

PH HORN PH



**FRÄSSYSTEME**

**MILLING SYSTEMS**

**2025/2026**





**ERLEBEN SIE HORN**  
**EXPLORE HORN**

## Erleben Sie HORN

Herausragende Ergebnisse sind immer die Kombination aus optimalem Zerspanungsprozess und perfektem Werkzeug. HORN verbindet dafür Spitzentechnologie, Leistungsfähigkeit und Zuverlässigkeit. Von der Einzelteil- bis zur Serienfertigung, für Standard- oder Sonderanwendungen: Unsere Werkzeuge bieten Ihnen schnelle, wirtschaftliche und qualitativ hochwertige Lösungen. Bei der Auswahl der individuellen Schnittparameter unterstützen Sie unsere Tabellen mit praxiserprobten Erfahrungswerten im jeweiligen Katalog. Nutzen Sie darüber hinaus das Know-how unserer Mitarbeiterinnen und Mitarbeiter im Innen- und Außendienst.

Nachhaltigkeit ist ein zentraler Bestandteil unserer Unternehmensphilosophie. Deshalb stehen Qualitätssicherung, Umweltschutz, Energieeffizienz und Sicherheit bei unseren Produkten und in der Produktion seit jeher im Fokus. Als leistungsstarker und zuverlässiger Werkzeugpartner sorgen wir dafür, dass Sie mit uns gemeinsam in eine innovative und wirtschaftliche Zukunft gehen.

Besuchen Sie auch unseren eShop, der Ihnen rund um die Uhr zur Verfügung steht.



Markus Horn  
Geschäftsführer  
Paul Horn GmbH



Matthias Rommel  
Geschäftsführer  
Paul Horn GmbH

## Explore HORN

Outstanding results are always a combination of the optimum cutting process and the perfect tool. To achieve this, HORN combines advanced technology, performance and reliability. From single part to series production, for standard or special applications: Our tools offer you fast, economical, high quality solutions. To assist you when choosing cutting parameters, our tables in the respective catalogue provide proven empirical values. Take advantage of the expertise of our office staff and sales engineers.

Sustainability is a central part of our corporate philosophy. That is why we have always focused on quality assurance, environmental protection, energy efficiency and safety with regard to our products and our production. As an efficient and reliable tool partner, we make sure that you join us in an innovative and strong economic future.

Please visit our eShop, which is available around the clock.



Markus Horn  
CEO  
Paul Horn GmbH



Matthias Rommel  
CEO  
Paul Horn GmbH

<b>A</b>	<b>System DC Nut- und Fasfräsen (Vollhartmetall-Schaftfräser)</b> System DC Groove and Chamfer Milling (Solid Carbide End Mills)		<b>A</b>
<b>B</b>	<b>Nutfräsen (zirkular)</b> Groove Milling by circular interpolation	<b>M304/M306/M308/M311/ M116/M313/M328/M332/M335</b>	<b>B</b>
	<b>Plan- und Hochvorschubfräsen</b> Face and High Feed Milling	<b>M620</b>	
<b>C</b>	<b>Nutfräsen</b> Groove Milling	<b>M275</b>	<b>C</b>
<b>D</b>	<b>Nutfräsen</b> Groove Milling	<b>380/381</b>	<b>D</b>
<b>E</b>	<b>Nutfräsen</b> Groove Milling	<b>M101</b>	<b>E</b>
<b>F</b>	<b>Nutfräsen</b> Groove Milling	<b>382/383/M310/M475</b>	<b>F</b>
<b>G</b>	<b>Gewindefräsen</b> Thread Milling	<b>DCG/M275/M304/M306/ M308/M311/M313/M328/ M332/380</b>	<b>G</b>
<b>H</b>	<b>Technische Hinweise Nut- und Zirkularfräsen</b> Technical Instructions Groove and Circular Milling		<b>H</b>
<b>I</b>	<b>Verzahnungsbearbeitung</b> Gear Machining		<b>I</b>
<b>J</b>	<b>T-Nuten-Fräsen</b> Milling of T-Slots	<b>M311/M313/M328/M406 M409</b>	<b>J</b>
<b>K</b>	<b>Mehrkantschlagen</b> Polygon Milling	<b>M275/381</b>	<b>K</b>
<b>L</b>	<b>System DA / DAH Hochvorschubfräsen</b> System DA / DAH High Feed Milling		<b>L</b>
<b>M</b>	<b>Tangentialfräsen</b> Tangential Milling	<b>M406/M409/M610</b>	<b>M</b>

- Alle Abmessungen sind in mm angegeben, sofern nicht anders vermerkt.  
All dimensions in mm, unless otherwise noted
- Weitere Abmessungen und Ausführungen sind auf Anfrage erhältlich.  
Further dimensions and versions are available on request.
- Das Anzugsmoment der Schrauben finden Sie im Kapitel "Technische Hinweise".  
For torque specification of the screw, please see "Technical Instructions".
- Alle Hartmetall-Fräaserschäfte mit beschädigter Schneidplattenaufnahme können von unserem Reparaturservice instand gesetzt werden.  
All carbide milling shanks with damaged seating can be repaired by HORN.
- Lieferzeiten / delivery times
  - ▲ ab Lager / on stock
  - △ 4 Wochen / 4 weeks
- Einsatz für Werkstoffgruppen / Use for material groups
  - empfohlen / recommended
  - bedingt einsetzbar / alternative recommended
  - nicht geeignet / not suitable

### Die HORN-Trennstellencodierung - wofür wird sie benötigt?

Die Trennstellencodierung stellt sicher, dass Sie immer die zueinander passenden Werkzeuge finden und wird bei Werkzeughaltern und bei Schneidplatten ausgewiesen. Wenn die Codes übereinstimmen, kann die Schneidplatte im entsprechenden Werkzeughalter verwendet werden. Das gilt auch für unser modulares Haltersystem, hier gibt die Trennstellencodierung die Schnittstelle zwischen Grundhalter und Kassette an.

### The HORN connection interface code - what is it needed for?

The connection interface code ensures that you will always find the appropriate tools and is shown on toolholders and inserts. If the codes match, the insert can be used in the corresponding toolholder. This also applies to our modular holder system, where the connection code indicates the interface between the holder and the cassette.

### HORN-Trennstellencodes und mögliche Kombinationen:

HORN connection interface codes and possible combinations:

- HIS** = Plattensitzgröße / Insert seat
- HWS** = Trennstelle Werkstückseitig / Interface workpiece side
- HMS** = Trennstelle Maschinenseitig / Interface machine side

HIS	↔	HWS
HMS	↔	HWS

### Beispiel Schneidplatte

Example insert

Bestellnummer Part number	Ds	Nw	w	s	s <sub>1</sub>	t <sub>max</sub>	Z	HIS	TA45
306.0050.10.00	9,7	0,5	0,57	3,4	3,2	0,85	3	306060R	▲

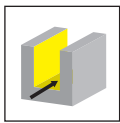
### Beispiel Klemmhalter

Example toolholder

Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
M306.0707.03A	7,5	100	A	306060R • 306060L

**N Technische Hinweise, Zubehör**  
Technical Instructions, Additional Equipment

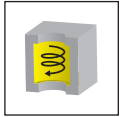
**INDEX**



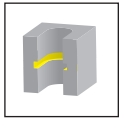
Nutfräsen  
Groove milling



Vollradiusnut fräsen  
Full radius groove milling



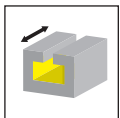
Zirkularnut  
Circular groove



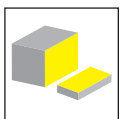
Innennut fräsen  
Internal groove milling



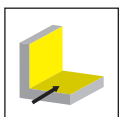
Seegerringnut  
Circlip groove



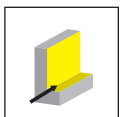
T-Nuten DIN650  
T-Slots



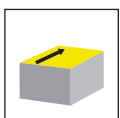
Trennfräsen  
Slot milling



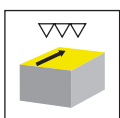
Eckfräsen  
Corner milling



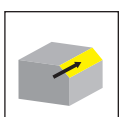
Besäumen  
Trimming



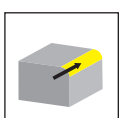
Planfräsen  
Face milling



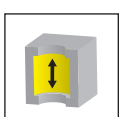
Schlichtfräsen  
Finishing



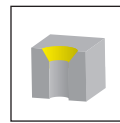
Fasen  
Chamfering



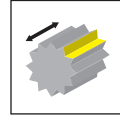
Radius fräsen  
Radius milling



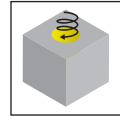
Bohrung fräsen  
Bore milling



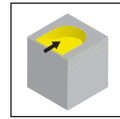
Fase fräsen  
Chamfer milling



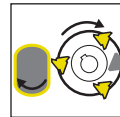
Verzahnung fräsen  
Gear milling



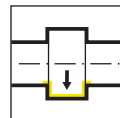
Bohrzirkularfräsen  
Helical interpolation



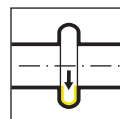
Rampe eintauchen  
Ramping



Mehrkantschlagen  
Polygon milling



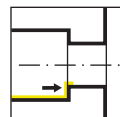
Einstecken innen  
Internal grooving



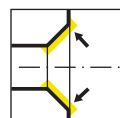
Einstecken innen Vollradius  
Internal grooving full radius



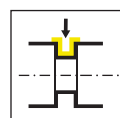
Ausdrehen und Fasen innen  
Internal boring and grooving chamfer



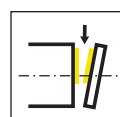
Rückwärtsdrehen innen  
Internal back turning



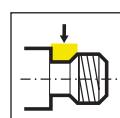
Fasen innen  
Internal chamfering



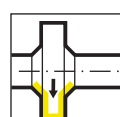
Einstecken außen  
External grooving



Abstechen  
Parting off



Gewindefreistich DIN76  
Corner thread relief



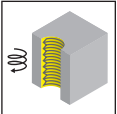
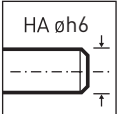




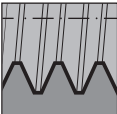

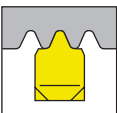

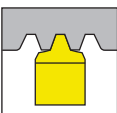






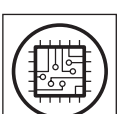
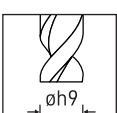

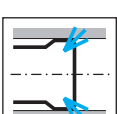

Einstecken mit Fase innen  
Internal grooving with chamfer



# Übersicht Anwendungen

## Overview Application



	Gewinde fräsen innen Thread milling internal		Schaftformen HA, HB, HE Shank forms
	Gewinde Teilprofil Partial profile thread		Schaftform Shank form
	Gewinde Vollprofil Full profile thread		Schaftform Shank form
	Gewinde innen Internal thread		Geometrie .3 Geometry
	Gewinde Whitworth Whitworth thread		Geometrie .40 für Aluminium Geometry .40 for aluminium
	Trapezgewinde Trapezoidal thread		Geometrie .E Geometry
	Unified-Gewinde Unified thread		Geometrie .FY Geometry
	Gewinde metrisch Metric ISO thread Anstellwinkel 60° (Tangentialfräsen) Approach angle 60° (Tangential Milling)		PKD-bestückt PCD tipped
	Anstellwinkel 45° Approach angle 45°		CVD-bestückt CVD tipped
	Bohrung Datenträger DIN69973 Bore hole for data carrier		
	Toleranzen Tolerances		
	Innenkühlung Internal coolant		
	Innenkühlung Internal coolant		
	Zähnezahlen Numbers of teeth		



**DC**



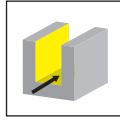
**Vollhartmetall-Schaftfräser  
System DC**

- Nutfräsen
- Fasfräsen

**Solid Carbide End Mills  
System DC**

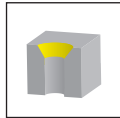
- Groove milling
- Chamfer milling

Nutfräser  
Groove milling cutter  
DCR/DCN/DCX



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13-16

Fasfräser  
Chamfer Milling Cutter  
DCF



Seite/Page  
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Schnittdaten  
Cutting data

Seite/Page  
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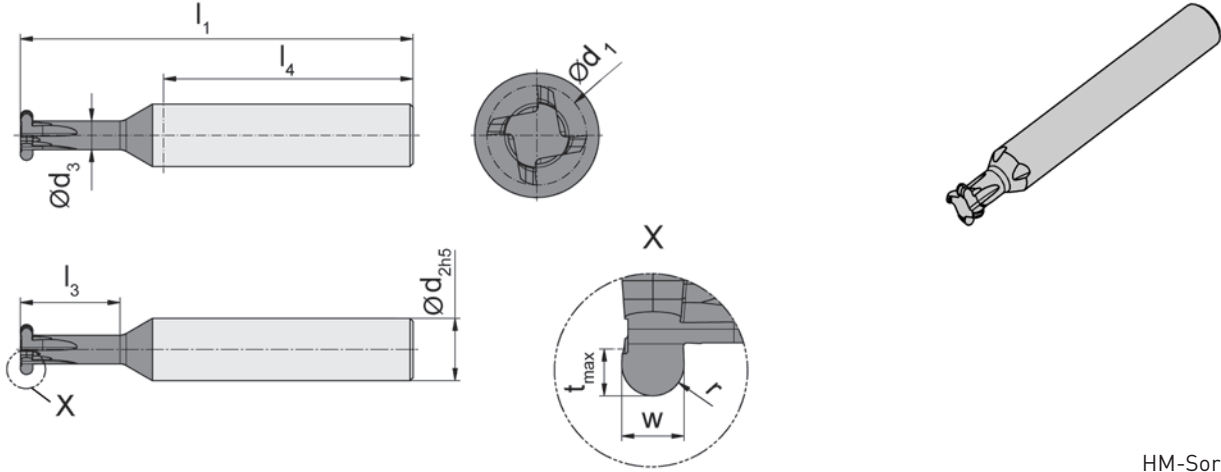
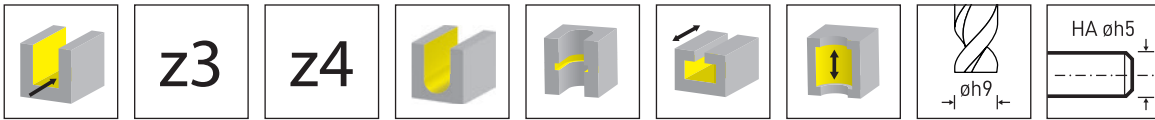
# Nutfräser

Groove milling cutter

## DCR



A



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

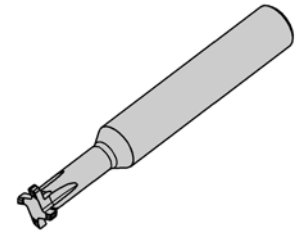
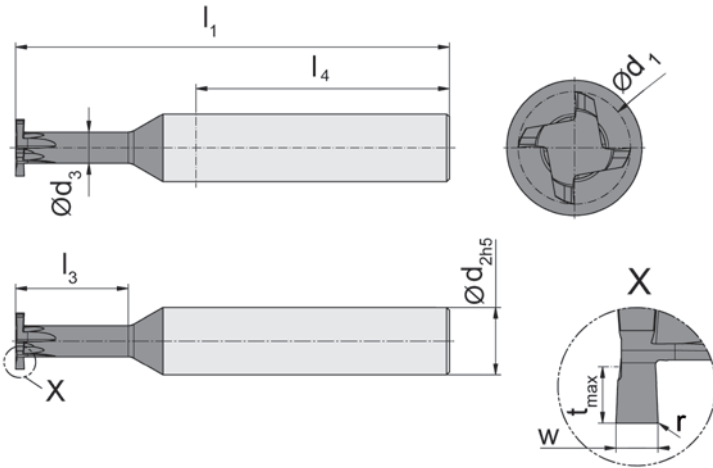
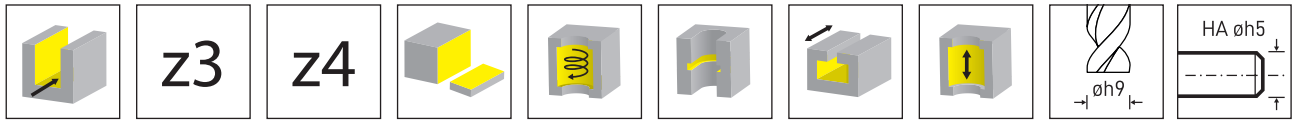
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Z	w	t <sub>max</sub>	r	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC25	RC45
DCR.3.40.10.05.1.06	3	1	0,5	0,5	4	6	2,75	50	4	36	▲	
DCR.3.50.10.05.2.06	3	1	0,75	0,5	5	6	3,2	50	6	36		▲
DCR.3.60.10.05.1.06	3	1	1	0,5	6	6	3,7	50	4	36		▲
DCR.3.60.10.05.2.06	3	1	1	0,5	6	6	3,7	63	6	36		▲
DCR.3.60.15.75.2.06	3	1,5	1	0,75	6	6	3,7	63	6	36		▲
DCR.3.70.10.05.2.08	3	1	1,25	0,5	7	8	4,2	63	10	36		▲
DCR.4.80.10.05.5.08	4	1	1,5	0,5	8	8	4,6	63	16	36		▲
DCR.4.80.15.75.3.08	4	1,5	1,5	0,75	8	8	4,6	63	8	36		▲
DCR.4.80.15.75.5.08	4	1,5	1,5	0,75	8	8	4,6	63	16	36		▲
DCR.4.80.20.10.3.08	4	2	1,5	1	8	8	4,6	63	8	36		▲
DCR.4.80.20.10.5.08	4	2	1,5	1	8	8	4,6	63	16	36		▲
DCR.4.100.10.05.6.10	4	1	2	0,5	10	10	5,5	77	20	40		▲
DCR.4.100.15.75.6.10	4	1,5	2	0,75	10	10	5,5	77	20	40		▲
DCR.4.100.20.10.6.10	4	2	2	1	10	10	5,5	77	20	40		▲
DCR.4.100.25.12.6.10	4	2,5	2	1,25	10	10	5,5	77	20	40		▲
DCR.4.100.30.15.6.10	4	3	2	1,5	10	10	5,5	77	20	40		▲
											P	● ●
											M	● ●
											K	● ●
											N	● ●
											S	● ●
											H	- -

# Nutfräser

Groove milling cutter

## DCN



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Z	w	t <sub>max</sub>	r	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC25	RC45
DCN.3.30.05.00.1.06	3	0,5	0,4	-	3	6	2	50	3	36	▲	
DCN.3.30.05.00.2.06	3	0,5	0,4	-	3	6	2	50	5	36	▲	
DCN.3.30.10.00.1.06	3	1	0,4	-	3	6	2	50	3	36	▲	
DCN.3.30.10.00.2.06	3	1	0,4	-	3	6	2	50	5	36	▲	
DCN.3.40.05.00.1.06	3	0,5	0,5	-	4	6	2,8	50	4	36	▲	
DCN.3.40.05.00.3.06	3	0,5	0,8	-	4	6	2,1	50	8	36	▲	
DCN.3.40.10.00.1.06	3	1	0,5	-	4	6	2,8	50	4	36	▲	
DCN.3.40.10.00.3.06	3	1	0,8	-	4	6	2,1	50	8	36	▲	
DCN.3.50.05.00.1.06	3	0,5	1	-	5	6	2,8	50	5	36		▲
DCN.3.50.05.00.3.06	3	0,5	1	-	5	6	2,8	54	10	36		▲
DCN.3.50.10.10.1.06	3	1	1	0,1	5	6	2,8	50	5	36		▲
DCN.3.50.10.10.3.06	3	1	1	0,1	5	6	2,8	54	10	36		▲
DCN.3.60.05.00.4.06	3	0,5	1,2	-	6	6	3,3	63	12	36		▲
DCN.3.60.10.00.1.06	3	1	1,2	-	6	6	3,3	50	4	36		▲
DCN.3.60.10.00.2.06	3	1	1,2	-	6	6	3,3	63	6	36		▲
DCN.3.60.10.00.4.06	3	1	1,2	-	6	6	3,3	63	12	36		▲
DCN.3.60.15.15.2.06	3	1,5	1,2	0,15	6	6	3,3	63	6	36		▲
DCN.3.60.15.15.4.06	3	1,5	1,2	0,15	6	6	3,3	63	12	36		▲
DCN.3.60.20.15.2.06	3	2	1,2	0,15	6	6	3,3	63	6	36		▲
DCN.3.60.20.15.4.06	3	2	1,2	0,15	6	6	3,3	63	12	36		▲
DCN.3.70.05.00.4.08	3	0,5	1,5	-	7	8	3,7	63	14	36		▲
DCN.3.70.10.00.4.08	3	1	1,5	-	7	8	3,7	63	14	36		▲
DCN.3.70.15.15.4.08	3	1,5	1,5	0,15	7	8	3,7	63	14	36		▲
DCN.3.70.20.15.4.08	3	2	1,5	0,15	7	8	3,7	63	14	36		▲
DCN.4.80.05.00.5.08	4	0,5	1,7	-	8	8	4,3	63	16	36		▲
DCN.4.80.10.00.3.08	4	1	1,7	-	8	8	4,3	63	8	36		▲
DCN.4.80.10.00.5.08	4	1	1,7	-	8	8	4,3	63	16	36		▲
DCN.4.80.15.15.3.08	4	1,5	1,7	0,15	8	8	4,3	63	8	36		▲
DCN.4.80.15.15.5.08	4	1,5	1,7	0,15	8	8	4,3	63	16	36		▲
DCN.4.80.20.15.3.08	4	2	1,7	0,15	8	8	4,3	63	8	36		▲
DCN.4.80.20.15.5.08	4	2	1,7	0,15	8	8	4,3	63	16	36		▲

