A                    | 20          | 20 | 120 | 20,0 | ●     | DC.. 11T3..                             |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SDHC R/L.. X07-A                    | SS 1751                   | KS 1751                    |
| SDHC R/L.. X11-A                    | V-M4-2400                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.



**Weitere Informationen finden Sie unter:**

*For more information see:*

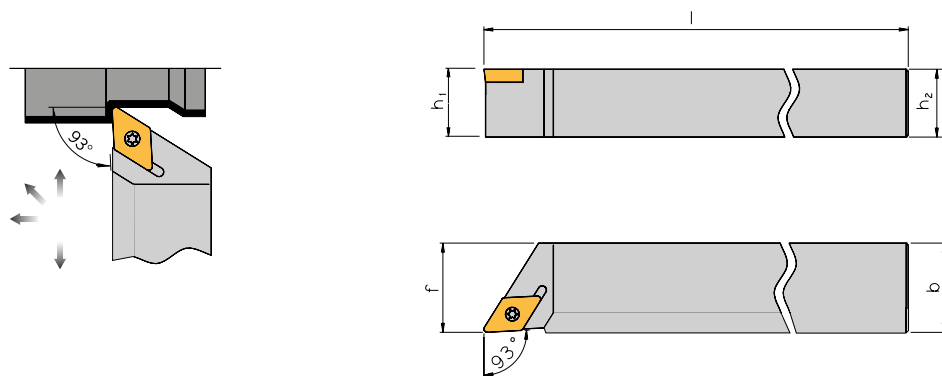
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Holders with screw clamping  
Adattatori con bloccaggio a vite

**SDJC R/L Anstellwinkel / Approach angle / Angolo di attacco: 93°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SDJC R/L 0808 X07-A                    | 8           | 8  | 115 | 8,0  | ●     | DC.. 0702..                             |
| SDJC R/L 1010 X07-A                    | 10          | 10 | 115 | 10,0 | ●     | DC.. 0702..                             |
| SDJC R/L 1212 X07-A                    | 12          | 12 | 130 | 12,0 | ●     | DC.. 0702..                             |
| SDJC R/L 1212 X11-A                    | 12          | 12 | 130 | 12,0 | ●     | DC.. 11T3..                             |
| SDJC R/L 1616 X07-A                    | 16          | 16 | 130 | 16,0 | ●     | DC.. 0702..                             |
| SDJC R/L 1616 X11-A                    | 16          | 16 | 130 | 16,0 | ●     | DC.. 11T3..                             |
| SDJC R/L 2020 X11-A                    | 20          | 20 | 120 | 20,0 | ●     | DC.. 11T3..                             |

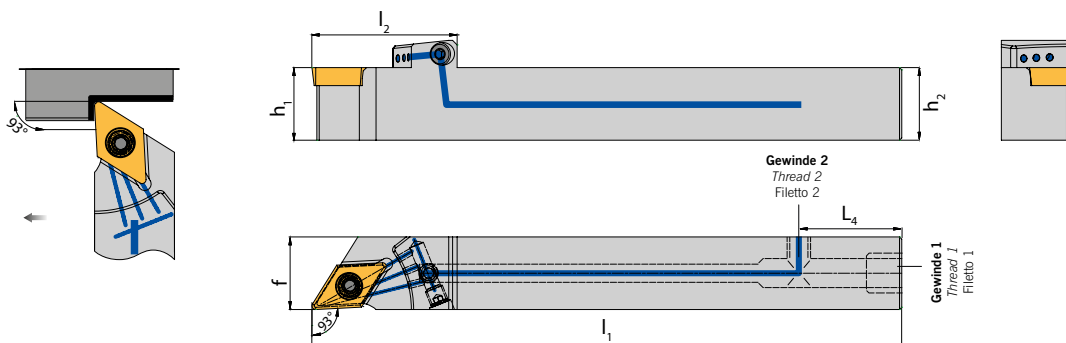
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SDJC R/L.. X07-A                    | SS 1751                   | KS 1751                    |
| SDJC R/L.. X11-A                    | V-M4-2400                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holder with screw clamping  
Adattatori con bloccaggio a vite

## SDJC R Anstellwinkel / Approach angle / Angolo di attacco: 93°



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

**Design SG.** – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

**Versione SG.** – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SDJCR 1212 X07-A-IK-S1G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | M8x1                               | ●      | DC.. 0702..                             |
| SDJCR 1212 X11-A-IK-S1G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDJCR 1616 X11-A-IK-S1G                | 16          | 16 | 130   | 32    | 20    | 16 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDJCR 1212 X07-A-IK-S2G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | DC.. 0702..                             |
| SDJCR 1212 X11-A-IK-S2G                | 12          | 12 | 130   | 32    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |
| SDJCR 1616 X11-A-IK-S2G                | 16          | 16 | 130   | 32    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |

\*Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\*An overview of varieties can be found on page 163

\*Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SDJC R.. X07-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SDJC R.. X11-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

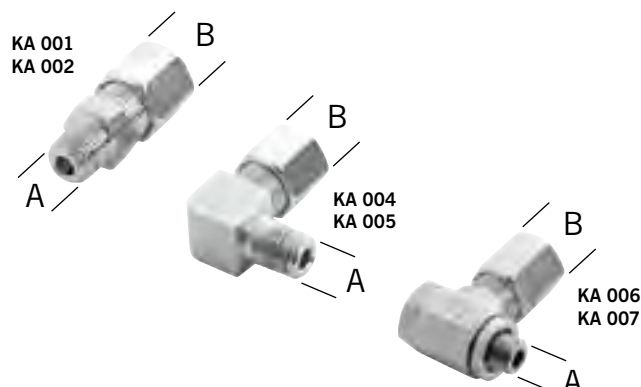
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

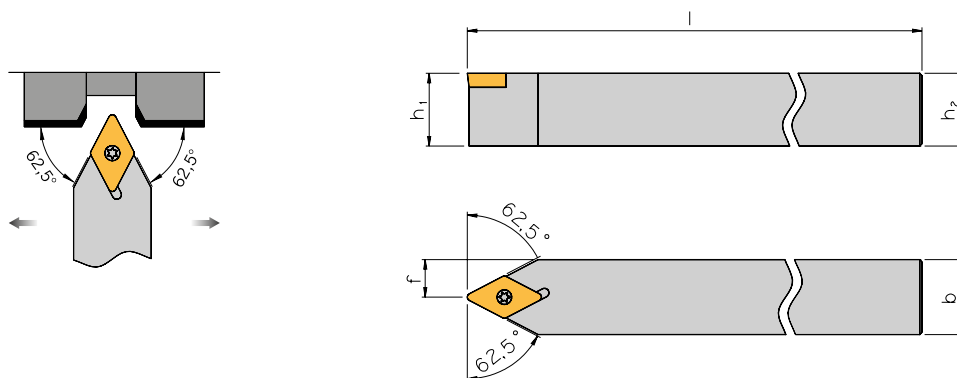
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SDNC N Anstellwinkel / Approach angle / Angolo di attacco: 62,5°**



## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SDNC N 0808 X07-A                      | 8           | 8  | 115 | 4,0  | ●     | DC.. 0702..                             |
| SDNC N 1010 X07-A                      | 10          | 10 | 115 | 5,0  | ●     | DC.. 0702..                             |
| SDNC N 1212 X07-A                      | 12          | 12 | 130 | 6,0  | ●     | DC.. 0702..                             |
| SDNC N 1212 X11-A                      | 12          | 12 | 130 | 6,0  | ●     | DC.. 11T3..                             |
| SDNC N 1616 X11-A                      | 16          | 16 | 130 | 8,0  | ●     | DC.. 11T3..                             |
| SDNC N 2020 X11-A                      | 20          | 20 | 120 | 10,0 | ●     | DC.. 11T3..                             |

## Ersatzteile / Spare parts / Ricambi

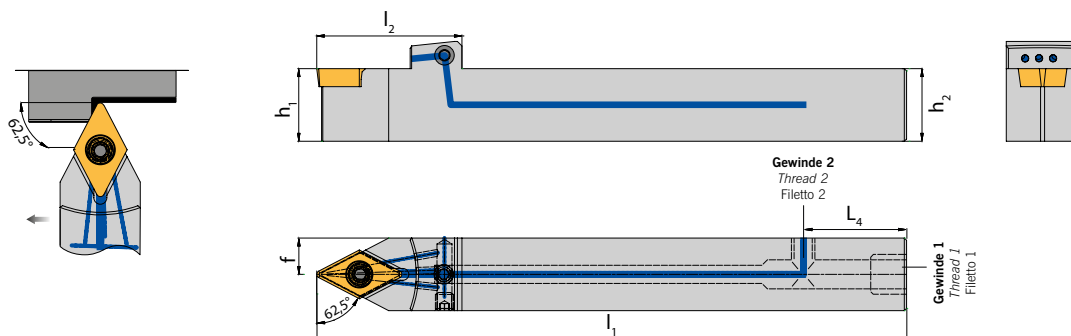
| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SDNC N.. X07-A                      | SS 1751                   | KS 1751                    |
| SDNC N.. X11-A                      | V-M4-2400                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SDNC N Anstellwinkel / Approach angle / Angolo di attacco: 62,5°**



## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

**Design SG.** – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

**Versione SG.** – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|---|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SDNCN 1212 X07-A-IK-S1G                | 12          | 12 | 130   | 27    | 20    | 6 | M8x1                               | M8x1                               | ●      | DC.. 0702..                             |
| SDNCN 1212 X11-A-IK-S1G                | 12          | 12 | 130   | 32    | 20    | 6 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDNCN 1616 X11-A-IK-S1G                | 16          | 16 | 130   | 32    | 20    | 8 | M8x1                               | M8x1                               | ●      | DC.. 11T3..                             |
| SDNCN 1212 X07-A-IK-S2G                | 12          | 12 | 130   | 27    | 20    | 6 | M8x1                               | G 1/8"                             | ●      | DC.. 0702..                             |
| SDNCN 1212 X11-A-IK-S2G                | 12          | 12 | 130   | 32    | 20    | 6 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |
| SDNCN 1616 X11-A-IK-S2G                | 16          | 16 | 130   | 32    | 20    | 8 | M8x1                               | G 1/8"                             | ●      | DC.. 11T3..                             |

\* Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\* An overview of varieties can be found on page 163

\* Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SDNC N.. X07-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SDNC N.. X11-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

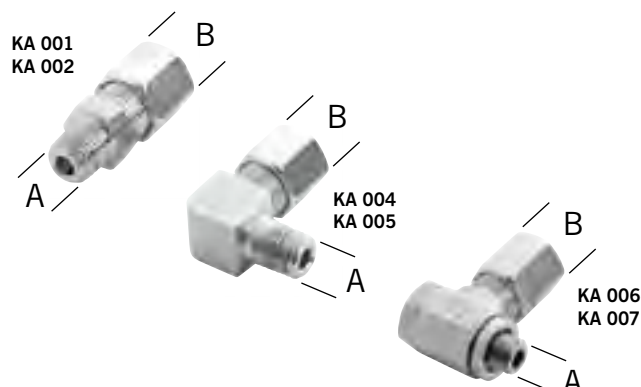
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

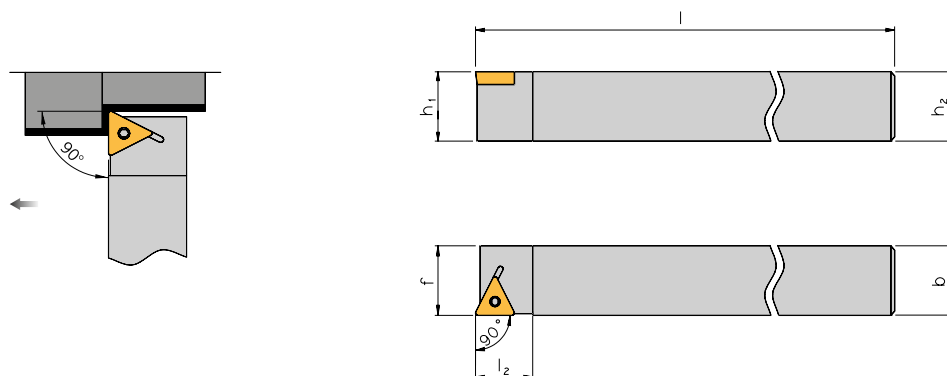
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**STAC R/L Anstellwinkel / Approach angle / Angolo di attacco: 90°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

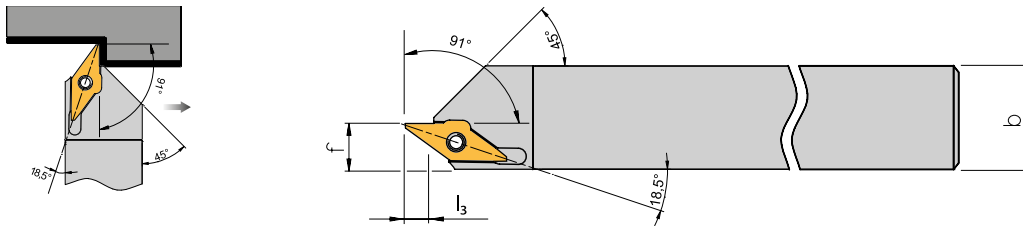
| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| STAC R/L 0808 X06-A                    | 8           | 8  | 115 | 8,0  | ●     | TC.. 06T1..                             |
| STAC R/L 1010 X09-A                    | 10          | 10 | 115 | 10,0 | ●     | TC.. 0902..                             |
| STAC R/L 1212 X11-A                    | 12          | 12 | 130 | 12,0 | ●     | TC.. 1102..                             |
| STAC R/L 1616 X11-A                    | 16          | 16 | 130 | 16,0 | ●     | TC.. 1102..                             |
| STAC R/L 2020 X11-A                    | 20          | 20 | 120 | 20,0 | ●     | TC.. 1102..                             |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| STAC R/L.. X06-A                    | SS 5140                   | KS 1886                    |
| STAC R/L.. X09-A                    | SS 5151                   | KS 5151                    |
| STAC R/L.. X11-A                    | SS 1751                   | KS 1751                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

## SV91C R/L Zum Rückwärtsdrehen / for back turning / Verso contromandrino



Rechte Ausführung abgebildet  
Right hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | $l_2$ | f   | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|-------|-----|-------|-----------------------------------------|
| SV91C R/L 1212 X11-A                   | 12          | 12 | 130 | 5     | 7,5 | ●     | VC.. 1103...                            |
| SV91C R/L 1616 X11-A                   | 16          | 16 | 130 | 5     | 7,5 | ●     | VC.. 1103...                            |
| SV91C R/L 2020 X11-A                   | 20          | 20 | 120 | 5     | 7,5 | ●     | VC.. 1103...                            |

Achtung: Rechter Halter → Linke Wendeschneidplatte  
 Achtung: Linker Halter → Rechte Wendeschneidplatte  
 Attention: Right-hand holder → Left-hand indexable insert  
 Attention: Left-hand holder → Right-hand indexable insert  
 Attenzione: Utensile destro → Inserto sinistro  
 Attenzione: Utensile sinistro → Inserto destro

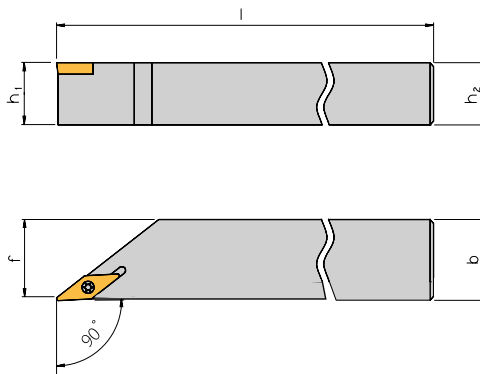
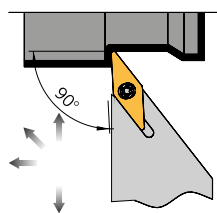
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SV91C R/L... X11-A                  | SS 1751                   | KS 1751                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
 Remark: All flats ground.  
 Nota: tutti i piani rettificati.

Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVAC R/L Anstellwinkel / Approach angle / Angolo di attacco: 90°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SVAC R/L 0808 X11-A                    | 8           | 8  | 115 | 8,0  | ●     | VC.. 1103..                             |
| SVAC R/L 1010 X11-A                    | 10          | 10 | 115 | 10,0 | ●     | VC.. 1103..                             |
| SVAC R/L 1212 X11-A                    | 12          | 12 | 130 | 12,0 | ●     | VC.. 1103..                             |
| SVAC R/L 1212 X16-A                    | 12          | 12 | 130 | 12,0 | ●     | VC.. 1604..                             |
| SVAC R/L 1616 X11-A                    | 16          | 16 | 130 | 16,0 | ●     | VC.. 1103..                             |
| SVAC R/L 1616 X16-A                    | 16          | 16 | 130 | 16,0 | ●     | VC.. 1604..                             |
| SVAC R/L 2020 X16-A                    | 20          | 20 | 120 | 20,0 | ●     | VC.. 1604..                             |

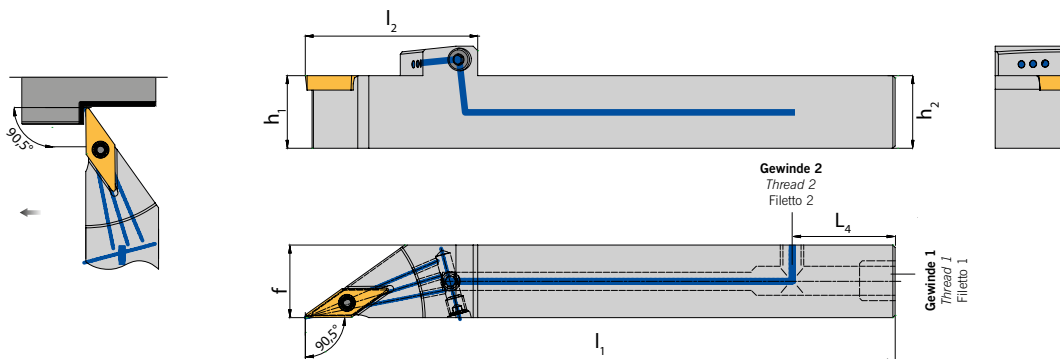
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SVAC R/L.. X11-A                    | SS 1751                   | KS 1751                    |
| SVAC R/L.. X16-A                    | V-M4-2700                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVAC R Anstellwinkel / Approach angle / Angolo di attacco: 90,5°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

**Design SG.** – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

**Versione SG.** – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SVACR 1212 X11-A-IK-S1G                | 12          | 12 | 130   | 35    | 20    | 12 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVACR 1212 X16-A-IK-S1G                | 12          | 12 | 130   | 45    | 20    | 12 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVACR 1616 X11-A-IK-S1G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVACR 1616 X16-A-IK-S1G                | 16          | 16 | 130   | 45    | 20    | 16 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVACR 1212 X11-A-IK-S2G                | 12          | 12 | 130   | 35    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVACR 1212 X16-A-IK-S2G                | 12          | 12 | 130   | 45    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |
| SVACR 1616 X11-A-IK-S2G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVACR 1616 X16-A-IK-S2G                | 16          | 16 | 130   | 45    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |

\*Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\*An overview of varieties can be found on page 163

\*Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SVAC R.. X11-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SVAC R.. X16-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

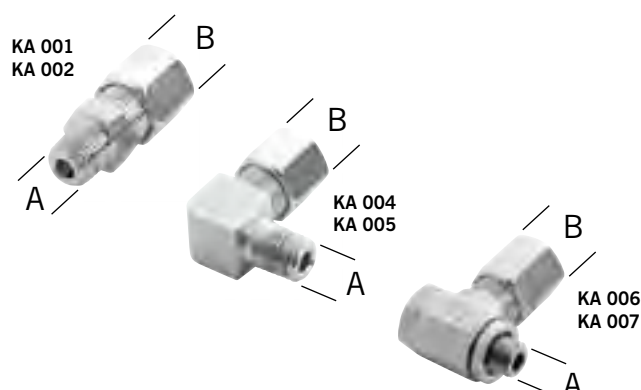
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

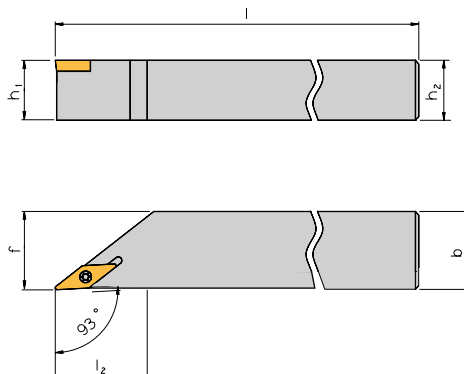
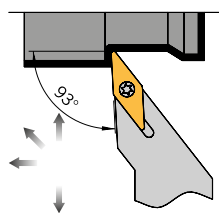
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVJC R/L Anstellwinkel / Approach angle / Angolo di attacco: 93°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SVJC R/L 0808 X11-A                    | 8           | 8  | 115 | 8,0  | ●     | VC.. 1103..                             |
| SVJC R/L 1010 X11-A                    | 10          | 10 | 115 | 10,0 | ●     | VC.. 1103..                             |
| SVJC R/L 1212 X11-A                    | 12          | 12 | 130 | 12,0 | ●     | VC.. 1103..                             |
| SVJC R/L 1212 X16-A                    | 12          | 12 | 130 | 12,0 | ●     | VC.. 1604..                             |
| SVJC R/L 1616 X11-A                    | 16          | 16 | 130 | 16,0 | ●     | VC.. 1103..                             |
| SVJC R/L 1616 X16-A                    | 16          | 16 | 130 | 16,0 | ●     | VC.. 1604..                             |
| SVJC R/L 2020 X16-A                    | 20          | 20 | 120 | 20,0 | ●     | VC.. 1604..                             |

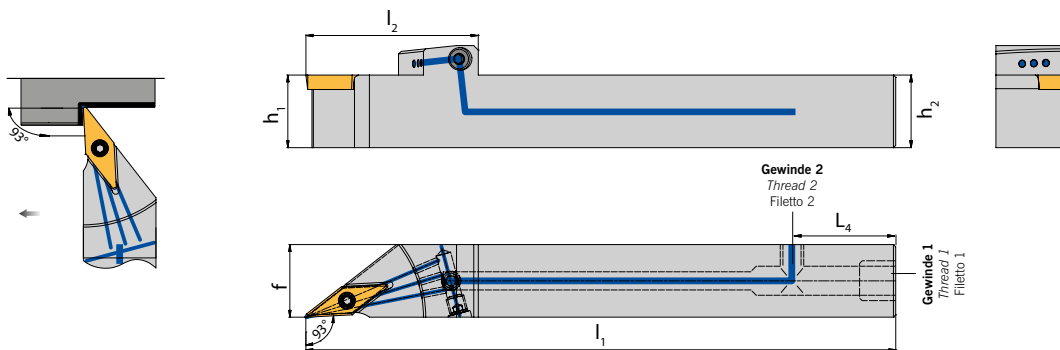
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SVJC R/L.. X11-A                    | SS 1751                   | KS 1751                    |
| SVJC R/L.. X16-A                    | V-M4-2700                 | KS 1111                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVJC R Anstellwinkel / Approach angle / Angolo di attacco: 93°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

**Design SG.** – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

**Versione SG.** – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | $l_1$ | $l_2$ | $l_4$ | f  | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-------|-------|-------|----|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SVJCR 1212 X11-A-IK-S1G                | 12          | 12 | 130   | 35    | 20    | 12 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVJCR 1212 X13-A-IK-S1G                | 12          | 12 | 130   | 38    | 20    | 12 | M8x1                               | M8x1                               | ●      | VC.. 1303..                             |
| SVJCR 1212 X16-A-IK-S1G                | 12          | 12 | 130   | 45    | 20    | 12 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVJCR 1616 X11-A-IK-S1G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVJCR 1616 X13-A-IK-S1G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | M8x1                               | ●      | VC.. 1303..                             |
| SVJCR 1616 X16-A-IK-S1G                | 16          | 16 | 130   | 45    | 20    | 16 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVJCR 1212 X11-A-IK-S2G                | 12          | 12 | 130   | 35    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVJCR 1212 X13-A-IK-S2G                | 12          | 12 | 130   | 38    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | VC.. 1303..                             |
| SVJCR 1212 X16-A-IK-S2G                | 12          | 12 | 130   | 45    | 20    | 12 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |
| SVJCR 1616 X11-A-IK-S2G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVJCR 1616 X13-A-IK-S2G                | 16          | 16 | 130   | 38    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | VC.. 1303..                             |
| SVJCR 1616 X16-A-IK-S2G                | 16          | 16 | 130   | 45    | 20    | 16 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |

\* Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163 / \* An overview of varieties can be found on page 163 / \* Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

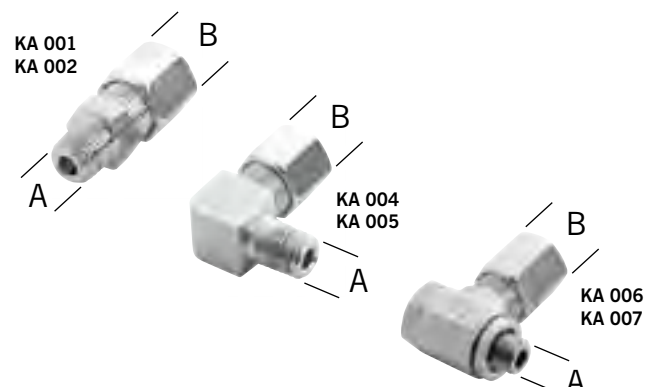
## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SVJC R.. X11-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4 x4                     | KP 3421                    |
| SVJC R.. X13-A                      | SS 8831                   | KS 1751                    | DIN 913 - M4 x4                     | KP 3421                    |
| SVJC R.. X16-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4 x4                     | KP 3421                    |

Hinweis: Auflage- und Anlageflächen geschliffen. / Remark: All flats ground. / Nota: tutti i piani rettificati.

## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo                                                                    | A            | B                |
|-----------------------------------------------------------------------------------------------------------|--------------|------------------|
| KA 001<br>Kühlmittelanschluss – gerade<br>Coolant supply – straight<br>Raccordo – dritto                  | M8x1<br>1/8" | Ø 6 mm<br>Ø 6 mm |
| KA 002                                                                                                    |              |                  |
| KA 004<br>Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed<br>Raccordo – angolato | M8x1<br>1/8" | Ø 6 mm<br>Ø 6 mm |
| KA 005                                                                                                    |              |                  |
| KA 006<br>Schwenkverschraubung<br>Swivelling screw-fitting<br>Raccordo – orientabile                      | M8x1<br>1/8" | Ø 6 mm<br>Ø 6 mm |
| KA 007                                                                                                    |              |                  |

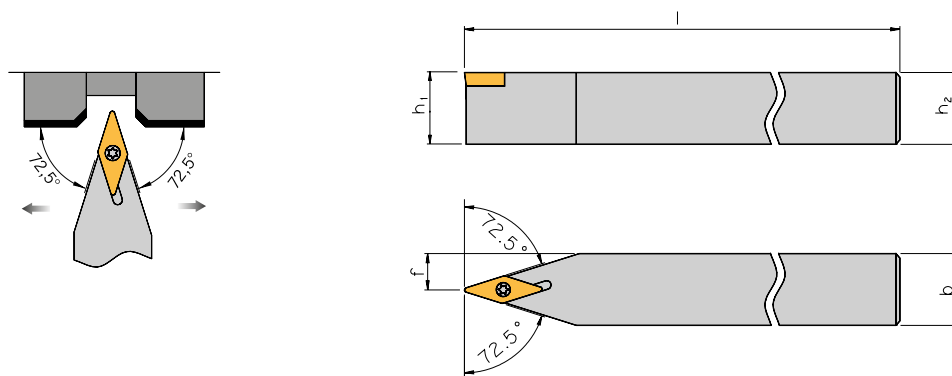


Alle Angaben in mm / Dimensions in mm / Tutte le dimensioni in mm

ARNO®-Werkzeuge | Langdrehen | Auto lathes | Fantina mobile

Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVVC N Anstellwinkel / Approach angle / Angolo di attacco: 72,5°**



## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | b  | l   | f    | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|----|-----|------|-------|-----------------------------------------|
| SVVC N 0808 X11-A                      | 8           | 8  | 115 | 4,0  | ●     | VC.. 1103..                             |
| SVVC N 1010 X11-A                      | 10          | 10 | 115 | 5,0  | ●     | VC.. 1103..                             |
| SVVC N 1212 X11-A                      | 12          | 12 | 130 | 6,0  | ●     | VC.. 1103..                             |
| SVVC N 1212 X16-A                      | 12          | 12 | 130 | 6,0  | ●     | VC.. 1604..                             |
| SVVC N 1616 X11-A                      | 16          | 16 | 130 | 8,0  | ●     | VC.. 1103..                             |
| SVVC N 1616 X16-A                      | 16          | 16 | 130 | 8,0  | ●     | VC.. 1604..                             |
| SVVC N 2020 X16-A                      | 20          | 20 | 120 | 10,0 | ●     | VC.. 1604..                             |

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SVVC N.. X11-A                      | SS 1751                   | KS 1751                    |
| SVVC N.. X16-A                      | V-M4-2700                 | KS 1111                    |

**Hinweis: Auflage- und Anlageflächen geschliffen.**

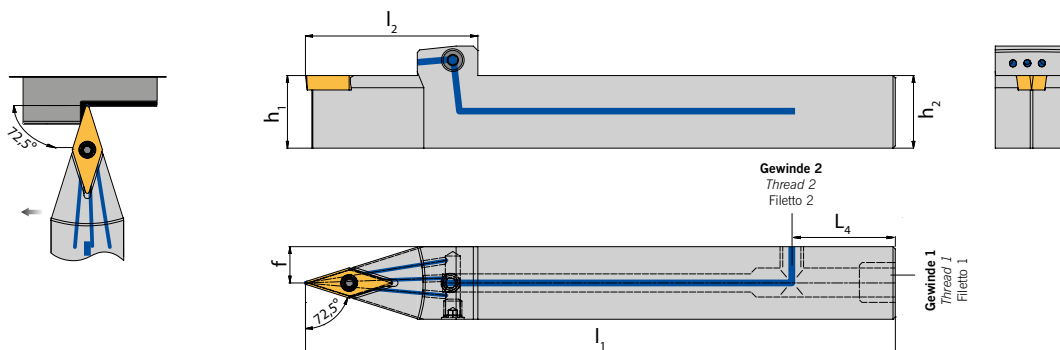
Remark: All flats ground.

Nota: tutti i piani rettificati.



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVVC N Anstellwinkel / Approach angle / Angolo di attacco: 72,5°**



## Klemmhalter mit Innenkühlung von der Seite

**Ausführung SG.** – Das Gewinde 2 ist gegenüber der Schneide

Holder with through tool coolant access from the side

Design SG. – Thread 2 is on the opposite side of the cutting edge

Adattatore con adduzione interna laterale

Versione SG. – Filettatura 2 sul lato opposto l'inserto

| Bezeichnung<br>Designation<br>Articolo | h <sub>1</sub> / h <sub>2</sub> | b  | l <sub>1</sub> | l <sub>2</sub> | l <sub>4</sub> | f | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39* | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|---------------------------------|----|----------------|----------------|----------------|---|------------------------------------|------------------------------------|--------|-----------------------------------------|
| SVVCN 1212 X11-A-IK-S1G                | 12                              | 12 | 130            | 38             | 20             | 6 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVVCN 1212 X16-A-IK-S1G                | 12                              | 12 | 130            | 45             | 20             | 6 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVVCN 1616 X11-A-IK-S1G                | 16                              | 16 | 130            | 38             | 20             | 8 | M8x1                               | M8x1                               | ●      | VC.. 1103..                             |
| SVVCN 1616 X16-A-IK-S1G                | 16                              | 16 | 130            | 45             | 20             | 8 | M8x1                               | M8x1                               | ●      | VC.. 1604..                             |
| SVVCN 1212 X11-A-IK-S2G                | 12                              | 12 | 130            | 38             | 20             | 6 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVVCN 1212 X16-A-IK-S2G                | 12                              | 12 | 130            | 45             | 20             | 6 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |
| SVVCN 1616 X11-A-IK-S2G                | 16                              | 16 | 130            | 38             | 20             | 8 | M8x1                               | G 1/8"                             | ●      | VC.. 1103..                             |
| SVVCN 1616 X16-A-IK-S2G                | 16                              | 16 | 130            | 45             | 20             | 8 | M8x1                               | G 1/8"                             | ●      | VC.. 1604..                             |

\* Eine Anfrage der Klemmhaltervarianten finden Sie auf Seite 163

\* An overview of varieties can be found on page 163

\* Per diverse tipologie di raccordo e posizione utilizzare modulo a pag 163

## Ersatzteile / Spare parts / Ricambi

| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Gewindestift<br>Thread pin<br>Grano | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|-------------------------------------|----------------------------|
| SVVC N.. X11-A                      | SS 1751                   | KS 1751                    | DIN 913 - M4x4                      | KP 3421                    |
| SVVC N.. X16-A                      | SS 1111                   | KS 1111                    | DIN 913 - M4x4                      | KP 3421                    |

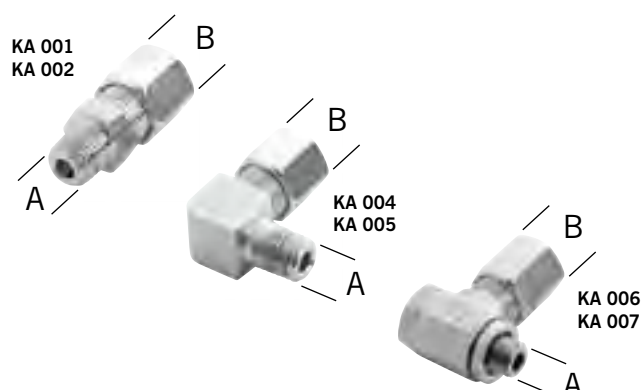
Hinweis: Auflage- und Anlageflächen geschliffen.

Remark: All flats ground.

Nota: tutti i piani rettificati.

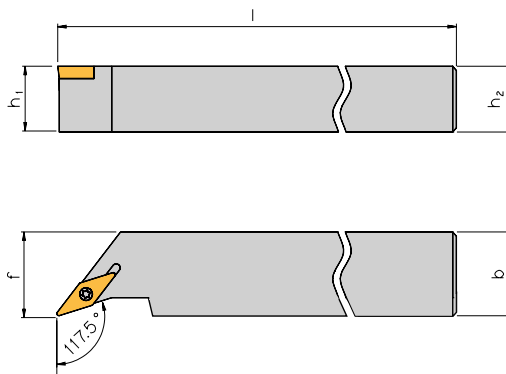
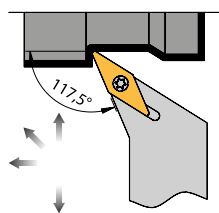
## Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                          | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------|------|--------|
| KA 001                                 | Kühlmittelanschluss – gerade<br>Coolant supply – straight                | M8x1 | Ø 6 mm |
| KA 002                                 | Raccordo – dritto                                                        | 1/8" | Ø 6 mm |
| KA 004                                 | Kühlmittelanschluss – winklig, fest<br>Coolant supply – angled and fixed | M8x1 | Ø 6 mm |
| KA 005                                 | Raccordo – angolato                                                      | 1/8" | Ø 6 mm |
| KA 006                                 | Schwenkverschraubung<br>Swivelling screw-fitting                         | M8x1 | Ø 6 mm |
| KA 007                                 | Raccordo – orientabile                                                   | 1/8" | Ø 6 mm |



Holders with screw clamping  
Adattatori con bloccaggio a vite

**SVXC R/L Anstellwinkel / Approach angle / Angolo di attacco: 117,5°**



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Klemmhalter / Holder / Adattatore

| Bezeichnung<br>Designation<br>Articolo | $h_1 / h_2$ | $b$ | $l$ | $f$  | PG 39 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|-------------|-----|-----|------|-------|-----------------------------------------|
| SVXC R/L 1616 X11-A                    | 16          | 16  | 130 | 16,0 | ●     | VC.. 1103..                             |
| SVXC R/L 2020 X11-A                    | 20          | 20  | 120 | 20,0 | ●     | VC.. 1103..                             |

## Ersatzteile / Spare parts / Ricambi

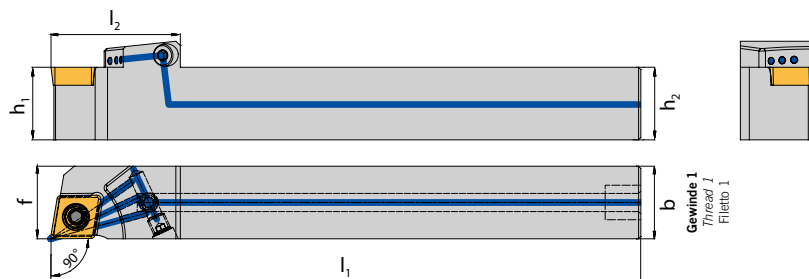
| Klemmhalter<br>Holder<br>Adattatore | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|-------------------------------------|---------------------------|----------------------------|
| SVXC R/L... X11-A                   | SS 1751                   | KS 1751                    |

Hinweis: Auflage- und Anlageflächen geschliffen.  
Remark: All flats ground.  
Nota: tutti i piani rettificati.

**Klemmhalter mit Innenkühlung von hinten**

Tool holder with through tool coolant access from the back

Steli con adduzione interna raccordo posteriore

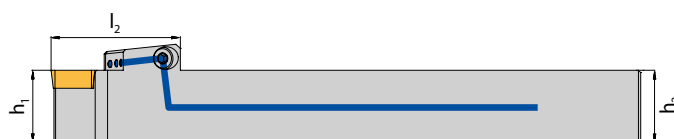
Aus Halter  
From holder  
Da utensileGewinde 1  
Thread 1  
Filetto 1

|                        |  |  |
|------------------------|--|--|
| ..... 1212 ..... -A-IK |  |  |
| ..... 1616 ..... -A-IK |  |  |

**Klemmhalter mit Innenkühlung von der Seite**

Tool holder with through tool coolant access from the side

Steli con adduzione interna raccordo laterale

**Standardausführung/**

Basic version/

Versione standard

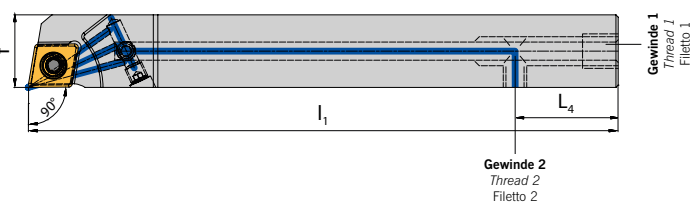
l<sub>1</sub>

|                        |     |
|------------------------|-----|
| ..... 1212 ..... -A-IK | 130 |
| ..... 1616 ..... -A-IK | 130 |

**Ausführung S. – Das Gewinde 2 ist auf der gleichen Seite wie die Schneide**

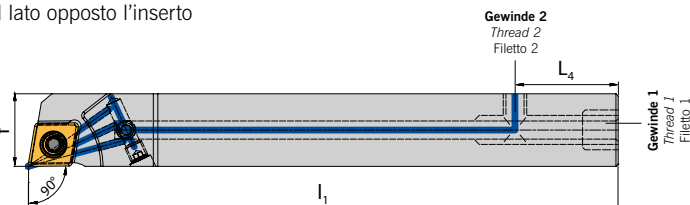
Design S. – Thread 2 is on the same side as the cutting edge

Versione S. – Filettatura 2 sul medesimo lato dell'inserto

Bitte ankreuzen:  
Please select:  
Indicare scelta:Rechter Halter  
Right-hand Holder  
Utensile destro**Ausführung SG. – Das Gewinde 2 ist gegenüber der Schneide**

Design SG. – Thread 2 is on the opposite side of the cutting edge

Versione SG. – Filettatura 2 sul lato opposto l'inserto

Bitte ankreuzen:  
Please select:  
Indicare scelta:Rechter Halter  
Right-hand Holder  
Utensile destroAus Halter  
From holder  
Da utensileGewinde 1  
Thread 1  
Filetto 1Gewinde 2  
Thread 2  
Filetto 2L<sub>4</sub>l<sub>1</sub>

|                        |  |  |  |  |
|------------------------|--|--|--|--|
| ..... 1212 ..... -A-IK |  |  |  |  |
| ..... 1616 ..... -A-IK |  |  |  |  |

Torque Screwdriver Sets  
Set chiavi dinamometriche



## Set 1

Einstellbereich von 0,6 Nm – 1,5 Nm

Adjustable from 0,6 Nm – 1,5 Nm

Registrabile da 0,6 Nm a 1,5 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T6, Torx T7, Torx T8 und Torx T9
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T6, Torx T7, Torx T8 and Torx T9
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T6, Torx T7, Torx T8, Torx T9
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 1**)

(Order as: **SET-TORQUE 1**)

(Esempio di ordinazione: **Set-Drehmoment 1**)

## Set 2

Einstellbereich von 1,5 Nm – 3,0 Nm

Adjustable from 1,5 Nm – 3,0 Nm

Registrabile da 1,5 Nm a 3,0 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T9, Torx T10 und Torx T15
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T9, Torx T10 and Torx T15
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T9, Torx T10, Torx T15
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 2**)

(Order as: **SET-TORQUE 2**)

(Esempio di ordinazione: **Set-Drehmoment 2**)

## Set 3

Einstellbereich von 3,0 Nm – 5,4 Nm

Adjustable from 3,0 Nm – 5,4 Nm

Registrabile da 3,0 Nm a 5,4 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T10, Torx T15 und Torx T20
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T10, Torx T15 and Torx T20
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T10, Torx T15, Torx T20
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 3**)

(Order as: **SET-TORQUE 3**)

(Esempio di ordinazione: **Set-Drehmoment 3**)

## Zulässige Anzugsmomente für Wendeschneidplatten – Spannelemente

Recommended torque settings for inserts

Momenti torcenti raccomandati per inserti

| Gewinde<br>Thread<br>Filetto vite | Torx-Größe<br>Torx size<br>Dimensione Torx | max. Anzugsmoment<br>max. torque<br>Momento torcente |
|-----------------------------------|--------------------------------------------|------------------------------------------------------|
| M1,8                              | T6                                         | 0,6 Nm                                               |
| M2                                | T6                                         | 0,6 Nm                                               |
| M2                                | T7                                         | 0,6 Nm                                               |
| M2,2                              | T6                                         | 1,0 Nm                                               |
| M2,2                              | T7                                         | 1,0 Nm                                               |
| M2,2                              | T8                                         | 1,3 Nm                                               |
| M3                                | T8                                         | 2,2 Nm                                               |
| M3                                | T9                                         | 2,2 Nm                                               |
| M3,5                              | T15                                        | 3,4 Nm                                               |
| M4                                | T15                                        | 5,1 Nm                                               |
| M4,5                              | T20                                        | 6,2 Nm                                               |
| M5                                | T20                                        | 6,2 Nm                                               |
| M6                                | T25                                        | 8,1 Nm                                               |



## Sonderlösungen – genau auf Sie zugeschnitten.

*Special solutions especially  
for your application!*

Soluzioni speciali –  
su misura per voi.

### Sie haben eine Aufgabe – wir haben die Lösung.

Nutzen Sie unsere langjährige Erfahrung im Bereich der Sonderwerkzeuge und arbeiten Sie mit ARNO-Werkzeugen in Zukunft effektiver und kostengünstiger.

Ganz egal, ob Sonderschneideinsätze oder komplexe Kombi-Werkzeuge – wir fertigen für Sie flexibel, schnell und präzise nahezu jeden Wunsch.

### *You have an application – we have a solution.*

*Take advantage of our many years' experience in special solutions and in future benefit from more efficient and cost effective ARNO tooling. Whether it is special inserts or complex combination tools – we are able to offer nearly any solutions.*

### Hai un problema – chiedici la nostra soluzione.

La nostra pluriennale esperienza nell'ambito delle lavorazioni meccaniche ci rende capaci di offrire qualsiasi soluzione di lavorazione nell'ambito delle nostre competenze specifiche.

Sia per singoli inserti o utensili e sia per complete combinazioni di utensili.

Un servizio veloce, flessibile e preciso per ogni esigenza.

Weitere Informationen finden Sie unter:

*For more information see:*

Altre informazioni su:

**[www.arno.de](http://www.arno.de)**

P

## Bearbeitung Stahl

Steel machining

Lavorazione Acciaio

## POSITIV

POSITIVE

POSITIVO

## - AM

Spanformgeometrie für den mittleren Zerspanungsbereich von Stahl, rostfreiem (austenitischem) Stahl und auch von Gusswerkstoffen. Sehr gute Spankontrolle bei geringen bis mittleren Spantiefen und Vorschubbereichen durch die Anordnung der speziell konzipierten Spanformnoppen. Weicher Spanablauf und niedrige Schnittkräfte.



## - AM

Chip breaker geometry for medium machining of steel, austenitic stainless steel and cast materials. Due to special chip pimples, very good chip control at low to medium depth of cut and feed rates. Smooth chip evacuation and low cutting forces.

## Mittlere Zerspanung

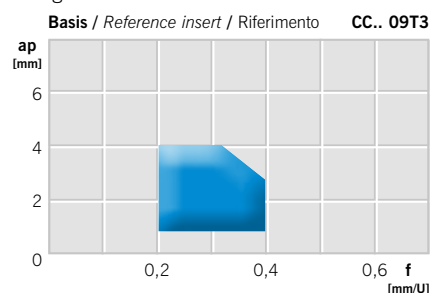
Medium machining  
Semifinitura

einseitig  
single sided  
singolo lato



## - AM

Geometria di rompitruciolo per la semifinitura di acciaio, acciaio inossidabile austenitico e acciaio da fusione. I rigonfiamenti sulla spoglia superiore aiutano la rottura del truciolo a basse e medie profondità di taglio ed avanzamenti. Ottimo scorrimento del truciolo e ridotte forze di taglio.



## - PS2

Geometrie für die Schlichtbearbeitung zum Erreichen hoher Oberflächengüten und Toleranzgenauigkeiten bei der Zerspanung von Stahl, Stahlguss und rostfreien Stählen. Mini-Spanbrecher für kontrollierten Spanbruch. Scharfe Schneidkante.



## - PS2

Geometry for finishing steel, cast steel and stainless steel. Mini chip breaker for controlled chip breaking. Sharp cutting edge.

## Schlichtzerspanung

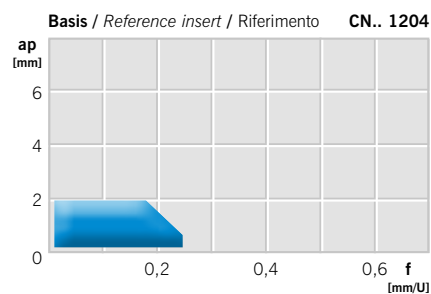
Finishing  
Finitura

einseitig  
single sided  
singolo lato



## - PS2

Geometria per la finitura di Acciaio, Acciaio da fusione ed Acciaio inossidabile. Mini rompitruciolo per un miglior controllo. Tagliente positivo.



## - PF2

Durch die geschliffene und polierte Oberfläche ist diese Geometrie besonders zur Schlichtbearbeitung geeignet. Sehr scharfe Schneidkanten und der 10° positive Spanwinkel garantieren ein optimales Ergebnis und einen kontrollierten Spanbruch.



## - PF2

Due to the ground, polished insert surface, this geometry is especially suitable for finishing applications. The very sharp cutting edge and 10° positive cut offer excellent results and swarf control.

## Schlichtzerspanung

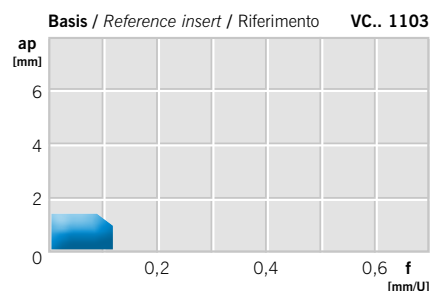
Finishing  
Finitura

einseitig  
single sided  
singolo lato



## - PF2

Grazie al tagliente rettificato e lappato oltre alla specifica geometria di taglio, questo inserto risulta ottimale per qualsiasi lavorazione di qualsiasi materiale. La spoglia superiore positiva a 10° ed il formatruciolo specifico, garantiscono inoltre un ottimo controllo truciolo.



P

**Bearbeitung Stahl**

Steel machining

Lavorazione Acciaio

**POSITIV**

POSITIVE

POSITIVO

Für die Schlichtbearbeitung sind auch die hochpositiven Geometrien -ASF, -ALU und -ACB in beschichteter Ausführung hervorragend geeignet.

*Please also consider our high positive geometries -ASF, -ALU and -ACB as their coated versions offer excellent results for finishing steels and stainless steels as well as high temperature alloys.*

Per la finitura suggeriamo le nostre geometrie positive: -ASF, -ALU ed -ACB da scegliere con idoneo rivestimento e preparazione tagliente.



-ASF



-ALU



-ACB



M

**Bearbeitung rostfreier Stahl***Stainless steel machining*

Lavorazione Acciaio inossidabile

**POSITIV***POSITIVE***POSITIVO****- PS**

Geometrie für die Feinschlichtbearbeitung von rostfreiem Stahl und warmfesten Legierungen mit geringen Vorschüben und Spanntiefen. Kontrollierter Spanbruch. Niedrige Schnittkräfte. Am Umfang geschliffene Wendeschneidplatte. Auch geeignet für die Bearbeitung von NE-Metallen.

**- PS**

*Geometry for finishing stainless steels and heat resistant alloys with low feed rates and depth of cut. Controlled chip breaking. Low cutting forces. Periphery ground insert which is also suitable for non-ferrous materials.*

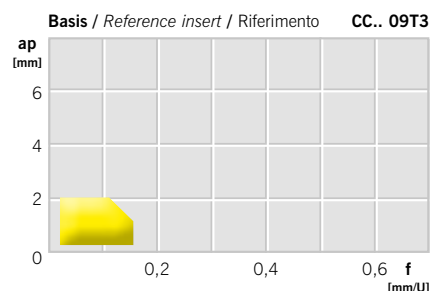
**Schlitzzerspanung**

*Finishing*  
Finitura

**einseitig**  
*single sided*  
singolo lato

**- PS**

Geometria nata per la super finitura di acciaio inossidabile e leghe esotiche e refrattarie per minime asportazioni e ridotti avanzamenti. Ottimo controllo truciolo. Basse forze di taglio. Inserto rettificato sul perimetro risulta idoneo anche per materiali non ferrosi.

**- PF2**

Durch die geschliffene und polierte Oberfläche ist diese Geometrie besonders zur Schlichtbearbeitung geeignet. Sehr scharfe Schneidkanten und der 10° positive Spanwinkel garantieren ein optimales Ergebnis und einen kontrollierten Spanbruch.

**- PF2**

*Due to the ground, polished insert surface, this geometry is especially suitable for finishing applications. The very sharp cutting edge and 10° positive cut offer excellent results and swarf control.*

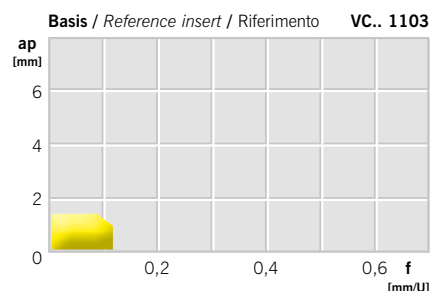
**Schlitzzerspanung**

*Finishing*  
Finitura

**einseitig**  
*single sided*  
singolo lato

**- PF2**

Grazie al tagliente rettificato e lappato oltre alla specifica geometria di taglio, questo inserto risulta ottimale per qualsiasi lavorazione di qualsiasi materiale. La spoglia superiore positiva a 10° ed il formatruciolo specifico, garantiscono inoltre un ottimo controllo truciolo.

**- PS2**

Geometrie für die Schlichtbearbeitung zum Erreichen hoher Oberflächengüten und Toleranzgenauigkeiten bei der Zerspanung von Stahl, Stahlguss und rostfreien Stählen. Mini-Spanbrecher für kontrollierten Spanbruch. Scharfe Schneidkante.

**- PS2**

*Geometry for finishing steel, cast steel and stainless steel. Mini chip breaker for controlled chip breaking. Sharp cutting edge.*

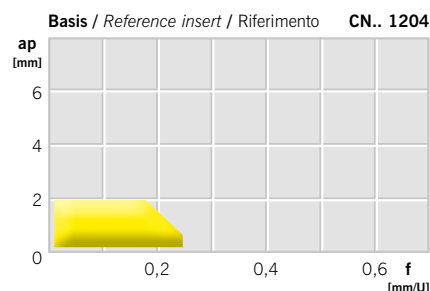
**Schlitzzerspanung**

*Finishing*  
Finitura

**einseitig**  
*single sided*  
singolo lato

**- PS2**

Geometria per la finitura di acciaio, acciaio da fusione ed acciaio inossidabile. Mini rompitruciolo per un miglior controllo. Tagliente positivo.





M

**Bearbeitung rostfreier Stahl***Stainless steel machining*

Lavorazione Acciaio inossidabile

**POSITIV***POSITIVE***POSITIVO****- AM**

Spanformgeometrie für den mittleren Zerspanungsbereich von Stahl, rostfreiem (austenitischem) Stahl und auch Gusswerkstoffen.

Sehr gute Spankontrolle bei geringen bis mittleren Spantiefen und Vorschubbereichen durch die Anordnung der speziell konzipierten Spanformnoppen. Weicher Spanablauf und niedrige Schnittkräfte.

**- AM**

*Chip breaker geometry for medium machining of steel, austenitic stainless steel and cast materials. Due to special chip pimples, very good chip control at low to medium depth of cut and feed rates. Smooth chip evacuation and low cutting forces.*

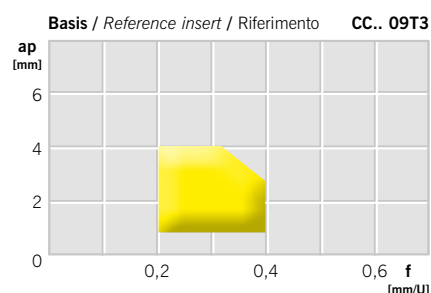
**Mittlere Zerspanung**

*Medium machining*  
Semifinitura

**einseitig**  
*single sided*  
singolo lato

**- AM**

Geometria di rompitruciolo per la semifinitura di acciaio, acciaio inossidabile austenitico e acciaio da fusione. I rigonfiamenti sulla spoglia superiore aiutano la rottura del truciolo a basse e medie profondità di taglio ed avanzamenti. Ottimo scorrimento del truciolo e ridotte forze di taglio.



Für die Schlichtbearbeitung sind auch die hochpositiven Geometrien -ASF, -ALU und -ACB in beschichteter Ausführung hervorragend geeignet.

*Please also consider our high positive geometries -ASF, -ALU and -ACB as their coated versions offer excellent results for finishing steels and stainless steels as well as high temperature alloys.*

Per la finitura suggeriamo le nostre geometrie positive: -ASF, -ALU ed -ACB da scegliere con idoneo rivestimento e preparazione tagliente.

**-ASF****-ALU****-ACB**

N

## Bearbeitung NE-Metalle

Non-ferrous materials

Lavorazione materiali non ferrosi

POSITIV

POSITIVE

POSITIVO

## - PS

Geometrie für die Feinschlichtbearbeitung von rostfreiem Stahl und warmfesten Legierungen mit geringen Vorschüben und Spanntiefen. Kontrollierter Spanbruch. Niedrige Schnittkräfte. Am Umfang geschliffene Wendeschneidplatte. Auch geeignet für die Bearbeitung von NE-Metallen.



## - PS

Geometry for finishing stainless steels and heat resistant alloys with low feed rates and depth of cut. Controlled chip breaking. Low cutting forces. Periphery ground insert which is also suitable for non-ferrous materials.

## Schlichtzerspanung

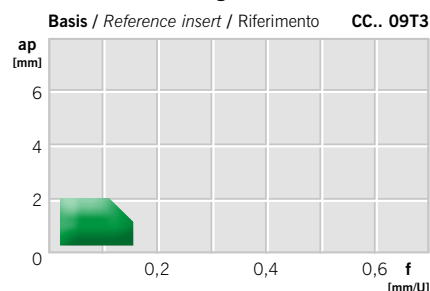
Finishing  
Finitura

einseitig  
single sided  
singolo lato



## - PS

Inserto rettificato su tutto il perimetro in versione senza rivestimento risulta ideale per la finitura di materiali non ferrosi. La versione rivestita si applica per la superfinitura di acciaio inossidabile e leghe refrattarie con basse forze di taglio e profondità di passata. Ottimo controllo truciolo. Basse forze di taglio.



## - PF2

Durch die geschliffene und polierte Oberfläche ist diese Geometrie besonders zur Schlichtbearbeitung geeignet. Sehr scharfe Schneidkanten und der 10° positive Spanwinkel garantieren ein optimales Ergebnis und einen kontrollierten Spanbruch.



## - PF2

Due to the ground and polished insert surface, this geometry is especially suitable for finishing applications. The very sharp cutting edge and 10° positive cut offer excellent results and swarf control.

## Schlichtzerspanung

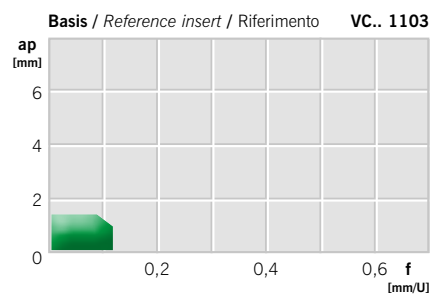
Finishing  
Finitura

einseitig  
single sided  
singolo lato



## - PF2

Grazie al tagliente rettificato e lappato oltre alla specifica geometria di taglio, questo inserto risulta ottimale per qualsiasi lavorazione di qualsiasi materiale. La spoglia superiore positiva a 10° ed il formatruciolo specifico, garantiscono inoltre un ottimo controllo truciolo.



N

## Bearbeitung NE-Metalle

Non-ferrous materials

Lavorazione materiali non ferrosi

## HOCHPOSITIV

HIGH POSITIVE

ULTRA POSITIVI

## - ASF

Schlichtgeometrie für die Bearbeitung von Aluminium und Aluminiumlegierungen sowie Bunt- und NE-Metallen. Auch geeignet zum Schlichten von rostfreien Stählen. Geringe Schnittkräfte durch die scharfe Schneidkante in Verbindung mit der speziell ausgelegten Spanleitstufe. Wendeschneidplatte komplett umfangsgeschliffen.



## - ASF

Finishing geometry for machining aluminum, aluminum alloys and non-ferrous materials. Also suitable for finishing stainless steel. Very low cutting forces due to sharp cutting edges and special chip breaker. Completely ground insert.

## Schlichtzerspanung

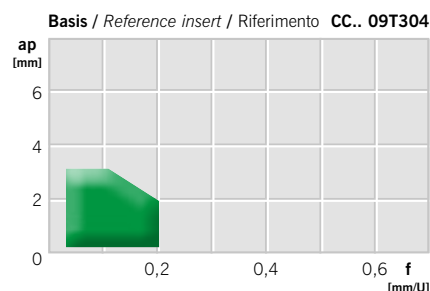
Finishing  
Finitura

einseitig  
single sided  
singolo lato



## - ASF

Geometrie di finitura per la lavorazione di materiali non ferrosi, Alluminio, leghe di Alluminio. Idoneo in versione rivestita anche per finitura di acciaio inossidabile. Basse forze di taglio grazie al tagliente molto positivo ed allo speciale vano rompitruciolo. Inserto completamente rettificato.



## - ACB

Anwendungsbereich entsprechend der „-ALU“-Geometrie, jedoch mit optimierter Spanform. Zusätzliche Spannoppen für verbesserten Spanbruch und kurze Späne.



## - ACB

Same application area as „-ALU“ geometry, however with optimized chip breaker. Special chip breaker for small chips.

## Mittlere Zerspanung

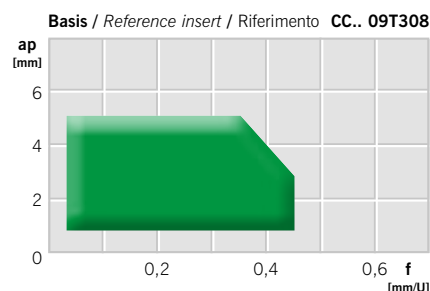
Medium machining  
Semifinitura

einseitig  
single sided  
singolo lato



## - ACB

Geometrie con un campo applicativo simile alla geometria „-ALU“ ma con rompitruciolo ottimizzato per un controllo trucioli di piccola sezione.



## - ALU

Geometrie für die Bearbeitung von Aluminium und Aluminiumlegierungen sowie Bunt- und NE-Metallen. Auch geeignet für die Feinzerspanung von Molybdän, Sinterstahl oder zum Schlichten von rostfreien Stählen. Geringe Schnittkräfte durch die scharfe Schneidkante in Verbindung mit der speziell ausgelegten Spanleitstufe. Dadurch optimale Bearbeitung von labilen, dünnwandigen Teilen möglich. Wendeschneidplatten komplett umfangsgeschliffen.



## - ALU

Geometry for machining aluminum/alloys and non-ferrous materials. Also suitable for finishing molybdenum, sintered steel or stainless steel. Very low cutting forces due to sharp cutting edges and special chip breaker. Excellent machining of unstable and thin-walled workpieces. Completely ground insert.

## Mittlere Zerspanung

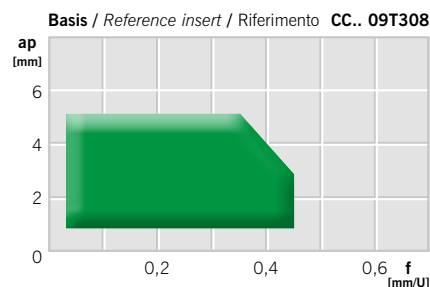
Medium machining  
Semifinitura

einseitig  
single sided  
singolo lato



## - ALU

Geometrie universale per lavorazione di alluminio, leghe di alluminio e materiali non ferrosi. In versione rivestita idonea anche per la finitura di leghe di molibdeno, acciai sinterizzati o acciai inossidabili. Ridotte forze di taglio per la spoglia positiva e rompitruciolo speciale. Ottimo per la lavorazione di pareti sottili o per condizioni gravose. Inserto completamente rettificato.



H

## Bearbeitung Cermet

Cermet  
Cermet

## POSITIV

POSITIVE  
POSITIVO

## - AQ

Geometrie für die Schlichtzerspanung von Stahl, Stahlguss und nichtrostenden Stählen. Hohe Oberflächenqualität und Toleranzgenauigkeit. Sehr gute Spanformung.



## - AQ

Universal geometry for finishing to medium machining of steel, cast steel and stainless steel. Excellent surface finish and tolerance accuracy. Very good swarf control.

## Schlichtzerspanung

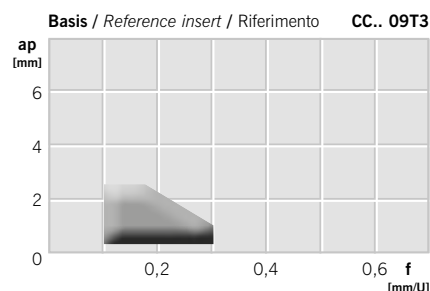
Finishing  
Finitura

einseitig  
single sided  
singolo lato



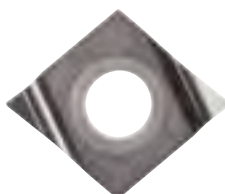
## - AQ

Geometria universale per la Finitura e la Semifinitura di acciaio, acciaio da fusione ed acciaio inossidabile. Ottima finitura superficiale e precisione di lavorazione. Eccellente controllo truciolo.



## - FS

Universalgeometrie für die Schlichtzerspanung von Stahl, rostfreien Stählen und Gusswerkstoffen. Durch die geschliffenen Spanbrecher ist diese Geometrie besonders zur Schlichtbearbeitung geeignet. Geringe Schnittkraft. Gute Spankontrolle. Optimierte Spanabfuhr.



## - FS

Universal geometry for finishing of steel, stainless steel and cast materials. Ground chip breaker for finishing applications. Low cutting forces, good chip control and excellent chip flow.

## Schlichtzerspanung

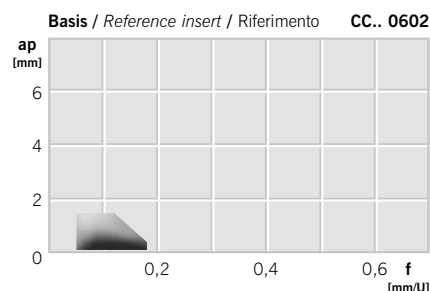
Finishing  
Finitura

einseitig  
single sided  
singolo lato



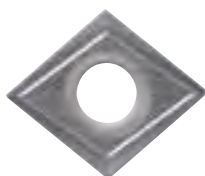
## - FS

Geometria universale per la lavorazione di acciaio, acciaio da fusione, acciai legati ed acciai inossidabili. Applicabile per la finitura e la semifinitura. Grazie all'ampio canale rompitruciolo, ottimo controllo truciolo nella maggior parte delle applicazioni.



## - AZ

Positive Geometrie für die Schlichtzerspanung und mittlere Bearbeitung von Stahl, Stahlguss und nichtrostenden Stählen. Geschliffene, umlaufende Spanleitstufe.



## - AZ

Positive geometry for finishing and medium machining of steel, cast steel and stainless steel. Ground circumferential chip breaker.

## Schlicht- und mittlere Zerspanung

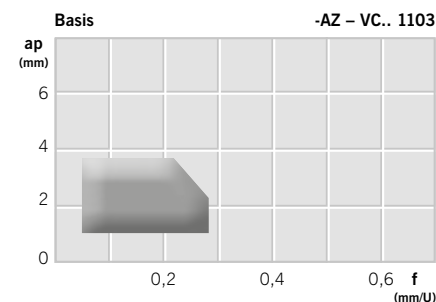
Finishing and medium machining  
Finitura e medie asportazioni

einseitig  
single sided  
singolo lato



## - AZ

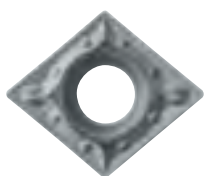
Per la semifinitura di Acciaio, Acciaio inossidabile ed Acciai da fusione. Tagliente positivo.



H

**Bearbeitung Cermet**Cermet  
Cermet**POSITIV**POSITIVE  
POSITIVO**- PM1**

Neu entwickelte positive Schneidengeometrie für die Schlichtbearbeitung und mittlere Zerspanung. Diese Geometrie eignet sich besonders zur Bearbeitung von Stahl sowie rostfreien Stählen. Die doppelt-positive Schneidkante garantiert eine hohe Prozesssicherheit und eine exzellente Spankontrolle auch bei hohen Vorschüben.

**- PM1**

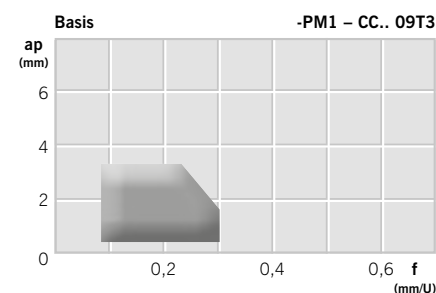
Newly developed positive geometry for finishing and medium machining. This geometry is mostly suitable for steel and stainless steel. The double positive cutting edge ensures high reliability and excellent swarf evacuation. The wave shaped geometry offers excellent swarf control, even at high feed rates.

**Schlicht- und mittlere Zerspanung**  
Finishing and medium machining  
Finitura e medie asportazioni

**einseitig**  
single sided  
singolo lato

**- PM1**

Nuova geometria Positiva sviluppata per la finitura o la semifinitura di Acciai legati e Acciai Inossidabili. La particolare forma positiva del rompitruciolo assicura una massima affidabilità della asportazione ed un ottimale controllo del truciolo.

**- PMC**

Universelle Geometrie für die Bearbeitung von Stahl und Stahlguss, legierten Stählen und nichtrostenden Stählen. Zum Schlichten und für die mittlere Zerspanung geeignet. Guter Spanablauf. In vielen Bearbeitungsbereichen einsetzbar.

**- PMC**

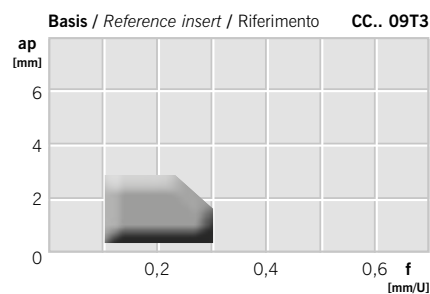
Universal geometry for machining steel, cast steel, alloyed steel and stainless steel. Suitable for finish to medium machining. Because of the wide chip grooves good chip control is achieved in most applications.

**Schlicht- und mittlere Zerspanung**  
Finishing and medium machining  
Finitura e medie asportazioni

**einseitig**  
single sided  
singolo lato

**- PMC**

Geometria universale per la lavorazione di acciaio, acciaio da fusione, acciai legati ed acciai inossidabili. Applicabile per la finitura e la semi-finitura. Grazie all'ampio canale rompitruciolo, ottimo controllo truciolo nella maggior parte delle applicazioni.



H

## Bearbeitung Cermet

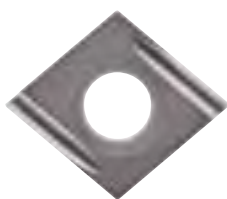
Cermet  
Cermet

## POSITIV

POSITIVE  
POSITIVO

- U

Hauptanwendungsbereich in der Stahlzer-spanung. Gute Spanlenkung bei geringem Vorschub und unterschiedlichen Schnitt-tiefen. Geringe Schnittkraft.



- U

Main application is steel machining. Good chip control at low feed rates and different cutting depths. Low cutting forces.

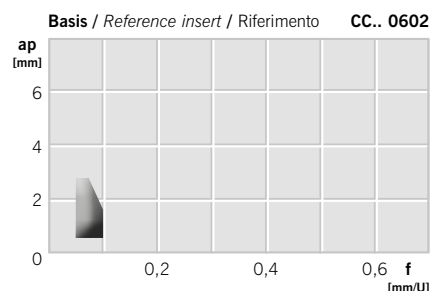
**Schlicht- und mittlere Zerspanung**  
Finishing and medium machining  
Finitura e medie asportazioni

einseitig  
single sided  
singolo lato



- U

Applicazione ideale nella Truciolatura di Acciaio. Ottimo controllo truciolo ed un taglio con ridotte forze in diverse profondità.



- Y

Für die mittlere Bearbeitung von Stahl, rost-freien Stählen und Gusswerkstoffen. Scharfe Schneidkante. Hohe Oberflächengüte.



- Y

For medium machining of steel, stainless steel and cast materials. Sharp cutting edge for a good surface finish.

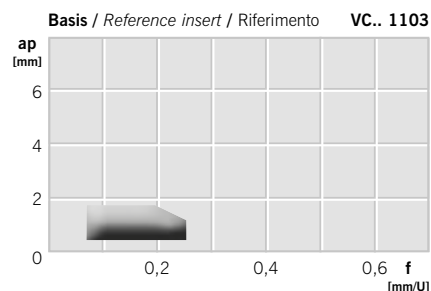
**Mittlere Zerspanung**  
Medium machining  
Semifinitura

einseitig  
single sided  
singolo lato



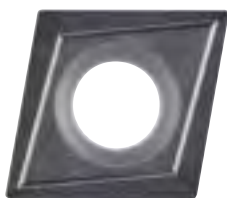
- Y

Per la semifinitura di Acciaio, Acciaio inossidabile ed Acciai da fusione. Con Taglio positivo e un alta qualità della superficie.



- Z

Positive Geometrie für die Schlichtzer-spanung und mittlere Bearbeitung von Stahl, Stahlguss und nichtrostenden Stählen. Geschliffene, umlaufende Spanleitstufe.



- Z

Positive geometry for finishing and medium machining of steel, cast steel and stainless steel. Ground circumferential chip breaker.

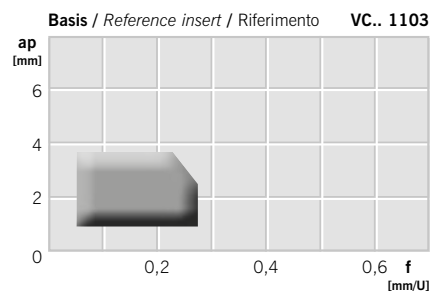
**Schlicht- und mittlere Zerspanung**  
Finishing and medium machining  
Finitura e medie asportazioni

einseitig  
single sided  
singolo lato



- Z

Per la semifinitura di Acciaio, Acciaio inossidabile ed Acciai da fusione. Tagliente positivo.



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | P | M | K | N | S | H |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|
| <b>EN</b><br><b>Universelle Spanformgeometrie in neutraler Ausführung für die Zerspanung von nahezu allen Materialien (je nach Beschichtung).</b><br><i>Universal geometry in neutral execution for machining almost all materials (depending on coating).</i><br>Geometria di taglio universale e generica per un vasto impiego su diversi materiali (in base a qualità di substrato e rivestimento).                                                                                                                                                                                                                                                                                                         | ● | ● | ● | ● | ● |   |
| <b>ER/EL</b><br><b>Spanformgeometrie in rechter oder linker Ausführung für die mittlere Zerspanung von Stahl und rostfreiem Stahl. Je nach Beschichtung für nahezu alle gängigen Materialien geeignet.</b><br><i>Geometry in right and left hand execution for medium machining of steel and stainless steel. Depending on coating it is suitable for almost all materials.</i><br>Spoglia superiore di rompitruciolo specifica per un utilizzo destro/sinistro per la semifinitura di Acciai e Acciai Inossidabili. Idonea per molteplici tipologie di materiali.                                                                                                                                             | ● | ● | ● | ● | ● |   |
| <b>FN</b><br><b>Umfangsgeschliffene Geometrie mit scharfer Schneidkante. Hauptanwendung bei NE-Metallen. In beschichteter Ausführung auch für die Zerspanung von rostfreien Stählen geeignet.</b><br><i>Periphery ground geometry with sharp edge. Main application in non-ferrous materials. Coated version also suitable for stainless steel.</i><br>Geometria di taglio rettificata con tagliente affilato. Specifica per materiali non ferrosi. Idonea alla lavorazione di Acciai ma in versione rivestita.                                                                                                                                                                                                | ○ | ● |   | ● |   |   |
| <b>TN</b><br><b>Geometrie mit gefaster Schneidkante für die grobe Zerspanung. Durch die Fase hoher Schutz der Schneidkante vor Verschleiß und Ausbrüchen. Je nach Beschichtung für nahezu alle gängigen Materialien geeignet.</b><br><i>Geometry with chamfered cutting edge for heavy machining. The chamfer protects the edge from wear and breakouts. Depending on coating suitable for almost all common materials.</i><br>Geometria robusta con bisello di rinforzo sul tagliente per sgrossatura pesante. Il rinforzo del tagliente garantisce massima robustezza in caso di taglio interrotto o di asportazioni gravose. Idonea per qualsiasi materiale in base all'abbinamento substrato/rivestimento. | ● | ● | ● | ● | ● |   |

| ISO                                                                                                                                                                                                                                          | Hartmetall beschichtet<br>Carbide coated<br>Metallo duro rivestito | Schneidstoff<br>Cutting material<br>Materiale da taglio                                                                                                                                                                                   | Anwendung<br>Application<br>Parametri |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>P</b><br><b>Stahl, Stahlguss, langspanender Temperguss</b><br><i>Steel, cast steel, malleable iron</i><br>Acciaio, acciaio da fusione, ghisa malleabile da truciolo lungo                                                                 |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |
| <b>M</b><br><b>Rostfreier Stahl, Stahlguss, Manganstahl, Automatenstahl</b><br><i>Stainless steel, cast steel, manganese steel, free cutting steel</i><br>Acciaio Inossidabile, Acciaio da Fusione, Acciaio al Manganese, Acciaio Automatico |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |
| <b>K</b><br><b>Grauguss, Kokillenhartguss, kurzspanender Temperguss</b><br><i>Grey cast iron, chilled hard cast iron, short chipping malleable iron</i><br>Ghisa grigia, ghisa sferoidale, ghisa malleabile a truciolo corto                 |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |
| <b>N</b><br><b>Aluminium und Al-Legierungen, nicht-metallische Werkstoffe</b><br><i>Aluminum and Al-alloys, non-ferrous materials</i><br>Alluminio e sue leghe, materiali non ferrosi o non metallici                                        |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |
| <b>S</b><br><b>Warmfeste Legierungen, Titanlegierungen</b><br><i>High temperature resistant alloys, titanium alloys</i><br>Leghe refrattarie, leghe esotiche, leghe di titanio                                                               |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |
| <b>H</b><br><b>Gehärteter Stahl, Hartguss</b><br><i>Hardened steel, hard cast iron</i><br>Acciaio temprato, ghisa temprata                                                                                                                   |                                                                    | <b>Zähigkeit</b><br>Toughness / Tenacità<br><b>Verschleißbeständigkeit / Wear resistance</b><br>Resistenza all'usura<br><b>Vorschub</b><br>Feed rate / Avanzamento<br><b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |                                       |

Hauptanwendungsbereich / Main application area / Applicazione principale

 Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

Nebenanwendungsbereich / Secondary application area / Applicazione dsecondaria

 Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata



## Beschichtet / Coated / Rivestito

### AK2110

#### CVD-Mehrlagenbeschichtung

Sorte für die Schrumpferspannung von Grauguss und Kugelgraphitguss. Die AK2110 besitzt eine exzellente Verschleißfestigkeit und eine geringe Neigung zur Aufbauschneidbildung. Für den universellen Einsatz bei der GG- und GGG-Bearbeitung.

#### CVD-multilayer coating

Grade for roughing of cast iron and nodular cast iron. AK2110 has excellent wear resistance and low tendency for build up edge. For the universal use on grey cast iron and ductile iron.

#### Rivestimento CVD-multistrato

Qualità per la lavorazione di sgrossatura di Ghisa grigia e Ghisa sferoidale. Grado con una ottima resistenza all'usura per una massima stabilità di taglio.

### AM2030

#### CVD-Mehrlagenbeschichtung

Für rostfreie Stähle und hochwarmfeste Legierungen, legierte und unlegierte Stähle, nichtrostende Stähle sowie Titanlegierungen geeignet. Sie weist eine extrem hohe Zähigkeit und eine sehr gute Verschleißfestigkeit auf. Die AM2030 hat ähnliche Eigenschaften wie die Sorte AM2035, durch die spezielle Oberflächenbehandlung (ARNO®-PowerTec) wird das Gleitverhalten des Spans jedoch verbessert und die Verklebneigung des Werkstoffs mit dem Schneidstoff deutlich reduziert.

#### CVD-multilayer coating

For stainless steel and high-temperature resistant alloys, alloyed and non-alloyed steel as well as titanium alloys. This grade gives high toughness as well as wear resistance. AM2030 is very similar to grade AM2035, however because of the special surface treatment (ARNO®-PowerTec) the swarf evacuation improves and the build up edge between the insert and the material is strongly reduced.

#### Rivestimento CVD-multistrato

Qualità per acciaio inossidabile, leghe refrattarie ed esotiche, acciai legati e non legati, leghe di titanio dove serve la massima resistenza all'usura. Questa qualità offre una ideale combinazione di tenacità e resistenza all'usura. AM2030 è molto simile alla qualità AM2035 ma grazie allo speciale rivestimento (ARNO®-PowerTec) lo scorrimento truciolo migliora e riduce notevolmente la formazione del tagliente di riporto e la deformazione da temperatura.

### AM2035

#### CVD-Mehrlagenbeschichtung

Für schwer zerspanbare, austenitische rostfreie Stähle und hochwarmfeste Legierungen ist diese Sorte die erste Wahl. Die AM2035 ist auch für legierte und unlegierte Stähle, nichtrostende Stähle sowie Titanlegierungen geeignet. Sie weist eine extrem hohe Zähigkeit und eine sehr gute Verschleißfestigkeit auf.

#### CVD-multilayer coating

First choice when machining difficult to cut austenitic stainless steel and high temperature alloys. AM2035 is also suitable for alloyed and non-alloyed stainless steel as well as titanium alloys. This grade offers extreme toughness and excellent wear resistance.

#### Rivestimento CVD-multistrato

Qualità suggerita per la lavorazione di difficili acciai inossidabili austenitici e leghe refrattarie. AM2035 è inoltre idonea a lavorare acciai altamente legati così come quelli debolmente legati o leghe di titanio. Questa qualità offre una maggiore tenacità ma una minore resistenza all'usura della qualità AM2030.

### AM2110

#### CVD-Mehrlagenbeschichtung

Für die Schlichtbearbeitung von rostfreiem Stahl. Durch die sehr harte und mikrofeine Beschichtung ergibt sich eine hohe Standzeit und verbesserte Verschleißfestigkeit.

#### CVD-multilayer coating

For finishing of stainless steel. The very hard and micro fine coating give a very high tool life and improved wear resistance.

#### Rivestimento CVD-multistrato

Qualità per la finitura di Acciaio inossidabile e Acciaio legato. Il rivestimento multistrato di elevata durezza con un substrato di metallo duro micrograna garantiscono la resistenza di un tagliente affilato e duro ma allo stesso tempo molto tenace.

### AM2130

#### CVD-Mehrlagenbeschichtung

Hauptsorte für die mittlere und schwere Bearbeitung von rostfreiem Stahl. Durch die sehr harte und mikrofeine Beschichtung ergibt sich eine hohe Standzeit und verbesserte Verschleißfestigkeit. Auch bei unterbrochenen Schnitten geeignet.

#### CVD-multilayer coating

Main grade for medium to heavy machining of stainless steel. The very hard and micro fine coating give a very high tool life and improved wear resistance. Also suitable for interrupted cut.

#### Rivestimento CVD-multistrato

Qualità per la asportazione media e pesante di Acciaio Inossidabile. Grazie al rivestimento multistrato molto duro ed il substrato in metallo duro micrograna, garantisce una elevata resistenza all'usura assieme ad una buona tenacità. Idonea anche per i tagli interrotti.

### AM5015

#### PVD-Mehrlagenbeschichtung

Verschleißfeste Sorte mit guter Schneidkantensicherheit zur Bearbeitung von Stählen, Stahlguss, rostfreien Stählen und hochwarmfesten Werkstoffen (auch Superlegierungen und Hochtemperaturlegierungen).

#### PVD-multilayer coating

Wear resistant grade for machining steel, cast steel, stainless steel and high temperature alloys (super alloys).

#### Rivestimento PVD-multistrato

Qualità resistente all'usura con un buon filo tagliente per la lavorazione di acciaio, acciaio da fusione, acciaio inossidabile e materiali refrattari come superleghe e leghe ad alta temperatura.

## AM5020

### PVD-Mehrlagenbeschichtung

Für die Schlichtbearbeitung von rostfreien Stählen und warmfesten Stählen. Die Sorte AM5020 ist optimal eingesetzt beim Feindre- hen von schwierigen Werkstoffen mit mittlere- ren Schnittgeschwindigkeiten. Sie weist eine hohe Zähigkeit und eine gute Verschleißfestig- keit auf.

### PVD-multilayer coating

*This grade is ideal for finishing of stainless steel and high temperature steel. Apply grade AM5020 when finish turning difficult to machine materials at medium cutting speeds. The grade has high toughness combined with good wear resistance.*

### Rivestimento PVD-multistrato

Qualità ideale per la finitura di acciaio inossidabile e leghe refrattarie ed esotiche. L'applicazione della qualità AM5020 è suggerita in finitura di materiali di difficile lavorabilità a medie velocità di taglio. Questa qualità combina una simile tenacità alla qualità AM2030 ma con un rivesti- mento PVD molto più duro e quindi più resistente all'usura.

## AM5025

### PVD-Mehrlagenbeschichtung

Optimale Sorte für die Bearbeitung von rost- freien Stählen, warmfesten Stählen und Titan(legierungen) bei der Schlicht- bis mittlere- ren Bearbeitung. Die AM5025 weist eine sehr gute Zähigkeit und eine gute Verschleißfestig- keit auf. Sie ist auch für wechselnde Schnitt- tiefen und unterbrochene Schnitte geeignet.

### PVD-multilayer coating

*Ideal grade for finish to medium machining of stainless steel, temperature resistant steel and titanium (alloys). AM5025 has very good tough- ness and good wear resistance and can be used both at varied cutting depth and interrupted cutting.*

### Rivestimento PVD-multistrato

Qualità ideale per la finitura e semi-finitura di acciaio inossidabile, leghe refrattarie ed esotiche e leghe di titanio. AM5025 ha una ottima tena- cità combinata ad una ottima resistenza all'usura e può essere utilizzato con profondità di passata variabili e con taglio interrotto.

## AM5110

### PVD-Mehrlagenbeschichtung

Sorte zur Feinbearbeitung von VA-Stählen, Nickel- und Titanlegierungen und exotischen Werkstoffen. Bearbeitung abrasiver und naturharter Werkstoffe wie CoCrMo oder Hartguss.

### PVD-multilayer coating

*Grade for finish machining of stainless steel, nickel and titanium alloys as well as exotic materials. Also for abrasive and hard materials such as CoCrMo and chilled cast iron.*

### Rivestimento PVD-multistrato

Qualità sviluppata per la lavorazione di preci- sione di acciai inossidabili, leghe di Nichel, leghe di Titanio, e materiali esotici. Ottima per la lavorazione di materiali abrasivi e duri come leghe Co, Cr, Mo o ghise dure.

## AM5120

### PVD-Mehrlagenbeschichtung

Sorte für die Schruppbearbeitung von rost- freien Stählen, auch besonders geeignet für exotische Materialien, hitzebeständige Legie- rungen und Titanlegierungen.

### PVD-multilayer coating

*The grade for roughing stainless steel and machining of exotic and heat resistant materials as well as titanium alloys.*

### Rivestimento PVD-multistrato

Grado per la sgrossatura di acciai inossidabili, particolarmente adatti per materiali esotici, leghe resistenti al calore e leghe di titanio.

## AM5120+

### PVD-Mehrlagenbeschichtung

Geeignet für die mittlere und gröbere Bearbei- tung von zähen, exotischen Werkstoffen wie E-Cu, Molybdän, Nickel, Reineisen. Drehen in Inconel und VA-Stählen bei hoher Schneid- kantenstabilität.

### PVD-multilayer coating

*Suitable for medium and roughing of tough exotic materials such as E-cu, molybdenum, nickel, pure iron, Inconel and stainless steel.*

### Rivestimento PVD-multistrato

Qualità adatta alla sgrossatura media di mate- riali esotici come E-Co, leghe con Molibdeno, Nichel, ferro puro. Idoneo anche per la tornitura di Inconel e acciai inossidabili.

## AM5130

### PVD-Mehrlagenbeschichtung

Universelle Sorte für die mittlere Bearbeitung von rostfreien Stählen und legierten Stählen sowie exotischen Materialien.

### PVD-multilayer coating

*Universal grade for medium machining of stain- less steels and alloyed steels as well as exotic materials.*

### Rivestimento PVD-multistrato

Qualità universale per sgrossatura media di acciai inossidabili, acciai legati ed materiali esotici.