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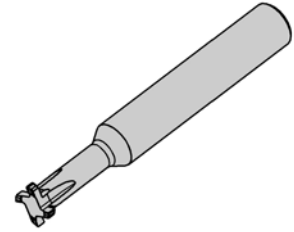
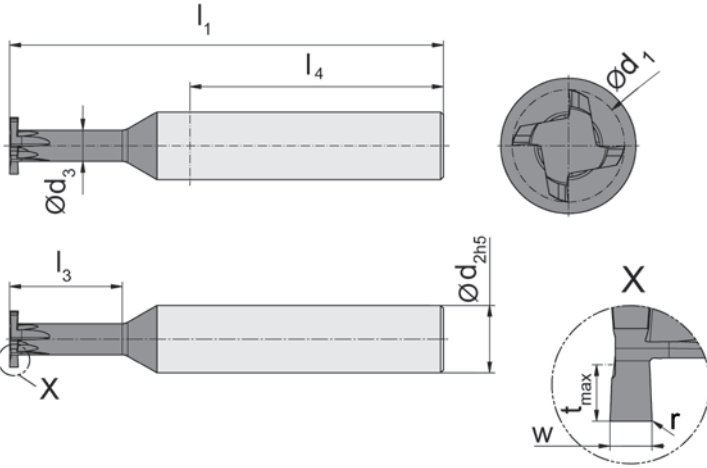
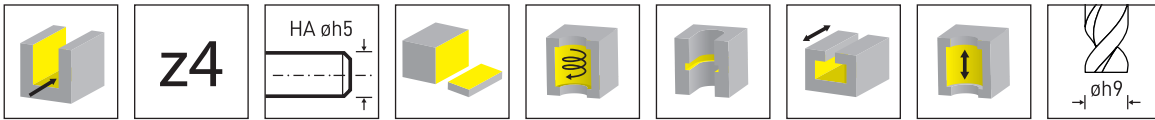
# Nutfräser

## Groove milling cutter

# DCN



# A



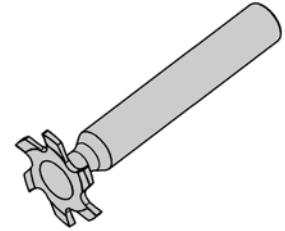
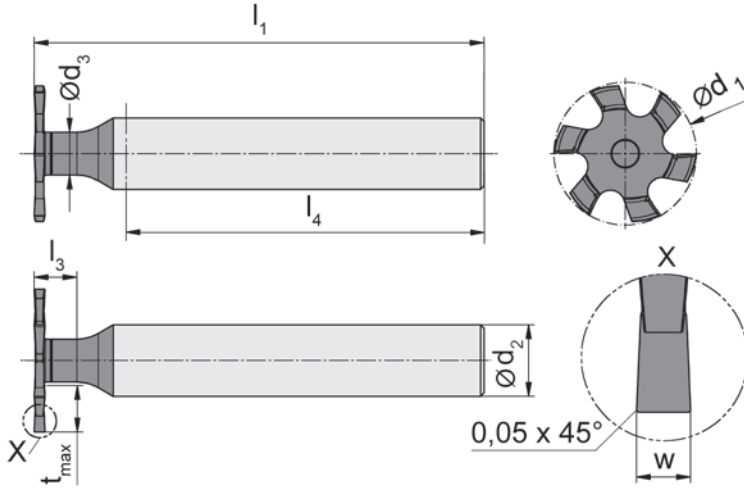
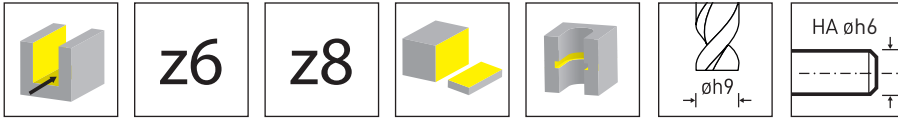
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Z	w	t <sub>max</sub>	r	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC45
DCN.4.90.05.00.5.10	4	0,5	2	-	9	10	4,7	63	18	40	▲
DCN.4.90.10.00.5.10	4	1	2	-	9	10	4,7	63	18	40	▲
DCN.4.90.15.15.5.10	4	1,5	2	0,15	9	10	4,7	63	18	40	▲
DCN.4.90.20.15.5.10	4	2	2	0,15	9	10	4,7	63	18	40	▲
DCN.4.100.05.00.6.10	4	0,5	2,2	-	10	10	5,3	77	20	40	▲
DCN.4.100.10.00.6.10	4	1	2,2	-	10	10	5,3	77	20	40	▲
DCN.4.100.15.00.6.10	4	1,5	2,2	-	10	10	5,3	77	20	40	▲
DCN.4.100.20.15.6.10	4	2	2,2	0,15	10	10	5,3	77	20	40	▲
DCN.4.100.25.15.6.10	4	2,5	2,2	0,15	10	10	5,3	77	20	40	▲
DCN.4.100.30.15.6.10	4	3	2,2	0,15	10	10	5,3	77	20	40	▲
DCN.4.110.05.00.6.12	4	0,5	2,5	-	11	12	5,7	77	22	45	▲
DCN.4.110.10.00.6.12	4	1	2,5	-	11	12	5,7	77	22	45	▲
DCN.4.110.15.00.6.12	4	1,5	2,5	-	11	12	5,7	77	22	45	▲
DCN.4.110.20.15.6.12	4	2	2,5	0,15	11	12	5,7	77	22	45	▲
DCN.4.110.25.15.6.12	4	2,5	2,5	0,15	11	12	5,7	77	22	45	▲
DCN.4.110.30.15.6.12	4	3	2,5	0,15	11	12	5,7	77	22	45	▲
DCN.4.120.05.00.6.12	4	0,5	3	-	12	12	5,7	77	25	45	▲
DCN.4.120.10.00.6.12	4	1	3	-	12	12	5,7	77	25	45	▲
DCN.4.120.15.00.6.12	4	1,5	3	-	12	12	5,7	77	25	45	▲
DCN.4.120.20.15.6.12	4	2	3	0,15	12	12	5,7	77	25	45	▲
DCN.4.120.25.15.6.12	4	2,5	3	0,15	12	12	5,7	77	25	45	▲
DCN.4.120.30.15.6.12	4	3	3	0,15	12	12	5,7	77	25	45	▲

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HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Z	w	t <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC45
DCX.6.20.050.2.05.10	6	0,53	7	20	10	5	64	6	40	▲
DCX.6.20.100.2.05.10	6	1,03	7	20	10	5	64	6	40	▲
DCX.6.20.150.2.05.10	6	1,53	7	20	10	5	64	6	40	▲
DCX.6.20.200.2.05.10	6	2,03	7	20	10	5	64	6	40	▲
DCX.6.20.250.2.05.10	6	2,53	7	20	10	5	64	6	40	▲
DCX.6.25.050.2.06.10	6	0,53	9	25	10	6	64	6	40	▲
DCX.6.25.100.2.06.10	6	1,03	9	25	10	6	64	6	40	▲
DCX.6.25.150.2.06.10	6	1,53	9	25	10	6	64	6	40	▲
DCX.6.25.200.2.06.10	6	2,03	9	25	10	6	64	6	40	▲
DCX.6.25.250.2.06.10	6	2,53	9	25	10	6	64	6	40	▲
DCX.6.30.050.4.07.12	6	0,53	11	30	12	7	80	9	45	▲
DCX.6.30.100.4.07.12	6	1,03	11	30	12	7	80	9	45	▲
DCX.6.30.150.4.07.12	6	1,53	11	30	12	7	80	9	45	▲
DCX.6.30.200.4.07.12	6	2,03	11	30	12	7	80	9	45	▲
DCX.6.30.250.4.07.12	6	2,53	11	30	12	7	80	9	45	▲
DCX.6.30.300.4.07.12	6	3,03	11	30	12	7	80	9	45	▲
DCX.6.35.050.4.08.12	6	0,53	13	35	12	8	80	11	45	▲
DCX.6.35.100.4.08.12	6	1,03	13	35	12	8	80	11	45	▲
DCX.6.35.150.4.08.12	6	1,53	13	35	12	8	80	11	45	▲
DCX.6.35.200.4.08.12	6	2,03	13	35	12	8	80	11	45	▲
DCX.6.35.250.4.08.12	6	2,53	13	35	12	8	80	11	45	▲
DCX.6.35.300.4.08.12	6	3,03	13	35	12	8	80	11	45	▲
DCX.8.40.050.4.09.12	8	0,53	15	40	12	9	80	11	45	▲
DCX.8.40.100.4.09.12	8	1,03	15	40	12	9	80	11	45	▲
DCX.8.40.150.4.09.12	8	1,53	15	40	12	9	80	11	45	▲
DCX.8.40.200.4.09.12	8	2,03	15	40	12	9	80	11	45	▲
DCX.8.40.250.4.09.12	8	2,53	15	40	12	9	80	11	45	▲
DCX.8.40.300.4.09.12	8	3,03	15	40	12	9	80	11	45	▲

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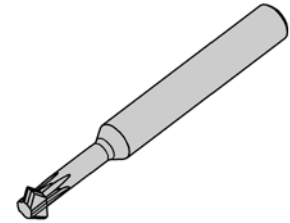
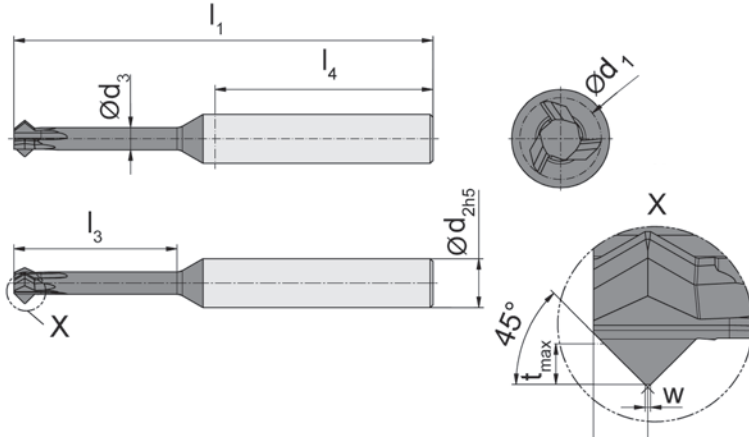
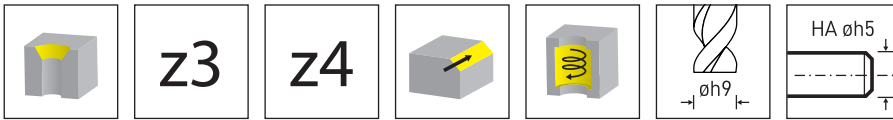
# Fasfräser

## Chamfer Milling Cutter

# DCF



# A



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Z	w	Fase Chamfer	$t_{max}$	$d_1$	$d_2$	$d_3$	$l_1$	$l_3$	$l_4$	RC25	RC45
DCF.3.20.4545.1.04	3	0,2	45°	0,3	2	4	1,25	39	4	28	▲	
DCF.3.20.4545.3.04	3	0,2	45°	0,3	2	4	1,25	45	8	28	▲	
DCF.3.30.4545.2.04	3	0,2	45°	0,3	3	4	2,1	39	6	28	▲	
DCF.3.30.4545.4.04	3	0,2	45°	0,3	3	4	2,1	45	10	28	▲	
DCF.3.40.4545.3.06	3	0,2	45°	0,75	4	6	2,2	50	8	36	▲	
DCF.3.40.4545.6.06	3	0,2	45°	0,75	4	6	2,2	54	12	36	▲	
DCF.3.50.4545.3.06	3	0,2	45°	1	5	6	2,7	54	10	36		▲
DCF.3.50.4545.5.06	3	0,2	45°	1	5	6	2,7	63	15	36		▲
DCF.3.60.4545.5.06	3	0,2	45°	1,25	6	6	3,15	63	16	36		▲
DCF.3.60.4545.6.06	3	0,2	45°	1,25	6	6	3,15	63	20	36		▲
DCF.3.60.4545.8.06	3	0,2	45°	1,25	6	6	3,15	65	25	36		▲
DCF.3.75.4545.6.08	3	0,2	45°	1,5	7,5	8	4,1	63	20	36		▲
DCF.3.75.4545.8.08	3	0,2	45°	1,5	7,5	8	4,1	63	30	36		▲
DCF.4.75.4545.8.08	4	0,2	45°	1,5	7,5	8	4,1	77	30	36		▲
DCF.4.80.4545.8.08	4	0,2	45°	1,5	8	8	4,7	80	40	36		▲
DCF.4.90.4545.8.10	4	0,2	45°	1,75	9	10	5,2	90	40	40		▲
DCF.4.100.4545.8.10	4	0,2	45°	2	10	10	5,7	100	50	40		▲

P	●	●
M	●	●
K	●	●
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S	●	●
H	-	-

Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit $v_c$ (m/min) / Startwerte Cutting speed $v_c$ (m/min) / Start values		
						RC25 RC45	fz	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	250-180	0,01 -0,03
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	220-160	0,01 -0,03
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	200-140	0,01 -0,03
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	180-120	0,01 -0,03
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	150-90	0,01 -0,03
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	250-180	0,01 -0,03
	niedrig legierter Stahl (<5%) Alloyed steel	gegüht annealed	P2.1	180	590	100Cr6	200-140	0,01 -0,03
		vergütet quenched	P2.2	280	960	14NiCr10	150-90	0,01 -0,03
		vergütet quenched	P2.3	350	1250	34CrMo4	140-80	0,01 -0,03
		vergütet quenched	P2.4	430	1450	55Cr3	140-80	0,01 -0,03
	hochlegierter Stahl (>5%) high alloyed steel	gegüht annealed	P3.1	200	680	X10CrAl18	180-120	0,01 -0,03
		gehärtet hardened	P3.2	350	1200	X210Cr2	140-80	0,01 -0,03
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200	250-180	0,01 -0,03
		legiert alloyed	P4.2	220	750	GX40CrSi28	220-160	0,01 -0,03
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39		0,01 -0,03
	<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	150-90
austenitisch austenitic ferritic			M1.2	300	1000	X6CrNiMo- Ti17-12-2	140-80	0,01 -0,03
austenitisch ferritisch austenitic			M1.3	230	780	X2CrNi- MoN17-13-3	120-60	0,01 -0,03

Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit R <sub>m</sub> [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit vc (m/min) / Startwerte Cutting speed vc (m/min) / Start values		
						RC25 RC45	fz	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	230-190	0,01 -0,03
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	230-190	0,01 -0,03
	Kugelgraphit- guss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	220-160	0,01 -0,03
		perlitisch perlitic	K2.1	260	700	GGG-60	220-160	0,01 -0,03
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45	220-160	0,01 -0,03
		perlitisch perlitic	K3.2	260	700	GTS-55-04	220-160	0,01 -0,03
	Ausferritisches Gusseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800			
		vergütet quenched	K4.2	350	1050			
		vergütet quenched	K4.3	450	1400			
<b>N</b>	Al-Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	bis 1000	0,02 - 0,04
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	600-200	0,02 - 0,04
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	400-200	0,02 - 0,04
		6-10% Si	N2.2	100	320	AlSi7Mg		
		10-15 % Si	N2.3	130	450	AlSi12		
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	400-200	0,02 - 0,04
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb	400-200	0,02 - 0,04
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40	400-200	0,02 - 0,04
		hochfest high strength	N3.4	300	1000	CuZn25Al- 5Mn4Fe3	160-100	0,02 - 0,04
Graphit Graphite		N4.1						

Werkstoff Material	Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit vc (m/min) / Startwerte Cutting speed vc (m/min) / Start values			
					RC25 RC45	fz		
<b>S</b> Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670		120-60	0,02 - 0,04	
	gehärtet hardened	S1.2	275	930		120-60	0,02 - 0,04	
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600	90-30	0,02 - 0,04
		gehärtet hardened	S2.2	350	1200	Inconel 713	90-30	0,02 - 0,04
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240		120-80	0,02 - 0,04
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200		120-80	0,02 - 0,04
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400		120-80	0,02 - 0,04	
<b>H</b> Gehärtete Stähle Hardened steels	50-55 HRC	H1.1	-	-				
	55-60 HRC	H1.2	-	-				
	60-63 HRC	H1.3	-	-				
	> 63HRC	H1.4	-	-				
<b>O</b> Thermoplaste Thermoplastics		O1.1						
	Duroplaste Duro plaste	O1.2						
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4					



System/System	Seite/Page
<b>M304</b>	<b>22</b>
<b>M306</b>	<b>32</b>
<b>M308</b>	<b>62</b>
<b>M311</b>	<b>84</b>
<b>M116</b>	<b>106</b>
<b>M313</b>	<b>112</b>
<b>M328</b>	<b>148</b>
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<b>M335</b>	<b>200</b>
<b>M620</b>	<b>204</b>

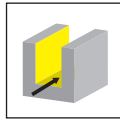
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



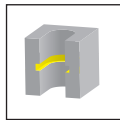
B

Fräferschaft  
Milling shank  
M304/M304.ST



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Schneidplatte  
Insert  
304



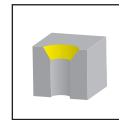
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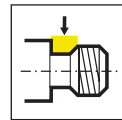
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## M304



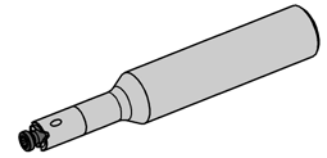
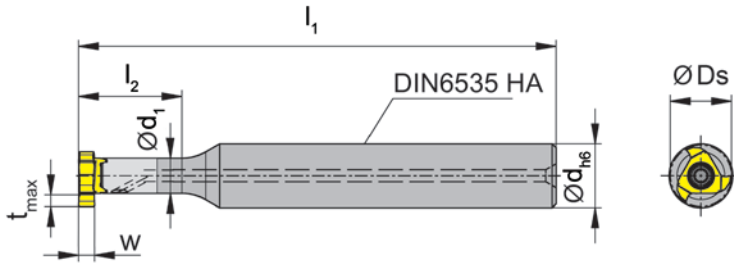
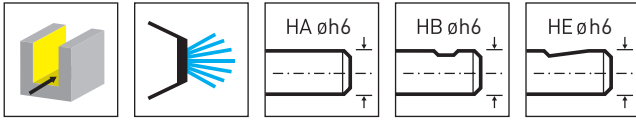
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\emptyset$  7,7 mm

**Milling shank with  
exchangeable insert**

from bore  $\emptyset$  7,7 mm

**B**



Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M304.0008.01A</b>	8	60	13	4,4	HA	304044R
<b>M304.0008.02A</b>	8	64	17	4,4	HA	304044R
<b>M304.0008.03A</b>	8	68	21	4,4	HA	304044R
<b>M304.0008.01B</b>	8	60	13	4,4	HB	304044R
<b>M304.0008.02B</b>	8	64	17	4,4	HB	304044R
<b>M304.0008.03B</b>	8	68	21	4,4	HB	304044R
<b>M304.0008.01E</b>	8	60	13	4,4	HE	304044R
<b>M304.0008.02E</b>	8	64	17	4,4	HE	304044R
<b>M304.0008.03E</b>	8	68	21	4,4	HE	304044R

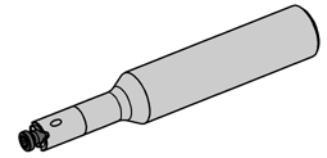
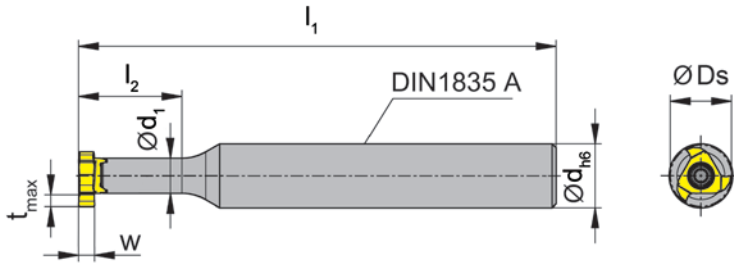
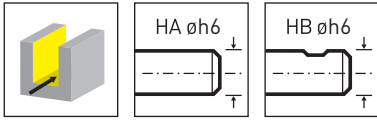
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M304...	<b>1.8.4T6EP</b>	<b>T6PL</b>





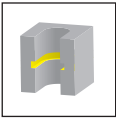
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<b>M304.ST08.01A</b>	8	60	13	4,4	HA	304044R
<b>M304.ST08.01B</b>	8	60	13	4,4	HB	304044R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M304...	<b>1.8.4T6EP</b>	<b>T6PL</b>

B



z3

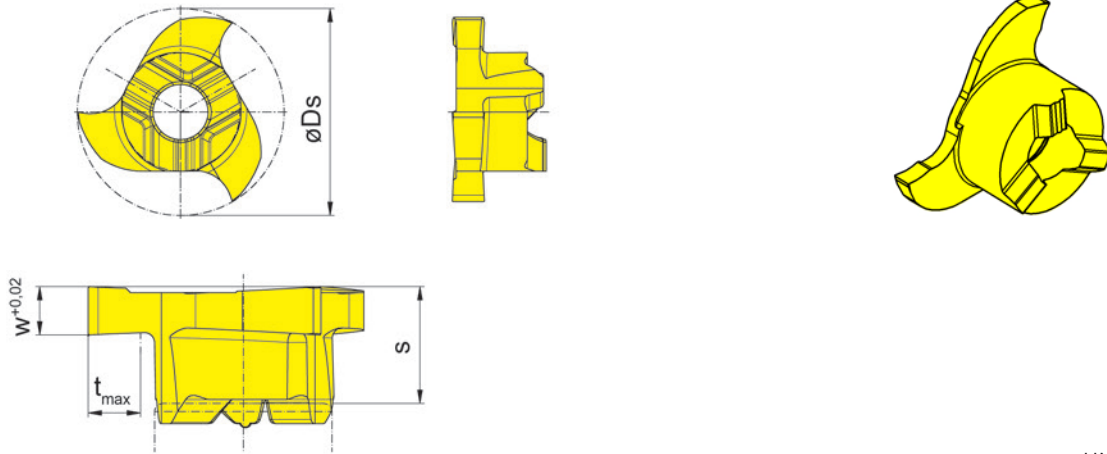


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
							EG35	EG55	IG35	
304.0025.20	7,7	0,25	2,6	1,3	3	304044R	▲		△	
304.0030.20	7,7	0,3	2,6	1,3	3	304044R	▲		△	
304.0040.20	7,7	0,4	2,6	1,3	3	304044R	▲		△	
304.0050.20	7,7	0,5	2,6	1,3	3	304044R		▲	▲	
304.0060.20	7,7	0,6	2,6	1,3	3	304044R	▲		△	
304.0070.20	7,7	0,7	2,6	1,3	3	304044R	▲		△	
304.0100.20	7,7	1	2,6	1,3	3	304044R		▲	▲	
304.0150.20	7,7	1,5	2,9	1,3	3	304044R		▲	▲	
304.0200.20	7,7	2	2,9	1,3	3	304044R		▲	▲	
							P	●	●	-
							M	●	○	●
							K	○	○	-
							N	-	-	-
							S	-	-	●
							H	-	-	-

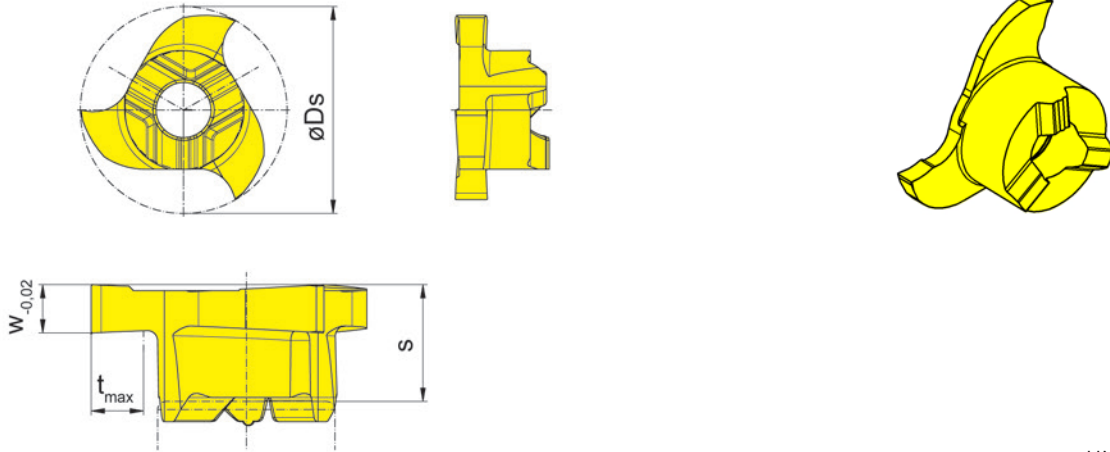


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	EG55	IG35
304.0080.20	7,7	0,8	0,87	2,6	1,3	3	304044R	▲	▲
304.0090.20	7,7	0,9	0,97	2,6	1,3	3	304044R	▲	▲
304.0110.20	7,7	1,1	1,21	2,9	1,3	3	304044R	▲	▲
304.0130.20	7,7	1,3	1,41	2,9	1,3	3	304044R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	-
M	○	●
K	○	-
N	-	-
S	-	●
H	-	-

**B**

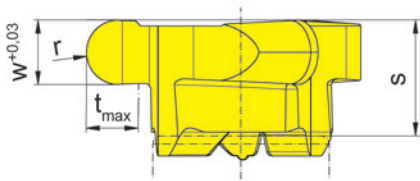
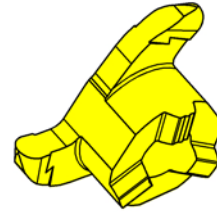
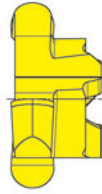
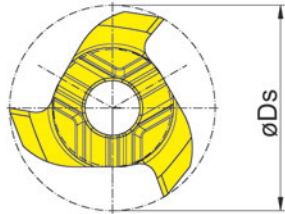


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55	IG35	
304.0004.08	7,7	0,8	2,6	0,4	1,3	3	304044R	▲	▲	
304.0006.12	7,7	1,2	2,9	0,6	1,3	3	304044R	▲	▲	
304.0008.16	7,7	1,6	2,9	0,8	1,3	3	304044R	▲	▲	
								P	●	-
								M	○	●
								K	○	-
								N	-	-
								S	-	●
								H	-	-

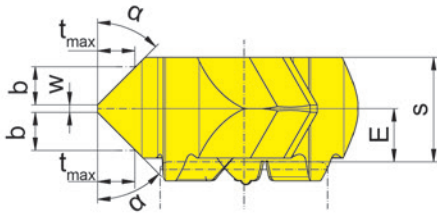
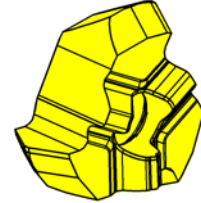
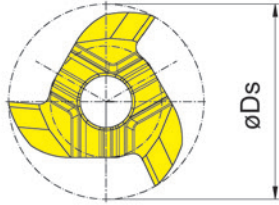


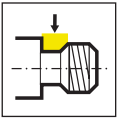
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	a	b	t <sub>max</sub>	Z	HIS	EG55	IG35	
304.1515.20	7,7	1,4	2,75	0,2	15°	1	0,3	3	304044R	Δ	Δ	
304.3030.20	7,7	1,4	2,75	0,2	30°	1	0,6	3	304044R	▲	▲	
304.4545.20	7,7	1,4	2,75	0,2	45°	1	1	3	304044R	▲	▲	
										P	●	-
										M	○	●
										K	○	-
										N	-	-
										S	-	●
										H	-	-

B



z3

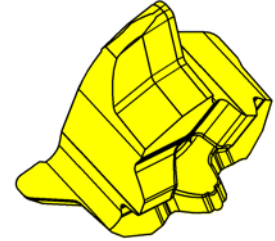
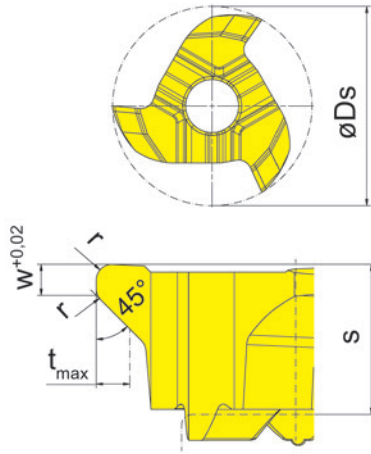


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55
304.0508.29	7,7	0,6	2,9	0,3	0,65	3	304044R	▲
								P ●
								M o
								K o
								N -
								S -
								H -

Gewindefreistriche DIN 76  
Thread relief DIN 76



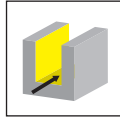
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



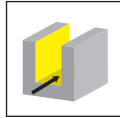
B

Frälerschaft  
Milling shank  
M306/M306.ER/M306.ST



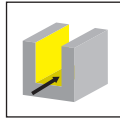
Seite/Page  
34-37

Grundaufnahme  
Basic Holder  
WFB



Seite/Page  
38

Einschraubfräser  
Screw-in cutter  
M306.M

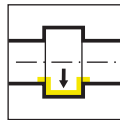


Seite/Page  
39

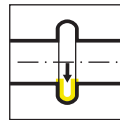
Schneidplatte  
Insert  
108/306/606



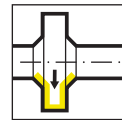
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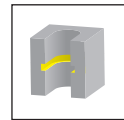
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42



Seite/Page  
43



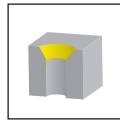
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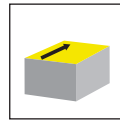
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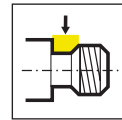
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53



Seite/Page  
54, 57-58



Seite/Page  
59-60



Seite/Page  
61



## M306



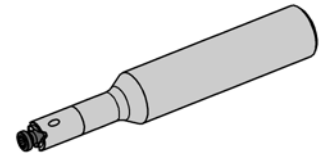
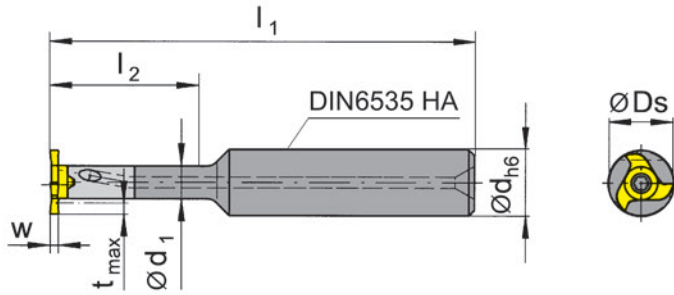
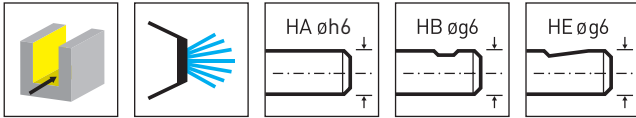
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  10 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  10 mm

B



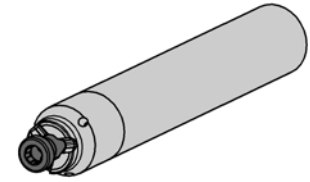
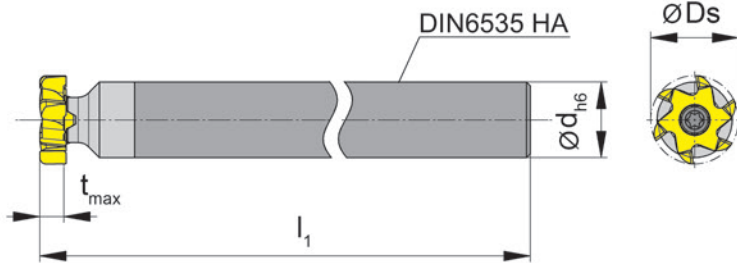
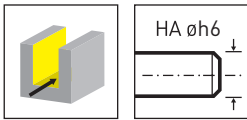
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M306.0012.01A	12	80	21	6	HA	306060R • 306060L
M306.0012.02A	12	90	30	6	HA	306060R • 306060L
M306.0012.03A	12	100	42	6	HA	306060R • 306060L
M306.0012.01B	12	80	21	6	HB	306060R • 306060L
M306.0012.02B	12	90	30	6	HB	306060R • 306060L
M306.0012.03B	12	100	42	6	HB	306060R • 306060L
M306.0012.01E	12	80	21	6	HE	306060R • 306060L
M306.0012.02E	12	90	30	6	HE	306060R • 306060L
M306.0012.03E	12	100	42	6	HE	306060R • 306060L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

## Ersatzteile

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M306...	2.6.5T8EP	T8PL



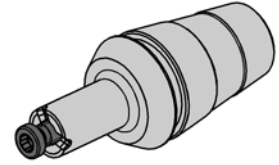
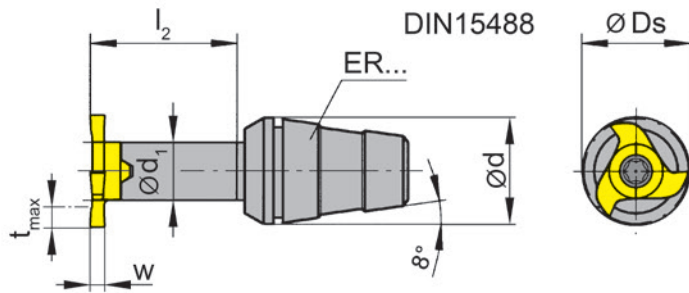
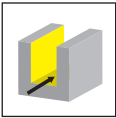
Bestellnummer Part number	d	$l_1$	Form	HWS
<b>M306.0707.03A</b>	7,5	100	HA	306060R • 306060L
<b>M306.1010.03A</b>	10	120	HA	306060R • 306060L

tmax und Ds siehe Schneidplatte  
tmax and Ds see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M306...	<b>2.6.5T8EP</b>	<b>T8PL</b>

**B**



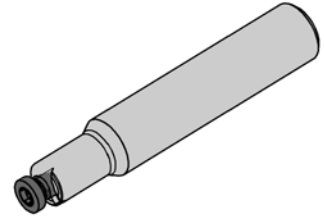
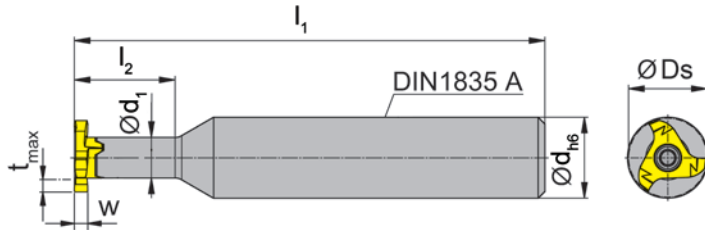
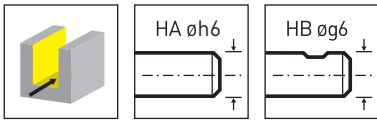
Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M306.ER11.02</b>	11	16	6	ER11.6499	306060R • 306060L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M306.ER11.02	<b>2.6.5T8EP</b>	<b>T8PL</b>



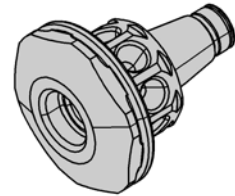
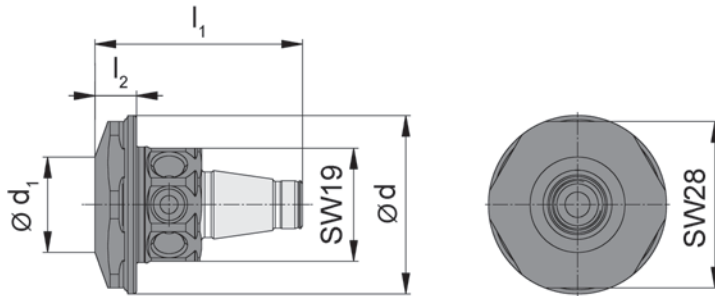
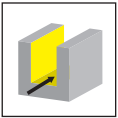
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<b>M306.ST10.01A</b>	10	60	15	6	HA	306060R • 306060L
<b>M306.ST12.01A</b>	12	70	15	6	HA	306060R • 306060L
<b>M306.ST10.01B</b>	10	60	15	6	HB	306060R • 306060L
<b>M306.ST12.01B</b>	12	70	15	6	HB	306060R • 306060L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

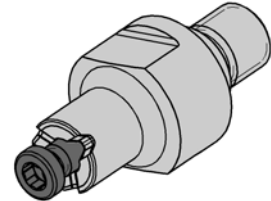
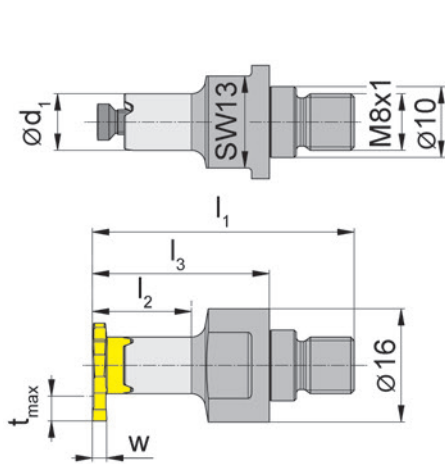
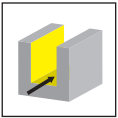
<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M306...	<b>2.6.5T8EP</b>	<b>T8PL</b>

**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	$d$
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter



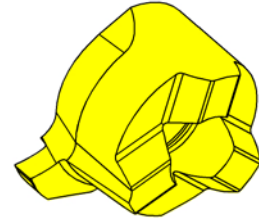
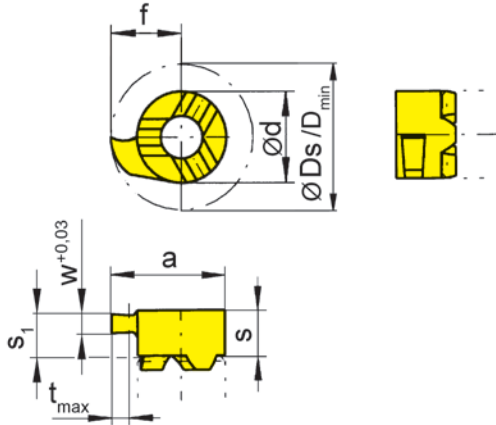
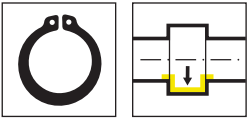
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
<b>M306.M081.01</b>	37	11	25	6	13	306060R • 306060L	8201

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M306.M081.01	<b>2.6.5T8EP</b>	<b>T8PL</b>

B



R = rechts wie gezeichnet  
R = right hand version shown

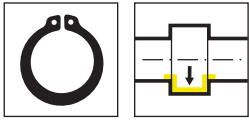
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	f	Ds	d	s	s <sub>1</sub>	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35	
<b>R108.0070.00</b>	0,74	0,7	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060R	▲	▲	▲	
<b>R108.0080.00</b>	0,84	0,8	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060R	▲	▲	▲	
<b>R108.0090.00</b>	0,94	0,9	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060R	▲	▲	▲	
<b>L108.0070.00</b>	0,74	0,7	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060L	△	▲	▲	
<b>L108.0080.00</b>	0,84	0,8	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060L	△	△	▲	
<b>L108.0090.00</b>	0,94	0,9	4,8	9,6	6	3,6	3,2	7,8	1	8	1	108060L	△	▲	▲	
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472													<b>P</b>	●	●	●
Zapfenausführung not face cutting, limited depth of cut													<b>M</b>	○	●	●
													<b>K</b>	○	●	●
													<b>N</b>	-	●	●
													<b>S</b>	-	●	●
													<b>H</b>	-	-	-