## AM5220

### PVD-Mehrlagenbeschichtung

Verschleißfeste Sorte zur Bearbeitung von Stählen, Stahlguss, rostfreien Stählen und hochwarmfesten Werkstoff-Superlegierungen.

### PVD-multilayer coating

*High wear resistant grade for machining steel, cast steel, stainless steel and high temperature super alloys.*

### Rivestimento PVD-multistrato

Multistrato su base ISO-M. Grado resistnte all'usura per la lavorazione di acciaio, fusioni, acciaio inossidabile, Superleghe.

## AP2025

### CVD-Mehrlagenbeschichtung

Diese vielseitige Sorte zeichnet sich durch ihr breites Einsatzspektrum bei allen Stahlwerkstoffen und Gusswerkstoffen aus. Sie ist ebenfalls für rostfreien Stahl geeignet. Durch ihre hohe Zähigkeit und hohe Verschleißfestigkeit ist sie die optimale Universalschneidplatte für Ihre Fertigung.

### CVD-multilayer coating

*This multi purpose grade excels due to its versatile application area in steel and cast materials. It is also very suitable for machining stainless steel, heat resistant alloys and titanium alloys. Because of its high toughness and wear resistance this is the optimum general purpose grade for your production.*

### Rivestimento CVD-multistrato

Qualità universale per svariati campi applicativi nella lavorazione di acciaio e materiali da fusione. E' inoltre idoneo ad alcune lavorazioni di acciaio inossidabile, leghe refrattarie e leghe di titanio. Grazie alla buona tenacità combinata ad una ottima resistenza all'usura risulta essere la qualità ottimale per le generiche lavorazioni della vostra produzione.

## AP2035

### CVD-Mehrlagenbeschichtung

Bei ungünstigen Schnittbedingungen, wie unterbrochenem Schnitt, labilen Verhältnissen oder nicht optimalen Materialoberflächen bei Stahlwerkstoffen, ist diese Sorte die erste Wahl. Ebenso kann die AP2035 bei rostfreien Stählen eingesetzt werden. Sie zeichnet sich durch eine extrem hohe Zähigkeit und eine gute Verschleißfestigkeit aus.

### CVD-multilayer coating

*When the cutting conditions are poor, interrupted cutting, unstable conditions or poor material surface quality, the grade AP2035 is your first choice. It can also be used in stainless steel. This grade has extreme high toughness and good wear resistance.*

### Rivestimento CVD-multistrato

Qualità suggerita in lavorazioni instabili, gravose, con taglio interrotto o su superfici grezze. Può essere utilizzata anche per la lavorazione di acciaio inossidabile dove è richiesta tenacità. Questa qualità ha un'elevata tenacità con la giusta combinazione di resistenza all'usura.

## AP2110

### CVD-Mehrlagenbeschichtung

Premium-Sorte für die „High Speed“-Bearbeitung von Stahl. Auch geeignet für die Schruppbearbeitung von Grauguss und Kugelgraphitguss. Hier garantiert sie höchste Sicherheit, auch unter extremen Bedingungen.

### CVD-multilayer coating

*Premium grade for "high speed" machining of steel. Also suitable for roughing of cast iron and nodular cast iron.*

### Rivestimento CVD-multistrato

Qualità per la lavorazione ad alta velocità di taglio di Acciaio. Adatto anche per la lavorazione di Ghisa Grigia e Ghisa Sferoidale. Qualità che garantisce la massima affidabilità in condizioni estreme di lavoro.

## AP2120

### CVD-Mehrlagenbeschichtung

Universelle Mehrbereichssorte für die Schlicht- und mittlere Zerspanung von Stahlwerkstoffen. Auch für leicht bis stark unterbrochenen Schnitt geeignet. Hervorragende Beständigkeit gegen plastische Verformung und Ausbrüche. Das legierte Hartmetallsubstrat mit einer neuartigen, extrem fein strukturierten Aluminiumoxidschicht sorgt für eine hohe thermische Beständigkeit und eine exzellente Schichthaftung.

### CVD-multilayer coating

*Grade for finishing and medium machining of steel in both uninterrupted and heavy interrupted cutting conditions. Excellent resistance to plastic deformation as well as fracturing. The alloyed carbide substrate with a fine grained aluminium oxide coating ensures high thermal resistance and excellent coating structure.*

### Rivestimento CVD-multistrato

Qualità universale per le lavorazioni generiche di Acciaio di finitura e semi-finitura. Adatta anche per lavorazioni a taglio interrotto. Eccellente resistenza alla deformazione plastica e alla craterizzazione. Ottima resistenza all'usura grazie al substrato micrograna e a rivestimenti multistrato di Ossido di Alluminio che garantiscono ottima dissipazione del calore.

## AP2310

### CVD-Mehrlagenbeschichtung

Nachfolgesorte für AP2110. Hauptsorte für die Stahlzerspanung im Bereich Schlichten. Neuer Beschichtungsaufbau ermöglicht höhere Verschleißfestigkeit und somit höhere Standzeiten.

### CVD-multilayer coating

*Replacement grade for AP2110. Grade for finishing steel. New coating technology offer less wear and longer tool life.*

### Rivestimento CVD-multistrato

Qualità per la finitura di acciaio. La nuova tecnologia di rivestimento garantisce una maggiore resistenza all'usura ed una incrementata vita inserto.

## AP2320

### CVD-Mehrlagenbeschichtung

Nachfolgesorte für AP2120. Hauptsorte für die Stahlzerspanung – gegen plastische Deformation mit hoher Bruchfestigkeit für den Bereich mittlere Zerspanung.

### CVD-multilayer coating

*Replacement grade for AP2120. Grade for cutting steel. Coating against plastic deformation with high tensile strength for medium machining.*

### Rivestimento CVD-multistrato

Qualità specifica per la semifinitura di acciaio. Tenace, resistente alle rotture e alla deformazione plastica causata dalle elevate temperature.

## AP2335

**CVD-Mehrlagenbeschichtung**  
**Nachfolgesorte für AP2135. Hauptsorte für die Stahlzerspanung – extrem zähe Sorte für unterbrochene Schnitte und ungünstige Bedingungen im Bereich Schruppen.**

*CVD-multilayer coating*  
*Replacement grade for AP2135. Grade for cutting steel. Extremely tough grade for interrupted cuts and unfavorable machining conditions in roughing applications.*

Rivestimento CVD-multistrato  
Qualità per la sgrossatura di Acciaio. Estremamente resistente al taglio interrotto ed in condizioni instabili di lavoro.

## AP5210

**PVD-Mehrlagenbeschichtung**  
**Universelle Sorte zur Feinbearbeitung von Stahl und rostfreien Stählen. Auch sehr gut geeignet für die mittlere und Feinbearbeitung von exotischen Werkstoffen, Titan und Titanlegierungen sowie Nickellegierungen. Hohe Beständigkeit bei der Bearbeitung abrasiver und naturharter Werkstoffe wie CoCrMo und Hartguss.**

*PVD-multilayer coating*  
*Medium to light machining of exotic materials, titanium, titanium alloys, nickel alloys, machining of abrasive and hard materials such as CoCrMo or chilled cast iron. Finishing of steel and stainless steel.*

Rivestimento PVD-multistrato  
Qualità per media asportazione e finitura di materiali esotici, leghe di Titanio, leghe di Nichel. Ottima per la lavorazione di materiali abrasivi o duricome leghe Co, Cr, Mo o ghise dure. Ottima per la superfinitura di acciai e acciai inossidabili.

## AM350

**CVD-Mehrlagenbeschichtung**  
**Sorte mit guter Verschleißfestigkeit und sehr guter Zähigkeit zum Drehen von Stahl, rostfreiem Stahl sowie Stahlguss bei mittleren Spanquerschnitten und mittleren bis hohen Schnittgeschwindigkeiten. Einsatz auch unter ungünstigen Bearbeitungsbedingungen. Besonders geeignet für alle austenitischen, rostfreien Stähle.**

*CVD-multilayer coating*  
*Grade with a good combination of wear resistance and toughness for turning steel, stainless steel as well as cast steel at medium chip cross sections and medium to high cutting speeds. Can also be used under unfavorable machining conditions. Special grade for stainless steel (austenitic).*

Rivestimento CVD-multistrato  
Qualità con una buona combinazione di resistenza all'usura e tenacità per la tornitura di acciaio, acciaio inossidabile e acciaio da fusione con medie sezioni truciolo e medio - alte velocità di taglio. Può anche venire utilizzato in condizioni di lavoro sfavorevoli. Grado speciale per acciai inossidabili austenitici.

## AT10

**PVD-Mehrlagenbeschichtung**  
**Zur Bearbeitung von Aluminium und Aluminiumlegierungen, Kupfer, Bronze, NE-Metallen und hochschmelzenden Werkstoffen bei mittleren Spanquerschnitten und unter ungünstigen Bearbeitungsbedingungen. Höhere Schnittwerte als bei Sorte PVD1 möglich.**

*PVD-multilayer coating*  
*Grade for medium machining of aluminium, aluminium alloys, copper, brass, non-ferrous materials and refractory metals under favorable cutting conditions. Higher cutting speeds can be used as grade PVD1.*

Rivestimento PVD-multistrato  
Qualità per la lavorazione di alluminio, leghe di alluminio, rame, ottone, materiali non ferrosi e leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) con medi parametri di taglio ed in buone condizioni di lavoro. Si può utilizzare a velocità di taglio maggiori rispetto alla qualità PVD1.

| ISO                                                                                                                                                                                                                                                 |    | Hartmetall unbeschichtet<br>Carbide uncoated<br>Metallo duro non rivestito | Schneidstoff<br>Cutting material<br>Materiale da taglio | Anwendung<br>Application<br>Parametri                                      |                                            |                                                                     |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------|--|
| <b>P</b><br><br>Stahl, Stahlguss,<br>langspanender Temperguss<br><br>Steel, cast steel,<br>malleable iron<br><br>Acciaio, acciaio da fusione,<br>ghisa malleabile da truciolo lungo                                                                 | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
| <b>M</b><br><br>Rostfreier Stahl, Stahlguss,<br>Manganstahl, Automatenstahl<br><br>Stainless steel, cast steel,<br>manganese steel, free cutting steel<br><br>Acciaio Inossidabile, Acciaio da Fusione,<br>Acciaio al Manganese, Acciaio Automatico | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
| <b>K</b><br><br>Grauguss, Kokillenhartguss,<br>kurzspanender Temperguss<br><br>Grey cast iron, chilled hard cast iron,<br>short chipping malleable iron<br><br>Ghisa grigia, ghisa sferoidale,<br>ghisa malleabile a truciolo corto                 | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
| <b>N</b><br><br>Aluminium und Al-Legierungen,<br>nichtmetallische Werkstoffe<br><br>Aluminum and Al-alloys,<br>non-ferrous materials<br><br>Alluminio e sue leghe,<br>materiali non ferrosi o non metallici                                         | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
| <b>S</b><br><br>Warmfeste Legierungen,<br>Titanlegierungen<br><br>High temperature resistant alloys,<br>titanium alloys<br><br>Leghe refrattarie, leghe esotiche,<br>leghe di titanio                                                               | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
| <b>H</b><br><br>Gehärteter Stahl, Hartguss<br><br>Hardened steel, hard cast iron<br><br>Acciaio temprato, ghisa temprata                                                                                                                            | 10 |                                                                            | <b>Zähigkeit</b><br>Toughness / Tenacità                | <b>Verschleißbeständigkeit</b> / Wear<br>resistance / Resistenza all'usura | <b>Vorschub</b><br>Feed rate / Avanzamento | <b>Schnittgeschwindigkeit</b><br>Cutting speed / Velocità di taglio |  |
|                                                                                                                                                                                                                                                     | 20 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 30 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 40 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |
|                                                                                                                                                                                                                                                     | 50 |                                                                            |                                                         |                                                                            |                                            |                                                                     |  |

Hauptanwendungsbereich / Main application area / Applicazione principale

AK1020 Sorte / Grade / Qualità  
Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

Nebenanwendungsbereich / Secondary application area / Applicazione dsecondaria

AK1020 Sorte / Grade / Qualità  
Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

## Unbeschichtet / Uncoated / Non rivestito

### AK1010

**Hartmetallsorte für die Bearbeitung von sämtlichen Gusswerkstoffen, Aluminium und Aluminiumlegierungen, Kupfer- und Kupferlegierungen sowie Bronze und Messing bei mittleren Spanquerschnitten und unter günstigen Bearbeitungsbedingungen.**

*Carbide grade for machining of all cast materials, aluminum and aluminum alloys, copper and copper alloys, bronze and brass as well as refractory metals (e.g. niob, tantalum, titanium, molybdenum, tungsten) at medium chip cross sections and at favorable cutting conditions.*

Grado di Metallo duro per la lavorazione dei seguenti materiali da fusione: alluminio, leghe di alluminio, rame, leghe di rame, bronzo, ottone così come limitatamente leghe refrattarie (a base di tantalio, niobio, titanio, molibdeno, tungsteno) a medie sezioni truciolo ed in condizioni favorevoli di lavorazione.

### AK1020

**Optimale Sorte bei der Schlichtbearbeitung von Nicht-Eisen-Metallen wie Aluminium (und Aluminiumlegierungen), Kupfer (und Legierungen), Bronze, Messing und nicht-metallischen Werkstoffen bei glattem Schnitt und/oder leicht wechselnden Schnitttiefen.**

*Ideal grade for finishing of non-ferrous materials such as aluminum (and aluminum alloys), copper (and alloys), bronze, brass and non metallic materials with a smooth cut and/or light varying cutting depths.*

Grado di Metallo duro ideale per la finitura di materiali non ferrosi quali alluminio e le sue leghe, rame e le sue leghe, bronzo, ottone, materiali non metallici con taglio dolce e con minime variazioni di profondità di passata.

### AK10

**HW-K10, HW-N15, HW-S10  
Hartmetallsorte zur Bearbeitung sämtlicher Gusswerkstoffe, Titan und Titanlegierungen bei mittleren Spanquerschnitten unter günstigen Bearbeitungsbedingungen.**

*Carbide grade for machining all cast iron materials, Ti and Ti-alloys at medium chip cross sections under favorable machining conditions.*

Grado di Metallo duro per la lavorazione di tutte le ghise, alluminio, titanio e leghe di titanio a medie sezioni truciolo in condizioni favorevoli di lavorazione.

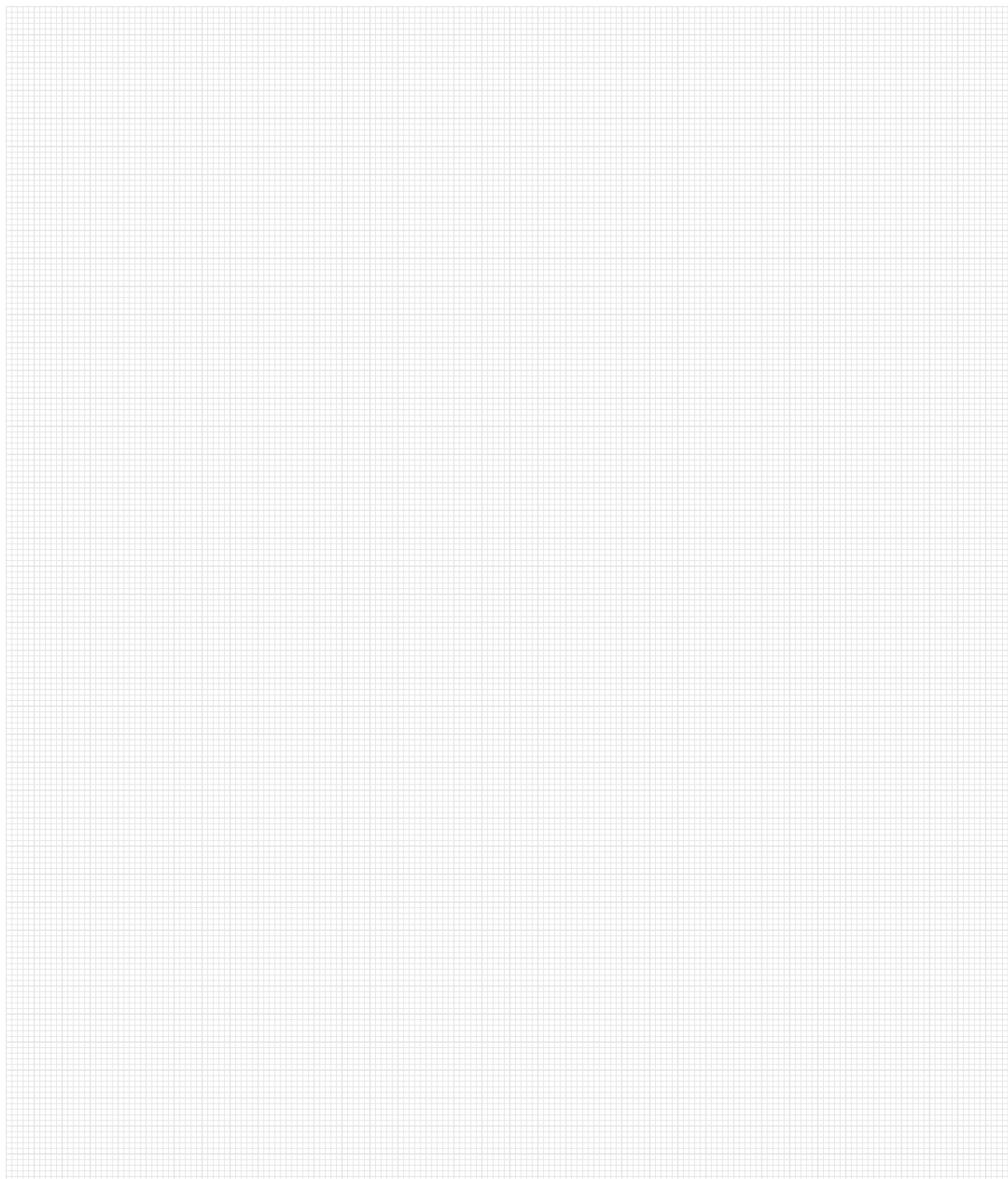
### AK20

**HW-K20, HW-N25, HW-S20  
Hartmetallsorte mit höherer Zähigkeit als AK10 zur Bearbeitung sämtlicher Gusswerkstoffe bei mittleren Spanquerschnitten unter ungünstigen Bearbeitungsbedingungen.**

*Carbide grade with higher toughness as AK10 for machining all cast iron materials at medium chip cross sections under unfavorable machining conditions.*

Grado di Metallo duro più tenace di AK10 per la lavorazione di ghisa e leghe di alluminio sezione truciolo media in condizioni di lavoro sfavorevoli.





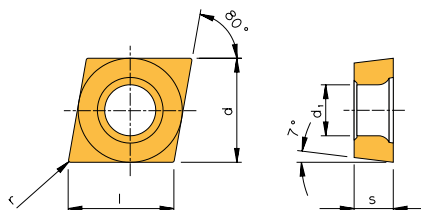
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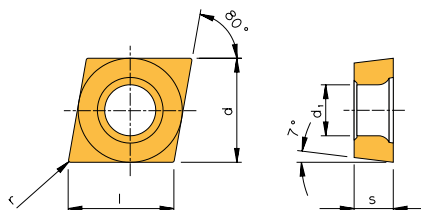
Bezeichnung  
Designation  
Articolo

|                   | l    | d     | s    | d <sub>1</sub> | r    | PG |
|-------------------|------|-------|------|----------------|------|----|
| CCGT 0602005FN-PS | 6,45 | 6,350 | 2,38 | 2,8            | 0,05 | 3  |
| CCGT 060201EN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,1  | 3  |
| CCGT 060201FN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,1  | 3  |
| CCGT 060202EN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| CCGT 060202FN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| CCGT 060204EN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| CCGT 060204FN-PS  | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| CCGT 09T3005FN-PS | 9,67 | 9,525 | 3,97 | 4,4            | 0,05 | 3  |
| CCGT 09T301EN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,1  | 3  |
| CCGT 09T301FN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,1  | 3  |
| CCGT 09T302EN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| CCGT 09T302FN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| CCGT 09T304EN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |
| CCGT 09T304FN-PS  | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |
| CCGT 060204FN-ALU | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 22 |
| CCGT 09T304FN-ALU | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 22 |
| CCGT 060204FN-ACB | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 22 |
| CCGT 09T304EN-ACB | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 22 |
| CCGT 09T304FN-ACB | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 22 |
| CCGT 09T308EN-ACB | 9,67 | 9,525 | 3,97 | 4,4            | 0,8  | 22 |
| CCGT 09T308FN-ACB | 9,67 | 9,525 | 3,97 | 4,4            | 0,8  | 22 |
| CCGT 060201EN-ASF | 6,45 | 6,350 | 2,38 | 2,8            | 0,1  | 22 |
| CCGT 060202EN-ASF | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 22 |
| CCGT 060202FN-ASF | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 22 |
| CCGT 060204EN-ASF | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 22 |
| CCGT 060204FN-ASF | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 22 |
| CCGT 09T302EN-ASF | 9,67 | 9,525 | 3,97 | 4,4            | 0,2  | 22 |
| CCGT 09T304EN-ASF | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 22 |
| CCGT 09T304FN-ASF | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 22 |
| CCGT 09T308FN-ASF | 9,67 | 9,525 | 3,97 | 4,4            | 0,8  | 22 |
| CCGX 060200FL     | 6,45 | 6,350 | 2,38 | 2,8            | 0,0  | 3  |
| CCGX 060200FR     | 6,45 | 6,350 | 2,38 | 2,8            | 0,0  | 3  |
| CCGX 060201FL     | 6,45 | 6,350 | 2,38 | 2,8            | 0,1  | 3  |
| CCGX 060201FR     | 6,45 | 6,350 | 2,38 | 2,8            | 0,1  | 3  |
| CCGX 060202FL     | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| CCGX 060202FR     | 6,45 | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| CCGX 060204FL     | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| CCGX 060204FR     | 6,45 | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| CCGX 09T300FL     | 9,67 | 9,525 | 3,97 | 4,4            | 0,0  | 3  |
| CCGX 09T300FR     | 9,67 | 9,525 | 3,97 | 4,4            | 0,0  | 3  |
| CCGX 09T301FL     | 9,67 | 9,525 | 3,97 | 4,4            | 0,1  | 3  |
| CCGX 09T301FR     | 9,67 | 9,525 | 3,97 | 4,4            | 0,1  | 3  |
| CCGX 09T302FL     | 9,67 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| CCGX 09T302FR     | 9,67 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| CCGX 09T304FL     | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |
| CCGX 09T304FR     | 9,67 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |



## Sorten / Grades / Qualità

| beschichtet/coated/rivestito |        |        |         |        |   | unbeschichtet/uncoated/non rivestito |        |      | Bezeichnung<br>Designation<br>Articolo                                 |
|------------------------------|--------|--------|---------|--------|---|--------------------------------------|--------|------|------------------------------------------------------------------------|
| AM5015                       | AM5025 | AM5110 | AM5120+ | AP5210 |   | AK1010                               | AK1020 | AK20 |                                                                        |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 0602005FN-PS                                                      |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060201EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060201FN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060202EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060202FN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060204EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 060204FN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T3005FN-PS                                                      |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T301EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T301FN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T302EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T302FN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T304EN-PS                                                       |
|                              | ●      |        |         |        |   | ●                                    | ●      |      | CCGT 09T304FN-PS                                                       |
|                              |        |        |         | ●      |   |                                      |        |      | CCGT 060204FN-ALU                                                      |
|                              |        |        |         | ●      |   |                                      |        |      | CCGT 09T304FN-ALU                                                      |
|                              |        |        |         | ●      |   |                                      |        |      | CCGT 060204FN-ACB                                                      |
|                              |        |        | ●       | ●      |   |                                      |        |      | CCGT 09T304EN-ACB                                                      |
|                              |        |        | ●       | ●      |   |                                      |        |      | CCGT 09T304FN-ACB                                                      |
|                              |        |        | ●       | ●      |   |                                      |        |      | CCGT 09T308EN-ACB                                                      |
|                              |        |        |         | ●      |   |                                      |        |      | CCGT 09T308FN-ACB                                                      |
| ●                            |        |        |         |        |   |                                      |        |      | CCGT 060201EN-ASF                                                      |
| ●                            | ●      |        |         |        |   |                                      |        |      | CCGT 060202EN-ASF                                                      |
|                              |        | ●      |         |        |   |                                      |        |      | CCGT 060202FN-ASF                                                      |
| ●                            | ●      |        |         |        |   |                                      |        |      | CCGT 060204EN-ASF                                                      |
|                              |        | ●      |         |        |   |                                      |        |      | CCGT 060204FN-ASF                                                      |
| ●                            | ●      |        |         |        |   |                                      |        |      | CCGT 09T302EN-ASF                                                      |
| ●                            | ●      |        |         |        |   |                                      |        |      | CCGT 09T304EN-ASF                                                      |
|                              |        | ●      |         |        |   |                                      |        |      | CCGT 09T304FN-ASF                                                      |
|                              |        | ●      |         |        |   |                                      |        |      | CCGT 09T308FN-ASF                                                      |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060200FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060200FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060201FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060201FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060202FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060202FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060204FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 060204FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T300FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T300FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T301FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T301FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T302FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T302FR                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T304FL                                                          |
|                              | ●      |        |         |        |   |                                      |        | ●    | CCGX 09T304FR                                                          |
| P                            | ●      | ○      |         | ●      |   |                                      |        |      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            | ●      |        | ●       | ○      |   |                                      |        |      | M ●                                                                    |
| K                            | ○      | ○      | ○       | ●      |   | ○                                    | ○      | ○    | K ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| N                            |        | ○      | ○       | ●      |   | ●                                    | ●      | ●    | N ●                                                                    |
| S                            | ●      | ●      | ●       | ●      | ● |                                      |        |      | S ●                                                                    |
| H                            | ○      | ○      |         |        |   |                                      |        |      | H ○                                                                    |



**CC..**



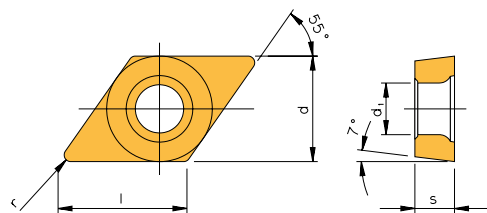
**Bezeichnung**  
Designation  
Articolo

|                          | <b>l</b> | <b>d</b> | <b>s</b> | <b>d<sub>1</sub></b> | <b>r</b> | <b>PG</b> |
|--------------------------|----------|----------|----------|----------------------|----------|-----------|
| <b>CCMT 060202EN-AM</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,2      | <b>3</b>  |
| <b>CCMT 060204EN-AM</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>3</b>  |
| <b>CCMT 060208EN-AM</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,8      | <b>3</b>  |
| <b>CCMT 09T302EN-AM</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,2      | <b>3</b>  |
| <b>CCMT 09T304EN-AM</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>3</b>  |
| <b>CCMT 09T308EN-AM</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,8      | <b>3</b>  |
| <b>CCMT 060202EN-PS2</b> | 6,45     | 6,350    | 2,38     | 2,8                  | 0,2      | <b>3</b>  |
| <b>CCMT 060204EN-PS2</b> | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>3</b>  |
| <b>CCMT 09T302EN-PS2</b> | 9,67     | 9,525    | 3,97     | 4,4                  | 0,2      | <b>3</b>  |
| <b>CCMT 09T304EN-PS2</b> | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>3</b>  |

| Sorten / Grades / Qualità    |        |        |        |        |        |        |        |        |        |        |                                                                        |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------------------------------------------------------------|
| beschichtet/coated/rivestito |        |        |        |        |        |        |        |        |        |        |                                                                        |
| AK2110                       | AM2110 | AM2130 | AM5020 | AM5110 | AM5120 | AP2110 | AP2120 | AP2310 | AP2320 | AP2335 | Bezeichnung<br>Designation<br>Articolo                                 |
|                              |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      | CCMT 060202EN-AM                                                       |
|                              |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      | CCMT 060204EN-AM                                                       |
|                              |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      | CCMT 060208EN-AM                                                       |
|                              |        | ●      |        | ●      | ●      |        |        | ●      | ●      | ●      | CCMT 09T302EN-AM                                                       |
|                              |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      | CCMT 09T304EN-AM                                                       |
|                              |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      | CCMT 09T308EN-AM                                                       |
|                              |        |        |        |        |        |        |        |        |        |        |                                                                        |
|                              |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        | CCMT 060202EN-PS2                                                      |
|                              |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        | CCMT 060204EN-PS2                                                      |
|                              |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        | CCMT 09T302EN-PS2                                                      |
|                              |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        | CCMT 09T304EN-PS2                                                      |
| P                            |        |        |        | ○      | ○      |        |        | ●      | ●      | ●      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            |        | ●      |        | ●      | ●      |        |        |        |        |        | M ●                                                                    |
| K                            |        |        |        | ○      | ○      |        |        |        |        |        | K ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| N                            |        |        |        | ○      | ○      |        |        |        |        |        | N ○                                                                    |
| S                            |        |        |        | ●      | ●      |        |        |        |        |        | S ●                                                                    |
| H                            |        |        |        | ○      | ○      |        |        |        |        |        | H ○                                                                    |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria



**DC..**

**Bezeichnung**  
Designation  
Articolo

|                    | <b>l</b> | <b>d</b> | <b>s</b> | <b>d<sub>1</sub></b> | <b>r</b> | <b>PG</b> |
|--------------------|----------|----------|----------|----------------------|----------|-----------|
| DCGT 0702005FN-PS  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,05     | 3         |
| DCGT 070201EN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,1      | 3         |
| DCGT 070201FN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,1      | 3         |
| DCGT 070202EN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 3         |
| DCGT 070202FN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 3         |
| DCGT 070204EN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 3         |
| DCGT 070204FN-PS   | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 3         |
| DCGT 11T3005FN-PS  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,05     | 3         |
| DCGT 11T301EN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,1      | 3         |
| DCGT 11T301FN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,1      | 3         |
| DCGT 11T302EN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,2      | 3         |
| DCGT 11T302FN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,2      | 3         |
| DCGT 11T304EN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 3         |
| DCGT 11T304FN-PS   | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 3         |
| DCGT 070204FN-ALU  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 22        |
| DCGT 11T304FN-ALU  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 22        |
| DCGT 070204FN-ACB  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 22        |
| DCGT 11T304EN-ACB  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 22        |
| DCGT 11T304FN-ACB  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 22        |
| DCGT 11T308EN-ACB  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,8      | 22        |
| DCGT 11T308FN-ACB  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,8      | 22        |
| DCGT 0702015EN-ASF | 7,75     | 6,350    | 2,38     | 2,8                  | 0,15     | 22        |
| DCGT 070201EN-ASF  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,1      | 22        |
| DCGT 070202EN-ASF  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 22        |
| DCGT 070202FN-ASF  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 22        |
| DCGT 070204EN-ASF  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 22        |
| DCGT 070204FN-ASF  | 7,75     | 6,350    | 2,38     | 2,8                  | 0,4      | 22        |
| DCGT 11T3015EN-ASF | 11,60    | 9,525    | 3,97     | 4,4                  | 0,15     | 22        |
| DCGT 11T301EN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,1      | 22        |
| DCGT 11T302EN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,2      | 22        |
| DCGT 11T3035EN-ASF | 11,60    | 9,525    | 3,97     | 4,4                  | 0,35     | 22        |
| DCGT 11T304EN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 22        |
| DCGT 11T304FN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 22        |
| DCGT 11T308EN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,8      | 22        |
| DCGT 11T308FN-ASF  | 11,60    | 9,525    | 3,97     | 4,4                  | 0,8      | 22        |
| DCGX 070200FL      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,0      | 3         |
| DCGX 070200FR      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,0      | 3         |
| DCGX 070201FL      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,1      | 3         |
| DCGX 070201FR      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,1      | 3         |
| DCGX 070202FL      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 3         |
| DCGX 070202FR      | 7,75     | 6,350    | 2,38     | 2,8                  | 0,2      | 3         |
| DCGX 11T300FL      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,0      | 3         |
| DCGX 11T300FR      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,0      | 3         |
| DCGX 11T301FL      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,1      | 3         |
| DCGX 11T301FR      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,1      | 3         |
| DCGX 11T302FL      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,2      | 3         |
| DCGX 11T302FR      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,2      | 3         |
| DCGX 11T304FL      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 3         |
| DCGX 11T304FR      | 11,60    | 9,525    | 3,97     | 4,4                  | 0,4      | 3         |



## Sorten / Grades / Qualità

beschichtet/coated/rivestito

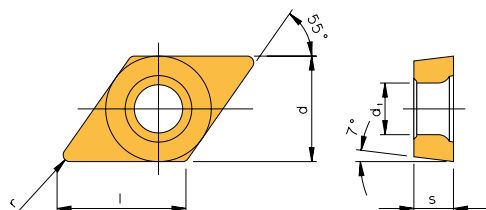
unbeschichtet/uncoated/non rivestito

Bezeichnung  
Designation  
Articolo

| AM5015 | AM5025 | AM5110 | AM5120+ | AP5210 | AK1010 | AK1020 | AK20 |                    |
|--------|--------|--------|---------|--------|--------|--------|------|--------------------|
|        | ●      |        |         |        | ●      | ●      |      | DCGT 0702005FN-PS  |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070201EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070201FN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070202EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070202FN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070204EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 070204FN-PS   |
|        | ●      |        |         | ●      | ●      | ●      |      | DCGT 11T3005FN-PS  |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T301EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T301FN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T302EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T302FN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T304EN-PS   |
|        | ●      |        |         |        | ●      | ●      |      | DCGT 11T304FN-PS   |
|        |        |        |         | ●      |        |        |      | DCGT 070204FN-ALU  |
|        |        |        |         | ●      |        |        |      | DCGT 11T304FN-ALU  |
|        |        |        | ●       | ●      |        |        |      | DCGT 070204FN-ACB  |
|        |        |        | ●       | ●      |        |        |      | DCGT 11T304EN-ACB  |
|        |        |        | ●       | ●      |        |        |      | DCGT 11T304FN-ACB  |
|        |        |        |         | ●      |        |        |      | DCGT 11T308EN-ACB  |
|        |        |        |         | ●      |        |        |      | DCGT 11T308FN-ACB  |
| ●      |        |        |         |        |        |        |      | DCGT 0702015EN-ASF |
| ●      |        |        |         |        |        |        |      | DCGT 070201EN-ASF  |
| ●      | ●      |        |         |        |        |        |      | DCGT 070202EN-ASF  |
| ●      | ●      | ●      |         |        |        |        |      | DCGT 070202FN-ASF  |
| ●      | ●      | ●      |         |        |        |        |      | DCGT 070204EN-ASF  |
| ●      |        | ●      |         |        |        |        |      | DCGT 070204FN-ASF  |
| ●      |        |        |         |        |        |        |      | DCGT 11T3015EN-ASF |
| ●      |        |        |         |        |        |        |      | DCGT 11T301EN-ASF  |
| ●      | ●      |        |         |        |        |        |      | DCGT 11T302EN-ASF  |
| ●      | ●      |        |         |        |        |        |      | DCGT 11T3035EN-ASF |
| ●      | ●      |        |         |        |        |        |      | DCGT 11T304EN-ASF  |
| ●      | ●      | ●      |         |        |        |        |      | DCGT 11T304FN-ASF  |
| ●      | ●      | ●      |         |        |        |        |      | DCGT 11T308EN-ASF  |
| ●      |        | ●      |         |        |        |        |      | DCGT 11T308FN-ASF  |
|        | ●      |        |         |        |        |        | ●    | DCGX 070200FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 070200FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 070201FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 070201FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 070202FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 070202FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T300FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T300FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T301FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T301FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T302FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T302FR      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T304FL      |
|        | ●      |        |         |        |        |        | ●    | DCGX 11T304FR      |
| P ●    |        | ○      |         | ○      |        |        |      | P ●                |
| M ●    | ●      | ●      | ○       | ●      |        |        |      | M ●                |
| K ○    |        | ○      |         | ○      | ○      | ○      | ○    | K ○                |
| N ●    |        | ○      | ●       |        | ●      | ●      | ●    | N ●                |
| S ●    | ●      | ●      | ●       | ●      |        |        |      | S ●                |
| H ○    |        | ○      |         |        |        |        |      | H ○                |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria



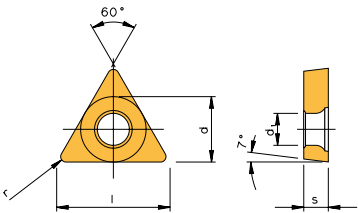
## DC..



Bezeichnung  
Designation  
Articolo

|                   | l     | d     | s    | d <sub>1</sub> | r    | PG |
|-------------------|-------|-------|------|----------------|------|----|
| DCMT 070202EN-AM  | 7,75  | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| DCMT 070204EN-AM  | 7,75  | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| DCMT 070208EN-AM  | 7,75  | 6,350 | 2,38 | 2,8            | 0,8  | 3  |
| DCMT 11T302EN-AM  | 11,60 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| DCMT 11T304EN-AM  | 11,60 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |
| DCMT 11T308EN-AM  | 11,60 | 9,525 | 3,97 | 4,4            | 0,8  | 3  |
| DCGT 11T3005FN-PS | 11,60 | 9,525 | 3,97 | 4,4            | 0,05 | 22 |
| DCMT 070202EN-PS2 | 7,75  | 6,350 | 2,38 | 2,8            | 0,2  | 3  |
| DCMT 070204EN-PS2 | 7,75  | 6,350 | 2,38 | 2,8            | 0,4  | 3  |
| DCMT 11T302EN-PS2 | 11,60 | 9,525 | 3,97 | 4,4            | 0,2  | 3  |
| DCMT 11T304EN-PS2 | 11,60 | 9,525 | 3,97 | 4,4            | 0,4  | 3  |

| Sorten / Grades / Qualità    |        |        |        |        |        |        |        |        |        |        |        |        |                                                                        |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------------------------------------------------------------|
| beschichtet/coated/rivestito |        |        |        |        |        |        |        |        |        |        |        |        |                                                                        |
| AK2110                       | AM2030 | AM2110 | AM2130 | AM5020 | AM5110 | AM5120 | AM5130 | AP2110 | AP2310 | AP2320 | AP2335 | AP5210 | Bezeichnung<br>Designation<br>Articolo                                 |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 070202EN-AM                                                       |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 070204EN-AM                                                       |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 070208EN-AM                                                       |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 11T302EN-AM                                                       |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 11T304EN-AM                                                       |
|                              |        |        | ●      |        |        | ●      |        |        | ●      | ●      | ●      |        | DCMT 11T308EN-AM                                                       |
|                              |        |        |        |        |        |        |        |        |        |        |        | ●      | DCGT 11T3005FN-PS                                                      |
|                              |        |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        |        | DCMT 070202EN-PS2                                                      |
|                              |        |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        |        | DCMT 070204EN-PS2                                                      |
|                              |        |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        |        | DCMT 11T302EN-PS2                                                      |
|                              |        |        | ●      |        | ●      | ●      |        |        | ●      | ●      |        |        | DCMT 11T304EN-PS2                                                      |
| P                            |        |        |        |        | ○      | ○      |        |        | ●      | ●      | ●      | ●      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            |        |        | ●      |        | ●      | ●      |        |        |        |        |        |        | M ● Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| K                            |        |        |        |        | ○      | ○      |        |        |        |        |        |        | K ○                                                                    |
| N                            |        |        |        |        | ○      | ○      |        |        |        |        |        |        | N ○                                                                    |
| S                            |        |        |        |        | ●      | ●      |        |        |        |        |        |        | S ●                                                                    |
| H                            |        |        |        |        | ○      | ○      |        |        |        |        |        |        | H ○                                                                    |



TC..



| Bezeichnung<br>Designation<br>Articolo | l     | d     | s    | d <sub>1</sub> | r   | PG |
|----------------------------------------|-------|-------|------|----------------|-----|----|
| TCMT 06T104EN-AM                       | 6,35  | 3,970 | 1,98 | 2,34           | 0,4 | 3  |
| TCMT 110204EN-AM                       | 11,00 | 6,350 | 2,38 | 2,8            | 0,4 | 3  |
| TCMT 110208EN-AM                       | 11,00 | 6,350 | 2,38 | 2,8            | 0,8 | 3  |
| TCGT 090202EN-ASF                      | 9,60  | 5,560 | 2,38 | 2,5            | 0,2 | 22 |

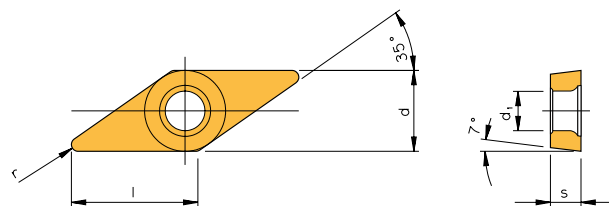


| Sorten / Grades / Qualità              |        |        |        |        |        |        |        |        |        |       |
|----------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| beschichtet/coated/rivestito           |        |        |        |        |        |        |        |        |        |       |
|                                        | AM2035 | AM2130 | AM5015 | AM5025 | AM5120 | AP2035 | AP2310 | AP2320 | AP2335 | AM350 |
| Bezeichnung<br>Designation<br>Articolo |        |        |        |        |        |        |        |        |        |       |
| TCMT 06T104EN-AM                       |        | ●      |        |        | ●      |        | ●      | ●      | ●      | ●     |
| TCMT 110204EN-AM                       | ●      |        |        |        |        | ●      |        |        |        |       |
| TCMT 110208EN-AM                       |        |        |        |        |        |        |        |        |        |       |
| TCGT 090202EN-ASF                      |        |        | ●      | ●      |        |        |        |        |        |       |
| <b>P</b>                               | ○      |        | ●      |        | ○      | ●      | ●      | ●      | ●      | ○     |
| <b>M</b>                               | ●      | ●      | ●      | ●      | ●      | ○      |        |        |        | ●     |
| <b>K</b>                               |        |        | ○      |        | ○      |        |        |        |        |       |
| <b>N</b>                               |        |        |        |        | ○      |        |        |        |        |       |
| <b>S</b>                               | ●      |        | ●      | ●      | ●      |        |        |        |        |       |
| <b>H</b>                               |        |        | ○      |        | ○      |        |        |        |        |       |

● **Hauptanwendung**  
Main application  
Applicazione principale

○ **Nebenanwendung**  
Secondary application  
Applicazione secondaria

VC..



Bezeichnung  
Designation  
Articolo

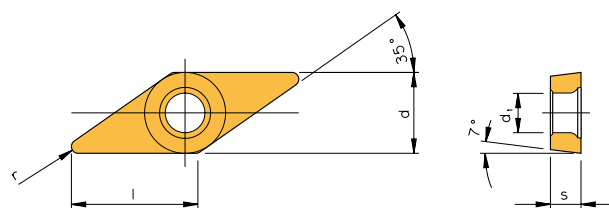
|                    | l     | d     | s    | d <sub>1</sub> | r    | PG |
|--------------------|-------|-------|------|----------------|------|----|
| VCGT 1103003FL-PF2 | 11,10 | 6,350 | 3,18 | 2,8            | 0,03 | 3  |
| VCGT 1103003FR-PF2 | 11,10 | 6,350 | 3,18 | 2,8            | 0,03 | 3  |
| VCGT 1103008FL-PF2 | 11,10 | 6,350 | 3,18 | 2,8            | 0,08 | 3  |
| VCGT 1103008FR-PF2 | 11,10 | 6,350 | 3,18 | 2,8            | 0,08 | 3  |
| VCGT 110301FL-PF2  | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGT 110301FR-PF2  | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGT 110302FL-PF2  | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGT 110302FR-PF2  | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGT 1103005FN-PS  | 11,10 | 6,350 | 3,18 | 2,8            | 0,05 | 3  |
| VCGT 110301EN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGT 110301FN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGT 110302EN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGT 110302FN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGT 110304EN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 3  |
| VCGT 110304FN-PS   | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 3  |
| VCGT 1604005FN-PS  | 16,50 | 9,525 | 4,76 | 4,4            | 0,05 | 3  |
| VCGT 160401EN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,1  | 3  |
| VCGT 160401FN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,1  | 3  |
| VCGT 160402EN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,2  | 3  |
| VCGT 160402FN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,2  | 3  |
| VCGT 160404EN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,4  | 3  |
| VCGT 160404FN-PS   | 16,50 | 9,525 | 4,76 | 4,4            | 0,4  | 3  |
| VCGT 110301FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,1  | 22 |
| VCGT 110302FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,2  | 22 |
| VCGT 110304FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 22 |
| VCGT 130302FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 22 |
| VCGT 130304FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 22 |
| VCGT 160402FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,2  | 22 |
| VCGT 160404FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 22 |
| VCGT 160408FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 22 |
| VCGT 110304FN-ACB  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 22 |

## Sorten / Grades / Qualità

| beschichtet/coated/rivestito |        |        |        |        |        |      | unbeschichtet/uncoated/non rivestito |        |      |                    | Bezeichnung<br>Designation<br>Articolo |
|------------------------------|--------|--------|--------|--------|--------|------|--------------------------------------|--------|------|--------------------|----------------------------------------|
| AM5015                       | AM5025 | AM5110 | AM5120 | AM5220 | AP5210 | AT10 | AK1010                               | AK1020 | AK20 |                    |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 1103003FL-PF2 |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 1103003FR-PF2 |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 1103008FL-PF2 |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 1103008FR-PF2 |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 110301FL-PF2  |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 110301FR-PF2  |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 110302FL-PF2  |                                        |
| ●                            |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 110302FR-PF2  |                                        |
|                              |        |        |        |        |        |      |                                      |        |      |                    |                                        |
|                              |        |        |        |        |        |      | ●                                    | ●      |      | VCGT 1103005FN-PS  |                                        |
|                              | ●      |        |        |        |        |      |                                      |        |      | VCGT 110301EN-PS   |                                        |
|                              | ●      |        |        |        |        | ●    | ●                                    | ●      |      | VCGT 110301FN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 110302EN-PS   |                                        |
|                              | ●      |        |        |        |        | ●    | ●                                    | ●      |      | VCGT 110302FN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 110304EN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 110304FN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 1604005FN-PS  |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160401EN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160401FN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160402EN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160402FN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160404EN-PS   |                                        |
|                              | ●      |        |        |        |        |      | ●                                    | ●      |      | VCGT 160404FN-PS   |                                        |
|                              |        |        |        |        |        |      |                                      |        |      |                    |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 110301FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 110302FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 110304FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 130302FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 130304FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 160402FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 160404FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      | VCGT 160408FN-ALU  |                                        |
|                              |        |        |        |        | ●      |      |                                      |        |      |                    |                                        |
|                              |        |        |        |        |        |      |                                      |        |      | VCGT 110304FN-ACB  |                                        |

|   |   |   |  |  |   |   |   |   |   |   |                                                                      |
|---|---|---|--|--|---|---|---|---|---|---|----------------------------------------------------------------------|
| P | ● |   |  |  | ● | ○ |   |   |   | P | ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M | ● | ● |  |  | ○ | ○ |   |   |   | M |                                                                      |
| K | ○ |   |  |  | ● | ○ | ○ | ○ | ○ | K | ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| N |   |   |  |  |   |   |   | ● | ● | N |                                                                      |
| S | ● | ● |  |  | ● |   |   |   |   | S |                                                                      |
| H | ○ |   |  |  |   |   |   |   |   | H |                                                                      |

VC..

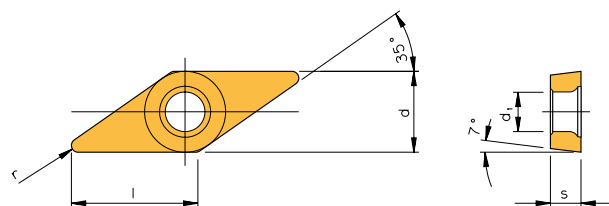


Bezeichnung  
Designation  
Articolo

|                    | l     | d     | s    | d <sub>1</sub> | r    | PG |
|--------------------|-------|-------|------|----------------|------|----|
| VCGT 0702015EN-ASF | 6,921 | 3,970 | 2,38 | 2,2            | 0,15 | 22 |
| VCGT 070202EN-ASF  | 6,921 | 3,970 | 2,38 | 2,2            | 0,2  | 22 |
| VCGT 070204EN-ASF  | 6,921 | 3,970 | 2,38 | 2,2            | 0,4  | 22 |
| VCGT 070204FN-ASF  | 6,921 | 3,970 | 2,38 | 2,2            | 0,4  | 22 |
| VCGT 1103005FN-ASF | 11,10 | 6,350 | 3,18 | 2,8            | 0,05 | 22 |
| VCGT 1103015EN-ASF | 11,10 | 6,350 | 3,18 | 2,8            | 0,15 | 22 |
| VCGT 110301EN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 22 |
| VCGT 110301FN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 22 |
| VCGT 110302EN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 22 |
| VCGT 110302FN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 22 |
| VCGT 1103035EN-ASF | 11,10 | 6,350 | 3,18 | 2,8            | 0,35 | 22 |
| VCGT 110304EN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 22 |
| VCGT 110304FN-ASF  | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 22 |
| VCGT 130302EN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 22 |
| VCGT 130304EN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 22 |
| VCGT 160402EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,2  | 22 |
| VCGT 160404EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 22 |
| VCGT 160408EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 22 |
| VCGX 110301FL      | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGX 110301FR      | 11,10 | 6,350 | 3,18 | 2,8            | 0,1  | 3  |
| VCGX 110302FL      | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGX 110302FR      | 11,10 | 6,350 | 3,18 | 2,8            | 0,2  | 3  |
| VCGX 110304FL      | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 3  |
| VCGX 110304FR      | 11,10 | 6,350 | 3,18 | 2,8            | 0,4  | 3  |
| VCGX 130301FR      | 13,10 | 7,940 | 3,18 | 3,2            | 0,1  | 3  |
| VCGX 130302FL      | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 3  |
| VCGX 130302FR      | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 3  |
| VCGX 130304FL      | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 3  |
| VCGX 130304FR      | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 3  |



| Sorten / Grades / Qualità    |        |        |        |        |        |      |                                      |        |      |                                                                        |
|------------------------------|--------|--------|--------|--------|--------|------|--------------------------------------|--------|------|------------------------------------------------------------------------|
| beschichtet/coated/rivestito |        |        |        |        |        |      | unbeschichtet/uncoated/non rivestito |        |      | Bezeichnung<br>Designation<br>Articolo                                 |
| AM5015                       | AM5025 | AM5110 | AM5120 | AM5220 | AP5210 | AT10 | AK1010                               | AK1020 | AK20 |                                                                        |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 0702015EN-ASF                                                     |
|                              | ●      |        |        |        |        |      |                                      |        |      | VCGT 070202EN-ASF                                                      |
|                              | ●      |        |        |        |        |      |                                      |        |      | VCGT 070204EN-ASF                                                      |
|                              |        |        |        | ●      |        |      |                                      |        |      | VCGT 070204FN-ASF                                                      |
|                              |        |        | ●      |        |        |      |                                      |        |      | VCGT 1103005FN-ASF                                                     |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 1103015EN-ASF                                                     |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 110301EN-ASF                                                      |
|                              |        |        | ●      |        |        |      |                                      |        |      | VCGT 110301FN-ASF                                                      |
| ●                            | ●      |        |        |        |        |      |                                      |        |      | VCGT 110302EN-ASF                                                      |
|                              |        | ●      | ●      |        |        |      |                                      |        |      | VCGT 110302FN-ASF                                                      |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 1103035EN-ASF                                                     |
| ●                            | ●      |        |        |        |        |      |                                      |        |      | VCGT 110304EN-ASF                                                      |
|                              |        | ●      | ●      |        |        |      |                                      |        |      | VCGT 110304FN-ASF                                                      |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 130302EN-ASF                                                      |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 130304EN-ASF                                                      |
| ●                            | ●      |        |        |        |        |      |                                      |        |      | VCGT 160402EN-ASF                                                      |
| ●                            | ●      |        |        |        |        |      |                                      |        |      | VCGT 160404EN-ASF                                                      |
| ●                            |        |        |        |        |        |      |                                      |        |      | VCGT 160408EN-ASF                                                      |
|                              |        |        |        |        |        |      |                                      |        | ●    | VCGX 110301FL                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 110301FR                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 110302FL                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 110302FR                                                          |
|                              |        |        |        |        |        |      |                                      |        | ●    | VCGX 110304FL                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 110304FR                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 130301FR                                                          |
|                              | ●      |        |        |        |        |      |                                      |        |      | VCGX 130302FL                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 130302FR                                                          |
|                              | ●      |        |        |        |        |      |                                      |        | ●    | VCGX 130304FL                                                          |
|                              |        |        |        |        |        |      |                                      |        |      | VCGX 130304FR                                                          |
| P                            | ●      | ○      | ○      | ●      |        |      |                                      |        |      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            | ●      | ●      | ●      | ●      | ●      |      |                                      |        |      | M ●                                                                    |
| K                            | ○      |        | ○      | ○      | ○      |      |                                      |        | ○    | K ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| N                            |        |        | ○      | ○      |        |      |                                      |        | ●    | N ●                                                                    |
| S                            | ●      | ●      | ●      | ●      | ●      |      |                                      |        |      | S ●                                                                    |
| H                            | ○      |        | ○      | ○      | ○      |      |                                      |        |      | H ○                                                                    |



## VC..



| Bezeichnung<br>Designation<br>Articolo | l     | d     | s    | d <sub>1</sub> | r   | PG |
|----------------------------------------|-------|-------|------|----------------|-----|----|
| VCMT 110302EN-PS2                      | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 3  |
| VCMT 110304EN-PS2                      | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 3  |
| VCMT 160404EN-PS2                      | 16,50 | 9,525 | 4,76 | 4,4            | 0,4 | 3  |
| VCMT 110302EN-AM                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 3  |
| VCMT 110304EN-AM                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 3  |
| VCMT 110308EN-AM                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,8 | 3  |
| VCMT 160404EN-AM                       | 16,50 | 9,525 | 4,76 | 4,4            | 0,4 | 3  |
| VCMT 160408EN-AM                       | 16,50 | 9,525 | 4,76 | 4,4            | 0,8 | 3  |

| Sorten / Grades / Qualità    |        |        |        |        |        |        |        |        |        |                                                                        |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------------------------------------------------------------------|
| beschichtet/coated/rivestito |        |        |        |        |        |        |        |        |        |                                                                        |
|                              | AM2130 | AM5110 | AM5120 | AM5130 | AP2025 | AP2035 | AP2310 | AP2320 | AP2335 | Bezeichnung<br>Designation<br>Articolo                                 |
|                              | ●      | ●      | ●      |        |        |        | ●      | ●      |        | VCMT 110302EN-PS2                                                      |
|                              | ●      | ●      | ●      |        |        |        | ●      | ●      |        | VCMT 110304EN-PS2                                                      |
|                              | ●      | ●      | ●      |        |        |        | ●      | ●      |        | VCMT 160404EN-PS2                                                      |
|                              | ●      |        | ●      |        |        |        | ●      | ●      | ●      | VCMT 110302EN-AM                                                       |
|                              | ●      |        | ●      |        |        |        | ●      | ●      | ●      | VCMT 110304EN-AM                                                       |
|                              |        |        |        |        | ●      | ●      |        |        |        | VCMT 110308EN-AM                                                       |
|                              | ●      |        | ●      |        |        |        | ●      | ●      | ●      | VCMT 160404EN-AM                                                       |
|                              | ●      |        | ●      |        |        |        | ●      | ●      | ●      | VCMT 160408EN-AM                                                       |
| P                            |        | ○      | ○      |        | ●      | ●      | ●      | ●      | ●      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            | ●      | ●      | ●      |        | ○      | ○      |        |        |        | M ● Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| K                            |        | ○      | ○      |        | ●      |        |        |        |        | K ○ Hauptanwendung<br>Main application<br>Applicazione principale      |
| N                            |        | ○      | ○      |        |        |        |        |        |        | N ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| S                            |        | ●      | ●      |        |        |        |        |        |        | S ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| H                            |        | ○      | ○      |        |        |        |        |        |        | H ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |

## Drehen – Hartmetall

## beschichtet

| ISO                                | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm <sup>2</sup> ] | Schnittgeschwindigkeit Vc [m/min] |         |         |         |         |         |         |         |         |         |         |
|------------------------------------|----------------------------------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                    |                                                                |                                       |                                       | AK2110                            | AM2030  | AM2035  | AM2110  | AM2130  | AM5015  | AM5020  | AM5025  | AM5110  | AM5120  | AM5120+ |
| P                                  | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                                   | 220-380                           | 170-220 | 180-230 | -       | -       | 220-320 | 180-230 | 180-230 | 220-350 | 220-320 | 180-280 |
|                                    |                                                                | ca. 0,45% C                           | 650                                   | 190-330                           | 160-180 | 170-190 | -       | -       | 180-290 | 170-190 | 170-190 | 180-310 | 180-290 | 160-250 |
|                                    |                                                                | ca. 0,75% C                           | 1000                                  | 160-280                           | 120-140 | 130-150 | -       | -       | 150-250 | 130-150 | 130-150 | 150-270 | 150-250 | 120-220 |
|                                    | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                                   | 180-300                           | 160-180 | 170-190 | -       | -       | 180-280 | 170-190 | 170-190 | 180-300 | 180-260 | -       |
|                                    |                                                                |                                       | 900                                   | 160-260                           | 80-140  | 90-150  | -       | -       | 170-250 | 90-150  | 90-150  | 170-270 | 150-220 | -       |
|                                    |                                                                |                                       | 1200                                  | 120-220                           | 60-120  | 70-130  | -       | -       | 150-220 | 70-130  | 70-130  | 150-240 | 80-190  | -       |
|                                    | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                                   | 140-220                           | 110-190 | 120-200 | -       | -       | 80-160  | 120-200 | 120-200 | 80-180  | 80-150  | -       |
|                                    |                                                                | gehärtet und angelassen               | 1100                                  | 70-130                            | 40-90   | 50-100  | -       | -       | 40-130  | 50-100  | 50-100  | 40-140  | 40-130  | -       |
| Nichtrostender Stahl und Stahlguss | ferritisch/martensitisch, geglüht                              | 700                                   | 140-220                               | 130-170                           | 140-180 | -       | -       | 60-180  | 140-180 | 140-180 | 40-180  | 40-150  | 50-160  |         |
|                                    | martensitisch, vergütet                                        | 1000                                  | 70-130                                | 100-150                           | 110-140 | -       | -       | 40-140  | 110-140 | 110-140 | 40-160  | 40-140  | 40-140  |         |
| M                                  | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450-600                               | -                                 | 100-180 | 100-180 | 120-200 | 100-140 | 80-160  | 120-200 | 120-200 | 80-180  | 80-160  | 70-150  |
|                                    |                                                                | austenitisch/ferritisch, abgeschreckt | 600-900                               | -                                 | 70-140  | 70-140  | 70-180  | 70-140  | 40-130  | 90-160  | 90-160  | 40-140  | 40-130  | 35-120  |
| K                                  | Grauguss                                                       | perlitisch, ferritisch                | 500-700                               | 250-380                           | -       | -       | -       | -       | 180-300 | -       | 120-160 | 180-350 | 180-300 | 180-300 |
|                                    |                                                                | perlitisch, martensitisch             | 700-850                               | 190-300                           | -       | -       | -       | -       | 160-280 | -       | 90-130  | 160-300 | 160-280 | 160-280 |
|                                    |                                                                |                                       | 800-1100                              | -                                 | -       | -       | -       | -       | 120-240 | -       | -       | 120-270 | 120-240 | 120-240 |
|                                    | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                                   | 220-300                           | -       | -       | -       | -       | 140-230 | -       | 120-160 | 140-230 | 140-230 | -       |
|                                    |                                                                | perlitisch                            | 800                                   | 150-230                           | -       | -       | -       | -       | 120-170 | -       | 120-180 | 120-170 | 120-170 | -       |
|                                    | Temperguss                                                     | ferritisch                            | 450                                   | 200-300                           | -       | -       | -       | -       | 150-210 | -       | 140-220 | 150-210 | 150-210 | -       |
|                                    |                                                                | perlitisch                            | 750                                   | 170-230                           | -       | -       | -       | -       | 150-210 | -       | 110-160 | 150-210 | 150-210 | -       |
| N                                  | Aluminium-Knetlegierungen                                      | nicht aushärtbar                      | 200                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                    |                                                                | aushärtbar, ausgehärtet               | 350                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                    | Aluminium-Gusslegierungen                                      | ≤ 12% Si, ausgehärtet                 | 250                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                    |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                    |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                    | Kupfer und Kupferlegierungen (Bronze/Messing)                  | Automatenlegierung, Pb > 1%           | 400                                   | -                                 | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500 | 150-500 |
|                                    |                                                                | Messing, Rotguss                      | 300                                   | -                                 | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500 | 150-500 |
|                                    |                                                                | Aluminiumbronze                       | 500                                   | -                                 | -       | -       | -       | -       | 160-450 | -       | -       | 160-350 | 160-300 | 120-400 |
|                                    |                                                                | Kupfer und Elektrolytkupfer           | 200                                   | -                                 | -       | -       | -       | -       | 100-320 | -       | -       | 120-220 | 120-200 | 120-250 |
|                                    | Nichtmetallische Werkstoffe                                    | Duroplaste                            |                                       | -                                 | -       | -       | -       | -       | 160-600 | -       | -       | 160-600 | 160-600 | -       |
| Faserverstärkte Kunststoffe        |                                                                |                                       | -                                     | -                                 | -       | -       | -       | 100-300 | -       | -       | 100-300 | 100-300 | 100-300 |         |
| Hartgummi                          |                                                                |                                       | -                                     | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       |         |
| S                                  | Warmfeste Legierungen                                          | Fe-Basis geglüht                      | 700                                   | -                                 | 20-40   | 20-40   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60   | 20-60   |
|                                    |                                                                | Fe-Basis ausgehärtet                  | 950                                   | -                                 | 15-35   | 15-35   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60   | 20-60   |
|                                    |                                                                | Ni- oder Co-Basis geglüht             | 800                                   | -                                 | 8-25    | 8-25    | -       | -       | 15-50   | -       | 15-40   | 15-60   | 15-50   | 15-50   |
|                                    |                                                                | Ni- oder Co-Basis gegossen            | 1100                                  | -                                 | 4-15    | 4-15    | -       | -       | 15-40   | -       | 10-25   | 15-50   | 15-40   | 15-40   |
|                                    |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                                  | -                                 | 4-15    | 4-15    | -       | -       | 15-40   | -       | 20-35   | 15-50   | 15-40   | 15-40   |
|                                    | Titanlegierungen                                               | Rein-Titan                            | 500-700                               | -                                 | 80-130  | 80-130  | -       | -       | 90-180  | -       | 80-140  | 100-210 | 90-180  | -       |
|                                    | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700-1000                              | -                                 | 15-35   | 15-35   | -       | -       | 40-80   | -       | 25-45   | 40-90   | 40-80   | -       |
| H                                  | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000-1350                             | -                                 | -       | -       | -       | -       | 30-50   | -       | -       | 30-55   | 30-50   | -       |
|                                    |                                                                | gehärtet und angelassen               | 1350-1700                             | -                                 | -       | -       | -       | -       | 10-25   | -       | -       | 15-25   | 10-25   | -       |
|                                    | Hartguss                                                       | gegossen                              | 1350                                  | -                                 | -       | -       | -       | -       | 40-70   | -       | -       | 40-80   | 40-70   | -       |
|                                    | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                                  | -                                 | -       | -       | -       | -       | 10-25   | -       | -       | 15-30   | 10-25   | -       |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

Weitere Sorten finden Sie  
auf den folgenden Seiten.



## Drehen – Hartmetall

## beschichtet

| ISO                                           | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm <sup>2</sup> ] | Schnittgeschwindigkeit Vc [m/min] |         |         |         |         |         |         |         |         |         |         |
|-----------------------------------------------|----------------------------------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                               |                                                                |                                       |                                       | AM5130                            | AM5220  | AP2025  | AP2035  | AP2110  | AP2120  | AP2310  | AP2320  | AP2335  | AP5210  | AM350   |
| P                                             | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                                   | 170-240                           | 180-280 | 190-240 | 180-230 | 300-400 | 250-350 | 300-400 | 250-350 | 180-270 | 220-370 | 180-230 |
|                                               |                                                                | ca. 0,45% C                           | 650                                   | 160-220                           | 160-250 | 170-200 | 170-190 | 260-350 | 210-300 | 260-350 | 210-300 | 170-230 | 180-330 | 170-190 |
|                                               |                                                                | ca. 0,75% C                           | 1000                                  | 140-200                           | 120-220 | 130-160 | 130-150 | 240-300 | 180-230 | 240-300 | 180-230 | 160-210 | 150-290 | 100-140 |
|                                               | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                                   | 170-220                           | 160-250 | 170-200 | 170-190 | 220-300 | 180-270 | 220-300 | 180-270 | 160-220 | 180-320 | 170-190 |
|                                               |                                                                |                                       | 900                                   | 170-200                           | 140-230 | 100-160 | 90-150  | 180-260 | 160-220 | 180-260 | 160-220 | 140-180 | 170-290 | 90-150  |
|                                               |                                                                |                                       | 1200                                  | 150-200                           | 120-200 | 80-140  | 70-130  | 120-220 | 100-200 | 120-220 | 100-200 | 100-160 | 150-260 | 70-130  |
|                                               | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                                   | 80-150                            | 70-150  | 130-170 | 120-200 | 150-220 | 130-200 | 150-220 | 130-200 | 130-180 | 80-180  | 120-200 |
|                                               |                                                                | gehärtet und angelassen               | 1100                                  | 40-120                            | 35-120  | 80-130  | 50-100  | 70-150  | 70-140  | 70-150  | 70-140  | 70-120  | 40-150  | 50-100  |
|                                               | Nichtrostender Stahl und Stahlguss                             | ferritisch/martensitisch, geglüht     | 700                                   | 40-160                            | 50-160  | 130-180 | 140-180 | -       | -       | -       | -       | -       | 40-140  | 140-180 |
| martensitisch, vergütet                       |                                                                | 1000                                  | 40-160                                | 40-140                            | 110-160 | 110-160 | -       | -       | -       | -       | -       | 40-120  | 110-160 |         |
| M                                             | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450-600                               | 80-150                            | 70-150  | 100-170 | 110-190 | -       | -       | -       | -       | -       | 70-150  | 120-190 |
|                                               |                                                                | austenitisch/ferritisch, abgeschreckt | 600-900                               | 40-120                            | 35-120  | -       | 80-150  | -       | -       | -       | -       | -       | 35-120  | 80-150  |
| K                                             | Grauguss                                                       | perlitisch, ferritisch                | 500-700                               | 180-240                           | 180-300 | 130-200 | -       | 160-230 | -       | -       | -       | -       | 180-350 | -       |
|                                               |                                                                | perlitisch, martensitisch             | 700-850                               | 160-220                           | 160-280 | 120-180 | -       | 150-200 | -       | -       | -       | -       | 160-300 | -       |
|                                               |                                                                |                                       | 800-1100                              | 120-200                           | 120-240 | -       | -       | -       | -       | -       | -       | -       | 120-270 | -       |
|                                               | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                                   | 140-200                           | 140-230 | 120-170 | -       | 160-210 | -       | -       | -       | -       | 140-230 | -       |
|                                               |                                                                | perlitisch                            | 800                                   | 110-160                           | 120-170 | 120-190 | -       | 130-170 | -       | -       | -       | -       | 120-170 | -       |
|                                               | Temperguss                                                     | ferritisch                            | 450                                   | 130-190                           | 150-210 | 150-230 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |
|                                               |                                                                | perlitisch                            | 750                                   | 130-190                           | 150-210 | 120-170 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |
|                                               | N                                                              | Aluminium-Knetlegierungen             | nicht aushärtbar                      | 200                               | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| aushärtbar, ausgehärtet                       |                                                                |                                       | 350                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| Aluminium-Gusslegierungen                     |                                                                | ≤ 12% Si, ausgehärtet                 | 250                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                                   | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| Kupfer und Kupferlegierungen (Bronze/Messing) |                                                                | Automatenlegierung, Pb > 1%           | 400                                   | 200-500                           | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | Messing, Rotguss                      | 300                                   | 200-500                           | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | Aluminiumbronze                       | 500                                   | 150-220                           | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | Kupfer und Elektrolytkupfer           | 200                                   | 120-220                           | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| Nichtmetallische Werkstoffe                   |                                                                | Duroplaste                            |                                       | 140-500                           | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               | Faserverstärkte Kunststoffe                                    |                                       | 100-300                               | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       |         |
|                                               | Hartgummi                                                      |                                       | -                                     | -                                 | -       | -       | -       | -       | -       | -       | -       | -       | -       |         |
| S                                             | Warmfeste Legierungen                                          | Fe-Basis geglüht                      | 700                                   | 20-50                             | 20-60   | 20-40   | 20-40   | -       | -       | -       | -       | -       | 20-70   | 20-40   |
|                                               |                                                                | Fe-Basis ausgehärtet                  | 950                                   | 20-50                             | 20-60   | 15-35   | 15-35   | -       | -       | -       | -       | -       | 20-70   | 15-35   |
|                                               |                                                                | Ni- oder Co-Basis geglüht             | 800                                   | 15-40                             | 15-50   | 10-30   | 8-25    | -       | -       | -       | -       | -       | 15-60   | 8-25    |
|                                               |                                                                | Ni- oder Co-Basis gegossen            | 1100                                  | 15-40                             | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |
|                                               |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                                  | 15-40                             | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |
|                                               | Titanlegierungen                                               | Rein-Titan                            | 500-700                               | 80-170                            | -       | 80-130  | 80-130  | -       | -       | -       | -       | -       | -       | -       |
|                                               | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700-1000                              | 40-70                             | -       | 20-40   | 15-35   | -       | -       | -       | -       | -       | -       | -       |
| H                                             | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000-1350                             | 30-45                             | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               |                                                                | gehärtet und angelassen               | 1350-1700                             | 15-25                             | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               | Hartguss                                                       | gegossen                              | 1350                                  | 40-65                             | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                                               | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                                  | 15-25                             | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |

Die Tabellenwerte sind Richtwerte.  
Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

Weitere Sorten finden Sie  
auf den folgenden Seiten. 

## Drehen – Hartmetall

## unbeschichtet

| ISO                                           | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm²] | Schnittgeschwindigkeit Vc [m/min] |            |            |
|-----------------------------------------------|----------------------------------------------------------------|---------------------------------------|--------------------------|-----------------------------------|------------|------------|
|                                               |                                                                |                                       |                          | AK1010                            | AK1020     | AK20       |
| P                                             | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                      | -                                 | -          | -          |
|                                               |                                                                | ca. 0,45% C                           | 650                      | -                                 | -          | -          |
|                                               |                                                                | ca. 0,75% C                           | 1000                     | -                                 | -          | -          |
|                                               | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                      | -                                 | -          | -          |
|                                               |                                                                |                                       | 900                      | -                                 | -          | -          |
|                                               |                                                                |                                       | 1200                     | -                                 | -          | -          |
|                                               | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                      | -                                 | -          | -          |
|                                               |                                                                | gehärtet und angelassen               | 1100                     | -                                 | -          | -          |
| Nichtrostender Stahl und Stahlguss            | ferritisch/martensitisch, geglüht                              | 700                                   | -                        | -                                 | -          |            |
|                                               | martensitisch, vergütet                                        | 1000                                  | -                        | -                                 | -          |            |
| M                                             | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450 - 600                | -                                 | -          | -          |
|                                               |                                                                | austenitisch/ferritisch, abgeschreckt | 600 - 900                | -                                 | -          | -          |
| K                                             | Grauguss                                                       | perlitisch, ferritisch                | 500 - 700                | 120 - 160                         | 120 - 160  | 120 - 160  |
|                                               |                                                                | perlitisch, martensitisch             | 700 - 850                | 90 - 140                          | 90 - 140   | 90 - 140   |
|                                               |                                                                |                                       | 800 - 1100               | 80 - 140                          | 80 - 140   | 80 - 140   |
|                                               | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                      | 130 - 170                         | 130 - 170  | 130 - 170  |
|                                               |                                                                | perlitisch                            | 800                      | 90 - 130                          | 90 - 130   | 90 - 130   |
|                                               | Temperguss                                                     | ferritisch                            | 450                      | 140 - 200                         | 140 - 200  | 140 - 200  |
|                                               |                                                                | perlitisch                            | 750                      | 120 - 160                         | 120 - 160  | 120 - 160  |
|                                               | N                                                              | Aluminium-Knetlegierungen             | nicht aushärtbar         | 200                               | 300 - 2500 | 300 - 2500 |
| aushärtbar, ausgehärtet                       |                                                                |                                       | 350                      | 200 - 2000                        | 200 - 2000 | 200 - 2000 |
| Aluminium-Gusslegierungen                     |                                                                | ≤ 12% Si, ausgehärtet                 | 250                      | 400 - 1500                        | 400 - 1500 | 400 - 1500 |
|                                               |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                      | 400 - 1500                        | 400 - 1500 | 400 - 1500 |
|                                               |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                      | 200 - 800                         | 200 - 800  | 200 - 800  |
| Kupfer und Kupferlegierungen (Bronze/Messing) |                                                                | Automatenlegierung, Pb > 1%           | 400                      | 250 - 600                         | 250 - 600  | 250 - 600  |
|                                               |                                                                | Messing, Rotguss                      | 300                      | 200 - 600                         | 200 - 600  | 200 - 600  |
|                                               |                                                                | Aluminiumbronze                       | 500                      | 150 - 400                         | 150 - 400  | 150 - 400  |
|                                               |                                                                | Kupfer und Elektrolytkupfer           | 200                      | 150 - 300                         | 150 - 300  | 150 - 300  |
| Nichtmetallische Werkstoffe                   |                                                                | Duroplaste                            |                          | 80 - 180                          | 80 - 180   | 80 - 180   |
|                                               | Faserverstärkte Kunststoffe                                    |                                       | 60 - 150                 | 60 - 150                          | 60 - 150   |            |
|                                               | Hartgummi                                                      |                                       | 100 - 250                | 100 - 250                         | 100 - 250  |            |
| S                                             | Warmfeste Legierungen                                          | Fe-Basis geglüht                      | 700                      | 15 - 40                           | -          | -          |
|                                               |                                                                | Fe-Basis ausgehärtet                  | 950                      | 8 - 28                            | -          | -          |
|                                               |                                                                | Ni- oder Co-Basis geglüht             | 800                      | 10 - 30                           | -          | -          |
|                                               |                                                                | Ni- oder Co-Basis gegossen            | 1100                     | 8 - 25                            | -          | -          |
|                                               |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                     | 8 - 25                            | -          | -          |
|                                               | Titanlegierungen                                               | Rein-Titan                            | 500 - 700                | 60 - 120                          | 60 - 120   | -          |
|                                               | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700 - 1000               | 30 - 80                           | 30 - 80    | 30 - 80    |
| H                                             | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000 - 1350              | -                                 | -          | -          |
|                                               |                                                                | gehärtet und angelassen               | 1350 - 1700              | -                                 | -          | -          |
|                                               | Hartguss                                                       | gegossen                              | 1350                     | -                                 | -          | -          |
|                                               | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                     | -                                 | -          | -          |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

## Turning – Carbide

coated

| ISO                                     | Material                                                   |                                    | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |         |         |         |         |         |         |         |         |         |          |
|-----------------------------------------|------------------------------------------------------------|------------------------------------|-----------------------------|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
|                                         |                                                            |                                    |                             | AK2110                   | AM2030  | AM2035  | AM2110  | AM2130  | AM5015  | AM5020  | AM5025  | AM5110  | AM5120  | AM5120 + |
| P                                       | Unalloyed steel and cast steel                             | ca. 0,15% C                        | 350                         | 220-380                  | 170-220 | 180-230 | -       | -       | 220-320 | 180-230 | 180-230 | 220-350 | 220-320 | 180-280  |
|                                         |                                                            | ca. 0,45% C                        | 650                         | 190-330                  | 160-180 | 170-190 | -       | -       | 180-290 | 170-190 | 170-190 | 180-310 | 180-290 | 160-250  |
|                                         |                                                            | ca. 0,75% C                        | 1000                        | 160-280                  | 120-140 | 130-150 | -       | -       | 150-250 | 130-150 | 130-150 | 150-270 | 150-250 | 120-220  |
|                                         | Low alloyed steel and cast steel                           |                                    | 600                         | 180-300                  | 160-180 | 170-190 | -       | -       | 180-280 | 170-190 | 170-190 | 180-300 | 180-260 | -        |
|                                         |                                                            |                                    | 900                         | 160-260                  | 80-140  | 90-150  | -       | -       | 170-250 | 90-150  | 90-150  | 170-270 | 150-220 | -        |
|                                         |                                                            |                                    | 1200                        | 120-220                  | 60-120  | 70-130  | -       | -       | 150-220 | 70-130  | 70-130  | 150-240 | 80-190  | -        |
|                                         | High alloyed steel, high alloyed tool steel and cast steel | annealed                           | 700                         | 140-220                  | 110-190 | 120-200 | -       | -       | 80-160  | 120-200 | 120-200 | 80-180  | 80-150  | -        |
|                                         |                                                            | hardened and tempered              | 1100                        | 70-130                   | 40-90   | 50-100  | -       | -       | 40-130  | 50-100  | 50-100  | 40-140  | 40-130  | -        |
|                                         | Stainless steel and cast steel                             | ferritic / martensitic, annealed   | 700                         | 140-220                  | 130-170 | 140-180 | -       | -       | 60-180  | 140-180 | 140-180 | 40-180  | 40-150  | 50-160   |
|                                         |                                                            | martensitic, hardened and tempered | 1000                        | 70-130                   | 100-150 | 110-140 | -       | -       | 40-140  | 110-140 | 110-140 | 40-160  | 40-140  | 40-140   |
| M                                       | Stainless steel and cast steel                             | austenitic and austenitic/ferritic | 450-600                     | -                        | 100-180 | 100-180 | 120-200 | 100-140 | 80-160  | 120-200 | 120-200 | 80-180  | 80-160  | 70-150   |
|                                         |                                                            | chilled                            | 600-900                     | -                        | 70-140  | 70-140  | 70-180  | 70-140  | 40-130  | 90-160  | 90-160  | 40-140  | 40-130  | 35-120   |
| K                                       | Cast iron                                                  | pearlitic, ferritic                | 500-700                     | 250-380                  | -       | -       | -       | -       | 180-300 | -       | 120-160 | 180-350 | 180-300 | 180-300  |
|                                         |                                                            | pearlitic, martensitic             | 700-850                     | 190-300                  | -       | -       | -       | -       | 160-280 | -       | 90-130  | 160-300 | 160-280 | 160-280  |
|                                         |                                                            |                                    | 800-1100                    | -                        | -       | -       |         |         | 120-240 | -       | -       | 120-270 | 120-240 | 120-240  |
|                                         | Cast iron with nodular graphite                            | ferritic                           | 550                         | 220-300                  | -       | -       | -       | -       | 140-230 | -       | 120-160 | 140-230 | 140-230 | -        |
|                                         |                                                            | pearlitic                          | 800                         | 150-230                  | -       | -       | -       | -       | 120-170 | -       | 120-180 | 120-170 | 120-170 | -        |
|                                         | Malleable cast iron                                        | ferritic                           | 450                         | 200-300                  | -       | -       | -       | -       | 150-210 | -       | 140-220 | 150-210 | 150-210 | -        |
|                                         |                                                            | pearlitic                          | 750                         | 170-230                  | -       | -       | -       | -       | 150-210 | -       | 110-160 | 150-210 | 150-210 | -        |
|                                         | N                                                          | Aluminum alloys, long chipping     | not heat treatable          | 200                      | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| heat treatable, heat treated            |                                                            |                                    | 350                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| Casted aluminum alloys                  |                                                            | ≤ 12% Si, hardened                 | 250                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
|                                         |                                                            | ≤ 12% Si, heat treatable, hardened | 300                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
|                                         |                                                            | ≤ 12% Si, not heat treatable       | 450                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| Copper and copper alloys (brass/bronze) |                                                            | Lead alloys, Pb > 1 %              | 400                         | -                        | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500 | 150-500  |
|                                         |                                                            | Brass, bronze                      | 300                         | -                        | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500 | 150-500  |
|                                         |                                                            | Aluminum bronze                    | 500                         | -                        | -       | -       | -       | -       | 160-450 | -       | -       | 160-350 | 160-300 | 120-400  |
|                                         |                                                            | Copper and electrolyte copper      | 200                         | -                        | -       | -       | -       | -       | 100-320 | -       | -       | 120-220 | 120-200 | 120-250  |
| Non-ferrous materials                   |                                                            | Duroplastics                       |                             | -                        | -       | -       | -       | -       | 160-600 | -       | -       | 160-600 | 160-600 | -        |
|                                         | Reinforced plastics                                        |                                    | -                           | -                        | -       | -       | -       | 100-300 | -       | -       | 100-300 | 100-300 | 100-300 |          |
|                                         | Hard rubber                                                |                                    | -                           | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       |          |
| S                                       | High temperature resistant alloys                          | Fe-alloyed annealed                | 700                         | -                        | 20-40   | 20-40   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60   | 20-60    |
|                                         |                                                            | Fe-alloyed hardened                | 950                         | -                        | 15-35   | 15-35   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60   | 20-60    |
|                                         |                                                            | Ni- oder Co- based annealed        | 800                         | -                        | 8-25    | 8-25    | -       | -       | 15-50   | -       | 15-40   | 15-60   | 15-50   | 15-50    |
|                                         |                                                            | Ni- oder Co- based casting         | 1100                        | -                        | 4-15    | 4-15    | -       | -       | 15-40   | -       | 10-25   | 15-50   | 15-40   | 15-40    |
|                                         |                                                            | Ni- oder Co- based hardened        | 1200                        | -                        | 4-15    | 4-15    | -       | -       | 15-40   | -       | 20-35   | 15-50   | 15-40   | 15-40    |
|                                         | Titanium alloys, high strength                             | Pure titanium                      | 500-700                     | -                        | 80-130  | 80-130  | -       | -       | 90-180  | -       | 80-140  | 100-210 | 90-180  | -        |
|                                         | Alpha- and beta-alloys, hardened                           |                                    | 700-1000                    | -                        | 15-35   | 15-35   | -       | -       | 40-80   | -       | 25-45   | 40-90   | 40-80   | -        |
| H                                       | Hardened steel                                             | hardened and tempered              | 1000-1350                   | -                        | -       | -       | -       | -       | 30-50   | -       | -       | 30-55   | 30-50   | -        |
|                                         |                                                            | hardened and tempered              | 1350-1700                   | -                        | -       | -       | -       | -       | 10-25   | -       | -       | 15-25   | 10-25   | -        |
|                                         | Hard cast iron                                             | casting                            | 1350                        | -                        | -       | -       | -       | -       | 40-70   | -       | -       | 40-80   | 40-70   | -        |
|                                         | Hardened cast iron                                         | hardened and tempered              | 1900                        | -                        | -       | -       | -       | -       | 10-25   | -       | -       | 15-30   | 10-25   | -        |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

More grades on the following pages. 

## Turning – Carbide

coated

| ISO                 | Material                                                   |                                    | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |         |         |         |         |         |         |         |         |         |         |
|---------------------|------------------------------------------------------------|------------------------------------|-----------------------------|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                     |                                                            |                                    |                             | AM5130                   | AM5220  | AP2025  | AP2035  | AP2110  | AP2120  | AP2310  | AP2320  | AP2335  | AP5210  | AM350   |
| P                   | Unalloyed steel and cast steel                             | ca. 0,15% C                        | 350                         | 170-240                  | 180-280 | 190-240 | 180-230 | 300-400 | 250-350 | 300-400 | 250-350 | 180-270 | 220-370 | 180-230 |
|                     |                                                            | ca. 0,45% C                        | 650                         | 160-220                  | 160-250 | 170-200 | 170-190 | 260-350 | 210-300 | 260-350 | 210-300 | 170-230 | 180-330 | 170-190 |
|                     |                                                            | ca. 0,75% C                        | 1000                        | 140-200                  | 120-220 | 130-160 | 130-150 | 240-300 | 180-230 | 240-300 | 180-230 | 160-210 | 150-290 | 100-140 |
|                     | Low alloyed steel and cast steel                           |                                    | 600                         | 170-220                  | 160-250 | 170-200 | 170-190 | 220-300 | 180-270 | 220-300 | 180-270 | 160-220 | 180-320 | 170-190 |
|                     |                                                            |                                    | 900                         | 170-200                  | 140-230 | 100-160 | 90-150  | 180-260 | 160-220 | 180-260 | 160-220 | 140-180 | 170-290 | 90-150  |
|                     |                                                            |                                    | 1200                        | 150-200                  | 120-200 | 80-140  | 70-130  | 120-220 | 100-200 | 120-220 | 100-200 | 100-160 | 150-260 | 70-130  |
|                     | High alloyed steel, high alloyed tool steel and cast steel | annealed                           | 700                         | 80-150                   | 70-150  | 130-170 | 120-200 | 150-220 | 130-200 | 150-220 | 130-200 | 130-180 | 80-180  | 120-200 |
|                     |                                                            | hardened and tempered              | 1100                        | 40-120                   | 35-120  | 80-130  | 50-100  | 70-150  | 70-140  | 70-150  | 70-140  | 70-120  | 40-150  | 50-100  |
|                     | Stainless steel and cast steel                             | ferritic / martensitic, annealed   | 700                         | 40-160                   | 50-160  | 130-180 | 140-180 | -       | -       | -       | -       | -       | 40-140  | 140-180 |
|                     |                                                            | martensitic, hardened and tempered | 1000                        | 40-160                   | 40-140  | 110-160 | 110-160 | -       | -       | -       | -       | -       | 40-120  | 110-160 |
| M                   | Stainless steel and cast steel                             | austenitic and austenitic/ferritic | 450-600                     | 80-150                   | 70-150  | 100-170 | 110-190 | -       | -       | -       | -       | -       | 70-150  | 120-190 |
|                     |                                                            | chilled                            | 600-900                     | 40-120                   | 35-120  | -       | 80-150  | -       | -       | -       | -       | -       | 35-120  | 80-150  |
| K                   | Cast iron                                                  | pearlitic, ferritic                | 500-700                     | 180-240                  | 180-300 | 130-200 | -       | 160-230 | -       | -       | -       | -       | 180-350 | -       |
|                     |                                                            | pearlitic, martensitic             | 700-850                     | 160-220                  | 160-280 | 120-180 | -       | 150-200 | -       | -       | -       | -       | 160-300 | -       |
|                     |                                                            |                                    | 800-1100                    | 120-200                  | 120-240 | -       | -       | -       | -       | -       | -       | -       | 120-270 | -       |
|                     | Cast iron with nodular graphite                            | ferritic                           | 550                         | 140-200                  | 140-230 | 120-170 | -       | 160-210 | -       | -       | -       | -       | 140-230 | -       |
|                     |                                                            | pearlitic                          | 800                         | 110-160                  | 120-170 | 120-190 | -       | 130-170 | -       | -       | -       | -       | 120-170 | -       |
|                     | Malleable cast iron                                        | ferritic                           | 450                         | 130-190                  | 150-210 | 150-230 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |
| pearlitic           |                                                            | 750                                | 130-190                     | 150-210                  | 120-170 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |         |
| N                   | Aluminum alloys, long chipping                             | not heat treatable                 | 200                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | heat treatable, heat treated       | 350                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     | Casted aluminum alloys                                     | ≤ 12% Si, hardened                 | 250                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | ≤ 12% Si, heat treatable, hardened | 300                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | ≤ 12% Si, not heat treatable       | 450                         | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     | Copper and copper alloys (brass/bronze)                    | Lead alloys, Pb > 1%               | 400                         | 200-500                  | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | Brass, bronze                      | 300                         | 200-500                  | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | Aluminum bronze                    | 500                         | 150-220                  | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | Copper and electrolyte copper      | 200                         | 120-220                  | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     | Non-ferrous materials                                      | Duroplastics                       |                             | 140-500                  | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| Reinforced plastics |                                                            |                                    | 100-300                     | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       |         |
| Hard rubber         |                                                            |                                    | -                           | -                        | -       | -       | -       | -       | -       | -       | -       | -       | -       |         |
| S                   | High temperature resistant alloys                          | Fe-alloyed annealed                | 700                         | 20-50                    | 20-60   | 20-40   | 20-40   | -       | -       | -       | -       | -       | 20-70   | 20-40   |
|                     |                                                            | Fe-alloyed hardened                | 950                         | 20-50                    | 20-60   | 15-35   | 15-35   | -       | -       | -       | -       | -       | 20-70   | 15-35   |
|                     |                                                            | Ni- oder Co- based annealed        | 800                         | 15-40                    | 15-50   | 10-30   | 8-25    | -       | -       | -       | -       | -       | 15-60   | 8-25    |
|                     |                                                            | Ni- oder Co- based casting         | 1100                        | 15-40                    | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |
|                     |                                                            | Ni- oder Co- based hardened        | 1200                        | 15-40                    | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |
|                     | Titanium alloys, high strength                             | Pure titanium                      | 500-700                     | 80-170                   | -       | 80-130  | 80-130  | -       | -       | -       | -       | -       | -       | -       |
|                     | Alpha- and beta-alloys, hardened                           | 700-1000                           | 40-70                       | -                        | 20-40   | 15-35   | -       | -       | -       | -       | -       | -       | -       |         |
| H                   | Hardened steel                                             | hardened and tempered              | 1000-1350                   | 30-45                    | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     |                                                            | hardened and tempered              | 1350-1700                   | 15-25                    | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     | Hard cast iron                                             | casting                            | 1350                        | 40-65                    | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |
|                     | Hardened cast iron                                         | hardened and tempered              | 1900                        | 15-25                    | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

More grades on the following pages. 