R = rechts wie gezeichnet  
R = right hand version shown

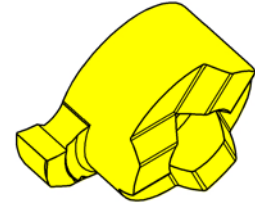
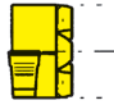
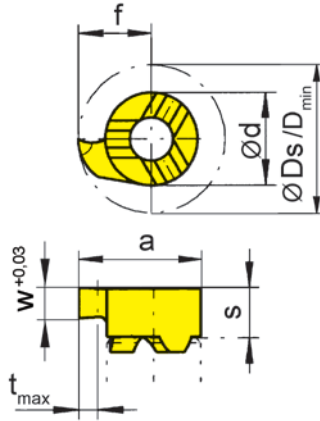
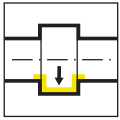
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	s	f	Ds	a	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35	
<b>R108.0110.00</b>	1,19	1,1	3,2	4,8	9,6	7,8	6	1	8	1	108060R	▲	▲	▲	
<b>R108.0130.00</b>	1,39	1,3	3,2	4,8	9,6	7,8	6	1	8	1	108060R	▲	▲	▲	
<b>R108.0160.00</b>	1,69	1,6	3,2	4,8	9,6	7,8	6	1	8	1	108060R	Δ	▲	▲	
<b>L108.0110.00</b>	1,19	1,1	3,2	4,8	9,6	7,8	6	1	8	1	108060L	Δ	▲	▲	
<b>L108.0130.00</b>	1,39	1,3	3,2	4,8	9,6	7,8	6	1	8	1	108060L		Δ	▲	
<b>L108.0160.00</b>	1,69	1,6	3,2	4,8	9,6	7,8	6	1	8	1	108060L	▲	Δ	▲	
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472												<b>P</b>	●	●	●
												<b>M</b>	○	●	●
												<b>K</b>	○	●	●
												<b>N</b>	-	●	●
												<b>S</b>	-	●	●
												<b>H</b>	-	-	-

**B**



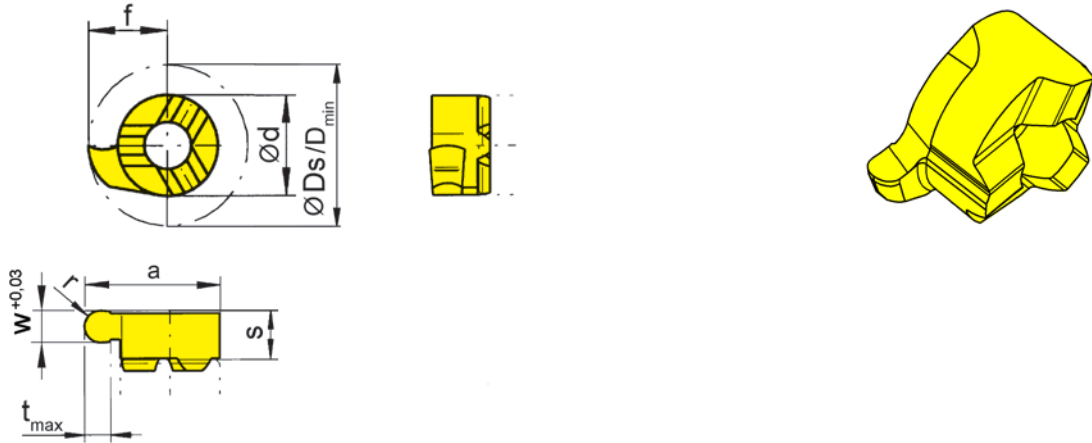
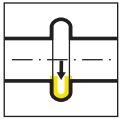
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	s	f	Ds	a	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
<b>R108.0150.00</b>	1,5	3,2	4,8	9,6	7,8	6	1	8	1	108060R	▲	▲	▲
<b>R108.0200.00</b>	2	3,2	4,8	9,6	7,8	6	1	8	1	108060R	▲	▲	▲
<b>L108.0150.00</b>	1,5	3,2	4,8	9,6	7,8	6	1	8	1	108060L		Δ	▲
<b>L108.0200.00</b>	2	3,2	4,8	9,6	7,8	6	1	8	1	108060L		▲	▲
<b>P</b>	●	●	●										
<b>M</b>	○	●	●										
<b>K</b>	○	●	●										
<b>N</b>	-	●	●										
<b>S</b>	-	●	●										
<b>H</b>	-	-	-										



R = rechts wie gezeichnet  
R = right hand version shown

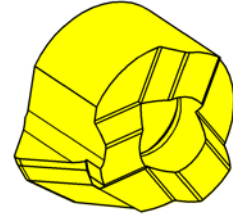
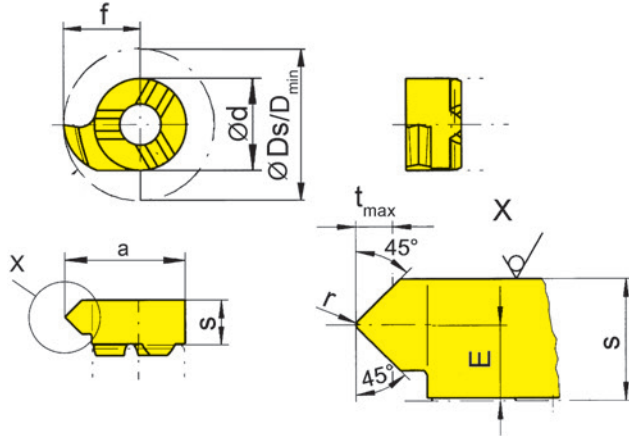
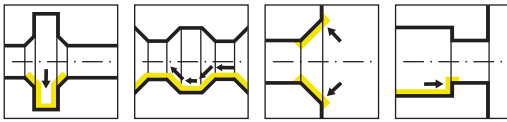
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	s	f	Ds	a	r	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
R108.0004.08	0,8	3,2	4,8	9,6	7,8	0,4	6	1	8	1	108060R	▲	▲	▲
R108.0006.12	1,2	3,2	4,8	9,6	7,8	0,6	6	1	8	1	108060R	▲	▲	▲
R108.0009.18	1,8	3,2	4,8	9,6	7,8	0,9	6	1	8	1	108060R	▲	▲	▲
L108.0004.08	0,8	3,2	4,8	9,6	7,8	0,4	6	1	8	1	108060L	▲	▲	▲
L108.0006.12	1,2	3,2	4,8	9,6	7,8	0,6	6	1	8	1	108060L	▲	▲	▲
L108.0009.18	1,8	3,2	4,8	9,6	7,8	0,9	6	1	8	1	108060L	▲	▲	▲
P	●	●	●											
M	○	●	●											
K	○	●	●											
N	-	●	●											
S	-	●	●											
H	-	-	-											

**B**



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	E	f	Ds	r	d	s	a	D <sub>min</sub>	α	t <sub>max</sub>	Z	HIS	EG55	TA45	TI25	TN35
<b>R108.4545.02</b>	1,8	4,65	9,3	0,2	6	3,6	7,65	7,8	45°	1,4	1	108060R	▲	▲	▲	▲
<b>L108.4545.02</b>	1,8	4,65	9,3	0,2	6	3,6	7,65	7,8	45°	1,4	1	108060L	▲	Δ	Δ	▲
<b>P</b>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>M</b>	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>K</b>	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>N</b>	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>S</b>	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>H</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

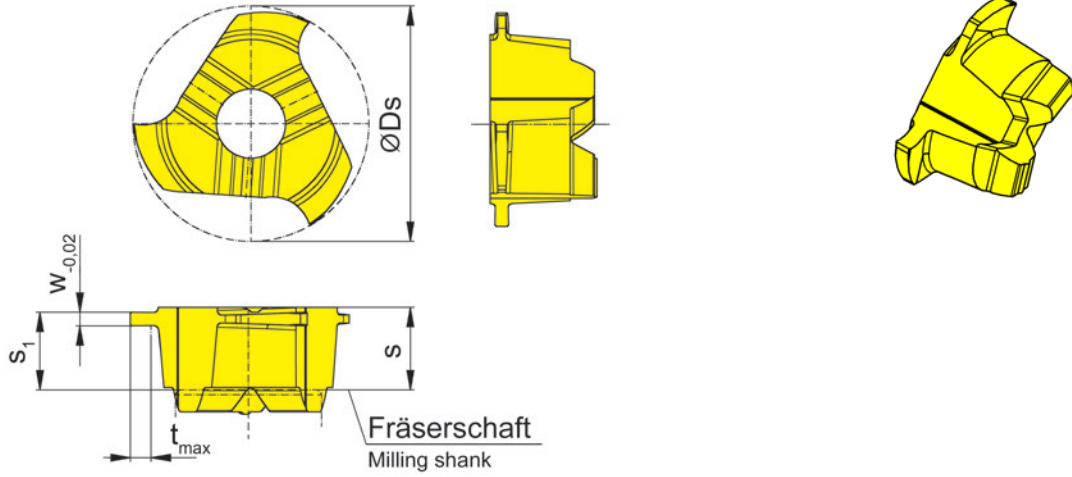


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	s <sub>1</sub>	t <sub>max</sub>	Z	HIS	EG35	TA45
306.0050.10.00	9,7	0,5	0,57	3,4	3,2	0,85	3	306060R	▲	▲
306.0070.10.00	9,7	0,7	0,77	3,4	3,2	1,15	3	306060R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

Zapfenausführung  
not face cutting, limited depth of cut

P	●	●
M	●	●
K	○	●
N	-	●
S	-	●
H	-	-

# Schneidplatte

Insert

# 306



B

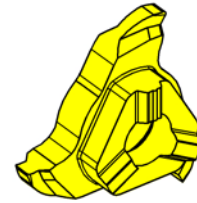
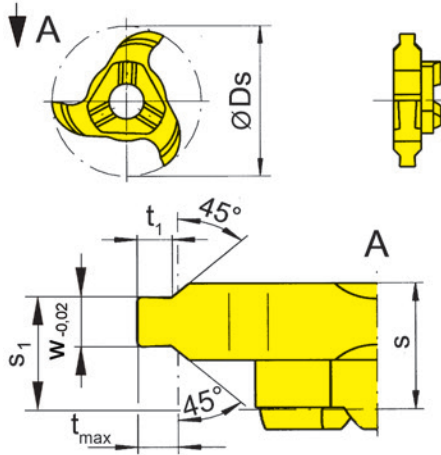


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	t <sub>max</sub>	Z	HIS	AS45
306.1105.30	11,7	1,1	1,21	0,47	3,4	2,7	0,5	3	306060R	▲
306.1307.30	11,7	1,3	1,41	0,65	3,4	2,6	0,7	3	306060R	▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●
M	●
K	●
N	o
S	●
H	-

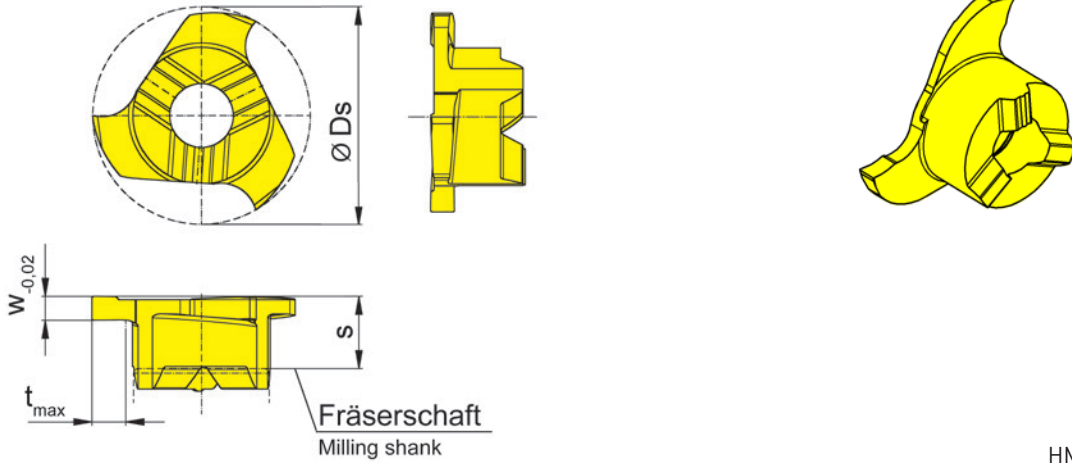


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	EG55	TA45
306.0080.10.00	9,7	0,8	0,87	3,2	1,5	3	306060R			▲
306.0090.10.00	9,7	0,9	0,97	3,2	1,5	3	306060R			▲
306.0100.10.00	9,7	1	1,07	3,2	1,5	3	306060R		▲	▲
306.0110.10.00	9,7	1,1	1,21	3,2	1,5	3	306060R			▲
306.0130.10.00	9,7	1,3	1,41	3,2	1,5	3	306060R	▲		▲
306.0160.10.00	9,7	1,6	1,71	3,2	1,5	3	306060R	▲		▲
								P	●	●
								M	●	○
								K	●	○
								N	○	-
								S	●	-
								H	-	-

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

B

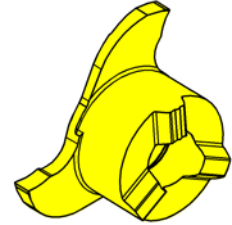
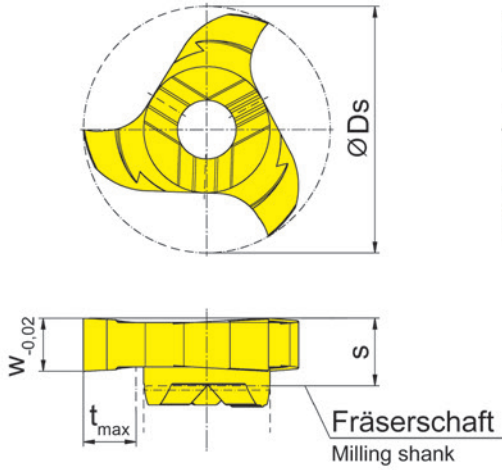
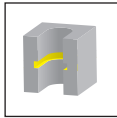


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	TF45	TN35
306.0110.00	11,7	1,1	1,21	3,2	2,5	3	306060R	▲	▲
306.0130.00	11,7	1,3	1,41	3,2	2,5	3	306060R	Δ	▲
306.0160.00	11,7	1,6	1,71	3,2	2,5	3	306060R	Δ	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	●
M	●	●
K	●	●
N	●	●
S	●	●
H	-	-



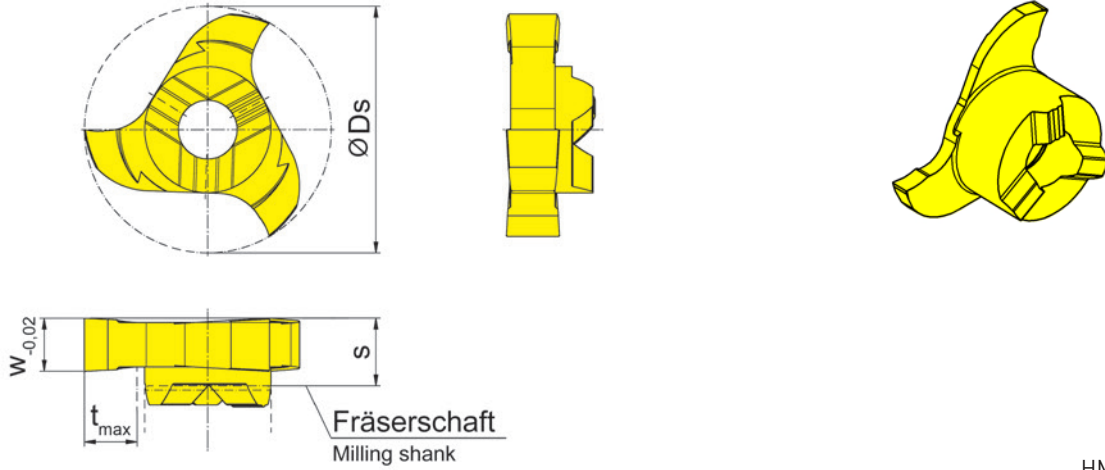


Abbildung = rechtsschneidend  
Picture = right hand cutting version

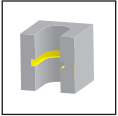
HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	T125
306.0110.40	11,7	1,1	1,21	3,2	2,5	3	306060R	▲
306.0130.40	11,7	1,3	1,41	3,2	2,5	3	306060R	Δ
306.0160.40	11,7	1,6	1,71	3,2	2,5	3	306060R	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	-
M	-
K	-
N	●
S	-
H	-

B



z3

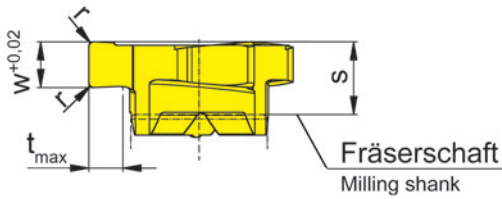
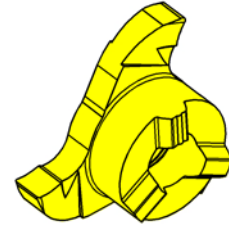
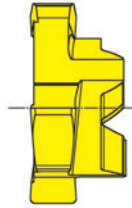
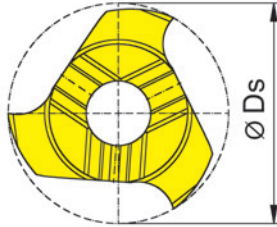
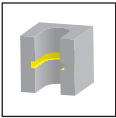


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
▲ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
								AS45	EG55	TA45	
306.0150.10.00	9,7	1,5	3,2	-	1,5	3	306060R	▲	▲	▲	
306.0200.10.00	9,7	2	3,2	0,2	1,5	3	306060R	▲	▲	▲	
306.0250.10.00	9,7	2,5	3,2	0,2	1,5	3	306060R		▲		
306.0300.10.00	9,7	3	3,2	0,2	1,5	3	306060R		▲		
								P	●	●	●
								M	●	○	●
								K	●	○	●
								N	○	-	●
								S	●	-	●
								H	-	-	-



z3

B

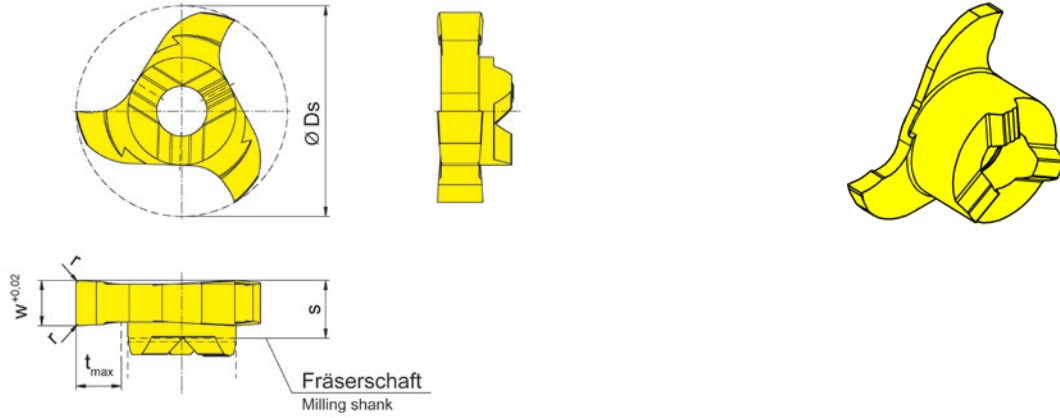


Abbildung = rechtsschneidend  
Picture = right hand cutting version

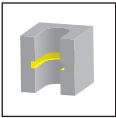
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TF45	TN35
306.0100.1.00	11,7	1	3,2	-	2,5	3	306060R			▲
306.0150.00	11,7	1,5	3,2	-	2,5	3	306060R	▲	▲	▲
306.0150.02	11,7	1,5	3,2	0,2	2,5	3	306060R	▲		
306.0200.00	11,7	2	3,2	0,2	2,5	3	306060R	▲	▲	▲
306.0250.00	11,7	2,5	3,2	0,2	2,5	3	306060R	▲	▲	▲
306.0300.00	11,7	3	4,2	0,2	2,5	3	306060R	▲		▲
P	●	●	●	●	●	●				
M	●	●	●	●	●	●				
K	●	●	●	●	●	●				
N	○	○	○	○	○	○				
S	●	●	●	●	●	●				
H	-	-	-	-	-	-				

B



z3

.40

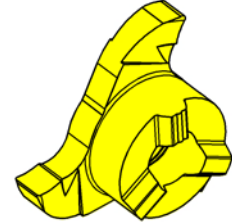
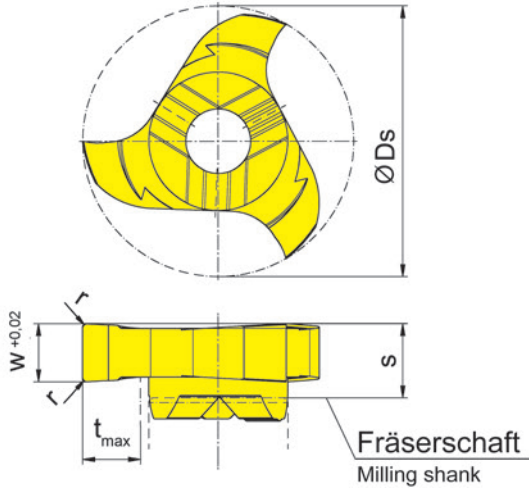


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	TI25
306.0150.40	11,7	1,5	3,2	-	2,5	3	306060R	▲
306.0200.40	11,7	2	3,2	0,2	2,5	3	306060R	▲
306.0250.40	11,7	2,5	3,2	0,2	2,5	3	306060R	▲
								P -
								M -
								K -
								N ●
								S -
								H -

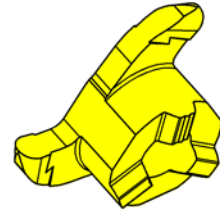
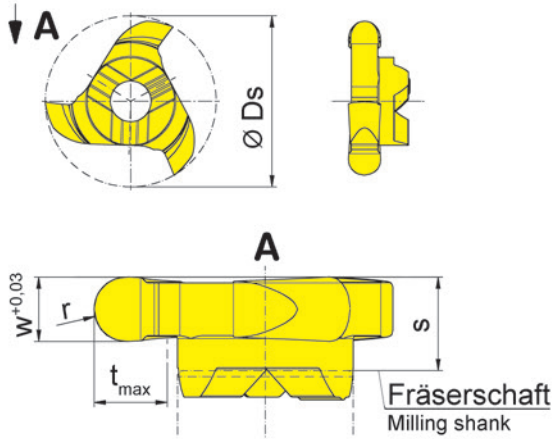


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

▲ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	RC45	TI25	TN35
306.0005.10	11,7	1	3,2	0,5	2,5	3	306060R		▲		
306.0007.15	11,7	1,5	3,2	0,75	2,5	3	306060R	▲			
306.0010.20	11,7	2	3,2	1	2,5	3	306060R	▲			
306.0011.22	11,7	2,2	3,2	1,1	2,5	3	306060R	▲		▲	▲
306.0015.30	11,7	3	4,2	1,5	2,5	3	306060R	▲			
								P	●	●	●
								M	●	●	●
								K	●	●	●
								N	○	-	●
								S	●	-	●
								H	-	-	-

**B**

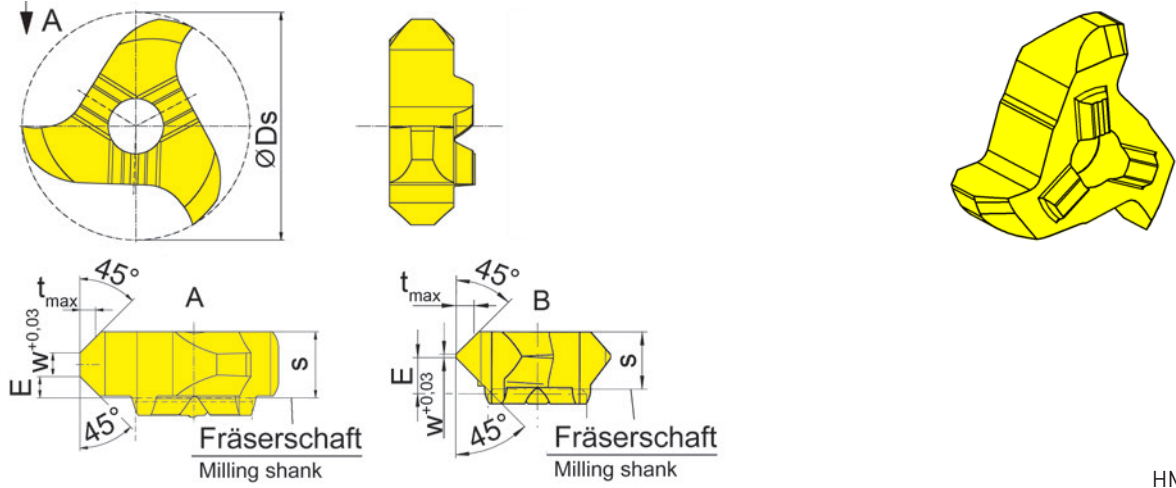


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	Form	t <sub>max</sub>	Z	HIS	MG12	TF45	TI25	TN35
306.4545.00	11,7	1,1	3,4	1,2	A	0,8	3	306060R	▲	▲	▲	▲
306.4593.20	9,3	1,6	3,4	0,2	B	1,4	3	306060R			▲	
									P	o	•	•
									M	-	•	•
									K	-	•	•
									N	-	•	•
									S	-	•	•
									H	-	-	-

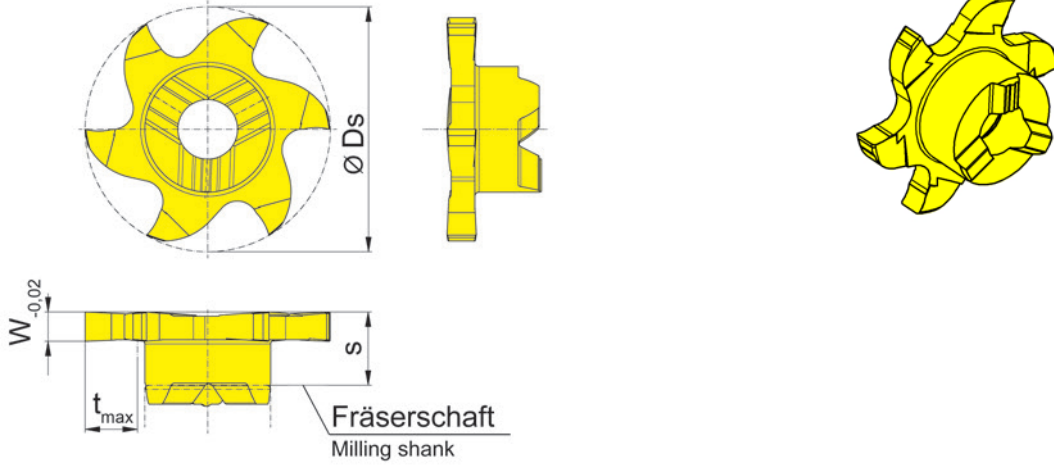


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

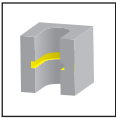
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	TA45
606.0110.00	11,7	1,1	1,21	3,5	2,5	6	306060R		▲
606.0130.00	11,7	1,3	1,41	3,5	2,5	6	306060R		▲
606.0160.00	11,7	1,6	1,71	3,5	2,5	6	306060R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

**B**



**z6**

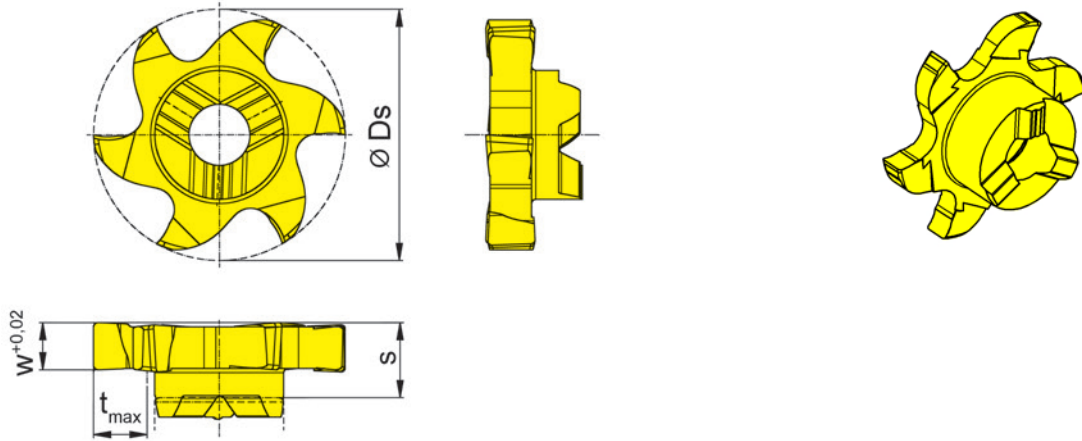


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	AS45	EG35	IG35	TA45
606.0025.00	11,7	0,25	3,5	2,5	6	306060R		▲	△	
606.0030.00	11,7	0,3	3,5	2,5	6	306060R		▲	△	
606.0040.00	11,7	0,4	3,5	2,5	6	306060R		▲	△	
606.0050.00	11,7	0,5	3,5	2,5	6	306060R		▲	△	
606.0060.00	11,7	0,6	3,5	2,5	6	306060R		▲	△	
606.0070.00	11,7	0,7	3,5	2,5	6	306060R		▲	△	
606.0080.00	11,7	0,8	3,5	2,5	6	306060R		▲	△	
606.0090.00	11,7	0,9	3,5	2,5	6	306060R		▲	△	
606.0100.00	11,7	1	3,5	2,5	6	306060R		▲	△	
606.0150.00	11,7	1,5	3,5	2,5	6	306060R	▲			▲
606.0200.00	11,7	2	3,5	2,5	6	306060R	▲			▲
606.0250.00	11,7	2,5	3,5	2,5	6	306060R	▲			▲
P	●	●	-	●						
M	●	●	●	●						
K	●	○	-	●						
N	○	-	-	●						
S	●	-	●	●						
H	-	-	-	-						



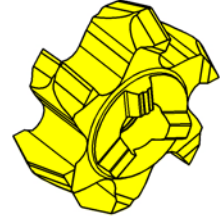
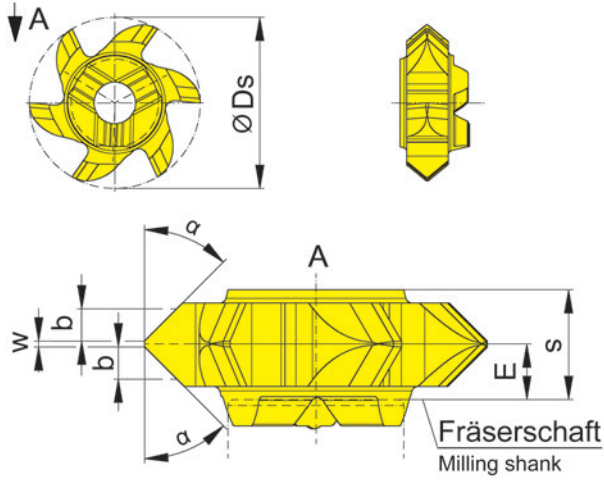


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	$\alpha$	b	Z	HIS	TA45
606.1515.20	11,7	1,9	3,7	0,2	15°	1,5	6	306060R	Δ
606.2020.20	11,7	1,9	3,7	0,2	20°	1,5	6	306060R	▲
606.3030.20	11,7	1,9	3,7	0,2	30°	1,5	6	306060R	▲
606.4545.20	11,7	1,9	3,7	0,2	45°	1,1	6	306060R	▲
									P ●
									M ●
									K ●
									N ●
									S ●
									H -

B

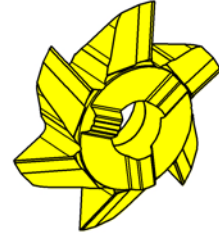
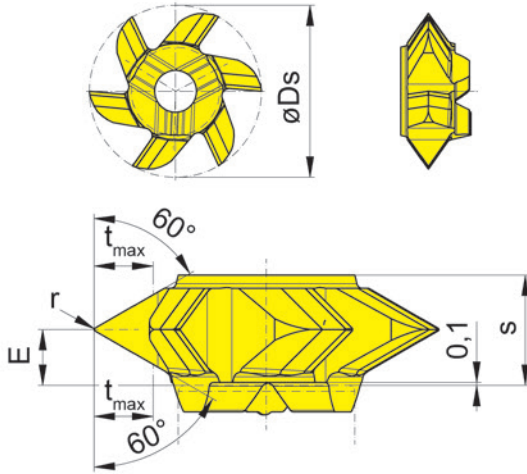
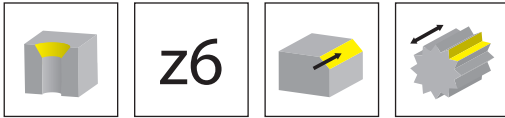


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	r	t <sub>max</sub>	Z	HIS	AS/45
606.6060.05	11,7	1,9	3,75	0,05	2	6	306060R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -

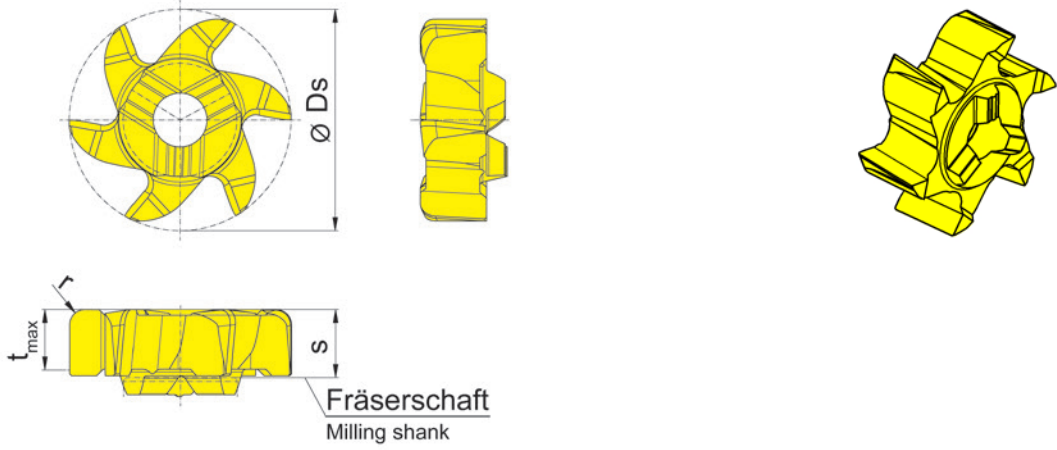


Abbildung = rechtsschneidend  
Picture = right hand cutting version

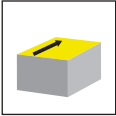
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	Z	r	$t_{max}$	s	HIS	AS45	TI25
606.PLT6.08	11,7	6	0,8	3,2	3,6	306060R	▲	▲
							P ● ●	● ●
							M ● ●	● ●
							K ● ●	● ●
							N ○ ●	● ●
							S ● ●	● ●
							H - -	- -

B



z6

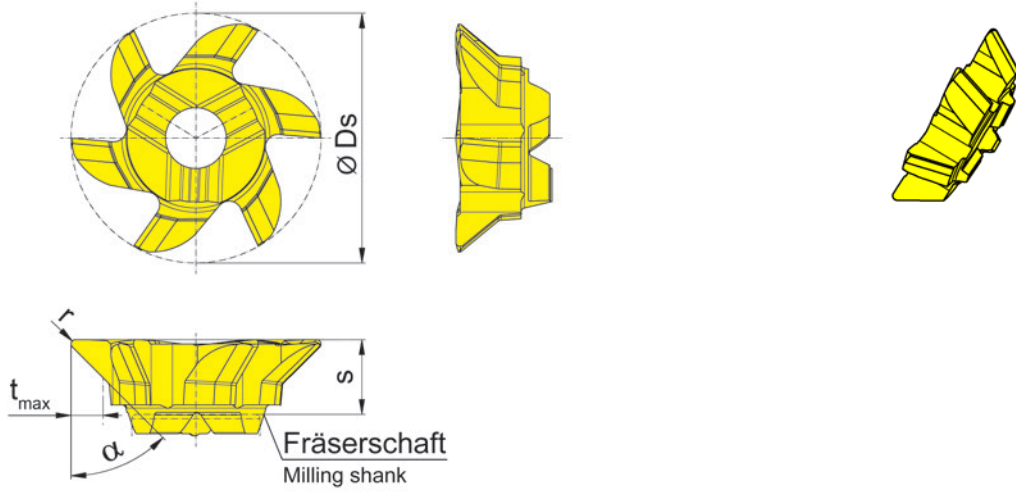
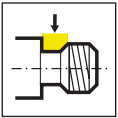


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	$\alpha$	$t_{max}$	s	HIS	AS/45
606.0015.22	11,7	6	0,2	15°	0,7	3,5	306060R	▲
606.0030.22	11,7	6	0,2	30°	1,4	3,5	306060R	▲
606.0045.22	11,7	6	0,2	45°	1,5	3,5	306060R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -



z6

B

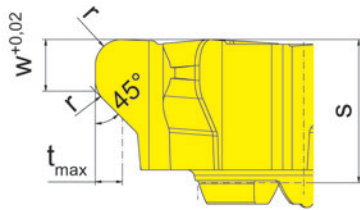
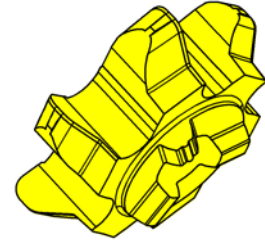
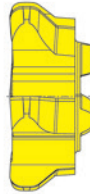
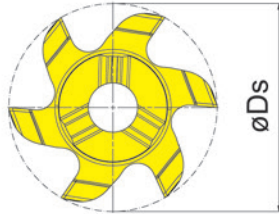


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55
606.1015.35	11,7	1,2	3,5	0,7	1,15	6	306060R	▲
								P ●
								M o
								K o
								N -
								S -
								H -

Gewindefreistriche DIN 76  
Thread relief DIN 76

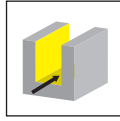
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



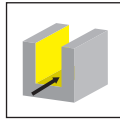
B

Frälerschaft  
Milling shank  
M308/M308.ST/M308.ER



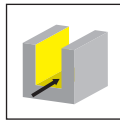
Seite/Page  
64-66

Grundaufnahme  
Basic Holder  
WFB



Seite/Page  
67

Einschraubfräser  
Screw-in cutter  
M308.M

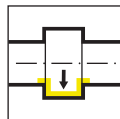


Seite/Page  
68

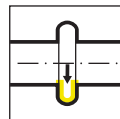
Schneidplatte  
Insert  
111/308/608



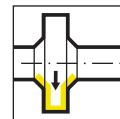
Seite/Page  
69-70, 74-76



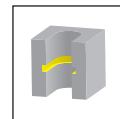
Seite/Page  
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Seite/Page  
72