## Turning – Carbide

uncoated

| ISO                                | Material                                                   |                                        | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |            |            |
|------------------------------------|------------------------------------------------------------|----------------------------------------|-----------------------------|--------------------------|------------|------------|
|                                    |                                                            |                                        |                             | AK1010                   | AK1020     | AK20       |
| P                                  | Unalloyed steel and cast steel                             | ca. 0,15% C                            | 350                         | -                        | -          | -          |
|                                    |                                                            | ca. 0,45% C                            | 650                         | -                        | -          | -          |
|                                    |                                                            | ca. 0,75% C                            | 1000                        | -                        | -          | -          |
|                                    | Low alloyed steel and cast steel                           |                                        | 600                         | -                        | -          | -          |
|                                    |                                                            |                                        | 900                         | -                        | -          | -          |
|                                    |                                                            |                                        | 1200                        | -                        | -          | -          |
|                                    | High alloyed steel, high alloyed tool steel and cast steel | annealed                               | 700                         | -                        | -          | -          |
|                                    |                                                            | hardened and tempered                  | 1100                        | -                        | -          | -          |
|                                    | Stainless steel and cast steel                             | ferritic / martensitic, annealed       | 700                         | -                        | -          | -          |
| martensitic, hardened and tempered |                                                            | 1000                                   | -                           | -                        | -          |            |
| M                                  | Stainless steel and cast steel                             | austenitic and austenitic/ferritic     | 450 - 600                   | -                        | -          | -          |
|                                    |                                                            | chilled                                | 600 - 900                   | -                        | -          | -          |
| K                                  | Cast iron                                                  | pearlitic, ferritic                    | 500 - 700                   | 120 - 160                | 120 - 160  | 120 - 160  |
|                                    |                                                            | pearlitic, martensitic                 | 700 - 850                   | 90 - 140                 | 90 - 140   | 90 - 140   |
|                                    |                                                            |                                        | 800 - 1100                  | 80 - 140                 | 80 - 140   | 80 - 140   |
|                                    | Cast iron with nodular graphite                            | ferritic                               | 550                         | 130 - 170                | 130 - 170  | 130 - 170  |
|                                    |                                                            | pearlitic                              | 800                         | 90 - 130                 | 90 - 130   | 90 - 130   |
|                                    | Malleable cast iron                                        | ferritic                               | 450                         | 140 - 200                | 140 - 200  | 140 - 200  |
|                                    |                                                            | pearlitic                              | 750                         | 120 - 160                | 120 - 160  | 120 - 160  |
| N                                  | Aluminum alloys, long chipping                             | not heat treatable                     | 200                         | 300 - 2500               | 300 - 2500 | 300 - 2500 |
|                                    |                                                            | heat treatable, heat treated           | 350                         | 200 - 2000               | 200 - 2000 | 200 - 2000 |
|                                    | Casted aluminum alloys                                     | ≤ 12% Si, hardened                     | 250                         | 400 - 1500               | 400 - 1500 | 400 - 1500 |
|                                    |                                                            | ≤ 12% Si, heat treatable, heat treated | 300                         | 400 - 1500               | 400 - 1500 | 400 - 1500 |
|                                    |                                                            | ≤ 12% Si, not heat treatable           | 450                         | 200 - 800                | 200 - 800  | 200 - 800  |
|                                    | Copper and copper alloys (brass/bronze)                    | Lead alloys, Pb > 1 %                  | 400                         | 250 - 600                | 250 - 600  | 250 - 600  |
|                                    |                                                            | Brass, bronze                          | 300                         | 200 - 600                | 200 - 600  | 200 - 600  |
|                                    |                                                            | Aluminum bronze                        | 500                         | 150 - 400                | 150 - 400  | 150 - 400  |
|                                    |                                                            | Copper and electrolyte copper          | 200                         | 150 - 300                | 150 - 300  | 150 - 300  |
|                                    | Non-ferrous materials                                      | Duroplastics                           |                             | 80 - 180                 | 80 - 180   | 80 - 180   |
|                                    |                                                            | Reinforced plastics                    |                             | 60 - 150                 | 60 - 150   | 60 - 150   |
| Hard rubber                        |                                                            |                                        | 100 - 250                   | 100 - 250                | 100 - 250  |            |
| S                                  | High temperature resistant alloys                          | Fe-alloyed annealed                    | 700                         | 15 - 40                  | -          | -          |
|                                    |                                                            | Fe-alloyed hardened                    | 950                         | 8 - 28                   | -          | -          |
|                                    |                                                            | Ni- oder Co- based annealed            | 800                         | 10 - 30                  | -          | -          |
|                                    |                                                            | Ni- oder Co- based casting             | 1100                        | 8 - 25                   | -          | -          |
|                                    |                                                            | Ni- oder Co- based hardened            | 1200                        | 8 - 25                   | -          | -          |
|                                    | Titanium alloys, high strength                             | Pure titanium                          | 500 - 700                   | 60 - 120                 | 60 - 120   | -          |
|                                    | Alpha- and beta-alloys, hardened                           |                                        | 700 - 1000                  | 30 - 80                  | 30 - 80    | 30 - 80    |
| H                                  | Hardened steel                                             | hardened and tempered                  | 1000 - 1350                 | -                        | -          | -          |
|                                    |                                                            | hardened and tempered                  | 1350 - 1700                 | -                        | -          | -          |
|                                    | Hard cast iron                                             | casting                                | 1350                        | -                        | -          | -          |
|                                    | Hardened cast iron                                         | hardened and tempered                  | 1900                        | -                        | -          | -          |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

## Tornitura – Metallo duro

## rivestito

| ISO                       | Materiale                                    |                                     | Resistenza<br>[N/mm²]    | Velocità di taglio V <sub>c</sub> (m/min) |         |         |         |         |         |         |         |         |         |          |
|---------------------------|----------------------------------------------|-------------------------------------|--------------------------|-------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
|                           |                                              |                                     |                          | AK2110                                    | AM2030  | AM2035  | AM2110  | AM2130  | AM5015  | AM5020  | AM5025  | AM5110  | AM5120  | AM5120 + |
| P                         | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                      | 220-380                                   | 170-220 | 180-230 | -       | -       | 220-320 | 180-230 | 180-230 | 220-350 | 220-320 | 180-280  |
|                           |                                              | ca. 0,45% C                         | 650                      | 190-330                                   | 160-180 | 170-190 | -       | -       | 180-290 | 170-190 | 170-190 | 180-310 | 180-290 | 160-250  |
|                           |                                              | ca. 0,75% C                         | 1000                     | 160-280                                   | 120-140 | 130-150 | -       | -       | 150-250 | 130-150 | 130-150 | 150-270 | 150-250 | 120-220  |
|                           | Acciaio debolmente legati                    |                                     | 600                      | 180-300                                   | 160-180 | 170-190 | -       | -       | 180-280 | 170-190 | 170-190 | 180-300 | 180-260 | -        |
|                           |                                              |                                     | 900                      | 160-260                                   | 80-140  | 90-150  | -       | -       | 170-250 | 90-150  | 90-150  | 170-270 | 150-220 | -        |
|                           |                                              |                                     | 1200                     | 120-220                                   | 60-120  | 70-130  | -       | -       | 150-220 | 70-130  | 70-130  | 150-240 | 80-190  | -        |
|                           | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                      | 140-220                                   | 110-190 | 120-200 | -       | -       | 80-160  | 120-200 | 120-200 | 80-180  | 80-150  | -        |
|                           |                                              | temprato e rinvenuto                | 1100                     | 70-130                                    | 40-90   | 50-100  | -       | -       | 40-130  | 50-100  | 50-100  | 40-140  | 40-130  | -        |
|                           | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                      | 140-220                                   | 130-170 | 140-180 | -       | -       | 60-180  | 140-180 | 140-180 | 40-180  | 40-150  | 50-160   |
|                           |                                              | martensitico, temprato              | 1000                     | 70-130                                    | 100-150 | 110-140 | -       | -       | 40-140  | 110-140 | 110-140 | 40-160  | 40-140  | 40-140   |
| M                         | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600                  | -                                         | 100-180 | 100-180 | 120-200 | 100-140 | 80-160  | 120-200 | 120-200 | 80-180  | 80-160  | 70-150   |
|                           |                                              | trattato o temprato                 | 600-900                  | -                                         | 70-140  | 70-140  | 70-180  | 70-140  | 40-130  | 90-160  | 90-160  | 40-140  | 40-130  | 35-120   |
| K                         | Ghisa grigia                                 | perlitica, ferritica                | 500-700                  | 250-380                                   | -       | -       | -       | -       | 180-300 | -       | 120-160 | 180-350 | 180-300 | 180-300  |
|                           |                                              | perlitica, martensitica             | 700-850                  | 190-300                                   | -       | -       | -       | -       | 160-280 | -       | 90-130  | 160-300 | 160-280 | 160-280  |
|                           |                                              |                                     | 800-1100                 | -                                         | -       | -       | -       | -       | 120-240 | -       | -       | 120-270 | 120-240 | 120-240  |
|                           | Ghisa sferoidale                             | ferritica                           | 550                      | 220-300                                   | -       | -       | -       | -       | 140-230 | -       | 120-160 | 140-230 | 140-230 | -        |
|                           |                                              | perlitica                           | 800                      | 150-230                                   | -       | -       | -       | -       | 120-170 | -       | 120-180 | 120-170 | 120-170 | -        |
|                           | Ghisa malleabile                             | ferritica                           | 450                      | 200-300                                   | -       | -       | -       | -       | 150-210 | -       | 140-220 | 150-210 | 150-210 | -        |
|                           |                                              | perlitica                           | 750                      | 170-230                                   | -       | -       | -       | -       | 150-210 | -       | 110-160 | 150-210 | 150-210 | -        |
|                           | N                                            | Leghe di alluminio a truciolo lungo | non trattabile           | 200                                       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| temprabile, trattato      |                                              |                                     | 350                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| Fusioni di Alluminio      |                                              | ≤ 12% Si, temprato                  | 250                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
|                           |                                              | ≤ 12% Si, temprabile, trattato      | 300                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
|                           |                                              | ≤ 12% Si, non trattabile            | 450                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
|                           |                                              | Leghe di Rame (Bronzo, Ottone)      | Leghe di Piombo, Pb > 1% | 400                                       | -       | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500  |
| Ottone, Bronzo            |                                              |                                     | 300                      | -                                         | -       | -       | -       | -       | 200-500 | -       | -       | 200-650 | 200-500 | 150-500  |
| Bronzo alluminio          |                                              |                                     | 500                      | -                                         | -       | -       | -       | -       | 160-450 | -       | -       | 160-350 | 160-300 | 120-400  |
| Rame e rame elettrolitico |                                              |                                     | 200                      | -                                         | -       | -       | -       | -       | 100-320 | -       | -       | 120-220 | 120-200 | 120-250  |
| Materiali non ferrosi     |                                              | Plastiche dure                      |                          | -                                         | -       | -       | -       | -       | 160-600 | -       | -       | 160-600 | 160-600 | -        |
|                           |                                              | Plastiche rinforzate                |                          | -                                         | -       | -       | -       | -       | 100-300 | -       | -       | 100-300 | 100-300 | 100-300  |
|                           |                                              | Gomme dure                          |                          | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -        |
| S                         |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto    | 700                                       | -       | 20-40   | 20-40   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60    |
|                           | a base di Fe, temprato                       |                                     | 950                      | -                                         | 15-35   | 15-35   | -       | -       | 20-60   | -       | 20-50   | 20-70   | 20-60   | 20-60    |
|                           | a base di Ni, ricotto                        |                                     | 800                      | -                                         | 8-25    | 8-25    | -       | -       | 15-50   | -       | 15-40   | 15-60   | 15-50   | 15-50    |
|                           | a base di Co, da fusione                     |                                     | 1100                     | -                                         | 4-15    | 4-15    | -       | -       | 15-40   | -       | 10-25   | 15-50   | 15-40   | 15-40    |
|                           | a base di Co, temprato                       |                                     | 1200                     | -                                         | 4-15    | 4-15    | -       | -       | 15-40   | -       | 20-35   | 15-50   | 15-40   | 15-40    |
|                           | Leghe di Titanio                             | titanio puro                        | 500-700                  | -                                         | 80-130  | 80-130  | -       | -       | 90-180  | -       | 80-140  | 100-210 | 90-180  | -        |
|                           | Leghe Alfa e Beta, trattate                  |                                     | 700-1000                 | -                                         | 15-35   | 15-35   | -       | -       | 40-80   | -       | 25-45   | 40-90   | 40-80   | -        |
| H                         | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350                | -                                         | -       | -       | -       | -       | 30-50   | -       | -       | 30-55   | 30-50   | -        |
|                           |                                              | temprato e rinvenuto                | 1350-1700                | -                                         | -       | -       | -       | -       | 10-25   | -       | -       | 15-25   | 10-25   | -        |
|                           | Ghisa temprata                               | da fusione                          | 1350                     | -                                         | -       | -       | -       | -       | 40-70   | -       | -       | 40-80   | 40-70   | -        |
|                           | Ghisa trattata                               | temprato e rinvenuto                | 1900                     | -                                         | -       | -       | -       | -       | 10-25   | -       | -       | 15-30   | 10-25   | -        |

I dati indicati in tabella sono valori approssimati.  
Può essere necessario adattarli alle singole applicazioni di lavorazione.

Altre tipi li trovate  
nelle pagine seguenti.



## Tornitura – Metallo duro

rivestito

| ISO                       | Materiale                                    |                                     | Resistenza<br>[N/mm²]    | Velocità di taglio V <sub>c</sub> (m/min) |         |         |         |         |         |         |         |         |         |         |       |
|---------------------------|----------------------------------------------|-------------------------------------|--------------------------|-------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
|                           |                                              |                                     |                          | AM5130                                    | AM5220  | AP2025  | AP2035  | AP2110  | AP2120  | AP2310  | AP2320  | AP2335  | AP5210  | AM350   |       |
| P                         | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                      | 170-240                                   | 180-280 | 190-240 | 180-230 | 300-400 | 250-350 | 300-400 | 250-350 | 180-270 | 220-370 | 180-230 |       |
|                           |                                              | ca. 0,45% C                         | 650                      | 160-220                                   | 160-250 | 170-200 | 170-190 | 260-350 | 210-300 | 260-350 | 210-300 | 170-230 | 180-330 | 170-190 |       |
|                           |                                              | ca. 0,75% C                         | 1000                     | 140-200                                   | 120-220 | 130-160 | 130-150 | 240-300 | 180-230 | 240-300 | 180-230 | 160-210 | 150-290 | 100-140 |       |
|                           | Acciaio debolmente legati                    |                                     | 600                      | 170-220                                   | 160-250 | 170-200 | 170-190 | 220-300 | 180-270 | 220-300 | 180-270 | 160-220 | 180-320 | 170-190 |       |
|                           |                                              |                                     | 900                      | 170-200                                   | 140-230 | 100-160 | 90-150  | 180-260 | 160-220 | 180-260 | 160-220 | 140-180 | 170-290 | 90-150  |       |
|                           |                                              |                                     | 1200                     | 150-200                                   | 120-200 | 80-140  | 70-130  | 120-220 | 100-200 | 120-220 | 100-200 | 100-160 | 150-260 | 70-130  |       |
|                           | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                      | 80-150                                    | 70-150  | 130-170 | 120-200 | 150-220 | 130-200 | 150-220 | 130-200 | 130-180 | 80-180  | 120-200 |       |
|                           |                                              | temprato e rinvenuto                | 1100                     | 40-120                                    | 35-120  | 80-130  | 50-100  | 70-150  | 70-140  | 70-150  | 70-140  | 70-120  | 40-150  | 50-100  |       |
|                           | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                      | 40-160                                    | 50-160  | 130-180 | 140-180 | -       | -       | -       | -       | -       | 40-140  | 140-180 |       |
|                           |                                              | martensitico, temprato              | 1000                     | 40-160                                    | 40-140  | 110-160 | 110-160 | -       | -       | -       | -       | -       | 40-120  | 110-160 |       |
| M                         | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600                  | 80-150                                    | 70-150  | 100-170 | 110-190 | -       | -       | -       | -       | -       | 70-150  | 120-190 |       |
|                           |                                              | trattato o temprato                 | 600-900                  | 40-120                                    | 35-120  | -       | 80-150  | -       | -       | -       | -       | -       | 35-120  | 80-150  |       |
| K                         | Ghisa grigia                                 | perlitica, ferritica                | 500-700                  | 180-240                                   | 180-300 | 130-200 | -       | 160-230 | -       | -       | -       | -       | 180-350 | -       |       |
|                           |                                              | perlitica, martensitica             | 700-850                  | 160-220                                   | 160-280 | 120-180 | -       | 150-200 | -       | -       | -       | -       | 160-300 | -       |       |
|                           |                                              |                                     | 800-1100                 | 120-200                                   | 120-240 | -       | -       | -       | -       | -       | -       | -       | 120-270 | -       |       |
|                           | Ghisa sferoidale                             | ferritica                           | 550                      | 140-200                                   | 140-230 | 120-170 | -       | 160-210 | -       | -       | -       | -       | 140-230 | -       |       |
|                           |                                              | perlitica                           | 800                      | 110-160                                   | 120-170 | 120-190 | -       | 130-170 | -       | -       | -       | -       | 120-170 | -       |       |
|                           | Ghisa malleabile                             | ferritica                           | 450                      | 130-190                                   | 150-210 | 150-230 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |       |
|                           |                                              | perlitica                           | 750                      | 130-190                                   | 150-210 | 120-170 | -       | 150-210 | -       | -       | -       | -       | 150-210 | -       |       |
|                           | N                                            | Leghe di alluminio a truciolo lungo | non trattabile           | 200                                       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       | -     |
| temprabile, trattato      |                                              |                                     | 350                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
| Fusioni di Alluminio      |                                              | ≤ 12% Si, temprato                  | 250                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | ≤ 12% Si, temprabile, trattato      | 300                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | ≤ 12% Si, non trattabile            | 450                      | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | Leghe di Rame (Bronzo, Ottone)      | Leghe di Piombo, Pb > 1% | 400                                       | 200-500 | -       | -       | -       | -       | -       | -       | -       | -       | -       | -     |
| Ottone, Bronzo            |                                              |                                     | 300                      | 200-500                                   | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
| Bronzo alluminio          |                                              |                                     | 500                      | 150-220                                   | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
| Rame e rame elettrolitico |                                              |                                     | 200                      | 120-220                                   | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
| Materiali non ferrosi     |                                              | Plastiche dure                      |                          | 140-500                                   | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | Plastiche rinforzate                |                          | 100-300                                   | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | Gomme dure                          |                          | -                                         | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
| S                         |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto    | 700                                       | 20-50   | 20-60   | 20-40   | 20-40   | -       | -       | -       | -       | -       | 20-70   | 20-40 |
|                           |                                              |                                     | a base di Fe, temprato   | 950                                       | 20-50   | 20-60   | 15-35   | 15-35   | -       | -       | -       | -       | -       | 20-70   | 15-35 |
|                           | a base di Ni, ricotto                        |                                     | 800                      | 15-40                                     | 15-50   | 10-30   | 8-25    | -       | -       | -       | -       | -       | 15-60   | 8-25    |       |
|                           | a base di Co, da fusione                     |                                     | 1100                     | 15-40                                     | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |       |
|                           | a base di Co, temprato                       |                                     | 1200                     | 15-40                                     | 15-40   | 5-18    | 4-15    | -       | -       | -       | -       | -       | 15-50   | 4-15    |       |
|                           | Leghe di Titanio                             | titanio puro                        | 500-700                  | 80-170                                    | -       | 80-130  | 80-130  | -       | -       | -       | -       | -       | -       | -       |       |
|                           | Leghe Alfa e Beta, trattate                  |                                     | 700-1000                 | 40-70                                     | -       | 20-40   | 15-35   | -       | -       | -       | -       | -       | -       | -       |       |
| H                         | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350                | 30-45                                     | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           |                                              | temprato e rinvenuto                | 1350-1700                | 15-25                                     | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           | Ghisa temprata                               | da fusione                          | 1350                     | 40-65                                     | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |
|                           | Ghisa trattata                               | temprato e rinvenuto                | 1900                     | 15-25                                     | -       | -       | -       | -       | -       | -       | -       | -       | -       | -       |       |

I dati indicati in tabella sono valori approssimati.  
Può essere necessario adattarli alle singole applicazioni di lavorazione.

Altre tipi li trovate  
nelle pagine seguenti.

4

## Tornitura – Metallo duro

non rivestito

| ISO                            | Materiale                                    |                                     | Resistenza<br>[N/mm²]  | Velocità di taglio V <sub>c</sub> (m/min) |          |          |          |
|--------------------------------|----------------------------------------------|-------------------------------------|------------------------|-------------------------------------------|----------|----------|----------|
|                                |                                              |                                     |                        | AK1010                                    | AK1020   | AK20     |          |
| P                              | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                    | -                                         | -        | -        |          |
|                                |                                              | ca. 0,45% C                         | 650                    | -                                         | -        | -        |          |
|                                |                                              | ca. 0,75% C                         | 1000                   | -                                         | -        | -        |          |
|                                | Acciaio debolmente legati                    |                                     | 600                    | -                                         | -        | -        |          |
|                                |                                              |                                     | 900                    | -                                         | -        | -        |          |
|                                |                                              |                                     | 1200                   | -                                         | -        | -        |          |
|                                | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                    | -                                         | -        | -        |          |
|                                |                                              | temprato e rinvenuto                | 1100                   | -                                         | -        | -        |          |
|                                | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                    | -                                         | -        | -        |          |
|                                |                                              | martensitico, temprato              | 1000                   | -                                         | -        | -        |          |
| M                              | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600                | -                                         | -        | -        |          |
|                                |                                              | trattato o temprato                 | 600-900                | -                                         | -        | -        |          |
| K                              | Ghisa grigia                                 | perlitica, ferritica                | 500-700                | 120-160                                   | 120-160  | 120-160  |          |
|                                |                                              | perlitica, martensitica             | 700-850                | 90-140                                    | 90-140   | 90-140   |          |
|                                |                                              |                                     | 800-1100               | 80-140                                    | 80-140   | 80-140   |          |
|                                | Ghisa sferoidale                             | ferritica                           | 550                    | 130-170                                   | 130-170  | 130-170  |          |
|                                |                                              | perlitica                           | 800                    | 90-130                                    | 90-130   | 90-130   |          |
|                                | Ghisa malleabile                             | ferritica                           | 450                    | 140-200                                   | 140-200  | 140-200  |          |
|                                |                                              | perlitica                           | 750                    | 120-160                                   | 120-160  | 120-160  |          |
|                                | N                                            | Leghe di alluminio a truciolo lungo | non trattabile         | 200                                       | 300-2500 | 300-2500 | 300-2500 |
| temprabile, trattato           |                                              |                                     | 350                    | 200-2000                                  | 200-2000 | 200-2000 |          |
| Fusioni di Alluminio           |                                              | ≤ 12% Si, temprato                  | 250                    | 400-1500                                  | 400-1500 | 400-1500 |          |
|                                |                                              | ≤ 12% Si, temprabile, trattato      | 300                    | 400-1500                                  | 400-1500 | 400-1500 |          |
|                                |                                              | ≤ 12% Si, non trattabile            | 450                    | 200-800                                   | 200-800  | 200-800  |          |
| Leghe di Rame (Bronzo, Ottone) |                                              | Leghe di Piombo, Pb > 1%            | 400                    | 250-600                                   | 250-600  | 250-600  |          |
|                                |                                              | Ottone, Bronzo                      | 300                    | 200-600                                   | 200-600  | 200-600  |          |
|                                |                                              | Bronzo alluminio                    | 500                    | 150-400                                   | 150-400  | 150-400  |          |
|                                |                                              | Rame e rame elettrolitico           | 200                    | 150-300                                   | 150-300  | 150-300  |          |
| Materiali non ferrosi          |                                              | Plastiche dure                      |                        | 80-180                                    | 80-180   | 80-180   |          |
|                                |                                              | Plastiche rinforzate                |                        | 60-150                                    | 60-150   | 60-150   |          |
|                                |                                              | Gomme dure                          |                        | 100-250                                   | 100-250  | 100-250  |          |
| S                              |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto  | 700                                       | 15-40    | -        | -        |
|                                |                                              |                                     | a base di Fe, temprato | 950                                       | 8-28     | -        | -        |
|                                | a base di Ni, ricotto                        |                                     | 800                    | 10-30                                     | -        | -        |          |
|                                | a base di Co, da fusione                     |                                     | 1100                   | 8-25                                      | -        | -        |          |
|                                | a base di Co, temprato                       |                                     | 1200                   | 8-25                                      | -        | -        |          |
|                                | Leghe di Titanio                             | titanio puro                        | 500-700                | 60-120                                    | 60-120   | -        |          |
|                                | Leghe Alfa e Beta, trattate                  |                                     | 700-1000               | 30-80                                     | 30-80    | 30-80    |          |
| H                              | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350              | -                                         | -        | -        |          |
|                                |                                              | temprato e rinvenuto                | 1350-1700              | -                                         | -        | -        |          |
|                                | Ghisa temprata                               | da fusione                          | 1350                   | -                                         | -        | -        |          |
|                                | Ghisa trattata                               | temprato e rinvenuto                | 1900                   | -                                         | -        | -        |          |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.



| ISO                                                                                                                                                                                                                                          | Hochpositiv beschichtet<br>High positive coated<br>Ultra positivi rivestito                                     | Hochpositiv unbeschichtet<br>High positive uncoated<br>Ultra positivi non rivestito | Schneidstoff<br>Cutting material<br>Materiale da taglio                                                                                                                                                      | Anwendung<br>Application<br>Parametri |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>P</b><br><b>Stahl, Stahlguss, langspanender Temperguss</b><br><i>Steel, cast steel, malleable iron</i><br>Acciaio, acciaio da fusione, ghisa malleabile da truciolo lungo                                                                 | 10 AL10 AL20<br>20 AM5015 AM5025 AM5120 AP5210 AT10 AT20 PVD1 PVD2<br>30<br>40<br>50                            |                                                                                     | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |
| <b>M</b><br><b>Rostfreier Stahl, Stahlguss, Manganstahl, Automatenstahl</b><br><i>Stainless steel, cast steel, manganese steel, free cutting steel</i><br>Acciaio Inossidabile, Acciaio da Fusione, Acciaio al Manganese, Acciaio Automatico | 10 AL10 AL20<br>20 AM5015 AM5025 AM5110 AM5120 AM520+ AM5220 AM530 AP5210 AT10 AT20 PVD1 PVD2<br>30<br>40<br>50 |                                                                                     | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |
| <b>K</b><br><b>Grauguss, Kokillenhartguss, kurzspanender Temperguss</b><br><i>Grey cast iron, chilled hard cast iron, short chipping malleable iron</i><br>Ghisa grigia, ghisa sferoidale, ghisa malleabile a truciolo corto                 | 10 AL10 AL20<br>20 AM5015 AM5025 AM5110 AM5120 AM520+ AM5220 AP5210 AT10 AT20<br>30<br>40<br>50                 | AK10 AK20                                                                           | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |
| <b>N</b><br><b>Aluminium und Al-Legierungen, nichtmetallische Werkstoffe</b><br><i>Aluminum and Al-alloys, non-ferrous materials</i><br>Alluminio e sue leghe, materiali non ferrosi o non metallici                                         | 10 AM5110<br>20 AM5120 AM5120+ AT10 AT20 PVD1 PVD2<br>30<br>40<br>50                                            | AK10 AK20                                                                           | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |
| <b>S</b><br><b>Warmfeste Legierungen, Titanlegierungen</b><br><i>High temperature resistant alloys, titanium alloys</i><br>Leghe refrattarie, leghe esotiche, leghe di titanio                                                               | 10 AL10 AL20<br>20 AM5015 AM5025 AM510 AM5120 AM520+ AM5220 AP5210 AT10 AT20<br>30<br>40<br>50                  | AK10 AK20                                                                           | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |
| <b>H</b><br><b>Gehärteter Stahl, Hartguss</b><br><i>Hardened steel, hard cast iron</i><br>Acciaio temprato, ghisa temprata                                                                                                                   |                                                                                                                 |                                                                                     | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |                                       |

Hauptanwendungsbereich / Main application area / Applicazione principale

 AK1020 Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

Nebenanwendungsbereich / Secondary application area / Applicazione dsecondaria

 AK1020 Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

## Beschichtet / Coated / Rivestito

## AM5015

**PVD-Mehrlagenbeschichtung**  
Verschleißfeste Sorte mit guter Schneidkantensicherheit zur Bearbeitung von Stählen, Stahlguss, rostfreien Stählen und hochwarmfesten Werkstoffen (auch Superlegierungen und Hochtemperaturlegierungen).

*PVD-multilayer coating*  
Wear resistant grade for machining steel, cast steel, stainless steel and high temperature alloys (super alloys).

Rivestimento PVD-multistrato  
Qualità resistente all'usura con un buon filo tagliente per la lavorazione di acciaio, acciaio da fusione, acciaio inossidabile e materiali refrattari come superleghe e leghe ad alta temperatura.

## AM5025

**PVD-Mehrlagenbeschichtung**  
Optimale Sorte für die Bearbeitung von rostfreien Stählen, warmfesten Stählen und Titanlegierungen bei der Schlicht- bis mittleren Bearbeitung. Die AM5025 weist eine sehr gute Zähigkeit und eine gute Verschleißfestigkeit auf. Sie ist auch für wechselnde Schnitttiefen und unterbrochene Schnitte geeignet.

*PVD-multilayer coating*  
Ideal grade for finish to medium machining of stainless steel, temperature resistant steel and titanium (alloys). AM5025 has very good toughness and good wear resistance and can be used both at varied cutting depths and interrupted cutting.

Rivestimento PVD-multistrato  
Qualità ideale per la finitura e semi-finitura di acciaio inossidabile, leghe refrattarie ed esotiche e leghe di titanio. AM5025 ha una ottima tenacità combinata ad una ottima resistenza all'usura e può essere utilizzato con profondità di passata variabili e con taglio interrotto.

## AM5110

**PVD-Mehrlagenbeschichtung**  
Optimale Sorte für die Feinbearbeitung von VA-Stählen, Nickel- und Titanlegierungen sowie exotischen Werkstoffen. Hohe Beständigkeit bei der Bearbeitung abrasiver und naturharter Werkstoffe wie CoCrMo und Hartguss.

*PVD-multilayer coating*  
Grade for finish machining of stainless steel, nickel -, titanium alloys and exotic materials. Also for abrasive and hard materials such as CoCrMo and chilled cast iron.

Rivestimento PVD-multistrato  
Qualità sviluppata per la lavorazione di precisione di acciai inossidabili, leghe di Nickel, leghe di Titanio, e materiali esotici. Ottima per la lavorazione di materiali abrasivi e duri come leghe Co, Cr, Mo o ghise dure.

## AM5120

**PVD-Mehrlagenbeschichtung**  
Sorte für die Schruppbearbeitung von rostfreien Stählen, auch besonders geeignet für exotische Materialien, hitzebeständige Legierungen und Titanlegierungen.

*PVD-multilayer coating*  
The grade for roughing stainless steel and machining of exotic and heat resistant materials as well as titanium alloys.

Rivestimento PVD-multistrato  
Grado per la sgrossatura di acciai inossidabili, particolarmente adatti per materiali esotici, leghe resistenti al calore e leghe di titanio.

## AM5120+

**PVD-Mehrlagenbeschichtung**  
Geeignet für die mittlere und gröbere Bearbeitung von zähen, exotischen Werkstoffen wie E-Cu, Molybdän, Nickel, Reineisen. Drehen in Inconel und VA-Stählen bei hoher Schneidkantenstabilität.

*PVD-multilayer coating*  
Suitable for medium and roughing of tough exotic materials such as pure copper, molybdenum, nickel, pure iron, Inconel and stainless steel.

Rivestimento PVD-multistrato  
Qualità adatta alla sgrossatura media di materiali esotici come E-Co, leghe con Molibdeno, Nickel, ferro puro. Idoneo anche per la tornitura di Inconel e acciai inossidabili.

## AM5220

**PVD-Mehrlagenbeschichtung**  
Verschleißfeste Sorte zur Bearbeitung von Stählen, Stahlguss, rostfreien Stählen und hochwarmfesten Werkstoff-Superlegierungen.

*PVD-multilayer coating*  
High wear resistant grade for machining steel, cast steel, stainless steel and high temperature super alloys.

Rivestimento PVD-multistrato su base ISO-M.  
Grado resistente all'usura per la lavorazione di acciaio, fusioni, acciaio inossidabile, Superleghe.

## AP5210

**PVD-Mehrlagenbeschichtung**  
Universelle Sorte zur Feinbearbeitung von Stahl und rostfreien Stählen. Auch sehr gut geeignet für die mittlere und Feinbearbeitung von exotischen Werkstoffen, Titan und Titanlegierungen sowie Nickellegierungen. Hohe Beständigkeit bei der Bearbeitung abrasiver und naturharter Werkstoffe wie CoCrMo und Hartguss.

*PVD-multilayer coating*  
Medium to light machining of exotic materials, titanium, titanium alloys, nickel alloys, machining of abrasive and hard materials such as CoCrMo or chilled cast iron. Finishing of steel and stainless steel.

Rivestimento PVD-multistrato  
Qualità per media asportazione e finitura di materiali esotici, leghe di Titanio, leghe di Nickel. Ottima per la lavorazione di materiali abrasivi o duricome leghe Co, Cr, Mo o ghise dure. Ottima per la superfinitura di acciai e acciai inossidabili.

## AL10

### PVD-Mehrlagenbeschichtung

**Extrem verschleißfeste Sorte zur Bearbeitung von Stählen, Grauguss und rostfreien Stählen. Diese Sorte zeichnet sich durch hohe Beschichtungshärte und äußerst hohe Verschleißfestigkeit aus. Besonders geeignet für sehr hohe Schnittgeschwindigkeiten.**

### PVD-multilayer coating

*Extremely wear resistant grade for machining steel materials, cast iron and stainless steel. Due to the high hardness in coating, high wear resistance can be achieved. Specially suitable for high cutting speeds.*

### Rivestimento PVD-multistrato

Qualità con eccellente resistenza all'usura per la lavorazione di materiali acciaioli, ghise e materiali non ferrosi. Data la notevole durezza del rivestimento viene assicurata una elevata resistenza all'usura. Molto valida per alte velocità di taglio.

## AL20

### PVD-Mehrlagenbeschichtung

**Verschleißfeste Sorte mit guter Schneidkanten-sicherheit zur Bearbeitung von Stählen, Grauguss und rostfreien Stählen. Diese Sorte zeichnet sich durch hohe Beschichtungshärte und gute Verschleißfestigkeit aus.**

### PVD-multilayer coating

*Wear resistant grade with good cutting edge stability for machining steel materials, cast iron and stainless steel. Due to the high hardness in coating, good wear resistance can be achieved.*

### Rivestimento PVD-multistrato

Qualità con buona resistenza all'usura e con buona affidabilità del filo tagliente per la lavorazione di acciaio, ghisa e materiali non ferrosi. Il rivestimento con una elevata durezza assicura la buona resistenza all'usura.

## AT10

### PVD-Mehrlagenbeschichtung

**Zur Bearbeitung von Aluminium und Aluminium-legierungen, Kupfer, Bronze, NE-Metallen und hochschmelzenden Werkstoffen bei mittleren Spanquerschnitten und unter ungünstigen Bearbeitungsbedingungen. Höhere Schnittwerte als bei Sorte PVD1 möglich.**

### PVD-multilayer coating

*Grade for medium machining of aluminium, aluminium alloys, copper, brass, non-ferrous materials and refractory metals under favorable cutting conditions. Higher cutting speeds can be used as grade PVD1.*

### Rivestimento PVD-multistrato

Qualità per la lavorazione di alluminio, leghe di alluminio, rame, ottone, materiali non ferrosi e leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) con medi parametri di taglio ed in buone condizioni di lavoro. Si può utilizzare a velocità di taglio maggiori rispetto alla qualità PVD1.

## AT20

### PVD-Mehrlagenbeschichtung

**Hartmetallsorte mit höherer Zähigkeit zur Bearbeitung von Aluminium und Aluminium-legierungen, Kupfer, Bronze, NE-Metallen und hochschmelzenden Werkstoffen bei mittleren Spanquerschnitten und unter ungünstigen Bearbeitungsbedingungen (unterbrochene Schnitte). Höhere Schnittwerte als bei Sorte PVD2 möglich.**

### PVD-multilayer coating

*Grade with higher toughness for medium machining of aluminium and aluminium alloys, copper, brass, non-ferrous materials and refractory metals under unfavorable cutting conditions. Higher cutting speeds can be used as grade PVD2.*

### Rivestimento PVD-multistrato

Qualità più tenace per la lavorazione di alluminio, leghe di alluminio, rame, ottone, materiali non ferrosi e leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) con medi parametri di taglio ed in buone condizioni di lavoro. Si può utilizzare a velocità di taglio maggiori rispetto alla qualità PVD2.

## PVD1

### PVD-Mehrlagenbeschichtung

**Feinkorn-Hartmetallsorte mit hoher Verschleißfestigkeit und gutem Widerstand gegen plastische Verformung für die leichte bis mittlere Zerspanung. Speziell zur Zerspanung von NE-Metallen, wie z. B. Al und Al-Legierungen, Kupfer, Bronze und hochschmelzenden Werkstoffen.**

### PVD-multilayer coating

*Submicron carbide grade with high wear resistance and resistance against crater wear. Light to medium cutting. Excellent for machining non-ferrous products, e. g. Al and Al-alloys, copper, brass and refractory metals.*

### Rivestimento PVD-multistrato

Qualità con base sub-micrograna per una elevata resistenza all'usura ed alla craterizzazione. Idonea alla finitura e semi-finitura. Eccellente per la lavorazione di materiali non ferrosi come Alluminio, leghe di Alluminio, Rame, Ottone, Leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) e Ghisa grigia.

## PVD2

### PVD-Mehrlagenbeschichtung

**Verschleißfeste Sorte mit guter Schneidkanten-sicherheit zur Bearbeitung von NE-Metallen, wie z. B. Al und Al-Legierungen, Kupfer, Bronze und hochschmelzenden Werkstoffen unter ungünstigen Bearbeitungsbedingungen. Auch geeignet für die Zerspanung von Stahl und rostfreiem Stahl im unteren Schlichtbereich bei guten Bearbeitungsbedingungen.**

### PVD-multilayer coating

*Wear resistant grade with good cutting edge stability for machining non-ferrous materials, e. g. Al and Al-alloys, copper, brass and refractory metals under unfavorable machining conditions. Also suitable for finishing steel and stainless steel under favorable machining conditions.*

### Rivestimento PVD-multistrato

Qualità resistente all'usura con buona stabilità del filo tagliente per la lavorazione di materiali non ferrosi come Alluminio e le sue leghe, Rame, Ottone e Leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) in condizioni sfavorevoli di lavoro. Anche idoneo alla finitura di acciaio ed acciaio inossidabile in condizioni di lavoro stabili.

Unbeschichtet / *Uncoated* / Non rivestito

## AK10

Feinkorn-Hartmetallsorte zur Bearbeitung von Al und Al-Legierungen, Kupfer, Bronze, NE-Metallen und hochschmelzenden Werkstoffen bei mittleren Spanquerschnitten unter günstigen Bearbeitungsbedingungen.

*Carbide grade for machining all cast iron materials, Ti and Ti-alloys at medium chip cross sections under favorable machining conditions.*

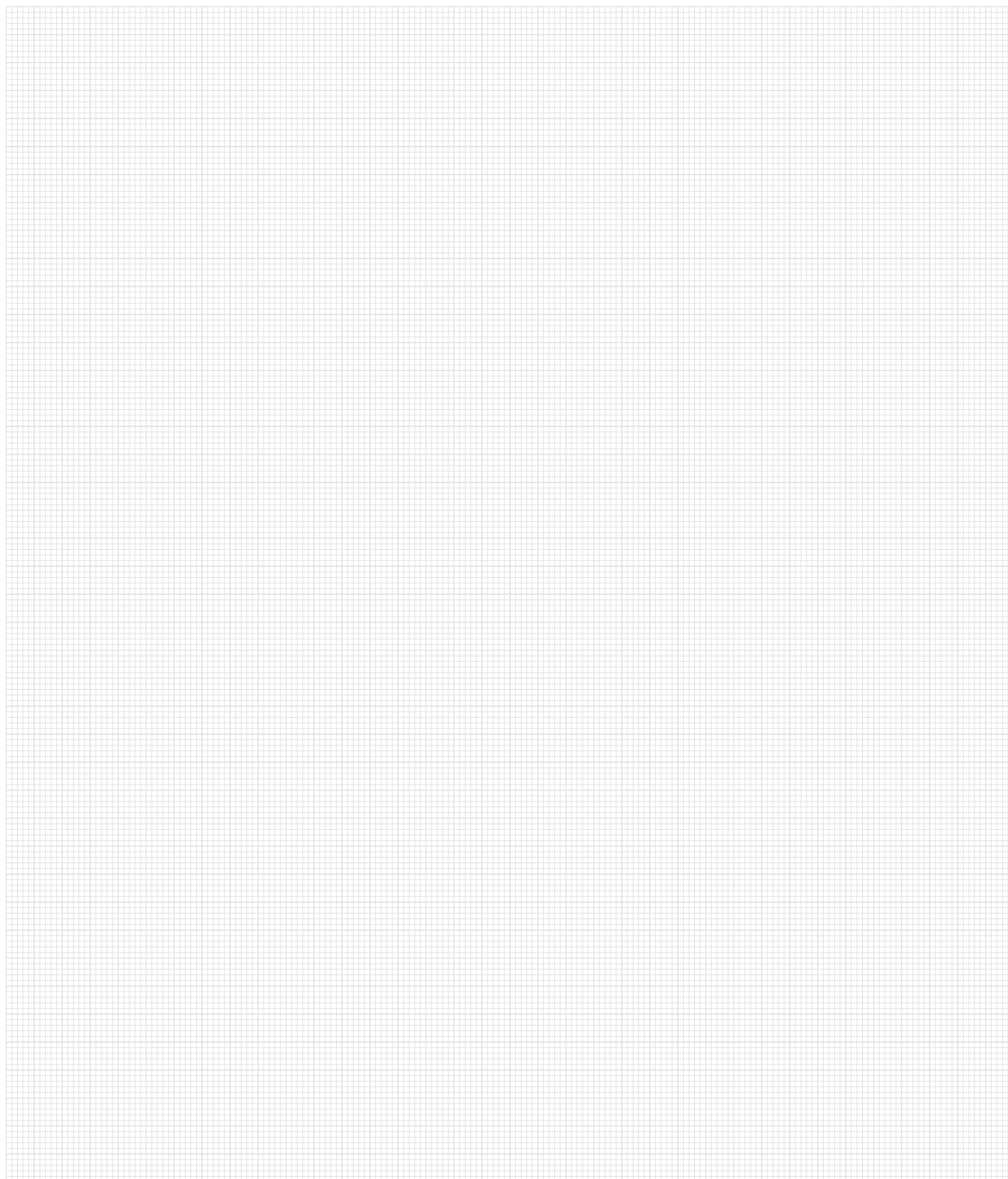
Grado di metallo duro Sub-micrograna per la lavorazione di Alluminio e leghe di Alluminio, Rame, Ottone, Metalli non ferrosi e Leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) con sezione truciolo media in condizioni stabili di lavoro.

## AK20

Hartmetallsorte mit höherer Zähigkeit zur Bearbeitung von Al und Al-Legierungen, Kupfer, Bronze, NE-Metallen und hochschmelzenden Werkstoffen bei mittleren Spanquerschnitten unter ungünstigen Bearbeitungsbedingungen, wie unterbrochene Schnitte.

*Carbide grade with higher toughness as AK10 for machining all cast iron materials at medium chip cross sections under unfavorable machining conditions.*

Grado di metallo duro con maggiore tenacità rispetto ad AK10 per la lavorazione di Alluminio e le sue leghe, Rame, Ottone, Materiali non ferrosi, Leghe refrattarie (Niobio, Tantalio, Molibdeno, Tungsteno) con parametri medi di taglio in condizioni di lavoro instabili e tagli interrotti.



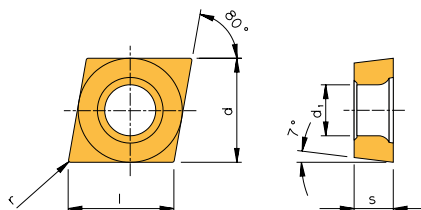
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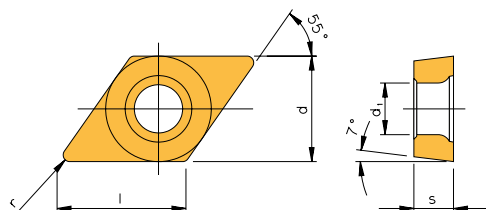
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**Bezeichnung**  
Designation  
Articolo

|                           | <b>l</b> | <b>d</b> | <b>s</b> | <b>d<sub>1</sub></b> | <b>r</b> | <b>PG</b>   |
|---------------------------|----------|----------|----------|----------------------|----------|-------------|
| <b>CCGT 0602005FN-ALU</b> | 6,45     | 6,350    | 2,38     | 2,8                  | 0,05     | <b>6</b>    |
| <b>CCGT 060201FN-ALU</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,1      | <b>6</b>    |
| <b>CCGT 060202FN-ALU</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,2      | <b>6</b>    |
| <b>CCGT 060204FN-ALU</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T301FN-ALU</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,1      | <b>6</b>    |
| <b>CCGT 09T302FN-ALU</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,2      | <b>6</b>    |
| <b>CCGT 09T304FN-ALU</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T308FN-ALU</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,8      | <b>6</b>    |
| <b>CCGT 060204FN-ACB</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T304EN-ACB</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T304FN-ACB</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T308EN-ACB</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,8      | <b>6/22</b> |
| <b>CCGT 09T308FN-ACB</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,8      | <b>6/22</b> |
| <b>CCGT 0602005FN-ASF</b> | 6,45     | 6,350    | 2,38     | 2,8                  | 0,05     | <b>6</b>    |
| <b>CCGT 060201EN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,1      | <b>6/22</b> |
| <b>CCGT 060201FN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,1      | <b>6</b>    |
| <b>CCGT 060202EN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,2      | <b>6/22</b> |
| <b>CCGT 060202FN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,2      | <b>6/22</b> |
| <b>CCGT 060204EN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>6/22</b> |
| <b>CCGT 060204FN-ASF</b>  | 6,45     | 6,350    | 2,38     | 2,8                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T3005FN-ASF</b> | 9,67     | 9,525    | 3,97     | 4,4                  | 0,05     | <b>6</b>    |
| <b>CCGT 09T301FN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,1      | <b>6</b>    |
| <b>CCGT 09T302EN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,2      | <b>6/22</b> |
| <b>CCGT 09T302FN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,2      | <b>6</b>    |
| <b>CCGT 09T304EN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T304FN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,4      | <b>6/22</b> |
| <b>CCGT 09T308FN-ASF</b>  | 9,67     | 9,525    | 3,97     | 4,4                  | 0,8      | <b>6/22</b> |





DC..

Bezeichnung  
Designation  
Articolo

l d s d<sub>1</sub> r PG



DCGT 0702005FN-ALU

7,75

6,350

2,38

2,8

0,05

6

DCGT 070201FN-ALU

7,75

6,350

2,38

2,8

0,1

6

DCGT 070202FN-ALU

7,75

6,350

2,38

2,8

0,2

6

DCGT 070204FN-ALU

7,75

6,350

2,38

2,8

0,4

6/22

DCGT 11T3005FN-ALU

11,60

9,525

3,97

4,4

0,05

6

DCGT 11T301FN-ALU

11,60

9,525

3,97

4,4

0,1

6

DCGT 11T302FN-ALU

11,60

9,525

3,97

4,4

0,2

6

DCGT 11T304FN-ALU

11,60

9,525

3,97

4,4

0,4

6/22

DCGT 11T308FN-ALU

11,60

9,525

3,97

4,4

0,8

6



DCGT 070204FN-ACB

7,75

6,350

2,38

2,8

0,4

6/22

DCGT 11T304EN-ACB

11,60

9,525

3,97

4,4

0,4

6/22

DCGT 11T304FN-ACB

11,60

9,525

3,97

4,4

0,4

6/22

DCGT 11T308EN-ACB

11,60

9,525

3,97

4,4

0,8

6/22

DCGT 11T308FN-ACB

11,60

9,525

3,97

4,4

0,8

6/22



DCGT 0702005FN-ASF

7,75

6,350

2,38

2,8

0,05

6

DCGT 0702015EN-ASF

7,75

6,350

2,38

2,8

0,15

22

DCGT 070201EN-ASF

7,75

6,350

2,38

2,8

0,1

6/22

DCGT 070201FN-ASF

7,75

6,350

2,38

2,8

0,1

6

DCGT 070202EN-ASF

7,75

6,350

2,38

2,8

0,2

6/22

DCGT 070202FN-ASF

7,75

6,350

2,38

2,8

0,2

6/22

DCGT 070204EN-ASF

7,75

6,350

2,38

2,8

0,4

6/22

DCGT 070204FN-ASF

7,75

6,350

2,38

2,8

0,4

6/22

DCGT 11T3005FN-ASF

11,60

9,525

3,97

4,4

0,05

6

DCGT 11T3015EN-ASF

11,60

9,525

3,97

4,4

0,15

22

DCGT 11T301EN-ASF

11,60

9,525

3,97

4,4

0,1

6/22

DCGT 11T301FN-ASF

11,60

9,525

3,97

4,4

0,1

6

DCGT 11T302EN-ASF

11,60

9,525

3,97

4,4

0,2

6/22

DCGT 11T302FN-ASF

11,60

9,525

3,97

4,4

0,2

6

DCGT 11T3035EN-ASF

11,60

9,525

3,97

4,4

0,35

22

DCGT 11T304EN-ASF

11,60

9,525

3,97

4,4

0,4

6/22

DCGT 11T304FN-ASF

11,60

9,525

3,97

4,4

0,4

6/22

DCGT 11T308EN-ASF

11,60

9,525

3,97

4,4

0,8

6/22

DCGT 11T308FN-ASF

11,60

9,525

3,97

4,4

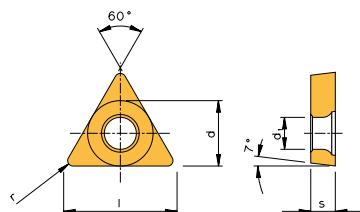
0,8

6/22



## Sorten / Grades / Qualità

| beschichtet/coated/rivestito |                  |                  |                   |                  |      |      |      |      |      |      |  | unbeschichtet/<br>uncoated/<br>non rivestito |      | Bezeichnung<br>Designation<br>Articolo                                 |
|------------------------------|------------------|------------------|-------------------|------------------|------|------|------|------|------|------|--|----------------------------------------------|------|------------------------------------------------------------------------|
| AM5015<br>(PG22)             | AM5025<br>(PG22) | AM5110<br>(PG22) | AM5120+<br>(PG22) | AP5210<br>(PG22) | AL10 | AL20 | AT10 | AT20 | PVD1 | PVD2 |  | AK10                                         | AK20 |                                                                        |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 0702005FN-ALU                                                     |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 070201FN-ALU                                                      |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 070202FN-ALU                                                      |
|                              |                  |                  |                   | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 070204FN-ALU                                                      |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T3005FN-ALU                                                     |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T301FN-ALU                                                      |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T302FN-ALU                                                      |
|                              |                  |                  |                   | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T304FN-ALU                                                      |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T308FN-ALU                                                      |
|                              |                  |                  |                   | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 070204FN-ACB                                                      |
|                              |                  |                  | ●                 |                  | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T304EN-ACB                                                      |
|                              |                  |                  | ●                 | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T304FN-ACB                                                      |
|                              |                  |                  |                   | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T308EN-ACB                                                      |
|                              |                  |                  |                   | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                            | ●    | DCGT 11T308FN-ACB                                                      |
|                              |                  |                  |                   |                  | ●    | ●    | ●    | ●    | ●    | ●    |  |                                              | ●    | DCGT 0702005FN-ASF                                                     |
|                              | ●                |                  |                   |                  |      |      |      |      |      |      |  |                                              | ●    | DCGT 0702015EN-ASF                                                     |
|                              | ●                |                  |                   |                  |      |      |      |      |      |      |  |                                              | ●    | DCGT 070201EN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 070201FN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 070202EN-ASF                                                      |
|                              | ●                | ●                | ●                 |                  | ●    | ●    | ●    | ●    |      | ●    |  | ●                                            | ●    | DCGT 070202FN-ASF                                                      |
|                              |                  | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 070204EN-ASF                                                      |
|                              |                  | ●                |                   |                  | ●    | ●    | ●    | ●    |      | ●    |  | ●                                            | ●    | DCGT 070204FN-ASF                                                      |
|                              | ●                |                  |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T3005FN-ASF                                                     |
|                              | ●                |                  |                   |                  |      |      |      |      |      |      |  |                                              | ●    | DCGT 11T3015EN-ASF                                                     |
|                              | ●                |                  |                   |                  |      |      |      |      |      |      |  |                                              | ●    | DCGT 11T301EN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T301FN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T302EN-ASF                                                      |
|                              | ●                |                  |                   |                  | ●    | ●    | ●    | ●    |      | ●    |  | ●                                            | ●    | DCGT 11T302FN-ASF                                                      |
|                              | ●                | ●                |                   |                  |      |      |      |      |      |      |  | ●                                            | ●    | DCGT 11T3035EN-ASF                                                     |
|                              | ●                | ●                | ●                 |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T304EN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      | ●    |  | ●                                            | ●    | DCGT 11T304FN-ASF                                                      |
|                              | ●                | ●                |                   |                  |      |      |      |      |      |      |  | ●                                            | ●    | DCGT 11T308EN-ASF                                                      |
|                              | ●                | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T308FN-ASF                                                      |
|                              |                  | ●                |                   |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                            | ●    | DCGT 11T308FN-ASF                                                      |
| AM5015<br>(PG22)             | AM5025<br>(PG22) | AM5110<br>(PG22) | AM5120+<br>(PG22) | AP5210<br>(PG22) | AL10 | AL20 | AT10 | AT20 | PVD1 | PVD2 |  | AK10                                         | AK20 |                                                                        |
| P                            | ●                | ○                |                   | ●                | ●    | ●    | ○    | ○    | ○    | ○    |  |                                              |      | P ● Hauptanwendung<br>Main application<br>Applicazione principale      |
| M                            | ●                | ●                | ○                 | ○                | ●    | ●    | ○    | ○    | ○    | ○    |  |                                              |      | M ●                                                                    |
| K                            | ○                | ○                |                   | ●                | ○    | ○    | ○    | ○    |      |      |  | ○                                            | ○    | K ○ Nebenanwendung<br>Secondary application<br>Applicazione secondaria |
| N                            |                  | ○                | ●                 |                  |      |      | ●    | ●    | ●    | ●    |  | ●                                            | ●    | N ●                                                                    |
| S                            | ●                | ●                | ●                 | ●                | ○    | ○    |      |      |      |      |  |                                              |      | S ●                                                                    |
| H                            | ○                | ○                |                   |                  | ○    | ○    |      |      |      |      |  |                                              |      | H ○                                                                    |



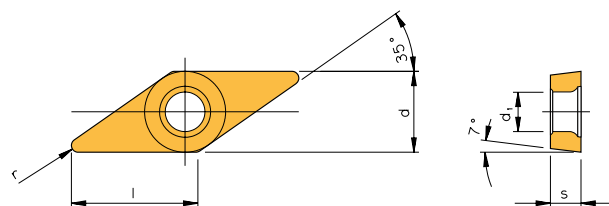
## TC..



**Bezeichnung**  
Designation  
Articolo

|                           | l     | d     | s    | d <sub>1</sub> | r    | PG          |
|---------------------------|-------|-------|------|----------------|------|-------------|
| <b>TCGT 06T101FN-ALU</b>  | 6,90  | 3,970 | 1,98 | 2,3            | 0,1  | <b>6</b>    |
| <b>TCGT 06T102FN-ALU</b>  | 6,90  | 3,970 | 1,98 | 2,3            | 0,2  | <b>6</b>    |
| <b>TCGT 090202FN-ALU</b>  | 9,60  | 5,560 | 2,38 | 2,5            | 0,2  | <b>6</b>    |
| <b>TCGT 090204FN-ALU</b>  | 9,60  | 5,560 | 2,38 | 2,5            | 0,4  | <b>6</b>    |
| <b>TCGT 090208FN-ALU</b>  | 9,60  | 5,560 | 2,38 | 2,5            | 0,8  | <b>6</b>    |
| <b>TCGT 110201FN-ALU</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,1  | <b>6</b>    |
| <b>TCGT 110202FN-ALU</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,2  | <b>6</b>    |
| <b>TCGT 110204FN-ALU</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,4  | <b>6</b>    |
| <b>TCGT 110204FN-ACB</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,4  | <b>6</b>    |
| <b>TCGT 06T102FN-ASF</b>  | 6,90  | 3,970 | 1,98 | 2,3            | 0,2  | <b>6</b>    |
| <b>TCGT 090202EN-ASF</b>  | 9,60  | 5,560 | 2,38 | 2,5            | 0,2  | <b>6/22</b> |
| <b>TCGT 090202FN-ASF</b>  | 9,60  | 5,560 | 2,38 | 2,5            | 0,2  | <b>6</b>    |
| <b>TCGT 1102005FN-ASF</b> | 11,00 | 6,350 | 2,38 | 2,8            | 0,05 | <b>6</b>    |
| <b>TCGT 110201FN-ASF</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,1  | <b>6</b>    |
| <b>TCGT 110202FN-ASF</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,2  | <b>6</b>    |
| <b>TCGT 110204FN-ASF</b>  | 11,00 | 6,350 | 2,38 | 2,8            | 0,4  | <b>6</b>    |

P  
M  
K  
N  
S  
H



## VC..



Bezeichnung  
Designation  
Articolo

|                    | l     | d     | s    | d <sub>1</sub> | r    | PG   |
|--------------------|-------|-------|------|----------------|------|------|
| VCGT 1103005FN-ALU | 11,10 | 6,350 | 3,18 | 2,9            | 0,05 | 6    |
| VCGT 110301FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,1  | 6/22 |
| VCGT 110302FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,2  | 6/22 |
| VCGT 110304FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 6/22 |
| VCGT 110308FN-ALU  | 11,10 | 6,350 | 3,18 | 2,9            | 0,8  | 6    |
| VCGT 1303005FN-ALU | 13,10 | 7,940 | 3,18 | 3,2            | 0,05 | 6    |
| VCGT 130301FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,1  | 6    |
| VCGT 130302FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 6/22 |
| VCGT 130304FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 6/22 |
| VCGT 130308FN-ALU  | 13,10 | 7,940 | 3,18 | 3,2            | 0,8  | 6    |
| VCGT 160401FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,1  | 6    |
| VCGT 160402FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,2  | 6/22 |
| VCGT 160404FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 6/22 |
| VCGT 160408FN-ALU  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 6/22 |
| VCGT 110304FN-ACB  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 6/22 |
| VCGT 110308FN-ACB  | 11,10 | 6,350 | 3,18 | 2,9            | 0,8  | 6    |
| VCGT 130304FN-ACB  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 6    |
| VCGT 130308FN-ACB  | 13,10 | 7,940 | 3,18 | 3,2            | 0,8  | 6    |
| VCGT 160404FN-ACB  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 6    |
| VCGT 160408FN-ACB  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 6    |
| VCGT 1103005FN-ASF | 11,10 | 6,350 | 3,18 | 2,9            | 0,05 | 6/22 |
| VCGT 1103015EN-ASF | 11,10 | 6,350 | 3,18 | 2,9            | 0,15 | 6/22 |
| VCGT 110301EN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,1  | 22   |
| VCGT 110301FN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,1  | 6/22 |
| VCGT 110302EN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,2  | 6/22 |
| VCGT 110302FN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,2  | 6/22 |
| VCGT 1103035EN-ASF | 11,10 | 6,350 | 3,18 | 2,9            | 0,35 | 22   |
| VCGT 110304EN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 6/22 |
| VCGT 110304FN-ASF  | 11,10 | 6,350 | 3,18 | 2,9            | 0,4  | 6/22 |
| VCGT 1303005FN-ASF | 13,10 | 7,940 | 3,18 | 3,2            | 0,05 | 6    |
| VCGT 130301FN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,1  | 6    |
| VCGT 130302EN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 6/22 |
| VCGT 130302FN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,2  | 6    |
| VCGT 130304EN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 6/22 |
| VCGT 130304FN-ASF  | 13,10 | 7,940 | 3,18 | 3,2            | 0,4  | 6    |
| VCGT 160401FN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,1  | 6    |
| VCGT 160402EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,2  | 6/22 |
| VCGT 160402FN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,2  | 6    |
| VCGT 160404EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 6/22 |
| VCGT 160404FN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,4  | 6    |
| VCGT 160408EN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 6/22 |
| VCGT 160408FN-ASF  | 16,60 | 9,525 | 4,76 | 4,4            | 0,8  | 6    |

## Sorten / Grades / Qualità

| beschichtet/coated/rivestito |                  |                  |                  |                  |      |      |      |      |      |      |  | unbeschichtet/<br>uncoated/non rivestito |      |                                        |
|------------------------------|------------------|------------------|------------------|------------------|------|------|------|------|------|------|--|------------------------------------------|------|----------------------------------------|
| AM5015<br>(PG22)             | AM5025<br>(PG22) | AM5110<br>(PG22) | AM5120<br>(PG22) | AP5210<br>(PG22) | AL10 | AL20 | AT10 | AT20 | PVD1 | PVD2 |  | AK10                                     | AK20 | Bezeichnung<br>Designation<br>Articolo |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 1103005FN-ALU                     |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110301FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110302FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110304FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110308FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 1303005FN-ALU                     |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130301FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130302FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130304FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130308FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160401FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160402FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160404FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160408FN-ALU                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110304FN-ACB                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 110308FN-ACB                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130304FN-ACB                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 130308FN-ACB                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160404FN-ACB                      |
|                              |                  |                  |                  | ●                | ●    | ●    | ●    | ●    | ●    | ●    |  | ●                                        | ●    | VCGT 160408FN-ACB                      |
|                              |                  |                  | ●                |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 1103005FN-ASF                     |
|                              | ●                |                  |                  |                  |      |      |      |      |      |      |  |                                          | ●    | VCGT 1103015EN-ASF                     |
|                              | ●                |                  |                  |                  |      |      |      |      |      |      |  |                                          | ●    | VCGT 110301EN-ASF                      |
|                              | ●                | ●                |                  | ●                | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 110301FN-ASF                      |
|                              | ●                |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 110302EN-ASF                      |
|                              | ●                |                  | ●                |                  |      |      |      |      |      |      |  | ●                                        | ●    | VCGT 110302FN-ASF                      |
|                              | ●                | ●                |                  |                  |      |      |      |      |      |      |  |                                          | ●    | VCGT 1103035EN-ASF                     |
|                              |                  |                  | ●                | ●                |      | ●    | ●    | ●    |      |      |  |                                          | ●    | VCGT 110304EN-ASF                      |
|                              |                  |                  | ●                |                  |      | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 110304FN-ASF                      |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 1303005FN-ASF                     |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 130301FN-ASF                      |
|                              | ●                |                  |                  |                  |      | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 130302EN-ASF                      |
|                              | ●                |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 130302FN-ASF                      |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 130304EN-ASF                      |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 130304FN-ASF                      |
|                              | ●                | ●                |                  |                  |      | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160401FN-ASF                      |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160402EN-ASF                      |
|                              | ●                | ●                |                  |                  |      | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160402FN-ASF                      |
|                              | ●                |                  |                  |                  |      | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160404EN-ASF                      |
|                              | ●                |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160404FN-ASF                      |
|                              | ●                |                  |                  |                  | ●    | ●    | ●    | ●    |      | ●    |  | ●                                        | ●    | VCGT 160408EN-ASF                      |
|                              |                  |                  |                  |                  | ●    | ●    | ●    | ●    |      |      |  | ●                                        | ●    | VCGT 160408FN-ASF                      |

| AM5015<br>(PG22) | AM5025<br>(PG22) | AM5110<br>(PG22) | AM5120<br>(PG22) | AP5210<br>(PG22) | AL10 | AL20 | AT10 | AT20 | PVD1 | PVD2 | AK10 | AK20 |
|------------------|------------------|------------------|------------------|------------------|------|------|------|------|------|------|------|------|
| P                | ●                | ○                | ○                | ●                | ●    | ●    | ○    | ○    | ○    | ○    |      |      |
| M                | ●                | ●                | ●                | ○                | ●    | ●    | ○    | ○    | ○    | ○    |      |      |
| K                | ○                |                  | ○                | ●                | ○    | ○    | ○    | ○    |      |      | ○    | ○    |
| N                |                  | ○                | ○                |                  |      |      | ●    | ●    | ●    | ●    | ●    | ●    |
| S                | ●                | ●                | ●                | ●                | ○    | ○    |      |      |      |      |      |      |
| H                | ○                |                  | ○                |                  | ○    | ○    |      |      |      |      |      |      |

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

## Drehen – Hochpositive Wendeschneidplatten

beschichtet

| ISO | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm <sup>2</sup> ] | Schnittgeschwindigkeit Vc [m/min] |         |         |         |         |         |         |
|-----|----------------------------------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------|---------|---------|---------|---------|---------|---------|
|     |                                                                |                                       |                                       | AM5015                            | AM5025  | AM5110  | AM5120  | AM5120+ | AM5220  | AP5210  |
| P   | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                                   | 220-320                           | 180-280 | 220-350 | 220-320 | 180-280 | 180-280 | 220-370 |
|     |                                                                | ca. 0,45% C                           | 650                                   | 180-290                           | 160-250 | 180-310 | 180-290 | 160-250 | 160-250 | 180-330 |
|     |                                                                | ca. 0,75% C                           | 1000                                  | 150-250                           | 120-220 | 150-270 | 150-250 | 120-220 | 120-220 | 150-290 |
|     | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                                   | 180-280                           | 160-250 | 180-300 | 180-280 | -       | 160-250 | 180-320 |
|     |                                                                |                                       | 900                                   | 170-250                           | 140-230 | 170-270 | 170-250 | -       | 140-230 | 170-290 |
|     |                                                                |                                       | 1200                                  | 150-220                           | 120-200 | 150-240 | 150-220 | -       | 120-200 | 150-260 |
|     | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                                   | 80-160                            | 70-150  | 80-180  | 80-160  | -       | 70-150  | 80-180  |
|     |                                                                | gehärtet und angelassen               | 1100                                  | 40-130                            | 35-120  | 40-140  | 40-130  | -       | 35-120  | 40-150  |
|     | Nichtrostender Stahl und Stahlguss                             | ferritisch/martensitisch, geglüht     | 700                                   | 60-180                            | 50-160  | 40-180  | 40-150  | 50-160  | 50-160  | 40-140  |
|     |                                                                | martensitisch, vergütet               | 1000                                  | 40-140                            | 40-140  | 40-160  | 40-130  | 40-140  | 40-140  | 40-120  |
| M   | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450-600                               | 80-160                            | 70-150  | 80-180  | 80-160  | 70-150  | 70-150  | 70-150  |
|     |                                                                | austenitisch/ferritisch, abgeschreckt | 600-900                               | 40-130                            | 35-120  | 40-140  | 40-130  | 35-120  | 35-120  | 35-120  |
| K   | Grauguss                                                       | perlitisch, ferritisch                | 500-700                               | 180-300                           | 180-300 | 180-350 | 180-300 | 180-300 | 180-300 | 180-350 |
|     |                                                                | perlitisch, martensitisch             | 700-850                               | 160-280                           | 160-280 | 160-300 | 160-280 | 160-280 | 160-280 | 160-300 |
|     |                                                                |                                       | 800-1100                              | 120-240                           | 120-240 | 120-270 | 120-240 | 120-240 | 120-240 | 120-270 |
|     | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                                   | 140-230                           | 130-210 | 140-230 | 140-230 | -       | 140-230 | 140-230 |
|     |                                                                | perlitisch                            | 800                                   | 120-170                           | 110-150 | 120-170 | 120-170 | -       | 120-170 | 120-170 |
|     | Temperguss                                                     | ferritisch                            | 450                                   | 150-210                           | 130-200 | 150-210 | 150-210 | -       | 150-210 | 150-210 |
|     |                                                                | perlitisch                            | 750                                   | 150-210                           | 130-200 | 150-210 | 150-210 | -       | 150-210 | 150-210 |
| N   | Aluminium-Knetlegierungen                                      | nicht aushärtbar                      | 200                                   | -                                 | -       | -       | -       | -       | -       | -       |
|     |                                                                | aushärtbar, ausgehärtet               | 350                                   | -                                 | -       | -       | -       | -       | -       | -       |
|     | Aluminium-Gusslegierungen                                      | ≤ 12% Si, ausgehärtet                 | 250                                   | -                                 | -       | -       | -       | -       | -       | -       |
|     |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                                   | -                                 | -       | -       | -       | -       | -       | -       |
|     |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                                   | -                                 | -       | -       | -       | -       | -       | -       |
|     | Kupfer und Kupferlegierungen (Bronze/Messing)                  | Automatenlegierung, Pb > 1%           | 400                                   | 200-500                           | 200-400 | 200-650 | 200-500 | 150-500 | -       | -       |
|     |                                                                | Messing, Rotguss                      | 300                                   | 200-500                           | 200-400 | 200-650 | 200-500 | 150-500 | -       | -       |
|     |                                                                | Aluminiumbronze                       | 500                                   | 160-450                           | 160-400 | 160-350 | 160-450 | 120-400 | -       | -       |
|     |                                                                | Kupfer und Elektrolytkupfer           | 200                                   | 100-320                           | 100-300 | 120-220 | 100-320 | 120-250 | -       | -       |
|     | Nichtmetallische Werkstoffe                                    | Duroplaste                            |                                       | 160-600                           | -       | 160-600 | 160-600 | -       | -       | -       |
|     |                                                                | Faserverstärkte Kunststoffe           |                                       | 100-300                           | -       | 100-300 | 100-300 | 100-300 | -       | -       |
|     |                                                                | Hartgummi                             |                                       | -                                 | -       | -       | 80-250  | -       | -       | -       |
| S   | Warmfeste Legierungen                                          | Fe-Basis geglüht                      | 700                                   | 20-60                             | 20-60   | 20-70   | 20-60   | 20-60   | 20-60   | 20-70   |
|     |                                                                | Fe-Basis ausgehärtet                  | 950                                   | 20-60                             | 20-60   | 20-70   | 20-60   | 20-60   | 20-60   | 20-70   |
|     |                                                                | Ni- oder Co-Basis geglüht             | 800                                   | 15-50                             | 15-50   | 15-60   | 15-50   | 15-50   | 15-50   | 15-60   |
|     |                                                                | Ni- oder Co-Basis gegossen            | 1100                                  | 15-40                             | 15-40   | 15-50   | 15-40   | 15-40   | 15-40   | 15-50   |
|     |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                                  | 15-40                             | 15-40   | 15-50   | 15-40   | 15-40   | 15-40   | 15-50   |
|     | Titanlegierungen                                               | Rein-Titan                            | 500-700                               | 90-180                            | 90-170  | 100-210 | 90-180  | -       | -       | -       |
|     | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700-1000                              | 40-80                             | 35-70   | 40-90   | 40-80   | -       | -       | -       |
| H   | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000-1350                             | 30-50                             | 30-50   | -       | 30-50   | -       | -       | -       |
|     |                                                                | gehärtet und angelassen               | 1350-1700                             | 10-25                             | 10-25   | -       | 10-25   | -       | -       | -       |
|     | Hartguss                                                       | gegossen                              | 1350                                  | 40-70                             | 40-70   | -       | 40-70   | -       | -       | -       |
|     | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                                  | 10-25                             | 10-25   | -       | 10-25   | -       | -       | -       |

Die Tabellenwerte sind Richtwerte.  
Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

Weitere Sorten finden Sie  
auf den folgenden Seiten. 

## Drehen – Hochpositive Wendeschneidplatten

beschichtet

| ISO                                           | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm²] | Schnittgeschwindigkeit Vc [m/min] |           |           |            |            |            |
|-----------------------------------------------|----------------------------------------------------------------|---------------------------------------|--------------------------|-----------------------------------|-----------|-----------|------------|------------|------------|
|                                               |                                                                |                                       |                          | AL10                              | AL20      | AT10      | AT20       | PVD1       | PVD2       |
| P                                             | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                      | 220 - 320                         | 180 - 280 | 220 - 320 | 180 - 280  | 200 - 290  | 160 - 250  |
|                                               |                                                                | ca. 0,45% C                           | 650                      | 180 - 290                         | 160 - 250 | 180 - 290 | 160 - 250  | 160 - 260  | 140 - 220  |
|                                               |                                                                | ca. 0,75% C                           | 1000                     | 150 - 250                         | 120 - 220 | 150 - 250 | 120 - 220  | 130 - 230  | 110 - 180  |
|                                               | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                      | 180 - 280                         | 160 - 250 | 180 - 280 | 160 - 250  | 160 - 250  | 140 - 220  |
|                                               |                                                                |                                       | 900                      | 170 - 250                         | 140 - 230 | 170 - 250 | 140 - 230  | 150 - 230  | 130 - 200  |
|                                               |                                                                |                                       | 1200                     | 150 - 220                         | 120 - 200 | 150 - 220 | 120 - 200  | 130 - 200  | 110 - 190  |
|                                               | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                      | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | gehärtet und angelassen               | 1100                     | -                                 | -         | -         | -          | -          | -          |
| Nichtrostender Stahl und Stahlguss            | ferritisch/martensitisch, gegläht                              | 700                                   | 170 - 290                | 160 - 280                         | 170 - 290 | 160 - 280 | 150 - 260  | 130 - 220  |            |
|                                               | martensitisch, vergütet                                        | 1000                                  | 140 - 280                | 130 - 280                         | 140 - 280 | 130 - 280 | 120 - 250  | 110 - 200  |            |
| M                                             | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450 - 600                | 140 - 280                         | 140 - 240 | 140 - 280 | 140 - 240  | 120 - 250  | 120 - 200  |
|                                               |                                                                | austenitisch/ferritisch, abgeschreckt | 600 - 900                | -                                 | -         | -         | -          | -          | -          |
| K                                             | Grauguss                                                       | perlitisch, ferritisch                | 500 - 700                | 180 - 300                         | 160 - 270 | 180 - 300 | 160 - 270  | 160 - 270  | -          |
|                                               |                                                                | perlitisch, martensitisch             | 700 - 850                | 160 - 280                         | 140 - 250 | 160 - 280 | 140 - 250  | 140 - 250  | -          |
|                                               |                                                                |                                       | 800 - 1100               | 120 - 240                         | 110 - 220 | 120 - 240 | 110 - 220  | 110 - 220  | -          |
|                                               | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                      | 140 - 230                         | 130 - 210 | 140 - 230 | 130 - 210  | 120 - 210  | -          |
|                                               |                                                                | perlitisch                            | 800                      | 120 - 170                         | 110 - 150 | 120 - 170 | 110 - 150  | 110 - 150  | -          |
|                                               | Temperguss                                                     | ferritisch                            | 450                      | 150 - 210                         | 130 - 200 | 150 - 210 | 130 - 200  | 130 - 180  | -          |
|                                               |                                                                | perlitisch                            | 750                      | 150 - 210                         | 130 - 200 | 150 - 210 | 130 - 200  | 130 - 180  | -          |
|                                               | N                                                              | Aluminium-Knetlegierungen             | nicht aushärtbar         | 200                               | -         | -         | 850 - 1300 | 850 - 1300 | 750 - 1200 |
| aushärtbar, ausgehärtet                       |                                                                |                                       | 350                      | -                                 | -         | 400 - 900 | 400 - 900  | 350 - 800  | 350 - 800  |
| Aluminium-Gusslegierungen                     |                                                                | ≤ 12% Si, ausgehärtet                 | 250                      | -                                 | -         | 260 - 800 | 260 - 800  | 230 - 700  | 230 - 700  |
|                                               |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                      | -                                 | -         | 200 - 550 | 200 - 550  | 180 - 500  | 180 - 500  |
|                                               |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                      | -                                 | -         | 200 - 500 | 200 - 500  | 180 - 450  | 180 - 450  |
| Kupfer und Kupferlegierungen (Bronze/Messing) |                                                                | Automatenlegierung, Pb > 1%           | 400                      | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | Messing, Rotguss                      | 300                      | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | Aluminiumbronze                       | 500                      | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | Kupfer und Elektrolytkupfer           | 200                      | -                                 | -         | -         | -          | -          | -          |
| Nichtmetallische Werkstoffe                   |                                                                | Duroplaste                            |                          | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | Faserverstärkte Kunststoffe           |                          | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | Hartgummi                             |                          | -                                 | -         | -         | -          | -          | -          |
| S                                             | Warmfeste Legierungen                                          | Fe-Basis gegläht                      | 700                      | 20 - 50                           | 20 - 50   | 20 - 50   | 20 - 50    | 15 - 45    | 15 - 45    |
|                                               |                                                                | Fe-Basis ausgehärtet                  | 950                      | 20 - 50                           | 20 - 50   | 20 - 50   | 20 - 50    | 15 - 45    | 15 - 45    |
|                                               |                                                                | Ni- oder Co-Basis gegläht             | 800                      | 15 - 40                           | 15 - 40   | 15 - 40   | 15 - 40    | 10 - 35    | 10 - 35    |
|                                               |                                                                | Ni- oder Co-Basis gegossen            | 1100                     | 15 - 30                           | 15 - 30   | 15 - 30   | 15 - 30    | 10 - 25    | 10 - 25    |
|                                               |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                     | 15 - 30                           | 15 - 30   | 15 - 30   | 15 - 30    | 10 - 25    | 10 - 25    |
|                                               | Titanlegierungen                                               | Rein-Titan                            | 500 - 700                | -                                 | -         | -         | -          | -          | -          |
|                                               | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700 - 1000               | -                                 | -         | -         | -          | -          | -          |
| H                                             | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000 - 1350              | -                                 | -         | -         | -          | -          | -          |
|                                               |                                                                | gehärtet und angelassen               | 1350 - 1700              | -                                 | -         | -         | -          | -          | -          |
|                                               | Hartguss                                                       | gegossen                              | 1350                     | -                                 | -         | -         | -          | -          | -          |
|                                               | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                     | -                                 | -         | -         | -          | -          | -          |

Die Tabellenwerte sind Richtwerte.  
Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

Weitere Sorten finden Sie  
auf den folgenden Seiten. 

## Drehen – Hochpositive Wendeschneidplatten

unbeschichtet

| ISO                                | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm²] | Schnittgeschwindigkeit Vc [m/min] |            |
|------------------------------------|----------------------------------------------------------------|---------------------------------------|--------------------------|-----------------------------------|------------|
|                                    |                                                                |                                       |                          | AK10                              | AK20       |
| P                                  | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                      | -                                 | -          |
|                                    |                                                                | ca. 0,45% C                           | 650                      | -                                 | -          |
|                                    |                                                                | ca. 0,75% C                           | 1000                     | -                                 | -          |
|                                    | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                      | -                                 | -          |
|                                    |                                                                |                                       | 900                      | -                                 | -          |
|                                    |                                                                |                                       | 1200                     | -                                 | -          |
|                                    | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                      | -                                 | -          |
|                                    |                                                                | gehärtet und angelassen               | 1100                     | -                                 | -          |
| Nichtrostender Stahl und Stahlguss | ferritisch/martensitisch, geglüht                              | 700                                   | -                        | -                                 |            |
|                                    | martensitisch, vergütet                                        | 1000                                  | -                        | -                                 |            |
| M                                  | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450 - 600                | -                                 | -          |
|                                    |                                                                | austenitisch/ferritisch, abgeschreckt | 600 - 900                | -                                 | -          |
| K                                  | Grauguss                                                       | perlitisch, ferritisch                | 500 - 700                | 120 - 160                         | 120 - 160  |
|                                    |                                                                | perlitisch, martensitisch             | 700 - 850                | 90 - 140                          | 90 - 140   |
|                                    |                                                                |                                       | 800 - 1100               | 80 - 140                          | 80 - 140   |
|                                    | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                      | 130 - 170                         | 130 - 170  |
|                                    |                                                                | perlitisch                            | 800                      | 90 - 130                          | 90 - 130   |
|                                    | Temperguss                                                     | ferritisch                            | 450                      | 140 - 200                         | 140 - 200  |
|                                    |                                                                | perlitisch                            | 750                      | 120 - 160                         | 120 - 160  |
| N                                  | Aluminium-Knetlegierungen                                      | nicht aushärtbar                      | 200                      | 300 - 2500                        | 300 - 2500 |
|                                    |                                                                | aushärtbar, ausgehärtet               | 350                      | 200 - 2000                        | 200 - 2000 |
|                                    | Aluminium-Gusslegierungen                                      | ≤ 12% Si, ausgehärtet                 | 250                      | 400 - 1500                        | 400 - 1500 |
|                                    |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                      | 400 - 1500                        | 400 - 1500 |
|                                    |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                      | 200 - 800                         | 200 - 800  |
|                                    | Kupfer und Kupferlegierungen (Bronze/Messing)                  | Automatenlegierung, Pb > 1%           | 400                      | 250 - 600                         | 250 - 600  |
|                                    |                                                                | Messing, Rotguss                      | 300                      | 200 - 600                         | 200 - 600  |
|                                    |                                                                | Aluminiumbronze                       | 500                      | 150 - 400                         | 150 - 400  |
|                                    |                                                                | Kupfer und Elektrolytkupfer           | 200                      | 150 - 300                         | 150 - 300  |
| Nichtmetallische Werkstoffe        | Duroplaste                                                     |                                       | 80 - 180                 | 80 - 180                          |            |
|                                    | Faserverstärkte Kunststoffe                                    |                                       | 60 - 150                 | 60 - 150                          |            |
|                                    | Hartgummi                                                      |                                       | 100 - 250                | 100 - 250                         |            |
| S                                  | Warmfeste Legierungen                                          | Fe-Basis geglüht                      | 700                      | 15 - 40                           | -          |
|                                    |                                                                | Fe-Basis ausgehärtet                  | 950                      | 8 - 28                            | -          |
|                                    |                                                                | Ni- oder Co-Basis geglüht             | 800                      | 10 - 30                           | -          |
|                                    |                                                                | Ni- oder Co-Basis gegossen            | 1100                     | 8 - 25                            | -          |
|                                    |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                     | 8 - 25                            | -          |
|                                    | Titanlegierungen                                               | Rein-Titan                            | 500 - 700                | 60 - 120                          | -          |
|                                    | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700 - 1000               | 30 - 80                           | 30 - 80    |
| H                                  | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000 - 1350              | -                                 | -          |
|                                    |                                                                | gehärtet und angelassen               | 1350 - 1700              | -                                 | -          |
|                                    | Hartguss                                                       | gegossen                              | 1350                     | -                                 | -          |
|                                    | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                     | -                                 | -          |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.



## Turning – High Positive Inserts

coated

| ISO                 | Material                                                   |                                        | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |         |         |         |          |         |         |
|---------------------|------------------------------------------------------------|----------------------------------------|-----------------------------|--------------------------|---------|---------|---------|----------|---------|---------|
|                     |                                                            |                                        |                             | AM5015                   | AM5025  | AM5110  | AM5120  | AM5120 + | AM5220  | AP5210  |
| P                   | Unalloyed steel and cast steel                             | ca. 0,15% C                            | 350                         | 220-320                  | 180-280 | 220-350 | 220-320 | 180-280  | 180-280 | 220-370 |
|                     |                                                            | ca. 0,45% C                            | 650                         | 180-290                  | 160-250 | 180-310 | 180-290 | 160-250  | 160-250 | 180-330 |
|                     |                                                            | ca. 0,75% C                            | 1000                        | 150-250                  | 120-220 | 150-270 | 150-250 | 120-220  | 120-220 | 150-290 |
|                     | Low alloyed steel and cast steel                           |                                        | 600                         | 180-280                  | 160-250 | 180-300 | 180-280 | -        | 160-250 | 180-320 |
|                     |                                                            |                                        | 900                         | 170-250                  | 140-230 | 170-270 | 170-250 | -        | 140-230 | 170-290 |
|                     |                                                            |                                        | 1200                        | 150-220                  | 120-200 | 150-240 | 150-220 | -        | 120-200 | 150-260 |
|                     | High alloyed steel, high alloyed tool steel and cast steel | annealed                               | 700                         | 80-160                   | 70-150  | 80-180  | 80-160  | -        | 70-150  | 80-180  |
|                     |                                                            | hardened and tempered                  | 1100                        | 40-130                   | 35-120  | 40-140  | 40-130  | -        | 35-120  | 40-150  |
|                     | Stainless steel and cast steel                             | ferritic / martensitic, annealed       | 700                         | 60-180                   | 50-160  | 40-180  | 40-150  | 50-160   | 50-160  | 40-140  |
|                     |                                                            | martensitic, hardened and tempered     | 1000                        | 40-140                   | 40-140  | 40-160  | 40-130  | 40-140   | 40-140  | 40-120  |
| M                   | Stainless steel and cast steel                             | austenitic and austenitic/ferritic     | 450-600                     | 80-160                   | 70-150  | 80-180  | 80-160  | 70-150   | 70-150  | 70-150  |
|                     |                                                            | chilled                                | 600-900                     | 40-130                   | 35-120  | 40-140  | 40-130  | 35-120   | 35-120  | 35-120  |
| K                   | Cast iron                                                  | pearlitic, ferritic                    | 500-700                     | 180-300                  | 180-300 | 180-350 | 180-300 | 180-300  | 180-300 | 180-350 |
|                     |                                                            | pearlitic, martensitic                 | 700-850                     | 160-280                  | 160-280 | 160-300 | 160-280 | 160-280  | 160-280 | 160-300 |
|                     |                                                            |                                        | 800-1100                    | 120-240                  | 120-240 | 120-270 | 120-240 | 120-240  | 120-240 | 120-270 |
|                     | Cast iron with nodular graphite                            | ferritic                               | 550                         | 140-230                  | 130-210 | 140-230 | 140-230 | -        | 140-230 | 140-230 |
|                     |                                                            | pearlitic                              | 800                         | 120-170                  | 110-150 | 120-170 | 120-170 | -        | 120-170 | 120-170 |
|                     | Malleable cast iron                                        | ferritic                               | 450                         | 150-210                  | 130-200 | 150-210 | 150-210 | -        | 150-210 | 150-210 |
| pearlitic           |                                                            | 750                                    | 150-210                     | 130-200                  | 150-210 | 150-210 | -       | 150-210  | 150-210 |         |
| N                   | Aluminum alloys, long chipping                             | not heat treatable                     | 200                         | -                        | -       | -       | -       | -        | -       | -       |
|                     |                                                            | heat treatable, heat treated           | 350                         | -                        | -       | -       | -       | -        | -       | -       |
|                     | Casted aluminum alloys                                     | ≤ 12% Si, hardened                     | 250                         | -                        | -       | -       | -       | -        | -       | -       |
|                     |                                                            | ≤ 12% Si, heat treatable, heat treated | 300                         | -                        | -       | -       | -       | -        | -       | -       |
|                     |                                                            | ≤ 12% Si, not heat treatable           | 450                         | -                        | -       | -       | -       | -        | -       | -       |
|                     | Copper and copper alloys (brass/bronze)                    | Lead alloys, Pb > 1 %                  | 400                         | 200-500                  | 200-400 | 200-650 | 200-500 | 150-500  | -       | -       |
|                     |                                                            | Brass, bronze                          | 300                         | 200-500                  | 200-400 | 200-650 | 200-500 | 150-500  | -       | -       |
|                     |                                                            | Aluminum bronze                        | 500                         | 160-450                  | 160-400 | 160-350 | 160-450 | 120-400  | -       | -       |
|                     |                                                            | Copper and electrolyte copper          | 200                         | 100-320                  | 100-300 | 120-220 | 100-320 | 120-250  | -       | -       |
|                     | Non-ferrous materials                                      | Duroplastics                           |                             | 160-600                  | -       | 160-600 | 160-600 | -        | -       | -       |
| Reinforced plastics |                                                            |                                        | 100-300                     | -                        | 100-300 | 100-300 | 100-300 | -        | -       |         |
| Hard rubber         |                                                            |                                        | -                           | -                        | -       | 80-250  | -       | -        | -       |         |
| S                   | High temperature resistant alloys                          | Fe-alloyed annealed                    | 700                         | 20-60                    | 20-60   | 20-70   | 20-60   | 20-60    | 20-60   | 20-70   |
|                     |                                                            | Fe-alloyed hardened                    | 950                         | 20-60                    | 20-60   | 20-70   | 20-60   | 20-60    | 20-60   | 20-70   |
|                     |                                                            | Ni- oder Co- based annealed            | 800                         | 15-50                    | 15-50   | 15-60   | 15-50   | 15-50    | 15-50   | 15-60   |
|                     |                                                            | Ni- oder Co- based casting             | 1100                        | 15-40                    | 15-40   | 15-50   | 15-40   | 15-40    | 15-40   | 15-50   |
|                     |                                                            | Ni- oder Co- based hardened            | 1200                        | 15-40                    | 15-40   | 15-50   | 15-40   | 15-40    | 15-40   | 15-50   |
|                     | Titanium alloys, high strength                             | Pure titanium                          | 500-700                     | 90-180                   | 90-170  | 100-210 | 90-180  | -        | -       | -       |
|                     | Alpha- and beta-alloys, hardened                           |                                        | 700-1000                    | 40-80                    | 35-70   | 40-90   | 40-80   | -        | -       | -       |
| H                   | Hardened steel                                             | hardened and tempered                  | 1000-1350                   | 30-50                    | 30-50   | -       | 30-50   | -        | -       | -       |
|                     |                                                            | hardened and tempered                  | 1350-1700                   | 10-25                    | 10-25   | -       | 10-25   | -        | -       | -       |
|                     | Hard cast iron                                             | casting                                | 1350                        | 40-70                    | 40-70   | -       | 40-70   | -        | -       | -       |
|                     | Hardened cast iron                                         | hardened and tempered                  | 1900                        | 10-25                    | 10-25   |         | 10-25   | -        | -       | -       |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

More grades on the  
following pages. 

## Turning – High Positive Inserts

coated

| ISO                           | Material                                                   |                                         | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |           |           |            |            |            |
|-------------------------------|------------------------------------------------------------|-----------------------------------------|-----------------------------|--------------------------|-----------|-----------|------------|------------|------------|
|                               |                                                            |                                         |                             | AL10                     | AL20      | AT10      | AT20       | PVD1       | PVD2       |
| P                             | Unalloyed steel and cast steel                             | ca. 0,15% C                             | 350                         | 220 - 320                | 180 - 280 | 220 - 320 | 180 - 280  | 200 - 290  | 160 - 250  |
|                               |                                                            | ca. 0,45% C                             | 650                         | 180 - 290                | 160 - 250 | 180 - 290 | 160 - 250  | 160 - 260  | 140 - 220  |
|                               |                                                            | ca. 0,75% C                             | 1000                        | 150 - 250                | 120 - 220 | 150 - 250 | 120 - 220  | 130 - 230  | 110 - 180  |
|                               | Low alloyed steel and cast steel                           |                                         | 600                         | 180 - 280                | 160 - 250 | 180 - 280 | 160 - 250  | 160 - 250  | 140 - 220  |
|                               |                                                            |                                         | 900                         | 170 - 250                | 140 - 230 | 170 - 250 | 140 - 230  | 150 - 230  | 130 - 200  |
|                               |                                                            |                                         | 1200                        | 150 - 220                | 120 - 200 | 150 - 220 | 120 - 200  | 130 - 200  | 110 - 190  |
|                               | High alloyed steel, high alloyed tool steel and cast steel | annealed                                | 700                         | -                        | -         | -         | -          | -          | -          |
|                               |                                                            | hardened and tempered                   | 1100                        | -                        | -         | -         | -          | -          | -          |
|                               | Stainless steel and cast steel                             | ferritic / martensitic, annealed        | 700                         | 170 - 290                | 160 - 280 | 170 - 290 | 160 - 280  | 150 - 260  | 130 - 220  |
|                               |                                                            | martensitic, hardened and tempered      | 1000                        | 140 - 280                | 130 - 280 | 140 - 280 | 130 - 280  | 120 - 250  | 110 - 200  |
| M                             | Stainless steel and cast steel                             | austenitic and austenitic/ferritic      | 450 - 600                   | 140 - 280                | 140 - 240 | 140 - 280 | 140 - 240  | 120 - 250  | 120 - 200  |
| chilled                       |                                                            | 600 - 900                               | -                           | -                        | -         | -         | -          | -          |            |
| K                             | Cast iron                                                  | pearlitic, ferritic                     | 500 - 700                   | 180 - 300                | 160 - 270 | 180 - 300 | 160 - 270  | 160 - 270  | -          |
|                               |                                                            | pearlitic, martensitic                  | 700 - 850                   | 160 - 280                | 140 - 250 | 160 - 280 | 140 - 250  | 140 - 250  | -          |
|                               |                                                            |                                         | 800 - 1100                  | 120 - 240                | 110 - 220 | 120 - 240 | 110 - 220  | 110 - 220  | -          |
|                               | Cast iron with nodular graphite                            | ferritic                                | 550                         | 140 - 230                | 130 - 210 | 140 - 230 | 130 - 210  | 120 - 210  | -          |
|                               |                                                            | pearlitic                               | 800                         | 120 - 170                | 110 - 150 | 120 - 170 | 110 - 150  | 110 - 150  | -          |
|                               | Malleable cast iron                                        | ferritic                                | 450                         | 150 - 210                | 130 - 200 | 150 - 210 | 130 - 200  | 130 - 180  | -          |
|                               |                                                            | pearlitic                               | 750                         | 150 - 210                | 130 - 200 | 150 - 210 | 130 - 200  | 130 - 180  | -          |
|                               | N                                                          | Aluminum alloys, long chipping          | not heat treatable          | 200                      | -         | -         | 850 - 1300 | 850 - 1300 | 750 - 1200 |
| heat treatable, heat treated  |                                                            |                                         | 350                         | -                        | -         | 400 - 900 | 400 - 900  | 350 - 800  | 350 - 800  |
| Casted aluminum alloys        |                                                            | ≤ 12% Si, hardened                      | 250                         | -                        | -         | 260 - 800 | 260 - 800  | 230 - 700  | 230 - 700  |
|                               |                                                            | ≤ 12% Si, heat treatable, heat treated  | 300                         | -                        | -         | 200 - 550 | 200 - 550  | 180 - 500  | 180 - 500  |
|                               |                                                            | ≤ 12% Si, not heat treatable            | 450                         | -                        | -         | 200 - 500 | 200 - 500  | 180 - 450  | 180 - 450  |
|                               |                                                            | Copper and copper alloys (brass/bronze) | Lead alloys, Pb > 1 %       | 400                      | -         | -         | -          | -          | -          |
| Brass, bronze                 |                                                            |                                         | 300                         | -                        | -         | -         | -          | -          | -          |
| Aluminum bronze               |                                                            |                                         | 500                         | -                        | -         | -         | -          | -          | -          |
| Copper and electrolyte copper |                                                            |                                         | 200                         | -                        | -         | -         | -          | -          | -          |
| Non-ferrous materials         |                                                            | Duroplastics                            |                             | -                        | -         | -         | -          | -          | -          |
|                               |                                                            | Reinforced plastics                     |                             | -                        | -         | -         | -          | -          | -          |
|                               |                                                            | Hard rubber                             |                             | -                        | -         | -         | -          | -          | -          |
| S                             |                                                            | High temperature resistant alloys       | Fe-alloyed annealed         | 700                      | 20 - 50   | 20 - 50   | 20 - 50    | 20 - 50    | 15 - 45    |
|                               | Fe-alloyed hardened                                        |                                         | 950                         | 20 - 50                  | 20 - 50   | 20 - 50   | 20 - 50    | 15 - 45    | 15 - 45    |
|                               | Ni- oder Co- based annealed                                |                                         | 800                         | 15 - 40                  | 15 - 40   | 15 - 40   | 15 - 40    | 10 - 35    | 10 - 35    |
|                               | Ni- oder Co- based casting                                 |                                         | 1100                        | 15 - 30                  | 15 - 30   | 15 - 30   | 15 - 30    | 10 - 25    | 10 - 25    |
|                               | Ni- oder Co- based hardened                                |                                         | 1200                        | 15 - 30                  | 15 - 30   | 15 - 30   | 15 - 30    | 10 - 25    | 10 - 25    |
|                               | Titanium alloys, high strength                             | Pure titanium                           | 500 - 700                   | -                        | -         | -         | -          | -          | -          |
|                               | Alpha- and beta-alloys, hardened                           |                                         | 700 - 1000                  | -                        | -         | -         | -          | -          | -          |
| H                             | Hardened steel                                             | hardened and tempered                   | 1000 - 1350                 | -                        | -         | -         | -          | -          | -          |
|                               |                                                            | hardened and tempered                   | 1350 - 1700                 | -                        | -         | -         | -          | -          | -          |
|                               | Hard cast iron                                             | casting                                 | 1350                        | -                        | -         | -         | -          | -          | -          |
|                               | Hardened cast iron                                         | hardened and tempered                   | 1900                        | -                        | -         | -         | -          | -          | -          |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

More grades on the following pages. 

## Turning – High Positive Inserts

uncoated

| ISO | Material                                                   |                                        | Tensile strength<br>[N/mm <sup>2</sup> ] | Cutting speed Vc [m/min] |            |
|-----|------------------------------------------------------------|----------------------------------------|------------------------------------------|--------------------------|------------|
|     |                                                            |                                        |                                          | AK10                     | AK20       |
| P   | Unalloyed steel and cast steel                             | ca. 0,15% C                            | 350                                      | -                        | -          |
|     |                                                            | ca. 0,45% C                            | 650                                      | -                        | -          |
|     |                                                            | ca. 0,75% C                            | 1000                                     | -                        | -          |
|     | Low alloyed steel and cast steel                           |                                        | 600                                      | -                        | -          |
|     |                                                            |                                        | 900                                      | -                        | -          |
|     |                                                            |                                        | 1200                                     | -                        | -          |
|     | High alloyed steel, high alloyed tool steel and cast steel | annealed                               | 700                                      | -                        | -          |
|     |                                                            | hardened and tempered                  | 1100                                     | -                        | -          |
|     | Stainless steel and cast steel                             | ferritic / martensitic, annealed       | 700                                      | -                        | -          |
|     |                                                            | martensitic, hardened and tempered     | 1000                                     | -                        | -          |
| M   | Stainless steel and cast steel                             | austenitic and austenitic/ferritic     | 450 - 600                                | -                        | -          |
|     |                                                            | chilled                                | 600 - 900                                | -                        | -          |
| K   | Cast iron                                                  | pearlitic, ferritic                    | 500 - 700                                | 120 - 160                | 120 - 160  |
|     |                                                            | pearlitic, martensitic                 | 700 - 850                                | 90 - 140                 | 90 - 140   |
|     |                                                            |                                        | 800 - 1100                               | 80 - 140                 | 80 - 140   |
|     | Cast iron with nodular graphite                            | ferritic                               | 550                                      | 130 - 170                | 130 - 170  |
|     |                                                            | pearlitic                              | 800                                      | 90 - 130                 | 90 - 130   |
|     | Malleable cast iron                                        | ferritic                               | 450                                      | 140 - 200                | 140 - 200  |
|     |                                                            | pearlitic                              | 750                                      | 120 - 160                | 120 - 160  |
| N   | Aluminum alloys, long chipping                             | not heat treatable                     | 200                                      | 300 - 2500               | 300 - 2500 |
|     |                                                            | heat treatable, heat treated           | 350                                      | 200 - 2000               | 200 - 2000 |
|     | Casted aluminum alloys                                     | ≤ 12% Si, hardened                     | 250                                      | 400 - 1500               | 400 - 1500 |
|     |                                                            | ≤ 12% Si, heat treatable, heat treated | 300                                      | 400 - 1500               | 400 - 1500 |
|     |                                                            | ≤ 12% Si, not heat treatable           | 450                                      | 200 - 800                | 200 - 800  |
|     | Copper and copper alloys (brass/bronze)                    | Lead alloys, Pb > 1%                   | 400                                      | 250 - 600                | 250 - 600  |
|     |                                                            | Brass, bronze                          | 300                                      | 200 - 600                | 200 - 600  |
|     |                                                            | Aluminum bronze                        | 500                                      | 150 - 400                | 150 - 400  |
|     |                                                            | Copper and electrolyte copper          | 200                                      | 150 - 300                | 150 - 300  |
|     | Non-ferrous materials                                      | Duroplastics                           |                                          | 80 - 180                 | 80 - 180   |
|     |                                                            | Reinforced plastics                    |                                          | 60 - 150                 | 60 - 150   |
|     |                                                            | Hard rubber                            |                                          | 100 - 250                | 100 - 250  |
| S   | High temperature resistant alloys                          | Fe-alloyed annealed                    | 700                                      | 15 - 40                  | -          |
|     |                                                            | Fe-alloyed hardened                    | 950                                      | 8 - 28                   | -          |
|     |                                                            | Ni- oder Co- based annealed            | 800                                      | 10 - 30                  | -          |
|     |                                                            | Ni- oder Co- based casting             | 1100                                     | 8 - 25                   | -          |
|     |                                                            | Ni- oder Co- based hardened            | 1200                                     | 8 - 25                   | -          |
|     | Titanium alloys, high strength                             | Pure titanium                          | 500 - 700                                | 60 - 120                 | -          |
|     | Alpha- and beta-alloys, hardened                           |                                        | 700 - 1000                               | 30 - 80                  | 30 - 80    |
| H   | Hardened steel                                             | hardened and tempered                  | 1000 - 1350                              | -                        | -          |
|     |                                                            | hardened and tempered                  | 1350 - 1700                              | -                        | -          |
|     | Hard cast iron                                             | casting                                | 1350                                     | -                        | -          |
|     | Hardened cast iron                                         | hardened and tempered                  | 1900                                     | -                        | -          |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

## Tornitura – Ultra positivi

rivestito

| ISO                       | Materiale                                    |                                     | Resistenza<br>[N/mm²]    | Velocità di taglio V <sub>c</sub> (m/min) |         |         |         |         |         |         |
|---------------------------|----------------------------------------------|-------------------------------------|--------------------------|-------------------------------------------|---------|---------|---------|---------|---------|---------|
|                           |                                              |                                     |                          | AM5015                                    | AM5025  | AM5110  | AM5120  | AM5120+ | AM5220  | AP5210  |
| P                         | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                      | 220-320                                   | 180-280 | 220-350 | 220-320 | 180-280 | 180-280 | 220-370 |
|                           |                                              | ca. 0,45% C                         | 650                      | 180-290                                   | 160-250 | 180-310 | 180-290 | 160-250 | 160-250 | 180-330 |
|                           |                                              | ca. 0,75% C                         | 1000                     | 150-250                                   | 120-220 | 150-270 | 150-250 | 120-220 | 120-220 | 150-290 |
|                           | Acciaio debolmente legati                    |                                     | 600                      | 180-280                                   | 160-250 | 180-300 | 180-280 | -       | 160-250 | 180-320 |
|                           |                                              |                                     | 900                      | 170-250                                   | 140-230 | 170-270 | 170-250 | -       | 140-230 | 170-290 |
|                           |                                              |                                     | 1200                     | 150-220                                   | 120-200 | 150-240 | 150-220 | -       | 120-200 | 150-260 |
|                           | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                      | 80-160                                    | 70-150  | 80-180  | 80-160  | -       | 70-150  | 80-180  |
|                           |                                              | temprato e rinvenuto                | 1100                     | 40-130                                    | 35-120  | 40-140  | 40-130  | -       | 35-120  | 40-150  |
|                           | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                      | 60-180                                    | 50-160  | 40-180  | 40-150  | 50-160  | 50-160  | 40-140  |
|                           |                                              | martensitico, temprato              | 1000                     | 40-140                                    | 40-140  | 40-160  | 40-130  | 40-140  | 40-140  | 40-120  |
| M                         | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600                  | 80-160                                    | 70-150  | 80-180  | 80-160  | 70-150  | 70-150  | 70-150  |
|                           |                                              | trattato o temprato                 | 600-900                  | 40-130                                    | 35-120  | 40-140  | 40-130  | 35-120  | 35-120  | 35-120  |
| K                         | Ghisa grigia                                 | perlitica, ferritica                | 500-700                  | 180-300                                   | 180-300 | 180-350 | 180-300 | 180-300 | 180-300 | 180-350 |
|                           |                                              | perlitica, martensitica             | 700-850                  | 160-280                                   | 160-280 | 160-300 | 160-280 | 160-280 | 160-280 | 160-300 |
|                           |                                              |                                     | 800-1100                 | 120-240                                   | 120-240 | 120-270 | 120-240 | 120-240 | 120-240 | 120-270 |
|                           | Ghisa sferoidale                             | ferritica                           | 550                      | 140-230                                   | 130-210 | 140-230 | 140-230 | -       | 140-230 | 140-230 |
|                           |                                              | perlitica                           | 800                      | 120-170                                   | 110-150 | 120-170 | 120-170 | -       | 120-170 | 120-170 |
|                           | Ghisa malleabile                             | ferritica                           | 450                      | 150-210                                   | 130-200 | 150-210 | 150-210 | -       | 150-210 | 150-210 |
|                           |                                              | perlitica                           | 750                      | 150-210                                   | 130-200 | 150-210 | 150-210 | -       | 150-210 | 150-210 |
|                           | N                                            | Leghe di alluminio a truciolo lungo | non trattabile           | 200                                       | -       | -       | -       | -       | -       | -       |
| temprabile, trattato      |                                              |                                     | 350                      | -                                         | -       | -       | -       | -       | -       | -       |
| Fusioni di Alluminio      |                                              | ≤ 12% Si, temprato                  | 250                      | -                                         | -       | -       | -       | -       | -       | -       |
|                           |                                              | ≤ 12% Si, temprabile, trattato      | 300                      | -                                         | -       | -       | -       | -       | -       | -       |
|                           |                                              | ≤ 12% Si, non trattabile            | 450                      | -                                         | -       | -       | -       | -       | -       | -       |
|                           |                                              | Leghe di Rame (Bronzo, Ottone)      | Leghe di Piombo, Pb > 1% | 400                                       | 200-500 | 200-400 | 200-650 | 200-500 | 150-500 | -       |
| Ottone, Bronzo            |                                              |                                     | 300                      | 200-500                                   | 200-400 | 200-650 | 200-500 | 150-500 | -       | -       |
| Bronzo alluminio          |                                              |                                     | 500                      | 160-450                                   | 160-400 | 160-350 | 160-450 | 120-400 | -       | -       |
| Rame e rame elettrolitico |                                              |                                     | 200                      | 100-320                                   | 100-300 | 120-220 | 100-320 | 120-250 | -       | -       |
| Materiali non ferrosi     |                                              | Plastiche dure                      |                          | 160-600                                   | -       | 160-600 | 160-600 | -       | -       | -       |
|                           |                                              | Plastiche rinforzate                |                          | 100-300                                   | -       | 100-300 | 100-300 | 100-300 | -       | -       |
|                           |                                              | Gomme dure                          |                          | -                                         | -       | -       | 80-250  | -       | -       | -       |
| S                         |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto    | 700                                       | 20-60   | 20-60   | 20-70   | 20-60   | 20-60   | 20-60   |
|                           | a base di Fe, temprato                       |                                     | 950                      | 20-60                                     | 20-60   | 20-70   | 20-60   | 20-60   | 20-60   | 20-70   |
|                           | a base di Ni, ricotto                        |                                     | 800                      | 15-50                                     | 15-50   | 15-60   | 15-50   | 15-50   | 15-50   | 15-60   |
|                           | a base di Co, da fusione                     |                                     | 1100                     | 15-40                                     | 15-40   | 15-50   | 15-40   | 15-40   | 15-40   | 15-50   |
|                           | a base di Co, temprato                       |                                     | 1200                     | 15-40                                     | 15-40   | 15-50   | 15-40   | 15-40   | 15-40   | 15-50   |
|                           | Leghe di Titanio                             | titanio puro                        | 500-700                  | 90-180                                    | 90-170  | 100-210 | 90-180  | -       | -       | -       |
|                           | Leghe Alfa e Beta, trattate                  |                                     | 700-1000                 | 40-80                                     | 35-70   | 40-90   | 40-80   | -       | -       | -       |
| H                         | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350                | 30-50                                     | 30-50   | -       | 30-50   | -       | -       | -       |
|                           |                                              | temprato e rinvenuto                | 1350-1700                | 10-25                                     | 10-25   | -       | 10-25   | -       | -       | -       |
|                           | Ghisa temprata                               | da fusione                          | 1350                     | 40-70                                     | 40-70   | -       | 40-70   | -       | -       | -       |
|                           | Ghisa trattata                               | temprato e rinvenuto                | 1900                     | 10-25                                     | 10-25   | -       | 10-25   | -       | -       | -       |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

 Altre tipi li trovate  
 nelle pagine seguenti.


## Tornitura – Ultra positivi

rivestito

| ISO                       | Materiale                                    |                                     | Resistenza<br>[N/mm²]    | Velocità di taglio V <sub>c</sub> (m/min) |         |         |          |          |          |
|---------------------------|----------------------------------------------|-------------------------------------|--------------------------|-------------------------------------------|---------|---------|----------|----------|----------|
|                           |                                              |                                     |                          | AL10                                      | AL20    | AT10    | AT20     | PVD1     | PVD2     |
| P                         | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                      | 220-320                                   | 180-280 | 220-320 | 180-280  | 200-290  | 160-250  |
|                           |                                              | ca. 0,45% C                         | 650                      | 180-290                                   | 160-250 | 180-290 | 160-250  | 160-260  | 140-220  |
|                           |                                              | ca. 0,75% C                         | 1000                     | 150-250                                   | 120-220 | 150-250 | 120-220  | 130-230  | 110-180  |
|                           | Acciaio debolmente legati                    |                                     | 600                      | 180-280                                   | 160-250 | 180-280 | 160-250  | 160-250  | 140-220  |
|                           |                                              |                                     | 900                      | 170-250                                   | 140-230 | 170-250 | 140-230  | 150-230  | 130-200  |
|                           |                                              |                                     | 1200                     | 150-220                                   | 120-200 | 150-220 | 120-200  | 130-200  | 110-190  |
|                           | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                      | -                                         | -       | -       | -        | -        | -        |
|                           |                                              | temprato e rinvenuto                | 1100                     | -                                         | -       | -       | -        | -        | -        |
|                           | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                      | 170-290                                   | 160-280 | 170-290 | 160-280  | 150-260  | 130-220  |
|                           |                                              | martensitico, temprato              | 1000                     | 140-280                                   | 130-280 | 140-280 | 130-280  | 120-250  | 110-200  |
| M                         | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600                  | 140-280                                   | 140-240 | 140-280 | 140-240  | 120-250  | 120-200  |
|                           |                                              | trattato o temprato                 | 600-900                  | -                                         | -       | -       | -        | -        | -        |
| K                         | Ghisa grigia                                 | perlitica, ferritica                | 500-700                  | 180-300                                   | 160-270 | 180-300 | 160-270  | 160-270  | -        |
|                           |                                              | perlitica, martensitica             | 700-850                  | 160-280                                   | 140-250 | 160-280 | 140-250  | 140-250  | -        |
|                           |                                              |                                     | 800-1100                 | 120-240                                   | 110-220 | 120-240 | 110-220  | 110-220  | -        |
|                           | Ghisa sferoidale                             | ferritica                           | 550                      | 140-230                                   | 130-210 | 140-230 | 130-210  | 120-210  | -        |
|                           |                                              | perlitica                           | 800                      | 120-170                                   | 110-150 | 120-170 | 110-150  | 110-150  | -        |
|                           | Ghisa malleabile                             | ferritica                           | 450                      | 150-210                                   | 130-200 | 150-210 | 130-200  | 130-180  | -        |
|                           |                                              | perlitica                           | 750                      | 150-210                                   | 130-200 | 150-210 | 130-200  | 130-180  | -        |
|                           | N                                            | Leghe di alluminio a truciolo lungo | non trattabile           | 200                                       | -       | -       | 850-1300 | 850-1300 | 750-1200 |
| temprabile, trattato      |                                              |                                     | 350                      | -                                         | -       | 400-900 | 400-900  | 350-800  | 350-800  |
| Fusioni di Alluminio      |                                              | ≤ 12% Si, temprato                  | 250                      | -                                         | -       | 260-800 | 260-800  | 230-700  | 230-700  |
|                           |                                              | ≤ 12% Si, temprabile, trattato      | 300                      | -                                         | -       | 200-550 | 200-550  | 180-500  | 180-500  |
|                           |                                              | ≤ 12% Si, non trattabile            | 450                      | -                                         | -       | 200-500 | 200-500  | 180-450  | 180-450  |
|                           |                                              | Leghe di Rame (Bronzo, Ottone)      | Leghe di Piombo, Pb > 1% | 400                                       | -       | -       | -        | -        | -        |
| Ottone, Bronzo            |                                              |                                     | 300                      | -                                         | -       | -       | -        | -        | -        |
| Bronzo alluminio          |                                              |                                     | 500                      | -                                         | -       | -       | -        | -        | -        |
| Rame e rame elettrolitico |                                              |                                     | 200                      | -                                         | -       | -       | -        | -        | -        |
| Materiali non ferrosi     |                                              | Plastiche dure                      |                          | -                                         | -       | -       | -        | -        | -        |
|                           |                                              | Plastiche rinforzate                |                          | -                                         | -       | -       | -        | -        | -        |
|                           |                                              | Gomme dure                          |                          | -                                         | -       | -       | -        | -        | -        |
| S                         |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto    | 700                                       | 20-50   | 20-50   | 20-50    | 20-50    | 15-45    |
|                           | a base di Fe, temprato                       |                                     | 950                      | 20-50                                     | 20-50   | 20-50   | 20-50    | 15-45    | 15-45    |
|                           | a base di Ni, ricotto                        |                                     | 800                      | 15-40                                     | 15-40   | 15-40   | 15-40    | 10-35    | 10-35    |
|                           | a base di Co, da fusione                     |                                     | 1100                     | 15-30                                     | 15-30   | 15-30   | 15-30    | 10-25    | 10-25    |
|                           | a base di Co, temprato                       |                                     | 1200                     | 15-30                                     | 15-30   | 15-30   | 15-30    | 10-25    | 10-25    |
|                           | Leghe di Titanio                             | titanio puro                        | 500-700                  | -                                         | -       | -       | -        | -        | -        |
|                           | Leghe Alfa e Beta, trattate                  |                                     | 700-1000                 | -                                         | -       | -       | -        | -        | -        |
| H                         | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350                | -                                         | -       | -       | -        | -        | -        |
|                           |                                              | temprato e rinvenuto                | 1350-1700                | -                                         | -       | -       | -        | -        | -        |
|                           | Ghisa temprata                               | da fusione                          | 1350                     | -                                         | -       | -       | -        | -        | -        |
|                           | Ghisa trattata                               | temprato e rinvenuto                | 1900                     | -                                         | -       | -       | -        | -        | -        |

I dati indicati in tabella sono valori approssimati.  
Può essere necessario adattarli alle singole applicazioni di lavorazione.

Altre tipi li trovate  
nelle pagine seguenti. ➤

## Tornitura – Ultra positivi

non rivestito

| ISO | Materiale                                    |                                     | Resistenza<br>[N/mm <sup>2</sup> ] | Velocità di taglio V <sub>c</sub> (m/min) |            |
|-----|----------------------------------------------|-------------------------------------|------------------------------------|-------------------------------------------|------------|
|     |                                              |                                     |                                    | AK10                                      | AK20       |
| P   | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                                | -                                         | -          |
|     |                                              | ca. 0,45% C                         | 650                                | -                                         | -          |
|     |                                              | ca. 0,75% C                         | 1000                               | -                                         | -          |
|     | Acciaio debolmente legati                    |                                     | 600                                | -                                         | -          |
|     |                                              |                                     | 900                                | -                                         | -          |
|     |                                              |                                     | 1200                               | -                                         | -          |
|     | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                                | -                                         | -          |
|     |                                              | temprato e rinvenuto                | 1100                               | -                                         | -          |
| M   | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                                | -                                         | -          |
|     |                                              | martensitico, temprato              | 1000                               | -                                         | -          |
| K   | Ghisa grigia                                 | austenitico e austenitico/ferritico | 450 - 600                          | -                                         | -          |
|     |                                              | trattato o temprato                 | 600 - 900                          | -                                         | -          |
|     |                                              |                                     |                                    |                                           |            |
|     | Ghisa sferoidale                             | perlitica, ferritica                | 500 - 700                          | 120 - 160                                 | 120 - 160  |
|     |                                              | perlitica, martensitica             | 700 - 850                          | 90 - 140                                  | 90 - 140   |
|     |                                              |                                     | 800 - 1100                         | 80 - 140                                  | 80 - 140   |
|     | Ghisa malleabile                             | ferritica                           | 550                                | 130 - 170                                 | 130 - 170  |
|     |                                              | perlitica                           | 800                                | 90 - 130                                  | 90 - 130   |
|     |                                              |                                     |                                    |                                           |            |
|     | Leghe di alluminio a truciolo lungo          | ferritica                           | 450                                | 140 - 200                                 | 140 - 200  |
|     |                                              | perlitica                           | 750                                | 120 - 160                                 | 120 - 160  |
| N   | Fusioni di Alluminio                         | non trattabile                      | 200                                | 300 - 2500                                | 300 - 2500 |
|     |                                              | temprabile, trattato                | 350                                | 200 - 2000                                | 200 - 2000 |
|     |                                              |                                     |                                    |                                           |            |
|     | Leghe di Rame (Bronzo, Ottone)               | ≤ 12% Si, temprato                  | 250                                | 400 - 1500                                | 400 - 1500 |
|     |                                              | ≤ 12% Si, temprabile, trattato      | 300                                | 400 - 1500                                | 400 - 1500 |
|     |                                              | ≤ 12% Si, non trattabile            | 450                                | 200 - 800                                 | 200 - 800  |
|     | Materiali non ferrosi                        | Leghe di Piombo, Pb > 1%            | 400                                | 250 - 600                                 | 250 - 600  |
|     |                                              | Ottone, Bronzo                      | 300                                | 200 - 600                                 | 200 - 600  |
|     |                                              | Bronzo alluminio                    | 500                                | 150 - 400                                 | 150 - 400  |
|     |                                              | Rame e rame elettrolitico           | 200                                | 150 - 300                                 | 150 - 300  |
| S   | Leghe refrattarie, Superleghe                | Plastiche dure                      |                                    | 80 - 180                                  | 80 - 180   |
|     |                                              | Plastiche rinforzate                |                                    | 60 - 150                                  | 60 - 150   |
|     |                                              | Gomme dure                          |                                    | 100 - 250                                 | 100 - 250  |
|     |                                              | a base di Fe, ricotto               | 700                                | 15 - 40                                   | -          |
|     |                                              | a base di Fe, temprato              | 950                                | 8 - 28                                    | -          |
|     | Leghe di Titanio                             | a base di Ni, ricotto               | 800                                | 10 - 30                                   | -          |
|     |                                              | a base di Co, da fusione            | 1100                               | 8 - 25                                    | -          |
|     |                                              | a base di Co, temprato              | 1200                               | 8 - 25                                    | -          |
|     |                                              |                                     |                                    |                                           |            |
|     | Leghe Alfa e Beta, trattate                  | titanio puro                        | 500 - 700                          | 60 - 120                                  | -          |
| H   | Acciaio temprato                             | temprato e rinvenuto                | 1000 - 1350                        | -                                         | -          |
|     |                                              | temprato e rinvenuto                | 1350 - 1700                        | -                                         | -          |
|     | Ghisa temprata                               | da fusione                          | 1350                               | -                                         | -          |
|     | Ghisa trattata                               | temprato e rinvenuto                | 1900                               | -                                         | -          |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

| ISO                                                                                                                                                                                                                                              |    | CERMET beschichtet<br>CERMET coated<br>Cermet rivestito | CERMET unbeschichtet<br>CERMET uncoated<br>Cermet non rivestito | Schneidstoff<br>Cutting material<br>Materiale da taglio          | Anwendung<br>Application<br>Parametri                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|
| <b>P</b><br><b>Stahl, Stahlguss, langspanender Tempermuss</b><br><i>Steel, cast steel, malleable iron</i><br><br>Acciaio, acciaio da fusione, ghisa malleabile da truciolo lungo                                                                 | 10 | AP6510                                                  | AP6010                                                          | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 | AC90C                                                   | ACE6                                                            | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |
| <b>M</b><br><b>Rostfreier Stahl, Stahlguss, Manganstahl, Automatenstahl</b><br><i>Stainless steel, cast steel, manganese steel, free cutting steel</i><br><br>Acciaio Inossidabile, Acciaio da Fusione, Acciaio al Manganese, Acciaio Automatico | 10 | AP6510                                                  | AP6010                                                          | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 | AC90C                                                   | ACE6                                                            | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |
| <b>K</b><br><b>Grauguss, Kokillenhartguss, kurzspanender Tempermuss</b><br><i>Grey cast iron, chilled hard cast iron, short chipping malleable iron</i><br><br>Ghisa grigia, ghisa sferoidale, ghisa malleabile a truciolo corto                 | 10 |                                                         | ACE6                                                            | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 |                                                         |                                                                 | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |
| <b>N</b><br><b>Aluminium und Al-Legierungen, nichtmetallische Werkstoffe</b><br><i>Aluminum and Al-alloys, non-ferrous materials</i><br><br>Alluminio e sue leghe, materiali non ferrosi o non metallici                                         | 10 |                                                         |                                                                 | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 |                                                         |                                                                 | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |
| <b>S</b><br><b>Warmfeste Legierungen, Titanlegierungen</b><br><i>High temperature resistant alloys, titanium alloys</i><br><br>Leghe refrattarie, leghe esotiche, leghe di titanio                                                               | 10 |                                                         |                                                                 | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 |                                                         |                                                                 | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |
| <b>H</b><br><b>Gehärteter Stahl, Hartguss</b><br><i>Hardened steel, hard cast iron</i><br><br>Acciaio temprato, ghisa temprata                                                                                                                   | 10 |                                                         |                                                                 | Zähigkeit<br>Toughness / Tenacità                                | Vorschub<br>Feed rate / Avanzamento                          |
|                                                                                                                                                                                                                                                  | 20 |                                                         |                                                                 | Verschleißbeständigkeit / Wear resistance / Resistenza all'usura | Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
|                                                                                                                                                                                                                                                  | 30 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 40 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  | 50 |                                                         |                                                                 |                                                                  |                                                              |
|                                                                                                                                                                                                                                                  |    |                                                         |                                                                 |                                                                  |                                                              |

Hauptanwendungsbereich / Main application area / Applicazione principale

AK1020 Sorte / Grade / Qualità  
Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

Nebenanwendungsbereich / Secondary application area / Applicazione dsecondaria

AK1020 Sorte / Grade / Qualità  
Empfohlener Anwendungsbereich / Recommended application area / Applicazione consigliata

## Beschichtet / Coated / Rivestito

### AP6510

**PVD-Mehrlagenbeschichtung**  
**Feinstkorn (durchschnittliche Korngröße 0,6 µm) Cermet-Sorte zur Bearbeitung von legierten und unlegierten Stählen, rostfreien Stählen und Stahlguss. Einsetzbar zum Schlichten und bei mittlerer Bearbeitung bei hohen Schnittgeschwindigkeiten. Die Sorte AP6510 weist hohe Standzeiten, stabile Schnittergebnisse, geringe Aufschweißneigung zum Werkstück, eine hohe Biegefestigkeit, geringe Abnutzung der Beschichtung sowie eine deutlich bessere Verschleißfestigkeit auf. Bei der Nassbearbeitung hat die AP6510 im Vergleich zum herkömmlichen Cermet eine deutlich höhere Stabilität.**

*PVD-multilayer coating  
 Fine grain (average grain size 0.6 µm) Cermet.  
 Grade for machining alloyed and non-alloyed steel, stainless steel and cast steel. Should be applied for finishing and medium machining at high cutting speed. AP6510 gives long tool life, constant performance, low tendency for built-up edge, high chemical stability and low oxidation wear as well as a considerable wear resistance. When cutting wet, AP6510 shows considerably higher stability over traditional Cermet.*

Rivestimento PVD-multistrato  
 Qualità Cermet Micrograna (dimensione media 0,6 µm) per la lavorazione di acciaio fortemente e debolmente legato, acciaio inossidabile e fusioni di acciaio. E' consigliato l'utilizzo per la finitura e la semi-finitura ad alte velocità di taglio. AP6510 assicura prolungata vita inserto, costanti prestazioni, ridotta tendenza alla formazione del tagliente di riporto, elevata stabilità chimica e bassa usura da ossidazione e da attrito. In lavorazioni con refrigerante, AP6510 dimostra una considerevole affidabilità rispetto alle tradizionali qualità Cermet.

### AC90C

**Beschichtete Cermet-Sorte für die Fertigbearbeitung bzw. mittlere Zerspanung. Sorte mit guter Zähigkeit und Verschleißfestigkeit. Aufgrund der PVD-Beschichtung geringe Neigung zur Bildung einer Aufbauschneide, besonders geeignet für nichtrostende Stähle.**

*Coated Cermet grade for light to medium machining. Good combination between toughness and wear resistance. Because of PVD-coating very little tendency for build up edge.*

Qualità di Cermet rivestita per finitura e semi-finitura. AC90C è una buona combinazione tra tenacità e resistenza all'usura. Il rivestimento PVD riduce la formazione del tagliente di riporto.

## Unbeschichtet / Uncoated / Non rivestito

### AP6010

**Feinstkorn (durchschnittliche Korngröße 0,6 µm) Cermet-Sorte zur Bearbeitung von legierten und unlegierten Stählen, rostfreien Stählen und Stahlguss. Hohe Standzeiten beim Schlichten und bei mittlerer Bearbeitung. Zur Hochgeschwindigkeitsbearbeitung geeignet. Sie weist eine hohe Biegefestigkeit (vergleichbar mit Hartmetall), einen hohen Kolkverschleißwiderstand und eine sehr gute Verschleißfestigkeit auf. Bei hohen Schnittgeschwindigkeiten zeichnet sich die Sorte AP6010 durch eine gute Oberflächenqualität und hohe Schnittgenauigkeit aus.**

*Fine grain (average grain size 0.6 µm) Cermet.  
 Grade for machining alloyed and non-alloyed steel, stainless steel and cast steel. Excellent tool life when finishing and medium machining. Suitable for high speed machining. This cermet has high chemical stability (comparable with carbide). This grade has low tendency for build up edge and excellent wear resistance. AP6010 excels at high cutting speed providing very good surface finish and high accuracy.*

Qualità Cermet Micrograna (dimensione media grana 0,6 µm) per la lavorazione di acciaio debolmente e fortemente legati, acciaio inossidabile, acciaio da fusione. Eccellente vita inserto in finitura e semi-finitura. Ottima per lavorazioni ad alta velocità. Questo Cermet ha una considerevole stabilità chimica rispetto al metallo duro. Qualità con ottima resistenza all'usura e ridotta tendenza alla formazione del tagliente di riporto. AP6010 eccelle nelle lavorazioni ad alta velocità assicurando buona finitura superficiale e elevata precisione.

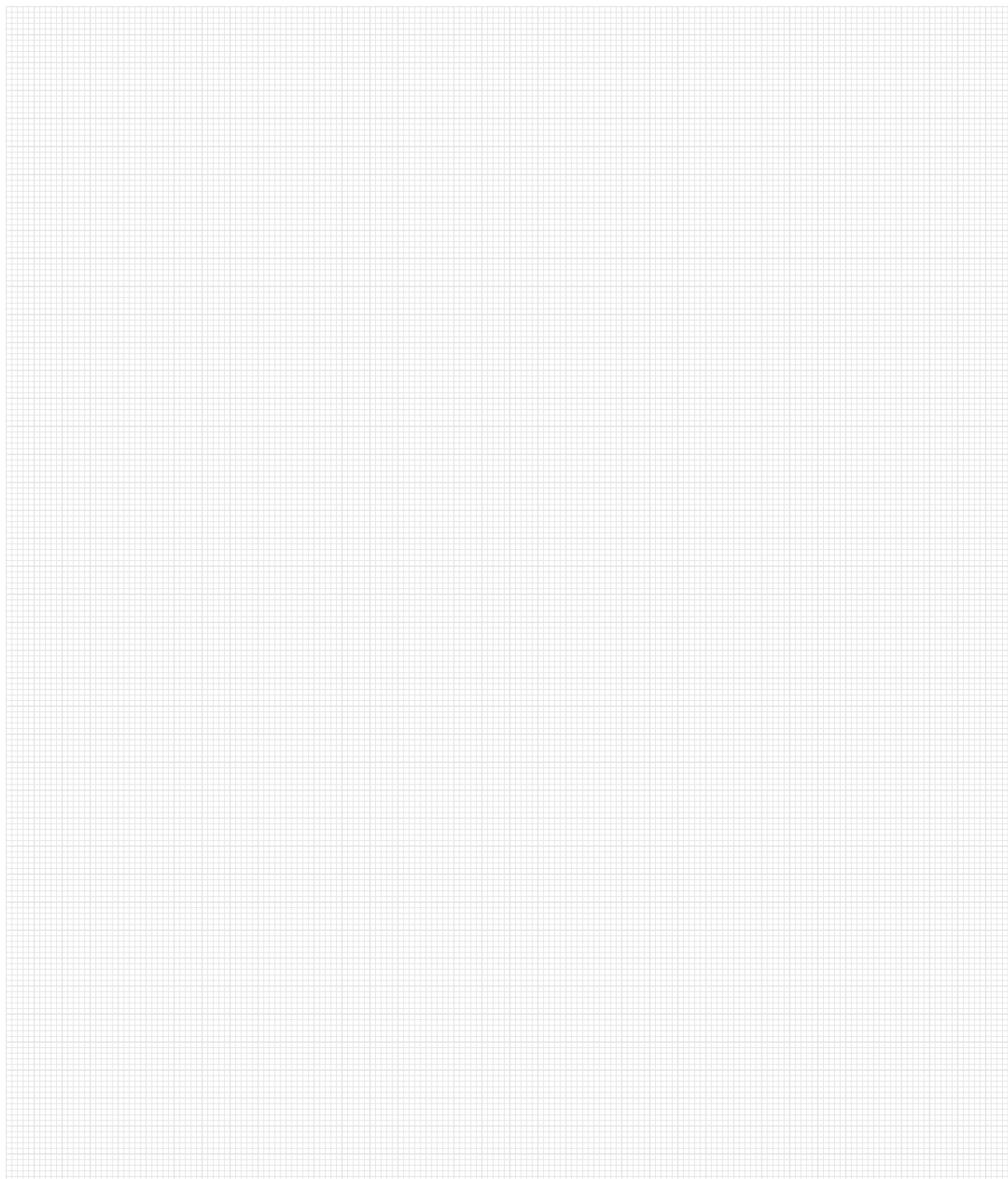
### ACE6

**Cermet-Sorte mit einem besseren Zähigkeitsverhalten für die Bearbeitung von Stahl, rostfreien Stahl und Gusswerkstoffe bei mittleren Spanquerschnitten und Schnittgeschwindigkeiten. Gute Widerstandsfähigkeit gegen Oxidation und Kerbverschleiß sowie geringe Neigung zur Aufbauschneidenbildung.**

*Cermet grade with better toughness for machining steel at medium chip cross sections and medium cutting speeds. Good resistance against oxydation, flank wear and build up edge.*

Qualità Cermet con migliore tenacità per la lavorazione di acciaio a medie asportazioni e velocità di taglio. Buona resistenza all'ossidazione e usura e ridotta tendenza alla formazione del tagliente di riporto.





**Weitere Informationen finden Sie unter:**

*For more information see:*

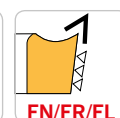
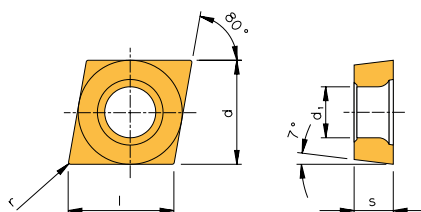
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**WERKZEUGE**

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| Bezeichnung<br>Designation<br>Articolo | Sorten / Grades / Qualità |       |      |                |     |    |                                  |       |                                          |      |
|----------------------------------------|---------------------------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        | l                         | d     | s    | d <sub>1</sub> | r   | PG | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |                           |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| CCGT 060201EN                          | 6,40                      | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       |                                          |      |
| CCGT 060202EN                          | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 | ●                                | ●     | ●                                        | ●    |
| CCGT 060204EN                          | 6,40                      | 6,350 | 2,38 | 2,8            | 0,4 | 23 | ●                                | ●     | ●                                        | ●    |
| CCGT 09T301EN                          | 9,70                      | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       |                                          | ●    |
| CCGT 09T302EN                          | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       |                                          | ●    |
| CCGT 09T304EN                          | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                |       |                                          | ●    |
| CCGT 060201FN-AZ                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| CCGT 060202FN-AZ                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 060204FN-AZ                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCGT 09T302FN-AZ                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T304FN-AZ                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCGT 060202FL-FS                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| CCGT 060204FL-FS                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| CCGT 09T302FR-FS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       |                                          | ●    |
| CCGT 09T304FL-FS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| CCGT 09T304FR-FS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| CCGT 060201FN-PS                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| CCGT 060202FN-PS                       | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T301FN-PS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       | ●                                        |      |
| CCGT 09T302FN-PS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T304FN-PS                       | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCGT 060201FL-U                        | 6,40                      | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        | ●    |
| CCGT 060201FR-U                        | 6,40                      | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        | ●    |
| CCGT 060202FL-U                        | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 | ●                                |       | ●                                        | ●    |
| CCGT 060202FR-U                        | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| CCGT 09T302ER-U                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T302FL-U                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| CCGT 09T302FR-U                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| CCGT 09T304ER-U                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCGT 060202FN-Z                        | 6,40                      | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T302FN-Z                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCGT 09T304FN-Z                        | 9,70                      | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |

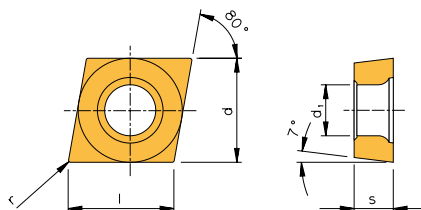
● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ● | ● |
| M | ● | ● | ○ | ● |
| K |   |   |   | ○ |
| N |   |   |   |   |
| S |   |   |   |   |
| H |   |   |   |   |

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| Bezeichnung<br>Designation<br>Articolo |      |       |      |                |     |    | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        | l    | d     | s    | d <sub>1</sub> | r   | PG | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |      |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| CCMT 060202EN-AQ                       | 6,40 | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| CCMT 060204EN-AQ                       | 6,40 | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  | ●     |                                          | ●    |
| CCMT 09T302EN-AQ                       | 9,70 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       | ●                                        | ●    |
| CCMT 09T304EN-AQ                       | 9,70 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                | ●     | ●                                        | ●    |
| CCMT 09T308EN-AQ                       | 9,70 | 9,525 | 3,97 | 4,4            | 0,8 | 23 | ●                                |       | ●                                        | ●    |
| CCMT 060202EN-PM1                      | 6,40 | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCMT 060204EN-PM1                      | 6,40 | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCMT 09T302EN-PM1                      | 9,70 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| CCMT 09T304EN-PM1                      | 9,70 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| CCMT 060202EN-PMC                      | 6,40 | 6,350 | 2,38 | 2,8            | 0,2 | 23 | ●                                |       | ●                                        |      |
| CCMT 060204EN-PMC                      | 6,40 | 6,350 | 2,38 | 2,8            | 0,4 | 23 | ●                                |       | ●                                        |      |
| CCMT 09T304EN-PMC                      | 9,70 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                |       |                                          |      |

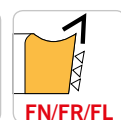
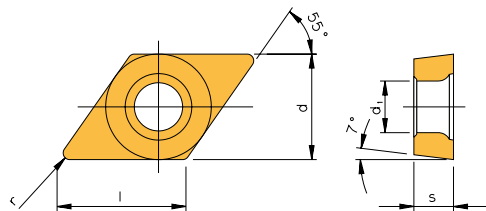
● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ● | ● |
| M | ● | ● | ○ | ● |
| K |   |   |   | ○ |
| N |   |   |   |   |
| S |   |   |   |   |
| H |   |   |   |   |

Inserts – CERMET

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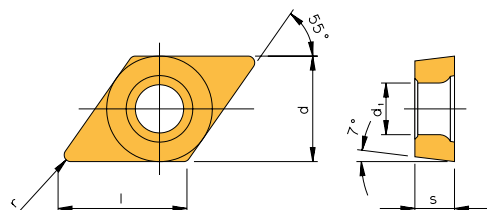


| Bezeichnung<br>Designation<br>Articolo |       |       |      |                |     |    | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|-------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        | l     | d     | s    | d <sub>1</sub> | r   | PG | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |       |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| DCGT 070201EN                          | 7,70  | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       |                                          | ●    |
| DCGT 070202EN                          | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| DCGT 070204EN                          | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| DCGT 11T301EN                          | 11,60 | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       |                                          | ●    |
| DCGT 11T302EN                          | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                | ●     | ●                                        | ●    |
| DCGT 11T304EN                          | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                | ●     | ●                                        | ●    |
| DCGT 070201FN-AZ                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| DCGT 070202FN-AZ                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCGT 070204FN-AZ                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCGT 11T302FN-AZ                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCGT 11T304FN-AZ                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCGT 070202FR-FS                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| DCGT 070204FR-FS                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| DCGT 11T302FL-FS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       |                                          | ●    |
| DCGT 11T302FR-FS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       |                                          | ●    |
| DCGT 11T304FL-FS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| DCGT 11T304FR-FS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| DCGT 070201FN-PS                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| DCGT 070202FN-PS                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCGT 11T301FN-PS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       | ●                                        |      |
| DCGT 11T302FN-PS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCGT 11T304FN-PS                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCGT 070201FL-U                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       |                                          | ●    |
| DCGT 070201FR-U                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| DCGT 070202FL-U                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| DCGT 070202FR-U                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| DCGT 11T301FL-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       |                                          | ●    |
| DCGT 11T301FR-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,1 | 23 |                                  |       |                                          | ●    |
| DCGT 11T302EL-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       | ●                                        |      |
| DCGT 11T302ER-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       |                                          |      |
| DCGT 11T302FL-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| DCGT 11T302FR-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       | ●                                        | ●    |
| DCGT 11T304EL-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCGT 11T304ER-U                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| DCGT 070202FN-Z                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| DCGT 070204FN-Z                        | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 | ●                                |       |                                          |      |
| DCGT 11T304FN-Z                        | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                |       |                                          |      |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ● | ● |
| M | ● | ● | ○ | ● |
| K |   |   |   | ○ |
| N |   |   |   |   |
| S |   |   |   |   |
| H |   |   |   |   |



## DC..



| Bezeichnung<br>Designation<br>Articolo |       |       |      |                |     |    | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|-------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        | l     | d     | s    | d <sub>1</sub> | r   | PG | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |       |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| DCMT 070202EN-AQ                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        | ●    |
| DCMT 070204EN-AQ                       | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 | ●                                | ●     | ●                                        | ●    |
| DCMT 11T302EN-AQ                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                | ●     | ●                                        | ●    |
| DCMT 11T304EN-AQ                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                | ●     | ●                                        | ●    |
| DCMT 11T308EN-AQ                       | 11,60 | 9,525 | 3,97 | 4,4            | 0,8 | 23 | ●                                |       | ●                                        | ●    |
| DCMT 070202EN-PM1                      | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCMT 070204EN-PM1                      | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCMT 11T302EN-PM1                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 |                                  |       | ●                                        |      |
| DCMT 11T304EN-PM1                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| DCMT 11T308EN-PM1                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,8 | 23 |                                  |       | ●                                        |      |
| DCMT 070202EN-PMC                      | 7,70  | 6,350 | 2,38 | 2,8            | 0,2 | 23 | ●                                |       |                                          |      |
| DCMT 070204EN-PMC                      | 7,70  | 6,350 | 2,38 | 2,8            | 0,4 | 23 | ●                                |       | ●                                        |      |
| DCMT 070208EN-PMC                      | 7,70  | 6,350 | 2,38 | 2,8            | 0,8 | 23 |                                  |       | ●                                        |      |
| DCMT 11T302EN-PMC                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,2 | 23 | ●                                |       |                                          |      |
| DCMT 11T304EN-PMC                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,4 | 23 | ●                                |       | ●                                        |      |
| DCMT 11T308EN-PMC                      | 11,60 | 9,525 | 3,97 | 4,4            | 0,8 | 23 | ●                                |       | ●                                        |      |

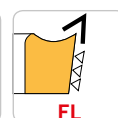
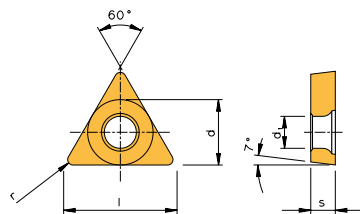
● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ● | ● |
| M | ● | ● | ○ | ● |
| K |   |   |   | ○ |
| N |   |   |   |   |
| S |   |   |   |   |
| H |   |   |   |   |

Inserts – CERMET

Inserti – CERMET



TC..

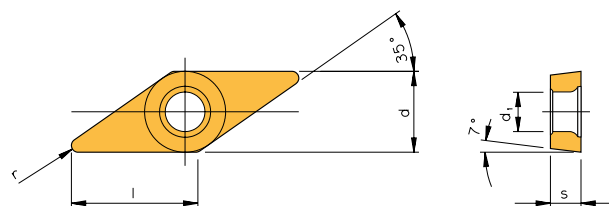


| Bezeichnung<br>Designation<br>Articolo | l     | d     | s    | d <sub>1</sub> | r   | PG | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|-------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        |       |       |      |                |     |    | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |       |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| TCGT 110202FL                          | 11,00 | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| TCGT 110204FL                          | 11,00 | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| TCMT 090202EN-AQ                       | 9,60  | 5,560 | 2,38 | 2,5            | 0,2 | 23 |                                  |       |                                          | ●    |
| TCMT 090204EN-AQ                       | 9,60  | 5,560 | 2,38 | 2,5            | 0,4 | 23 |                                  |       |                                          | ●    |
| TCMT 110202EN-AQ                       | 11,00 | 6,350 | 2,38 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| TCMT 110204EN-AQ                       | 11,00 | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        | ●    |
| TCMT 110208EN-AQ                       | 11,00 | 6,350 | 2,38 | 2,8            | 0,8 | 23 |                                  |       |                                          | ●    |
| TCMT 16T304EN-AQ                       | 16,50 | 9,525 | 3,97 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| TCMT 110204EN-PM1                      | 11,00 | 6,350 | 2,38 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| TCMT 110208EN-PM1                      | 11,00 | 6,350 | 2,38 | 2,8            | 0,8 | 23 |                                  |       | ●                                        |      |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |  |   |   |
|---|--|---|---|
| P |  | ● | ● |
| M |  | ○ | ● |
| K |  |   | ○ |
| N |  |   |   |
| S |  |   |   |
| H |  |   |   |



VC..

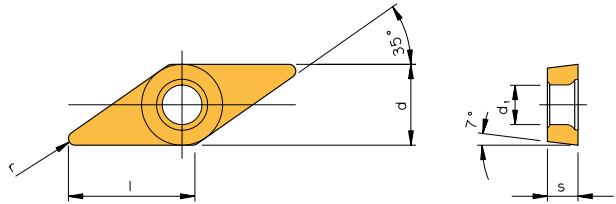


| Bezeichnung<br>Designation<br>Articolo |       |       |      |                |     |    | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|-------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        | l     | d     | s    | d <sub>1</sub> | r   | PG | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |       |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| VCGT 110301FN-AZ                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| VCGT 110302FN-AZ                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| VCGT 110304FN-AZ                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| VCGT 110301FN-PS                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| VCGT 110302FN-PS                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| VCGT 110304FN-PS                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| VCGT 110301FL-U                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| VCGT 110301FR-U                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,1 | 23 |                                  |       | ●                                        |      |
| VCGT 110302FL-U                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| VCGT 110302FR-U                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| VCGT 110302FL-Y                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| VCGT 110302FR-Y                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| VCGT 110304FL-Y                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| VCGT 110304FR-Y                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| VCGT 160404FL-Y                        | 16,60 | 9,525 | 4,76 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| VCGT 160404FR-Y                        | 16,60 | 9,525 | 4,76 | 4,4            | 0,4 | 23 |                                  |       |                                          | ●    |
| VCGT 110301FN-Z                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,1 | 23 |                                  |       |                                          | ●    |
| VCGT 110302FN-Z                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       |                                          | ●    |
| VCGT 110304FN-Z                        | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |  |   |   |
|---|--|---|---|
| P |  | ● | ● |
| M |  | ○ | ● |
| K |  |   | ○ |
| N |  |   |   |
| S |  |   |   |
| H |  |   |   |

Inserts – CERMET  
Inserti – CERMET



VC..



| Bezeichnung<br>Designation<br>Articolo | l     | d     | s    | d <sub>1</sub> | r   | PG | Sorten / Grades / Qualità        |       |                                          |      |
|----------------------------------------|-------|-------|------|----------------|-----|----|----------------------------------|-------|------------------------------------------|------|
|                                        |       |       |      |                |     |    | beschichtet/<br>coated/rivestito |       | unbeschichtet/<br>uncoated/non rivestito |      |
|                                        |       |       |      |                |     |    | AP6510                           | AC90C | AP6010                                   | ACE6 |
| VCMT 110304EN-AQ                       | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       |                                          | ●    |
| VCMT 160404EN-AQ                       | 16,60 | 9,525 | 4,76 | 4,4            | 0,4 | 23 |                                  | ●     |                                          | ●    |
| VCMT 160408EN-AQ                       | 16,60 | 9,525 | 4,76 | 4,4            | 0,8 | 23 |                                  | ●     |                                          | ●    |
| VCMT 110302EN-PM1                      | 11,10 | 6,350 | 3,18 | 2,8            | 0,2 | 23 |                                  |       | ●                                        |      |
| VCMT 110304EN-PM1                      | 11,10 | 6,350 | 3,18 | 2,8            | 0,4 | 23 |                                  |       | ●                                        |      |
| VCMT 160404EN-PM1                      | 16,60 | 9,525 | 4,76 | 4,4            | 0,4 | 23 |                                  |       | ●                                        |      |
| VCMT 160408EN-PM1                      | 16,60 | 9,525 | 4,76 | 4,4            | 0,8 | 23 |                                  |       | ●                                        |      |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |
|---|---|---|---|
| P | ● | ● | ● |
| M | ● | ○ | ● |
| K |   |   | ○ |
| N |   |   |   |
| S |   |   |   |
| H |   |   |   |



## Drehen – CERMET

| ISO                                           | Werkstoff                                                      |                                       | Zugfestigkeit<br>[N/mm²] | Schnittgeschwindigkeit Vc [m/min] |           |           |           |
|-----------------------------------------------|----------------------------------------------------------------|---------------------------------------|--------------------------|-----------------------------------|-----------|-----------|-----------|
|                                               |                                                                |                                       |                          | AP6510                            | AC90C     | AP6010    | ACE6      |
| P                                             | Unlegierter Stahl und Stahlguss                                | ca. 0,15% C                           | 350                      | 100 - 500                         | 160 - 460 | 100 - 450 | 100 - 400 |
|                                               |                                                                | ca. 0,45% C                           | 650                      | 80 - 500                          | 90 - 430  | 80 - 450  | 80 - 370  |
|                                               |                                                                | ca. 0,75% C                           | 1000                     | 50 - 350                          | 60 - 400  | 50 - 350  | 50 - 350  |
|                                               | Niedrig legierter Stahl und Stahlguss                          |                                       | 600                      | 80 - 500                          | 90 - 350  | 80 - 450  | 80 - 300  |
|                                               |                                                                |                                       | 900                      | 70 - 500                          | 80 - 300  | 70 - 450  | 70 - 270  |
|                                               |                                                                |                                       | 1200                     | 50 - 350                          | 60 - 300  | 50 - 350  | 50 - 250  |
|                                               | Hochlegierter Stahl, hochlegierter Werkzeugstahl und Stahlguss | geglüht                               | 700                      | 60 - 320                          | 90 - 230  | 60 - 250  | 80 - 200  |
|                                               |                                                                | gehärtet und angelassen               | 1100                     | 50 - 180                          | 60 - 180  | 50 - 180  | 50 - 160  |
|                                               | Nichtrostender Stahl und Stahlguss                             | ferritisch/martensitisch, ge­glüht    | 700                      | 80 - 350                          | 90 - 290  | 80 - 300  | 80 - 250  |
| martensitisch, vergütet                       |                                                                | 1000                                  | 80 - 400                 | -                                 | 80 - 350  | 80 - 250  |           |
| M                                             | Nichtrostender Stahl und Stahlguss                             | austenitisch und                      | 450 - 600                | 80 - 380                          | -         | 80 - 300  | 80 - 240  |
|                                               |                                                                | austenitisch/ferritisch, abgeschreckt | 600 - 900                | 60 - 350                          | -         | 60 - 300  | 80 - 240  |
| K                                             | Grauguss                                                       | perlitisch, ferritisch                | 500 - 700                | 100 - 500                         | -         | 100 - 300 | 80 - 300  |
|                                               |                                                                | perlitisch, martensitisch             | 700 - 850                | 100 - 380                         | -         | 100 - 300 | 80 - 260  |
|                                               |                                                                |                                       | 800 - 1100               | 100 - 350                         | -         | 100 - 300 | 80 - 240  |
|                                               | Gusseisen mit Kugelgraphit                                     | ferritisch                            | 550                      | 80 - 350                          | 80 - 300  | 100 - 300 | 80 - 300  |
|                                               |                                                                | perlitisch                            | 800                      | 80 - 350                          | 80 - 250  | 100 - 300 | 80 - 250  |
|                                               | Temperguss                                                     | ferritisch                            | 450                      | 80 - 350                          | 80 - 350  | 100 - 300 | 80 - 350  |
|                                               |                                                                | perlitisch                            | 750                      | 80 - 350                          | 60 - 250  | 100 - 300 | 60 - 250  |
|                                               | N                                                              | Aluminium-Knetlegierungen             | nicht aushärtbar         | 200                               | -         | -         | -         |
| aushärtbar, ausgehärtet                       |                                                                |                                       | 350                      | -                                 | -         | -         | -         |
| Aluminium-Gusslegierungen                     |                                                                | ≤ 12% Si, ausgehärtet                 | 250                      | -                                 | -         | -         | -         |
|                                               |                                                                | ≤ 12% Si, aushärtbar, ausgehärtet     | 300                      | -                                 | -         | -         | -         |
|                                               |                                                                | ≤ 12% Si, nicht aushärtbar            | 450                      | -                                 | -         | -         | -         |
| Kupfer und Kupferlegierungen (Bronze/Messing) |                                                                | Automatenlegierung, Pb > 1%           | 400                      | -                                 | -         | -         | -         |
|                                               |                                                                | Messing, Rotguss                      | 300                      | -                                 | -         | -         | -         |
|                                               |                                                                | Aluminiumbronze                       | 500                      | -                                 | -         | -         | -         |
|                                               |                                                                | Kupfer und Elektrolytkupfer           | 200                      | -                                 | -         | -         | -         |
| Nichtmetallische Werkstoffe                   |                                                                | Duroplaste                            |                          | -                                 | -         | -         | -         |
|                                               | Faserverstärkte Kunststoffe                                    |                                       | -                        | -                                 | -         | -         |           |
|                                               | Hartgummi                                                      |                                       | -                        | -                                 | -         | -         |           |
| S                                             | Warmfeste Legierungen                                          | Fe-Basis ge­glüht                     | 700                      | -                                 | -         | -         | -         |
|                                               |                                                                | Fe-Basis ausgehärtet                  | 950                      | -                                 | -         | -         | -         |
|                                               |                                                                | Ni- oder Co-Basis ge­glüht            | 800                      | -                                 | -         | -         | -         |
|                                               |                                                                | Ni- oder Co-Basis gegossen            | 1100                     | -                                 | -         | -         | -         |
|                                               |                                                                | Ni- oder Co-Basis ausgehärtet         | 1200                     | -                                 | -         | -         | -         |
|                                               | Titanlegierungen                                               | Rein-Titan                            | 500 - 700                | -                                 | -         | -         | -         |
|                                               | Alpha+Beta-Legierungen, ausgehärtet                            |                                       | 700 - 1000               | -                                 | -         | -         | -         |
| H                                             | Gehärteter Stahl                                               | gehärtet und angelassen               | 1000 - 1350              | -                                 | -         | -         | -         |
|                                               |                                                                | gehärtet und angelassen               | 1350 - 1700              | -                                 | -         | -         | -         |
|                                               | Hartguss                                                       | gegossen                              | 1350                     | -                                 | -         | -         | -         |
|                                               | Gehärtetes Gusseisen                                           | gehärtet und angelassen               | 1900                     | -                                 | -         | -         | -         |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

## Turning – CERMET

| ISO                                     | Material                                                   |                                        | Tensile strength<br>[N/mm²] | Cutting speed Vc [m/min] |           |           |           |
|-----------------------------------------|------------------------------------------------------------|----------------------------------------|-----------------------------|--------------------------|-----------|-----------|-----------|
|                                         |                                                            |                                        |                             | AP6510                   | AC90C     | AP6010    | ACE6      |
| P                                       | Unalloyed steel and cast steel                             | ca. 0,15% C                            | 350                         | 100 - 500                | 160 - 460 | 100 - 450 | 100 - 400 |
|                                         |                                                            | ca. 0,45% C                            | 650                         | 80 - 500                 | 90 - 430  | 80 - 450  | 80 - 370  |
|                                         |                                                            | ca. 0,75% C                            | 1000                        | 50 - 350                 | 60 - 400  | 50 - 350  | 50 - 350  |
|                                         | Low alloyed steel and cast steel                           |                                        | 600                         | 80 - 500                 | 90 - 350  | 80 - 450  | 80 - 300  |
|                                         |                                                            |                                        | 900                         | 70 - 500                 | 80 - 300  | 70 - 450  | 70 - 270  |
|                                         |                                                            |                                        | 1200                        | 50 - 350                 | 60 - 300  | 50 - 350  | 50 - 250  |
|                                         | High alloyed steel, high alloyed tool steel and cast steel | annealed                               | 700                         | 60 - 320                 | 90 - 230  | 60 - 250  | 80 - 200  |
|                                         |                                                            | hardened and tempered                  | 1100                        | 50 - 180                 | 60 - 180  | 50 - 180  | 50 - 160  |
|                                         | Stainless steel and cast steel                             | ferritic / martensitic, annealed       | 700                         | 80 - 350                 | 90 - 290  | 80 - 300  | 80 - 250  |
|                                         |                                                            | martensitic, hardened and tempered     | 1000                        | 80 - 400                 | -         | 80 - 350  | 80 - 250  |
| M                                       | Stainless steel and cast steel                             | austenitic and austenitic/ferritic     | 450 - 600                   | 80 - 380                 | -         | 80 - 300  | 80 - 240  |
|                                         |                                                            | chilled                                | 600 - 900                   | 60 - 350                 | -         | 60 - 300  | 80 - 240  |
| K                                       | Cast iron                                                  | pearlitic, ferritic                    | 500 - 700                   | 100 - 500                | -         | 100 - 300 | 80 - 300  |
|                                         |                                                            | pearlitic, martensitic                 | 700 - 850                   | 100 - 380                | -         | 100 - 300 | 80 - 260  |
|                                         |                                                            |                                        | 800 - 1100                  | 100 - 350                | -         | 100 - 300 | 80 - 240  |
|                                         | Cast iron with nodular graphite                            | ferritic                               | 550                         | 80 - 350                 | 80 - 300  | 100 - 300 | 80 - 300  |
|                                         |                                                            | pearlitic                              | 800                         | 80 - 350                 | 80 - 250  | 100 - 300 | 80 - 250  |
|                                         | Malleable cast iron                                        | ferritic                               | 450                         | 80 - 350                 | 80 - 350  | 100 - 300 | 80 - 350  |
|                                         |                                                            | pearlitic                              | 750                         | 80 - 350                 | 60 - 250  | 100 - 300 | 60 - 250  |
|                                         | N                                                          | Aluminum alloys, long chipping         | not heat treatable          | 200                      | -         | -         | -         |
| heat treatable, heat treated            |                                                            |                                        | 350                         | -                        | -         | -         | -         |
| Casted aluminum alloys                  |                                                            | ≤ 12% Si, hardened                     | 250                         | -                        | -         | -         | -         |
|                                         |                                                            | ≤ 12% Si, heat treatable, heat treated | 300                         | -                        | -         | -         | -         |
|                                         |                                                            | ≤ 12% Si, not heat treatable           | 450                         | -                        | -         | -         | -         |
| Copper and copper alloys (brass/bronze) |                                                            | Lead alloys, Pb > 1%                   | 400                         | -                        | -         | -         | -         |
|                                         |                                                            | Brass, bronze                          | 300                         | -                        | -         | -         | -         |
|                                         |                                                            | Aluminum bronze                        | 500                         | -                        | -         | -         | -         |
|                                         |                                                            | Copper and electrolyte copper          | 200                         | -                        | -         | -         | -         |
| Non-ferrous materials                   |                                                            | Duroplastics                           |                             | -                        | -         | -         | -         |
|                                         | Reinforced plastics                                        |                                        | -                           | -                        | -         | -         |           |
|                                         | Hard rubber                                                |                                        | -                           | -                        | -         | -         |           |
| S                                       | High temperature resistant alloys                          | Fe-alloyed annealed                    | 700                         | -                        | -         | -         | -         |
|                                         |                                                            | Fe-alloyed hardened                    | 950                         | -                        | -         | -         | -         |
|                                         |                                                            | Ni- oder Co- based annealed            | 800                         | -                        | -         | -         | -         |
|                                         |                                                            | Ni- oder Co- based casting             | 1100                        | -                        | -         | -         | -         |
|                                         |                                                            | Ni- oder Co- based hardened            | 1200                        | -                        | -         | -         | -         |
|                                         | Titanium alloys, high strength                             | Pure titanium                          | 500 - 700                   | -                        | -         | -         | -         |
|                                         | Alpha- and beta-alloys, hardened                           |                                        | 700 - 1000                  | -                        | -         | -         | -         |
| H                                       | Hardened steel                                             | hardened and tempered                  | 1000 - 1350                 | -                        | -         | -         | -         |
|                                         |                                                            | hardened and tempered                  | 1350 - 1700                 | -                        | -         | -         | -         |
|                                         | Hard cast iron                                             | casting                                | 1350                        | -                        | -         | -         | -         |
|                                         | Hardened cast iron                                         | hardened and tempered                  | 1900                        | -                        | -         | -         | -         |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.

## Tornitura – CERMET

| ISO                            | Materiale                                    |                                     | Resistenza<br>[N/mm²] | Velocità di taglio V <sub>c</sub> (m/min) |         |         |         |
|--------------------------------|----------------------------------------------|-------------------------------------|-----------------------|-------------------------------------------|---------|---------|---------|
|                                |                                              |                                     |                       | AP6510                                    | AC90C   | AP6010  | ACE6    |
| P                              | Acciaio non legati o debolmente legati       | ca. 0,15% C                         | 350                   | 100-500                                   | 160-460 | 100-450 | 100-400 |
|                                |                                              | ca. 0,45% C                         | 650                   | 80-500                                    | 90-430  | 80-450  | 80-370  |
|                                |                                              | ca. 0,75% C                         | 1000                  | 50-350                                    | 60-400  | 50-350  | 50-350  |
|                                | Acciaio debolmente legati                    |                                     | 600                   | 80-500                                    | 90-350  | 80-450  | 80-300  |
|                                |                                              |                                     | 900                   | 70-500                                    | 80-300  | 70-450  | 70-270  |
|                                |                                              |                                     | 1200                  | 50-350                                    | 60-300  | 50-350  | 50-250  |
|                                | Acciai fortemente legati, acciai da utensili | ricotto                             | 700                   | 60-320                                    | 90-230  | 60-250  | 80-200  |
|                                |                                              | temprato e rinvenuto                | 1100                  | 50-180                                    | 60-180  | 50-180  | 50-160  |
|                                | Acciai inossidabili e stampati               | ferritico / martensitico, ricotto   | 700                   | 80-350                                    | 90-290  | 80-300  | 80-250  |
|                                |                                              | martensitico, temprato              | 1000                  | 80-400                                    | -       | 80-350  | 80-250  |
| M                              | Acciai inossidabili e stampati               | austenitico e austenitico/ferritico | 450-600               | 80-380                                    | -       | 80-300  | 80-240  |
|                                |                                              | trattato o temprato                 | 600-900               | 60-350                                    | -       | 60-300  | 80-240  |
| K                              | Ghisa grigia                                 | perlitica, ferritica                | 500-700               | 100-500                                   | -       | 100-300 | 80-300  |
|                                |                                              | perlitica, martensitica             | 700-850               | 100-380                                   | -       | 100-300 | 80-260  |
|                                |                                              |                                     | 800-1100              | 100-350                                   | -       | 100-300 | 80-240  |
|                                | Ghisa sferoidale                             | ferritica                           | 550                   | 80-350                                    | 80-300  | 100-300 | 80-300  |
|                                |                                              | perlitica                           | 800                   | 80-350                                    | 80-250  | 100-300 | 80-250  |
|                                | Ghisa malleabile                             | ferritica                           | 450                   | 80-350                                    | 80-350  | 100-300 | 80-350  |
|                                |                                              | perlitica                           | 750                   | 80-350                                    | 60-250  | 100-300 | 60-250  |
|                                | N                                            | Leghe di alluminio a truciolo lungo | non trattabile        | 200                                       | -       | -       | -       |
| temprabile, trattato           |                                              |                                     | 350                   | -                                         | -       | -       | -       |
| Fusioni di Alluminio           |                                              | ≤ 12% Si, temprato                  | 250                   | -                                         | -       | -       | -       |
|                                |                                              | ≤ 12% Si, temprabile, trattato      | 300                   | -                                         | -       | -       | -       |
|                                |                                              | ≤ 12% Si, non trattabile            | 450                   | -                                         | -       | -       | -       |
| Leghe di Rame (Bronzo, Ottone) |                                              | Leghe di Piombo, Pb > 1%            | 400                   | -                                         | -       | -       | -       |
|                                |                                              | Ottone, Bronzo                      | 300                   | -                                         | -       | -       | -       |
|                                |                                              | Bronzo alluminio                    | 500                   | -                                         | -       | -       | -       |
|                                |                                              | Rame e rame elettrolitico           | 200                   | -                                         | -       | -       | -       |
| Materiali non ferrosi          |                                              | Plastiche dure                      |                       | -                                         | -       | -       | -       |
|                                |                                              | Plastiche rinforzate                |                       | -                                         | -       | -       | -       |
|                                |                                              | Gomme dure                          |                       | -                                         | -       | -       | -       |
| S                              |                                              | Leghe refrattarie, Superleghe       | a base di Fe, ricotto | 700                                       | -       | -       | -       |
|                                | a base di Fe, temprato                       |                                     | 950                   | -                                         | -       | -       | -       |
|                                | a base di Ni, ricotto                        |                                     | 800                   | -                                         | -       | -       | -       |
|                                | a base di Co, da fusione                     |                                     | 1100                  | -                                         | -       | -       | -       |
|                                | a base di Co, temprato                       |                                     | 1200                  | -                                         | -       | -       | -       |
|                                | Leghe di Titanio                             | titanio puro                        | 500-700               | -                                         | -       | -       | -       |
|                                | Leghe Alfa e Beta, trattate                  |                                     | 700-1000              | -                                         | -       | -       | -       |
| H                              | Acciaio temprato                             | temprato e rinvenuto                | 1000-1350             | -                                         | -       | -       | -       |
|                                |                                              | temprato e rinvenuto                | 1350-1700             | -                                         | -       | -       | -       |
|                                | Ghisa temprata                               | da fusione                          | 1350                  | -                                         | -       | -       | -       |
|                                | Ghisa trattata                               | temprato e rinvenuto                | 1900                  | -                                         | -       | -       | -       |

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

| Artikel / Item / Articolo                                                                         | PG 11 |
|---------------------------------------------------------------------------------------------------|-------|
| <b>Schraube / Screw / Vite</b>                                                                    |       |
| SS 1111                                                                                           | ●     |
| SS 1751                                                                                           | ●     |
| SS 5140                                                                                           | ●     |
| SS 5151                                                                                           | ●     |
| SS 8831                                                                                           | ●     |
| V-M4-2200                                                                                         | ●     |
| V-M4-2400                                                                                         | ●     |
| V-M4-2700                                                                                         | ●     |
| <b>Schlüssel / Key / Chiave</b>                                                                   |       |
| KP 3421                                                                                           | ●     |
| KS 1111                                                                                           | ●     |
| KS 1751                                                                                           | ●     |
| KS 1886                                                                                           | ●     |
| KS 5151                                                                                           | ●     |
| <b>Gewindestift / Thread pin / Grano</b>                                                          |       |
| DIN 913 - M4x4                                                                                    | ●     |
| <b>Kühlmittelschlus – gerade / Coolant supply – straight / Raccordo – dritto</b>                  |       |
| KA 001                                                                                            | ●     |
| KA 002                                                                                            | ●     |
| <b>Kühlmittelschlus – winklig, fest / Coolant supply – angled and fixed / Raccordo – angolato</b> |       |
| KA 004                                                                                            | ●     |
| KA 005                                                                                            | ●     |
| <b>Schwenkverschraubung / Swivelling screw-fitting / Raccordo – orientabile</b>                   |       |
| KA 006                                                                                            | ●     |
| KA 007                                                                                            | ●     |



# 5

## DECO-CUT

## DECO-CUT

## DECO-CUT

### Stechdrehsystem

### Grooving system

### Sistema di scanalatura

- Systemvorstellung
- Werkzeugauswahl
- Halter und Ersatzteile
- Wendeschneidplatten
- Anwendungshinweise
- Übersicht Ersatzteile

- Introduction
- Tool shank options
- Holders and Spare Parts
- Indexable Inserts
- Application Reference
- Overview Spare Parts

- Caratteristiche del sistema
- Tripologie di corpo utensile
- Steli e ricambi
- Inserti
- Esempi applicativi
- Gamma utensili ricambi

**246 – 247**  
**248 – 252**  
**254 – 259**  
**260 – 273**  
**274 – 277**  
**277**

### Beste Präzision und Wirtschaftlichkeit!

*Accuracy and performance!*

Precisione e prestazioni!

#### Grundhalter

**8 × 8 bis 20 × 20 mm**

*Basic holders*

*8 × 8 to 20 × 20 mm*

Corpo utensili

da 8 × 8 a 20 × 20 mm



## Systemvorstellung

DECO-CUT ist ein modulares System zur Herstellung von kleinen, dünnen und sehr genauen Massendrehteilen (ab ca. 2,5xD)

- Schäfte von 8x8 bis 20x 20 mm und Zylinderschaft Ø 10 mm

## Fakten

- zweiseitige Wendeschneidplatte
- durch V-Plattensitz mit 3-Punkt-Auflage höchste Stabilität und Wiederholgenauigkeit in der Länge und Spitzenhöhe
- aufgrund einer zentralen Klemmschraube sehr schneller Plattenwechsel möglich
- speziell für das Langdrehen entwickelte Geometrien
- Feinstkornsorten wahlweise mit Hochleistungs-PVD-Beschichtungen
- alle Aufnahmeschäfte sind präzise geschliffen

## Introduction

DECO-CUT is a modular system for manufacturing small, thin-walled and accurate parts.

- Shank sizes from 8x8 to 20x 20 mm and cylindrical shank Ø 10 mm

## Features

- Double sided inserts
- Due to V-shaped insert pocket with 3-point location a very strong insert location is achieved with highest repeatability in insert length and height
- Quick insert changes due to centrally located screw
- Geometries specially developed for swiss style auto lathes
- Fine grain carbide with or without high performance PVD coatings
- Ground shanks on all toolholders

## Descrizione

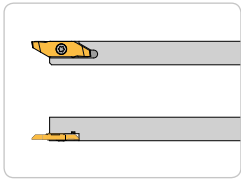
DECO-CUT è un sistema modulare per realizzare piccoli particolari, sottili e con tolleranze molto accurate per la produzione massiva di pezzi torniti (da circa 2,5 x D).

- Steli da 8x8 fino a 20x20 mm e stelo cilindrico Ø 10 mm

## Caratteristiche

- Inserti a doppio tagliente in metallo duro Micro grana
- Tramite il fissaggio a 3-punti si ottiene una alta stabilità con la migliore ripetibilità di precisione di lunghezza e altezza dell'inserto
- Eccellente precisione di riposizionamento inserto
- Stabile e preciso fissaggio inserto
- Rivestimenti PVD ad elevato rendimento
- Forme inserti per tutte le applicazioni

## Grundhalter / Basic holders / Corpo utensili

**SLAO R/L Standard-Drehhalter mit Vierkantschaft**

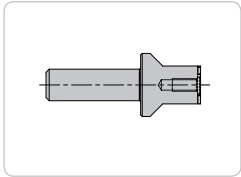
- zum Drehen, Stechdrehen und Gewindeschneiden

*Standard toolholder with square shank*

- for turning, groove & turn and threading

Utensile Standard a stelo quadro

- per Tornitura, Scanalatura, Troncatura e Filettatura

Seite/Page/Pagina **254****SLCO N Drehhalter mit Zylinderschaft**

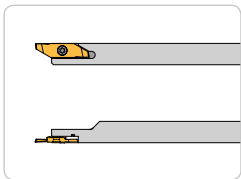
- zum Drehen, Stechdrehen und Gewindeschneiden
- zur Aufnahme auf Bohrstationen an Haupt- und Gegenspindel
- für linke und auch rechte Wendeschneidplatten einsetzbar

*Tool holder with cylindrical shank*

- for turning, groove & turn and threading
- cylindrical shank for applying on main or counter spindle
- suitable for both right and left-hand inserts

Stelo cilindrico

- per tornitura, troncatura e filettatura
- per montaggio su stazioni di foratura sul contro mandrino
- per inserti destri e sinistri

Seite/Page/Pagina **256****SLXO R Drehhalter mit abgesetztem Vierkantschaft**

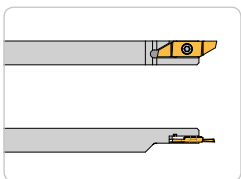
- zum Abstechen kurzer Werkstücke bei Maschinen mit Abgreifspinde
- Abstechposition nahe der Hauptspindel, daher auch bei kleinen Durchmessern stabile Werkstückspannung

*Tool holder with off-set square shank*

- for parting-off short work pieces on machines with sub spindle
- part-off position near the main spindle ensures maximum component clamping also by smaller diameters

Stelo scaricato

- per troncature di pezzi corti
- bloccaggio stabile anche con diametri piccoli

Seite/Page/Pagina **258****SLXO L Schlanker Drehhalter mit versetztem Plattensitz und Vierkantschaft**

- zum vereinfachten Wechsel der Wendeschneidplatte ohne Halterausbau
- der größere Abstand zur Führungsbuchse ist zu beachten

*Tool holder with off line insert seat and square shank for parting-off*

- easy insert change without removing holder from turret
- note the distance to guide bush

Stelo di troncatura scaricato per un taglio molto ravvicinato al mandrino

- permette il taglio di pezzi molto corti
- inserto più vicino al contro mandrino

Seite/Page/Pagina **259**



## Schneideinsätze / Inserts / Inserti



LAB

**Abstechplatten mit 0° Spanwinkel**

- für Automatenstähle und legierte Stähle
- zum Abstechen kleiner Durchmesser
- einfach nachschleifbar
- auf allen Haltern einsetzbar

*Part-off insert with 0° chip breaker*

- for steel and alloyed steel
- for parting off small diameters
- easy to re-grind
- can be used on all holders

**Troncatura con angolo di spoglia 0°**

- per acciai automatici e legati
- per diametri piccoli
- riaffilabile
- uso su steli standard

Seite/Page/Pagina **260**

LAB

**Abstechplatten mit 4° Spanwinkel**

- zum Abstechen von exotischen Werkstoffen, die einen weicheren Schnitt erfordern
- auf allen Haltern einsetzbar

*Part-off insert with 4° chip breaker*

- for exotic materials which requires softer cutting geometry
- can be used on all holders

**Troncatura con angolo di spoglia 4°**

- per materiali esotici
- Uso su steli standard

Seite/Page/Pagina **261**

LAB

**Abstechplatten links/rechts und rechts/links versetzt mit 0° Spanwinkel**

- für Automatenstähle und legierte Stähle
- zum Abstechen kleiner Durchmesser nahe der Abgreifspindel
- in Kombination mit SLXO..- Abstechhaltern

*Part-off inserts off line with 0° chip breaker*

- for steel and alloyed steel
- for parting off small diameters close to the sub spindle
- use with holders SLXO..