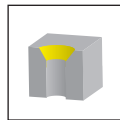
Seite/Page  
73



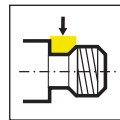
Seite/Page  
77-78, 81



Seite/Page  
79



Seite/Page  
80, 82



Seite/Page  
83

## M308



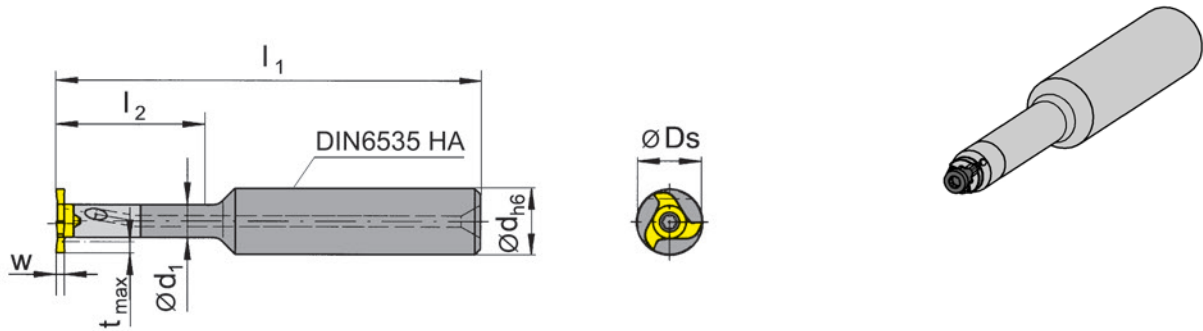
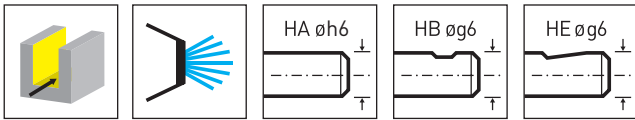
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\emptyset$  13,7 mm

**Milling shank with  
exchangeable insert**

from bore  $\emptyset$  13,7 mm

**B**



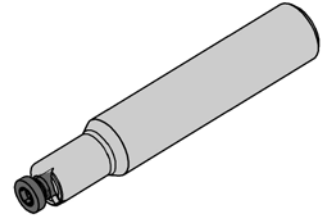
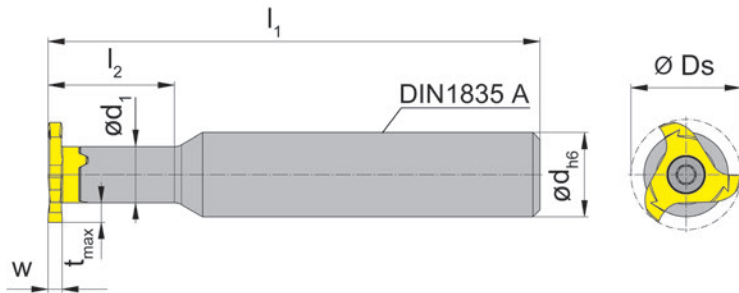
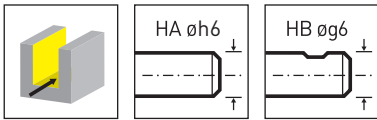
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M308.0012.01A</b>	12	95	29	8	HA	308080R • 308080L
<b>M308.0012.02A</b>	12	110	42	8	HA	308080R • 308080L
<b>M308.0012.03A</b>	12	120	56	8	HA	308080R • 308080L
<b>M308.0012.01B</b>	12	95	29	8	HB	308080R • 308080L
<b>M308.0012.02B</b>	12	110	42	8	HB	308080R • 308080L
<b>M308.0012.03B</b>	12	120	56	8	HB	308080R • 308080L
<b>M308.0012.01E</b>	12	95	29	8	HE	308080R • 308080L
<b>M308.0012.02E</b>	12	110	42	8	HE	308080R • 308080L
<b>M308.0012.03E</b>	12	120	56	8	HE	308080R • 308080L

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M308...	<b>3.5.12T10EP</b>	<b>T10PL</b>





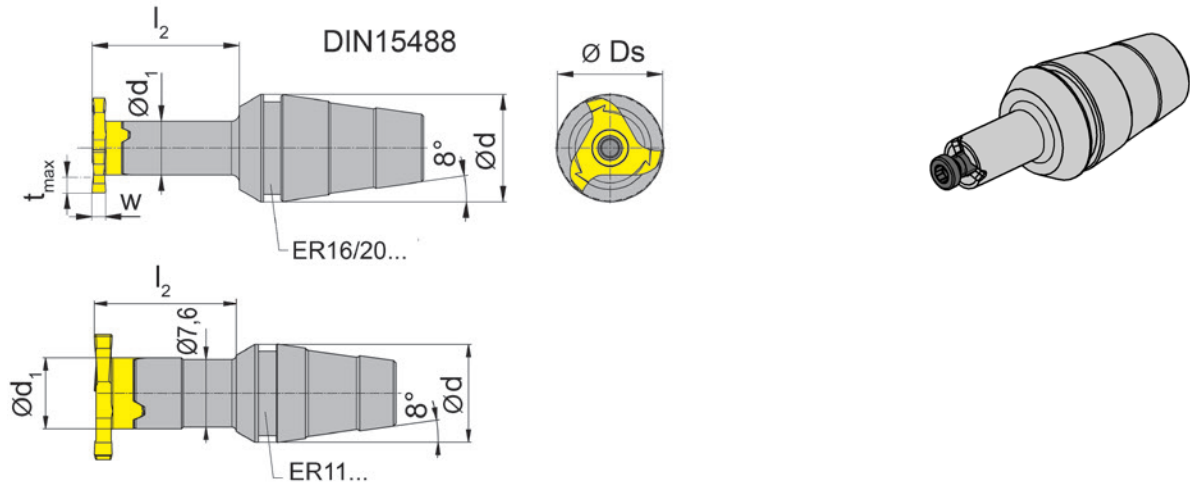
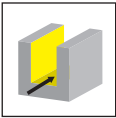
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M308.ST10.01A</b>	10	60	18	8	HA	308080R • 308080L
<b>M308.ST12.01A</b>	12	70	18	8	HA	308080R • 308080L
<b>M308.ST13.01A</b>	13	70	26	8	HA	308080R • 308080L
<b>M308.ST10.01B</b>	10	60	18	8	HB	308080R • 308080L
<b>M308.ST12.01B</b>	12	70	18	8	HB	308080R • 308080L

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M308...	<b>3.5.12T10EP</b>	<b>T10PL</b>

**B**



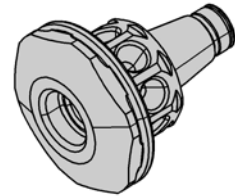
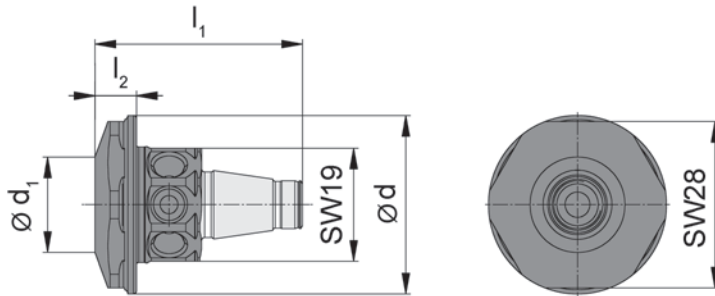
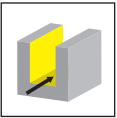
Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M308.ER11.02</b>	11	16	8	ER11.6499	308080R • 308080L
<b>M308.ER16.02</b>	16	22	8	ER16.6499/ERM16.6499	308080R • 308080L
<b>M308.ER20.02</b>	20	22	8	ER20.6499/ERM20.6499	308080R • 308080L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

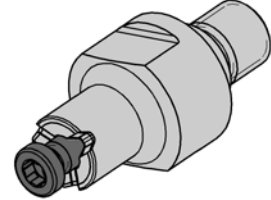
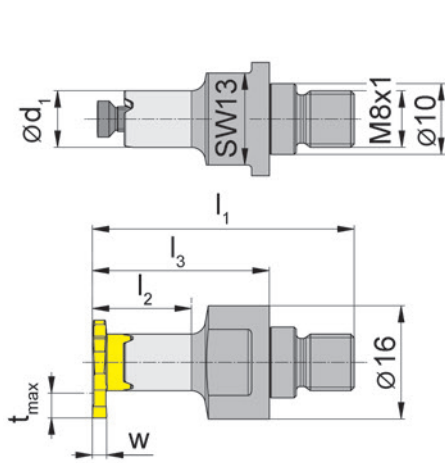
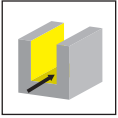
<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M308...	<b>3.5.12T10EP</b>	<b>T10PL</b>



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	$d$
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter

B



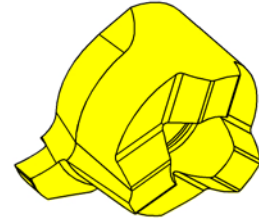
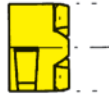
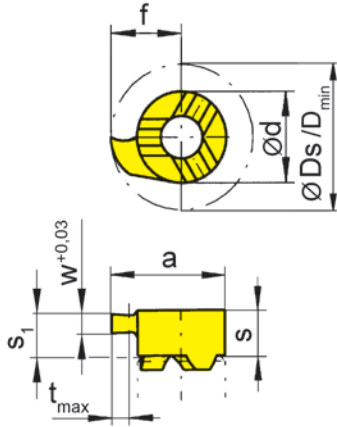
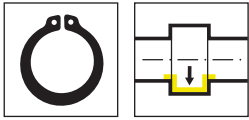
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
M308.M081.01	37	14	25	8	13	308080R • 308080L	8201

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M308.M081.01	3.5.12T10EP	T10PL



R = rechts wie gezeichnet  
R = right hand version shown

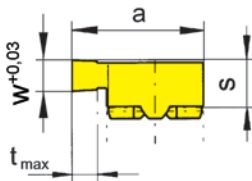
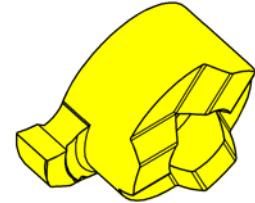
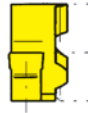
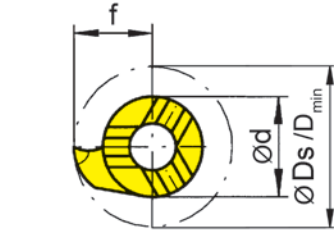
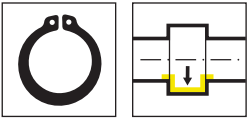
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	f	Ds	d	s	s <sub>1</sub>	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35	
<b>R111.0070.00</b>	0,74	0,7	6,7	13,4	8	4,15	3,95	10,7	1,2	11	1	111080R	▲	▲	▲	
<b>R111.0080.00</b>	0,84	0,8	6,7	13,4	8	4,15	3,95	10,7	1,3	11	1	111080R	▲	▲	▲	
<b>R111.0090.00</b>	0,94	0,9	6,7	13,4	8	4,15	3,95	10,7	1,5	11	1	111080R	▲	▲	▲	
<b>L111.0070.00</b>	0,74	0,7	6,7	13,4	8	4,15	3,95	10,7	1,2	11	1	111080L		Δ	▲	
<b>L111.0080.00</b>	0,84	0,8	6,7	13,4	8	4,15	3,95	10,7	1,3	11	1	111080L		Δ	▲	
<b>L111.0090.00</b>	0,94	0,9	6,7	13,4	8	4,15	3,95	10,7	1,5	11	1	111080L		▲	▲	
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472													<b>P</b>	●	●	●
Zapfenausführung not face cutting, limited depth of cut													<b>M</b>	○	●	●
													<b>K</b>	○	●	●
													<b>N</b>	-	●	●
													<b>S</b>	-	●	●
													<b>H</b>	-	-	-

**B**



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

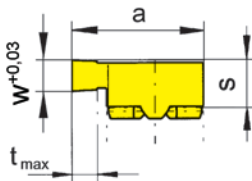
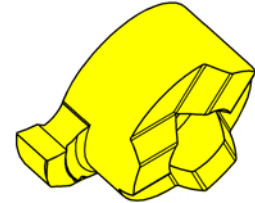
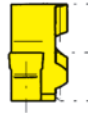
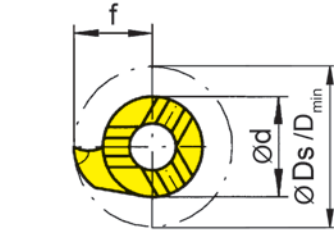
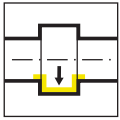
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	s	f	Ds	d	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
<b>R111.0110.00</b>	1,19	1,1	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0130.00</b>	1,39	1,3	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0160.00</b>	1,69	1,6	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
<b>L111.0110.00</b>	1,19	1,1	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲
<b>L111.0130.00</b>	1,39	1,3	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	△	▲	▲
<b>L111.0160.00</b>	1,69	1,6	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

<b>P</b>	●	●	●
<b>M</b>	○	●	●
<b>K</b>	○	●	●
<b>N</b>	-	●	●
<b>S</b>	-	●	●
<b>H</b>	-	-	-



R = rechts wie gezeichnet  
R = right hand version shown

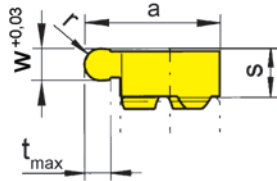
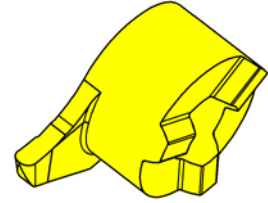
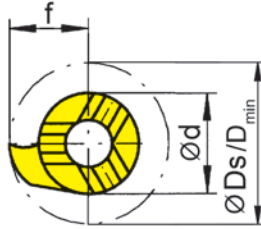
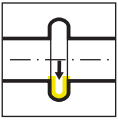
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	s	f	Ds	d	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
R111.0150.00	1,5	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
R111.0200.00	2	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
R111.0250.00	2,5	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
R111.0300.00	3	3,95	6,7	13,4	8	10,7	2,3	11	1	111080R	▲	▲	▲
L111.0150.00	1,5	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲
L111.0200.00	2	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲
L111.0250.00	2,5	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲
L111.0300.00	3	3,95	6,7	13,4	8	10,7	2,3	11	1	111080L	▲	▲	▲
P	●	●	●										
M	○	●	●										
K	○	●	●										
N	-	●	●										
S	-	●	●										
H	-	-	-										

**B**



R = rechts wie gezeichnet  
R = right hand version shown

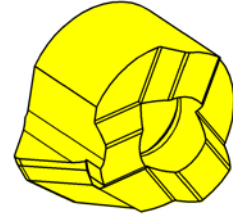
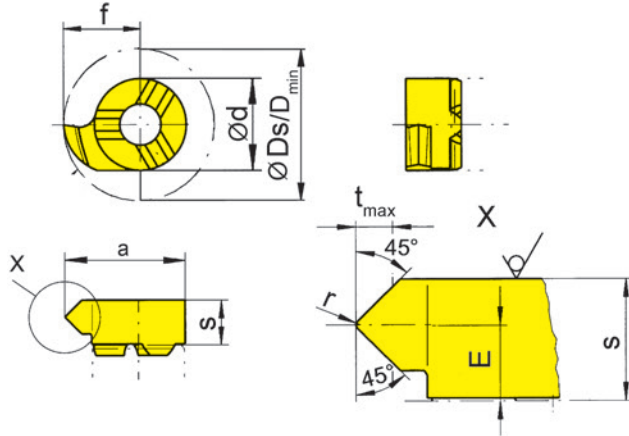
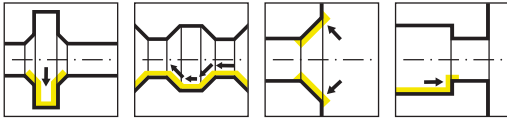
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	f	Ds	r	d	s	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
<b>R111.0004.08</b>	0,8	6,7	13,4	0,4	8	3,95	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0006.12</b>	1,2	6,7	13,4	0,6	8	3,95	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0009.18</b>	1,8	6,7	13,4	0,9	8	3,95	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0010.20</b>	2	6,7	13,4	1	8	3,95	10,7	2,3	11	1	111080R	▲	▲	▲
<b>R111.0015.30</b>	3	6,7	13,4	1,5	8	3,95	10,7	2,3	11	1	111080R	▲	▲	▲
<b>L111.0004.08</b>	0,8	6,7	13,4	0,4	8	3,95	10,7	2,3	11	1	111080L	▲	▲	▲
<b>L111.0006.12</b>	1,2	6,7	13,4	0,6	8	3,95	10,7	2,3	11	1	111080L	▲	▲	▲
<b>L111.0009.18</b>	1,8	6,7	13,4	0,9	8	3,95	10,7	2,3	11	1	111080L	▲	▲	▲
<b>L111.0010.20</b>	2	6,7	13,4	1	8	3,95	10,7	2,3	11	1	111080L	▲	▲	▲
<b>L111.0015.30</b>	3	6,7	13,4	1,5	8	3,95	10,7	2,3	11	1	111080L	▲	▲	▲
<b>P</b>	●	●	●											
<b>M</b>	○	●	●											
<b>K</b>	○	●	●											
<b>N</b>	-	●	●											
<b>S</b>	-	●	●											
<b>H</b>	-	-	-											





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	E	f	Ds	r	d	s	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TN35
<b>R111.4545.02</b>	2,4	6,7	13,4	0,2	8	4,15	10,7	1,5	11	1	111080R	▲	▲
<b>L111.4545.02</b>	2,4	6,7	13,4	0,2	8	4,15	10,7	1,5	11	1	111080L	▲	▲
												P	●
												M	○
												K	○
												N	-
												S	-
												H	-

B

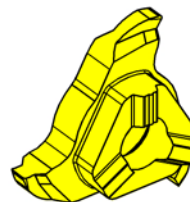
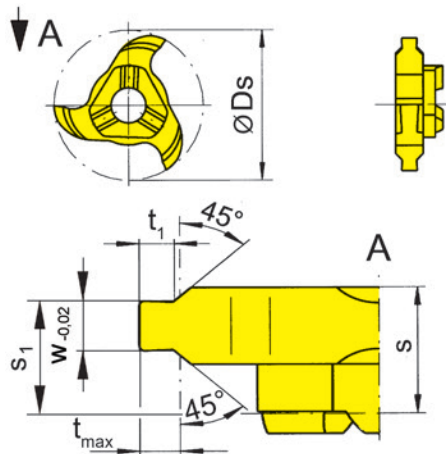
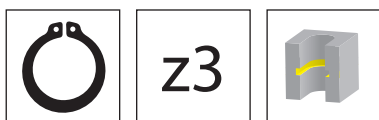


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	t <sub>max</sub>	Z	HIS	AS45
308.1105.30	15,7	1,1	1,21	0,47	4,7	3,6	0,5	3	308080R	▲
308.1307.30	15,7	1,3	1,41	0,65	4,7	3,5	0,7	3	308080R	▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●
M	●
K	●
N	o
S	●
H	-

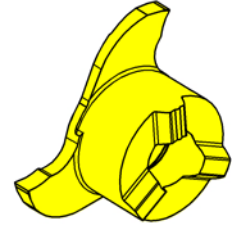
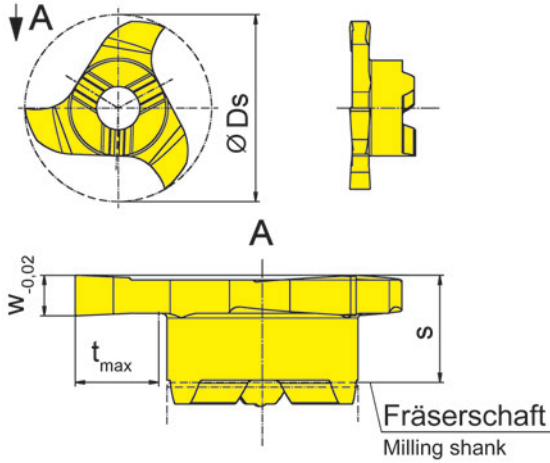


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	TF45	TN35	
308.0110.00	15,7	1,1	1,21	4,5	3,5	3	308080R		▲	▲	
308.0130.00	15,7	1,3	1,41	4,5	3,5	3	308080R	Δ	Δ	▲	
308.0160.00	15,7	1,6	1,71	4,5	3,5	3	308080R	Δ	Δ	▲	
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472								P	●	●	●
								M	●	●	●
								K	●	●	●
								N	○	●	●
								S	●	●	●
								H	-	-	-

B

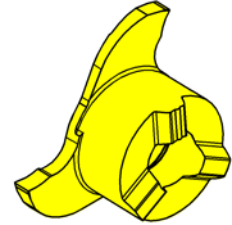
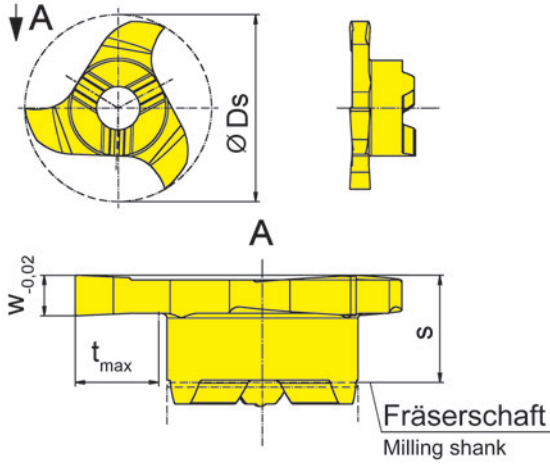