**Troncatura destra/sinistra con angolo di spoglia 0°**

- per acciai automatici e legati
- per diametri piccoli
- combinati con steli SLXO..

Seite/Page/Pagina **262**

LAB

**Abstechplatten links/rechts versetzt mit 4° Spanwinkel**

- für exotische Werkstoffe die einen weicheren Schnitt erfordern
- Abstechen nahe der Abgreifspindel
- in Kombination mit SLXOL..-Abstechhaltern

*Part-off insert with 4° chip breaker*

- for exotic materials which require softer cutting geometry
- for parting off close to the sub spindle
- use with holders SLXO..

**Troncatura con angolo di spoglia 4°**

- per materiali esotici
- per un taglio molto vicino al mandrino
- combinati con steli SLXO..

Seite/Page/Pagina **263**

## Schneideinsätze / Inserts / Inserti

**LST****Stechdrehplatte mit 0° Spanwinkel**

- zum Einstecken und Stechdrehen von kleinen Werkstückdurchmessern

*Groove and turn insert with 0° chip breaker*

- for grooving and turning of small diameter components

Troncatura destra/sinistra con  
angolo di spoglia 0°

- for grooving and turning of small diameter components

Seite/ Page/ Pagina **264****LST****Stechdrehplatten mit Zwei-Flächen-Anschliff**

- zum Einstecken und Stechdrehen von exotischen Werkstoffen (z.B. Titanlegierungen) sowie rostfreien Stählen
- beide Hauptschneiden sind komplett auf einer Höhe und haben jeweils einen Spanwinkel von 10°

*Groove and turn inserts with 2 ground chip breakers*

- for grooving and turning of exotic materials as well as stainless steel
- both main edges are on same height and both have 10° chip breakers

Inserti per scanalatura e tornitura

- per materiali esotici e acciai inossidabili
- entrambi i taglienti hanno un angolo di spoglia di 10°

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## Schneideinsätze / Inserts / Inserti

**LVD****Drehplatte mit 0° Spanwinkel**

- zum Drehen kleiner Durchmesser
- wahlweise mit 90° oder 92° Einstellwinkel

*Turning insert with 0° chip breaker*

- for turning small diameters
- optional 90° or 92° approach angle

## Inserti con angolo di spoglia 0°

- per diametri piccoli
- con angolo di registrazione 90° o 92°

Seite/ Page/ Pagina **266****LVD****Drehen mit je 10° Spanwinkel durch Zwei-Flächen-Anschliff**

- für exotische Werkstoffe (z.B. Titanlegierungen) und rostfreie Stähle
- wahlweise mit 90° oder 92° Einstellwinkel

*Turning insert with 2 ground 10° chip breakers*

- for turning of exotic materials as well as stainless steel
- optional 90° or 92° approach angle

## Inserti con angolo di spoglia 10°

- per materiali esotici
- con angolo di registrazione 90° o 92°

Seite/ Page/ Pagina **267****LGE****Gewindedrehen Teilprofil 60° + 55°**

- links und rechts steigend einsetzbar bis 3° Steigungswinkel
- für alle gängigen Gewinde metrisch, UN, Zoll
- linker Halter bei rechtssteigendem Gewinde: für höhere Stabilität bei langen Gewinden, da die Stange in der Führungsbuchse bleibt (siehe Bild L)

*60° + 55° partial profile thread form*

- for left and right hand threading
- for metric and UN threads
- use left hand holder for right hand thread when threading long threads, improves stability (see picture L)

## Tornitura di filettatura profilo parziale 60°, 55°

- per filettatura destrorsa o sinistrorsa con angolo di spoglia 3°
- per filettatura metrica e UN
- stelo sinistro per filettature di particolari molto lunghi e maggiore stabilità (vedi fig. L)

Seite/ Page/ Pagina **268****LGE****Gewindedrehen Vollprofil 60°**

- links und rechts steigend einsetzbar bis 3° Steigungswinkel
- für metrische Gewinde P 0,4 – 1,0 mm
- linker Halter bei rechtssteigendem Gewinde: für höhere Stabilität bei langen Gewinden, da die Stange in der Führungsbuchse bleibt (siehe Bild L)

*60° full profile thread form*

- for left and right hand threading
- for metric threads P 0.4 – 1.0 mm
- use left hand holder for right hand thread when threading long threads, improves stability (see picture L)

## Tornitura di filettatura profilo completo 60°

- per filettatura destrorsa o sinistrorsa con angolo di spoglia 3°
- per filettatura metrica passo da P 0,4 – 1,0 mm
- stelo sinistro per filettature di particolari molto lunghi e maggiore stabilità (vedi fig. L)

Seite/ Page/ Pagina **269**

## Schneideinsätze / Inserts / Inserti



LRD

**Stechdrehen hinter Bund mit 0° Spanwinkel**

- für die Bearbeitung kleiner Durchmesser
- Einstellwinkel 70°

*Back turning inserts with 0° chip breaker*

- for machining of small diameters
- approach angle of 70°

## Angolo di spoglia 0°

- per diametri piccoli
- angolo di registrazione 70°

Seite/Page/Pagina **270**

LRD

**Stechdrehen hinter Bund mit je 10° Spanwinkel  
(Zwei-Flächen-Anschliff)**

- für die Bearbeitung exotischer Werkstoffe (z.B. Titanlegierungen) und rostfreier Stähle
- der Bereich „X“ ist vollständig auf Drehmitte
- Einstellwinkel 70°

*Back turning inserts with 10° chip breaker*

- for turning of exotic materials as well as stainless steel
- the „X“ dimension is exactly on centre
- approach angle of 70°

## Angolo di spoglia 10°

- per materiali esotici (leghe di titanio e acciai inossidabili)
- tagliente x ad altezza 0
- angolo di registrazione 70°

Seite/Page/Pagina **271**

LRD

**Stechdrehen hinter Bund mit 8° Spanwinkel**

- für die Bearbeitung exotischer Werkstoffe  
(z.B. Titanlegierungen) und von rostfreien Stählen
- Einstellwinkel 55° für alternativen Spanabfluss

*Back turning inserts with 8° chip breaker*

- for turning of exotic materials as well as stainless steel
- approach angle of 55° for alternative chip evacuation

## Angolo di spoglia 8°

- per materiali esotici (leghe di titanio e acciai inossidabili)
- angolo di registrazione 55°

Seite/Page/Pagina **272**

LRO

**Rohling zur Eigenprofilierung**

- Spanflächen poliert

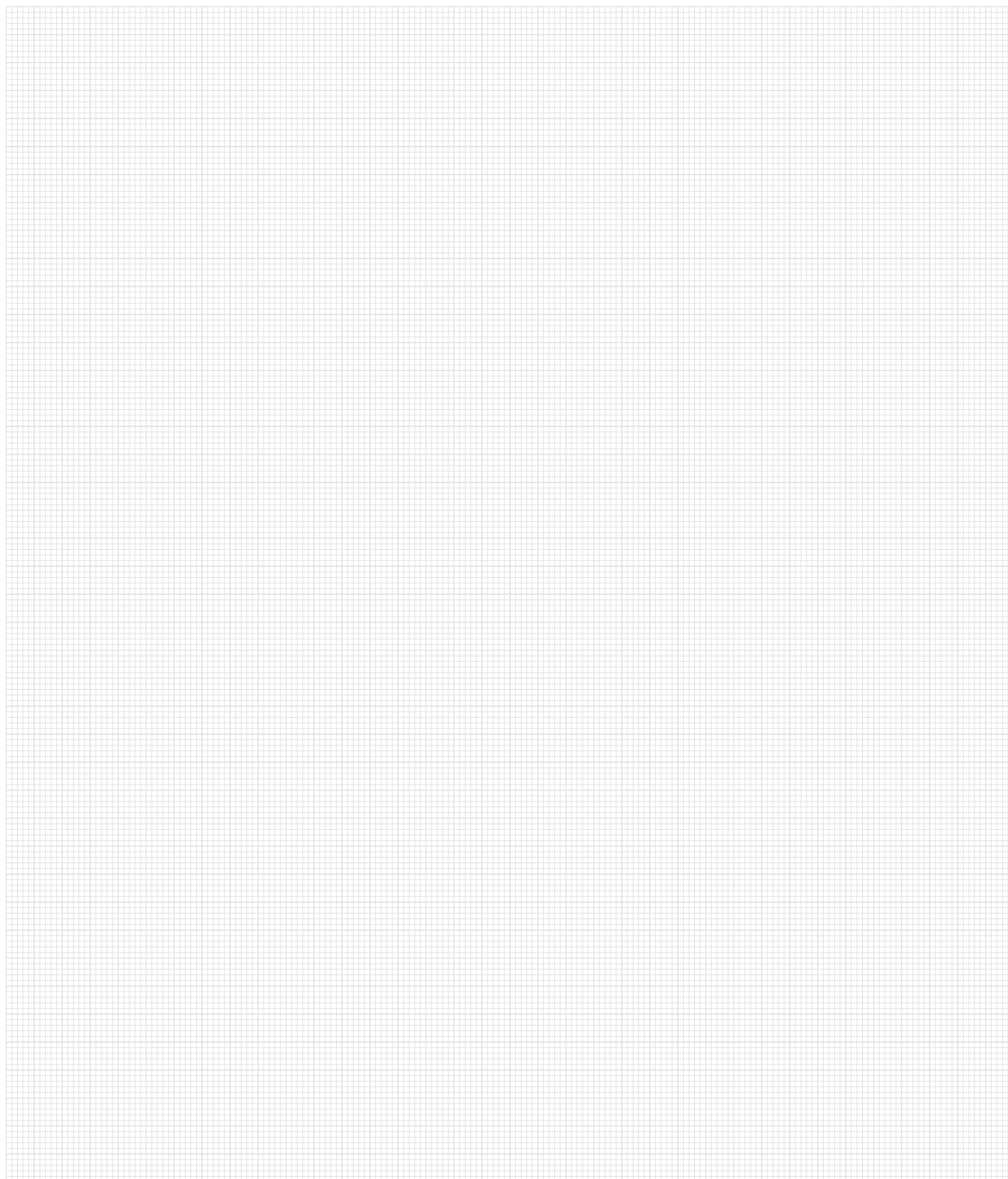
*Blanks for special profiles*

- chip breaker polished

## Semilavorato per la realizzazione di speciali

- superficie rettificata

Seite/Page/Pagina **273**



**Weitere Informationen finden Sie unter:**

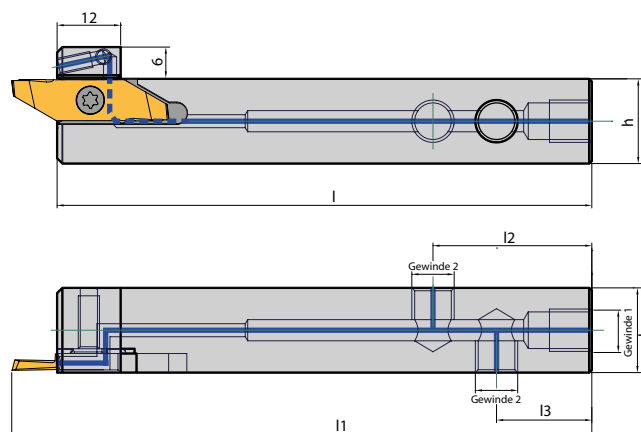
*For more information see:*

Per maggiori informazioni visita il sito:

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## SLAO R/L



Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione destra in figura

## Standard-Drehhalter mit Vierkantschaft

Standard toolholder with square shank

Utensile Standard a stelo quadro

| Bezeichnung<br>Designation<br>Articolo | h  | b  | l    | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | Gewinde 1<br>Thread 1<br>Filetto 1 | Gewinde 2<br>Thread 2<br>Filetto 2 | PG 39 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|----|----|------|----------------|----------------|----------------|------------------------------------|------------------------------------|-------|-------------------------------------|
| SLAO R/L 0808 X08-115                  | 8  | 8  | 115  | 124            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1010 X08-115                  | 10 | 10 | 115  | 124            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1012 X08-100-IK               | 10 | 12 | 100  | 109            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 08..                            |
| SLAO R/L 1212 X08-100-IK               | 12 | 12 | 100  | 109            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 08..                            |
| SLAO R/L 1212 X08-130                  | 12 | 12 | 130  | 139            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1212 X08-90                   | 12 | 12 | 91,5 | 100,5          | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1313 X08-130                  | 13 | 13 | 130  | 139            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1616 X08-100-IK               | 16 | 16 | 100  | 109            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 08..                            |
| SLAO R/L 1616 X08-130                  | 16 | 16 | 130  | 139            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1616 X08-75                   | 16 | 16 | 75   | 84             | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 2020 X08-100-IK               | 20 | 20 | 100  | 109            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 08..                            |
| SLAO R/L 2020 X08-120                  | 20 | 20 | 120  | 129            | –              | –              | –                                  | –                                  | ●     | L.. 08..                            |
| SLAO R/L 1010 X10-115*                 | 10 | 10 | 115  | 127            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 1012 X10-100-IK*              | 12 | 12 | 100  | 112            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 10..                            |
| SLAO R/L 1212 X10-90*                  | 12 | 12 | 90   | 102            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 1212 X10-100-IK*              | 12 | 12 | 100  | 112            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 10..                            |
| SLAO R/L 1212 X10-130*                 | 12 | 12 | 130  | 142            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 1313 X10-130*                 | 13 | 13 | 130  | 142            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 1616 X10-75*                  | 16 | 16 | 75   | 87             | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 1616 X10-100-IK*              | 16 | 16 | 100  | 112            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 10..                            |
| SLAO R/L 1616 X10-130*                 | 16 | 16 | 130  | 142            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |
| SLAO R/L 2020 X10-100-IK*              | 20 | 20 | 100  | 112            | 30             | 18             | M8x1                               | M8x1                               | ●     | L.. 10..                            |
| SLAO R/L 2020 X10-120*                 | 20 | 20 | 120  | 132            | –              | –              | –                                  | –                                  | ●     | L.. 10..                            |

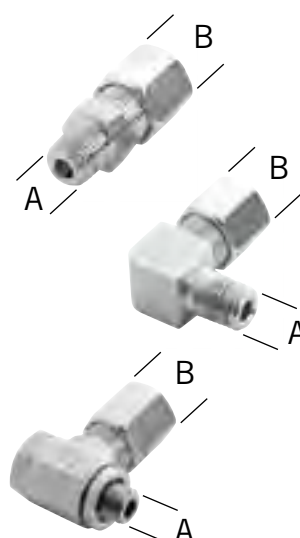
\* Verfügbar ab Q4/2016  
Available from Q4/2016  
Disponibile da Q4/2016

### Ersatzteile / Spare parts / Ricambi

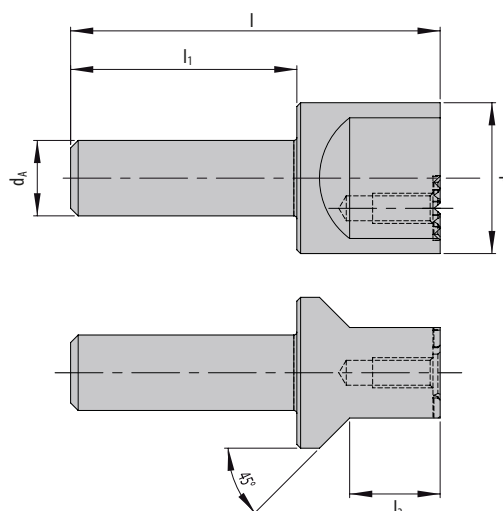
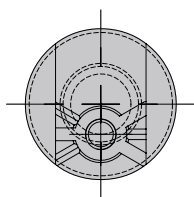
| Halter<br>Holder<br>Stelo       | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave | Verschlusschraube<br>Locking screw<br>Vite di tenuta |
|---------------------------------|---------------------------|----------------------------|------------------------------------------------------|
| SLAO R/L 0808..                 | AS 0027                   | KS 1111                    | –                                                    |
| SLAO R/L 0808.. -IK             | AS 0027                   | KS 1111                    | AS 0079                                              |
| SLAO R/L 1010.. - 2020..X08     | AS 0028                   | KS 1111                    | –                                                    |
| SLAO R/L 1010.. - 2020.. X08-1K | AS 0028                   | KS 1111                    | AS 0079                                              |
| SLAO R/L 1010.. - 2020..X10..   | AS 0028                   | KS 1111                    | –                                                    |
| SLAO R/L 1010.. - 2020.. X10-1K | AS 0028                   | KS 1111                    | AS 0079                                              |

### Zubehör / Accessories / Accessori

| Bezeichnung<br>Designation<br>Articolo |                                                                                                        | A    | B      |
|----------------------------------------|--------------------------------------------------------------------------------------------------------|------|--------|
| <b>KA 001</b>                          | <b>Kühlmittelanschluss – gerade</b><br>Coolant supply – straight<br>Raccordo – dritto                  | M8x1 | Ø 6 mm |
| <b>KA 004</b>                          | <b>Kühlmittelanschluss – winklig, fest</b><br>Coolant supply – angled and fixed<br>Raccordo – angolato | M8x1 | Ø 6 mm |
| <b>KA 006</b>                          | <b>Schwenkverschraubung</b><br>Swivelling screw-fitting<br>Raccordo – orientabile                      | M8x1 | Ø 6 mm |



## SLCO N



### Drehhalter mit Zylinderschaft

Tool holder with cylindrical shank

Stelo cilindrico

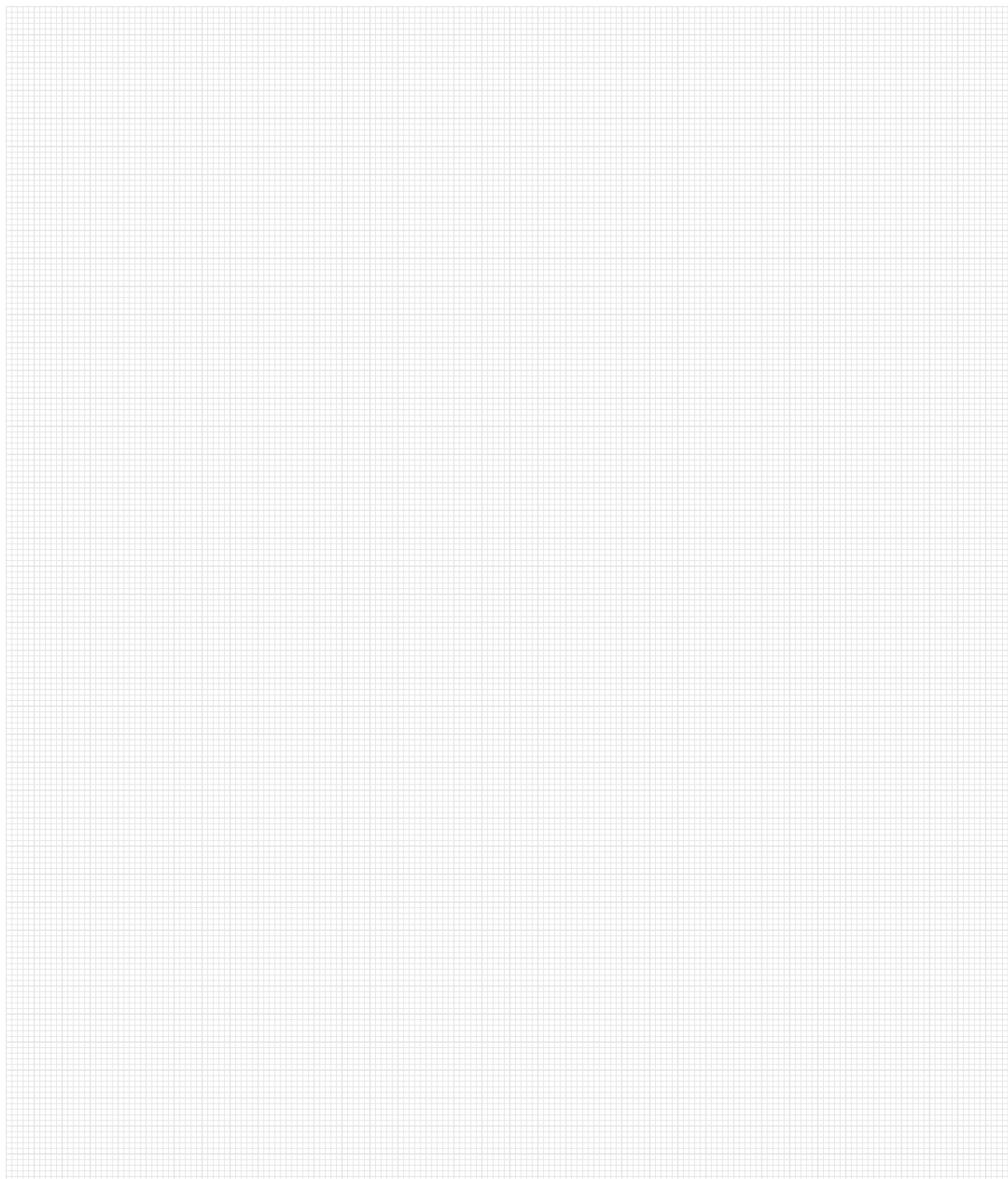
| Bezeichnung<br>Designation<br>Articolo | l  | l <sub>1</sub> | l <sub>2</sub> | d <sub>A</sub> | d  | PG 39 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|----|----------------|----------------|----------------|----|-------|-------------------------------------|
| SLCON 10 X08                           | 49 | 30             | 12             | 10             | 20 | ●     | L.. 08..                            |

### Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| SLCON 10 X08              | AS 0028                   | KS 1111                    |

Hinweis: Weitere Durchmesser auf Anfrage.  
Remark: Other diameters are available on request.  
Nota: Altre forme e dimensioni disponibili su richiesta.





**Weitere Informationen finden Sie unter:**

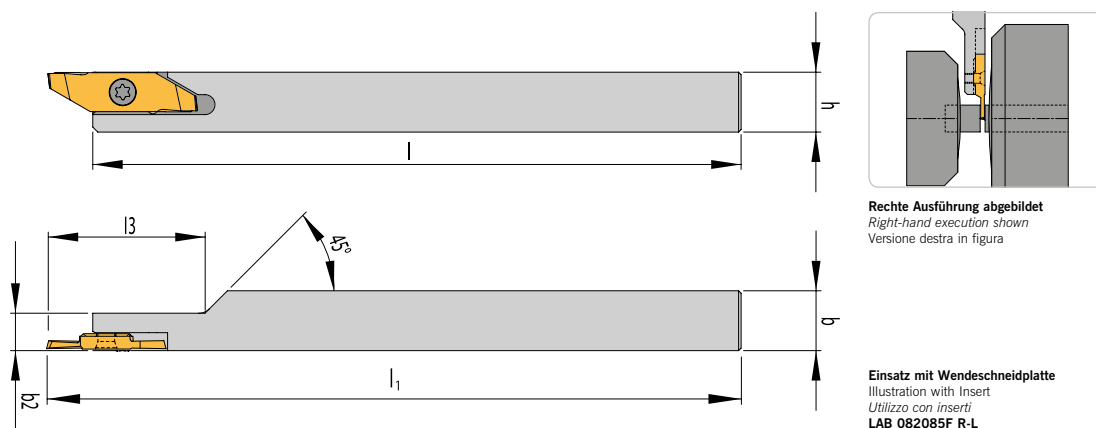
*For more information see:*

Per maggiori informazioni visita il sito:

**ARNO<sup>®</sup>**  
**WERKZEUGE**

**[www.arno.de](http://www.arno.de)**

## SLXO R



## Drehhalter mit abgesetztem Vierkantschaft

Tool holder with off-set square shank

Stelo scaricato

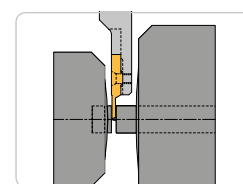
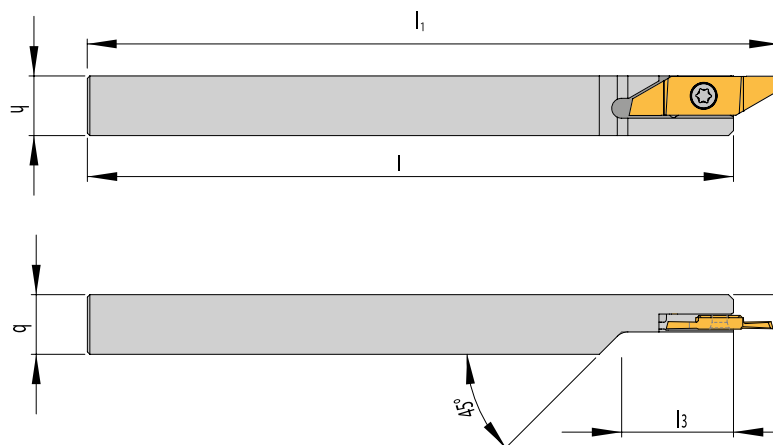
| Bezeichnung<br>Designation<br>Articolo | h  | b  | b <sub>2</sub> | l   | l <sub>1</sub> | l <sub>3</sub> | PG 39 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|----|----|----------------|-----|----------------|----------------|-------|-------------------------------------|
| SLXOR 1212 X08-130                     | 12 | 12 | 7,5            | 130 | 139            | 30             | ●     | L.. 08..                            |
| SLXOR 1212 X10-130*                    | 12 | 12 | 7,5            | 130 | 142            | 32             | ●     | L.. 10..                            |
| SLXOR 1616 X10-130*                    | 16 | 16 | 7,5            | 130 | 142            | 42             | ●     | L.. 10..                            |

\* Verfübar ab Q4/2016  
Available from Q4/2016  
Disponibile da Q4/2016

## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| SLXOR 1212 X08-130        | AS 0029                   | KS 1111                    |

## SLXO L



Linke Ausführung abgebildet  
Left-hand execution shown  
Versione sinistra in figura

Einsatz mit Wendeschneidplatte  
Illustration with Insert  
Utilizzo con inserti  
LAB 08.. F L-R

## Schlanker Drehhalter mit versetztem Plattensitz und Vierkantschaft

Tool holder with off line insert seat and square shank for parting-off

Stelo di troncatura scaricato per un taglio molto ravvicinato al mandrino

| Bezeichnung<br>Designation<br>Articolo | h  | b  | b <sub>2</sub> | l   | l <sub>1</sub> | l <sub>3</sub> | PG 39 | Schneideinsatz<br>Insert<br>Inserto |
|----------------------------------------|----|----|----------------|-----|----------------|----------------|-------|-------------------------------------|
| SLXOL 1212 X08-130                     | 12 | 12 | 7,5            | 130 | 139            | 30             | ●     | L.. 08..                            |
| SLXOL 1616 X08-130                     | 16 | 16 | 7,5            | 130 | 139            | 40             | ●     | L.. 08..                            |
| SLXOL 1212 X10-130*                    | 12 | 12 | 7,5            | 130 | 142            | 32             | ●     | L.. 10..                            |
| SLXOL 1616 X10-130*                    | 16 | 16 | 7,5            | 130 | 142            | 42             | ●     | L.. 10..                            |

## Ersatzteile / Spare parts / Ricambi

| Halter<br>Holder<br>Stelo | Schraube<br>Screw<br>Vite | Schlüssel<br>Key<br>Chiave |
|---------------------------|---------------------------|----------------------------|
| SLXOL.. X08-130           | AS 0029                   | KS 1111                    |

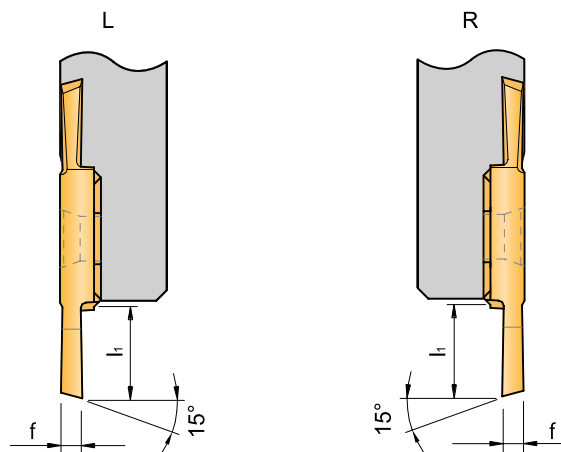
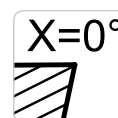
Inserts – Part-off

Inserti – di troncatura

## Abstechplatten mit 0° Spanwinkel

Part-off insert with 0° chip breaker

Troncatura con angolo di spoglia 0°



### LAB



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|------------------------------------|--------|--------|
|                                        |     |                | AP4020                             | AP5020 | AK1020 |
| LAB 080804FL                           | 0,8 | 4,0            | ●                                  | ●      | ●      |
| LAB 080804FR                           | 0,8 | 4,0            | ●                                  | ●      | ●      |
| LAB 081005FL                           | 1,0 | 5,0            | ●                                  | ●      | ●      |
| LAB 081005FR                           | 1,0 | 5,0            | ●                                  | ●      | ●      |
| LAB 081205FL                           | 1,2 | 5,0            | ●                                  | ●      | ●      |
| LAB 081205FR                           | 1,2 | 5,0            | ●                                  | ●      | ●      |
| LAB 081507FL                           | 1,5 | 7,0            | ●                                  | ●      | ●      |
| LAB 081507FR                           | 1,5 | 7,0            | ●                                  | ●      | ●      |
| LAB 082085FL                           | 2,0 | 8,5            | ●                                  | ●      | ●      |
| LAB 082085FR                           | 2,0 | 8,5            | ●                                  | ●      | ●      |
| LAB 082585FL                           | 2,5 | 8,5            | ●                                  | ●      | ●      |
| LAB 082585FR                           | 2,5 | 8,5            | ●                                  | ●      | ●      |
| LAB 102010FL*                          | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102010FR*                          | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102511FL*                          | 2,5 | 11,0           | ●                                  | ●      | ●      |
| LAB 102511FR*                          | 2,5 | 11,0           | ●                                  | ●      | ●      |

\* Verfügbar ab Q4/2016  
Available from Q4/2016  
Disponibile da Q4/2016

- **Hauptanwendung**  
Main application  
Applicazione principale
- **Nebenanwendung**  
Secondary application  
Applicazione secondaria

|   |   |   |   |
|---|---|---|---|
| P | ○ | ● |   |
| M |   | ● |   |
| K |   |   |   |
| N | ● |   | ● |
| S |   | ● | ● |
| H |   |   |   |

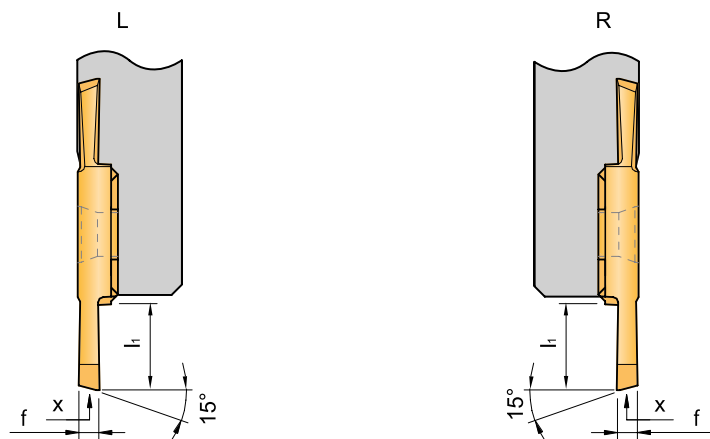
Inserts – Part-off

Inserti – di troncatura

## Abstechplatten mit 4° Spanwinkel

Part-off insert with 4° chip breaker

Troncatura con angolo di spoglia 4°



## LAB

Sorten / Grades / Qualità  
PG 35

| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | AP4020 | AP5020 | AK1020 |
|----------------------------------------|-----|----------------|--------|--------|--------|
| LAB 081507FL-PF                        | 1,5 | 7,0            | ●      | ●      | ●      |
| LAB 081507FR-PF                        | 1,5 | 7,0            | ●      | ●      | ●      |
| LAB 082085FL-PF                        | 2,0 | 8,5            | ●      | ●      | ●      |
| LAB 082085FR-PF                        | 2,0 | 8,5            | ●      | ●      | ●      |
| LAB 102010FL-PF*                       | 2,0 | 10,0           | ●      | ●      | ●      |
| LAB 102010FR-PF*                       | 2,0 | 10,0           | ●      | ●      | ●      |
| LAB 102511FL-PF*                       | 2,5 | 11,0           | ●      | ●      | ●      |
| LAB 102511FR-PF*                       | 2,5 | 11,0           | ●      | ●      | ●      |

Hinweis: Schneide um 0,4 mm unter Mitte.

Muss an der Maschine korrigiert werden.

Remark: Set at 0.4 mm below centre, adjust at machine.

Nota: Inserto 0,4 mm sottocentro, prevedere la corretta registrazione in macchina.

\* Verfübar ab Q4/2016

Available from Q4/2016

Disponibile da Q4/2016

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● |   |
| S |   | ● |
| H |   |   |

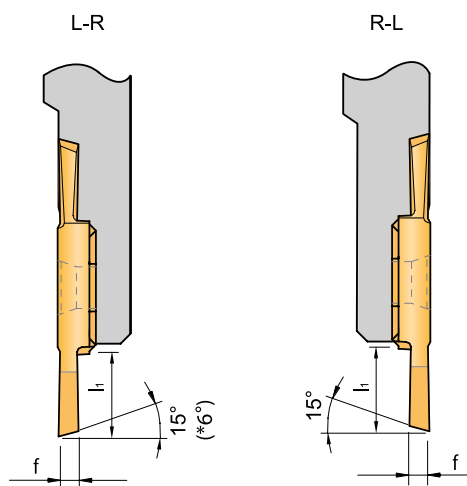
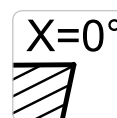
Inserts – Part-off

Inserti – di troncatura

# Abstechplatten links/rechts und rechts/links versetzt mit 0° Spanwinkel

Part-off inserts off line with 0° chip breaker

Troncatura destra/sinistra con angolo di spoglia 0°



## LAB



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|------------------------------------|--------|--------|
|                                        |     |                | AP4020                             | AP5020 | AK1020 |
| LAB 081507FL-R                         | 1,5 | 7,0            | ●                                  | ●      | ●      |
| LAB 081585FL-R-6**                     | 1,5 | 8,5            | ●                                  | ●      | ●      |
| LAB 082085FL-R                         | 2,0 | 8,5            | ●                                  | ●      | ●      |
| LAB 082085FR-L                         | 2,0 | 8,5            | ●                                  | ●      | ●      |
| LAB 102010FL-R*                        | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102010FR-L*                        | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102511FL-R*                        | 2,5 | 11,0           | ●                                  | ●      | ●      |
| LAB 102511FR-L*                        | 2,5 | 11,0           | ●                                  | ●      | ●      |

\* Verfügbar ab Q4/2016  
Available from Q4/2016  
Disponibile da Q4/2016

\*\* Mit 6° Schräge  
With 6° grind  
Con 6° di sforno

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |
|---|---|---|---|
| P | ○ | ● |   |
| M |   | ● |   |
| K |   |   |   |
| N | ● |   | ● |
| S |   | ● | ● |
| H |   |   |   |

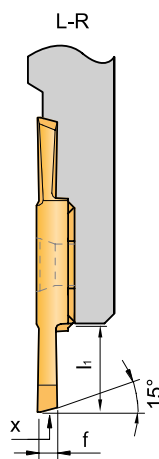
Inserts – Part-off

Inserti – di troncatura

## Abstechplatten links/rechts versetzt mit 4° Spanwinkel

Part-off insert left/right hand cutting with 4° chip breaker

Troncatura destra/sinistra con angolo di spoglia 4°



### LAB



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|------------------------------------|--------|--------|
|                                        |     |                | AP4020                             | AP5020 | AK1020 |
| LAB 081507FL-R-PF                      | 1,5 | 7,0            | ●                                  | ●      | ●      |
| LAB 082085FL-R-PF                      | 2,0 | 8,5            | ●                                  | ●      | ●      |
| LAB 102010FL-R-PF*                     | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102010FR-L-PF*                     | 2,0 | 10,0           | ●                                  | ●      | ●      |
| LAB 102511FL-R-PF*                     | 2,5 | 11,0           | ●                                  | ●      | ●      |
| LAB 102511FR-L-PF*                     | 2,5 | 11,0           | ●                                  | ●      | ●      |

Hinweis: Schneide um 0,4 mm unter Mitte.  
Muss an der Maschine korrigiert werden.

Remark: Set at 0.4 mm below centre, adjust at machine.

Nota: Inserto 0,4 mm sottocentro, prevedere la corretta registrazione in macchina.

\* Verfügbar ab Q4/2016

Available from Q4/2016

Disponibile da Q4/2016

● **Hauptanwendung**  
Main application  
Applicazione principale

○ **Nebenanwendung**  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● |   |
| S |   | ● |
| H |   |   |

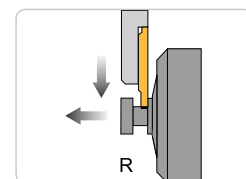
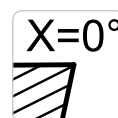
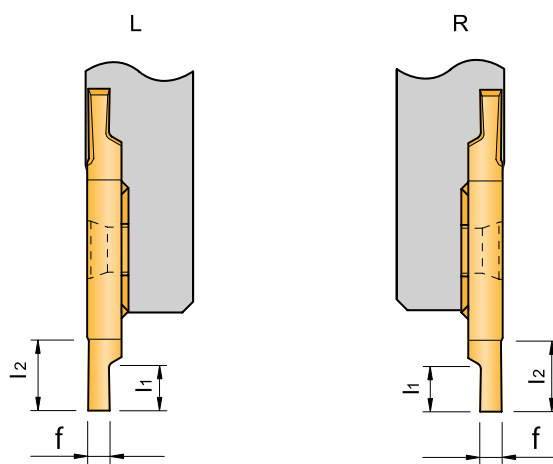
Inserts – Groove and turning

Inserti – di tornitura

## Stechdrehplatte mit 0° Spanwinkel

Groove and turn insert with 0° chip breaker

Troncatura destra/sinistra con angolo di spoglia 0°



### LST

Sorten / Grades / Qualità  
PG 35

| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | l <sub>2</sub> | AP4020 | AP5020 | AK1020 |
|----------------------------------------|-----|----------------|----------------|--------|--------|--------|
| LST 080802FL                           | 0,8 | 2,0            | 4,0            | ●      | ●      | ●      |
| LST 080802FR                           | 0,8 | 2,0            | 4,0            | ●      | ●      | ●      |
| LST 081025FL                           | 1,0 | 2,5            | 4,0            | ●      | ●      | ●      |
| LST 081025FR                           | 1,0 | 2,5            | 4,0            | ●      | ●      | ●      |
| LST 081230FL                           | 1,2 | 3,0            | 4,0            | ●      | ●      | ●      |
| LST 081230FR                           | 1,2 | 3,0            | 4,0            | ●      | ●      | ●      |
| LST 081530FL                           | 1,5 | 3,0            | 4,0            | ●      | ●      | ●      |
| LST 081530FR                           | 1,5 | 3,0            | 4,0            | ●      | ●      | ●      |
| LST 082040FL                           | 2,0 | 4,0            | 6,5            | ●      | ●      | ●      |
| LST 082040FR                           | 2,0 | 4,0            | 6,5            | ●      | ●      | ●      |
| LST 082560FL                           | 2,5 | 6,0            | 6,5            | ●      | ●      | ●      |
| LST 082560FR                           | 2,5 | 6,0            | 6,5            | ●      | ●      | ●      |
| LST 083065FL                           | 3,0 | 6,5            | 6,5            | ●      | ●      | ●      |
| LST 083065FR                           | 3,0 | 6,5            | 6,5            | ●      | ●      | ●      |

- **Hauptanwendung**  
Main application  
Applicazione principale
- **Nebenanwendung**  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● | ● |
| S |   | ● |
| H |   |   |



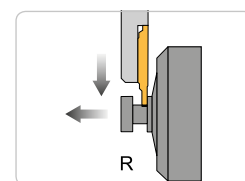
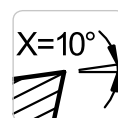
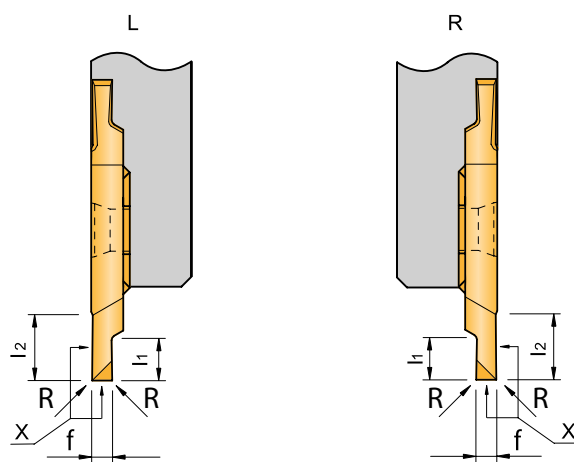
Inserts – Groove and turning

Inserti – di tornitura

# Stechdrehplatten mit Zwei-Flächen-Anschliff

Groove and turn inserts with 2 ground chip breakers

Inserti per scanalatura e tornitura



## LST

Sorten / Grades / Qualità  
PG 35

| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | l <sub>2</sub> | R    | AP4010 | AP4020 | AP5010 | AP5020 | AK1010 | AK1020 |
|----------------------------------------|-----|----------------|----------------|------|--------|--------|--------|--------|--------|--------|
| LST 081025-008FR-P                     | 1,0 | 2,5            | 4,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 081025FL-P                         | 1,0 | 2,5            | 4,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 081025FR-P                         | 1,0 | 2,5            | 4,0            | 0,0  |        |        |        | ●      |        | ●      |
| LST 081230FL-P                         | 1,2 | 3,0            | 4,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 081230FR-P                         | 1,2 | 3,0            | 4,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 081530-008FR-P                     | 1,5 | 3,0            | 4,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 081530-02FR-P                      | 1,5 | 3,0            | 4,0            | 0,2  | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 081530FL-P                         | 1,5 | 3,0            | 4,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 081530FR-P                         | 1,5 | 3,0            | 4,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 082040-008FR-P                     | 2,0 | 4,0            | 4,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 082040-02FR-P                      | 2,0 | 4,0            | 4,0            | 0,2  | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 082040FL-P                         | 2,0 | 4,0            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 082040FR-P                         | 2,0 | 4,0            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 082560-002FR-P                     | 2,5 | 6,0            | 4,0            | 0,2  | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 082560-008FR-P                     | 2,5 | 6,0            | 4,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 082560FL-P                         | 2,5 | 6,0            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 082560FR-P                         | 2,5 | 6,0            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 083065-008FR-P                     | 3,0 | 6,5            | 4,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 083065-02FR-P                      | 3,0 | 6,5            | 4,0            | 0,2  | ●      | ●      | ●      | ●      | ●      | ●      |
| LST 083065FL-P                         | 3,0 | 6,5            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |
| LST 083065FR-P                         | 3,0 | 6,5            | 6,5            | 0,0  |        | ●      |        | ●      |        | ●      |

- Hauptanwendung  
Main application  
Applicazione principale
- Nebenanwendung  
Secondary application  
Applicazione secondaria

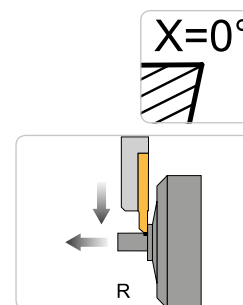
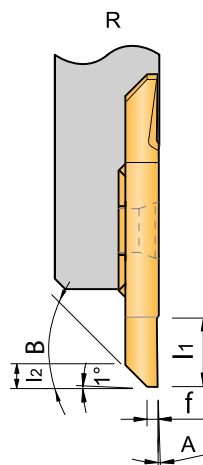
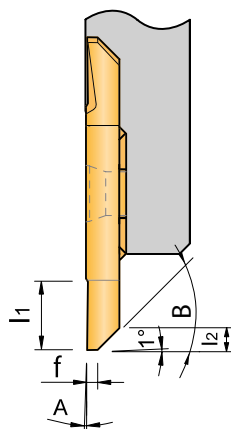
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| P |   | ○ | ● | ● |   |   |
| M |   |   | ● | ● |   |   |
| K |   |   |   |   |   |   |
| N | ● | ● |   |   | ● | ● |
| S |   |   | ● | ● | ● | ● |
| H |   |   |   |   |   |   |

Inserts – Turning  
Inserti – di tornitura

## Drehplatte mit 0° Spanwinkel

Turning insert with 0° chip breaker

Inserti con angolo di spoglia 0°



### LVD



| Bezeichnung<br>Designation<br>Articolo | Sorten / Grades / Qualità<br>PG 35 |                |                |    |     |   |
|----------------------------------------|------------------------------------|----------------|----------------|----|-----|---|
|                                        | f                                  | l <sub>1</sub> | l <sub>2</sub> | A  | B   |   |
| LVD 08-0FL                             | 1,0                                | 6,5            | –              | 0° | 45° | ● |
| LVD 08-0FR                             | 1,0                                | 6,5            | –              | 0° | 45° | ● |
| LVD 08-2FL                             | 1,0                                | 6,5            | –              | 2° | 45° | ● |
| LVD 08-2FR                             | 1,0                                | 6,5            | –              | 2° | 45° | ● |
| LVD 080565FL                           | 0,5                                | 6,5            | 5,5            | 1° | 25° | ● |
| LVD 080565FR                           | 0,5                                | 6,5            | 5,5            | 1° | 25° | ● |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● |   |
| S |   | ● |
| H |   |   |

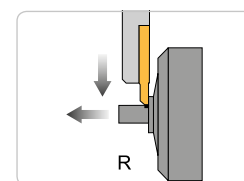
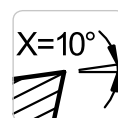
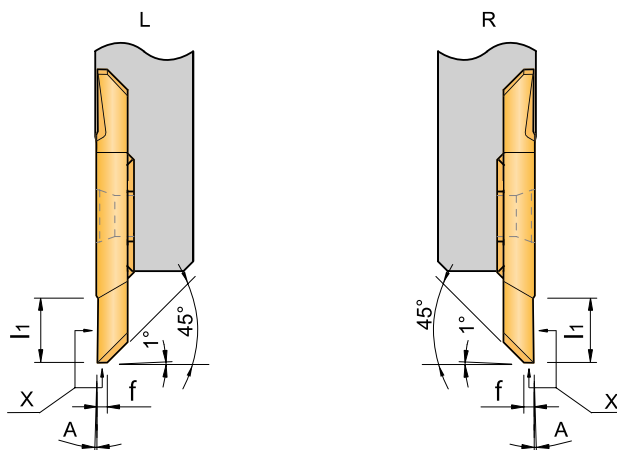
Inserts – Turning

Inserti – di tornitura

# Drehen mit je 10° Spanwinkel durch Zwei-Flächen-Anschliff

Turning insert with 2 ground 10° chip breakers

Inserti con angolo di spoglia 10°



## LVD



| Bezeichnung<br>Designation<br>Articolo | f   | L <sub>1</sub> | A  | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|----|------------------------------------|--------|--------|
|                                        |     |                |    | AP4020                             | AP5020 | AK1020 |
| LVD 08-0FL-P                           | 1,0 | 6,5            | 0° | ●                                  | ●      | ●      |
| LVD 08-0FR-P                           | 1,0 | 6,5            | 0° | ●                                  | ●      | ●      |
| LVD 08-2FL-P                           | 1,0 | 6,5            | 2° | ●                                  | ●      | ●      |
| LVD 08-2FR-P                           | 1,0 | 6,5            | 2° | ●                                  | ●      | ●      |

Schneidkantenausführung siehe Infoteil.

Cutting edge information available in Info section.

Informazioni sulle geometrie di taglio disponibile nella sezione Informazioni.

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● | ● |
| S |   | ● |
| H |   |   |

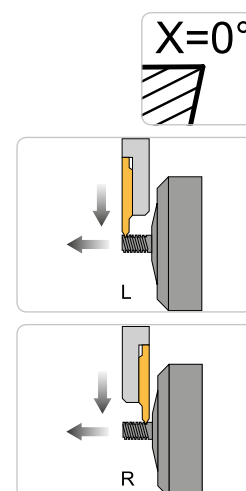
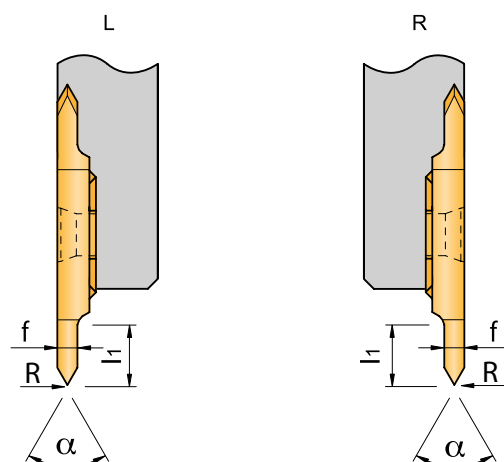
Inserts – Threading – partial profile

Inserti – Tornitura di filettatura profilo parziale ISO

## Gewindedrehen Teilprofil 60° + 55°

60° + 55° partial profile thread form

Tornitura di filettatura profilo parziale 60°, 55°



### LGE



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | α   | R    | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|-----|------|------------------------------------|--------|--------|
|                                        |     |                |     |      | AP4020                             | AP5020 | AK1020 |
| LGE 08-55-006FL                        | 2,0 | 6,0            | 55° | 0,06 | ●                                  | ●      | ●      |
| LGE 08-55-006FR                        | 2,0 | 6,0            | 55° | 0,06 | ●                                  | ●      | ●      |
| LGE 08-55FR                            | 2,0 | 6,0            | 55° | 0,0  | ●                                  | ●      | —      |
| LGE 08-60-006FL                        | 2,0 | 6,0            | 60° | 0,06 | ●                                  | ●      | ●      |
| LGE 08-60-006FR                        | 2,0 | 6,0            | 60° | 0,06 | ●                                  | ●      | ●      |
| LGE 08-60FL                            | 2,0 | 6,0            | 60° | 0,0  | ●                                  | ●      | ●      |
| LGE 08-60FR                            | 2,0 | 6,0            | 60° | 0,0  | ●                                  | ●      | ●      |

Hinweis: Weitere Gewindeprofile auf Anfrage erhältlich.  
Remark: Other thread forms available on request.  
Nota: Altre tipologie di filettature disponibili su richiesta.

- **Hauptanwendung**  
Main application  
Applicazione principale
- **Nebenanwendung**  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● | ● |
| S |   | ● |
| H |   |   |

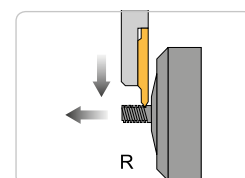
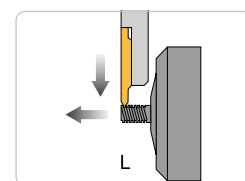
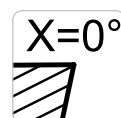
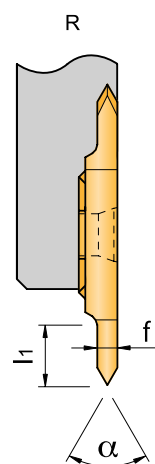
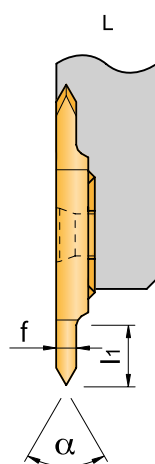
Inserts – Threading – full profile

Inserti – Tornitura di filettatura profilo completo ISO

## Gewindedrehen Vollprofil 60°

60° full profile thread form

Tornitura di filettatura profilo completo 60°



## LGE



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | α   | Teilung<br>Pitch<br>Passo | Sorten / Grades /<br>Qualità<br>PG 35 |        |
|----------------------------------------|-----|----------------|-----|---------------------------|---------------------------------------|--------|
|                                        |     |                |     |                           | AP5020                                | AK1020 |
| LGE 08-M0.40FL                         | 1,0 | 3,0            | 60° | 0,40                      | ●                                     | ●      |
| LGE 08-M0.40FR                         | 1,0 | 3,0            | 60° | 0,40                      | ●                                     | ●      |
| LGE 08-M0.50FL                         | 1,0 | 3,0            | 60° | 0,50                      | ●                                     | ●      |
| LGE 08-M0.50FR                         | 1,0 | 3,0            | 60° | 0,50                      | ●                                     | ●      |
| LGE 08-M0.70FL                         | 1,0 | 3,0            | 60° | 0,70                      | ●                                     | ●      |
| LGE 08-M0.70FR                         | 1,0 | 3,0            | 60° | 0,70                      | ●                                     | ●      |
| LGE 08-M0.75FL                         | 1,0 | 3,0            | 60° | 0,75                      | ●                                     | ●      |
| LGE 08-M0.75FR                         | 1,0 | 3,0            | 60° | 0,75                      | ●                                     | ●      |
| LGE 08-M0.80FL                         | 1,5 | 4,5            | 60° | 0,80                      | ●                                     | ●      |
| LGE 08-M0.80FR                         | 1,5 | 4,5            | 60° | 0,80                      | ●                                     | ●      |
| LGE 08-M1.00FL                         | 1,5 | 4,5            | 60° | 1,00                      | ●                                     | ●      |
| LGE 08-M1.00FR                         | 1,5 | 4,5            | 60° | 1,00                      | ●                                     | ●      |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ● |   |
| M | ● |   |
| K |   |   |
| N |   | ● |
| S | ● | ● |
| H |   |   |

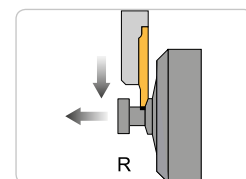
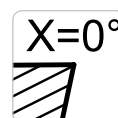
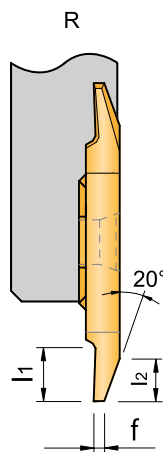
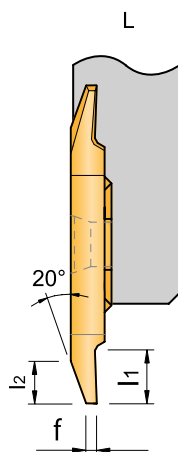
Inserts – Back Turning

Inserti – Tornitura (verso contromandrino)

## Stechdrehen hinter Bund mit 0° Spanwinkel

Back turning inserts with 0° chip breaker

Angolo di spoglia 0°



### LRD



| Bezeichnung<br>Designation<br>Articolo | f   | L <sub>1</sub> | L <sub>2</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|----------------|------------------------------------|--------|--------|
|                                        |     |                |                | AP4020                             | AP5020 | AK1020 |
| LRD 080504FL                           | 0,5 | 4,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 080504FR                           | 0,5 | 4,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 080565FL                           | 0,5 | 6,5            | 4,0            | ●                                  | ●      | ●      |
| LRD 080565FR                           | 0,5 | 6,5            | 4,0            | ●                                  | ●      | ●      |
| LRD 081050FL                           | 1,0 | 5,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 081050FR                           | 1,0 | 5,0            | 4,0            | ●                                  | ●      | ●      |

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● | ● |
| S |   | ● |
| H |   |   |

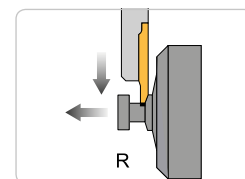
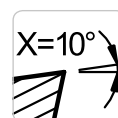
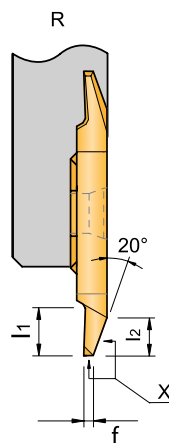
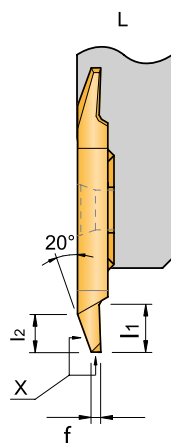
Inserts – Back Turning

Inserti – Tornitura (verso contromandrino)

## Stechdrehen hinter Bund mit je 10° Spanwinkel (Zwei-Flächen-Anschliff)

Back turning inserts with 10° chip breaker

Angolo di spoglia 10°



### LRD



| Bezeichnung<br>Designation<br>Articolo | f   | l <sub>1</sub> | l <sub>2</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|-----|----------------|----------------|------------------------------------|--------|--------|
|                                        |     |                |                | AP4020                             | AP5020 | AK1020 |
| LRD 080504FL-P                         | 0,5 | 4,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 080504FR-P                         | 0,5 | 4,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 081050FL-P                         | 1,0 | 5,0            | 4,0            | ●                                  | ●      | ●      |
| LRD 081050FR-P                         | 1,0 | 5,0            | 4,0            | ●                                  | ●      | ●      |

● **Hauptanwendung**  
Main application  
Applicazione principale

○ **Nebenanwendung**  
Secondary application  
Applicazione secondaria

|   |   |   |
|---|---|---|
| P | ○ | ● |
| M |   | ● |
| K |   |   |
| N | ● | ● |
| S |   | ● |
| H |   |   |

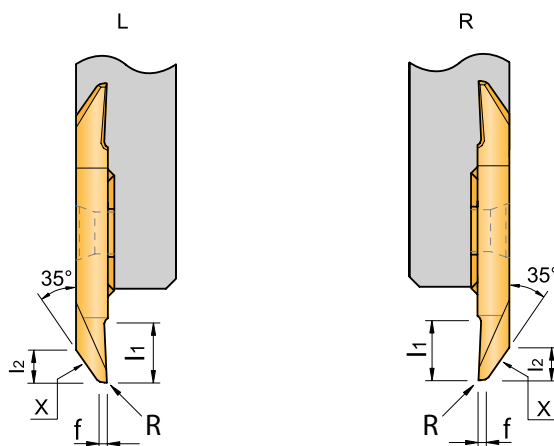
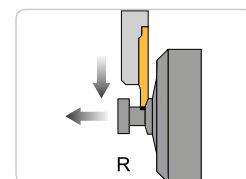
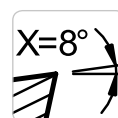
Inserts – Back Turning

Inserti – Tornitura (verso contromandrino)

## Stechdrehen hinter Bund mit 8° Spanwinkel

Back turning inserts with 8° chip breaker

Angolo di spoglia 8°



### LRD



| Bezeichnung<br>Designation<br>Articolo | Sorten / Grades / Qualità<br>PG 35 |                |                |      |        |        |        |        |        |        |
|----------------------------------------|------------------------------------|----------------|----------------|------|--------|--------|--------|--------|--------|--------|
|                                        | f                                  | l <sub>1</sub> | l <sub>2</sub> | R    | AP4010 | AP4020 | AP5010 | AP5020 | AK1010 | AK1020 |
| LRD 081060FL-SP                        | 1,0                                | 6,0            | 3,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LRD 081060FR-SP                        | 1,0                                | 6,0            | 3,0            | 0,0  |        | ●      |        | ●      |        | ●      |
| LRD 081060-008FR-SP                    | 1,0                                | 6,0            | 3,0            | 0,08 | ●      | ●      | ●      | ●      | ●      | ●      |
| LRD 081060-02FR-SP                     | 1,0                                | 6,0            | 3,0            | 0,2  | ●      | ●      | ●      | ●      | ●      | ●      |

Hinweis: Schneide um 0,2 mm unter Mitte.  
Muss an der Maschine korrigiert werden.

Remark: Set at 0.2 mm below centre, adjust at machine.

Nota: Filo di taglio 0,2 mm sottocentro.  
Prevedere idonea correzione in macchina.

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

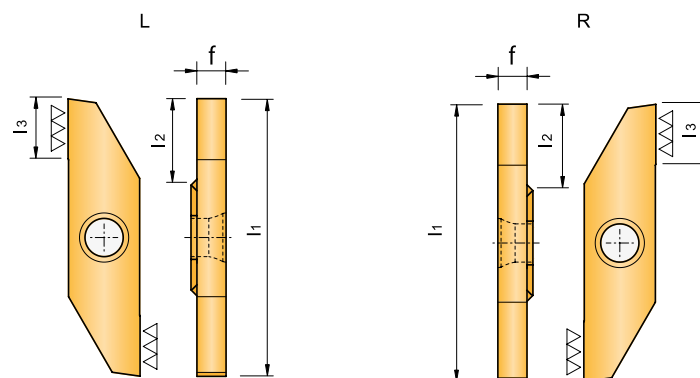
|   |   |   |   |   |  |  |  |  |   |   |
|---|---|---|---|---|--|--|--|--|---|---|
| P |   | ○ | ● | ● |  |  |  |  |   |   |
| M |   |   | ● | ● |  |  |  |  |   |   |
| K |   |   |   |   |  |  |  |  |   |   |
| N | ● | ● |   |   |  |  |  |  | ● | ● |
| S |   |   | ● | ● |  |  |  |  | ● | ● |
| H |   |   |   |   |  |  |  |  |   |   |



# Rohling für Sonderanwendungen

Blanks for special applications

Semilavorati per applicazioni speciali



## LRO



| Bezeichnung<br>Designation<br>Articolo | f    | l <sub>1</sub> | l <sub>2</sub> | l <sub>3</sub> | Sorten / Grades / Qualità<br>PG 35 |        |        |
|----------------------------------------|------|----------------|----------------|----------------|------------------------------------|--------|--------|
|                                        |      |                |                |                | AP4020                             | AP5020 | AK1020 |
| LRO 08FL                               | ~3,2 | ~30,5          | ~9,2           | ~6,5           | ●                                  | ●      | ●      |
| LRO 08FR                               | ~3,2 | ~30,5          | ~9,2           | ~6,5           | ●                                  | ●      | ●      |
| LRO 10FL*                              | ~2,8 | ~37            | ~12            | ~9,5           | ●                                  | ●      | ●      |
| LRO 10FR*                              | ~2,8 | ~37            | ~12            | ~9,5           | ●                                  | ●      | ●      |

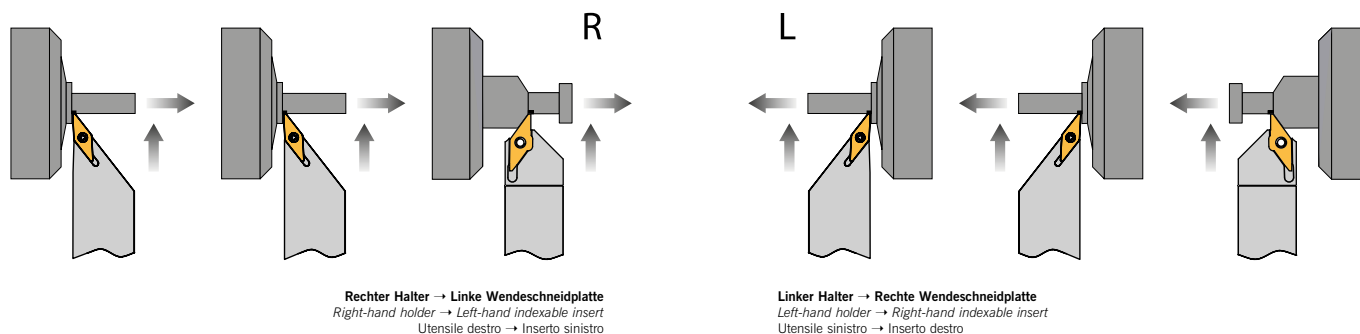
\*Verfügbar ab Q4/2016  
Available from Q4/2016  
Disponibile da Q4/2016

● Hauptanwendung  
Main application  
Applicazione principale

○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |
|---|---|---|---|
| P | ○ | ● |   |
| M |   | ● |   |
| K |   |   |   |
| N | ● |   | ● |
| S |   | ● | ● |
| H |   |   |   |

## Grundhalter – Drehoperationen / Basic holder – Turning Operations / Corpo utensile – tornitura



## Universelle Sorte zur Bearbeitung sämtlicher Werkstoffe

Durch die geschliffene und polierte Oberfläche ist diese Geometrie besonders zur Schlichtbearbeitung geeignet. Sehr scharfe Schneidkanten und der 10° positive Spanwinkel garantieren ein optimales Ergebnis und einen kontrollierten Spanbruch. Feinkornsorte mit einem Eckenradius ab 0,02 mm. Vorschub 0,01–0,1 mm/U. In rechter und linker Ausführung erhältlich.

## Universal geometry for machining all materials

Due to the ground and polished surface this grade is most suitable for finishing applications. The very sharp cutting edge and the 10° positive rake angle guarantee an optimum machining and controlled chip breaking. Fine grain carbide with corner radiuses starting at 0.02 mm, feed rate 0.01–0,1 mm/rev. The insert is available in right and left hand execution.

## Qualità universale per la lavorazione di qualsiasi materiale

Grazie al tagliente rettificato e lappato oltre alla specifica geometria di taglio, questo inserto risulta ottimale per qualsiasi lavorazione di qualsiasi materiale. La spoglia superiore positiva a 10° ed il formatruciolo specifico, garantiscono inoltre un ottimo controllo truciolo. Il metallo duro micrograna ed il raggio di punta 0,02 mm permettono la lavorazione di particolari anche molto piccoli. Avanzamenti da 0,01 a 0,1 mm/giro. Disponibili in versione destra e sinistra.

### Hartmetall beschichtet / Carbide coated / Metallo duro rivestito

#### AP4010

**PVD Beschichtung, Substrat + TiN**  
**Sorte für die Feinbearbeitung von weichen Werkstoffen, welche eine Tendenz zur Bildung einer Aufbauschneide haben. Sehr geringer Reibwert. (Sorte ist für die Titanbearbeitung nicht geeignet)**

*PVD-coating, substrate + TiN*  
*Grade for light machining of soft materials which can cause build-up edge. Very low co-efficiency. (Grade is not suitable for titanium machining)*

Rivestimento PVD, metallo duro micrograna + TiN  
 Qualità per lavorazione di materiali morbidi con tendenza a formare tagliente di riporto . Molto basso coefficiente di attrito . Grado non è adatto per la lavorazione di leghe di titanio

#### AP4020

**PVD Beschichtung, Substrat + TiN**  
**Universelle Sorte für leichte Bearbeitung von NE-Metallen (Kupfer und Kupferlegierungen, Bronze, Messing) sowie Aluminium und Aluminiumlegierungen bei geringen Schnittgeschwindigkeiten. Bestens geeignet für die Bearbeitung von weichen Werkstoffen mit der Tendenz zur Bildung von Aufbauschneiden. Auch für die Zerspanung von Automatenstählen bei kleinsten Durchmessern geeignet. Sehr geringer Reibwert.**

*PVD-coating, substrate + TiN*  
*Universal grade for light machining of nonferrous materials (copper and copper alloys, bronze and brass) as well as aluminum and aluminum alloys at low cutting speed. Very suitable for machining soft materials with a tendency to create a build up edge. Also suitable for machining small diameter components in free cutting steel. Very low co-efficiency.*

Rivestimento PVD, metallo duro micrograna + TiN  
 Grado universale per lavorazione a basse velocità di taglio di materiali non ferrosi come ottone, rame e sue leghe, bronzo, alluminio. Molto valido per materiali teneri che tendono a generare tagliente di riporto. Idoneo anche alla lavorazione di piccoli diametri in acciai ad alta velocità o a basso tenore di carbonio.

#### AP5010

**PVD-Mehrlagenbeschichtung, Substrat + TiAlN**  
**Sehr verschleißfeste Sorte für die Feinbearbeitung von Stahl, rostfreiem Stahl und Titanlegierungen bei guten Bearbeitungsbedingungen.**

*PVD-multilayer coating, substrate + TiAlN*  
*Very wear resistant grade for light machining of steel, stainless steel and titanium alloys under favourable machining conditions.*

Rivestimento PVD, metallo duro micrograna + TiAlN  
 Grado con elevata resistenza all'usura studiato per la lavorazione di acciaio, acciaio inossidabile e leghe di titanio in buone condizioni di lavoro

#### AP5020

**PVD-Mehrlagenbeschichtung, Substrat + TiAlN**  
**Universelle Sorte für die allgemeine Stahlzerspannung. Auch geeignet für die Bearbeitung rostfreier Stähle, warmfester Legierungen sowie Titanlegierungen. Sehr gute Warmfestigkeit.**

*PVD-multilayer coating, substrate + TiAlN*  
*Suitable for general steel cutting, but also suitable for machining stainless steel, high temperature alloys as well as titanium alloys. Very good heat resistance.*

Rivestimento PVD, metallo duro micrograna + TiAlN  
 Grado di metallo duro per lavorazioni di acciai, di acciai INOX, leghe fortemente legate o resistenti al calore così come leghe di Titanio. Elevata resistenza al calore.

### Hartmetall unbeschichtet / Carbide uncoated / Metallo duro non rivestito

#### AK1010

**Feinkorn-Sorte zur Bearbeitung von Aluminium, Aluminiumlegierungen und exotischen Werkstoffen (Titan). Für unterbrochene Schnitte und ungünstige Bearbeitungsbedingungen geeignet.**

*Fine grain carbide grade for machining aluminum, aluminum alloys and exotic materials (titanium). Suitable for interrupted cut and other unfavourable machining conditions.*

Metallo duro micrograna per la lavorazione di metalli non ferrosi, plastiche, duroplastiche, leghe di alluminio e materiali esotici ( in titanio ). Adatto per tagli interrotti e condizioni di lavoro sfavorevoli.

#### AK1020

**Verschleißfeste Feinkorn-Sorte.**  
**Geeignet für die Bearbeitung von Aluminium, Aluminiumlegierungen und exotischen Werkstoffen (Titan). Basissorte für kundenspezifische Beschichtungslösungen.**

*Wear resistant fine grain carbide.*  
*Suitable for machining aluminum, aluminum alloys and exotic materials (titanium). Base grade for customer specific coating solutions.*

Metallo duro micrograna con elevata resistenza all'usura. Idoneo alla lavorazione di alluminio e le sue leghe o materiali esotici a basse velocità di taglio. Grado utilizzato anche per specifiche soluzioni dedicate di rivestimenti.

## Empfohlene Schnittwerte / Recommended cutting data / Parametri di taglio suggerito

| ISO | Werkstoff / Material / Materiale                                                                                                       |                         | Schnittgeschwindigkeit / Cutting speed / Velocità di taglio |             |                                       |             |
|-----|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------|-------------|---------------------------------------|-------------|
|     |                                                                                                                                        |                         | Drehen / Turning / Tornitura                                |             | Abstechen / Parting off / Scanalatura |             |
|     |                                                                                                                                        |                         | V <sub>c</sub> [m/min]                                      | f [mm/U]    | V <sub>c</sub> [m/min]                | f [mm/U]    |
| P   | <b>Automatenstahl</b><br>Free cutting steel<br>Acciaio non legato                                                                      |                         | 120 - 200                                                   | 0,01 - 0,20 | 80 - 150                              | 0,01 - 0,15 |
|     | <b>Stahl</b><br>Steel<br>Acciaio                                                                                                       | < 600 N/mm <sup>2</sup> | 80 - 160                                                    | 0,01 - 0,18 | 70 - 120                              | 0,01 - 0,12 |
|     | <b>Stahl</b><br>Steel<br>Acciaio                                                                                                       | < 800 N/mm <sup>2</sup> | 60 - 120                                                    | 0,01 - 0,15 | 60 - 100                              | 0,01 - 0,10 |
|     | <b>Stahl</b><br>Steel<br>Acciaio                                                                                                       | > 800 N/mm <sup>2</sup> | 50 - 100                                                    | 0,01 - 0,12 | 40 - 80                               | 0,01 - 0,08 |
| M   | <b>Rostfreie Stähle</b><br>Stainless steel<br>Acciaio inossidabile                                                                     |                         | 60 - 120                                                    | 0,01 - 0,15 | 60 - 100                              | 0,01 - 0,08 |
| N   | <b>Aluminium und AL- Legierungen</b><br>Aluminum and Al-alloys<br>Alluminio e sue leghe                                                |                         | 180 - 800                                                   | 0,01 - 0,30 | 150 - 300                             | 0,01 - 0,20 |
|     | <b>Kupfer und Kupferlegierungen (Messing, Bronze)</b><br>Copper and copper alloys (brass and bronze)<br>Leghe di Rame (Ottone, Bronzo) |                         | 100 - 500                                                   | 0,01 - 0,30 | 100 - 300                             | 0,01 - 0,20 |
| S   | <b>Titan</b><br>Titanium<br>Titanio                                                                                                    |                         | 30 - 70                                                     | 0,01 - 0,12 | 30 - 50                               | 0,01 - 0,06 |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

The recommended cutting data are only approximate values.

It may be necessary to adjust them to each individual machining application.

I dati indicati in tabella sono valori approssimati.

Può essere necessario adattarli alle singole applicazioni di lavorazione.

**Eckenradius / Corner radius****Raggio di punta**

Wenn nichts angegeben ist beträgt der Eckenradius der Schneidplatten R 0,0 mm. Die Schneidplatten erzeugen die guten Oberflächengüten mit einer Schleppschneide.

When there is no radius shown, the corner radius of the insert is R 0,0 mm. The inserts achieve the excellent surface finish with a wiper edge effect.

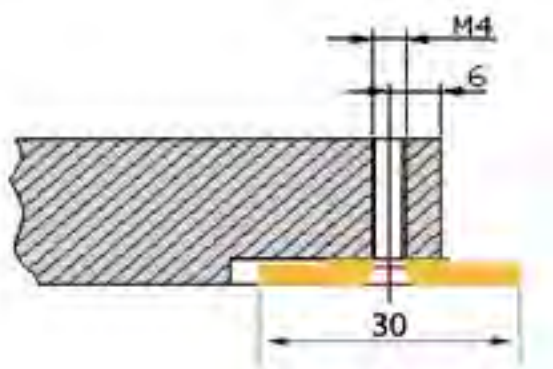
Se non altrimenti specificato il raggio di punta dell'inserto è di 0,0 mm. L'inserto permette di ottenere un effetto raschiante per una eccellente finitura superficiale.

**Freiwinkel / Clearance angle****Angolo di spoglia inferiore**

Der Freiwinkel in Schnittrichtung beträgt bei allen Schneidplatten 7°, die Nebenfreiwinkel haben 3°. Daher ist ein Einsatz in Richtung Nebenschneide nur bedingt möglich.

The clearance angle in the main cutting direction on all inserts is 7°, the clearance angle for the secondary edge is 3°. Due to this fact the usage of the secondary cutting direction is limited.

Per tutti gli inserti, la spoglia inferiore è 7° quella secondaria è 3°. In copiatura sono quindi permessi limitati avanzamenti.

**Einbaumaße der Wendeschneidplatte****Location of the indexable insert****Dimensione degli inserti****Berechnung des Steigungswinkels beim Gewindedrehen****Calculation of the helix angle for thread turning****Calcolo del passo per la filettatura**

Der Steigungswinkel des Gewindes bzw. der erforderliche Neigungswinkel ergibt sich aus folgender Formel:

The helix angle of the thread and the required inclination angle can be calculated by the following formula:

L'angolo del filetto e quello di inclinazione si calcolano con la seguente formula:

$$\tan \lambda = \frac{p}{d_2 \times \pi}$$

$\lambda$  = Steigungswinkel / Inclination / Angolo di inclinazione

$d_2$  = Flankendurchmesser / Pitch diameter / Diametro nominale filetto

$p$  = Steigung / Pitch / Passo

**Hinweis:** Darstellung im Katalog gilt für Maschinen mit rechts liegender Hauptspindel (z. B. Tornos, Maier, etc.)  
**Weitere Informationen finden Sie im Anhang dieses Kataloges.**

**Remark:** Illustrations in the catalog show the main spindle on the right hand side (Machines: Tornos, Maier, etc.)  
For further technical information please refer to the info section in the back of this book.

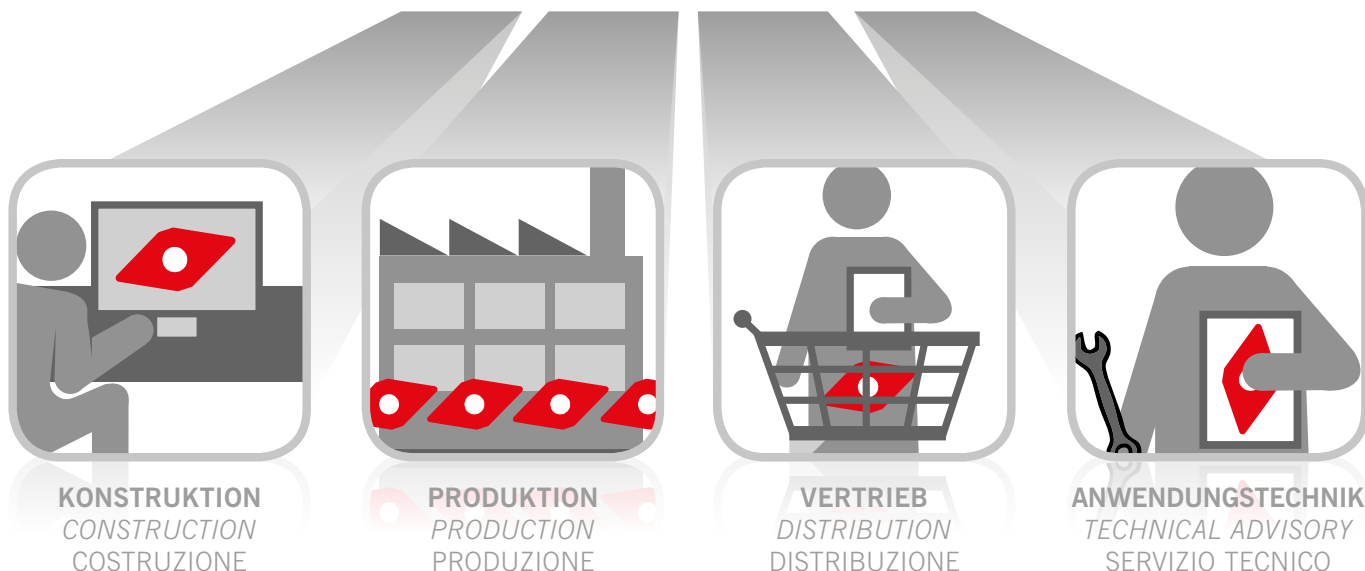
**Nota:** Rappresentazioni valide per macchine con mandrino a destra (p.es: Tornos, Maier, ...).  
Altre Informazioni li trovate nell'allegato di questo catalogo.

**Ersatzteile / Spare parts / Ricambi**

| Artikel / Items / Articolo                                                                           | PG 11 |
|------------------------------------------------------------------------------------------------------|-------|
| <b>Schlüssel / Screw / Vite</b>                                                                      |       |
| KS 1111                                                                                              | ●     |
| <b>Schraube / Key / Chiave</b>                                                                       |       |
| AS 0027 / AS 0028 / AS 0029                                                                          | ●     |
| <b>Verschlusschraube / Locking screw / Vite di tenuta</b>                                            |       |
| AS 0079 (M8 x 1 x 4)                                                                                 | ●     |
| <b>Kühlmittelanschluss – gerade / Coolant supply – straight / Raccordo – dritto</b>                  |       |
| KA 001                                                                                               | ●     |
| <b>Kühlmittelanschluss – winklig, fest / Coolant supply – angled and fixed / Raccordo – angolato</b> |       |
| KA 004                                                                                               | ●     |
| <b>Schwenkverschraubung / Swivelling screw-fitting / Raccordo – orientabile</b>                      |       |
| KA 006                                                                                               | ●     |

# ARNO®

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**Weitere Informationen finden Sie unter:**

*For more information see:*

Altre informazioni su:

**[www.arno.de](http://www.arno.de)**



6

**SHARK-CUT®****SHARK-CUT®****SHARK-CUT®****Multifunktionswerkzeug***Multi purpose tool*

## Untensile multifunzione

|                         |                         |                               |                  |
|-------------------------|-------------------------|-------------------------------|------------------|
| • Systemvorstellung     | • Introduction          | • Caratteristiche del sistema | <b>280 – 281</b> |
| • Bezeichnungssystem    | • Designation system    | • Sistema di numerazione      | <b>282</b>       |
| • Werkzeugauswahl       | • Tool shank options    | • Tipologie di numerazione    | <b>283</b>       |
| • SHARK-CUT® Mini       | • SHARK-CUT® Mini       | • SHARK-CUT® Mini             | <b>284 – 285</b> |
| • SHARK-CUT® Standard   | • SHARK-CUT® Standard   | • SHARK-CUT® Standard         | <b>286 – 288</b> |
| • Wendschneidplatten    | • Inserts               | • Inserti                     |                  |
| – Geometriebeschreibung | – Geometry description  | – Descrizione delle Geometrie | <b>289</b>       |
| – Sortenbeschreibung    | – Grade description     | – Descrizione delle Qualità   | <b>290 – 291</b> |
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| • Ersatzteile           | • Spare parts           | • Ricambi                     | <b>294</b>       |
| • Schnittwerte          | • Cutting data          | • Parametri di taglio         | <b>295 – 301</b> |
| • Anwendungshinweise    | • Application reference | • Suggerimenti tecnici        | <b>302 – 307</b> |

### ARNO® Multifunktionswerkzeug SHARK-CUT®

*ARNO® Multi purpose tool SHARK-CUT®*

ARNO® Utensile multifunzione SHARK-CUT®

#### Vorteile des SHARK-CUT®-Systems:

#### DREHEN und BOHREN mit nur 1 Werkzeug!

*Advantages of the SHARK-CUT® system:*

*Turning and boring with only 1 tool!*

Vantaggi del sistema SHARK-CUT®:

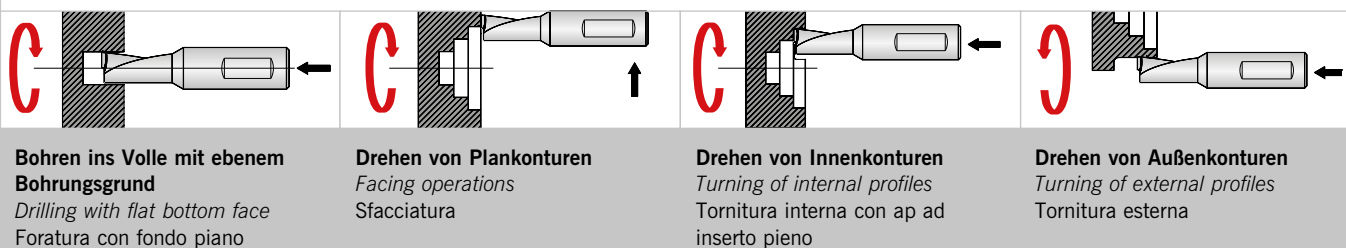
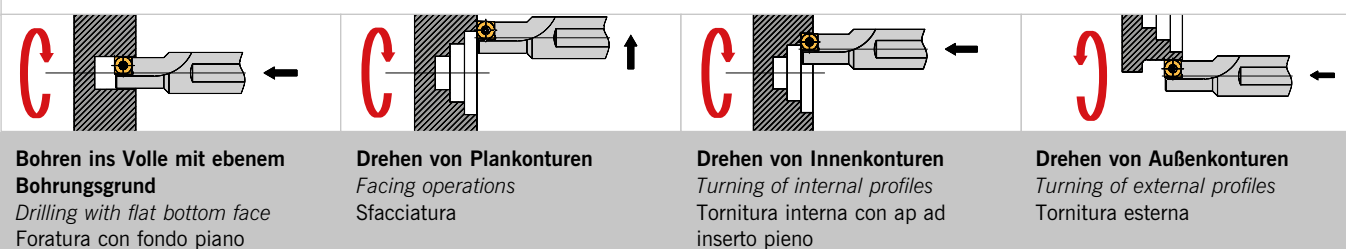
Foratura e barenatura con un unico utensile!

- |                                                                 |                                                               |                                                                  |
|-----------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------|
| • Erzeugt ebenen Bohrungsgrund                                  | • Produces a flat bottom hole                                 | • Foratura con fondo piano                                       |
| • Problemlöser bei fehlenden Werkzeugplätzen an der Maschine    | • Problem solver for insufficient machine tool posts          | • Risolutore di problemi nei casi di limitate posizioni utensili |
| • Weniger Programmieraufwand                                    | • Less programming                                            | • Riduce la programmazione macchina                              |
| • Kürzere Rüstzeiten                                            | • Shorter set-up times                                        | • Riduce i tempi di setup utensili                               |
| • Reduzierte Voreinstellzeiten                                  | • Reduced pre-setting times                                   | • Riduce i tempi di setup                                        |
| • Reduzierte Lagerhaltung von Werkzeugen und Wendschneidplatten | • Reduced stock-keeping costs for tools and indexable inserts | • Riduce i costi di magazzino di utensili ed inserti             |
| • Geringere Kosten für die Werkzeugbeschaffung                  | • Lower tool purchasing costs                                 | • Riduce i costi di utensileria                                  |



**SHARK-CUT® Mini:****DREHEN und BOHREN  $\geq \varnothing 4$  mm****Vollhartmetallwerkzeug***Turning and boring  $\geq \varnothing 4$  mm**Solid carbide tool*Foratura e barenatura  $\geq \varnothing 4$  mm

Utensile in metallo duro integrale

**Bohren ins Volle mit ebenem  
Bohrungsgrund***Drilling with flat bottom face  
Foratura con fondo piano***Drehen von Plankonturen  
Facing operations  
Sfacciatura****Drehen von Innenkonturen  
Turning of internal profiles  
Tornitura interna con ap ad  
inserto pieno****Drehen von Außenkonturen  
Turning of external profiles  
Tornitura esterna****SHARK-CUT® Standard:****DREHEN und BOHREN  $\geq \varnothing 8$  mm***Turning and boring  $\geq \varnothing 8$  mm*Foratura e barenatura  $\geq \varnothing 8$  mm**1,5 x D****2,25 x D****3 x D****Bohren ins Volle mit ebenem  
Bohrungsgrund***Drilling with flat bottom face  
Foratura con fondo piano***Drehen von Plankonturen  
Facing operations  
Sfacciatura****Drehen von Innenkonturen  
Turning of internal profiles  
Tornitura interna con ap ad  
inserto pieno****Drehen von Außenkonturen  
Turning of external profiles  
Tornitura esterna**

## SHARK-CUT® Mini

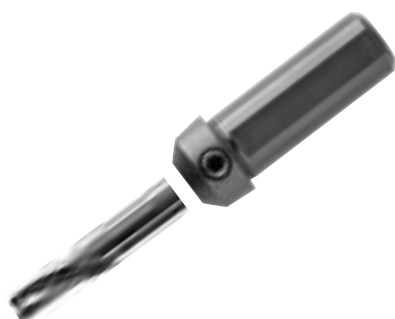
| SC         | 04                   | R/L               | 016            | SP                    | ALU       | AK10  |
|------------|----------------------|-------------------|----------------|-----------------------|-----------|-------|
| SHARK-CUT® | Nenn-<br>durchmesser | Rechts / Links    | Nutzlänge      | Gedrahter<br>Spanraum | Geometrie | Sorte |
|            | Diameter             | Right / Left      | max. depth     | Spiral flute          | Geometry  | Grade |
|            | Diametro             | Destro / Sinistro | Utile foratura | Scarichi elicoidali   | Geometria | Grado |

## SHARK-CUT® Standard

| SC         | 16                   | R/L               | 0036           | SP                    | 08                             |
|------------|----------------------|-------------------|----------------|-----------------------|--------------------------------|
| SHARK-CUT® | Nenn-<br>durchmesser | Rechts / Links    | Nutzlänge      | Gedrahter<br>Spanraum | WSP-Größe                      |
|            | Diameter             | Right / Left      | max. depth     | Spiral flute          | Insert size                    |
|            | Diametro             | Destro / Sinistro | Utile foratura | Scarichi elicoidali   | Inserto lunghezza<br>tagliente |

## SHARK-CUT® Wendeschneidplatten / Inserts / Inserti

| LPET 080304FN                  | AWI       | AL10  |
|--------------------------------|-----------|-------|
| WSP-Bezeichnung gemäß ISO-Norm | Geometrie | Sorte |
| ISO code                       | Geometry  | Grade |
| Codifica ISO                   | Geometria | Grado |



## SHARK-CUT® Mini

2,25 x D

Ø 4,0 – 8,0 mm

Seite/Page/Pagina 284

4 x D

Ø 4,0 – 8,0 mm

Seite/Page/Pagina 285



## SHARK-CUT® Standard

1,5 x D

Ø 8,0 – 32,0 mm

Seite/Page/Pagina 286

2,25 x D

Ø 8,0 – 32,0 mm

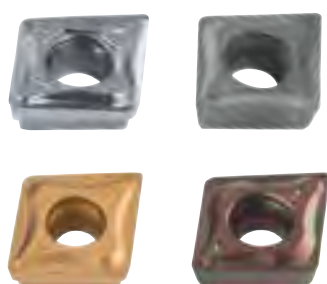
Seite/Page/Pagina 287

3 x D

Ø 8,0 – 32,0 mm

Seite/Page/Pagina 288

Densimet



## SHARK-CUT® Wendeschneidplatten

Inserts

Inserti

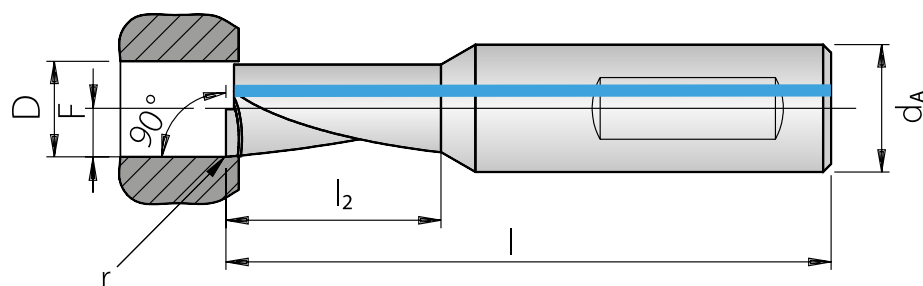
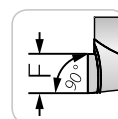
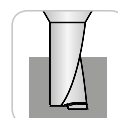
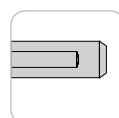
LPET

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LPNT

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SC



Rechte Ausführung abgebildet

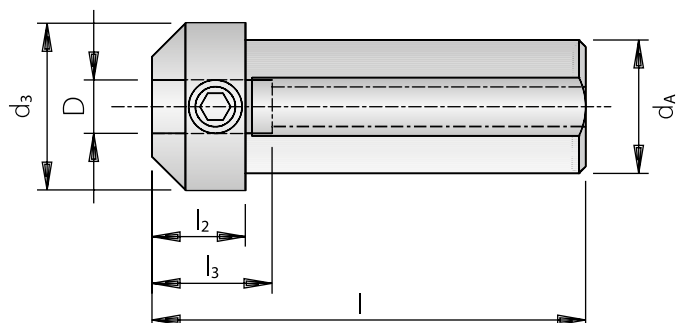
Right-hand execution shown

Versione Destra in figura

| Bezeichnung<br>Designation<br>Articolo |   |    |                |                |     |     | Sorten / Grades / Qualità<br>PG 19 |                                            |
|----------------------------------------|---|----|----------------|----------------|-----|-----|------------------------------------|--------------------------------------------|
|                                        | D | l  | l <sub>2</sub> | d <sub>A</sub> | F   | r   | beschichtet<br>coated<br>rivestito | unbeschichtet<br>uncoated<br>non rivestito |
|                                        |   |    |                |                |     |     | AL350                              | AK10                                       |
| SC04L-009SP                            | 4 | 35 | 9,00           | 6              | 2,0 | 0,2 | ●                                  |                                            |
| SC04L-009SP-ALU                        | 4 | 35 | 9,00           | 6              | 2,0 | 0,2 |                                    | ●                                          |
| SC04R-009SP                            | 4 | 35 | 9,00           | 6              | 2,0 | 0,2 | ●                                  |                                            |
| SC04R-009SP-ALU                        | 4 | 35 | 9,00           | 6              | 2,0 | 0,2 |                                    | ●                                          |
| SC04L-016SP                            | 4 | 41 | 16,00          | 6              | 2,0 | 0,2 | ●                                  |                                            |
| SC04L-016SP-ALU                        | 4 | 41 | 16,00          | 6              | 2,0 | 0,2 |                                    | ●                                          |
| SC04R-016SP                            | 4 | 41 | 16,00          | 6              | 2,0 | 0,2 | ●                                  |                                            |
| SC04R-016SP-ALU                        | 4 | 41 | 16,00          | 6              | 2,0 | 0,2 |                                    | ●                                          |
| SC05L-011SP                            | 5 | 37 | 11,25          | 6              | 2,5 | 0,2 | ●                                  |                                            |
| SC05L-011SP-ALU                        | 5 | 37 | 11,25          | 6              | 2,5 | 0,2 |                                    | ●                                          |
| SC05R-011SP                            | 5 | 37 | 11,25          | 6              | 2,5 | 0,2 | ●                                  |                                            |
| SC05R-011SP-ALU                        | 5 | 37 | 11,25          | 6              | 2,5 | 0,2 |                                    | ●                                          |
| SC05L-020SP                            | 5 | 45 | 20,00          | 6              | 2,5 | 0,2 | ●                                  |                                            |
| SC05L-020SP-ALU                        | 5 | 45 | 20,00          | 6              | 2,5 | 0,2 |                                    | ●                                          |
| SC05R-020SP                            | 5 | 45 | 20,00          | 6              | 2,5 | 0,2 | ●                                  |                                            |
| SC05R-020SP-ALU                        | 5 | 45 | 20,00          | 6              | 2,5 | 0,2 |                                    | ●                                          |
| SC06L-013SP                            | 6 | 38 | 13,50          | 8              | 3,0 | 0,2 | ●                                  |                                            |
| SC06L-013SP-ALU                        | 6 | 38 | 13,50          | 8              | 3,0 | 0,2 |                                    | ●                                          |
| SC06R-013SP                            | 6 | 38 | 13,50          | 8              | 3,0 | 0,2 | ●                                  |                                            |
| SC06R-013SP-ALU                        | 6 | 38 | 13,50          | 8              | 3,0 | 0,2 |                                    | ●                                          |
| SC06R-013SP-R0,40                      | 6 | 38 | 13,50          | 8              | 3,0 | 0,4 | ●                                  |                                            |
| SC06L-024SP                            | 6 | 49 | 24,00          | 8              | 3,0 | 0,2 | ●                                  |                                            |
| SC06L-024SP-ALU                        | 6 | 49 | 24,00          | 8              | 3,0 | 0,2 |                                    | ●                                          |
| SC06R-024SP                            | 6 | 49 | 24,00          | 8              | 3,0 | 0,2 | ●                                  |                                            |
| SC06R-024SP-ALU                        | 6 | 49 | 24,00          | 8              | 3,0 | 0,2 |                                    | ●                                          |

| Bezeichnung<br>Designation<br>Articolo | D | l  | l <sub>2</sub> | d <sub>A</sub> | F   | r   | Sorten / Grades / Qualità<br>PG 19 |                                            |
|----------------------------------------|---|----|----------------|----------------|-----|-----|------------------------------------|--------------------------------------------|
|                                        |   |    |                |                |     |     | beschichtet<br>coated<br>rivestito | unbeschichtet<br>uncoated<br>non rivestito |
|                                        |   |    |                |                |     |     | AL350                              | AK10                                       |
| SC07L-015SP                            | 7 | 42 | 15,75          | 8              | 3,5 | 0,2 | ●                                  |                                            |
| SC07L-015SP-ALU                        | 7 | 42 | 15,75          | 8              | 3,5 | 0,2 |                                    | ●                                          |
| SC07R-015SP                            | 7 | 42 | 15,75          | 8              | 3,5 | 0,2 | ●                                  |                                            |
| SC07R-015SP-ALU                        | 7 | 42 | 15,75          | 8              | 3,5 | 0,2 |                                    | ●                                          |
| SC07L-028SP                            | 7 | 53 | 28,00          | 8              | 3,5 | 0,2 | ●                                  |                                            |
| SC07L-028SP-ALU                        | 7 | 53 | 28,00          | 8              | 3,5 | 0,2 |                                    | ●                                          |
| SC07R-028SP                            | 7 | 53 | 28,00          | 8              | 3,5 | 0,2 | ●                                  |                                            |
| SC07R-028SP-ALU                        | 7 | 53 | 28,00          | 8              | 3,5 | 0,2 |                                    | ●                                          |
| SC08L-018SP                            | 8 | 45 | 18,00          | 8              | 4,0 | 0,2 | ●                                  |                                            |
| SC08L-018SP-ALU                        | 8 | 45 | 18,00          | 8              | 4,0 | 0,2 |                                    | ●                                          |
| SC08R-018SP                            | 8 | 45 | 18,00          | 8              | 4,0 | 0,2 | ●                                  |                                            |
| SC08R-018SP-ALU                        | 8 | 45 | 18,00          | 8              | 4,0 | 0,2 |                                    | ●                                          |
| SC08L-032SP                            | 8 | 57 | 32,00          | 8              | 4,0 | 0,2 | ●                                  |                                            |
| SC08L-032SP-ALU                        | 8 | 57 | 32,00          | 8              | 4,0 | 0,2 |                                    | ●                                          |
| SC08R-032SP                            | 8 | 57 | 32,00          | 8              | 4,0 | 0,2 | ●                                  |                                            |
| SC08R-032SP-ALU                        | 8 | 57 | 32,00          | 8              | 4,0 | 0,2 |                                    | ●                                          |

## Adapter / Holder / Adattatore

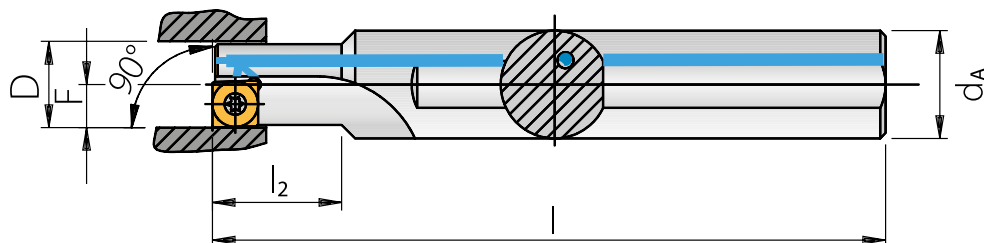
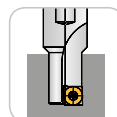
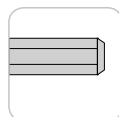


## Trägerwerkzeug / Holder / Utensile

| Bezeichnung<br>Designation<br>Articolo | D | d <sub>3</sub> | l  | l <sub>2</sub> | l <sub>3</sub> | d <sub>A</sub> | PG 19 | Klemmschraube<br>Clamping screw<br>Vite |
|----------------------------------------|---|----------------|----|----------------|----------------|----------------|-------|-----------------------------------------|
| SC AD20-06                             | 6 | 25             | 65 | 14             | 18             | 20             | ●     | 7897990                                 |
| SC AD20-08                             | 8 | 25             | 65 | 14             | 18             | 20             | ●     | 7897990                                 |

Drilling depth up to 1.5 x D

Foratura fino a 1,5 x D



## Trägerwerkzeug / Holder / Utensile

Rechte Ausführung abgebildet

Right-hand execution shown

Versione Destra in figura

| Bezeichnung<br>Designation<br>Articolo | D  | L   | L <sub>2</sub> | d <sub>A</sub> | F    | PG 19 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|----|-----|----------------|----------------|------|-------|-----------------------------------------|
| SC08R/L-0012G-04-IP** *                | 8  | 80  | 12,0           | 12             | 4,0  | ●     | LPET / LPNT 0401..                      |
| SC10R/L-0015G-05-IP*                   | 10 | 90  | 15,0           | 12             | 5,0  | ●     | LPET / LPNT 0502..                      |
| SC12R/L-0018G-06-IP*                   | 12 | 100 | 18,0           | 16             | 6,0  | ●     | LPET / LPNT 0602..                      |
| SC14R/L-0021G-07-IP*                   | 14 | 110 | 21,0           | 16             | 7,0  | ●     | LPET / LPNT 0703..                      |
| SC16R/L-0024G-08-IP*                   | 16 | 125 | 24,0           | 20             | 8,0  | ●     | LPET / LPNT 0803..                      |
| SC18R/L-0027G-09-IP*                   | 18 | 135 | 27,0           | 25             | 9,0  | ●     | LPET / LPNT 09T3..                      |
| SC20R/L-0030G-10-IP*                   | 20 | 150 | 30,0           | 25             | 10,0 | ●     | LPET / LPNT 10T3..                      |

\*\* Rechter Halter → Rechte Wendeschneidplatte  
Linker Halter → Linke Wendeschneidplatte

\*\* Right-hand holder → Right-hand indexable insert  
Left-hand holder → Left-hand indexable insert

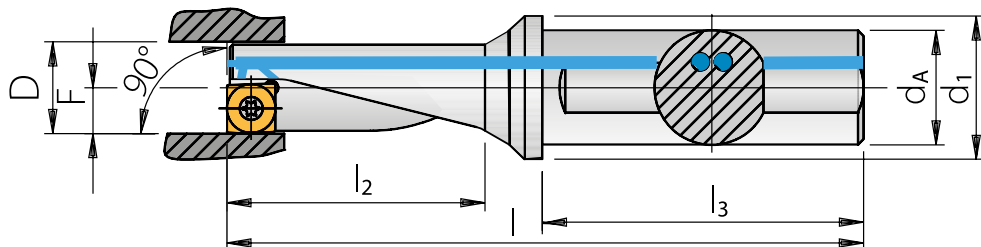
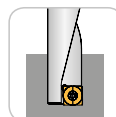
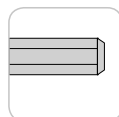
\*\* Utensile Destro → Inserto Destro  
Utensile Sinistro → Inserto Sinistro

\* Lieferbar ab Q1/2017  
Available from Q1/2017  
Disponibile da Q1/2017

Hinweis: Trägerwerkzeuge werden mit Klemmschrauben und Ersatzschrauben geliefert, jedoch ohne Schlüssel.  
Ersatzteile und Zubehör siehe Seite 294.

Remark: Holders will be supplied with clamping screws and spare screws, however without key.  
Spare parts and accessories see page 294.

Nota: L'utensile é fornito completo di vite, 1 vite di ricambio, ma SENZA chiave. Ricambi a pagina 294.



## Trägerwerkzeug / Holder / Utensile

Rechte Ausführung abgebildet

Right-hand execution shown

Versione Destra in figura

| Bezeichnung<br>Designation<br>Articolo | D  | l     | l <sub>2</sub> | l <sub>3</sub> | d <sub>1</sub> | d <sub>A</sub> | F    | PG 19 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|----|-------|----------------|----------------|----------------|----------------|------|-------|-----------------------------------------|
| SC08R/L-0018SP-04-IP** *               | 8  | 60,0  | 18,0           | 38             | 12             | 10             | 4,0  | ●     | LPET / LPNT 0401..                      |
| SC10R/L-0023SP-05-IP*                  | 10 | 69,5  | 22,5           | 42             | 16             | 12             | 5,0  | ●     | LPET / LPNT 0502..                      |
| SC12R/L-0027SP-06-IP*                  | 12 | 78,0  | 27,0           | 45             | 20             | 16             | 6,0  | ●     | LPET / LPNT 0602..                      |
| SC14R/L-0032SP-07-IP*                  | 14 | 83,5  | 31,5           | 45             | 20             | 16             | 7,0  | ●     | LPET / LPNT 0703..                      |
| SC16R/L-0036SP-08-IP*                  | 16 | 94,0  | 36,0           | 50             | 25             | 20             | 8,0  | ●     | LPET / LPNT 0803..                      |
| SC18R/L-0041SP-09-IP*                  | 18 | 109,5 | 40,5           | 56             | 32             | 25             | 9,0  | ●     | LPET / LPNT 09T3..                      |
| SC20R/L-0045SP-10-IP*                  | 20 | 111,0 | 45,0           | 56             | 32             | 25             | 10,0 | ●     | LPET / LPNT 10T3..                      |

\*\* Rechter Halter → Rechte Wendeschneidplatte  
Linker Halter → Linke Wendeschneidplatte

\*\* Right-hand holder → Right-hand indexable insert  
Left-hand holder → Left-hand indexable insert

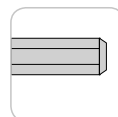
\*\* Utensile Destro → Inserto Destro  
Utensile Sinistro → Inserto Sinistro

\* Lieferbar ab Q1/2017  
Available from Q1/2017  
Disponibile da Q1/2017

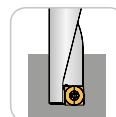
Hinweis: Trägerwerkzeuge werden mit Klemmschrauben und Ersatzschrauben geliefert, jedoch ohne Schlüssel.  
Ersatzteile und Zubehör siehe Seite 294.

Remark: Holders will be supplied with clamping screws and spare screws, however without key.  
Spare parts and accessories see page 294.

Nota: L'utensile é fornito completo di vite, 1 vite di ricambio, ma SENZA chiave. Ricambi a pagina 294.



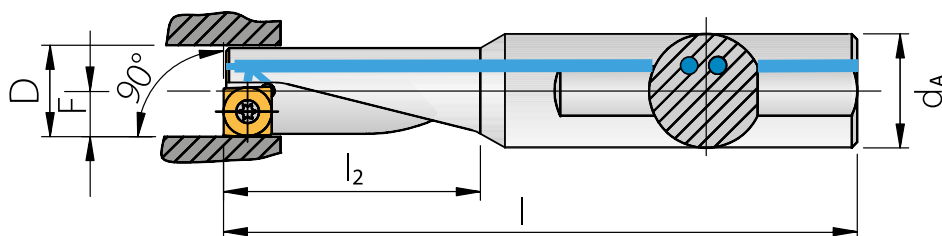
mit IK  
with ic  
con ic



8,0 - 20,0 mm



Seite  
Page  
Pagina  
294 – 307



Schwingungsarm!  
Vibration damped!  
Stop alle vibrazioni!



## Trägerwerkzeug / Holder / Utensile

Rechte Ausführung abgebildet  
Right-hand execution shown  
Versione Destra in figura

| Bezeichnung<br>Designation<br>Articolo | D  | l   | l <sub>2</sub> | d <sub>A</sub> | F    | PG 19 | Wendeschneidplatte<br>Insert<br>Inserto |
|----------------------------------------|----|-----|----------------|----------------|------|-------|-----------------------------------------|
| SC08R/L-0024SP-04-IP** *               | 8  | 80  | 24             | 12             | 4,0  | ●     | LPET / LPNT 0401..                      |
| SC10R/L-0030SP-05-IP*                  | 10 | 85  | 30             | 12             | 5,0  | ●     | LPET / LPNT 0502..                      |
| SC12R/L-0036SP-06-IP*                  | 12 | 95  | 36             | 16             | 6,0  | ●     | LPET / LPNT 0602..                      |
| SC14R/L-0042SP-07-IP*                  | 14 | 100 | 42             | 16             | 7,0  | ●     | LPET / LPNT 0703..                      |
| SC16R/L-0048SP-08-IP*                  | 16 | 110 | 48             | 20             | 8,0  | ●     | LPET / LPNT 0803..                      |
| SC18R/L-0054SP-09-IP*                  | 18 | 125 | 54             | 25             | 9,0  | ●     | LPET / LPNT 09T3..                      |
| SC20R/L-0060SP-10-IP*                  | 20 | 130 | 60             | 25             | 10,0 | ●     | LPET / LPNT 10T3..                      |

\*\* Rechter Halter → Rechte Wendeschneidplatte  
Linker Halter → Linke Wendeschneidplatte

\*\* Right-hand holder → Right-hand indexable insert  
Left-hand holder → Left-hand indexable insert

\*\* Utensile Destro → Inserto Destro  
Utensile Sinistro → Inserto Sinistro

\* Lieferbar ab Q1/2017  
Available from Q1/2017  
Disponibile da Q1/2017

Hinweis: Trägerwerkzeuge werden mit Klemmschrauben und Ersatzschrauben geliefert, jedoch ohne Schlüssel.  
Ersatzteile und Zubehör siehe Seite 294.

Remark: Holders will be supplied with clamping screws and spare screws, however without key.  
Spare parts and accessories see page 294.

Nota: L'utensile é fornito completo di vite, 1 vite di ricambio, ma SENZA chiave. Ricambi a pagina 294.



## - ALU

- Hochglänzende, polierte Oberfläche der Wendschneidplatte für minimale Verklebung und optimales Zerspanungsverhalten
- Hochpositive Schneidengeometrie
- Spezielle Geometrie für die Bearbeitung von Aluminiumwerkstoffen, NE-Metallen und Kunststoffen



## - ALU

- *Ground and polished insert surface for minimum friction and optimum cutting performance*
- *Highpositive geometry*
- *Special geometry for machining aluminium, non-ferrous materials and synthetics*

## - ALU

- Geometria lappata per un ottimo taglio del materiale e per ridurre incollaggi sulla superficie
- Geometria con spoglia superiore molto positiva
- Geometria dedicata alla lavorazione di materiali non ferrosi, ghise e plastiche

## - EN/ER/EL

- Standardgeometrie für die Bearbeitung von Stahl, Guss und rostfreiem Stahl



## - EN/ER/EL

- *Standard geometry for machining steel, stainless steel and cast iron*

## - EN/ER/EL

- Geometria Standard per la lavorazione di acciai, acciai inossidabili e ghise acciai

## - WI/AWI

- Extrem hochwertige Oberflächen durch Schleppschneide
- Breitschlichtgeometrie
- Erhöhter Vorschub für optimalen Spanbruch, geringere Bearbeitungszeiten und somit höhere Wirtschaftlichkeit



## - WI/AWI

- *Extremely good surface finish with wiper geometry*
- *Wiper edge geometry*
- *Increased feed rate for better chip breaking, reduced machine time and therefore better productivity*

## - WI/AWI

- Geometria con tecnologia wiper per ottime finiture superficiali
- Grazie al raschiante è possibile incrementare avanzamenti e ridurre tempi ciclo
- Geometria raschiante con tecnologia wiper su inserto -ALU per una migliorata finitura superficiale di leghe non ferrose, alluminio e plastiche

## Hartmetall beschichtet / Carbide grade coated / Metallo duro rivestito

## AM4130

## PVD-Mehrlagenbeschichtung

Die universell einsetzbare Sorte ist die erste Wahl für die Bearbeitung von rostfreiem Stahl und hochwarmfesten Legierungen. Sie überzeugt mit sehr guten Leistungen und zeichnet sich durch ihr breites Einsatzspektrum, höchste Zähigkeit sowie eine exzellente Verschleißfestigkeit aus. .

## PVD multilayer coating

Universal and first choice for machining stainless steel and high temperature alloys. Wide application area, very tough and with excellent wear resistance.

## Rivestimento multistrato PVD

La Qualità universale scelta per la lavorazione di acciaio inossidabile e leghe ad alta temperatura. Garantisce ottimi risultati e si distingue per la sua vasta gamma di applicazioni, grazie ad una elevata durezza e ad una eccellente resistenza all'usura.

## AM5035 (AL350) – HC - P40, HC - M35

PVD-Mehrlagenbeschichtung,  
Substrat + TiAlN

Hartmetallsorte für die Bearbeitung von rostfreien Stählen. Sorte ist auch zum Bearbeiten von Stahlwerkstoffen im niedrigen bis mittleren Festigkeitsbereich, sowie hochwarmfester Legierungen geeignet. Optimale Schneidkantenstabilität. Auch im mittleren und niedrigen Schnittgeschwindigkeitsbereich sehr gute Ergebnisse.

PVD-multilayer coating,  
substrate + TiAlN

Grade for machining stainless steel, but can also be used for steel materials with low to medium hardness as well as high temperature alloys. Optimum cutting edge stability. Excellent results at low to medium cutting speeds.

Rivestimento multistrato PVD,  
substrato + TiAlN

Qualità di metallo duro per lavorazione di acciaio inossidabile, anche idonea per acciai con durezza medio-bassa e per leghe altamente legate. Ottima stabilità tagliente. Eccellenti risultati a velocità di taglio medio basse.

## AP2225

## CVD-Mehrlagenbeschichtung

Verschleißfeste Sorte für Stahl und Gusswerkstoffe bei stabilen Verhältnissen und hohen Schnittgeschwindigkeiten. Die Sorte AP2225 weist eine stabile Schneidkante auf und besticht durch höchste Wärmebeständigkeit.

## CVD multilayer coating

Wear resistant grade for steel and cast materials in stable machining conditions and for high cutting speed. Strong cutting edge and high heat resistance.

## Rivestimento multistrato CVD

Grado resistente all'usura per acciaio e ghisa in condizioni stabili ed elevate velocità di taglio. La Qualità AP2225 ha un tagliente robusto e offre la massima resistenza al calore.

## AP2235

## CVD-Mehrlagenbeschichtung

Die zuverlässige Wahl für die Bearbeitung von Stahl- und Gusswerkstoffen bei instabilen Verhältnissen. Die Sorte AP2235 hat eine höchst stabile Schneidkante und besticht durch ein sehr zähes Grundsubstrat.

## CVD multilayer coating

The reliable choice for machining steel and cast materials under less stable machining conditions. The grade has strong cutting edge preparation and is very tough.

## Rivestimento multistrato CVD

La scelta affidabile per lavorazione di acciaio e fusioni in condizioni instabili. La Qualità AP2235 ha un tagliente estremamente robusto con un substrato di base molto duro.

## AK2015 – HC - P15, HC - K15 - CVD

## CVD-Mehrlagenbeschichtung,

Substrat + TiCN + TiCN + TiCNB + Al<sub>2</sub>O<sub>3</sub>  
Das Hauptanwendungsgebiet dieser Sorte ist die Bearbeitung von Gusswerkstoffen aller Art. Sie eignet sich aber auch zum Bearbeiten von Stahlwerkstoffen. Das neue Substrat gewährleistet die erforderliche Zähigkeit und Warmfestigkeit.

## CVD-multilayer coating,

substrate + TiCN + TiCN + TiCNB + Al<sub>2</sub>O<sub>3</sub>  
The main application area for this grade is the machining of all cast materials. It is also suitable for machining steel. The new substrate offers the necessary toughness and heat resistance.

## Rivestimento multistrato CVD,

substrato + TiCN + TiCN + TiCNB + Al<sub>2</sub>O<sub>3</sub>  
Grado studiato per lavorare materiali teneri stampati o da fusione. In alcune applicazioni idoneo anche alla lavorazione di acciai. Lo speciale substrato offre il giusto compromesso tra tenacità e resistenza all'usura.

## AL10 – HC - P10, HC - M15, HC - K10, HC - N15, HC - S10

PVD-Mehrlagenbeschichtung,  
Substrat + AlTiN

Extrem verschleißfeste Sorte zur Bearbeitung von Stählen und Grauguss. Diese Sorte zeichnet sich durch hohe Beschichtungshärte und äußerst hohe Verschleißfestigkeit aus. Besonders geeignet für sehr hohe Schnittgeschwindigkeiten.

PVD-multilayer coating,  
substrate + AlTiN

Extremely wear resistant grade for machining steel materials, cast iron and non-ferrous products. Due to high hardness in coating, high wear-resistance can be achieved. Specially suitable for high cutting speeds.

Rivestimento multistrato PVD,  
substrato + AlTiN

Grado dall'elevata resistente all'usura per la lavorazione di acciai, ghise e materiali non ferrosi. Il rivestimento di elevata durezza assicura un'ottima resistenza all'usura. Valido per elevate velocità di taglio.

### Hartmetall beschichtet / Carbide grade coated / Metallo duro rivestito

#### AM35C – HC - P35, HC - M30

CVD-Mehrlagenbeschichtung,  
Substrat + TiC + TiCN + TiN  
Hartmetallsorte mit hoher Zähigkeit für die  
Stahlbearbeitung im mittleren Schnittge-  
schwindigkeitsbereich.

CVD-multilayer coating,  
substrate + TiC + TiCN + TiN  
Carbide grade with high toughness for machining  
steel materials at medium cutting speeds.

Rivestimento multistrato CVD,  
substrato + TiC + TiCN + TiN  
Grado di metallo duro universale per la  
lavorazione di acciai a medie velocità di  
taglio.

#### AR26C – HC - P25, HC - K20

CVD-Mehrlagenbeschichtung,  
Substrat + TiN + TiCN + Al<sub>2</sub>O<sub>3</sub>  
Hartmetallsorte mit hoher Verschleißfestigkeit  
für die Bearbeitung von Guss- und Stahlwerk-  
stoffen.

CVD-multilayer coating,  
substrate + TiN + TiCN + Al<sub>2</sub>O<sub>3</sub>  
Carbide grade with high wear-resistance for  
machining cast iron and steel materials.

Rivestimento multistrato CVD,  
substrato + TiC + TiCN + Al<sub>2</sub>O<sub>3</sub>  
Qualità di metallo duro con alta resistenza  
all'usura per la lavorazione di ghise ed alcuni  
acciai teneri debolmente legati o dal basso  
tenore di carbonio.

### Hartmetall unbeschichtet / Carbide grade uncoated / Metallo duro non rivestito

#### AK10 – HW - K10, HW - N10, HW - S10

Hartmetallsorte für die Bearbeitung von Alu-  
minium, Aluminiumlegierungen, Nichteisen-  
metallen und Kunststoffen. Die Sorte ist auch  
bedingt geeignet für die Bearbeitung von  
Gusswerkstoffen, Titan und Titanlegierungen.  
Die Wendeschneidplatte ist umfangsseitig  
geschliffen und die Spanfläche poliert.

Grade for machining aluminium, aluminium  
alloys, non-ferrous metals and plastics.  
Grade can also be used for machining cast iron  
and temperature metals. Insert is periphery-  
ground and the chipbreaker is polished.

Metallo duro micrograna per la lavorazione di  
alluminio, leghe di alluminio, metalli non ferrosi  
e leghe plastiche. Valido anche in determinate  
condizioni di stabilità per la finitura di ghisa e  
leghe altamente legate. Gli inserti sono lappati  
sulla superficie e rettificati sul perimetro.

#### AP40 – HW - P40, HW - M35

Speziell für die Stahlbearbeitung bei Schnitt-  
geschwindigkeiten unter 80 m/min oder bei  
ungünstigen Stabilitätsverhältnissen.

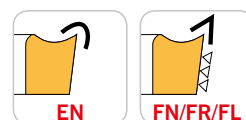
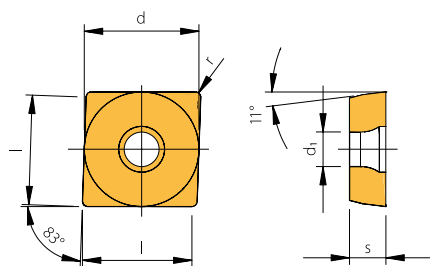
Special carbide grade for steel materials at  
cutting speeds below 80 m/min and unstable  
machining conditions.

Grado di metallo duro tenace per lavorare acciai  
a velocità di taglio inferiori agli 80 m/min ed in  
condizioni instabili di lavoro.

Weitere Informationen und Details zum Schneidplattenbohrer SHARK-CUT® finden  
Sie im ARNO® Katalog „Werkzeuge und Wendeschneidplatten zum Bohren“ Kapitel 4.

For more information about the SHARK-CUT® please see our ARNO® catalogue  
“Drilling tools and indexable inserts for drilling” chapter 4.

Per ulteriori informazioni sul sistema SHARK-CUT® consultare il nostro catalogo ARNO®  
“Utensili ed inserti di Foratura” Capitolo 4.



Abgebildet FN Wendeschneidplatte  
Shown FN-Insert  
Inserti FN in figura

## LPET



| Bezeichnung<br>Designation<br>Articolo | l    | d°   | s    | r   | d <sub>1</sub> | PG 33                              |       |       |                                            |
|----------------------------------------|------|------|------|-----|----------------|------------------------------------|-------|-------|--------------------------------------------|
|                                        |      |      |      |     |                | beschichtet<br>coated<br>rivestito |       |       | unbeschichtet<br>uncoated<br>non rivestito |
|                                        |      |      |      |     |                | AL10                               | AM35C | AR26C | AK10                                       |
| LPET 040104FL-ALU                      | 4,0  | 4,5  | 1,80 | 0,4 | 2,10           | ●                                  |       |       | ●                                          |
| LPET 040104FR-ALU                      | 4,0  | 4,5  | 1,80 | 0,4 | 2,10           | ●                                  |       |       | ●                                          |
| LPET 050204FN-ALU                      | 5,0  | 5,8  | 2,10 | 0,4 | 2,25           | ●                                  |       |       | ●                                          |
| LPET 060204FN-ALU                      | 6,0  | 6,5  | 2,38 | 0,4 | 2,50           | ●                                  |       |       | ●                                          |
| LPET 070304FN-ALU                      | 7,0  | 7,6  | 3,18 | 0,4 | 2,80           | ●                                  |       |       | ●                                          |
| LPET 080304FN-ALU                      | 8,0  | 8,5  | 3,18 | 0,4 | 3,40           | ●                                  |       |       | ●                                          |
| LPET 09T304FN-ALU                      | 9,0  | 9,6  | 3,00 | 0,4 | 3,40           | ●                                  |       |       | ●                                          |
| LPET 10T304FN-ALU                      | 10,0 | 10,6 | 3,97 | 0,4 | 4,40           | ●                                  |       |       | ●                                          |



|                   |      |      |      |     |      |   |  |  |   |
|-------------------|------|------|------|-----|------|---|--|--|---|
| LPET 040102FL-AWI | 4,0  | 4,5  | 1,80 | 0,2 | 2,10 | ● |  |  | ● |
| LPET 040102FR-AWI | 4,0  | 4,5  | 1,80 | 0,2 | 2,10 | ● |  |  | ● |
| LPET 040104FL-AWI | 4,0  | 4,5  | 1,80 | 0,4 | 2,10 | ● |  |  | ● |
| LPET 040104FR-AWI | 4,0  | 4,5  | 1,80 | 0,4 | 2,10 | ● |  |  | ● |
| LPET 050202FN-AWI | 5,0  | 5,8  | 2,10 | 0,2 | 2,25 | ● |  |  | ● |
| LPET 050204FN-AWI | 5,0  | 5,8  | 2,10 | 0,4 | 2,25 | ● |  |  | ● |
| LPET 060202FN-AWI | 6,0  | 6,5  | 2,38 | 0,2 | 2,50 | ● |  |  | ● |
| LPET 060204FN-AWI | 6,0  | 6,5  | 2,38 | 0,4 | 2,50 | ● |  |  | ● |
| LPET 070304FN-AWI | 7,0  | 7,6  | 3,18 | 0,4 | 2,80 | ● |  |  | ● |
| LPET 080304FN-AWI | 8,0  | 8,5  | 3,18 | 0,4 | 3,40 | ● |  |  | ● |
| LPET 09T304FN-AWI | 9,0  | 9,6  | 3,97 | 0,4 | 3,40 | ● |  |  | ● |
| LPET 10T304FN-AWI | 10,0 | 10,6 | 3,97 | 0,4 | 4,40 | ● |  |  | ● |
| LPET 10T308FN-AWI | 10,0 | 10,6 | 3,97 | 0,8 | 4,40 | ● |  |  | ● |



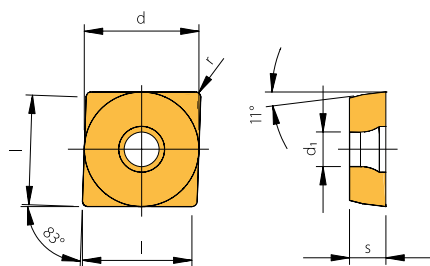
|                  |      |      |      |     |      |  |   |   |  |
|------------------|------|------|------|-----|------|--|---|---|--|
| LPET 060204EN-WI | 6,0  | 6,5  | 2,38 | 0,4 | 2,50 |  | ● | ● |  |
| LPET 070304EN-WI | 7,0  | 7,6  | 3,18 | 0,4 | 2,80 |  | ● | ● |  |
| LPET 080304EN-WI | 8,0  | 8,5  | 3,18 | 0,4 | 3,40 |  | ● | ● |  |
| LPET 09T304EN-WI | 9,0  | 9,6  | 3,97 | 0,4 | 3,40 |  | ● | ● |  |
| LPET 10T304EN-WI | 10,0 | 10,6 | 3,97 | 0,4 | 4,40 |  | ● | ● |  |

\* Rechter Halter → Rechte Wendeschneidplatte  
\* Right-hand holder → Right-hand indexable insert  
\* Utensile Destro → Inserto Destro

● Maß „d“ gemessen auf Höhe Maß „s“  
● Dimension „d“ measured to height „s“  
● Dimensione „d“ misurata ad altezza „s“

● Hauptanwendung  
Main application  
Applicazione principale  
○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |
|---|---|---|---|---|
| P | ● | ● | ● |   |
| M | ● | ○ |   |   |
| K | ○ |   | ● | ○ |
| N |   |   |   | ● |
| S | ○ | ○ |   |   |
| H | ○ |   |   |   |



Abgebildet EN Wendeschneidplatte  
Shown EN-Insert  
Inserti EN in figura

## LPNT



| PG 33                                  |      |      |      |     |                |                                    |       |       |        |        |        |        |                                            |      |
|----------------------------------------|------|------|------|-----|----------------|------------------------------------|-------|-------|--------|--------|--------|--------|--------------------------------------------|------|
| Bezeichnung<br>Designation<br>Articolo | l    | d°   | s    | r   | d <sub>i</sub> | beschichtet<br>coated<br>rivestito |       |       |        |        |        |        | unbeschichtet<br>uncoated<br>non rivestito |      |
|                                        |      |      |      |     |                | AK2015                             | AL350 | AM35C | AM4130 | AM5035 | AP2225 | AP2235 | AR26C                                      | AP40 |
| LPNT 040102EL                          | 4,0  | 4,5  | 1,80 | 0,2 | 2,10           |                                    | ●     | ●     |        |        |        |        | ●                                          |      |
| LPNT 040102ER                          | 4,0  | 4,5  | 1,80 | 0,2 | 2,10           |                                    | ●     | ●     |        |        |        |        | ●                                          |      |
| LPNT 040104EL                          | 4,0  | 4,5  | 1,80 | 0,4 | 2,10           |                                    | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          |      |
| LPNT 040104ER                          | 4,0  | 4,5  | 1,80 | 0,4 | 2,10           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 050202EN                          | 5,0  | 5,8  | 2,10 | 0,2 | 2,25           |                                    | ●     | ●     | ●      |        | ●      | ●      | ●                                          | ●    |
| LPNT 050204EN                          | 5,0  | 5,8  | 2,10 | 0,4 | 2,25           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 060202EN                          | 6,0  | 6,5  | 2,38 | 0,2 | 2,50           |                                    | ●     | ●     |        |        |        |        | ●                                          | ●    |
| LPNT 060204EN                          | 6,0  | 6,5  | 2,38 | 0,4 | 2,50           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 070304EN                          | 7,0  | 7,6  | 3,18 | 0,4 | 2,80           |                                    | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 080304EN                          | 8,0  | 8,5  | 3,18 | 0,4 | 3,40           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 09T304EN                          | 9,0  | 9,6  | 3,97 | 0,4 | 3,40           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 10T304EN                          | 10,0 | 10,6 | 3,97 | 0,4 | 4,40           | ●                                  | ●     | ●     | ●      | ●      | ●      | ●      | ●                                          | ●    |
| LPNT 10T308EN                          | 10,0 | 10,6 | 3,97 | 0,8 | 4,40           |                                    | ●     | ●     |        |        |        |        | ●                                          | ●    |

|                  |      |      |      |     |      |  |  |  |   |  |   |   |  |  |
|------------------|------|------|------|-----|------|--|--|--|---|--|---|---|--|--|
| LPNT 080304EN-WI | 8,0  | 8,5  | 3,18 | 0,4 | 3,40 |  |  |  | ● |  | ● | ● |  |  |
| LPNT 09T304EN-WI | 9,0  | 9,6  | 3,97 | 0,4 | 3,40 |  |  |  | ● |  | ● | ● |  |  |
| LPNT 10T304EN-WI | 10,0 | 10,6 | 3,97 | 0,4 | 4,40 |  |  |  | ● |  | ● | ● |  |  |

\* Rechter Halter → Rechte Wendeschneidplatte  
\* Right-hand holder → Right-hand indexable insert  
\* Utensile Destro → Inserto Destro

① Maß „d“ gemessen auf Höhe Maß „s“  
① Dimension „d“ measured to height „s“  
① Dimensione „d“ misurata ad altezza „s“

● Hauptanwendung  
Main application  
Applicazione principale  
○ Nebenanwendung  
Secondary application  
Applicazione secondaria

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
| P | ○ | ○ | ○ | ○ | ○ | ● | ● | ● |   | ● |
| M |   | ● | ● | ● | ● | ○ | ○ |   |   |   |
| K | ● |   |   |   |   |   | ● | ○ | ● |   |
| N |   |   |   |   |   |   |   |   |   |   |
| S |   | ○ | ○ | ● | ○ |   |   |   |   |   |
| H |   |   |   |   |   |   |   |   |   |   |

## SHARK-CUT® Standard

| Halter<br>Holder<br>Utensile | Schraube<br>Screw<br>Vite | PG 11 | Anzugsmoment<br>Torque<br>Momento di serraggio | Schlüssel<br>Key<br>Chiave | PG 11 |
|------------------------------|---------------------------|-------|------------------------------------------------|----------------------------|-------|
| SC08R/L- ..SP04-IP           | AS 0100                   | ●     | 0,6 Nm                                         | T 5106-IP                  | ●     |
| SC10R/L- ..SP05-IP           | AS 0101                   | ●     | 0,6 Nm                                         | T 5106-IP                  | ●     |
| SC12R/L- ..SP06-IP           | AS 0102                   | ●     | 1,0 Nm                                         | T 5107-IP                  | ●     |
| SC14R/L- ..SP07-IP           | AS 0103                   | ●     | 1,3 Nm                                         | T 5108-IP                  | ●     |
| SC16R/L- ..SP08-IP           | AS 0104                   | ●     | 2,2 Nm                                         | T 5109-IP                  | ●     |
| SC18R/L- ..SP09-IP           | AS 0104                   | ●     | 2,2 Nm                                         | T 5109-IP                  | ●     |
| SC20R/L- ..SP10-IP           | AS 0105                   | ●     | 3,4 Nm                                         | T 5115-IP                  | ●     |

| ISO                                           | Werkstoff                                 |                                                            | Zugfestigkeit<br>(N/mm²) | Schnittgeschwindigkeit V <sub>c</sub> (m/min) |           |            |           |           |           |           |           |           |           | unbeschichtet |   |
|-----------------------------------------------|-------------------------------------------|------------------------------------------------------------|--------------------------|-----------------------------------------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|---|
|                                               |                                           |                                                            |                          | beschichtet                                   |           |            |           |           |           |           |           |           |           |               |   |
|                                               |                                           |                                                            |                          | AK2015                                        | AL10      | AL350      | AM35C     | AM4130    | AM5035    | AP2225    | AP2235    | AR26C     | AK10      | AP40          |   |
| P                                             | Unlegierter Stahl und Stahlguss           | < 0,15 % C/vergütet                                        | 350                      | 120 - 220                                     | 200 - 300 | 120 - 230  | 140 - 250 | 120 - 250 | 120 - 230 | 150 - 300 | 140 - 280 | 150 - 280 | -         | 80 - 140      |   |
|                                               |                                           | 0,15 – 0,45 % C/vergütet                                   | 650                      | 100 - 160                                     | 170 - 280 | 80 - 160   | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 70 - 100      |   |
|                                               |                                           | > 0,45 % C/vergütet                                        | 1000                     | 80 - 130                                      | 150 - 250 | 50 - 130   | 70 - 150  | 50 - 130  | 50 - 130  | 70 - 160  | 50 - 150  | 100 - 170 | -         | 50 - 100      |   |
|                                               | Niedrig legierter Stahl und Stahlguss     | geglüht                                                    | 600                      | 100 - 160                                     | 170 - 270 | 80 - 160   | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 60 - 100      |   |
|                                               |                                           | vergütet                                                   | 900                      | 70 - 130                                      | 160 - 250 | 60 - 130   | 80 - 150  | 60 - 150  | 60 - 130  | 100 - 180 | 80 - 160  | 90 - 160  | -         | 50 - 90       |   |
|                                               |                                           |                                                            | 1200                     | 60 - 110                                      | 150 - 220 | 60 - 100   | 70 - 120  | 60 - 120  | 60 - 100  | 80 - 140  | 70 - 130  | 80 - 140  | -         | 50 - 80       |   |
|                                               | Hochlegierter Stahl                       | geglüht                                                    | 700                      | 90 - 140                                      | -         | 80 - 140   | 100 - 160 | 80 - 170  | 80 - 140  | 110 - 190 | 100 - 180 | 110 - 180 | -         | 60 - 80       |   |
|                                               | Hochlegierter Werkzeugstahl und Stahlguss | gehärtet und angelassen                                    | 1100                     | 60 - 110                                      | -         | 50 - 100   | 60 - 120  | 50 - 130  | 50 - 100  | 70 - 150  | 60 - 140  | 80 - 140  | -         | -             |   |
| Nichtrostender Stahl                          | ferritisch, geglüht                       | 700                                                        | -                        | 160 - 280                                     | 50 - 200  | 100 - 180  | 50 - 200  | 50 - 200  | 110 - 220 | 100 - 200 | -         | -         | -         |               |   |
| Stahlguss                                     | martensitisch, vergütet                   | 1000                                                       | -                        | 140 - 280                                     | 50 - 150  | 80 - 150   | 50 - 150  | 50 - 150  | 100 - 180 | 80 - 150  | -         | -         | -         |               |   |
| M                                             | Nichtrostender Stahl                      | austenitisch und austenitisch/<br>ferritisch, abgeschreckt | 450–600                  | -                                             | 140 - 280 | 50 - 190   | 100 - 190 | 50 - 180  | 50 - 190  | 100 - 200 | 100 - 180 | -         | -         | 50 - 150      |   |
|                                               |                                           | 600–900                                                    | -                        | -                                             | 50 - 100  | -          | 50 - 130  | 50 - 100  | -         | -         | -         | -         | 40 - 90   |               |   |
| K                                             | Grauguss                                  | perlitisch/ferritisch                                      | 500–700                  | 140 - 240                                     | 170 - 300 | -          | -         | 120 - 200 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -             |   |
|                                               |                                           | perlitisch/martensitisch                                   | 700–850                  | 140 - 240                                     | 150 - 270 | -          | -         | 100 - 180 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -             |   |
|                                               |                                           |                                                            | 800–1100                 | 120 - 190                                     | 120 - 240 | -          | -         | 80 - 230  | -         | 110 - 220 | 100 - 200 | 100 - 160 | 80 - 120  | -             |   |
|                                               | Gusseisen mit Kugelgraphit                | ferritisch                                                 | 550                      | 130 - 240                                     | 140 - 230 | -          | -         | 120 - 200 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -             |   |
|                                               |                                           | perlitisch                                                 | 800                      | 130 - 240                                     | 120 - 170 | -          | -         | 100 - 180 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -             |   |
|                                               | Temperguss                                | ferritisch                                                 | 450                      | 120 - 240                                     | 150 - 200 | -          | -         | 90 - 160  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -             |   |
|                                               |                                           | perlitisch                                                 | 750                      | 120 - 240                                     | 140 - 200 | -          | -         | 70 - 150  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -             |   |
|                                               | N                                         | Aluminium-Knetlegierungen                                  | nicht aushärtbar         | 200                                           | -         | 800 - 1300 | -         | -         | 80 - 2000 | -         | -         | -         | -         | 100 - 500     | - |
| aushärtbar, ausgehärtet                       |                                           |                                                            | 350                      | -                                             | 400 - 900 | -          | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 300 | -             |   |
| Aluminium-Gusslegierungen                     |                                           | ≤ 12 % Si, ausgehärtet                                     | 250                      | -                                             | 250 - 800 | -          | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 500 | -             |   |
|                                               |                                           | ≤ 12 % Si, aushärtbar, ausgehärtet                         | 300                      | -                                             | 200 - 550 | -          | -         | 80 - 1300 | -         | -         | -         | -         | 100 - 300 | -             |   |
|                                               |                                           | ≤ 12 % Si, nicht aushärtbar                                | 450                      | -                                             | 200 - 550 | -          | -         | 80 - 600  | -         | -         | -         | -         | 100 - 300 | -             |   |
| Kupfer und Kupferlegierungen (Bronze/Messing) |                                           | Automatenlegierung, Pb > 1 %                               | 400                      | -                                             | -         | -          | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500 | -             |   |
|                                               |                                           | Messing, Rotguss                                           | 300                      | -                                             | -         | -          | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500 | -             |   |
|                                               |                                           | Aluminiumbronze                                            | 500                      | -                                             | -         | -          | -         | 80 - 300  | -         | -         | -         | -         | 100 - 300 | -             |   |
|                                               |                                           | Kupfer und Elektrolytkupfer                                | 200                      | -                                             | -         | -          | -         | 80 - 200  | -         | -         | -         | -         | 100 - 300 | -             |   |
| Nichtmetallische Werkstoffe                   |                                           | Duroplaste                                                 | -                        | -                                             | -         | -          | -         | 60 - 160  | -         | -         | -         | -         | 80 - 180  | -             |   |
|                                               |                                           | Faserverstärkte Kunststoffe                                | -                        | -                                             | -         | -          | -         | 50 - 140  | -         | -         | -         | -         | 60 - 150  | -             |   |
|                                               | Hartgummi                                 | -                                                          | -                        | -                                             | -         | -          | 80 - 200  | -         | -         | -         | -         | 100 - 250 | -         |               |   |
| S                                             | Warmfeste Legierungen                     | Fe-Basis, geglüht                                          | 700                      | -                                             | 20 - 50   | 20 - 50    | -         | 20 - 90   | 20 - 50   | -         | 20 - 50   | -         | -         | -             |   |
|                                               |                                           | Fe-Basis, ausgehärtet                                      | 950                      | -                                             | 20 - 50   | 20 - 40    | -         | 20 - 90   | 20 - 40   | -         | 20 - 40   | -         | -         | -             |   |
|                                               |                                           | Ni- oder Co-Basis, geglüht                                 | 800                      | -                                             | 15 - 40   | 15 - 25    | -         | 20 - 90   | 15 - 25   | -         | 15 - 20   | -         | -         | -             |   |
|                                               |                                           | Ni- oder Co-Basis, gegossen                                | 1100                     | -                                             | 15 - 30   | -          | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -             |   |
|                                               |                                           | Ni- oder Co-Basis, ausgehärtet                             | 1200                     | -                                             | 15 - 30   | -          | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -             |   |
|                                               | Titanlegierungen                          | Rein-Titan                                                 | 500–700                  | -                                             | -         | 50 - 120   | -         | 40 - 100  | 50 - 120  | -         | 50 - 120  | -         | 50 - 120  | -             |   |
| Alpha+Beta-Legierungen                        | ausgehärtet                               | 700–1000                                                   | -                        | -                                             | 30 - 50   | -          | 30 - 90   | 30 - 50   | -         | 30 - 50   | -         | 30 - 50   | -         |               |   |
| H                                             | Gehärteter Stahl                          | gehärtet und angelassen                                    | 55 HRC                   | -                                             | -         | -          | -         | -         | -         | -         | -         | -         | -         | -             |   |
|                                               |                                           | 60 HRC                                                     | -                        | -                                             | -         | -          | -         | -         | -         | -         | -         | -         | -         | -             |   |
|                                               | Hartguss                                  | gegossen                                                   | 41 HRC                   | -                                             | -         | -          | -         | -         | -         | -         | -         | -         | -         | -             |   |
|                                               | Gehärtetes Gusseisen                      | gehärtet und angelassen                                    | 55 HRC                   | -                                             | -         | -          | -         | -         | -         | -         | -         | -         | -         | -             |   |

Die Tabellenwerte sind Richtwerte.

Es kann notwendig sein, die Werte den jeweiligen Bearbeitungsumständen anzupassen.

| ISO                    | Material                                   |                                                 | Tensile strength<br>(N/mm2) | Cutting speed V <sub>c</sub> (m/min) |            |           |           |           |           |           |           |           |           | uncoated |  |
|------------------------|--------------------------------------------|-------------------------------------------------|-----------------------------|--------------------------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|--|
|                        |                                            |                                                 |                             | coated                               |            |           |           |           |           |           |           |           |           |          |  |
|                        |                                            |                                                 |                             | AK2015                               | AL10       | AL350     | AM35C     | AM4130    | AM5035    | AP2225    | AP2235    | AR26C     | AK10      | AP40     |  |
| P                      | Unalloyed steel and cast steel             | < 0.15 % C/hardened and tempered                | 350                         | 120 - 220                            | 200 - 300  | 120 - 230 | 140 - 250 | 120 - 250 | 120 - 230 | 150 - 300 | 140 - 280 | 150 - 280 | -         | 80 - 140 |  |
|                        |                                            | 0.15 - 0.45% C/hardened and tempered            | 650                         | 100 - 160                            | 170 - 280  | 80 - 160  | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 70 - 100 |  |
|                        |                                            | > 0.45 % C/hardened and tempered                | 1000                        | 80 - 130                             | 150 - 250  | 50 - 130  | 70 - 150  | 50 - 130  | 70 - 160  | 50 - 150  | 100 - 170 | -         | 50 - 100  |          |  |
|                        | Low alloyed steel and cast steel           | annealed                                        | 600                         | 100 - 160                            | 170 - 270  | 80 - 160  | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 60 - 100 |  |
|                        |                                            | hardened and tempered                           | 900                         | 70 - 130                             | 160 - 250  | 60 - 130  | 80 - 150  | 60 - 150  | 60 - 130  | 100 - 180 | 80 - 160  | 90 - 160  | -         | 50 - 90  |  |
|                        |                                            |                                                 | 1200                        | 60 - 110                             | 150 - 220  | 60 - 100  | 70 - 120  | 60 - 120  | 60 - 100  | 80 - 140  | 70 - 130  | 80 - 140  | -         | 50 - 80  |  |
|                        | High alloyed steel                         | annealed                                        | 700                         | 90 - 140                             | -          | 80 - 140  | 100 - 160 | 80 - 170  | 80 - 140  | 110 - 190 | 100 - 180 | 110 - 180 | -         | 60 - 80  |  |
|                        | High alloyed tool steel and cast steel     | hardened                                        | 1100                        | 60 - 110                             | -          | 50 - 100  | 60 - 120  | 50 - 130  | 50 - 100  | 70 - 150  | 60 - 140  | 80 - 140  | -         | -        |  |
|                        | Stainless steel                            | ferritic, annealed                              | 700                         | -                                    | 160 - 280  | 50 - 200  | 100 - 180 | 50 - 200  | 50 - 200  | 110 - 220 | 100 - 200 | -         | -         | -        |  |
| Cast steel             | martensitic, hardened and tempered         | 1000                                            | -                           | 140 - 280                            | 50 - 150   | 80 - 150  | 50 - 150  | 50 - 150  | 100 - 180 | 80 - 150  | -         | -         | -         |          |  |
| M                      | Stainless steel                            | austenitic and austenitic/<br>ferritic, chilled | 450 - 600                   | -                                    | 140 - 280  | 50 - 190  | 100 - 190 | 50 - 180  | 50 - 190  | 100 - 200 | 100 - 180 | -         | -         | 50 - 150 |  |
|                        |                                            |                                                 | 600 - 900                   | -                                    | -          | 50 - 100  | -         | 50 - 130  | 50 - 100  | -         | -         | -         | -         | 40 - 90  |  |
| K                      | Cast iron                                  | pearlitic/ferritic                              | 500 - 700                   | 140 - 240                            | 170 - 300  | -         | -         | 120 - 200 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -        |  |
|                        |                                            | pearlitic/martensitic                           | 700 - 850                   | 140 - 240                            | 150 - 270  | -         | -         | 100 - 180 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -        |  |
|                        |                                            |                                                 | 800 - 1100                  | 120 - 190                            | 120 - 240  | -         | -         | 80 - 230  | -         | 110 - 220 | 100 - 200 | 100 - 160 | 80 - 120  | -        |  |
|                        | Cast iron with nodular graphite            | ferritic                                        | 550                         | 130 - 240                            | 140 - 230  | -         | -         | 120 - 200 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -        |  |
|                        |                                            | pearlitic                                       | 800                         | 130 - 240                            | 120 - 170  | -         | -         | 100 - 180 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -        |  |
|                        | Malleable cast iron                        | ferritic                                        | 450                         | 120 - 240                            | 150 - 200  | -         | -         | 90 - 160  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -        |  |
|                        |                                            | pearlitic                                       | 750                         | 120 - 240                            | 140 - 200  | -         | -         | 70 - 150  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -        |  |
| N                      | Aluminium alloys long chipping             | not heat treatable                              | 200                         | -                                    | 800 - 1300 | -         | -         | 80 - 2000 | -         | -         | -         | -         | 100 - 500 | -        |  |
|                        |                                            | heat treatable, heat treated                    | 350                         | -                                    | 400 - 900  | -         | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 300 | -        |  |
|                        | Casted aluminium alloys                    | ≤ 12 % Si, heat treated                         | 250                         | -                                    | 250 - 800  | -         | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 500 | -        |  |
|                        |                                            | ≤ 12 % Si, heat treatable, heat treated         | 300                         | -                                    | 200 - 550  | -         | -         | 80 - 1300 | -         | -         | -         | -         | 100 - 300 | -        |  |
|                        |                                            | ≤ 12 % Si, not heat treatable                   | 450                         | -                                    | 200 - 550  | -         | -         | 80 - 600  | -         | -         | -         | -         | 100 - 300 | -        |  |
|                        | Copper and copper alloys<br>(Brass/Bronze) | Lead alloys, Pb > 1 %                           | 400                         | -                                    | -          | -         | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500 | -        |  |
|                        |                                            | Brass, Bronze                                   | 300                         | -                                    | -          | -         | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500 | -        |  |
|                        |                                            | Aluminium bronze                                | 500                         | -                                    | -          | -         | -         | 80 - 300  | -         | -         | -         | -         | 100 - 300 | -        |  |
|                        |                                            | Copper and elektrolyte copper                   | 200                         | -                                    | -          | -         | -         | 80 - 200  | -         | -         | -         | -         | 100 - 300 | -        |  |
|                        | Non-ferrous materials                      | Duroplastic                                     | -                           | -                                    | -          | -         | -         | 60 - 160  | -         | -         | -         | -         | 80 - 180  | -        |  |
|                        |                                            | Re-inforced plastics                            | -                           | -                                    | -          | -         | -         | 50 - 140  | -         | -         | -         | -         | 60 - 150  | -        |  |
|                        |                                            | Hard rubber                                     | -                           | -                                    | -          | -         | -         | 80 - 200  | -         | -         | -         | -         | 100 - 250 | -        |  |
| S                      | High temperature resistant alloys          | Fe-alloyed, annealed                            | 700                         | -                                    | 20 - 50    | 20 - 50   | -         | 20 - 90   | 20 - 50   | -         | 20 - 50   | -         | -         | -        |  |
|                        |                                            | Fe-alloyed, heat treated                        | 950                         | -                                    | 20 - 50    | 20 - 40   | -         | 20 - 90   | 20 - 40   | -         | 20 - 40   | -         | -         | -        |  |
|                        |                                            | Ni- or Co-alloyed, annealed                     | 800                         | -                                    | 15 - 40    | 15 - 25   | -         | 20 - 90   | 15 - 25   | -         | 15 - 20   | -         | -         | -        |  |
|                        |                                            | Ni- or Co-alloyed, casting                      | 1100                        | -                                    | 15 - 30    | -         | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -        |  |
|                        |                                            | Ni- or Co-alloyed, heat treated                 | 1200                        | -                                    | 15 - 30    | -         | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -        |  |
|                        | Titanium alloys                            | Pure titan                                      | 500 - 700                   | -                                    | -          | 50 - 120  | -         | 40 - 100  | 50 - 120  | -         | 50 - 120  | -         | 50 - 120  | -        |  |
| Alpha- and Beta-alloys | heat treated                               | 700 - 1000                                      | -                           | -                                    | 30 - 50    | -         | 30 - 90   | 30 - 50   | -         | 30 - 50   | -         | 30 - 50   | -         |          |  |
| H                      | Hardened steel                             | hardened                                        | 55 HRC                      | -                                    | -          | -         | -         | -         | -         | -         | -         | -         | -         |          |  |
|                        |                                            |                                                 | 60 HRC                      | -                                    | -          | -         | -         | -         | -         | -         | -         | -         | -         |          |  |
|                        | Hard cast iron                             | casting                                         | 41 HRC                      | -                                    | -          | -         | -         | -         | -         | -         | -         | -         | -         |          |  |
|                        | Hardened cast iron                         | hardened                                        | 55 HRC                      | -                                    | -          | -         | -         | -         | -         | -         | -         | -         | -         |          |  |

The recommended cutting data are only approximate values.  
It may be necessary to adjust them to each individual machining application.



| ISO                  | Materiale                                  |                                       | Resistenza<br>(N/mm²) | Velocità di taglio V <sub>c</sub> (m/min) |            |           |           |           |           |           |           |           |           | non<br>rivestito |   |
|----------------------|--------------------------------------------|---------------------------------------|-----------------------|-------------------------------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------|---|
|                      |                                            |                                       |                       | rivestito                                 |            |           |           |           |           |           |           |           |           |                  |   |
| P                    | Acciai non legati                          | < 0,15 % C/ bonificato                | 350                   | 120 - 220                                 | 200 - 300  | 120 - 230 | 140 - 250 | 120 - 250 | 120 - 230 | 150 - 300 | 140 - 280 | 150 - 280 | -         | 80 - 140         |   |
|                      |                                            | 0,15 – 0,45 % C/ bonificato           | 650                   | 100 - 160                                 | 170 - 280  | 80 - 160  | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 70 - 100         |   |
|                      |                                            | > 0,45 % C/ bonificato                | 1000                  | 80 - 130                                  | 150 - 250  | 50 - 130  | 70 - 150  | 50 - 130  | 50 - 130  | 70 - 160  | 50 - 150  | 100 - 170 | -         | 50 - 100         |   |
|                      | Acciai debolmente legati e Ghise acciaiOSE | ricotto                               | 600                   | 100 - 160                                 | 170 - 270  | 80 - 160  | 100 - 180 | 80 - 180  | 80 - 160  | 120 - 220 | 100 - 200 | 120 - 200 | -         | 60 - 100         |   |
|                      |                                            | bonificato                            | 900                   | 70 - 130                                  | 160 - 250  | 60 - 130  | 80 - 150  | 60 - 150  | 60 - 130  | 100 - 180 | 80 - 160  | 90 - 160  | -         | 50 - 90          |   |
|                      |                                            |                                       | 1200                  | 60 - 110                                  | 150 - 220  | 60 - 100  | 70 - 120  | 60 - 120  | 60 - 100  | 80 - 140  | 70 - 130  | 80 - 140  | -         | 50 - 80          |   |
|                      | Acciai fortemente legati                   | ricotto                               | 700                   | 90 - 140                                  | -          | 80 - 140  | 100 - 160 | 80 - 170  | 80 - 140  | 110 - 190 | 100 - 180 | 110 - 180 | -         | 60 - 80          |   |
|                      | Acciai da utensili e fusioni               | temprato e rinvenuto                  | 1100                  | 60 - 110                                  | -          | 50 - 100  | 60 - 120  | 50 - 130  | 50 - 100  | 70 - 150  | 60 - 140  | 80 - 140  | -         | -                |   |
|                      | Acciai inossidabili                        | ferritico, ricotto                    | 700                   | -                                         | 160 - 280  | 50 - 200  | 100 - 180 | 50 - 200  | 50 - 200  | 110 - 220 | 100 - 200 | -         | -         | -                |   |
| Ghisa acciaiOSA      | martensitico, bonificato                   | 1000                                  | -                     | 140 - 280                                 | 50 - 150   | 80 - 150  | 50 - 150  | 50 - 150  | 100 - 180 | 80 - 150  | -         | -         | -         |                  |   |
| M                    | Acciai inossidabili                        | austenitico e autenitico/             | 450 – 600             | -                                         | 140 - 280  | 50 - 190  | 100 - 190 | 50 - 180  | 50 - 190  | 100 - 200 | 100 - 180 | -         | -         | 50 - 150         |   |
|                      |                                            | ferritico, trattato o temperato       | 600 – 900             | -                                         | -          | 50 - 100  | -         | 50 - 130  | 50 - 100  | -         | -         | -         | -         | 40 - 90          |   |
| K                    | Ghisa grigia                               | perlitica/ ferritico                  | 500 – 700             | 140 - 240                                 | 170 - 300  | -         | -         | 120 - 200 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -                |   |
|                      |                                            | perlitica/ martensitico               | 700 – 850             | 140 - 240                                 | 150 - 270  | -         | -         | 100 - 180 | -         | 130 - 280 | 120 - 250 | 120 - 200 | 100 - 150 | -                |   |
|                      |                                            |                                       | 800 – 1100            | 120 - 190                                 | 120 - 240  | -         | -         | 80 - 230  | -         | 110 - 220 | 100 - 200 | 100 - 160 | 80 - 120  | -                |   |
|                      | Ghisa sferoidale                           | ferritico                             | 550                   | 130 - 240                                 | 140 - 230  | -         | -         | 120 - 200 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -                |   |
|                      |                                            | perlitica                             | 800                   | 130 - 240                                 | 120 - 170  | -         | -         | 100 - 180 | -         | 120 - 280 | 110 - 250 | 110 - 200 | 100 - 140 | -                |   |
|                      | Ghisa temprata                             | ferritico                             | 450                   | 120 - 240                                 | 150 - 200  | -         | -         | 90 - 160  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -                |   |
| perlitica            |                                            | 750                                   | 120 - 240             | 140 - 200                                 | -          | -         | 70 - 150  | -         | 110 - 280 | 100 - 250 | 100 - 200 | 100 - 160 | -         |                  |   |
| N                    | Leghe di Alluminio stampato                | non invecchiato                       | 200                   | -                                         | 800 - 1300 | -         | -         | 80 - 2000 | -         | -         | -         | -         | 100 - 500 | -                |   |
|                      |                                            | invecchiato                           | 350                   | -                                         | 400 - 900  | -         | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 300 | -                |   |
|                      | Leghe di Alluminio da fusione              | ≤ 12 % Si, invecchiato                | 250                   | -                                         | 250 - 800  | -         | -         | 80 - 1500 | -         | -         | -         | -         | 100 - 500 | -                |   |
|                      |                                            | ≤ 12 % Si, rinvenuto, invecchiato     | 300                   | -                                         | 200 - 550  | -         | -         | 80 - 1300 | -         | -         | -         | -         | 100 - 300 | -                |   |
|                      |                                            | ≤ 12 % Si, non invecchiato            | 450                   | -                                         | 200 - 550  | -         | -         | 80 - 600  | -         | -         | -         | -         | 100 - 300 | -                |   |
|                      |                                            | Rame e Leghe di Rame (Bronzo/ Ottone) | Automatici, Pb > 1 %  | 400                                       | -          | -         | -         | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500        | - |
|                      | Ottone, Bronzo                             |                                       | 300                   | -                                         | -          | -         | -         | 80 - 400  | -         | -         | -         | -         | 100 - 500 | -                |   |
|                      | Bronzoalluminio                            |                                       | 500                   | -                                         | -          | -         | -         | 80 - 300  | -         | -         | -         | -         | 100 - 300 | -                |   |
|                      | Rame e Rame Elettrolitico                  |                                       | 200                   | -                                         | -          | -         | -         | 80 - 200  | -         | -         | -         | -         | 100 - 300 | -                |   |
|                      | Materiali non metallici                    | Duroplastiche                         | -                     | -                                         | -          | -         | -         | 60 - 160  | -         | -         | -         | -         | 80 - 180  | -                |   |
| Plastiche rinforzate |                                            | -                                     | -                     | -                                         | -          | -         | 50 - 140  | -         | -         | -         | -         | 60 - 150  | -         |                  |   |
| Gomme dure           |                                            | -                                     | -                     | -                                         | -          | -         | 80 - 200  | -         | -         | -         | -         | 100 - 250 | -         |                  |   |
| S                    | Leghe resistenti al calore                 | Base-Fe, ricotto                      | 700                   | -                                         | 20 - 50    | 20 - 50   | -         | 20 - 90   | 20 - 50   | -         | 20 - 50   | -         | -         | -                |   |
|                      |                                            | Base-Fe, invecchiato                  | 950                   | -                                         | 20 - 50    | 20 - 40   | -         | 20 - 90   | 20 - 40   | -         | 20 - 40   | -         | -         | -                |   |
|                      |                                            | Base Ni o Co, ricotto                 | 800                   | -                                         | 15 - 40    | 15 - 25   | -         | 20 - 90   | 15 - 25   | -         | 15 - 20   | -         | -         | -                |   |
|                      |                                            | Base Ni o Co, da fusione              | 1100                  | -                                         | 15 - 30    | -         | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -                |   |
|                      |                                            | Base Ni o Co, invecchiato             | 1200                  | -                                         | 15 - 30    | -         | -         | 20 - 90   | 10 - 20   | -         | 10 - 20   | -         | -         | -                |   |
|                      | Leghe di Titanio                           | Titanio puro                          | 500 – 700             | -                                         | -          | 50 - 120  | -         | 40 - 100  | 50 - 120  | -         | 50 - 120  | -         | 50 - 120  | -                |   |
|                      | Leghe Alpha+Beta                           | invecchiato                           | 700 – 1000            | -                                         | -          | 30 - 50   | -         | 30 - 90   | 30 - 50   | -         | 30 - 50   | -         | 30 - 50   | -                |   |
| H                    | Acciaio Temprato                           | temprato e rinvenuto                  | 55 HRC                | -                                         | -          | -         | -         | -         | -         | -         | -         | -         | -         |                  |   |
|                      |                                            | 60 HRC                                | -                     | -                                         | -          | -         | -         | -         | -         | -         | -         | -         | -         |                  |   |
|                      | Getti Temprati                             | da fusione                            | 41 HRC                | -                                         | -          | -         | -         | -         | -         | -         | -         | -         | -         |                  |   |
|                      | Ghisa Temprata                             | temprato e rinvenuto                  | 55 HRC                | -                                         | -          | -         | -         | -         | -         | -         | -         | -         | -         | -                |   |

I dati indicati in tabella sono valori approssimati.  
Può essere necessario adattarli alle singole applicazioni di lavorazione.

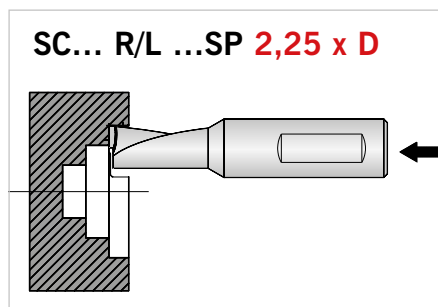
| ISO                                                                                                                                                                                                                                                                                        | Hartmetall beschichtet<br>Carbide coated<br>Metallo duro rivestito | Hartmetall unbeschichtet<br>Carbide uncoated<br>Metallo duro non rivestito | Schneidstoff<br>Cutting material<br>Materiale da taglio                                                                                                                                                      | Anwendung<br>Application<br>Parametri                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>P</b><br><b>Stahl, Stahlguss, langspanender Temperguss</b><br><i>Steel, cast steel, long chipping malleable iron</i><br>Acciaio, acciaio colato, ghisa temprata a truciolo lungo                                                                                                        | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
| <b>M</b><br><b>Rostfreier Stahl, Stahlguss, Manganstahl, Automatenstahl</b><br><i>Stainless steel, cast steel, manganese steel, free cutting steel</i><br>Acciaio inossidabile, acciaio colato, acciaio al manganese, ghisa legata, ghisa temprata, acciaio automatico, leghe refrattarie  | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
| <b>K</b><br><b>Grauguss, Kokillenhartguss, kurzspanender Temperguss</b><br><i>Grey cast iron, chilled hard cast iron, short chipping malleable iron</i><br>Ghisa grigia, ghisa fusa in conchiglia, ghisa temprata a truciolo corto, acciaio temprato, metalli non ferrosi, plastica, legno | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
| <b>N</b><br><b>Aluminium und Al-Legierungen, nichtmetallische Werkstoffe</b><br><i>Aluminium and Al-alloys, non ferrous materials</i><br>Alluminio e leghe di alluminio, materiali non metallici                                                                                           | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
| <b>S</b><br><b>Warmfeste Legierungen, Titanlegierungen</b><br><i>High temperature resistant alloys, Titanium alloys</i><br>Leghe refrattarie, leghe di titanio                                                                                                                             | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |
| <b>H</b><br><b>Gehärteter Stahl, Hartguss</b><br><i>Hardened Steel, hard cast iron</i><br>Acciaio temprato, ghisa conchigliata                                                                                                                                                             | 10<br>20<br>30<br>40<br>50                                         | 10<br>20<br>30<br>40<br>50                                                 | Zähigkeit<br>Toughness / Tenacità<br>Verschleißbeständigkeit / Wear resistance / Resistenza all'usura<br>Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio | Vorschub<br>Feed rate / Avanzamento<br>Schnittgeschwindigkeit<br>Cutting speed / Velocità di taglio |

Hauptanwendungsbereich / Main application area / Applicazione principale

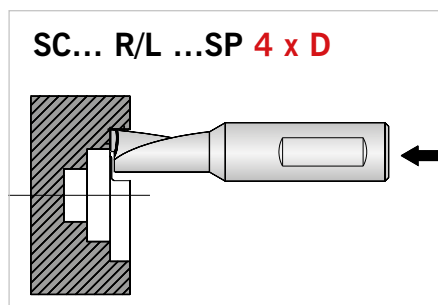
Nebenanwendungsbereich / Secondary application area / Applicazione secondaria

AM35C — Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich /  
 Recommended application area /  
 Applicazione consigliata

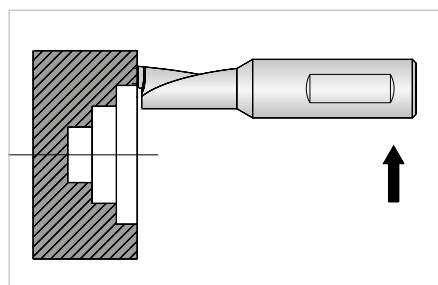
AR26C — Sorte / Grade / Qualità  
 Empfohlener Anwendungsbereich /  
 Recommended application area /  
 Applicazione consigliata

**Längsdrehen / Turning / Tornitura**


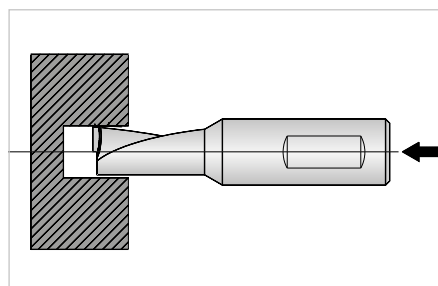
| SHARK-CUT®-Ø (mm)                                       | Spantiefe ap (mm) / Depth of cut / Profondità di passata |      |      |      |      |      |      |      |
|---------------------------------------------------------|----------------------------------------------------------|------|------|------|------|------|------|------|
|                                                         | 0,5                                                      | 1    | 1,5  | 2    | 2,5  | 3    | 3,5  | 4    |
| Vorschub f (mm/U) / Feed rate / Velocità di avanzamento |                                                          |      |      |      |      |      |      |      |
| SC04                                                    | 0,10                                                     | 0,10 | 0,08 | 0,05 | –    | –    | –    | –    |
| SC05                                                    | 0,10                                                     | 0,10 | 0,09 | 0,06 | 0,04 | –    | –    | –    |
| SC06                                                    | 0,10                                                     | 0,10 | 0,10 | 0,08 | 0,06 | 0,04 | –    | –    |
| SC07                                                    | 0,10                                                     | 0,10 | 0,10 | 0,10 | 0,08 | 0,06 | 0,04 | –    |
| SC08                                                    | 0,10                                                     | 0,10 | 0,10 | 0,10 | 0,10 | 0,08 | 0,06 | 0,04 |

**Längsdrehen / Turning / Tornitura**


| SHARK-CUT®-Ø (mm)                                       | Spantiefe ap (mm) / Depth of cut / Profondità di passata |      |       |       |       |       |
|---------------------------------------------------------|----------------------------------------------------------|------|-------|-------|-------|-------|
|                                                         | 0,5                                                      | 1    | 1,5   | 2     | 2,5   | 3     |
| Vorschub f (mm/U) / Feed rate / Velocità di avanzamento |                                                          |      |       |       |       |       |
| SC04                                                    | 0,10                                                     | 0,08 | 0,050 | –     | –     | –     |
| SC05                                                    | 0,10                                                     | 0,09 | 0,060 | 0,040 | –     | –     |
| SC06                                                    | 0,10                                                     | 0,09 | 0,060 | 0,040 | –     | –     |
| SC07                                                    | 0,10                                                     | 0,10 | 0,080 | 0,060 | 0,040 | –     |
| SC08                                                    | 0,10                                                     | 0,10 | 0,085 | 0,075 | 0,055 | 0,040 |

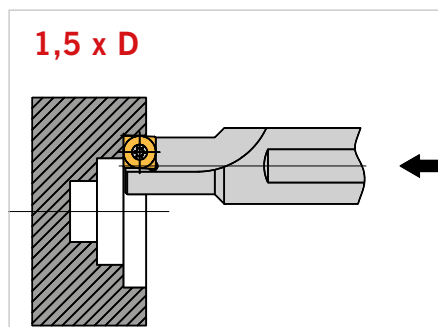
**Plandrehen / Facing / Sfacciatura**


| SHARK-CUT®-Ø (mm) | SC...R/L...SP (2,25 x D) |          | SC...R/L...SP-ALU (4 x D) |          |
|-------------------|--------------------------|----------|---------------------------|----------|
|                   | ap (mm)                  | f (mm/U) | ap (mm)                   | f (mm/U) |
| SC04              | 0,7                      | 0,07     | 0,7                       | 0,05     |
| SC05              | 0,7                      | 0,07     | 0,7                       | 0,05     |
| SC06              | 0,7                      | 0,07     | 0,7                       | 0,05     |
| SC07              | 1,0                      | 0,08     | 1,0                       | 0,06     |
| SC08              | 1,0                      | 0,08     | 1,0                       | 0,06     |

**Bohren / Drilling / Foratura**


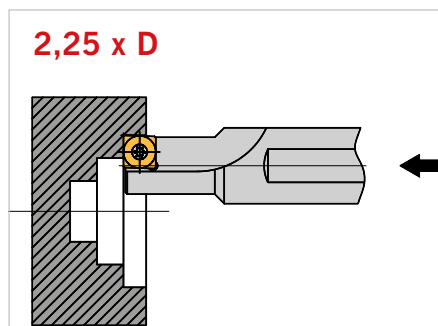
| SHARK-CUT®-Ø (mm) | SC...R/L...SP (2,25 x D) | SC...R/L...SP-ALU (4 x D) |
|-------------------|--------------------------|---------------------------|
|                   | f (mm/U)                 | f (mm/U)                  |
| SC04              | 0,005 - 0,030            | 0,005 - 0,020             |
| SC05              | 0,005 - 0,030            | 0,005 - 0,020             |
| SC06              | 0,005 - 0,030            | 0,005 - 0,020             |
| SC07              | 0,005 - 0,035            | 0,005 - 0,025             |
| SC08              | 0,005 - 0,040            | 0,005 - 0,030             |

## Längsdrehen / Turning / Tornitura



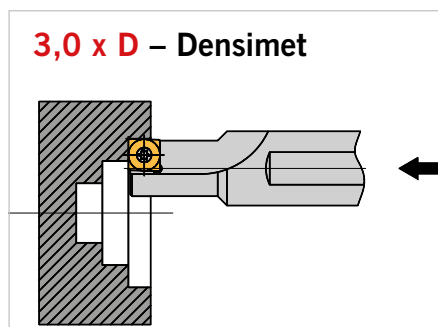
| SHARK-CUT®-Ø (mm)                                       | Spantiefe ap (mm) / Depth of cut / Profondità di passata |      |      |      |      |      |      |      |      |      |    |    |
|---------------------------------------------------------|----------------------------------------------------------|------|------|------|------|------|------|------|------|------|----|----|
|                                                         | 1                                                        | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 12 | 14 |
| Vorschub f (mm/U) / Feed rate / Velocità di avanzamento |                                                          |      |      |      |      |      |      |      |      |      |    |    |
| SC08...(LP...04)                                        | 0,12                                                     | 0,11 | 0,10 | 0,07 | –    | –    | –    | –    | –    | –    | –  | –  |
| SC10...(LP...05)                                        | 0,15                                                     | 0,15 | 0,12 | 0,10 | 0,09 | –    | –    | –    | –    | –    | –  | –  |
| SC12...(LP...06)                                        | 0,16                                                     | 0,16 | 0,15 | 0,13 | 0,12 | 0,10 | –    | –    | –    | –    | –  | –  |
| SC14...(LP...07)                                        | 0,18                                                     | 0,18 | 0,18 | 0,15 | 0,13 | 0,11 | –    | –    | –    | –    | –  | –  |
| SC16...(LP...08)                                        | 0,20                                                     | 0,20 | 0,20 | 0,19 | 0,17 | 0,15 | 0,14 | 0,12 | –    | –    | –  | –  |
| SC18...(LP...09)                                        | 0,21                                                     | 0,21 | 0,21 | 0,21 | 0,19 | 0,17 | 0,16 | 0,14 | –    | –    | –  | –  |
| SC20...(LP...10)                                        | 0,22                                                     | 0,22 | 0,22 | 0,22 | 0,22 | 0,21 | 0,19 | 0,17 | 0,16 | 0,15 | –  | –  |

## Längsdrehen / Turning / Tornitura



| SHARK-CUT®-Ø (mm)                                       | Spantiefe ap (mm) / Depth of cut / Profondità di passata |      |      |      |      |      |      |   |
|---------------------------------------------------------|----------------------------------------------------------|------|------|------|------|------|------|---|
|                                                         | 1                                                        | 2    | 2,5  | 3    | 3,5  | 4    | 5    | 6 |
| Vorschub f (mm/U) / Feed rate / Velocità di avanzamento |                                                          |      |      |      |      |      |      |   |
| SC08...(LP...04)                                        | 0,12                                                     | 0,09 | 0,07 | –    | –    | –    | –    | – |
| SC10...(LP...05)                                        | 0,15                                                     | 0,12 | 0,10 | 0,09 | –    | –    | –    | – |
| SC12...(LP...06)                                        | 0,16                                                     | 0,16 | 0,13 | 0,12 | 0,10 | –    | –    | – |
| SC14...(LP...07)                                        | 0,18                                                     | 0,18 | 0,16 | 0,14 | 0,11 | –    | –    | – |
| SC16...(LP...08)                                        | 0,20                                                     | 0,20 | 0,18 | 0,16 | 0,14 | 0,12 | –    | – |
| SC18...(LP...09)                                        | 0,21                                                     | 0,21 | 0,20 | 0,18 | 0,16 | 0,14 | –    | – |
| SC20...(LP...10)                                        | 0,22                                                     | 0,22 | 0,22 | 0,21 | 0,19 | 0,17 | 0,12 | – |

## Längsdrehen / Turning / Tornitura



| SHARK-CUT®-Ø (mm)                                       | Spantiefe ap (mm) / Depth of cut / Profondità di passata |      |      |      |      |      |      |   |
|---------------------------------------------------------|----------------------------------------------------------|------|------|------|------|------|------|---|
|                                                         | 1                                                        | 2    | 2,5  | 3    | 3,5  | 4    | 5    | 6 |
| Vorschub f (mm/U) / Feed rate / Velocità di avanzamento |                                                          |      |      |      |      |      |      |   |
| SC08...(LP...04)                                        | 0,12                                                     | 0,09 | 0,07 | –    | –    | –    | –    | – |
| SC10...(LP...05)                                        | 0,13                                                     | 0,11 | 0,09 | 0,07 | –    | –    | –    | – |
| SC12...(LP...06)                                        | 0,15                                                     | 0,13 | 0,12 | 0,11 | 0,10 | –    | –    | – |
| SC14...(LP...07)                                        | 0,16                                                     | 0,16 | 0,15 | 0,13 | 0,11 | –    | –    | – |
| SC16...(LP...08)                                        | 0,18                                                     | 0,18 | 0,17 | 0,15 | 0,13 | 0,12 | –    | – |
| SC18...(LP...09)                                        | 0,20                                                     | 0,20 | 0,18 | 0,17 | 0,15 | 0,14 | –    | – |
| SC20...(LP...10)                                        | 0,22                                                     | 0,22 | 0,22 | 0,21 | 0,19 | 0,16 | 0,14 | – |

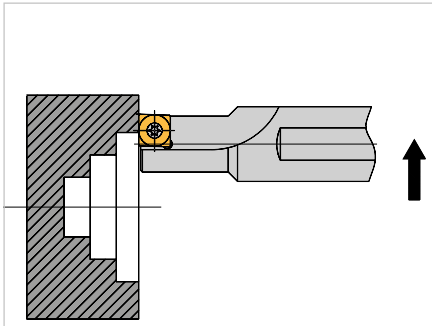
## Längsdrehen / Turning / Tornitura

| Werkstoff<br>Material<br>Materiale | Elastizitätsmodul (kg/mm²)<br>Modulus of elasticity<br>Modulo di elasticità | Dichte (g/cm³)<br>Thickness<br>Peso specifico |
|------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------|
| Densimet                           | 360                                                                         | 17,50                                         |
| Stahl / Steel / Acciaio            | 210                                                                         | 7,85                                          |

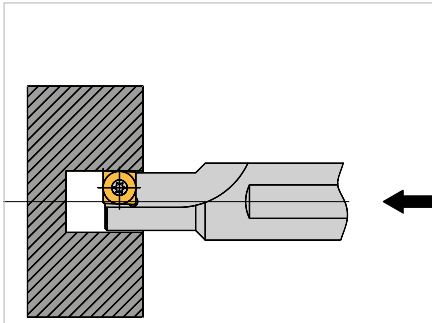
Höchste Präzision bei hervorragender Oberflächengüte und gesteigerten Standzeiten werden durch hohes Elastizitätsmodul und hohe Dichte erreicht, da diese besonders schwingungsdämpfend wirken.