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

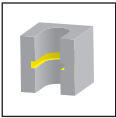
HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	TI25
308.0110.40	15,7	1,1	1,21	4,5	3,5	3	308080R	▲
308.0130.40	15,7	1,3	1,41	4,5	3,5	3	308080R	▲
308.0160.40	15,7	1,6	1,71	4,5	3,5	3	308080R	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	-
M	-
K	-
N	●
S	-
H	-



z3

B

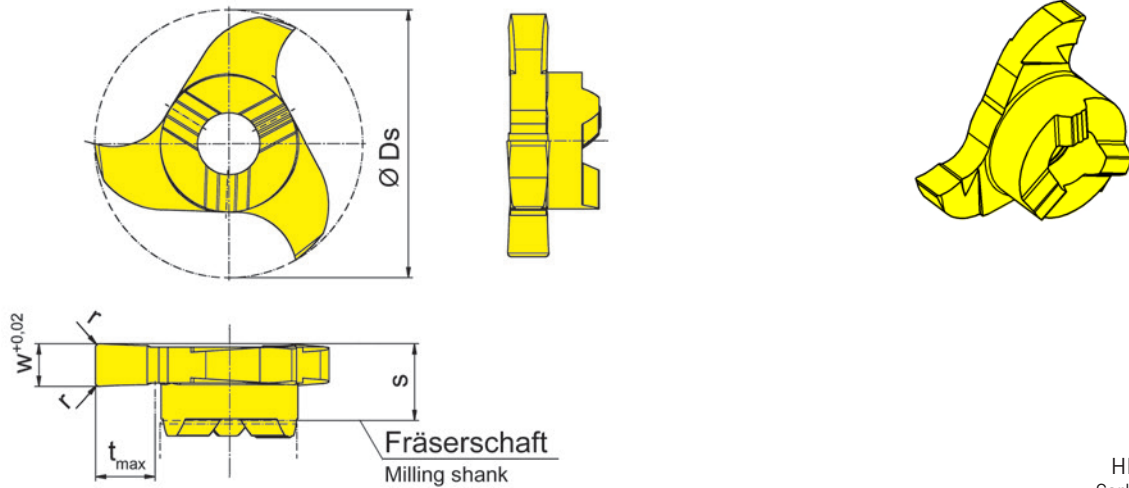


Abbildung = rechtsschneidend  
Picture = right hand cutting version

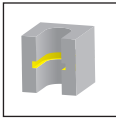
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TF45	TN35
308.0150.00	15,7	1,5	4,5	-	3,5	3	308080R	▲	▲	▲
308.0200.00	15,7	2	4,5	0,2	3,5	3	308080R	▲	Δ	▲
308.0250.00	15,7	2,5	4,5	0,2	3,5	3	308080R	▲	▲	▲
								P	●	●
								M	●	●
								K	●	●
								N	○	●
								S	●	●
								H	-	-

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

B



z3

.40

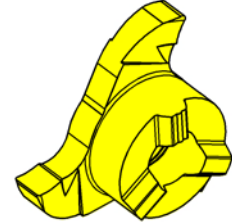
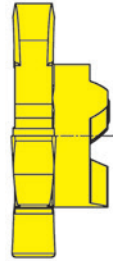
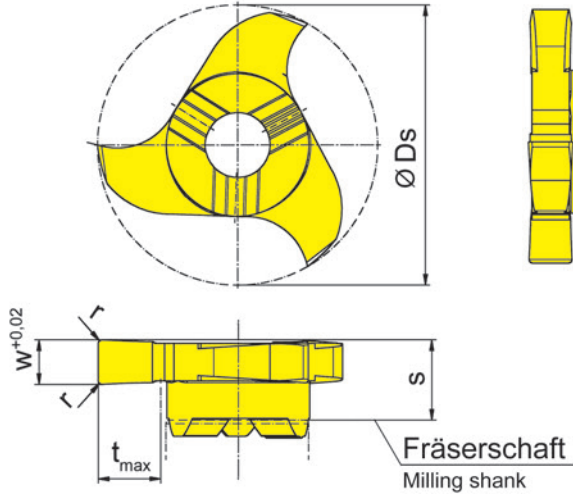


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	T125
308.0150.40	15,7	1,5	4,5	-	3,5	3	308080R	▲
308.0200.40	15,7	2	4,5	0,2	3,5	3	308080R	▲
308.0250.40	15,7	2,5	4,5	0,2	3,5	3	308080R	▲

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

P	-
M	-
K	-
N	●
S	-
H	-

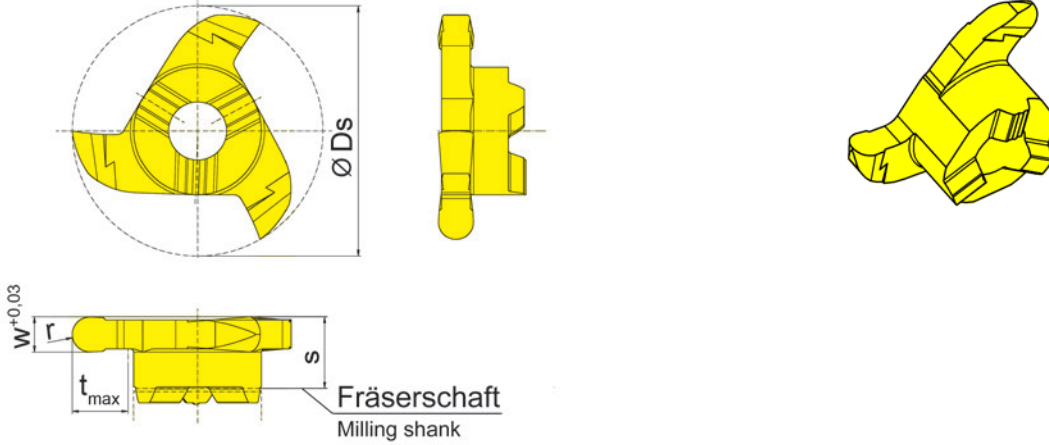


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS		AN25	AS45	RC45	TF45	TN35
308.0005.10	15,7	1	4,5	0,5	3,5	3	308080R		▲		▲		
308.0007.15	15,7	1,5	4,5	0,75	3,5	3	308080R			▲			
308.0010.20	15,7	2	4,5	1	3,5	3	308080R			▲			
308.0011.22	15,7	2,2	4,5	1,1	3,5	3	308080R			▲		▲	▲
308.0015.30	15,7	3	4,5	1,5	3,5	3	308080R			▲			
308.0020.40	15,7	4	4,5	2	3,5	3	308080R			▲			
P	●	●	●	●	●	●							
M	○	●	●	●	●	●							
K	-	●	●	●	●	●							
N	-	○	-	●	●	●							
S	-	●	-	●	●	●							
H	-	-	-	-	-	-							

B

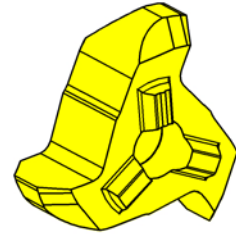
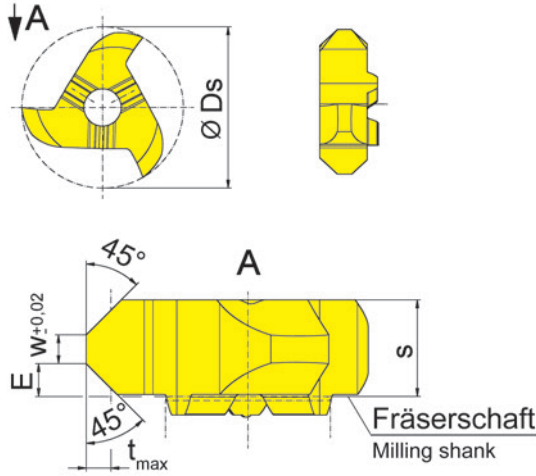


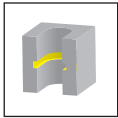
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	t <sub>max</sub>	Z	HIS		TF45	TN35
308.4545.00	15,7	1,6	4,7	1,4	1,2	3	308080R		Δ	▲
									P ● ●	
									M ● ●	
									K ● ●	
									N ● ●	
									S ● ●	
									H - -	





**z6**

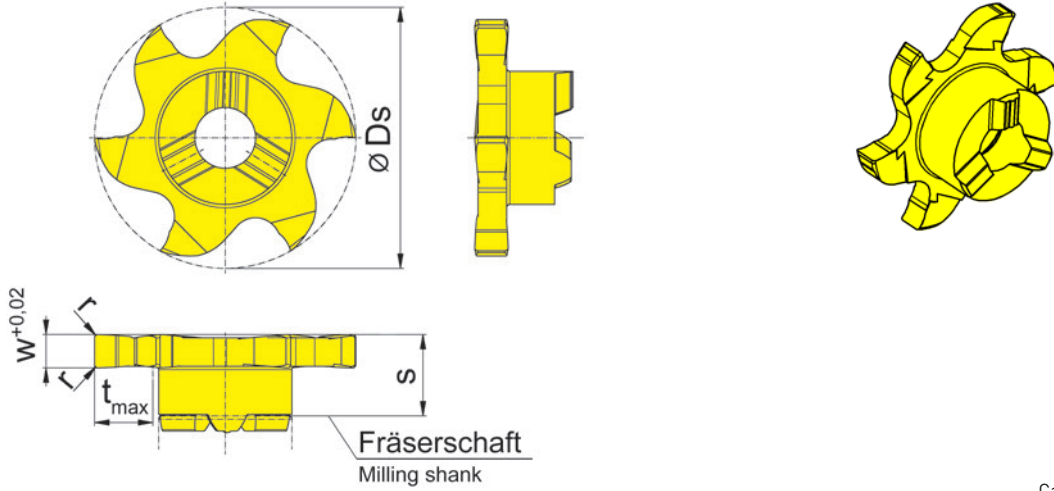


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG35	IG35	TI25
608.0025.00	15,7	0,25	4,9	-	3,5	6	308080R		▲	△	
608.0030.00	15,7	0,3	4,9	-	3,5	6	308080R		▲	△	
608.0040.00	15,7	0,4	4,9	-	3,5	6	308080R		▲	△	
608.0050.00	15,7	0,5	4,9	-	3,5	6	308080R		▲	△	
608.0060.00	15,7	0,6	4,9	-	3,5	6	308080R		▲	△	
608.0070.00	15,7	0,7	4,9	-	3,5	6	308080R		▲	△	
608.0080.00	15,7	0,8	4,9	-	3,5	6	308080R		▲	△	
608.0090.00	15,7	0,9	4,9	-	3,5	6	308080R		▲	△	
608.0100.00	15,7	1	4,9	-	3,5	6	308080R		▲	△	
608.0150.00	15,7	1,5	4,9	-	3,5	6	308080R	▲			▲
608.0200.00	15,7	2	4,9	0,2	3,5	6	308080R	▲			▲
608.0250.00	15,7	2,5	4,9	0,2	3,5	6	308080R	▲			▲

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

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

**B**

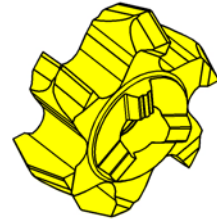
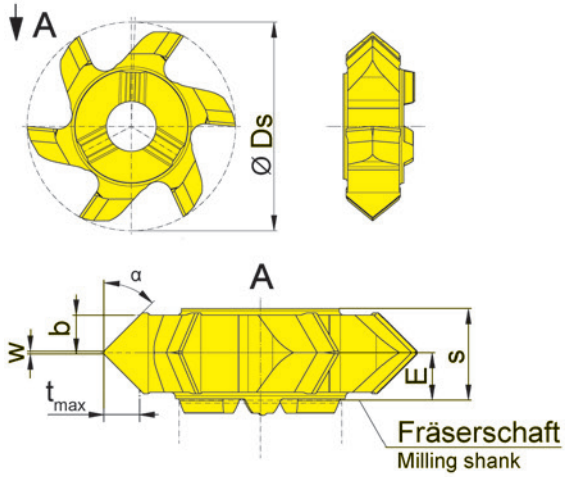


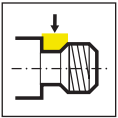
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	E	s	w	α	b	t <sub>max</sub>	Z	HIS	TA45	TI25
608.1515.20	15,7	2,6	5,1	0,2	15°	2,2	0,6	6	308080R	▲	
608.2020.20	15,7	2,6	5,1	0,2	20°	2,2	0,8	6	308080R	▲	
608.3030.20	15,7	2,6	5,1	0,2	30°	2,2	1,3	6	308080R	▲	
608.4545.20	15,7	2,6	5,1	0,2	45°	1,7	1,7	6	308080R		▲
										P	● ●
										M	● ●
										K	● ●
										N	● ●
										S	● ●
										H	- -



z6

B

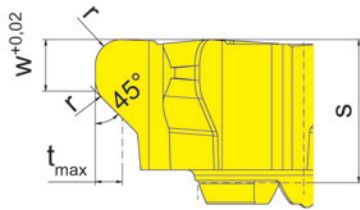
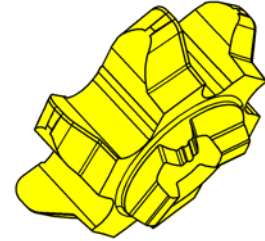
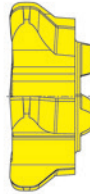
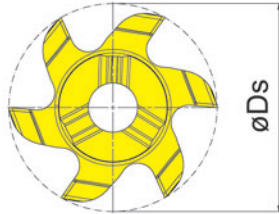


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55
608.1015.49	15,7	1,8	4,8	0,7	1,15	6	308080R	▲
								P ●
								M o
								K o
								N -
								S -
								H -

Gewindefreistriche DIN 76  
Thread relief DIN 76

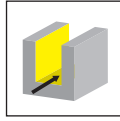
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



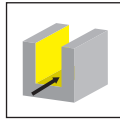
B

Frälerschaft  
Milling shank  
M311/M311.ST/M311.ER



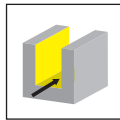
Seite/Page  
86-89

Grundaufnahme  
Basic Holder  
WFB



Seite/Page  
90

Einschraubfräser  
Screw-in cutter  
M311.M



Seite/Page  
91

Schneidplatte  
Insert  
311/611/911



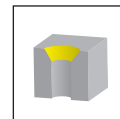
Seite/Page  
92-94, 99



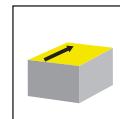
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95-96, 100, 104



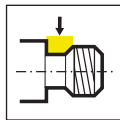
Seite/Page  
97



Seite/Page  
98, 102



Seite/Page  
101



Seite/Page  
103

## M311



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  18 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  18 mm

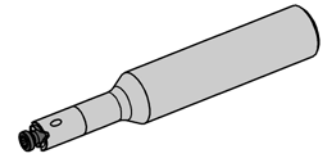
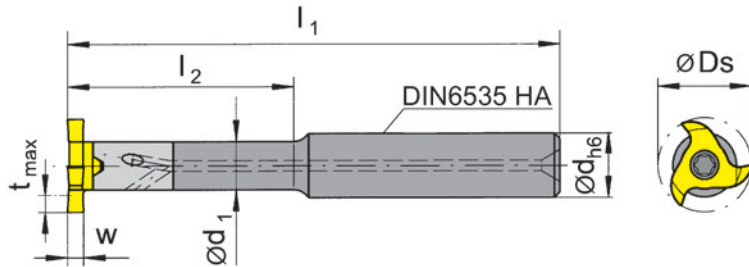
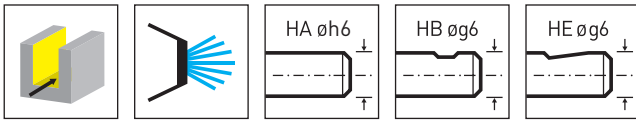
# Frärschaft

## Milling shank

# M311



B



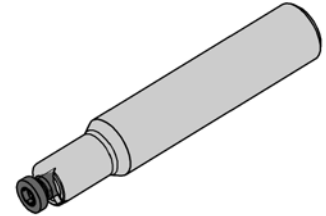
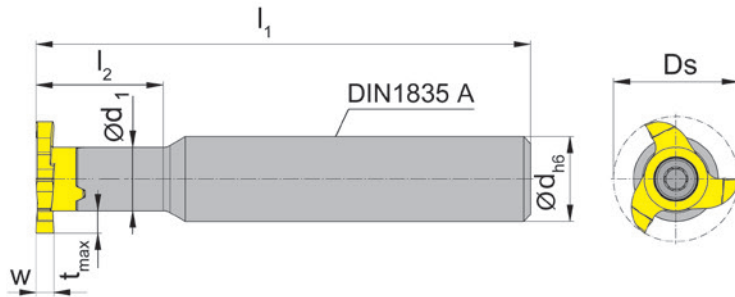
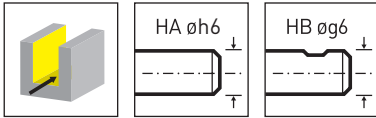
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M311.0012.01A	12	100	32	9	HA	311090R
M311.0012.02A	12	100	45	9	HA	311090R
M311.0012.03A	12	120	64	9	HA	311090R
M311.0012.05A	12	130	20	9	HA	311090R
M311.0016.01A	16	100	32	9	HA	311090R
M311.0016.02A	16	110	45	9	HA	311090R
M311.0016.03A	16	130	64	9	HA	311090R
M311.0012.01B	12	100	32	9	HB	311090R
M311.0012.02B	12	100	45	9	HB	311090R
M311.0012.03B	12	120	64	9	HB	311090R
M311.0016.01B	16	100	32	9	HB	311090R
M311.0016.02B	16	110	45	9	HB	311090R
M311.0016.03B	16	130	64	9	HB	311090R
M311.0012.01E	12	100	32	9	HE	311090R
M311.0012.02E	12	100	45	9	HE	311090R
M311.0012.03E	12	120	64	9	HE	311090R
M311.0016.01E	16	100	32	9	HE	311090R
M311.0016.02E	16	110	45	9	HE	311090R
M311.0016.03E	16	130	64	9	HE	311090R

w, D<sub>s</sub>, t<sub>max</sub> siehe Schneidplatte  
w, D<sub>s</sub>, t<sub>max</sub> see inserts

### Ersatzteile

Spare Parts

Frärschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311...	4.14T15P	T15PQ



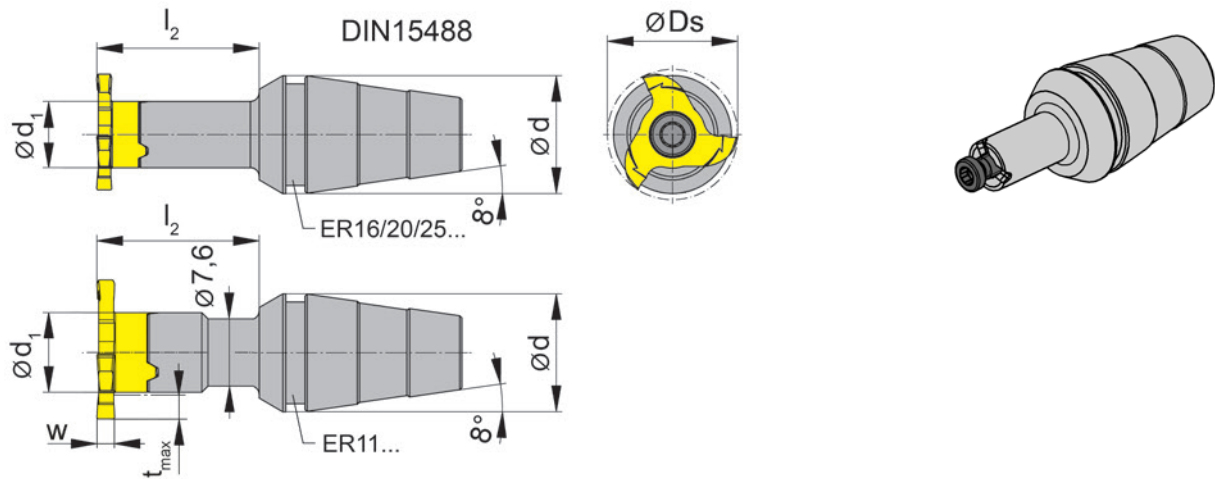
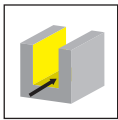
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M311.ST10.01A</b>	10	60	18	9	HA	311090R
<b>M311.ST12.01A</b>	12	70	18	9	HA	311090R
<b>M311.ST13.01A</b>	13	70	26	9	HA	311090R
<b>M311.ST16.01A</b>	16	80	26	9	HA	311090R
<b>M311.ST10.01B</b>	10	60	18	9	HB	311090R
<b>M311.ST12.01B</b>	12	70	18	9	HB	311090R
<b>M311.ST16.01B</b>	16	80	26	9	HB	311090R