Absolute precision, excellent surface quality and improved tool life have been achieved as a result of the high modulus of elasticity and density since these particularly reduce vibrations.

Assoluta precisione, eccellente finitura superficiale ed incremento delle vita utensile sono ottenute da un materiale antivibrante risultato di un abbinamento tra un elevato modulo di elasticità ed un elevato peso specifico.

**Plandrehen / Facing / Sfacciatura**


| SHARK-CUT®-Ø (mm) | 1,5 x D |          | 2,25 x D |          | 3 x D – Densimet |          |
|-------------------|---------|----------|----------|----------|------------------|----------|
|                   | ap (mm) | f (mm/U) | ap (mm)  | f (mm/U) | ap (mm)          | f (mm/U) |
| SC08...(LP...04)  | 2,00    | 0,10     | 1,50     | 0,07     | 1,00             | 0,10     |
| SC10...(LP...05)  | 2,50    | 0,12     | 2,00     | 0,12     | 1,20             | 0,12     |
| SC12...(LP...06)  | 3,00    | 0,15     | 2,50     | 0,14     | 1,50             | 0,15     |
| SC14...(LP...07)  | 3,50    | 0,16     | 3,00     | 0,15     | 1,70             | 0,16     |
| SC16...(LP...08)  | 4,00    | 0,17     | 3,50     | 0,16     | 2,00             | 0,17     |
| SC18...(LP...09)  | 5,00    | 0,18     | 3,50     | 0,17     | 2,30             | 0,18     |
| SC20...(LP...10)  | 5,00    | 0,20     | 4,00     | 0,18     | 2,50             | 0,20     |

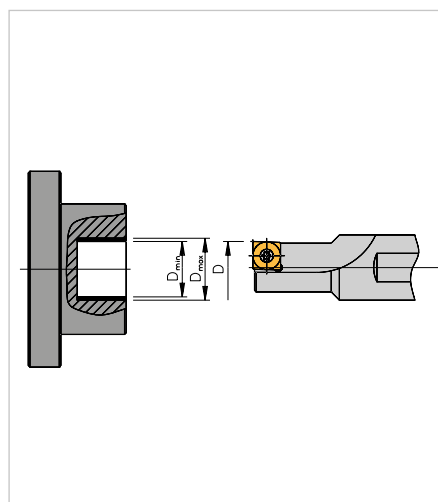
**Bohren / Drilling / Foratura**


| SHARK-CUT®-Ø (mm) | 1,5 - 2,25 x D | 3 x D – Densimet |
|-------------------|----------------|------------------|
|                   | f (mm/U)       | f (mm/U)         |
| SC08...(LP...04)  | 0,01 - 0,04    | 0,01 - 0,02      |
| SC10...(LP...05)  | 0,01 - 0,05    | 0,01 - 0,03      |
| SC12...(LP...06)  | 0,01 - 0,05    | 0,01 - 0,04      |
| SC14...(LP...07)  | 0,01 - 0,07    | 0,01 - 0,05      |
| SC16...(LP...08)  | 0,02 - 0,08    | 0,02 - 0,06      |
| SC18...(LP...09)  | 0,03 - 0,09    | 0,03 - 0,07      |
| SC20...(LP...10)  | 0,03 - 0,10    | 0,03 - 0,08      |

## Maximale Bohrtiefen / Maximum drilling depth / Massima profondità di foratura

| Maximale Bohrtiefen / Maximum drilling depth / Massima profondità di foratura |                         |                          |                 |                  |               |
|-------------------------------------------------------------------------------|-------------------------|--------------------------|-----------------|------------------|---------------|
| SHARK-CUT®-Ø (mm)                                                             | Mini (2,25 x D)<br>(mm) | Mini ALU (4 x D)<br>(mm) | 1,5 x D<br>(mm) | 2,25 x D<br>(mm) | 3 x D<br>(mm) |
| 4                                                                             | 9,00                    | 16                       | –               | –                | –             |
| 5                                                                             | 11,25                   | 20                       | –               | –                | –             |
| 6                                                                             | 13,50                   | 24                       | –               | –                | –             |
| 7                                                                             | 15,75                   | 28                       | –               | –                | –             |
| 8                                                                             | 18,00                   | 32                       | 12              | 18,0             | 24            |
| 10                                                                            | –                       | –                        | 15              | 22,0             | 30            |
| 12                                                                            | –                       | –                        | 18              | 27,0             | 36            |
| 14                                                                            | –                       | –                        | 21              | 31,5             | 42            |
| 16                                                                            | –                       | –                        | 24              | 36,0             | 48            |
| 18                                                                            | –                       | –                        | 27              | 40,5             | 54            |
| 20                                                                            | –                       | –                        | 30              | 45,0             | 60            |

## Bohren aus der Mitte / Drilling off centre / Foratura fuori centro

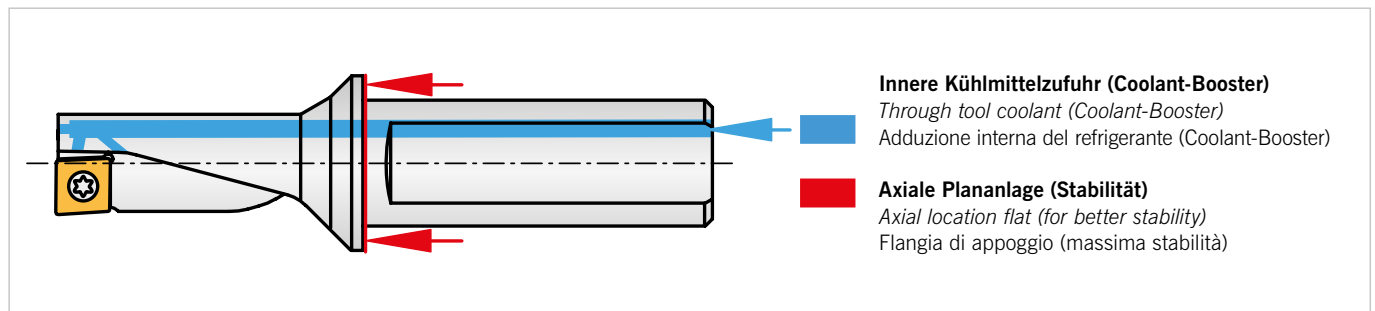


| Werkzeugtyp<br>Type of tool<br>Tipo di utensile | Werkzeug- Nenndurchmesser<br>Nominal tool diameter<br>Diametro Nominale utensile | Werkstück-Bohrdurchmesser<br>Drilling diameter<br>Diametri ottenibili |                       |
|-------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------|
|                                                 |                                                                                  | D <sub>min</sub> (mm)                                                 | D <sub>max</sub> (mm) |
| SC 04 R/L-...SP...(Mini)                        | 4                                                                                | 3,90                                                                  | 4,2                   |
| SC 05 R/L-...SP...(Mini)                        | 5                                                                                | 4,90                                                                  | 5,2                   |
| SC 06 R/L-...SP...(Mini)                        | 6                                                                                | 5,90                                                                  | 6,2                   |
| SC 07 R/L-...SP...(Mini)                        | 7                                                                                | 6,90                                                                  | 7,2                   |
| SC 08 R/L-...SP...(Mini)                        | 8                                                                                | 7,90                                                                  | 8,2                   |
| SC 08 R/L-...04                                 | 8                                                                                | 7,85                                                                  | 8,3                   |
| SC 10 R/L-...05                                 | 10                                                                               | 9,85                                                                  | 10,5                  |
| SC 12 R/L-...06                                 | 12                                                                               | 11,85                                                                 | 12,5                  |
| SC 14 R/L-...07                                 | 14                                                                               | 13,85                                                                 | 14,5                  |
| SC 16 R/L-...08                                 | 16                                                                               | 15,85                                                                 | 16,5                  |
| SC 18 R/L-...09                                 | 18                                                                               | 17,85                                                                 | 18,5                  |
| SC 20 R/L-...10                                 | 20                                                                               | 19,80                                                                 | 20,5                  |

Durch die speziell entwickelte und aufeinander abgestimmte Ausführung von Werkzeug und Wendeschneidplatte ist es möglich außer Mitte zu bohren. Es können somit Abweichungen zum Werkzeugdurchmesser erreicht werden.

*Because of the special design of the holder and indexable inserts, it is possible to drill off centre.*

Grazie allo speciale profilo dell'inserto e utensile è possibile forare fuori centro.

**Coolant-Booster** / *Coolant-Booster* / Ugelli Booster**Kühlmitteldruck**

Als innovative Detaillösung bietet der SHARK-CUT® eine spezielle Kühlmittelzufuhr zur besseren Ausbringung der Späne aus der Bohrung. Ein eigener, rückwärtsgerichteter Kühlmittelstrahl sorgt für einen verbesserten Spänetransport. Der Kühlmitteldruck muss dafür, unabhängig vom Durchmesser, ca. 1,5–3 bar (optimal 5–7 bar) betragen.

**Coolant pressure**

The SHARK-CUT® tool offer a unique detail when it comes to swarf evacuation. A "return" (pointing back up the flute) coolant channel ensures optimum swarf evacuation, therefore the coolant pressure, no matter the diameter, must be 1.5–3 bar (optimum 5–7 bar).

**Pressione del refrigerante**

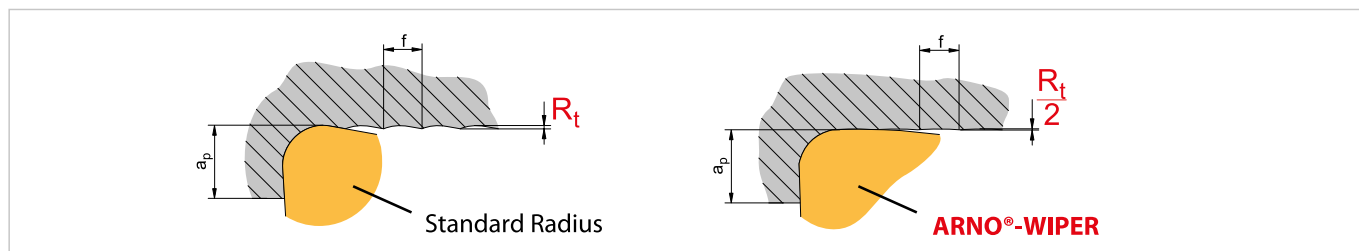
Lo SHARK-CUT® offre un dettaglio unico per l'aiuto nell'evacuazione truciolo. Un ugello orientato in direzioni di uscita del foro aiuta il truciolo ad incanalarsi e ad essere espulso. La pressione suggerita, indipendente dal diametro deve essere di almeno 1,5–3 bar (ottimale 5–7 bar).

**Achsversatz der Maschine***Displacement of the machine / Montaggio sulla macchina utensile*

|                                                                                                                                                           |                                                                                                                  |                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Situation / Situation / Condizione</b></p> <p><b>Versatz in X-Richtung</b><br/><i>Displacement in X-direction</i><br/>Collisione lungo l'asse X</p> | <p>The diagram shows a tool holder with a red circle indicating the area of displacement in the X-direction.</p> | <p><b>Lösung / Solution / Soluzione</b></p> <p><b>Werkzeugkorrektur anpassen</b><br/><i>Correct tool positioning</i><br/>Correggere posizione</p>                                       |
| <p><b>Situation / Situation / Condizione</b></p> <p><b>Winkelfehler</b><br/><i>Angle error</i><br/>Orientamento errato</p>                                | <p>The diagram shows a tool holder with a red circle indicating the area of angle error.</p>                     | <p><b>Lösung / Solution / Soluzione</b></p> <p><b>Revolver und/oder Spindelstock ausrichten</b><br/><i>Turret and/or spindle adjustment</i><br/>Registrazione torretta e/o mandrino</p> |
| <p><b>Situation / Situation / Condizione</b></p> <p><b>Positionierfehler</b><br/><i>Positioning error</i><br/>Posizionamento errato</p>                   | <p>The diagram shows a tool holder with a red circle indicating the area of positioning error.</p>               | <p><b>Lösung / Solution / Soluzione</b></p> <p><b>Werkzeug ausrichten</b><br/><i>Adjust tool holder</i><br/>Registrazione utensili</p>                                                  |

## WIPER-Geometrie / WIPER-Geometry / WIPER-Geometria

### Funktionsprinzip (Nutzen) / Information / Obiettivi



#### Bessere Oberfläche

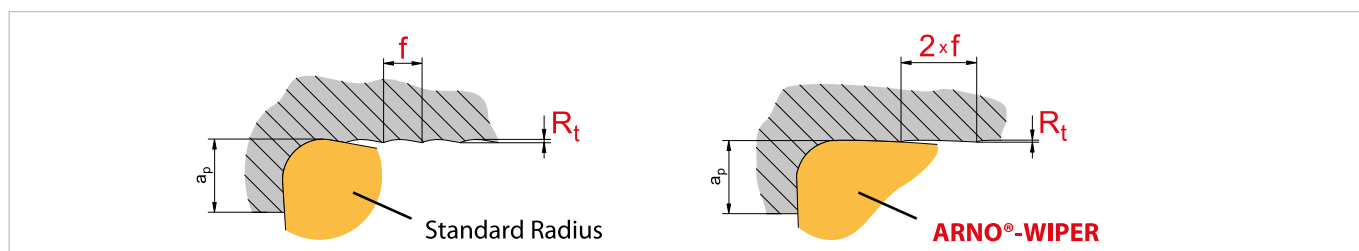
Bei gleichem Vorschub erreicht die Wendschneidplatte mit WIPER-Schneide einen um das Vielfache besseren  $R_a$ -Wert gegenüber einer herkömmlichen Wendschneidplatte.

#### Better surface

At the same feed rate the WIPER insert achieves a much better  $R_a$ -value against a conventional insert.

#### Migliore finitura superficiale

Con i medesimi avanzamenti dell'inserto normale, la geometria WIPER assicura un migliore valore  $R_a$ .



#### Geringere Bearbeitungszeit

Soll der gleiche  $R_a$ -Wert erreicht werden wie mit einer Standard-Wendschneidplatte, so kann mit der Schneidplatte mit WIPER-Schneide der doppelte Vorschub gefahren werden (= geringere Stückzeiten!).

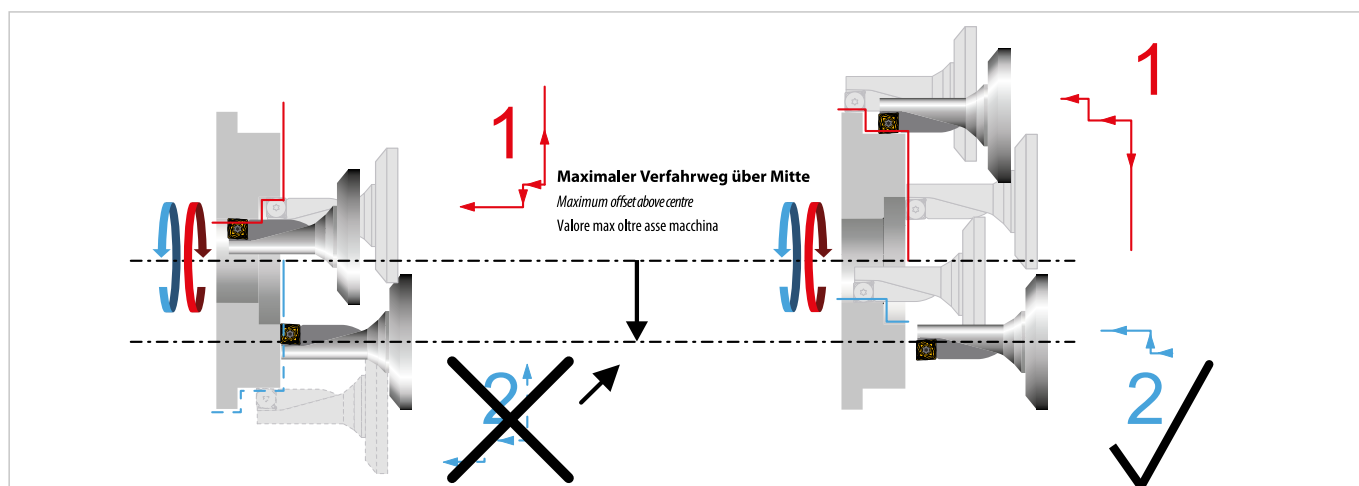
#### Reduced machine time

If the required  $R_a$ -value is achieved with a standard insert, the insert can be applied using up to twice the feed rate and thereby reducing machine time.

#### Riduzione tempo ciclo

La geometria WIPER permette avanzamenti anche doppi rispetto agli inserti a raggio standard assicurando pari rugosità superficiale. Questa caratteristica arriva a dimezzare i tempi ciclo, specialmente in operazioni di barenatura.

## Bearbeitung über Mitte / Machining over centre / Lavorazione fuori asse



#### Situation / Situation / Condizione

Bei nicht ausreichendem Verfahrweg der Maschine über die Mittelachse ist der Außendurchmesser nicht mit dem selben Werkzeug bearbeitbar.

At not adequate travel of the machine over the centre the outside diameter can not be machined with the same tool.

Nel caso di corse ridotte delle macchine utensili i diametri esterni possono non essere lavorabili con il medesimo utensile.

#### Lösung / Solution / Soluzione

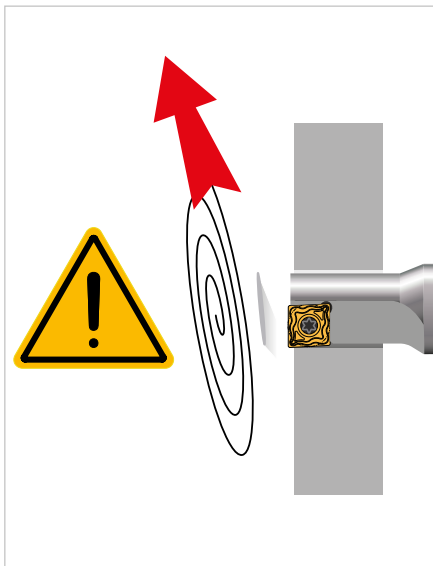
Verwendung eines rechten SHARK-CUT® Werkzeuges.

Using a right hand SHARK-CUT® tool.

Utilizzare un utensile SHARK-CUT® destro.



## Durchgangsbohrung / Through hole drilling / Foratura passante



## Hinweis

Bei feststehendem Werkzeug und rotierendem Werkstück fällt bei Durchgangsbohrungen eine scharfkantige Ronde ab. Bitte Sicherheitsvorkehrungen treffen.

Der Kühlmitteldruck sollte für SHARK-CUT® 2,25 x D ca. 5–7 bar und für SHARK-CUT® 1,5 x D ca. 1,5–3 bar betragen. Ist der notwendige Kühlmitteldruck maschinen-seitig nicht vorhanden, kann es von Vorteil sein, den Bohrvorgang kurz zu unterbrechen, um die Bohrung zu entleeren.

## Information

When through hole drilling with stationary tool and rotating component a sharp disc is produced, please ensure adequate safety precautions.

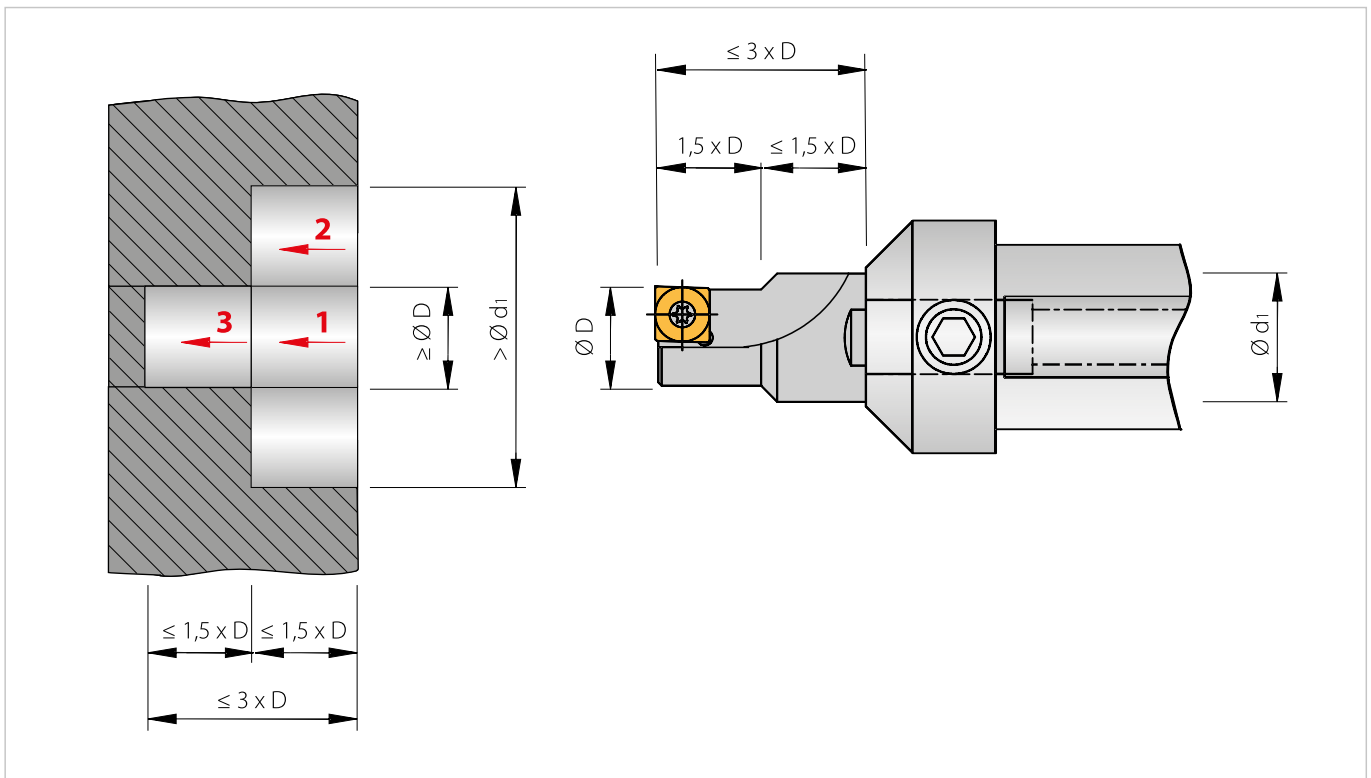
The coolant pressure for a 1.5 x D SHARK-CUT® should be minimum 1.5–3 bar, for 2.25 x D drill depth 5–7 bar is required. If the necessary coolant pressure is not available, it could be beneficial to interrupt the cutting briefly in order to clear the hole.

## Accorgimenti

In operazioni di foratura passante con utensile fisso, un disco affilato risulta a fine operazione, assicurare adeguate protezioni.

La pressione del refrigerante per un utensile SHARK-CUT® 1,5 x D deve essere minimo 1,5–3 bar, mentre per la versione 2,25 x D è suggerito un minimo di 5–7 bar. Nei casi in cui la pressione del refrigerante non fosse sufficiente è suggerito prevedere una lavorazione con interruzioni per assicurare una giusta evacuazione truciolo.

## Bohrtiefen bis 3 x D / Deep bores up to 3 x D / Per forature fino a 3 x D



Mit SHARK-CUT® Werkzeugen SC...1,5 x D können bei entsprechender Werkstückkontur, Bohrtiefen bis zum Dreifachen des Nenn-durchmessers erreicht werden (siehe Bild). Es ist dabei auf die Arbeitsabfolge 1, 2 und 3 zu achten. Für Werkzeuge mit dem Durchmesser 8 mm werden rechte und linke Wendeschneidplatten benötigt. Für Werkzeuge mit Durchmesser 10 bis 32 mm kommen neutrale Wendeschneidplatten zum Einsatz.

With the SHARK-CUT® tools SC...1.5 x D it is possible to drill up to three times the diameter (see picture). However please note working order 1, 2 and 3. For holders with diameter 8 mm use inserts with right and left chip breakers. For holders with diameter 10 to 32 mm use neutral inserts.

Con corpo utensile SC...1,5 x D è possibile forare fino a 3 x D a condizione che la forma del foro corrisponda alla figura. Prestare attenzione all'ordine 1, 2 e 3. Per utensili diametro 8 mm prestare attenzione agli inserti che hanno versione Destra e Sinistra. Per utensili superiori a 10 a 32 mm di diametro gli inserti sono neutri.

## Formeln / Formulas / Formule

**Schnittgeschwindigkeit**

Cutting Speed

Velocità di taglio

$$V_c = \frac{\pi \cdot D \cdot n}{1000}$$

**Drehzahl**

Revolution per minute

Numero di giri al minuto

$$n = \frac{V_c \cdot 1000}{\pi \cdot D}$$

**Zeitspanvolumen**

Chip removal rate

Volume truciolo

$$Q = V_c \cdot a_p \cdot f_n$$

|                      |                                                                      |                |                      |                                                                                  |               |          |                                                                |                  |
|----------------------|----------------------------------------------------------------------|----------------|----------------------|----------------------------------------------------------------------------------|---------------|----------|----------------------------------------------------------------|------------------|
| <b>D</b>             | <b>Durchmesser</b><br>Diameter<br>Diametro                           | <b>(mm)</b>    | <b>f<sub>n</sub></b> | <b>Vorschub pro Umdrehung</b><br>Feed rate per revolution<br>Avanzamento al giro | <b>(mm/U)</b> | <b>n</b> | <b>Spindeldrehzahl</b><br>Spindel revolution<br>Numero di giri | <b>(U/min)</b>   |
| <b>V<sub>c</sub></b> | <b>Schnittgeschwindigkeit</b><br>Cutting speed<br>Velocità di taglio | <b>(m/min)</b> | <b>a<sub>p</sub></b> | <b>Schnitttiefe</b><br>Depth of cut<br>Profondità di passata                     | <b>(mm)</b>   | <b>Q</b> | <b>Zeitspanvolumen</b><br>Chip removal rate<br>Volume truciolo | <b>(cm³/min)</b> |

| Anwendungsproblem / Type of problem / Tipo di problema |                                                         |                                                                    |                                                                       |                                         |                                                            |                                                 |                                                         | Abhilfe<br>Corrective measures<br>Soluzioni possibili                | Kriterium / Criteria / Criterio                                    |
|--------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------|
| Ausbrüche<br>Edge chipping<br>Sceggiatura inserto      | Aufbauschneide<br>Built-up edge<br>Tagliente di riporto | Freiflächenverschleiß<br>Wear in clearance face<br>Labbro di usura | Plastische Verformung<br>Plastic deformation<br>Deformazione plastica | Vibrationen<br>Vibrations<br>Vibrazioni | Oberflächengüte<br>Surface finish<br>Finitura superficiale | Span zu lang<br>Chip too long<br>Truciolo lungo | Span zu kurz<br>Chip too short<br>Truciolo troppo corto |                                                                      |                                                                    |
|                                                        | ↑                                                       | ↓                                                                  | ↓                                                                     | ↓                                       | ↑                                                          | ↓                                               |                                                         | <b>Schnittgeschwindigkeit</b><br>Cutting speed<br>Velocità di taglio | Schnittwerte /<br>Cutting values /<br>Parametri di taglio          |
| ↓                                                      |                                                         | ~                                                                  | ↓                                                                     | ↑                                       | ↓                                                          | ↑                                               | ↓                                                       | <b>Vorschub</b><br>Feed<br>Avanzamento                               |                                                                    |
| ↑                                                      |                                                         | ↑                                                                  | ↑                                                                     | ↓                                       | ↑                                                          |                                                 |                                                         | <b>Eckenradius</b><br>Corner radius<br>Raggio di punta               | Wende-<br>schneidplatten /<br>Insert selection /<br>Scelta inserto |
| ↓                                                      |                                                         | ↑                                                                  | ↑                                                                     |                                         |                                                            |                                                 |                                                         | <b>Schneidstoff</b><br>Cutting material<br>Materiale da taglio       |                                                                    |
| ~                                                      |                                                         |                                                                    |                                                                       | ~                                       | ~                                                          |                                                 |                                                         | <b>Spannung Werkzeug</b><br>Tool clamping<br>Bloccaggio utensile     | Allgemeine Kriterien / General criteria /<br>Accorgimenti generali |
| ~                                                      |                                                         |                                                                    |                                                                       | ~                                       | ~                                                          |                                                 |                                                         | <b>Spannung Werkstück</b><br>Workpiece clamping<br>Bloccaggio pezzo  |                                                                    |
| ~                                                      |                                                         |                                                                    |                                                                       | ~                                       | ↓                                                          |                                                 |                                                         | <b>Auskragung</b><br>Overhang<br>Sporgenza                           |                                                                    |
| ~                                                      |                                                         | ~                                                                  |                                                                       | ~                                       | ~                                                          |                                                 |                                                         | <b>Spitzenhöhe</b><br>Tip height<br>Altezza tagliente                |                                                                    |
|                                                        | •                                                       | •                                                                  | •                                                                     |                                         | •                                                          | •                                               |                                                         | <b>Kühlschmierstoff</b><br>Cooling lubricant<br>Lubro-refrigerante   |                                                                    |



**erhöhen, vergrößern - großer Einfluss**  
increase, bigger effect  
aumentare notevolmente i valori



**erhöhen, vergrößern - kleiner Einfluss**  
increase, smaller effect  
aumentare leggermente i valori



**verwenden**  
apply  
utilizzare



**senken, verkleinern - großer Einfluss**  
reduce, bigger effect  
diminuire notevolmente i valori



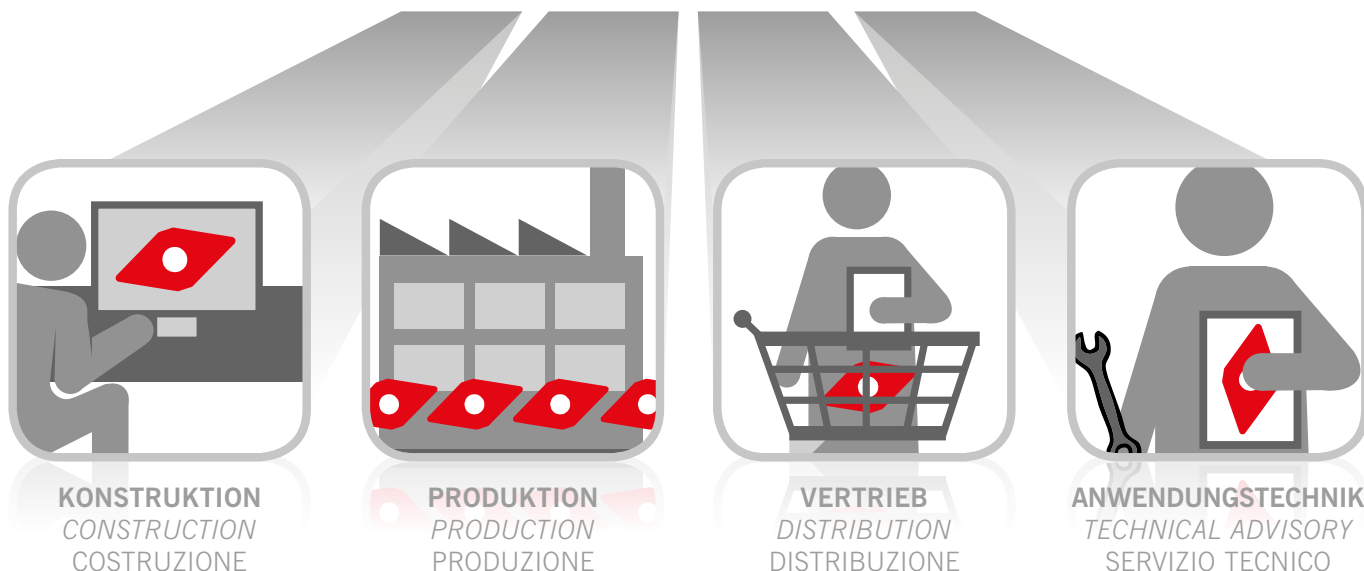
**senken, verkleinern - kleiner Einfluss**  
reduce, smaller effect  
diminuire leggermente i valori



**kontrollieren, optimieren**  
check, optimize  
controllare, ottimizzare

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# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                         | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.        | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|---------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|-------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------|
| Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                 |                                                        |
| P                                                                                           | P1                     | 1.0401                                           |                                                     | C 15                                      | C15                                          |                                                                                                                                   | 080M15,<br>144917CS,<br>040A15,<br>080A15                       |                                                        |
|                                                                                             | P1                     | 1.0402                                           |                                                     | C 22                                      | C22                                          |                                                                                                                                   | 040 A 15,<br>055 M 15, En 2,<br>22 CS, 22 HS,<br>C 22, 070 M 20 | 2D,<br>2                                               |
|                                                                                             | P2                     | 1.0501                                           |                                                     | C 35                                      | C35                                          |                                                                                                                                   | 080A32,<br>080A35,<br>080M36,<br>1449.40CS                      |                                                        |
|                                                                                             | P2                     | 1.0503                                           |                                                     | C 45                                      | C45                                          |                                                                                                                                   | 060A47,<br>080M46,<br>1449.50HS,<br>1449.50CS                   |                                                        |
|                                                                                             | P4                     | 1.0535                                           |                                                     | C 55                                      | C55                                          |                                                                                                                                   | 070M55,<br>5770-50                                              | 9                                                      |
|                                                                                             | P4 / P5                | 1.0601                                           |                                                     | C 60                                      | C60                                          |                                                                                                                                   | 060A62,<br>5770-60,<br>1449 60HS.CS                             |                                                        |
|                                                                                             | P6                     | 1.0715                                           |                                                     | 9 SMn 28                                  | 11SMn30                                      |                                                                                                                                   | 230M07                                                          |                                                        |
|                                                                                             | P6                     | 1.0718                                           |                                                     | 9 SMnPb 28                                | 11SMnPb30                                    |                                                                                                                                   |                                                                 |                                                        |
|                                                                                             | P6                     | 1.0722                                           |                                                     | 10 SPb 20                                 | 10SPb20                                      |                                                                                                                                   |                                                                 |                                                        |
|                                                                                             | P6                     | 1.0726                                           |                                                     | 35 S 20                                   | 35S20                                        |                                                                                                                                   | 212M36                                                          |                                                        |
|                                                                                             | P6                     | 1.0736                                           |                                                     | 9 SMn 36                                  | 11SMn37                                      |                                                                                                                                   | 240M07                                                          | 1B                                                     |
|                                                                                             | P6                     | 1.0737                                           |                                                     | 9 SMnPb 36                                | 11SMnPb37                                    | Ledloy                                                                                                                            |                                                                 |                                                        |
|                                                                                             | P7 / P10               | 1.0904                                           |                                                     |                                           | 55Si7                                        |                                                                                                                                   | 250A53                                                          | 45                                                     |
|                                                                                             | P7 / P10               | 1.0961                                           |                                                     | 60 SiCr 7                                 | S340MGC,<br>60SiCr7                          |                                                                                                                                   | 250A61                                                          |                                                        |
|                                                                                             | P1                     | 1.1141                                           |                                                     | Ck 15                                     | C15E                                         |                                                                                                                                   | 040A15,<br>080M15,<br>S14, CS17                                 | 32C                                                    |
|                                                                                             | P7 / H2                | 1.1157                                           |                                                     | 40 Mn 4                                   | 40Mn4                                        |                                                                                                                                   | 150M36                                                          | 15                                                     |
|                                                                                             | P1 / P3                | 1.1158                                           |                                                     | Ck 25                                     | C25E                                         |                                                                                                                                   | 070M26                                                          |                                                        |
|                                                                                             | P7                     | 1.1167                                           |                                                     | 36 Mn 5                                   | 36Mn5                                        |                                                                                                                                   | 150M36                                                          | 15 B                                                   |
|                                                                                             | P7                     | 1.1170                                           |                                                     | 28 Mn 6                                   | 28Mn6                                        |                                                                                                                                   | 150M28,<br>150M19,<br>S92                                       | 14A,<br>14B                                            |
|                                                                                             | P2                     | 1.1183                                           |                                                     | Cf 35                                     | C35G                                         |                                                                                                                                   | 060A35,<br>080A35                                               |                                                        |
|                                                                                             | P2                     | 1.1191                                           |                                                     | Ck 45                                     | C45E                                         |                                                                                                                                   | 080M46,<br>060A47                                               |                                                        |
|                                                                                             | P4 / P5                | 1.1203                                           |                                                     | Ck 55                                     | C55E                                         |                                                                                                                                   | 060A57                                                          | 9                                                      |
|                                                                                             | P2 / P3                | 1.1213                                           |                                                     | Cf 53                                     | C53G                                         |                                                                                                                                   | 060A52,<br>070M55                                               |                                                        |
|                                                                                             | P4 / P5                | 1.1221                                           |                                                     | Ck 60                                     | C60E                                         |                                                                                                                                   | 060A62,<br>070M60,<br>CS60                                      |                                                        |
|                                                                                             | P4 / H1                | 1.1274                                           |                                                     | Ck 101                                    | C101E,<br>C100S                              |                                                                                                                                   | 060A96,<br>5770-95,<br>CS95                                     |                                                        |
|                                                                                             | P11                    | 1.3401                                           |                                                     | X 120 Mn 12                               | X120Mn12                                     |                                                                                                                                   |                                                                 |                                                        |
|                                                                                             | P7 / H2                | 1.3505                                           |                                                     | 100 Cr 6                                  | 100Cr6                                       |                                                                                                                                   | BL3, 534A99,<br>535A99, 2S135,<br>S135                          |                                                        |
|                                                                                             | P7                     | 1.5415                                           |                                                     | 15 Mo 3                                   | 16Mo3                                        |                                                                                                                                   | 1501-240,<br>1503-243B,<br>3606-243,<br>3059-243                |                                                        |
|                                                                                             | P3                     | 1.5423                                           |                                                     | 16 Mo 5                                   | 16Mo5                                        |                                                                                                                                   | 1503-245-420                                                    |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                | Frankreich<br>France<br>Francia<br><b>AFNOR</b> | Italien<br>Italy<br>Italia<br><b>UNI</b> | Schweden<br>Sweden<br>Svezia<br><b>SS</b> | Spanien<br>Spain<br>Spagna<br><b>UNE</b>     | Japan<br>Japan<br>Giappone<br><b>JIS</b> | USA<br>USA<br>USA<br><b>AISI/SAE/ASTM</b>                   | Belgien<br>Belgium<br>Belgio<br><b>NBN</b> | Russland<br>Russia<br>Russia<br><b>GOST</b> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------|----------------------------------------------|------------------------------------------|-------------------------------------------------------------|--------------------------------------------|---------------------------------------------|
| <b>Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione</b> |                                                 |                                          |                                           |                                              |                                          |                                                             |                                            |                                             |
| <b>P</b>                                                                                           | C18RR,<br>XC18                                  | C15,<br>C16,<br>1C15                     | 1350                                      | F.111                                        | S 15 C,<br>JIS S 15C                     | J 409 Grade 1015                                            |                                            |                                             |
|                                                                                                    | AF42C20,<br>XC25,<br>1C22                       | C20,<br>C21                              | 1450                                      | 1C22,<br>F112                                | S 20 C,<br>S22C,<br>JIS S 20C            |                                                             | C25-1                                      | 20                                          |
|                                                                                                    | C35,<br>1C35,<br>AF55C35                        | C35,<br>1C35                             | 1572,<br>155                              | F.113                                        | S 35 C                                   |                                                             | C35-1                                      | 35                                          |
|                                                                                                    | 1C45,<br>AF 65 C 45                             | C45,<br>1C45                             | 1650                                      | F.114                                        | JIS S 45C                                |                                                             | C45-1                                      | 45                                          |
|                                                                                                    | C54,<br>1C55,<br>AF 70 C 55                     | C55,<br>1C55                             | 1655                                      | F.115                                        | S 55 C                                   |                                                             | C55-1                                      | 55                                          |
|                                                                                                    | C60,<br>1C60,<br>AF70C55                        | C60,<br>1C60                             |                                           | F.115                                        | S 58 C                                   |                                                             | C60-1                                      | 60                                          |
|                                                                                                    | S250                                            | CF9Mn28                                  | 1912                                      | F.2111 - 11SMn28                             | JIS SUM22                                |                                                             |                                            |                                             |
|                                                                                                    | S250Pb                                          | CF9SMnPb28                               | 1914                                      | F.2112 - 11SMn-<br>Pb28                      | SUM22L,<br>SUM23L,<br>SUM24L             | 12L13, 12L14,<br>J 403 Grade 12L14,<br>J 1397 Grade 12L14   |                                            |                                             |
|                                                                                                    | 35MF6                                           |                                          | 1957                                      | F.210G                                       |                                          | J 403 Grade 1141                                            |                                            |                                             |
|                                                                                                    | S300                                            | CF9SMn36                                 |                                           | F.2113 - 12 SMn 35                           | SUM 25                                   | J 403 Grade 1213,<br>J 403 Grade 1215,<br>J 1392 Grade 1213 |                                            |                                             |
|                                                                                                    | S300Pb                                          | CF9SMnPb36                               | 1926                                      | F.2114 - 12 SMnPb<br>35                      |                                          | J 403 Grade 12L14,<br>J 1397 Grade 12L14                    |                                            |                                             |
|                                                                                                    | 55S7                                            |                                          | 2085                                      | F.1440 - 56 Si 7                             |                                          |                                                             |                                            |                                             |
|                                                                                                    | 60SC7                                           |                                          |                                           | F.1442 - 60 SiCr 8                           |                                          |                                                             |                                            |                                             |
|                                                                                                    |                                                 |                                          | 1370                                      | F.1511 - C 16 k,<br>F.1110 - C 15 k          | S 15,<br>S 15 CK,<br>JIS S 15 C          |                                                             | C16-2                                      | 15                                          |
|                                                                                                    | 35M5                                            |                                          |                                           |                                              |                                          | 1035,<br>1041                                               |                                            | 40G                                         |
|                                                                                                    | 2C25                                            |                                          |                                           | F.1120 - C 25 k,<br>C25K (F1120)             | S 25 C,<br>S 28 C                        |                                                             | C25-2                                      | 25                                          |
|                                                                                                    | 40M5                                            |                                          | 2120                                      | F.1203 - 36 Mn5                              | SMn 438 (H),<br>SCMn 3                   |                                                             |                                            | 35G2                                        |
|                                                                                                    | 20M5                                            | C28Mn                                    |                                           | 28Mn6                                        | SCMn1                                    | 1027                                                        | 28Mn6                                      | 30G                                         |
|                                                                                                    | XC38H1TS                                        | C36,<br>C38                              |                                           |                                              | S 35 C                                   |                                                             | C36                                        | 35                                          |
|                                                                                                    | C45RR, XC42H1,<br>XC45, 2C45,<br>XC48, XC48H1   |                                          | 1672                                      | F1140-C45k,<br>F1142-C48k                    | S 45 C,<br>S 48 C                        |                                                             | C45-2                                      | 45                                          |
|                                                                                                    | XC55H1,<br>2C55,<br>XC54                        |                                          | 1655                                      | F.1150 - C 55 k                              | S 55 C                                   |                                                             | C55-2                                      | 55                                          |
|                                                                                                    | XC48H1TS                                        |                                          |                                           |                                              | S 50 C                                   | 1050,<br>1055                                               | C53                                        | 50                                          |
|                                                                                                    | C60RR,<br>XC60,<br>2C60                         |                                          | 1665,<br>168                              | F.511,<br>F.512                              | S 58 C                                   |                                                             | C60-2                                      | 60                                          |
|                                                                                                    | C100RR,<br>C100,<br>XC100,<br>E 100             |                                          | 1870                                      |                                              | SUP4                                     |                                                             |                                            |                                             |
|                                                                                                    | Z120M12,<br>Z120Mn12                            |                                          | 2183                                      | F.82551-AM-X 120,<br>Mn 12                   | SCMnH1,<br>SCMnH11                       |                                                             |                                            | 110G13L                                     |
|                                                                                                    | Y100C6,<br>100C6,<br>100Cr6                     | 100Cr6                                   | 2258                                      | F.5230 100 Cr6,<br>F.1310-100 Cr 6,<br>F.131 | SUJ 2,<br>SUJ 4                          | L3                                                          |                                            | SchCh15                                     |
|                                                                                                    | 15D3,<br>15Mo3                                  | 16Mo3 (KG KW)                            | 2912                                      | F.2601-16 Mo 3                               |                                          |                                                             | 16Mo3                                      |                                             |
|                                                                                                    |                                                 | 16Mo5KG,<br>16Mo5KW                      |                                           | F.2602-16Mo5                                 | SB 450 M,<br>SB 480 M                    |                                                             | 16Mo5                                      |                                             |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                         | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN      | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.                  | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|---------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------|
| Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione |                        |                                                  |                                                     |                                                |                                              |                                                                                                                                   |                                                                           |                                                        |
| P                                                                                           | P7                     | 1.5622                                           |                                                     | 14 Ni 6                                        | 14Ni6                                        |                                                                                                                                   |                                                                           |                                                        |
|                                                                                             | P11                    | 1.5662                                           |                                                     | X 8 Ni 9                                       | X8Ni9                                        |                                                                                                                                   | 1501-509;510,<br>3603-509LT,<br>1502-502-650,<br>509-690,<br>1503-509-690 |                                                        |
|                                                                                             | P11                    | 1.5680                                           |                                                     | 12 Ni 19                                       | X12Ni5,<br>12Ni19                            |                                                                                                                                   |                                                                           |                                                        |
|                                                                                             | P9                     | 1.5710                                           |                                                     | 36 NiCr 6                                      | 36NiCr6                                      |                                                                                                                                   | 640A35                                                                    |                                                        |
|                                                                                             | P7                     | 1.5732                                           |                                                     | 14 NiCr 10                                     | 14NiCr10                                     |                                                                                                                                   |                                                                           |                                                        |
|                                                                                             | P7                     | 1.5752                                           |                                                     | 14 NiCr 14                                     | 15NiCr13                                     |                                                                                                                                   | 655M13,<br>655A12,<br>655H13                                              | 36A,<br>36B                                            |
|                                                                                             | P7 / P9                | 1.6511                                           |                                                     | 36 CrNiMo 4                                    | 36CrNiMo4                                    |                                                                                                                                   | 816M40                                                                    | 110                                                    |
|                                                                                             | P7                     | 1.6523                                           |                                                     | 20NiCrMo2-2                                    | 21NiCrMo2                                    |                                                                                                                                   | 805H20,<br>805M20,<br>806M20                                              | 362                                                    |
|                                                                                             | P9                     | 1.6546                                           |                                                     | 40 NiCrMo 22                                   | 40NiCrMo2-2,<br>40NiCrMo2KD                  |                                                                                                                                   | 311-Type7                                                                 |                                                        |
|                                                                                             | P7 / P9                | 1.6582                                           |                                                     | 34 CrNiMo 6                                    | 34CrNiMo6                                    |                                                                                                                                   | 816M40,<br>817M40                                                         | 24                                                     |
|                                                                                             | P7                     | 1.6587                                           |                                                     | 17 CrNiMo 8,<br>17 CrNiMo 6,<br>17 CrNiMo 6 BG | 17CrNiMo6,<br>18CrNiMo7-6                    |                                                                                                                                   | 820A16                                                                    |                                                        |
|                                                                                             | P7                     | 1.6657                                           |                                                     | 14 NiCrMo 134                                  | 14NiCrMo13-4                                 |                                                                                                                                   | 832H13,<br>832M13,<br>S157                                                | 36C                                                    |
|                                                                                             | P7                     | 1.7015                                           |                                                     | 15 Cr 3                                        | 15Cr2KD                                      |                                                                                                                                   | 523M15                                                                    | 206                                                    |
|                                                                                             | P7 / P8                | 1.7033                                           |                                                     | 34 Cr 4                                        | 34Cr4                                        |                                                                                                                                   | 530A32,<br>530H32,<br>530M32                                              |                                                        |
|                                                                                             | P7 / P9                | 1.7035                                           |                                                     | 41 Cr 4                                        | 41Cr4                                        |                                                                                                                                   | 530M40,<br>530A40,<br>530H40                                              | 18                                                     |
|                                                                                             | P9                     | 1.7045                                           |                                                     | 42 Cr 4                                        | 42Cr4                                        |                                                                                                                                   | 530A40                                                                    | 18                                                     |
|                                                                                             | P7                     | 1.7131                                           |                                                     | 16 MnCr 5                                      | 16MnCr5                                      |                                                                                                                                   | 527M17,<br>590H17,<br>590M17                                              |                                                        |
|                                                                                             | P7 / P9                | 1.7176                                           |                                                     | 55 Cr 3                                        | 55Cr3                                        |                                                                                                                                   | 525A58,<br>525A60,<br>525H60                                              | 48                                                     |
|                                                                                             | P8                     | 1.7218                                           |                                                     | 25 CrMo 4                                      | 25CrMo4                                      |                                                                                                                                   | 1717CDS110,<br>708A25                                                     |                                                        |
|                                                                                             | P7 / P9                | 1.7220                                           |                                                     | 34 CrMo 4                                      | 34CrMo4                                      |                                                                                                                                   | 708A37                                                                    | 19B                                                    |
|                                                                                             | P7 / P9                | 1.7223                                           |                                                     | 41 CrMo 4                                      | 41CrMo4                                      |                                                                                                                                   | 708M40,<br>3111-5.1                                                       |                                                        |
|                                                                                             | P7 / P9                | 1.7225                                           |                                                     | 42 CrMo 4                                      | 42CrMo4                                      |                                                                                                                                   | 708A42,<br>708M40,<br>709M40                                              | 19A                                                    |
|                                                                                             | P7                     | 1.7262                                           |                                                     | 15 CrMo 5                                      | 15CrMo5                                      |                                                                                                                                   |                                                                           |                                                        |



# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                | Frankreich<br>France<br>Francia<br><b>AFNOR</b> | Italien<br>Italy<br>Italia<br><b>UNI</b> | Schweden<br>Sweden<br>Svezia<br><b>SS</b> | Spanien<br>Spain<br>Spagna<br><b>UNE</b>                                          | Japan<br>Japan<br>Giappone<br><b>JIS</b> | USA<br>USA<br>USA<br><b>AISI/SAE/ASTM</b> | Belgien<br>Belgium<br>Belgio<br><b>NBN</b> | Russland<br>Russia<br>Russia<br><b>GOST</b> |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------|---------------------------------------------|
| <b>Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione</b> |                                                 |                                          |                                           |                                                                                   |                                          |                                           |                                            |                                             |
| <b>P</b>                                                                                           | 16N6,<br>15N6,<br>15Ni6                         | 14Ni6KG,<br>14Ni6KT                      |                                           | F.2641-15Ni6                                                                      |                                          |                                           | 18Ni6                                      |                                             |
|                                                                                                    | Z8N9,<br>9Ni490                                 | X10Ni9,<br>X12Ni09                       |                                           | F.2645-X8 Ni09                                                                    | SL9N53(60)                               |                                           | 10Ni36                                     |                                             |
|                                                                                                    | Z18N5,<br>5Ni390                                |                                          |                                           |                                                                                   |                                          | 2515,<br>2517                             | 12Ni20                                     |                                             |
|                                                                                                    | 35NC6                                           |                                          |                                           |                                                                                   | SNC 236                                  |                                           |                                            |                                             |
|                                                                                                    | 14NC11                                          | 16NiCr11                                 |                                           | F.1540-15NiCr11                                                                   | SNC 415 (H)                              |                                           |                                            |                                             |
|                                                                                                    | 14NC11,<br>12NC15,<br>14NC12,<br>13NiCr14       |                                          |                                           |                                                                                   | SNC 815 (H),<br>SNC22,<br>JIS SNC 815    | 3310,<br>3415,<br>9314                    | 13NiCr12                                   |                                             |
|                                                                                                    | 40NCD3,<br>36CrNiMo4,<br>35NCD5                 | 38NiCrMo7 (KB)                           |                                           | F.1280-35NiCrMo4                                                                  |                                          |                                           |                                            | 40ChN2MA                                    |
|                                                                                                    | 20NCD2,<br>22NCD2                               | 20NiCrMo2                                | 2506                                      | F1552-20NiCrMo2,<br>F1534-20NiCrMo3                                               | SNCM 220 (H)                             | J 1268 Grade<br>8620H                     |                                            |                                             |
|                                                                                                    | 40NCD2                                          | 40NiCrMo2 (KB)                           |                                           | F1204-40NiCrMo2,<br>F1205-40NiCrMo2DF                                             | SNCM 240                                 |                                           | 40NiCrMo2                                  | 38ChGNM                                     |
|                                                                                                    | 35NCD6,<br>34CrNiMo6,<br>34CrNiMo8              | 35NiCrMo6KB                              | 2541                                      | F1272-40NiCrMo7,<br>34CrNiMo6                                                     | SNCM 447,<br>JIS Snc M447                |                                           | 35CrNiMo6                                  | 38Ch2N2MA                                   |
|                                                                                                    | 18NCD6                                          | 18NiCrMo7                                |                                           | F.1560-14 NiCrMo13,<br>F.156                                                      |                                          |                                           | 17CrNiMo7                                  |                                             |
|                                                                                                    | 16NCD13                                         | 15NiCrMo13                               |                                           | F1560-14NiCrMo13,<br>F.1569-14NiCrMo131                                           |                                          |                                           | 14NiCrMo13                                 |                                             |
|                                                                                                    | 12C3,<br>15Cr2,<br>18C3                         |                                          |                                           |                                                                                   | SCr 415 (H)                              |                                           | 15Cr2                                      | 15Ch                                        |
|                                                                                                    | 32C4,<br>34C4                                   | 34Cr4(KB)                                |                                           | F.8221-35 Cr 4,<br>F.224                                                          | SCr 435 (H)                              |                                           | 34Cr4                                      | 35Ch                                        |
|                                                                                                    | 42C4,<br>41Cr4                                  | 41Cr4,<br>41Cr4KB                        |                                           | 38Cr4,<br>38Cr41,<br>42Cr4,<br>F.1202-42Cr4                                       | SCR4,<br>SCr 440 (H)                     |                                           | 41Cr4                                      | 40Ch                                        |
|                                                                                                    | 42C4,<br>42C4TS                                 | 41Cr4                                    | 2245                                      | F1201,<br>F1202,<br>F1206,<br>F.1202-42Cr4                                        | SCR4,<br>SCr 440 (H),<br>SCr 440         | 5140,<br>5140H                            |                                            | 40Ch                                        |
|                                                                                                    | 16MC5,<br>16MC4,<br>16MnCr5                     | 16MnCr5                                  | 2511,<br>2173                             | F.1515-16 MnCr5,<br>F.151                                                         |                                          | J 1268 Grade<br>4118H                     | 16MnCr5                                    | 18ChG                                       |
|                                                                                                    | 55Cr3,<br>55C3                                  | 55Cr3                                    | 2253                                      | F.1431-55 Cr3,<br>F.143                                                           | SUP 9 (A)                                |                                           | 55Cr3                                      | 50ChGA                                      |
|                                                                                                    | 25CD4,<br>25CrMo4                               | 25CrMo4 (KB)                             | 2225                                      | F8372-AM26CrMo4,<br>F8330-AM25CrMo4,<br>F1256-30CrMo4-1,<br>F.222                 | SCM420,<br>SCM430,<br>SCCrM1             |                                           | 25CrMo4                                    | 20ChM                                       |
|                                                                                                    | 35CD4,<br>34CrMo4,<br>35CD4 / 34CrMo5           | 34CrMo4KB,<br>35CrMo4,<br>35CrMo4F       | 2234                                      | F8331-AM34CrMo4,<br>F8231-34CrMo4,<br>F1250-35CrMo4,<br>F1254-35CrMo4DF,<br>F.125 | SCM 432,<br>SCCrM 3,<br>SCM 435 H        | 4135,<br>4137,<br>J 1268 Grade<br>4135H   | 34CrMo4                                    | AS38ChGM                                    |
|                                                                                                    | 42CD4TS                                         | 41CrMo4                                  |                                           | F8332-AM42CrMo4,<br>F8232-42CrMo4,<br>F1252-40CrMo4                               | SCM 440,<br>JIS SCM 440                  |                                           | 41CrMo4                                    | 40ChFA                                      |
|                                                                                                    | 42CD4,<br>42CrMo4                               | 38CrMo4KB,<br>42CrMo4,<br>G40CrMo4       | 2244                                      | F8332-AM42CrMo4,<br>F8232-42CrMo4,<br>F1252-40CrMo4                               | SCM 440 (H),<br>SNB 7,<br>JIS SCM 440    |                                           | 42CrMo4                                    |                                             |
|                                                                                                    | 12CD4                                           |                                          |                                           | F.1551-12CrMo4                                                                    | SCM 415 (H)                              |                                           |                                            |                                             |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                             | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.                             | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|-------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione</b>                              |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                                      |                                                        |
| P                                                                                                                               | P7                     | 1.7335                                           |                                                     | 13 CrMo 4 4                               | 13CrMo4-5                                    |                                                                                                                                   | 620-440,<br>1503-620-440,<br>1502, 620-470,<br>3606-620,<br>620-540,<br>3604-620-440 |                                                        |
|                                                                                                                                 | P7 / P10               | 1.7361                                           |                                                     | 32 CrMo 12                                | 32CrMo12                                     |                                                                                                                                   | 722M24                                                                               | 40B                                                    |
|                                                                                                                                 | P7                     | 1.7380                                           |                                                     | 10 CrMo 9 10                              | 10CrMo9-10                                   |                                                                                                                                   | 3059-622-490,<br>3606-622,<br>1502-622,<br>3604-622,<br>622Gr.31,<br>622Gr.45        |                                                        |
|                                                                                                                                 | P7                     | 1.7715                                           |                                                     | 14 MoV 6 3                                | 14MoV6-3                                     |                                                                                                                                   | 1503-660-460,<br>3604-660                                                            |                                                        |
|                                                                                                                                 | P7 / P9                | 1.8159                                           |                                                     | 50 CrV 4                                  | 51CrV4                                       |                                                                                                                                   | 735A50,<br>735A51,<br>735H51,<br>735M50                                              | 47                                                     |
|                                                                                                                                 | P7                     | 1.8509                                           |                                                     | 41 CrAlMo 7                               | 41CrAlMo7                                    | Nitraloy 135                                                                                                                      | 905M39                                                                               | 41B                                                    |
|                                                                                                                                 | P7 / P10               | 1.8523                                           |                                                     | 39 CrMoV 13 9                             | 40CrMoV13-9                                  |                                                                                                                                   | 897M39                                                                               | 40C                                                    |
| <b>Rost-, säure- und hitzebeständige Stähle / Stainless and heat resisting steels / Acciai inossidabili e leghe refrattarie</b> |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                                      |                                                        |
| P                                                                                                                               | P14 / P15              | 1.4000                                           |                                                     | X 7 Cr 13                                 | X6Cr13                                       |                                                                                                                                   | 403S17                                                                               |                                                        |
|                                                                                                                                 | P14                    | 1.4001                                           |                                                     | X 7 Cr 14                                 | X7Cr14                                       |                                                                                                                                   | 403S17                                                                               |                                                        |
|                                                                                                                                 | P14 / P15              | 1.4006                                           |                                                     | X 10 Cr 13,<br>X 12 Cr 13                 | X12Cr13,<br>X10Cr13                          |                                                                                                                                   | 410S21,<br>410C21,<br>ANC1A                                                          |                                                        |
|                                                                                                                                 | P14                    | 1.4016                                           |                                                     | X 6 Cr 17                                 | X6Cr17                                       |                                                                                                                                   | 430S15,<br>430S17,<br>430S18                                                         | 60                                                     |
|                                                                                                                                 | P15                    | 1.4027                                           |                                                     | G-X 20 Cr 14                              | GX20Cr14                                     |                                                                                                                                   | ANC1B,<br>ANC1C,<br>420C24,<br>420C29                                                |                                                        |
|                                                                                                                                 | P15                    | 1.4034                                           |                                                     | X 46 Cr 13                                | X46Cr13                                      |                                                                                                                                   | 420S45                                                                               |                                                        |
|                                                                                                                                 | P15                    | 1.4057                                           |                                                     | X 20 CrNi 17 2                            | X19CrNi17-2,<br>X17CrNi16-2                  |                                                                                                                                   | 431S29,<br>6S80,<br>S80                                                              | 57                                                     |
|                                                                                                                                 | P14 / P15              | 1.4104                                           |                                                     | X 12 CrMoS 17                             | X14CrMoS17                                   |                                                                                                                                   |                                                                                      |                                                        |
|                                                                                                                                 | P14                    | 1.4113                                           |                                                     | X 6 CrMo 17 1                             | X6CrMo17-1                                   |                                                                                                                                   | 434S17                                                                               |                                                        |
|                                                                                                                                 | P15                    | 1.4313                                           |                                                     | X 4 CrNi 13 4                             | X3CrNiMo13-4                                 |                                                                                                                                   | 425C11,<br>425C12                                                                    |                                                        |
|                                                                                                                                 | P15                    | 1.4718                                           |                                                     | X 45 CrSi 9 3                             | X45CrSi9-3-1                                 |                                                                                                                                   | 401S45                                                                               | 52                                                     |
|                                                                                                                                 | P14                    | 1.4724                                           |                                                     | X 10 CrAl 13,<br>X 10 CrAlSi 13           | X10CrAlSi13,<br>X10CrAl13                    |                                                                                                                                   | 403S17                                                                               |                                                        |
|                                                                                                                                 | P14                    | 1.4742                                           |                                                     | X 10 CrAl 18,<br>X 10 CrAlSi 18           | X10CrAl18,<br>X10CrAlSi18                    |                                                                                                                                   | 430S15                                                                               | 60                                                     |
|                                                                                                                                 | P15                    | 1.4747                                           |                                                     | X 80 CrNiSi 20                            | X80CrNiSi20                                  | Sil XB                                                                                                                            | 443S65                                                                               | 59                                                     |
|                                                                                                                                 | P14                    | 1.4762                                           |                                                     | X 10 CrAl 24,<br>X 10 CrAlSi 25           | X10CrAl24,<br>X10CrAlSi25                    |                                                                                                                                   |                                                                                      |                                                        |
| <b>Werkzeugstähle / Tool steels / Acciai da utensili</b>                                                                        |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                                      |                                                        |
| P                                                                                                                               | P4                     | 1.1545                                           |                                                     | C 105 W 1                                 | C105U                                        |                                                                                                                                   |                                                                                      |                                                        |
|                                                                                                                                 | P4                     | 1.1663                                           |                                                     | C 125 W                                   | C125W,<br>C125U                              |                                                                                                                                   |                                                                                      |                                                        |
|                                                                                                                                 | P7 / H2                | 1.2067                                           |                                                     | 100 Cr 6                                  | 99Cr6,<br>102Cr6                             |                                                                                                                                   | BL3,<br>534A99                                                                       |                                                        |
|                                                                                                                                 | P11 / H3               | 1.2080                                           |                                                     | X 210 Cr 12                               | X210Cr12                                     |                                                                                                                                   | BD3                                                                                  |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                      | Frankreich<br>France<br>Francia<br>AFNOR           | Italien<br>Italy<br>Italia<br>UNI   | Schweden<br>Sweden<br>Svezia<br>SS | Spanien<br>Spain<br>Spagna<br>UNE                 | Japan<br>Japan<br>Giappone<br>JIS | USA<br>USA<br>USA<br>AISI/SAE/ASTM | Belgien<br>Belgium<br>Belgio<br>NBN | Russland<br>Russia<br>Russia<br>GOST |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|------------------------------------|---------------------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Bau- und Konstruktionsstähle / Structural and constructional steels / Acciai da costruzione                              |                                                    |                                     |                                    |                                                   |                                   |                                    |                                     |                                      |
| P                                                                                                                        | 15CD3.05,<br>15CD4.05                              | 14CrMo3,<br>16CrMo3                 | 2216                               | F.2631-14CrMo45                                   | SFVA F 12                         | A387 Grade 12Cl2                   | 14CrMo45                            | 12ChM                                |
|                                                                                                                          | 30CD12                                             | 32CrMo12                            | 2240                               | F.124.A                                           |                                   |                                    | 32CrMo12                            |                                      |
|                                                                                                                          | 12CD9.10,<br>10CrMo9-10,<br>10CrMo9-11             | 12CrMo9 (KW KG),<br>G14CrMo9,<br>10 | 2218                               | TU.H                                              | SFVAF22A,<br>BSCMV4,<br>SCPH32-CF | A387 Grade 22,<br>A387 Grade 22Cl2 |                                     | 12Ch8                                |
|                                                                                                                          |                                                    |                                     |                                    | F.2621-13 MoCrV6                                  |                                   |                                    | 13MoCrV6                            |                                      |
|                                                                                                                          | 50CV4,<br>51CrV4,<br>50CrV4                        | 50CrV4                              | 2230                               | F.1430-51CrV4                                     | SUP 10                            |                                    | 50CrV4                              | 50ChGFA                              |
|                                                                                                                          | 40CAD6.12                                          | 41CrAlMo7                           | 2940                               | F.1740-41CrAlMo7                                  | SACM 645,<br>JIS SACM 645         |                                    | 41CrAlMo7                           | 38ChMJuA                             |
|                                                                                                                          |                                                    |                                     |                                    |                                                   |                                   |                                    | 39CrMoV13                           |                                      |
| Rost-, säure- und hitzebeständige Stähle / Stainless and heat resisting steels / Acciai inossidabili e leghe refrattarie |                                                    |                                     |                                    |                                                   |                                   |                                    |                                     |                                      |
| P                                                                                                                        | Z6013,<br>Z6Cr13,<br>Z8C12                         | X6Cr13                              | 2301                               | F.3110-X6 Cr13                                    | SUS403,<br>SUS410S,<br>SUS429     |                                    |                                     | 08Ch13                               |
|                                                                                                                          | Z3014,<br>Z8C13FF                                  | X6Cr13                              |                                    | F.8401-AM-X12<br>Cr13                             | SUS403,<br>SUS410S,<br>SUS429     | 403,<br>410S,<br>429               |                                     | 08Ch13                               |
|                                                                                                                          | Z12C13,<br>Z12Cr13,<br>Z10C13                      | X12Cr13,<br>X10Cr13                 | 2302                               | F.3401-X12 Cr13                                   | SUS 410,<br>JIS SUS 410           | 410                                |                                     | 12Ch13                               |
|                                                                                                                          | Z8C17,<br>Z6Cr17                                   | X8Cr17                              | 2320                               | F.3113-X8 Cr17                                    | SUS 430                           |                                    |                                     | 12Ch17                               |
|                                                                                                                          | Z20C13M                                            |                                     |                                    |                                                   | SCS 2                             |                                    |                                     | 20Ch13L                              |
|                                                                                                                          | Z40C14,<br>Z40Cr14,<br>Z38C13M,<br>Z44C14          | X40Cr14                             |                                    | F.3405-X46 Cr13                                   |                                   |                                    |                                     | 40Ch13                               |
|                                                                                                                          | Z15CN16.02                                         | X16CrNi16                           | 2321                               | F.3427-X15 CrNi16,<br>F.313,<br>F.3427-X19CrNi172 | SUS 431,<br>JIS SUS 431           |                                    |                                     | 20Ch17N2                             |
|                                                                                                                          | Z10CF17                                            | X10CrS17                            | 2383                               | F3117-X10CrS17,<br>F3413-X14CrMoS17               | SUS 431,<br>SUS430F               | 430F,<br>J 405 Grade 51435         |                                     |                                      |
|                                                                                                                          | Z8CD17.01                                          | X8CrMo17                            | 2325                               | F3116-X6CrMo171                                   | SUS 434                           |                                    |                                     |                                      |
|                                                                                                                          | Z5CN13.4,<br>Z4CND13.4M,<br>Z6CN13-4,<br>Z8CD17-01 | GX6CrNi13 04                        | 2385                               |                                                   | SCS 5,<br>SCS 6                   | CA6                                |                                     |                                      |
|                                                                                                                          | Z45CS9                                             | X45CrSi8                            |                                    | F.3220-X 4 ScrSi<br>09-03                         | SUH 1                             | HNv3                               |                                     | 40Ch9S2                              |
|                                                                                                                          | Z10C13,<br>Z13C13                                  | X10CrAl12                           |                                    | F.13152-X 10 CrAl13                               |                                   | 405                                |                                     | 10Ch13SJü                            |
|                                                                                                                          | Z10CAS18,<br>Z12CAS18                              | X8Cr17                              |                                    | F.3153-X 10 CrAl 18                               | SUH 21                            | 430                                |                                     | 15Ch18SJü                            |
|                                                                                                                          | Z80CSN20.02                                        |                                     |                                    | F.3222-X 80CrSi-<br>Ni20-02                       | SUH 4                             | HNv6                               |                                     |                                      |
|                                                                                                                          | Z10CAS24,<br>Z12CAS25                              | X16Cr26                             | 2322                               | F.3154-X 10 CrAl24                                | SUH 446                           | 446                                |                                     |                                      |
| Werkzeugstähle / Tool steels / Acciai da utensili                                                                        |                                                    |                                     |                                    |                                                   |                                   |                                    |                                     |                                      |
| P                                                                                                                        | C105E2U,<br>Y1105                                  | C100KU                              | 1880                               | F515,<br>F516                                     | SK 3 (TC105)                      | W110                               |                                     | U10A-1                               |
|                                                                                                                          | Y2120                                              |                                     |                                    | F.5123 C120                                       |                                   | W112                               |                                     | U13-1                                |
|                                                                                                                          | 100Cr6RR,<br>100C6,<br>Y100C6                      |                                     | 2258                               | F.5230 100 Cr6,<br>F.1310 - 100 Cr6,<br>F.131     | SUJ 2,<br>SUJ 4                   | L3,<br>52100,<br>L1                |                                     | Ch                                   |
|                                                                                                                          | X200Cr12,<br>Z200C12                               | X205Cr12KU                          |                                    | F.5212 X210 Cr12                                  | SKD 1,<br>SKS                     | D3                                 |                                     | Ch12                                 |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                                     | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN | Deutschland<br>Germany<br>Germania<br>DIN EN          | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.               | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|-------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Werkzeugstähle / Tool steels / Acciai da utensili</b>                                                                                |                        |                                                  |                                                     |                                           |                                                       |                                                                                                                                   |                                                                        |                                                        |
| <b>P</b>                                                                                                                                | P11 / H1               | 1.2344                                           |                                                     | X 40 CrMoV 5 1                            | X40CrMoV5-1                                           |                                                                                                                                   | BH13                                                                   |                                                        |
|                                                                                                                                         | P11 / H3               | 1.2363                                           |                                                     | X 100 CrMoV 5 1                           | X100CrMoV5-1                                          |                                                                                                                                   | BA2                                                                    |                                                        |
|                                                                                                                                         | P7 / H2                | 1.2419                                           |                                                     | 105 WCr 6                                 | 107WCr5,<br>105WCr6,<br>100WCr6                       |                                                                                                                                   |                                                                        |                                                        |
|                                                                                                                                         | P14 / H3               | 1.2436                                           |                                                     | X 210 CrW 12                              | X210CrW12-1,<br>X210CrW12                             |                                                                                                                                   |                                                                        |                                                        |
|                                                                                                                                         | P7 / H2                | 1.2542                                           |                                                     | 45 WCrV 7                                 | 45WCrV8,<br>45WCrV7                                   |                                                                                                                                   | BS1                                                                    |                                                        |
|                                                                                                                                         | P11 / P13              | 1.2581                                           |                                                     | X 30 WCrV 9 3                             | X30WCrV9-3                                            |                                                                                                                                   | BH21                                                                   |                                                        |
|                                                                                                                                         | P14 / H3               | 1.2601                                           |                                                     | X 165 CrMoV 12                            | X165CrMoV12                                           |                                                                                                                                   |                                                                        |                                                        |
|                                                                                                                                         | P7 / P10 / H1          | 1.2713                                           |                                                     | 55 NiCrMoV 6                              | 55NiCrMoV6                                            |                                                                                                                                   | BH224                                                                  |                                                        |
|                                                                                                                                         | P7 / H3                | 1.2833                                           |                                                     | 100 V 1                                   | 100V1                                                 |                                                                                                                                   | BW2                                                                    |                                                        |
|                                                                                                                                         | P11 / H3               | 1.3243                                           |                                                     | S 6-5-2-5                                 | HS6-5-2-5                                             |                                                                                                                                   | BM35                                                                   |                                                        |
|                                                                                                                                         | P11 / H3               | 1.3255                                           |                                                     | S 18-1-2-5                                | HS18-1-2-5                                            |                                                                                                                                   | BT4                                                                    |                                                        |
|                                                                                                                                         | P11 / H3               | 1.3343                                           |                                                     | S 6-5-2                                   | HS6-5-2                                               |                                                                                                                                   | BM2                                                                    |                                                        |
|                                                                                                                                         | P11 / H3               | 1.3348                                           |                                                     | S 2-9-2                                   | HS2-9-2                                               |                                                                                                                                   |                                                                        |                                                        |
|                                                                                                                                         | P11 / H3               | 1.3355                                           |                                                     | S 18-0-1                                  | HS18-0-1                                              |                                                                                                                                   | BT1                                                                    |                                                        |
| <b>Rostfreier und warmfester Stahl / Stainless steel and high temperature steel / Acciai inossidabili e acciai resistenti al calore</b> |                        |                                                  |                                                     |                                           |                                                       |                                                                                                                                   |                                                                        |                                                        |
| <b>M</b>                                                                                                                                | M1                     | 1.4301                                           |                                                     | X 5 CrNi 18 10                            | X5CrNi18-10                                           |                                                                                                                                   | 304S15,<br>304S16,<br>304S31,<br>304S11,<br>304S17,<br>LW21,<br>LWCF21 | 58E                                                    |
|                                                                                                                                         | M1                     | 1.4305                                           |                                                     | X 10 CrNiS 18 9                           | X8CrNiS18-9                                           |                                                                                                                                   | 303S21,<br>303S22,<br>303S31                                           | 58M                                                    |
|                                                                                                                                         | M1                     | 1.4306                                           |                                                     | X 2 CrNi 19 11                            | X2CrNi19-11                                           |                                                                                                                                   | 304S11,<br>LW20,<br>LWCF20,<br>S536, T74,<br>304C12 (LT196),<br>305S11 |                                                        |
|                                                                                                                                         | M1                     | 1.4308                                           |                                                     | G-X 6 CrNi 18 9                           | GX5CrNi19-10                                          |                                                                                                                                   | 304C15,<br>304C15 (LT196)                                              |                                                        |
|                                                                                                                                         | M2                     | 1.4310                                           |                                                     | X 12 CrNi 17 7                            | X9CrNi18-8,<br>X10CrNi18-8                            |                                                                                                                                   | 301S21,<br>301S22,<br>302S26                                           |                                                        |
|                                                                                                                                         | M1                     | 1.4311                                           |                                                     | X 2 CrNiN 18 10                           | X2CrNiN18-10                                          |                                                                                                                                   | 304S62                                                                 |                                                        |
|                                                                                                                                         | M1                     | 1.4401                                           |                                                     | X 5 CrNiMo 17 12 2                        | X5CrNiMo17-12-2,<br>X4CrNiMo17-12-2,<br>X5CrNiMo18-10 |                                                                                                                                   | 316S13,<br>316S17,<br>316S19,<br>316S31,<br>316S33,<br>316S16          |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                                     | Frankreich<br>France<br>Francia<br><b>AFNOR</b>                                                    | Italien<br>Italy<br>Italia<br><b>UNI</b>     | Schweden<br>Sweden<br>Svezia<br><b>SS</b> | Spanien<br>Spain<br>Spagna<br><b>UNE</b>                                                   | Japan<br>Japan<br>Giappone<br><b>JIS</b> | USA<br>USA<br>USA<br><b>AISI/SAE/ASTM</b> | Belgien<br>Belgium<br>Belgio<br><b>NBN</b> | Russland<br>Russia<br>Russia<br><b>GOST</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------|---------------------------------------------|
| <b>Werkzeugstähle / Tool steels / Acciai da utensili</b>                                                                                |                                                                                                    |                                              |                                           |                                                                                            |                                          |                                           |                                            |                                             |
| <b>P</b>                                                                                                                                | X40CrMoV5,<br>Z40CDV5                                                                              | X40CrMoV511KU                                | 2242                                      | F.5318 X40 CrMoV5                                                                          | SKD 61                                   | H13                                       |                                            | 4Ch5MF1S                                    |
|                                                                                                                                         | X100CrMoV5,<br>Z100CDV5                                                                            | X100CrMoV51KU                                | 2260                                      | F.5227 X100<br>CrMoV5                                                                      | SKD 12,<br>JIS SKD 12                    | A2                                        |                                            |                                             |
|                                                                                                                                         | 105WC13                                                                                            | 107WCr5KU                                    | 2140                                      | F.5233 105 WCr5,<br>F.523                                                                  | SKS 2,<br>SKS 3,<br>SKS 31               |                                           |                                            |                                             |
|                                                                                                                                         | X210CrW12-1,<br>Z210CW12-01,<br>Z 210 CW 12                                                        | X215CrW121KU                                 | 2312                                      | F.5213 X210 CrW12,<br>F.521                                                                |                                          | D6                                        |                                            |                                             |
|                                                                                                                                         | 45WCrV8,<br>45WCrV20                                                                               | 45WCrV8KU                                    | 2710                                      | F.5241 45 WCrSi 8,<br>F.524,<br>F.524145WCrSi 8                                            |                                          | S1                                        |                                            | 5ChW2SF                                     |
|                                                                                                                                         | X30WCrV9,<br>Z30WCrV9                                                                              | X30WCrV93KU                                  |                                           | F.5323 X30 WCrV9                                                                           | SKD 5                                    | H21                                       |                                            | 3Ch2W8F                                     |
|                                                                                                                                         |                                                                                                    | X165CrMoW12KU                                | 2310                                      | F.5211 X160<br>CrMoV12                                                                     |                                          |                                           |                                            |                                             |
|                                                                                                                                         |                                                                                                    |                                              |                                           | F.528,<br>F.520S                                                                           |                                          | L6                                        |                                            | 5ChNM                                       |
|                                                                                                                                         | C105E2UV1,<br>Y1105V,<br>100V2                                                                     | 102V2KU                                      |                                           |                                                                                            | SKS 43                                   | W210                                      |                                            |                                             |
|                                                                                                                                         | Z85WDCV06- 05-<br>05-04-02,<br>Z90WDCV06- 05-<br>05-04-02                                          | HS6-5-2-5                                    | 2723                                      | F.5613 6-5-2-5                                                                             | SKH 55                                   | M35                                       |                                            | R6M5K5                                      |
|                                                                                                                                         | Z80WKC18- 05-<br>04-01                                                                             | HS18-1-1-5                                   |                                           | F.5530 18-1-1-5                                                                            | SKH 3                                    | T4                                        |                                            |                                             |
|                                                                                                                                         | Z85WDCV06- 05-<br>04-02                                                                            | HS6-5-2-5                                    | 2722                                      | F.5603 6-5-2                                                                               | SKH 51                                   | M2                                        |                                            | R6M5                                        |
|                                                                                                                                         | Z100DCW09- 04-<br>02-02                                                                            | HS2-9-2                                      | 2782                                      | F.5607 2-9-2                                                                               |                                          | M7                                        |                                            |                                             |
|                                                                                                                                         | Z80WCV18-04-01                                                                                     | HS18-0-1                                     |                                           | F.5520 18-0-1                                                                              | SKH 2                                    | T1                                        |                                            | R18                                         |
| <b>Rostfreier und warmfester Stahl / Stainless steel and high temperature steel / Acciai inossidabili e acciai resistenti al calore</b> |                                                                                                    |                                              |                                           |                                                                                            |                                          |                                           |                                            |                                             |
| <b>M</b>                                                                                                                                | Z4CN19-10FF,<br>Z5CN17-08,<br>Z6CN18-09,<br>Z7CN18-09                                              | X5CrNi18 10                                  | 2332,<br>233                              | F.3451-X5 CrNi18-<br>10, F.314,<br>F.3504-X6CrNi19<br>10,<br>F3504-X5CrNi1810              | SUS 304                                  | 304,<br>304H                              |                                            | 08Ch18N10                                   |
|                                                                                                                                         | Z10CNF18.09,<br>Z8CNF18-09                                                                         | X10CrNiS18 09                                | 2346                                      | F.3508-X10Cr-<br>NiS18-09                                                                  | SUS 303,<br>JIS SUS 303                  | J 405 Grade 30303                         |                                            |                                             |
|                                                                                                                                         | Z1CN18-12,<br>Z2CN18-10,<br>Z3CN19.10M,<br>Z3CN18-10,<br>Z3CN19-11,<br>Z3CN19-11FF                 | X3CrNi18 11,<br>X2CrNi18 11,<br>GX2CrNi19 10 | 2352                                      | F.3503-X 2CrNi19-<br>10,<br>F3503-X 2CrNi18-<br>10                                         | JIS SCS 19,<br>JIS SUS 304L              |                                           |                                            | 03Ch18N11                                   |
|                                                                                                                                         | Z6CN18.10M                                                                                         |                                              |                                           |                                                                                            | SCS 13                                   |                                           |                                            | 07Ch18N9L                                   |
|                                                                                                                                         | Z12CN17.07,<br>Z12CN18.07,<br>Z11CN17-08,<br>Z11CN18-08,<br>Z12CN18-09                             | X12CrNi17 07                                 | 2331                                      | F.3517-X12CrNi17<br>07                                                                     | SUS 301                                  | 301                                       |                                            |                                             |
|                                                                                                                                         | Z3CN18-07Az,<br>Z3CN18-10AZ                                                                        | X2CrNi18 11                                  | 2371                                      | F3541-X2CrN-<br>iN1810                                                                     | SUS 304 LN                               | 304LN                                     |                                            |                                             |
|                                                                                                                                         | Z6CND17.11,<br>Z3CD17-11-01,<br>Z6CND17-11,<br>Z6CND17-11-02FF,<br>Z7CND17-11-02,<br>Z7CND17-12-02 | X5CrNiMo17 12                                | 2347                                      | F.3543-X5CrNi-<br>Mo17-12,<br>F.3543-X6 CrNi-<br>Mo17- 12-03,<br>F3543-X5CrNi-<br>Mo17-122 | SUS 316                                  | 316                                       |                                            |                                             |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                              | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.         | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|-------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------|
| Rostfreier und warmfester Stahl / Stainless steel and high temperature steel / Acciai inossidabili e acciai resistenti al calore |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                  |                                                        |
| M                                                                                                                                | M1                     | 1.4408                                           |                                                     | G-X 6 CrNiMo 18 10                        | GX5CrNiMo19-11-2                             |                                                                                                                                   | 316C16,<br>316C16 (LT196),<br>ANC4B                              |                                                        |
|                                                                                                                                  | M1                     | 1.4429                                           |                                                     | X 2 CrNiMoN 17<br>13 3                    | X2CrNiMoN17-13-3                             |                                                                                                                                   | 316S62,<br>316S63                                                |                                                        |
|                                                                                                                                  | M1                     | 1.4435                                           |                                                     | X 2 CrNiMo 18 14 3,<br>X 2 CrNiMo 18 12   | X2CrNiMo18-14-3                              |                                                                                                                                   | 316S11, 316S13,<br>316S14, 316S31,<br>LW22, LWCF22,<br>316S12    |                                                        |
|                                                                                                                                  | M1                     | 1.4438                                           |                                                     | X 2 CrNiMo 18 16 4                        | X2CrNiMo18-15-4                              |                                                                                                                                   | 317S12                                                           |                                                        |
|                                                                                                                                  | M1                     | 1.4460                                           |                                                     | X 4 CrNiMoN 27 5 2                        | X3CrNiMoN27-5-2                              |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4541                                           |                                                     | X 6 CrNiTi 18 10                          | X6CrNiTi18-10                                |                                                                                                                                   | 321S12,<br>321S31,<br>321S51<br>(1010, 1105),<br>LW24,<br>LWCF24 | 58B,<br>58C                                            |
|                                                                                                                                  | M1                     | 1.4550                                           |                                                     | X 6 CrNiNb 18 10                          | X6CrNiNb18-10                                |                                                                                                                                   | 347S20,<br>347S31,<br>347S51,<br>ANC3B                           | 58F,<br>58G                                            |
|                                                                                                                                  | M1                     | 1.4571                                           |                                                     | X 6 CrNiMoTi 17<br>12 2                   | X6CrNiMoTi17-12-2                            |                                                                                                                                   | 320S31,<br>320S17,<br>320S18                                     | 58J                                                    |
|                                                                                                                                  | M1                     | 1.4581                                           |                                                     | G-X 5 CrNiMoNb<br>18 10                   | GX5CrNi-<br>MoNb19-11-2                      |                                                                                                                                   | 318C17,<br>ANC4C                                                 |                                                        |
|                                                                                                                                  | M1                     | 1.4583                                           |                                                     | X 10 CrNiMoNb<br>18 12                    | X10CrNiMoNb18-12                             |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4828                                           |                                                     | X 15 CrNiSi 20 12                         | X15CrNiSi20-12                               |                                                                                                                                   | 309S24                                                           |                                                        |
|                                                                                                                                  | M2                     | 1.4871                                           |                                                     | X 53 CrMnNiN 21 9                         | X53CrMnNiN21-9                               |                                                                                                                                   | 349S54                                                           |                                                        |
|                                                                                                                                  | M1                     | 1.4878                                           |                                                     | X 12 CrNiTi 18 9                          | X12CrNiTi18-9,<br>X10CrNiTi18-10             |                                                                                                                                   | 321S20,<br>321S51                                                | 58B,<br>58C                                            |
| Warmfeste Legierung Fe-Basis / High temperature resistant alloys / Leghe refrattarie, Superleghe                                 |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                  |                                                        |
| M                                                                                                                                | M1                     | 1.4558                                           |                                                     | X 2 NiCrAlTi 32 20                        | X2NiCrAlTi32-20                              |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4563                                           |                                                     | X 1 NiCrMoCu 31<br>27 4                   | X1NiCrMo-<br>Cu31-27-4                       |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4864                                           |                                                     | X 12 NiCrSi 36 16                         | X12NiCrSi36-16,<br>X12NiCrSi35-16            | Incoloy DS                                                                                                                        | NA17                                                             |                                                        |
|                                                                                                                                  | M1                     | 1.4958                                           |                                                     | X 5 NiCrAlTi31-20                         | X5NiCrAlTi31-20                              |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4977                                           |                                                     |                                           | X 40 CoCrNi 20 20                            |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | M1                     | 1.4845                                           |                                                     | X12CrNi25-21                              |                                              |                                                                                                                                   | 310S16                                                           |                                                        |
| Grauguss/ Cast iron / Ghisa grigia                                                                                               |                        |                                                  |                                                     |                                           |                                              |                                                                                                                                   |                                                                  |                                                        |
| K                                                                                                                                | K3                     | 0.6010                                           | EN-JL1010                                           | GG-10,<br>GG 10                           | EN-GJL-100                                   |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | K3                     | 0.6015                                           | EN-JL1020                                           | GG-15,<br>GG 15                           | EN-GJL-150                                   |                                                                                                                                   | Grade 150                                                        |                                                        |
|                                                                                                                                  | K3                     | 0.6020                                           | EN-JL1030                                           | GG-20,<br>GG 20                           | EN-GJL-200                                   |                                                                                                                                   | Grade 220                                                        |                                                        |
|                                                                                                                                  | K3                     | 0.6025                                           | EN-JL1040                                           | GG-25,<br>GG 25                           | EN-GJL-250                                   |                                                                                                                                   | Grade 260                                                        |                                                        |
|                                                                                                                                  | K4                     | 0.6030                                           | EN-JL1050                                           | GG-30,<br>GG 30                           | EN-GJL-300                                   |                                                                                                                                   | Grade 300                                                        |                                                        |
|                                                                                                                                  | K4                     | 0.6035                                           | EN-JL1060                                           | GG-35,<br>GG 35                           | EN-GJL-350                                   |                                                                                                                                   | Grade 350                                                        |                                                        |
|                                                                                                                                  | K4                     | 0.6040                                           |                                                     | GG-40,<br>GG 40                           | EN-GJL-400                                   |                                                                                                                                   | Grade 400                                                        |                                                        |
|                                                                                                                                  | K4                     | 0.6660                                           |                                                     | GGL-NiCr 20 2                             |                                              |                                                                                                                                   | L-NiCr20 2                                                       |                                                        |
|                                                                                                                                  | K4                     |                                                  |                                                     | GG-26Cr,<br>GG 26Cr                       | EN-GJL-260 Cr                                |                                                                                                                                   |                                                                  |                                                        |
|                                                                                                                                  | K7                     |                                                  |                                                     | GGV 45                                    | EN-GJV-450                                   |                                                                                                                                   |                                                                  |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                              | Frankreich<br>France<br>Francia<br>AFNOR         | Italien<br>Italy<br>Italia<br>UNI | Schweden<br>Sweden<br>Svezia<br>SS | Spanien<br>Spain<br>Spagna<br>UNE                                                                      | Japan<br>Japan<br>Giappone<br>JIS | USA<br>USA<br>USA<br>AISI/SAE/ASTM | Belgien<br>Belgium<br>Belgio<br>NBN | Russland<br>Russia<br>Russia<br>GOST |
|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Rostfreier und warmfester Stahl / Stainless steel and high temperature steel / Acciai inossidabili e acciai resistenti al calore |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
| M                                                                                                                                |                                                  |                                   |                                    | F.8414-AM-X7<br>CrNiMo20 10                                                                            | SCS 14                            |                                    |                                     | 07Ch18N10G2S2M2L                     |
|                                                                                                                                  | Z2CND17.13Az                                     | X2CrNiMoN17 13                    | 2375                               | F3543- X2CrNi-<br>MoN17133                                                                             | SUS 316 LN                        | 316LN                              |                                     |                                      |
|                                                                                                                                  | Z2CND17.13,<br>Z3CND17-12-03,<br>Z3CND18-14-03   | X2CrNiMo17 13                     | 2353                               | F.3533-X2 CrNiMo<br>17-12-03,<br>F.3534-X6 CrNiMo<br>17-12-03                                          |                                   | 316L                               |                                     | 03Ch17N14M3                          |
|                                                                                                                                  | Z2CND19.15,<br>Z2CND19-15-04,<br>Z3CND19-15-04   | X2CrNiMo18 16                     | 2367                               | F3539-X2CrNi-<br>Mo18164                                                                               | SUS 317 L                         | 317L                               |                                     |                                      |
|                                                                                                                                  | Z3CND25-07Az,<br>Z5CND27-05Az                    |                                   | 2324                               | F3309-X8CrNi-<br>Mo27-05,<br>F3552-X8CrNi-<br>Mo266                                                    | SUS 329 J1                        |                                    |                                     |                                      |
|                                                                                                                                  | Z6CNT18.10                                       | X6CrNiTi18 11                     | 2337                               | F.3553-X7 CrNiTi<br>18-11,<br>F.3523-X 6 CrNi-<br>Ti18-11,<br>09 Ch 18N10T,<br>F3523-X6CrNi-<br>Ti1810 | SUS 321,<br>JIS SUS 321           |                                    |                                     | 06Ch18N10T                           |
|                                                                                                                                  | Z6CNNb18.10                                      | X6CrNiNb18 11,<br>X8CrNiNb18 11   | 2338                               | F.3552-X 7<br>CrNiNb18-11,<br>F.3524-X 67<br>CrNiNb18-11,<br>F3524-<br>X6CrNiNb1810                    | SUS 347                           |                                    |                                     | 08Ch18N12B                           |
|                                                                                                                                  | Z6CNDT17.12                                      | X6CrNiMoTi17 12                   | 2350                               | F.3552-X 6 CrNiMo-<br>Ti17-12-03,<br>F3535- X6CrNiMo-<br>Ti17122                                       | SUS 316 Ti                        | 316Ti,<br>326Ti                    |                                     | 10Ch17N13M2T                         |
|                                                                                                                                  | Z4CNDNb18.12M                                    | GX6CrNiMoNb20 11                  |                                    |                                                                                                        | SCS 22                            |                                    |                                     |                                      |
|                                                                                                                                  |                                                  | X6CrNiMoNb17 13                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
| M                                                                                                                                | Z15CNS20.12,<br>Z17CNS20-12,<br>Z9CN24-13        | X16CrNi23 14                      |                                    | F3312-X15CrNi-<br>Si20-12                                                                              | SUH 309                           | 309                                |                                     | 20Ch20N14S2                          |
|                                                                                                                                  | Z52CMN21.09,<br>Z53CMNS21-09Az,<br>Z53CMN21-09Az | X53CrMnNiN21 9                    |                                    | F.3217-X53 CrMn-<br>NiN 21-09                                                                          | SUH 35,<br>SUH 36                 | EV8                                |                                     | 55Ch20G9AN4                          |
|                                                                                                                                  | T6CNT18.12 (B),<br>Z6CNT18-10                    |                                   | 2337                               | F.3523-X 6CrNiTi<br>18 11                                                                              | SUS 321                           | 321                                |                                     |                                      |
|                                                                                                                                  |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
| Warmfeste Legierung Fe-Basis / High temperature resistant alloys / Leghe refrattarie, Superleghe                                 |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
| M                                                                                                                                |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
|                                                                                                                                  | Z12NCS37.18,<br>Z12NCS35.16,<br>Z20NCS33-16      |                                   |                                    | F.3313-X12 CrNi<br>36-16                                                                               | SUH 330                           |                                    |                                     |                                      |
|                                                                                                                                  | Z 42 CNKDOWNb                                    |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
|                                                                                                                                  | Z8CN25-20                                        | X6CrNi2521                        | 2361                               |                                                                                                        | SUH310                            | 310S                               |                                     | 20Ch23N18                            |
| Grauguss/ Cast iron / Ghisa grigia                                                                                               |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |
| K                                                                                                                                | Fi10D,<br>FGL100                                 | G10                               | 110                                | FG 10                                                                                                  | FC 100,<br>FC10                   |                                    |                                     | Sc10                                 |
|                                                                                                                                  | Fi15D,<br>FGL150                                 | G15                               | 115                                | FG 15                                                                                                  | FC 150                            |                                    |                                     | Sc15                                 |
|                                                                                                                                  | Fi20D,<br>FGL200                                 | G20                               | 120                                | FG 20                                                                                                  | FC 200,<br>FC20                   |                                    |                                     | Sc20                                 |
|                                                                                                                                  | Fi25D,<br>FGL250                                 | G25                               | 125                                | FG 25                                                                                                  | FC25,<br>FC 250                   |                                    |                                     | Sc25                                 |
|                                                                                                                                  | Fi30D,<br>FGL300                                 | G30                               | 130                                | FG 30                                                                                                  | FC 300                            |                                    |                                     | Sc30                                 |
|                                                                                                                                  | Fi35D,<br>FGL350                                 | G35                               | 135                                | FG 35                                                                                                  | FC 350                            |                                    |                                     | Sc35                                 |
|                                                                                                                                  | Fi40D,<br>FGL400                                 |                                   | 140                                |                                                                                                        |                                   |                                    |                                     | Sc40                                 |
|                                                                                                                                  | L-NC 20 2                                        |                                   | 523                                |                                                                                                        |                                   |                                    |                                     |                                      |
|                                                                                                                                  |                                                  |                                   |                                    |                                                                                                        |                                   |                                    |                                     |                                      |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                            | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN     | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S. | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|--------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|
| <b>Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame</b> |                        |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                          |                                                        |
| <b>K</b>                                                                       | K5                     | 0.7040                                           | EN-JS1030                                           | GGG-40                                        | EN-GJS-400-15                                |                                                                                                                                   | 420 / 12                                                 |                                                        |
|                                                                                | K6                     | 0.7050                                           | EN-JS1050                                           | GGG-50                                        | EN-GJS-500-7                                 |                                                                                                                                   | 500 / 7                                                  |                                                        |
|                                                                                | K6                     | 0.7060                                           | EN-JS1060,<br>EN-JS 1092                            | GGG-60                                        | EN-GJS-600-3,<br>EN-GJS-600-3U               |                                                                                                                                   | 600 / 3                                                  |                                                        |
|                                                                                | K6                     | 0.7070                                           | EN-JS1070,<br>EN-JS 1102                            | GGG-70                                        | EN-GJS-700-2,<br>EN-GJS-700-2U               |                                                                                                                                   | 700 / 2                                                  |                                                        |
| <b>Temperguss / Malleable cast iron / Ghisa malleabile</b>                     |                        |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                          |                                                        |
| <b>K</b>                                                                       | K1                     | 0.8035                                           | EN-JM 1010                                          | GTW-35,<br>GTW-35-04                          | GTW-35-04,<br>EN-GJMW-350-4                  |                                                                                                                                   | W 35-04                                                  |                                                        |
|                                                                                | K1                     | 0.8040                                           | EN-JM 1030                                          | GTW-40-05,<br>GTW-40                          | EN-GJMW-400-5,<br>GTW-40-05                  |                                                                                                                                   | W 410 / 4                                                |                                                        |
|                                                                                | K1                     | 0.8045                                           | EN-JM 1040                                          | GTW-45-07,<br>GTW-45                          | EN-GJMW-450-7                                |                                                                                                                                   | 45-07                                                    |                                                        |
|                                                                                | K1                     | 0.8135                                           | EN-JM 1130                                          | GTS-35-10,<br>GTS-35                          | EN-GJMB 350-10                               |                                                                                                                                   | B 340 / 12                                               |                                                        |
|                                                                                | K1                     | 0.8145                                           | EN-JM 1140                                          | GTS-45-06,<br>GTS-45                          | EN-GJMB 450-6,<br>GTS-45-06                  |                                                                                                                                   | P 440 / 7,<br>P 45-06                                    |                                                        |
|                                                                                | K1                     | 0.8155                                           | EN-JM 1160                                          | GTS-55-04,<br>GTS-55                          | EN-GJMB 550-4,<br>GTS-55-04                  |                                                                                                                                   | P 540 / 5,<br>P 55-04                                    |                                                        |
|                                                                                | K2                     | 0.8165                                           | EN-JM 1180                                          | GTS 65-02,<br>GTS-65                          | EN-GJMB 650-2,<br>GTS-65-02                  |                                                                                                                                   | P 65-02                                                  |                                                        |
|                                                                                | K2                     | 0.8170                                           | EN-JM 1190                                          | GTS 70-02,<br>GTS-70                          | EN-GJMB 700-2,<br>GTS-70-02                  |                                                                                                                                   | P 70-02                                                  |                                                        |
| <b>Aluminiumlegierung / Aluminium alloys / Leghe di Alluminio</b>              |                        |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                          |                                                        |
| <b>N</b>                                                                       | N1                     | 3.0255                                           | EN AW-1050A                                         | Al99.5                                        | Al99.5                                       |                                                                                                                                   | 1B                                                       |                                                        |
|                                                                                | N4                     | 3.1371                                           | EN AC-21000                                         | G-AlCu4TiMg                                   | G-AlCu4TiMg                                  |                                                                                                                                   |                                                          |                                                        |
|                                                                                | N2                     | 3.1655                                           | EN AW-2011                                          | AlCu6BiPb                                     | AlCu6BiPb                                    |                                                                                                                                   | FC1                                                      |                                                        |
|                                                                                | N2                     | 3.1734                                           |                                                     | Y-Legierung                                   | AlCu4Mg1.5Ni2,<br>WL 3.1734                  |                                                                                                                                   | LM14                                                     |                                                        |
|                                                                                | N4                     | 3.2371                                           | EN AC-42100                                         | G-AlSi7Mg                                     | G-AlSi7Mg,<br>AlSi7Mg                        |                                                                                                                                   | 2L99,<br>LM25                                            |                                                        |
|                                                                                | N4                     | 3.2373                                           | EN AC-43300                                         | G-AlSi9Mg                                     | G-AlSi9Mg,<br>AlSi9Mg                        |                                                                                                                                   |                                                          |                                                        |
|                                                                                | N4                     | 3.2381                                           | EN AC-43000                                         | G-AlSi10Mg                                    | G-AlSi10Mg,<br>AlSi10Mg                      |                                                                                                                                   | LM9                                                      |                                                        |
|                                                                                | N4                     | 3.2382                                           | EN AC-43400                                         | GD-AlSi10Mg                                   | AlSi10Mg(Fe)                                 |                                                                                                                                   | LM9                                                      |                                                        |
|                                                                                | N4                     | 3.2383                                           | EN AC-43200                                         | G-AlSi10MgCu                                  | G-AlSi10MgCu,<br>AlSi10Mg (Cu)               |                                                                                                                                   |                                                          |                                                        |
|                                                                                | N3                     | 3.2581                                           | EN AC-44200                                         | G-AlSi12                                      | G-AlSi12,<br>AlSi12                          |                                                                                                                                   | LM6                                                      |                                                        |
|                                                                                | N3                     | 3.2582                                           | EN AC-44300                                         | GD-AlSi12                                     | GD-AlSi12,<br>AlSi12 (Fe)                    |                                                                                                                                   | LM6,<br>LM20                                             |                                                        |
|                                                                                | N3                     | 3.2583                                           | EN AC-47000                                         | G-AlSi12 (Cu)                                 | G-AlSi12 (Cu)                                |                                                                                                                                   | LM20                                                     |                                                        |
|                                                                                | N2                     | 3.3315                                           | EN AW-5005A                                         | AlMg1                                         | AlMg1C                                       |                                                                                                                                   | N41                                                      |                                                        |
|                                                                                | N3                     | 3.3561                                           | EN AC-51300                                         | G-AlMg5                                       | G-AlMg5                                      |                                                                                                                                   | N6,<br>LM5                                               |                                                        |
|                                                                                | N2                     | 3.4345                                           | EN AW-7022                                          | AlZnMgCu0.5                                   | AlZnMgCu0.5                                  |                                                                                                                                   |                                                          |                                                        |
| <b>Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame</b> |                        |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                          |                                                        |
| <b>N</b>                                                                       | N7                     | 2.0240                                           | CW502L                                              | CuZn15                                        | CuZn15                                       | Mittelrotombak,<br>Goldtombak                                                                                                     | CZ 102                                                   |                                                        |
|                                                                                | N7                     | 2.0265                                           | CW505L                                              | CuZn30                                        | CuZn30                                       | Halbtombak,<br>Lötmetall,<br>Cartridge Messing,<br>Cuivre Poli,<br>Metarsic                                                       | CZ 106                                                   |                                                        |
|                                                                                | N7                     | 2.0321                                           | CW508L                                              | CuZn37                                        | CuZn37                                       | Druckmessing,<br>Etzqualitäts,<br>Stimmenmessing,<br>Weichmessing,<br>Prägemessing                                                | CZ 108                                                   |                                                        |
|                                                                                | N7                     | 2.0592                                           | CC765S                                              | G-CuZn35Al1,<br>GK-CuZn35Al1,<br>GZ-CuZn35Al1 | CuZn35Mn2Al-<br>1Fe1-C                       |                                                                                                                                   | HTB 1                                                    |                                                        |



# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                     | Frankreich<br>France<br>Francia<br>AFNOR | Italien<br>Italy<br>Italia<br>UNI | Schweden<br>Sweden<br>Svezia<br>SS | Spanien<br>Spain<br>Spagna<br>UNE | Japan<br>Japan<br>Giappone<br>JIS | USA<br>USA<br>USA<br>AISI/SAE/ASTM | Belgien<br>Belgium<br>Belgio<br>NBN | Russland<br>Russia<br>Russia<br>GOST |
|-------------------------------------------------------------------------|------------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| K                                                                       | FGS 400-12                               | GS400-12                          | 717                                |                                   | FCD 400,<br>FCD40                 |                                    |                                     | VC42-12                              |
|                                                                         | FGS 500-7                                | GS500-7                           | 727                                |                                   | FCD 500,<br>FCD50                 |                                    |                                     | VC50-2                               |
|                                                                         | FGS 600-3                                | GS600-3                           | 732                                |                                   | FCD 600,<br>FCD60                 |                                    |                                     | VC60-2                               |
|                                                                         | FGS 700-2                                | GS700-2                           | 737                                |                                   | FCD 700,<br>FCD70                 |                                    |                                     | VC70-2                               |
| Temperguss / Malleable cast iron / Ghisa malleabile                     |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| K                                                                       | MB 35-7                                  |                                   |                                    |                                   | FCMW 330                          |                                    |                                     |                                      |
|                                                                         | MB 40-10                                 |                                   |                                    |                                   | FCMW 350                          |                                    |                                     |                                      |
|                                                                         | MB 45-7                                  |                                   |                                    |                                   | FCMWP 440                         |                                    |                                     |                                      |
|                                                                         | MN 35-10                                 |                                   | 815                                |                                   | FCMB 340                          |                                    |                                     |                                      |
|                                                                         | MP 50-5                                  |                                   | 854                                |                                   |                                   |                                    |                                     |                                      |
|                                                                         | MP 60-3                                  |                                   | 856                                |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   | 862                                |                                   |                                   |                                    |                                     |                                      |
|                                                                         | MP 70-2                                  |                                   | 862                                |                                   |                                   |                                    |                                     |                                      |
|                                                                         | FGS370-17                                | GS042/15                          | 0717-15                            |                                   |                                   |                                    |                                     | VC42-12                              |
| Aluminiumlegierung / Aluminium alloys / Leghe di Alluminio              |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       | A5                                       | 4507                              | 4007                               | L-3051                            | A1x1,<br>A1050                    | 1050A                              |                                     |                                      |
|                                                                         | A-U5GT                                   |                                   |                                    | L-2140                            | AC1B                              |                                    |                                     |                                      |
|                                                                         | A-U5PbBi                                 | 6362                              | 4355                               | L-3182                            | A2011                             |                                    |                                     |                                      |
|                                                                         | A-U4NT                                   | 3045                              |                                    | L-2150                            | AC5A                              |                                    |                                     |                                      |
|                                                                         | A-S7G0.3                                 | 7257                              | 4244                               | L-2651                            | AC4C,<br>JIS AC4 CH (AL 9)        |                                    |                                     |                                      |
|                                                                         | A7-S10G                                  | 3051                              | 4253                               |                                   | AC4A,<br>JIS AC4 A (AL 4)         |                                    |                                     |                                      |
|                                                                         | A-S10G                                   | 3051                              | 4253                               | L-2560,<br>L-2561                 | JIS AC4 A (AL 4V)                 |                                    |                                     |                                      |
|                                                                         | A-S10G                                   | 3051                              | 4253                               | L-2560,<br>L-2561                 | AC4A                              |                                    |                                     |                                      |
|                                                                         | A-S9GU                                   |                                   |                                    |                                   | JIS ADC3 (AL 4)                   |                                    |                                     |                                      |
|                                                                         | A-S13                                    | 4514                              | 4261                               | L-2520,<br>L-2521                 | AC3A                              |                                    |                                     |                                      |
|                                                                         | A-S13,<br>A-S12                          | 4514,<br>G-AlSi13                 | 4261                               | L-2520,<br>21                     | AC3A                              |                                    |                                     |                                      |
|                                                                         | A-S12U                                   | 3048                              | 4260                               | L-2530                            | ADC1 (AK 12),<br>AC3A (AL 12)     | 413.1                              |                                     |                                      |
|                                                                         | A-G0,<br>6                               | 5764                              | 4106                               | L-3350                            | A2x8,<br>A5005                    | 5005A                              |                                     |                                      |
|                                                                         | A-G6                                     | 3058                              | 4146                               | L-3320                            | JIS AC7A (AL28)                   | 5056A,<br>514.1                    |                                     |                                      |
|                                                                         | A-Z5GU0.6                                |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       | CuZn15                                   |                                   |                                    |                                   | C2300                             |                                    |                                     |                                      |
|                                                                         | CuZn30                                   |                                   |                                    |                                   | C2600                             |                                    |                                     |                                      |
|                                                                         | CuZn37                                   |                                   |                                    |                                   | C2720                             |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                     | Zerspanungs-<br>gruppe                   | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN     | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.         | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|-------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------|
| Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame |                                          |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                                  |                                                        |
| N                                                                       | N7                                       | 2.0596                                           | CC764S                                              | G-CuZn34Al2,<br>GK-CuZn34Al2,<br>GZ-CuZn34Al2 | CuZn34Mn3Al-<br>2Fe1-C                       |                                                                                                                                   |                                                                  |                                                        |
|                                                                         | N7                                       | 2.0966                                           | CW307G                                              | CuAl10Ni5Fe4                                  | CuAl10Ni5Fe4                                 |                                                                                                                                   | CA 104                                                           |                                                        |
|                                                                         | N7                                       | 2.0975                                           | CC333G                                              | G-CuAl11Ni,<br>G-CuAl10Ni                     | G-CuAl11Ni                                   |                                                                                                                                   | AB2                                                              |                                                        |
|                                                                         | N7                                       | 2.1050                                           | CC480K                                              | G-CuSn10Zn                                    | CuSn10-C                                     |                                                                                                                                   | G1,<br>CT1                                                       |                                                        |
|                                                                         | N7                                       | 2.1052                                           | CC483K                                              | G-CuSn12,<br>GZ-CuSn12,<br>GC-CuSn12          | CuSn12-C                                     |                                                                                                                                   | Pb2                                                              |                                                        |
|                                                                         | N9                                       | 2.1090                                           | CC493K                                              | G-CuSn7ZnPb,<br>GZ-CuSn7ZnPb,<br>GC-CuSn7ZnPb | CuSn7Zn4Pb7-C                                | Rotguss 7                                                                                                                         |                                                                  |                                                        |
|                                                                         | N9                                       | 2.1096                                           | CC491K                                              | G-CuSn5ZnPb                                   | CuSn5Zn5Pb5-C                                | Rotguss 5                                                                                                                         | LG2                                                              |                                                        |
|                                                                         | N9                                       | 2.1098                                           | CC490K                                              | G-CuSn2ZnPb                                   | CuSn3Zn8Pb5-C                                | Alloy 5A                                                                                                                          | LG1                                                              |                                                        |
|                                                                         | N9                                       | 2.1176                                           | CC495K                                              | G-CuPb10Sn,<br>GZ-CuPb10Sn,<br>GC-CuPb10Sn    | CuSn10Pb10-C                                 |                                                                                                                                   | LB2                                                              |                                                        |
|                                                                         | N9                                       | 2.1182                                           | CC496K                                              | G-CuPb15Sn,<br>GZ-CuPb15Sn,<br>GC-CuPb15Sn    | CuSn7Pb15-C                                  |                                                                                                                                   | LB1                                                              |                                                        |
|                                                                         | N9                                       | 2.1188                                           | CC497K                                              | G-CuPb20Sn                                    | CuSn5Pb20-C                                  |                                                                                                                                   | LB5                                                              |                                                        |
|                                                                         | N7                                       | 2.1293                                           | CW106C                                              | CuCrZr                                        | CuCr1Zr                                      |                                                                                                                                   | CC 102                                                           |                                                        |
|                                                                         | N7                                       |                                                  |                                                     | CuAl6.5Fe2.5Sn0.25                            |                                              | AMPCO 8                                                                                                                           |                                                                  |                                                        |
|                                                                         | N7                                       |                                                  |                                                     |                                               |                                              | AMPCO 6                                                                                                                           |                                                                  |                                                        |
|                                                                         | N10                                      |                                                  |                                                     | CuAl13Fe4.5                                   |                                              | AMPCO 21                                                                                                                          |                                                                  |                                                        |
| N10                                                                     |                                          |                                                  |                                                     |                                               | AMPCO 26                                     |                                                                                                                                   |                                                                  |                                                        |
| Magnesiumlegierung / Magnesium alloys / Leghe di magnesio               |                                          |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                                  |                                                        |
| N                                                                       | N6                                       | 3.5101                                           | EN-MC35110                                          | G-MgZn 4 SE 1 Zr 1                            | EN-MCMgZn4RE1Zr,<br>G-MgZn4SE1Zr1            |                                                                                                                                   | RZ5, MAG5,<br>MAG9, TZ6                                          |                                                        |
|                                                                         | N6                                       | 3.5103                                           | EN-MC65120                                          | G-MgSE 3 Zn 2 Zr 1                            | EN-MCMgRE3Zn2Zr,<br>G-MgSE3Zn2Zr1            |                                                                                                                                   | ZRE1,<br>MAG6                                                    |                                                        |
|                                                                         | N6                                       | 3.5106                                           | EN-MC65210                                          | G-MgAg 3 SE 2 Zr 1                            | EN-MCMgRE2Ag2Zr,<br>G-MgAg3SE2Zr1            |                                                                                                                                   | MSR,<br>QE22                                                     |                                                        |
|                                                                         | N6                                       | 3.5161                                           |                                                     | MgZn6Zr,<br>MgZn 6 Zr F 29                    | MgZn6Zr,<br>MgZn6Zr F29                      |                                                                                                                                   | ZW1, ZW3, ZW6,<br>ZW21, MAG 161,<br>MAG 131, MAG 141,<br>MAG 151 |                                                        |
|                                                                         | N6                                       | 3.5200                                           |                                                     | MgMn2                                         | MgMn2                                        |                                                                                                                                   | MAG 101,<br>AM503                                                |                                                        |
|                                                                         | N6                                       | 3.5312                                           |                                                     | MgAl3Zn                                       | MgAl3Zn                                      |                                                                                                                                   | AZ31,<br>MAG 111                                                 |                                                        |
|                                                                         | N6                                       | 3.5470                                           | EN-MC21320                                          | MgAl4Si1                                      | EN-MCMgAl4Si                                 |                                                                                                                                   |                                                                  |                                                        |
|                                                                         | N6                                       | 3.5612                                           |                                                     | MgAl6Zn                                       | MgAl6Zn                                      |                                                                                                                                   | MAG121,<br>AZM                                                   |                                                        |
|                                                                         | N6                                       | 3.5632                                           | EN-MC21150                                          | G-MgAl 6 Zn 3                                 | G-MgAl6Zn3                                   | AZ63                                                                                                                              |                                                                  |                                                        |
|                                                                         | N6                                       | 3.5662                                           |                                                     | G-MgAl 6                                      | G-MgAl6                                      |                                                                                                                                   |                                                                  |                                                        |
|                                                                         | N6                                       | 3.5812                                           | EN-MC21110                                          | G-MgAl 8 Zn 1                                 | G-MgAl8Zn1                                   | AZ81 hp                                                                                                                           | MAG1, MAG2,<br>AZ80, AZ81,<br>A8                                 |                                                        |
|                                                                         | N6                                       | 3.5912                                           | EN-MC21120                                          | GD-MgAl 9 Zn 1                                | GD-MgAl9Zn1                                  | AZ91                                                                                                                              | AZ91,<br>MAG3,<br>MAG7                                           |                                                        |
|                                                                         | Duroplast / Duroplastics / Duroplastiche |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                                  |                                                        |
| N                                                                       | N12                                      |                                                  |                                                     |                                               |                                              | EP,<br>Epoxid,<br>Epoxy                                                                                                           |                                                                  |                                                        |
|                                                                         | N12                                      |                                                  |                                                     |                                               |                                              | Bakelite                                                                                                                          |                                                                  |                                                        |
|                                                                         | N12                                      |                                                  |                                                     |                                               |                                              | Pertinax                                                                                                                          |                                                                  |                                                        |
|                                                                         | N12                                      |                                                  |                                                     |                                               |                                              | Resitex                                                                                                                           |                                                                  |                                                        |
| Thermoplast / Thermoplastic / Termoplastiche                            |                                          |                                                  |                                                     |                                               |                                              |                                                                                                                                   |                                                                  |                                                        |
| N                                                                       | N11                                      |                                                  |                                                     |                                               |                                              | PMMA,<br>Polymethyl-<br>metacrylate,<br>Plexiglass,<br>Acrylic glass                                                              |                                                                  |                                                        |
|                                                                         | N11                                      |                                                  |                                                     |                                               |                                              | PC,<br>Polycarbonate,<br>Makrolon                                                                                                 |                                                                  |                                                        |
|                                                                         | N11                                      |                                                  |                                                     |                                               |                                              | PA,<br>Polyacrvlamide                                                                                                             |                                                                  |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                     | Frankreich<br>France<br>Francia<br>AFNOR | Italien<br>Italy<br>Italia<br>UNI | Schweden<br>Sweden<br>Svezia<br>SS | Spanien<br>Spain<br>Spagna<br>UNE | Japan<br>Japan<br>Giappone<br>JIS | USA<br>USA<br>USA<br>AISI/SAE/ASTM | Belgien<br>Belgium<br>Belgio<br>NBN | Russland<br>Russia<br>Russia<br>GOST |
|-------------------------------------------------------------------------|------------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-------------------------------------|--------------------------------------|
| Kupfer und Kupferlegierungen / Copper and copper alloys / Leghe di Rame |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       | CuAl9Ni5Fe3Mn,<br>U-A10N                 |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | CuAl11Ni5Fe                              | G-CuAl11Fe4Ni4                    |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | A53-707,<br>CuSn12                       |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | CuSn7Pb6Zn4                              |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | CuPb5Sn5Zn5                              |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | CuPb10Sn10                               |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | CuPb20Sn5                                |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          | CuCrZr                            |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| Magnesiumlegierung / Magnesium alloys / Leghe di magnesio               |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       | G-Z4TR,<br>ZH62                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-TR3Z2                                  |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-Ag2.5                                  |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   | M1                                 |                                     |                                      |
|                                                                         | G-M2                                     |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-A3Z1,<br>AZ31                          |                                   |                                    |                                   |                                   | 52,<br>51                          |                                     |                                      |
|                                                                         | G-A4S1                                   |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-A6Z1,<br>AZ61                          |                                   |                                    |                                   |                                   | 520,<br>531                        |                                     |                                      |
|                                                                         | AZ63                                     |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-A9,<br>AZ81                            | AZ81 hp                           | AZ81 hp                            |                                   |                                   |                                    |                                     |                                      |
|                                                                         | G-A9Z1,<br>AZ91                          | AZ91 hp                           |                                    |                                   |                                   | HK31                               |                                     |                                      |
| Duroplast / Duroplastics / Duroplastiche                                |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         | Phenolic                                 |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| Thermoplast / Thermoplastic / Termoplastiche                            |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
| N                                                                       |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |
|                                                                         |                                          |                                   |                                    |                                   |                                   |                                    |                                     |                                      |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                                | Zerspanungs-<br>gruppe | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN | Deutschland<br>Germany<br>Germania<br>W.-Nr. DIN EN | Deutschland<br>Germany<br>Germania<br>DIN         | Deutschland<br>Germany<br>Germania<br>DIN EN | Deutschland –<br>Herstellerbezeichnung<br>Germany –<br>Manufacturer's designation<br>Germania –<br>identificazione del produttore | Großbritannien<br>Great Britain<br>Gran Bretagna<br>B.S.                  | Großbritannien<br>Great Britain<br>Gran Bretagna<br>EN |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------|-----------------------------------------------------|---------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------|
| Titan und Titanlegierung / Titanium and titanium alloys / Titanio e leghe di Titanio                                               |                        |                                                  |                                                     |                                                   |                                              |                                                                                                                                   |                                                                           |                                                        |
| S                                                                                                                                  | S6                     | 3.7025                                           |                                                     | Ti 1                                              | Ti 99.8                                      | TitaniumGrade1                                                                                                                    | TA.1                                                                      |                                                        |
|                                                                                                                                    | S7                     | 3.7115.1                                         |                                                     | TiAl 5 Sn 2                                       | TiAl5Sn2.5                                   |                                                                                                                                   |                                                                           |                                                        |
|                                                                                                                                    | S6                     | 3.7124                                           |                                                     | TiCu2                                             | TiCu2                                        |                                                                                                                                   | TA.21, TA.22,<br>TA.23,<br>TA.24, TA.52,<br>TA.53,<br>TA.54, TA.55, TA.58 |                                                        |
|                                                                                                                                    | S7                     | 3.7164,<br>3.7165                                |                                                     | TiAl 6 V 4                                        | TiAl6V4                                      | TitaniumGrade5                                                                                                                    | TA.10, TA.11, TA.12,<br>TA.13, TA.28, TA.56                               |                                                        |
| Warmfeste Legierung Ni-/Co-Basis / High temperature resistant alloys, Ni- or Co-alloyed / Leghe resistenti al calore, base Ni o Co |                        |                                                  |                                                     |                                                   |                                              |                                                                                                                                   |                                                                           |                                                        |
| S                                                                                                                                  | S3                     | 2.4360                                           |                                                     | NiCu30Fe                                          | NiCu30                                       | Monel 400                                                                                                                         | 3072-76,<br>NA13                                                          |                                                        |
|                                                                                                                                    | S4                     | 2.4375                                           |                                                     | NiCu30Al                                          | NiCu30Al3Ti                                  | Monel K500                                                                                                                        | 3072-76,<br>HC202,<br>3146,<br>Na18                                       |                                                        |
|                                                                                                                                    | S3                     | 2.4630                                           |                                                     | NiCr20Ti                                          |                                              | Nimonic 75                                                                                                                        | HR5,<br>703 B,<br>203-4                                                   |                                                        |
|                                                                                                                                    | S3                     | 2.4642                                           |                                                     | NiCr30Fe                                          |                                              | Inconel 690,<br>Alloy 690                                                                                                         |                                                                           |                                                        |
|                                                                                                                                    | S4                     | 2.4668                                           |                                                     | NiCr19Fe19NbMo,<br>NiCr19Fe19NbMo3,<br>NiCr19NbMo | NiCr19Nb5Mo3                                 | Inconel 718,<br>Udimet 630                                                                                                        | HR 8                                                                      |                                                        |
|                                                                                                                                    | S4                     | 2.4669                                           |                                                     | NiCr15Fe7TiAl,<br>Alloy X-750                     | NiCr15Fe7Ti2Al                               | Inconel X-750,<br>Alloy X-750                                                                                                     | HR 505                                                                    |                                                        |
|                                                                                                                                    | S3                     | 2.4856                                           |                                                     | NiCr22Mo9Nb,<br>Alloy 625                         | NiCr22Mo9Nb                                  | Inconel 625                                                                                                                       |                                                                           |                                                        |
|                                                                                                                                    | S3                     | 2.4858                                           |                                                     | NiCr21Mo,<br>Alloy 825                            | NiFe30Cr21Mo3                                | Incoloy 825                                                                                                                       | 3072-76                                                                   |                                                        |
| Gehärtetes Gusseisen / Hardened cast iron / Acciaio Temprato                                                                       |                        |                                                  |                                                     |                                                   |                                              |                                                                                                                                   |                                                                           |                                                        |
| H                                                                                                                                  | H4                     | 0.9640                                           |                                                     | G-X300CrMoNi1521                                  | GX300CrMo-Ni15-2-1                           |                                                                                                                                   | Grade3A,<br>Grade3B,<br>BS4844                                            |                                                        |
|                                                                                                                                    | H4                     | 0.9645                                           |                                                     | G-X260CrMoNi2021                                  | GX260CrMo-Ni20-2-1                           |                                                                                                                                   | Grade3C                                                                   |                                                        |
|                                                                                                                                    | H4                     | 0.9650                                           |                                                     | G-X260Cr27                                        | GX260Cr27                                    |                                                                                                                                   | Grade3D                                                                   |                                                        |
|                                                                                                                                    | H4                     | 0.9655                                           |                                                     | G-X300CrMo271                                     | GX300CrMo27-1                                |                                                                                                                                   | Grade3E                                                                   |                                                        |
| Hartguss / Hard cast iron / Ghisa Temprata                                                                                         |                        |                                                  |                                                     |                                                   |                                              |                                                                                                                                   |                                                                           |                                                        |
| H                                                                                                                                  | H4                     | 0.9620                                           |                                                     | G-X260NiCr42                                      | GX260NiCr42                                  | Ni-Hard 2                                                                                                                         | Grade2A,<br>BS4844 (1986) 2A                                              |                                                        |
|                                                                                                                                    | H4                     | 0.9625                                           |                                                     | G-X330NiCr42                                      | GX330NiCr42                                  | Ni-Hard 1                                                                                                                         | Grade2B,<br>BS4844 (1986) 2B                                              |                                                        |
|                                                                                                                                    | H4                     | 0.9630                                           |                                                     | G-X300CrNiSi952                                   | GX300CrNiSi952                               | Ni-Hard 4                                                                                                                         | Grade2C,<br>Grade2D,<br>Grade2E,<br>BS4844 (1986) 2E                      |                                                        |
|                                                                                                                                    | H4                     | 0.9635                                           |                                                     | G-X300CrMo153                                     | GX300CrMo15-3                                |                                                                                                                                   | Grade3A;B,<br>Grade3B                                                     |                                                        |

# Werkstoff-Vergleichstabelle

Material – comparison table

Tavola comparativa dei materiali

| ISO                                                                                                                                | Frankreich<br>France<br>Francia<br>AFNOR | Italien<br>Italy<br>Italia<br>UNI | Schweden<br>Sweden<br>Svezia<br>SS | Spanien<br>Spain<br>Spagna<br>UNE | Japan<br>Japan<br>Giappone<br>JIS | USA<br>USA<br>USA<br>AISI/SAE/ASTM    | Belgien<br>Belgium<br>Belgio<br>NBN | Russland<br>Russia<br>Russia<br>GOST |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|
| Titan und Titanlegierung / Titanium and titanium alloys / Titanio e leghe di Titanio                                               |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
| S                                                                                                                                  | T-35                                     |                                   |                                    | Ti-P01                            |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    | T-U2                                     |                                   |                                    | Ti-P11                            |                                   |                                       |                                     |                                      |
|                                                                                                                                    | T-A6V                                    |                                   |                                    | Ti-P63                            |                                   | 4911, 4928, 4935,<br>4954, 4965, 4967 |                                     |                                      |
| Warmfeste Legierung Ni-/Co-Basis / High temperature resistant alloys, Ni- or Co-alloyed / Leghe resistenti al calore, base Ni o Co |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
| S                                                                                                                                  | NU30                                     |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   |                                    |                                   |                                   | AMS 4676                              |                                     |                                      |
|                                                                                                                                    | NC 20 T                                  |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    | NC 19 FeNb                               |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    | NC 15 FeTNb                              |                                   |                                    |                                   |                                   | 5542G                                 |                                     |                                      |
|                                                                                                                                    | NC 22 FeDNB                              |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    | NC 21 FeDU                               |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
| Gehärtetes Gusseisen / Hardened cast iron / Acciaio Temprato                                                                       |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
| H                                                                                                                                  |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   | 466                                |                                   |                                   |                                       |                                     |                                      |
| Hartguss / Hard cast iron / Ghisa Temprata                                                                                         |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |
| H                                                                                                                                  |                                          |                                   | 512                                |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   | 513                                |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   | 457                                |                                   |                                   |                                       |                                     |                                      |
|                                                                                                                                    |                                          |                                   |                                    |                                   |                                   |                                       |                                     |                                      |

# Härtevergleich

Hardness – comparison table

Comparazione delle durezze

| Zugfestigkeit<br>Tensile strength<br>Resistenza alla trazione<br>N/mm <sup>2</sup> | Vickers<br>HV | Brinell<br>HB | Rockwell<br>HRC |
|------------------------------------------------------------------------------------|---------------|---------------|-----------------|
| 255                                                                                | 80            | 76,0          | –               |
| 270                                                                                | 85            | 80,7          | –               |
| 285                                                                                | 90            | 85,5          | –               |
| 305                                                                                | 95            | 90,2          | –               |
| 320                                                                                | 100           | 95,0          | –               |
| 335                                                                                | 105           | 99,8          | –               |
| 350                                                                                | 110           | 105           | –               |
| 370                                                                                | 115           | 109           | –               |
| 385                                                                                | 120           | 114           | –               |
| 400                                                                                | 125           | 119           | –               |
| 415                                                                                | 130           | 124           | –               |
| 430                                                                                | 135           | 128           | –               |
| 450                                                                                | 140           | 133           | –               |
| 465                                                                                | 145           | 138           | –               |
| 480                                                                                | 150           | 143           | –               |
| 495                                                                                | 155           | 147           | –               |
| 510                                                                                | 160           | 152           | –               |
| 530                                                                                | 165           | 156           | –               |
| 545                                                                                | 170           | 162           | –               |
| 560                                                                                | 175           | 166           | –               |
| 575                                                                                | 180           | 171           | –               |
| 595                                                                                | 185           | 176           | –               |
| 610                                                                                | 190           | 181           | –               |
| 625                                                                                | 195           | 185           | –               |
| 640                                                                                | 200           | 190           | –               |
| 660                                                                                | 205           | 195           | –               |
| 675                                                                                | 210           | 199           | –               |
| 690                                                                                | 215           | 204           | –               |
| 705                                                                                | 220           | 209           | –               |
| 720                                                                                | 225           | 214           | –               |
| 740                                                                                | 230           | 219           | –               |
| 755                                                                                | 235           | 223           | –               |
| 770                                                                                | 240           | 228           | 20,3            |
| 785                                                                                | 245           | 233           | 21,3            |
| 800                                                                                | 250           | 238           | 22,2            |
| 820                                                                                | 255           | 242           | 23,1            |
| 835                                                                                | 260           | 247           | 24,0            |
| 850                                                                                | 265           | 252           | 24,8            |
| 865                                                                                | 270           | 257           | 25,6            |
| 880                                                                                | 275           | 261           | 26,4            |
| 900                                                                                | 280           | 266           | 27,1            |
| 915                                                                                | 285           | 271           | 27,8            |
| 930                                                                                | 290           | 276           | 28,5            |
| 950                                                                                | 295           | 280           | 29,2            |
| 965                                                                                | 300           | 285           | 29,8            |
| 995                                                                                | 310           | 295           | 31,0            |
| 1030                                                                               | 320           | 304           | 32,2            |
| 1060                                                                               | 330           | 314           | 33,3            |
| 1095                                                                               | 340           | 323           | 34,4            |
| 1125                                                                               | 350           | 333           | 35,5            |
| 1155                                                                               | 360           | 342           | 36,6            |
| 1190                                                                               | 370           | 352           | 37,7            |
| 1220                                                                               | 380           | 361           | 38,8            |
| 1255                                                                               | 390           | 371           | 39,8            |
| 1290                                                                               | 400           | 380           | 40,8            |
| 1320                                                                               | 410           | 390           | 41,8            |
| 1350                                                                               | 420           | 399           | 42,7            |
| 1385                                                                               | 430           | 409           | 43,6            |

# Härtevergleich

Hardness – comparison table

Comparazione delle durezze

| Zugfestigkeit<br>Tensile strength<br>Resistenza alla trazione<br>N/mm <sup>2</sup> | Vickers<br>HV | Brinell<br>HB | Rockwell<br>HRC |
|------------------------------------------------------------------------------------|---------------|---------------|-----------------|
| 1420                                                                               | 440           | 418           | 44,5            |
| 1455                                                                               | 450           | 428           | 45,3            |
| 1485                                                                               | 460           | 437           | 46,1            |
| 1520                                                                               | 470           | 447           | 46,9            |
| 1555                                                                               | 480           | (456)         | 47,7            |
| 1595                                                                               | 490           | (466)         | 48,4            |
| 1630                                                                               | 500           | (475)         | 49,1            |
| 1665                                                                               | 510           | (485)         | 49,8            |
| 1700                                                                               | 520           | (494)         | 50,5            |
| 1740                                                                               | 530           | (504)         | 51,1            |
| 1775                                                                               | 540           | (513)         | 51,7            |
| 1810                                                                               | 550           | (523)         | 52,3            |
| 1845                                                                               | 560           | (532)         | 53,0            |
| 1880                                                                               | 570           | (542)         | 53,6            |
| 1920                                                                               | 580           | (551)         | 54,1            |
| 1955                                                                               | 590           | (561)         | 54,7            |
| 1995                                                                               | 600           | (570)         | 55,2            |
| 2030                                                                               | 610           | (580)         | 55,7            |
| 2070                                                                               | 620           | (589)         | 56,3            |
| 2105                                                                               | 630           | (599)         | 56,8            |
| 2145                                                                               | 640           | (608)         | 57,3            |
| 2180                                                                               | 650           | (618)         | 57,8            |
| –                                                                                  | 660           | –             | 58,3            |
| –                                                                                  | 670           | –             | 58,8            |
| –                                                                                  | 680           | –             | 59,2            |
| –                                                                                  | 690           | –             | 59,7            |
| –                                                                                  | 700           | –             | 60,1            |
| –                                                                                  | 720           | –             | 61,0            |
| –                                                                                  | 740           | –             | 61,8            |
| –                                                                                  | 760           | –             | 62,5            |
| –                                                                                  | 780           | –             | 63,3            |
| –                                                                                  | 800           | –             | 64,0            |
| –                                                                                  | 820           | –             | 64,7            |
| –                                                                                  | 840           | –             | 65,3            |
| –                                                                                  | 860           | –             | 65,9            |
| –                                                                                  | 880           | –             | 66,4            |
| –                                                                                  | 900           | –             | 67,0            |
| –                                                                                  | 920           | –             | 67,5            |

## Berechnung / Calculation / Calcolazione

| Werkstoffeigenschaft<br>Material properties<br>Proprietà del materiale                                                     | Einheit / Prüfmethode                                                                        | Unit / proof method                                                                            | Unità / sistema di controllo                                                                  | Formelzeichen<br>Formula abbreviation<br>Formula abbreviata |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>Zugfestigkeit</b><br>Tensile strength<br>Resistenza alla trazione                                                       | N/mm <sup>2</sup>                                                                            | N/mm <sup>2</sup>                                                                              | N/mm <sup>2</sup>                                                                             | R <sub>m</sub>                                              |
| <b>Vickershärte</b><br>Hardness Vickers<br>Durezza Vickers                                                                 | Diamantpyramide 136°<br>Prüfkraft F ≥ 98 N                                                   | Diamond pyramid 136°<br>Proof strength F ≥ 98 N                                                | Piramide diamante 136°<br>Valore Forza F ≥ 98 N                                               | HV                                                          |
| <b>Brinellhärte Errechnet aus:</b><br>Hardness Brinell calculated from:<br>Durezza Brinell calcolata da:<br>HB = 0,95 × HV | $0,102 \times F/D^2 = 30 \text{ N/mm}^2$<br>F = Prüfkraft in N<br>D = Kugeldurchmesser in mm | $0,102 \times F/D^2 = 30 \text{ N/mm}^2$<br>F = Proof strength in N<br>D = Ball diameter in mm | $0,102 \times F/D^2 = 30 \text{ N/mm}^2$<br>F = Valore Forza in N<br>D = Diametro sfera in mm | HB                                                          |
| <b>Rockwellhärte C</b><br>Hardness Rockwell C<br>Durezza Rockwell C                                                        | Diamantkegel 120°<br>Gesamtprüfkraft 1471 ± 9 N                                              | 120° Diamond cone<br>Total proof strength 1471 ± 9 N                                           | Cono diamante 120°<br>Valore Totale Forza 1471 ± 9 N                                          | HRC                                                         |

Umrechnungen von Härtewerten nach diesen Formeln sind nur annähernd genau. Siehe DIN 50150  
Conversion of hardness according to these formulas are only approximately correct. See DIN 50150  
Valori di conversioni di durezza di questa tabella sono approssimate. Vedere norma DIN50150

## Freiflächenverschleiß / Flank wear / Usura sul fianco



Abrieb an der Freifläche, normaler Verschleiß nach einer längeren Eingriffszeit.

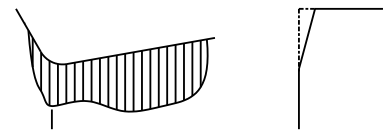
*Abrasion on the flank, normal wear after a certain machining time.*

- Ursache:**
- Zu hohe Schnittgeschwindigkeit
  - Hartmetallsorte mit zu geringer Verschleißfestigkeit
  - Nicht genügend Kühlung

- Reasons:**
- Cutting speed too high
  - Carbide grade with insufficient wear resistance
  - Insufficient amount of cooling lubricant

- Abhilfe:**
- Schnittgeschwindigkeit senken
  - Verschleißfestere HM-Sorte wählen
  - Kühlschmierstoffzufuhr verbessern

- Solution:**
- Reduce cutting speed
  - Select more wear resistant carbide grade
  - Improve coolant supply



Usura sul fianco, usura normale dopo un certo tempo di lavorazione.

- Cause:**
- Velocità di taglio troppo alta
  - Qualità di metallo duro con resistenza all'usura troppo bassa
  - Insufficiente quantità di lubrorefrigerante

- Soluzioni:**
- Ridurre la velocità di taglio
  - Scegliere una qualità più resistente all'usura
  - Migliorare l'adduzione di lubrorefrigerante

## Ausbröckelung / Edge chipping / Scheggiature



Durch überhöhte Beanspruchung der Schneidkante können Partikel aus der Schneidplatte ausbrechen.

*Through excessive mechanical stress at the cutting edge fracture and chipping can take place.*

- Ursache:**
- Zu verschleißfeste Sorte
  - Vibrationen
  - Zu hoher Vorschub bzw. Schnitttiefe

- Reasons:**
- Grade with too high wear resistance
  - Vibrations
  - Feed rate too high or excessive depth of cut

- Abhilfe:**
- Zähere Sorte verwenden
  - Negative Schneidengeometrie mit Spanleitstufe verwenden
  - Ausspannung reduzieren; Mittenhöhe prüfen
  - Stabilisierung der Schneidkante

- Solution:**
- Use tougher grade
  - Use negative cutting edge geometry with chip groove
  - Reduce overhang; check centre height
  - Increase stability of cutting edge



La sollecitazione eccessiva del tagliente può causare il distacco di particelle di metallo duro.

- Cause:**
- Qualità di M.D. con resistenza all'usura troppo elevata
  - Vibrationen
  - Avanzamento o profondità di taglio troppo elevati

- Soluzioni:**
- Usare una qualità più tenace
  - Usare una geometria negativa del tagliente con canalino formatruciolo
  - Ridurre la sporgenza, controllare l'altezza del filo tagliente
  - Stabilizzazione del tagliente

## Kolkverschleiß / Cratering / Craterizzazione



Der ablaufende heiße Span verursacht eine Auskolkung der Schneidplatte an der Spanfläche.

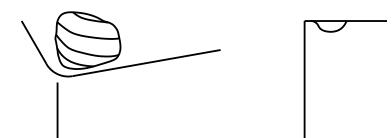
*The hot chip which is being evacuated causes cratering at the rake face of the cutting edge.*

- Ursache:**
- Zu hohe Schnittgeschwindigkeit und/oder Vorschub
  - Zu geringer Spanwinkel
  - Sorte mit zu geringer Verschleißfestigkeit
  - Falsche Kühlung

- Reasons:**
- Cutting speed and/or feed rate too high
  - Rake angle too shallow
  - Grade with insufficient wear resistance
  - Incorrect coolant supply

- Abhilfe:**
- Schnittgeschwindigkeit und/oder Vorschub herabsetzen
  - Kühlmittelmenge und/oder Druck erhöhen, Zuführung ändern
  - Verschleißfestere Sorte wählen

- Solution:**
- Reduce cutting speed and/or feed rate
  - Increase coolant quantity and/or pressure, optimize coolant supply
  - Use grade which is more resistant to cratering



Il truciolo che sta per essere evacuato causa una craterizzazione dell'inserto sulla spoglia superiore.

- Cause:**
- Velocità di taglio o/e avanzamento troppo elevati
  - Angolo di spoglia superiore basso
  - Qualità di metallo duro con resistenza all'usura troppo bassa
  - Adduzione del refrigerante scorretta

- Soluzioni:**
- Ridurre la velocità di taglio e/o l'avanzamento
  - Aumentare la quantità del refrigerante e/o la pressione, controllare l'adduzione.
  - Utilizzare una qualità più resistente alla craterizzazione



### Plastische Verformung / Plastic deformation / Deformazione plastica



**Hohe Zerspanungstemperatur bei gleichzeitiger mechanischer Beanspruchung kann zu plastischer Verformung führen.**

**Ursache:**

- Zu hohe Arbeitstemperatur, daher Erweichung des Grundmaterials
- Ungeeignete Sorte
- Falsche Kühlung

**Abhilfe:**

- Schnittgeschwindigkeit senken
- Verschleißfestere HM-Sorte wählen
- Kühlung vorsehen

*High machining temperature and simultaneous mechanical stress may lead to plastic deformation.*

**Reasons:**

- Too high machining temperature resulting in softening of substrate
- Wear/heat resistance of carbide grade too low
- Incorrect coolant supply

**Solution:**

- Reduce cutting speed
- Choose carbide grade with higher wear resistance
- Provide cooling



Un'alta temperatura di lavorazione insieme ad una simultanea sollecitazione meccanica può causare la deformazione plastica.

**Cause:**

- Temperatura di lavorazione troppo alta, questo comporta un cedimento del substrato
- Qualità di M.D. non idonea
- Adduzione del refrigerante scorretta

**Soluzioni:**

- Ridurre la velocità di taglio
- Scegliere una qualità di metallo duro più resistente all'usura
- Provvedere alla refrigerazione

### Aufbauschneidenbildung / Built-up edge / Formazione di taglienti di riporto



**Materialaufschweißungen an der Schneidkante treten auf, wenn der Span infolge zu niedriger Schnitttemperatur nicht richtig abfließt.**

**Ursache:**

- Zu geringe Schnittgeschwindigkeit
- Zu kleiner Spanwinkel
- Falscher Schneidstoff
- Fehlende Kühlung/Schmierung

**Abhilfe:**

- Schnittgeschwindigkeit erhöhen
- Spanwinkel erhöhen
- TiN-Beschichtung einsetzen
- Fettene Emulsionen verwenden

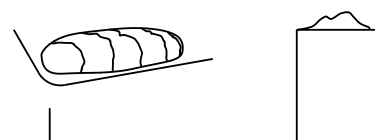
*Built-up edge occurs when the chip is not evacuated properly due to insufficient cutting temperature.*

**Reasons:**

- Cutting speed too low
- Rake angle too small
- Wrong cutting material
- Lack of cooling/lubrication

**Solution:**

- Increase cutting speed
- Enlarge rake angle
- Apply TiN-coating
- Use emulsion with higher concentration



Il tagliente di riporto si presenta quando il truciolo non viene tagliato in modo corretto a causa della velocità di taglio troppo bassa.

**Cause:**

- Velocità di taglio troppo bassa
- Angolo di spoglia superiore negativo
- Materiale da taglio sbagliato
- Mancanza di lubrorefrigerazione

**Soluzioni:**

- Aumentare la velocità di taglio
- Incrementare l'angolo di spoglia superiore
- Impiegare un rivestimento TiN
- Utilizzare un'emulsione più grassa

### Kerbverschleiß / Notching / Usura ad intaglio



**Einschnürung am Spantiefenmaximum.**

**Ursache:**

- Oxidation an der Schneidkante
- Zu hohe Temperatur an der Kante

**Abhilfe:**

- Unterschiedliche Schnitttiefen verwenden
- Schnittgeschwindigkeit herabsetzen
- Kühlschmierstoffzufuhr verbessern

*Notch at the maximum depth of cut.*

**Reasons:**

- Oxidation of the cutting edge
- Excessive heat on the cutting edge

**Solution:**

- Use various depths of cut
- Reduce cutting speed
- Improve coolant supply



Intaglio al livello della profondità massima di taglio.

**Cause:**

- Ossidazione sul tagliente
- Troppo calore sul tagliente

**Soluzioni:**

- Applicare varie profondità di taglio
- Ridurre la velocità di taglio
- Migliorare l'adduzione del refrigerante

## Berechnungseinheiten / Calculation units / Unità di misura

|                      |                                                                                               |                |                      |                                                                                         |                  |
|----------------------|-----------------------------------------------------------------------------------------------|----------------|----------------------|-----------------------------------------------------------------------------------------|------------------|
| <b>D</b>             | <b>Durchmesser</b><br><i>Diameter</i><br>Diametro                                             | <b>(mm)</b>    | <b>n</b>             | <b>Spindeldrehzahl</b><br><i>Spindel revolution</i><br>Numero di giri                   | <b>(U/min)</b>   |
| <b>l</b>             | <b>Länge</b><br><i>Length</i><br>Lunghezza                                                    | <b>(mm)</b>    | <b>Q</b>             | <b>Zeitspanvolumen</b><br><i>Chip removal rate</i><br>Volume truciolo                   | <b>(cm³/min)</b> |
| <b>v<sub>c</sub></b> | <b>Schnittgeschwindigkeit</b><br><i>Cutting speed</i><br>Velocità di taglio                   | <b>(m/min)</b> | <b>P<sub>c</sub></b> | <b>Netto-Antriebsleistung</b><br><i>Power</i><br>Assorbimento potenza                   | <b>(kW)</b>      |
| <b>k<sub>c</sub></b> | <b>Spezifische Schnittkraft</b><br><i>Specific cutting force</i><br>Forza di taglio specifica | <b>(N/mm²)</b> | <b>f<sub>n</sub></b> | <b>Vorschub pro Umdrehung</b><br><i>Feed rate per revolution</i><br>Avanzamento al giro | <b>(mm/U)</b>    |
| <b>a<sub>p</sub></b> | <b>Schnitttiefe</b><br><i>Depth of cut</i><br>Profondità di taglio                            | <b>(mm)</b>    |                      |                                                                                         |                  |

## Formeln / Formulas / Formule

### Schnittgeschwindigkeit

*Cutting speed*  
Velocità di taglio

$$v_c = \frac{\pi \cdot D \cdot n}{1000}$$

### Drehzahl

*Revolutions*  
Numero di giri

$$n = \frac{v_c \cdot 1000}{\pi \cdot D}$$

### Zeitspanvolumen

*Chip removal rate*  
Volume truciolo

$$Q = v_c \cdot a_p \cdot f_n$$

### Netto-Antriebsleistung

*Power*  
Assorbimento potenza

$$P_c = \frac{a_p \cdot f_n \cdot k_c \cdot v_c}{6 \cdot 10^4}$$

# Set Drehmoment-Schraubendreher

Torque Screwdriver Sets  
Set chiavi dinamometriche



## Set 1

Einstellbereich von 0,6 Nm – 1,5 Nm

Adjustable from 0,6 Nm – 1,5 Nm

Registrabile da 0,6 Nm a 1,5 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T6, Torx T7, Torx T8 und Torx T9
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T6, Torx T7, Torx T8 and Torx T9
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T6, Torx T7, Torx T8, Torx T9
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 1**)

(Order as: **SET-TORQUE 1**)

(Esempio di ordinazione: **Set-Drehmoment 1**)

## Set 2

Einstellbereich von 1,5 Nm – 3,0 Nm

Adjustable from 1,5 Nm – 3,0 Nm

Registrabile da 1,5 Nm a 3,0 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T9, Torx T10 und Torx T15
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T9, Torx T10 and Torx T15
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T9, Torx T10, Torx T15
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 2**)

(Order as: **SET-TORQUE 2**)

(Esempio di ordinazione: **Set-Drehmoment 2**)

## Set 3

Einstellbereich von 3,0 Nm – 5,4 Nm

Adjustable from 3,0 Nm – 5,4 Nm

Registrabile da 3,0 Nm a 5,4 Nm

- 1 Drehmoment-Schraubendreher
- je 1 Hochleistungsklinge Torx T10, Torx T15 und Torx T20
- 1 Einstellschlüssel

- 1 Torque screwdriver
- 1/ea Bit Torx T10, Torx T15 and Torx T20
- 1 Adjustment key

- 1 Chiave dinamometrica
- 1 Set di punte Torx T10, Torx T15, Torx T20
- 1 Chiave di registrazione

(Bestellbezeichnung: **Set-Drehmoment 3**)

(Order as: **SET-TORQUE 3**)

(Esempio di ordinazione: **Set-Drehmoment 3**)

## Zulässige Anzugsmomente für **Wendeschneidplatten** – Spannelemente

Recommended torque settings *for indexable inserts*

Momenti torcenti raccomandati *per viti*

| Gewinde<br>Thread<br>Filetto vite | Torx-Größe<br>Torx size<br>Dimensione Torx | max. Anzugsmoment<br>max. torque<br>Momento torcente |
|-----------------------------------|--------------------------------------------|------------------------------------------------------|
| M1,8                              | T6                                         | 0,6 Nm                                               |
| M2                                | T6                                         | 0,6 Nm                                               |
| M2                                | T7                                         | 0,6 Nm                                               |
| M2,2                              | T6                                         | 1,0 Nm                                               |
| M2,2                              | T7                                         | 1,0 Nm                                               |
| M2,2                              | T8                                         | 1,3 Nm                                               |
| M3                                | T8                                         | 2,2 Nm                                               |
| M3                                | T9                                         | 2,2 Nm                                               |
| M3,5                              | T15                                        | 3,4 Nm                                               |
| M4                                | T15                                        | 5,1 Nm                                               |
| M4,5                              | T20                                        | 6,2 Nm                                               |
| M5                                | T20                                        | 6,2 Nm                                               |
| M6                                | T25                                        | 8,1 Nm                                               |

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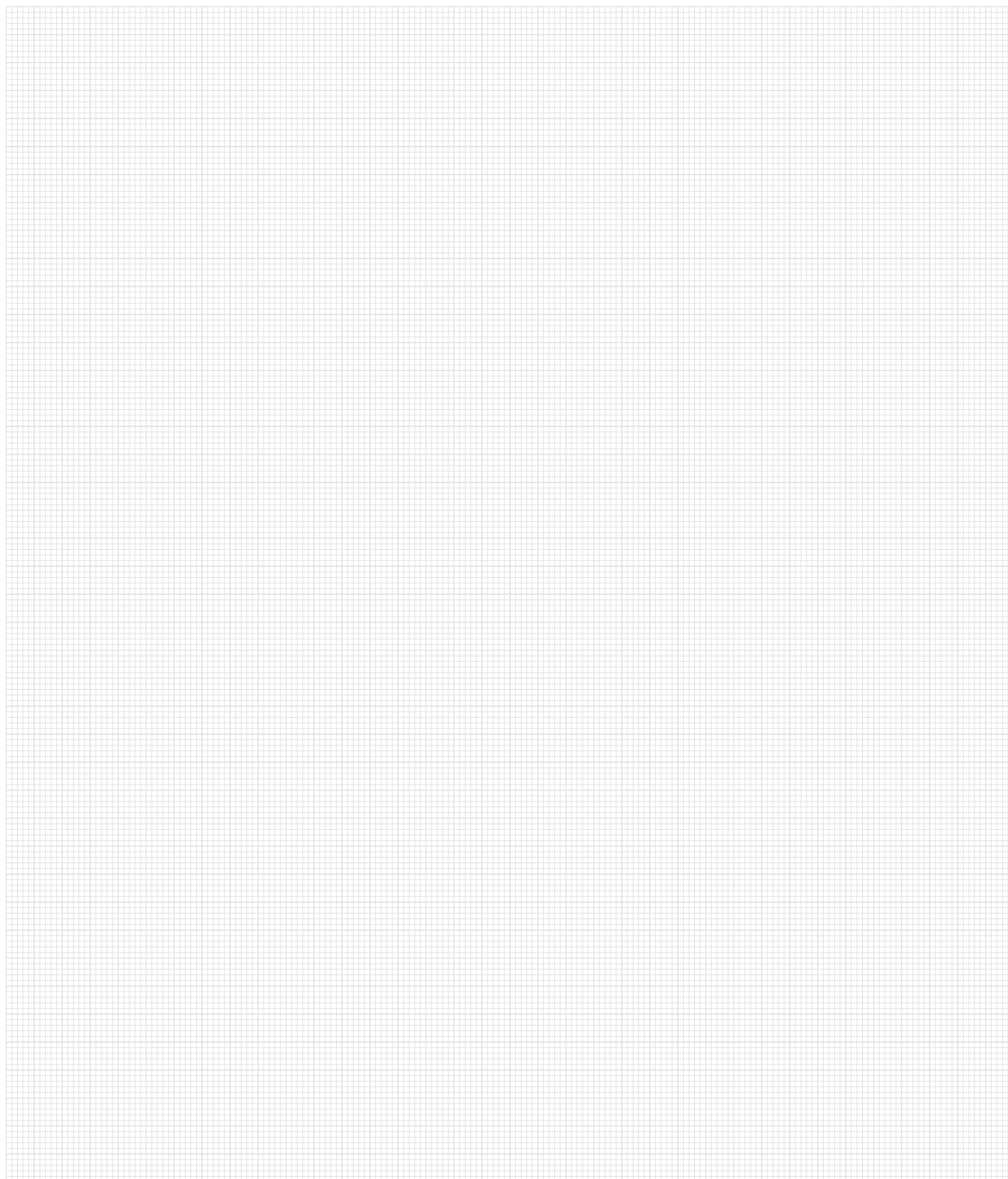
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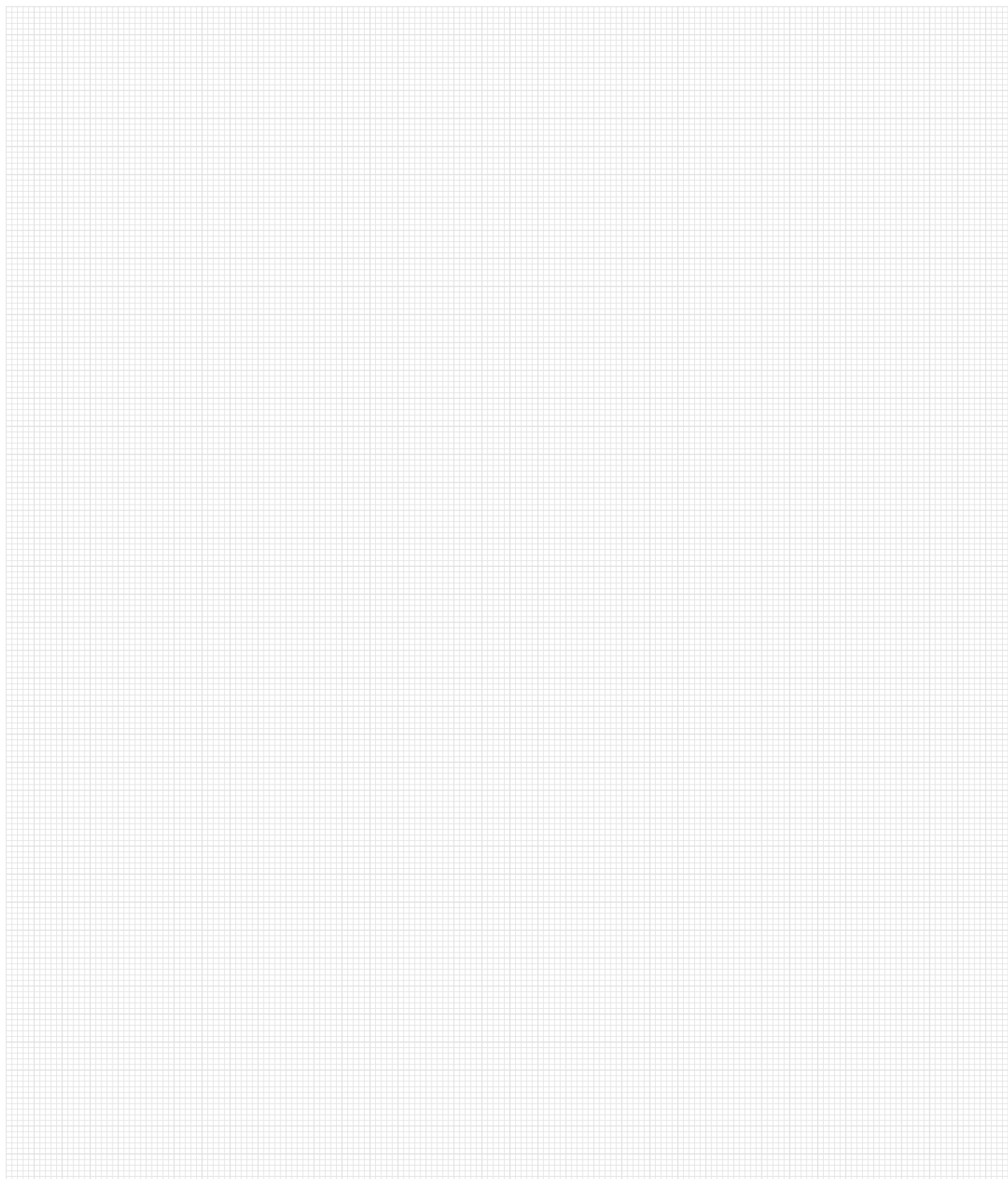
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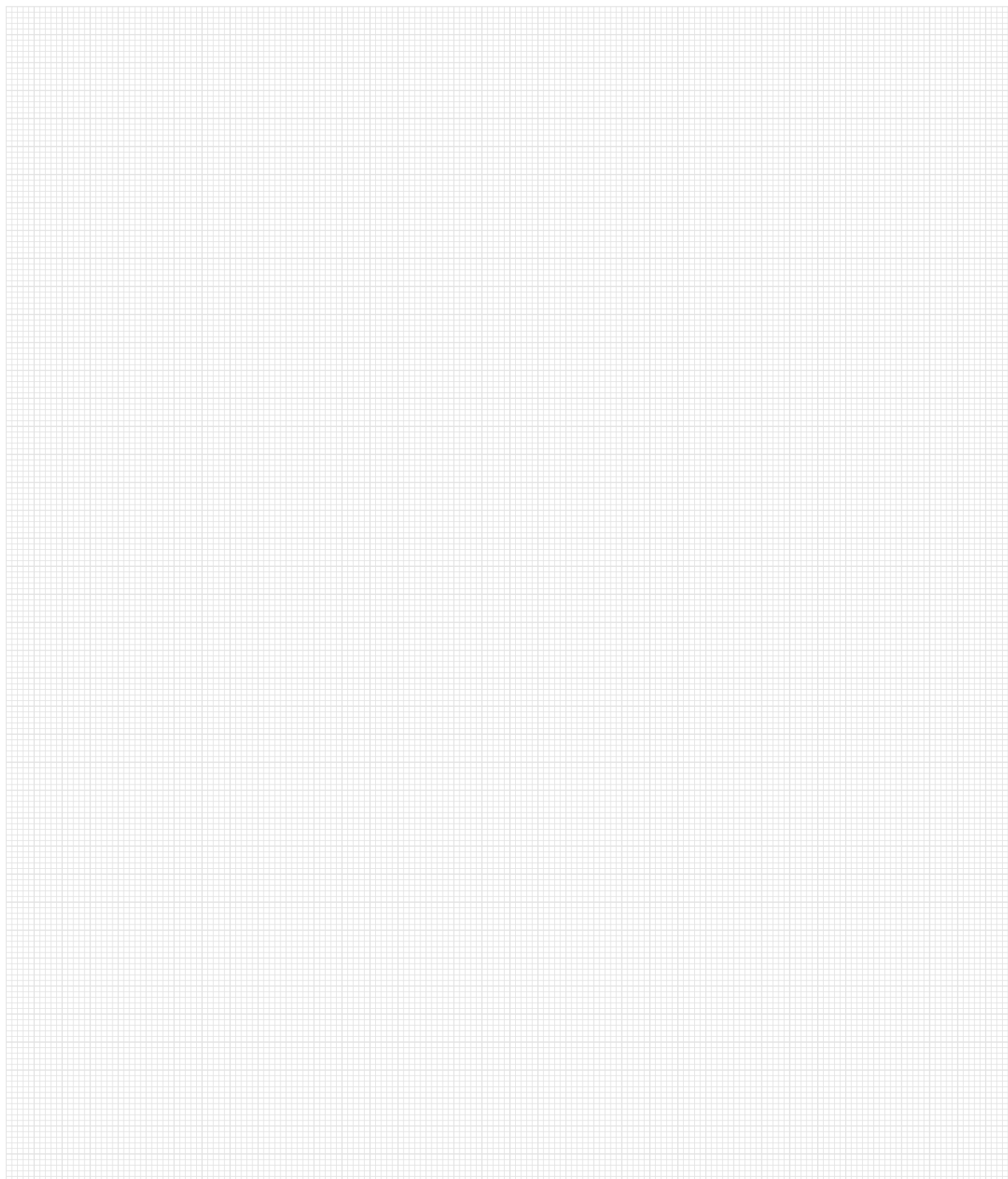
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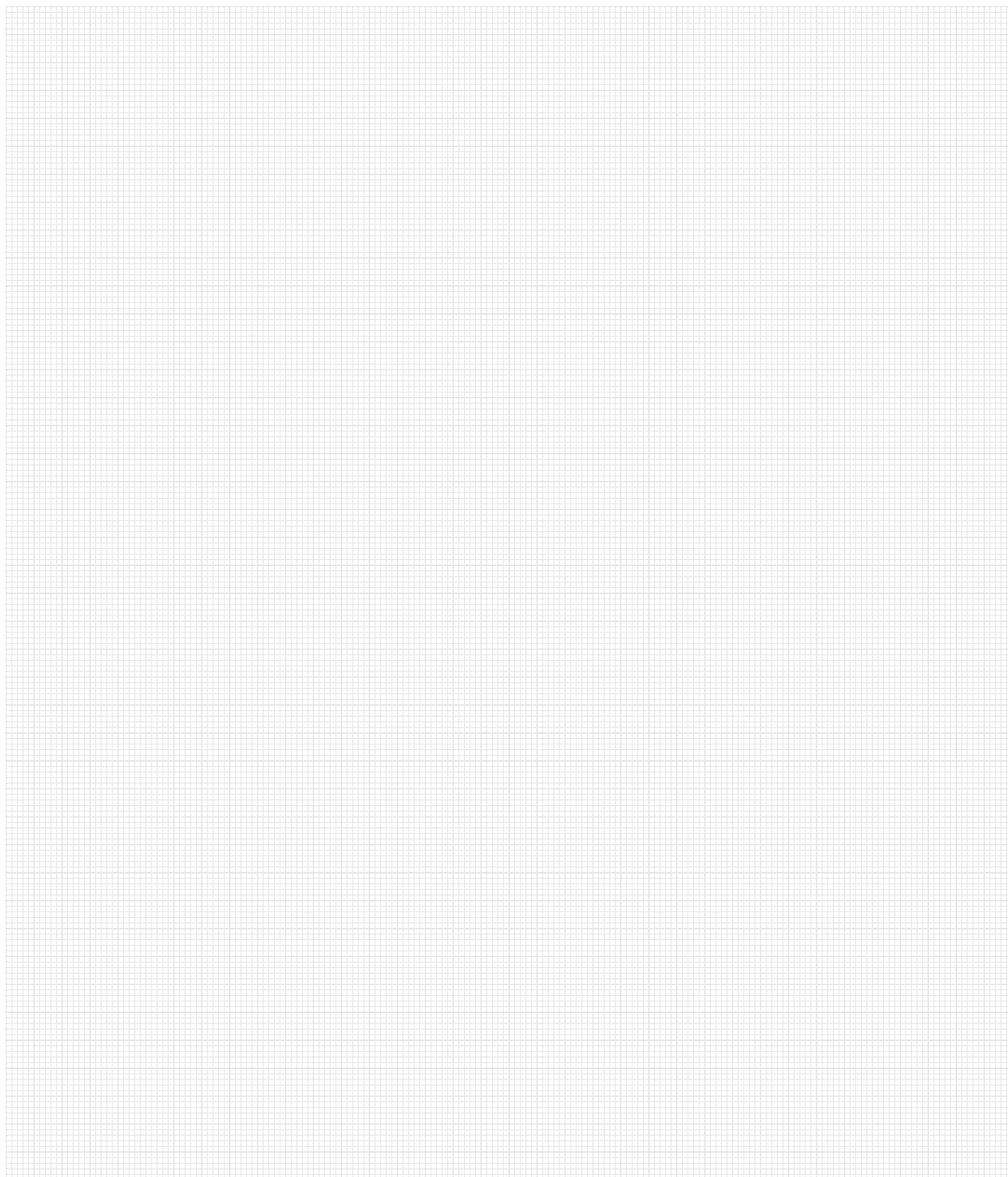
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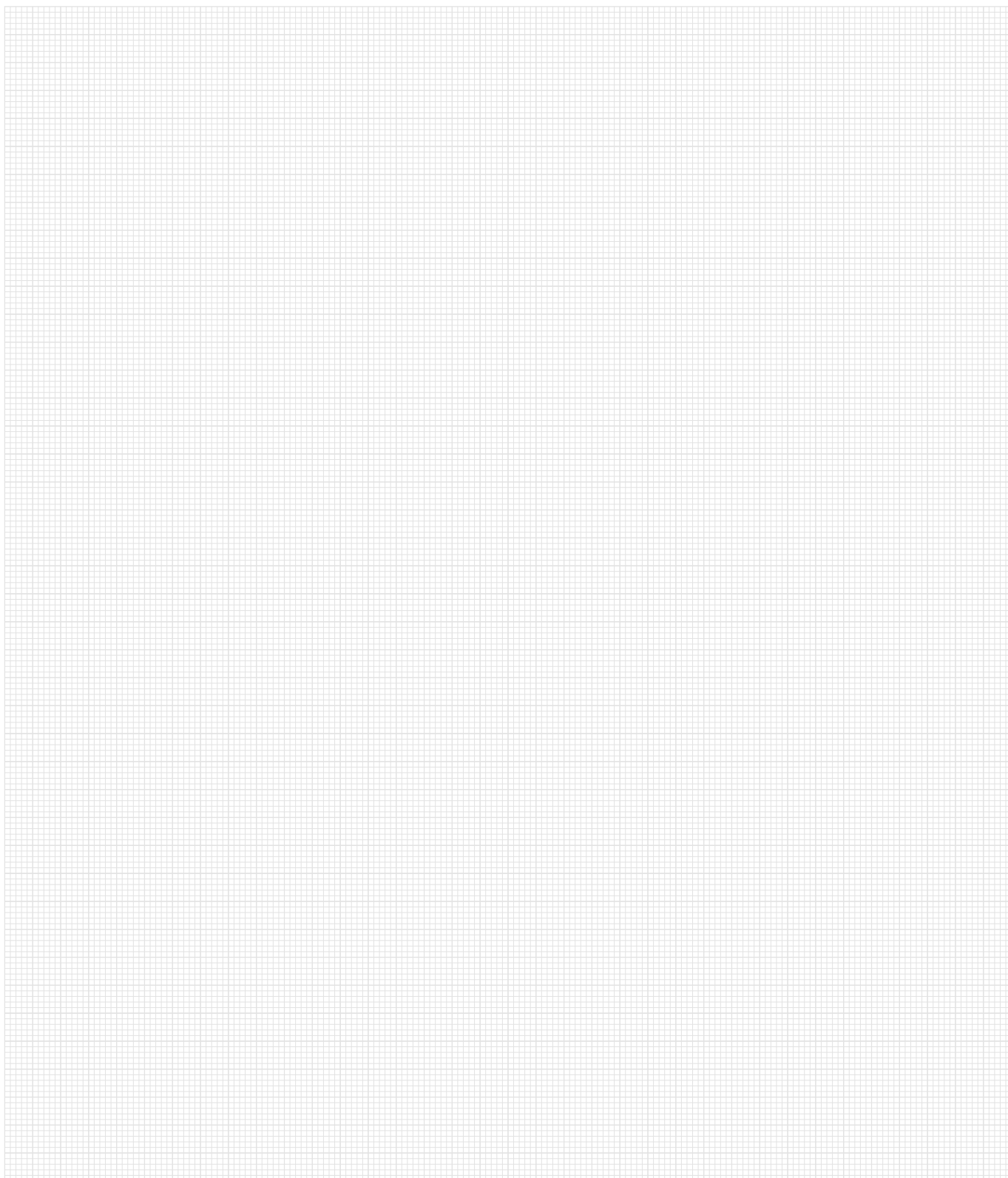
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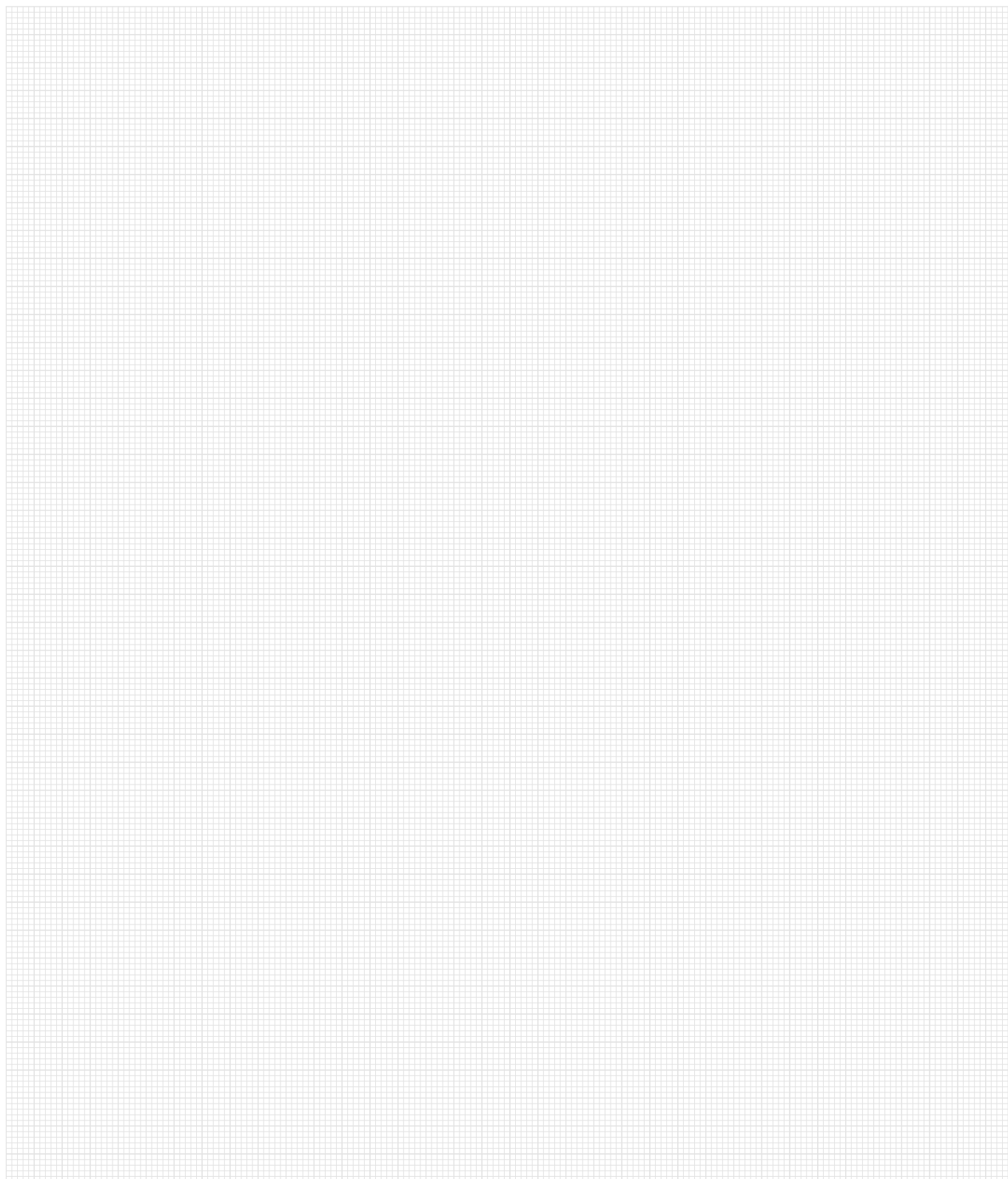
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Mit Leidenschaft und Begeisterung den Herausforderungen unserer Kunden zu begegnen, zu tüfteln, zu entwickeln und präzise zu fertigen – das macht ARNO®-Werkzeuge aus. Rund 70 Jahre Erfahrung fließen in jedes unserer Werkzeuge. Das ist zertifizierte Qualität und Präzision auf höchstem Niveau.

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**ZERTIFIKAT**

Die Zertifizierungsstelle  
der TÜV SÜD Management Service GmbH  
bescheinigt, dass das Unternehmen

**ARNO  
WERKZEUGE**

**Karl-Heinz Arnold GmbH**  
Karlsbader Straße 4  
73760 Ostfildern  
Deutschland

für den Geltungsbereich

**Konstruktion, Lagerung und Vertrieb von  
Zerspanungswerkzeugen und Spannzeugen**

ein Qualitätsmanagementsystem  
eingeführt hat und anwendet.

Durch ein Audit, Bericht-Nr. **70013372**,  
wurde der Nachweis erbracht, dass die Forderungen der

**ISO 9001:2008**

erfüllt sind.

Dieses Zertifikat ist gültig in Verbindung  
mit dem Hauptzertifikat vom **2015-11-12** bis **2018-09-14**.  
Zertifikat-Registrier-Nr.: **12 100 21067/01 TMS**.

*M. Wegmann*  
Product Compliance Management  
München, 2015-11-04

**TÜV SÜD**  
Management Service GmbH

**IAF** **THAA**

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