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M311...	<b>4.14T15P</b>	<b>T15PQ</b>

B



Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
M311.ER11.02	11	22	9	ER11.6499	311090R
M311.ER25.02	25	22	9	ER25.6499	311090R
M311.ER16.02	16	22	9	ER16.6499/ERM16.6499	311090R
M311.ER20.02	20	22	9	ER20.6499/ERM20.6499	311090R
M311.ER20.14.01	20	19,7	12,5	ER20.6499/ERM20.6499	311090R
M311.ER25.14.01	25	19,7	14,5	ER25.6499	311090R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

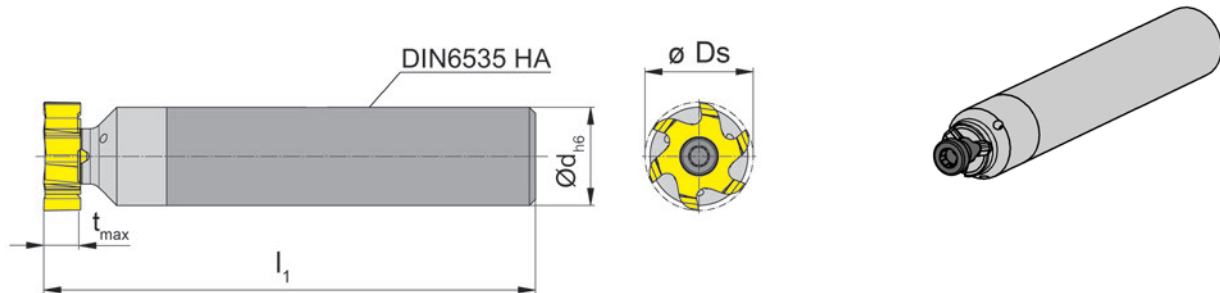
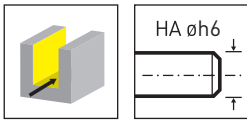
Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

## Ersatzteile

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311.E...	4.14T15P	T15PQ
M311.ER25.14.01	4.14T15P	T15PL





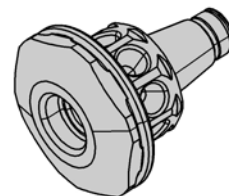
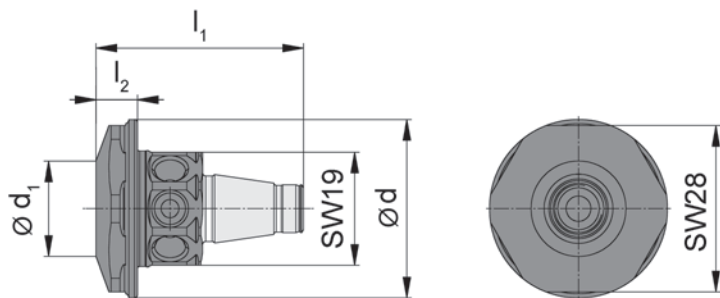
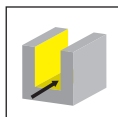
Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M311.0012.D.00A</b>	12	80	HA	311090R
<b>M311.0016.D.00A</b>	16	80	HA	311090R

t<sub>max</sub> und D<sub>s</sub> siehe Schneidplatte  
t<sub>max</sub> and D<sub>s</sub> see inserts

**Ersatzteile**  
Spare Parts

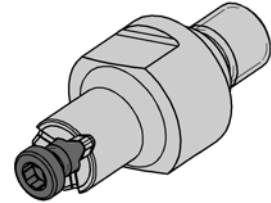
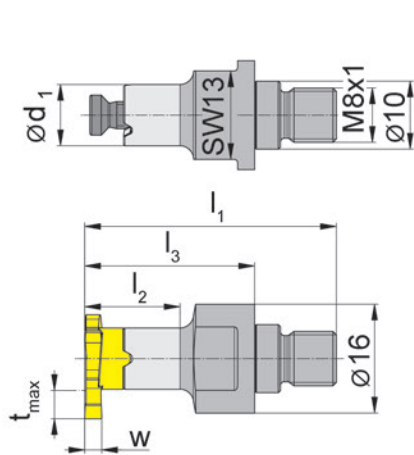
Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311...	<b>4.14T15P</b>	<b>T15PQ</b>

**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	$d$
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter



Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
<b>M311.M081.01</b>	37	14	25	9	13	311090R	8201

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Einschraubfräser</b> Screw-in cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M311.M081.01	<b>4.14T15P</b>	<b>T15PQ</b>

# Schneidplatte

Insert

# 311



**B**

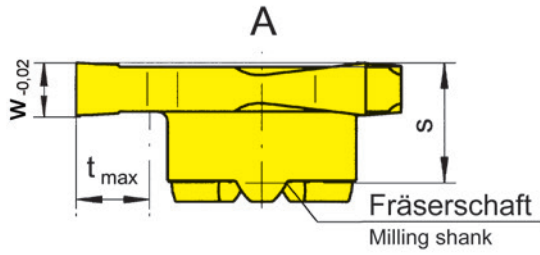
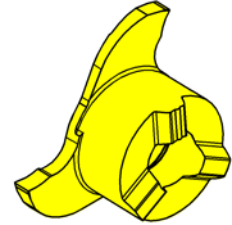
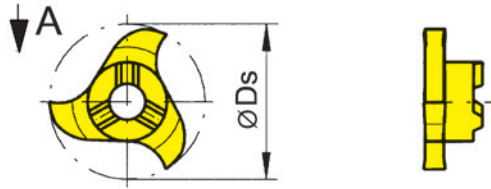


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	TN35
311.0110.00	17,7	1,1	1,21	5,75	3,5	3	311090R	▲	▲
311.0130.00	17,7	1,3	1,41	5,75	3,5	3	311090R	Δ	▲
311.0160.00	17,7	1,6	1,71	5,75	3,5	3	311090R	Δ	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

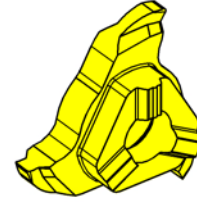
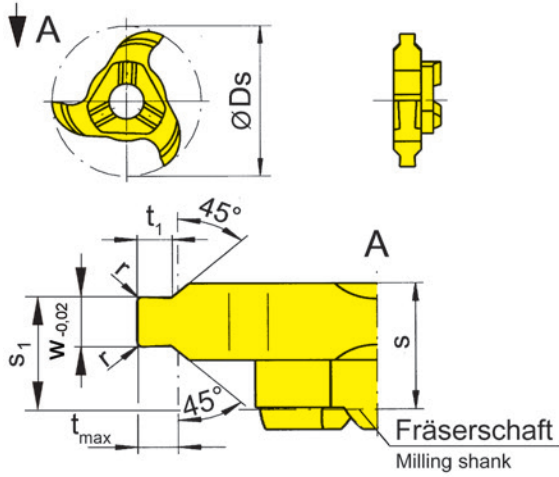


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	Z	HIS	AS45
311.1307.30	17,7	1,3	1,41	0,65	5,95	4,7	-	0,7	3	311090R	▲
311.1812.35	17,7	1,85	1,96	1,21	5,95	5	0,2	1,25	3	311090R	▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●
M	●
K	●
N	o
S	●
H	-

B

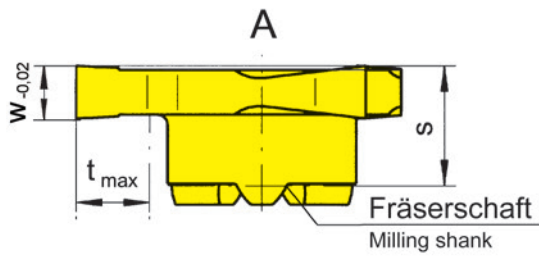
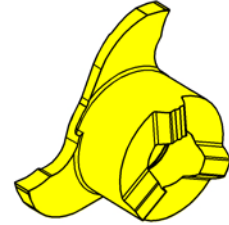
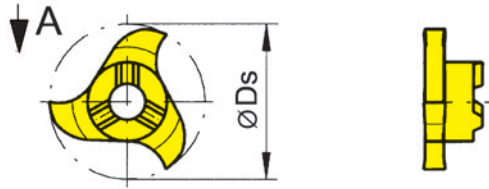


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

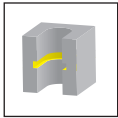
HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	T125
311.0110.40	17,7	1,1	1,21	5,75	3,5	3	311090R	▲
311.0130.40	17,7	1,3	1,41	5,75	3,5	3	311090R	▲
311.0160.40	17,7	1,6	1,71	5,75	3,5	3	311090R	Δ

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	-
M	-
K	-
N	●
S	-
H	-



z3

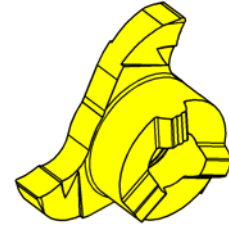
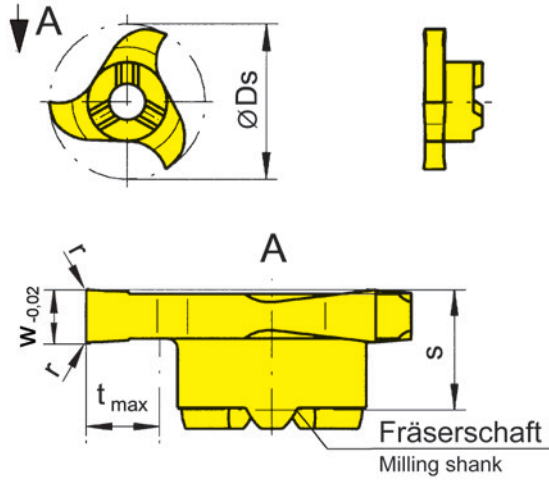


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
								AS45	EG55	TN35	
311.0100.00	17,7	1	5,75	-	3,5	3	311090R		Δ		
311.0150.00	17,7	1,5	5,75	-	3,5	3	311090R	▲		▲	
311.0200.00	17,7	2	5,75	0,2	3,5	3	311090R	▲		▲	
311.0250.00	17,7	2,5	5,75	0,2	3,5	3	311090R	▲		▲	
311.0300.00	17,7	3	5,75	0,2	3,5	3	311090R	▲		▲	
311.0400.00	17,7	4	5,75	0,2	3,5	3	311090R	▲			
								P	●	●	●
								M	●	○	●
								K	●	○	●
								N	○	-	●
								S	●	-	●
								H	-	-	-

B

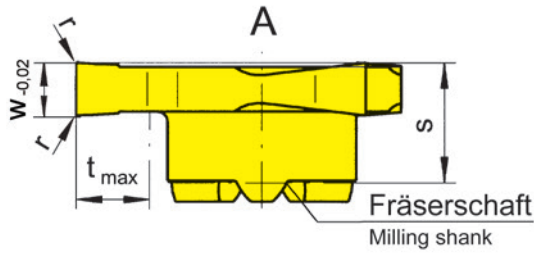
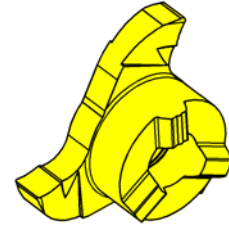
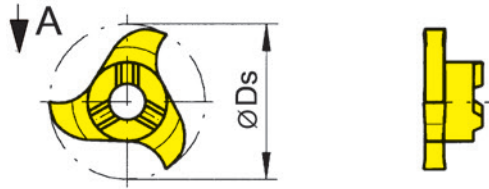


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	Ti25
311.0150.40	17,7	1,5	5,75	-	3,5	3	311090R	▲
311.0200.40	17,7	2	5,75	0,2	3,5	3	311090R	▲
311.0250.40	17,7	2,5	5,75	0,2	3,5	3	311090R	▲
311.0300.40	17,7	3	5,75	0,2	3,5	3	311090R	▲
311.0400.40	17,7	4	5,75	0,2	3,5	3	311090R	▲
								P ●
								M ●
								K ●
								N ●
								S ●
								H -



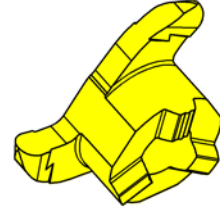
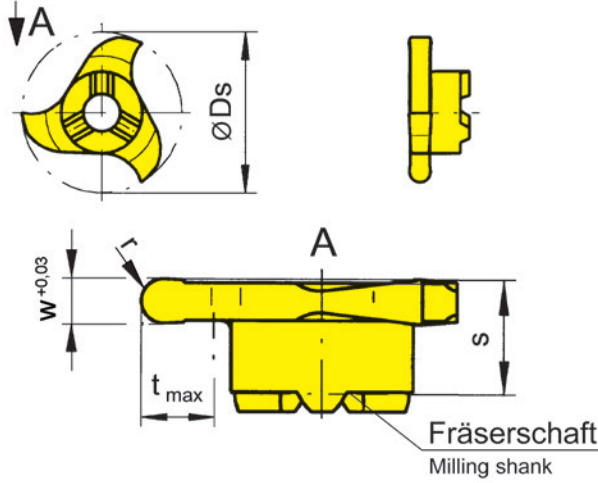


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	RC45	TN35
311.0005.10	17,7	1	5,75	0,5	3,5	3	311090R		▲	
311.0007.15	17,7	1,5	5,75	0,75	3,5	3	311090R	▲		
311.0010.20	17,7	2	5,75	1	3,5	3	311090R	▲		
311.0011.22	17,7	2,2	5,75	1,1	3,5	3	311090R	▲		▲
311.0015.30	17,7	3	5,75	1,5	3,5	3	311090R	▲		
311.0020.40	17,7	4	5,75	2	3,5	3	311090R	▲		
P	●	●	●							
M	●	●	●							
K	●	●	●							
N	○	-	●							
S	●	-	●							
H	-	-	-							

B

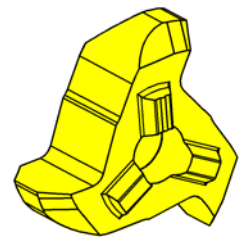
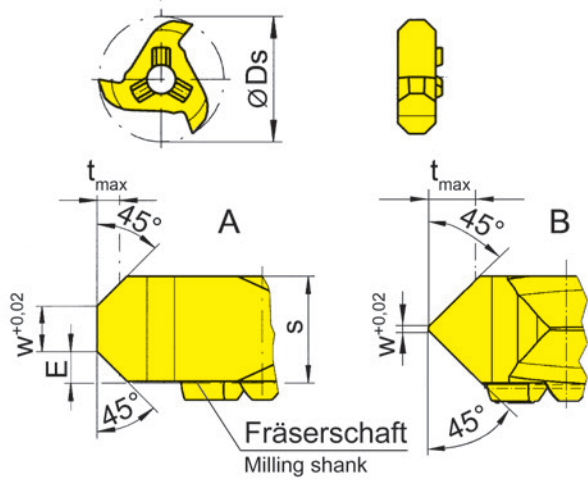


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	Form	t <sub>max</sub>	Z	HIS		TI25	TN35
311.4545.00	17,7	1,7	5,95	2,5	A	1,4	3	311090R			▲
311.4545.20	15	2,95	5,95	0,2	B	2,5	3	311090R		▲	▲
									P	●	●
									M	●	●
									K	●	●
									N	●	●
									S	●	●
									H	-	-

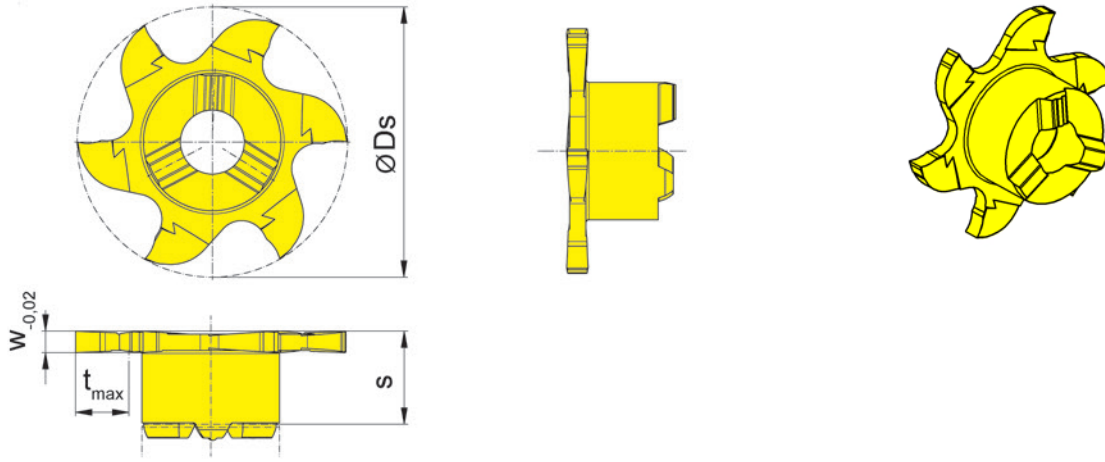
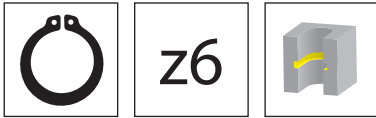


Abbildung = rechtsschneidend  
Picture = right hand cutting version

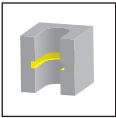
HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	TI25
611.0110.00	17,7	1,1	1,21	6,1	3,5	6	311090R	▲	▲
611.0130.00	17,7	1,3	1,41	6,1	3,5	6	311090R	▲	▲
611.0160.00	17,7	1,6	1,71	6,1	3,5	6	311090R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

**B**



**z6**

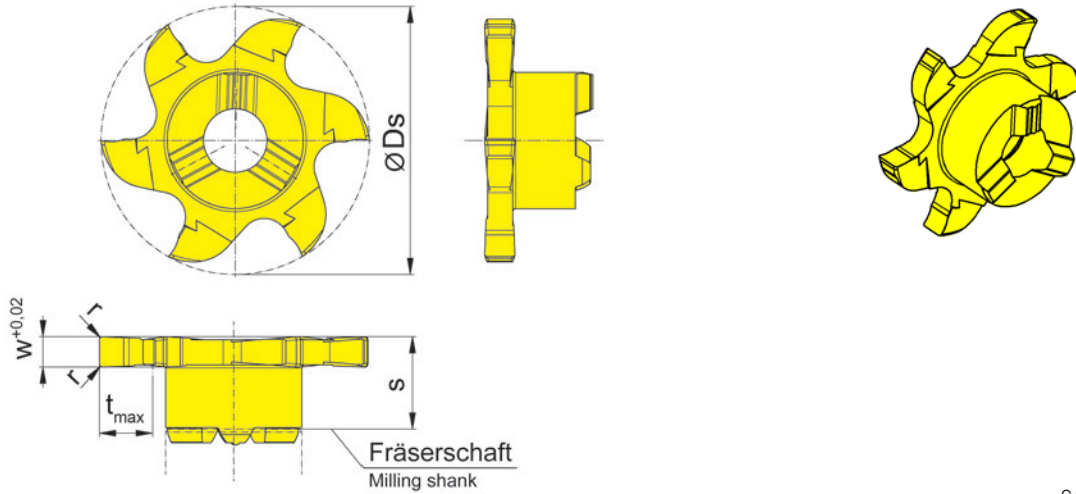


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG35	EG55	Ti25
611.0050.00	17,7	0,5	6,1	-	3,5	6	311090R		▲		
611.0100.00	17,7	1	6,1	-	3,5	6	311090R			▲	
611.0150.00	17,7	1,5	6,1	-	3,5	6	311090R	▲			▲
611.0200.00	17,7	2	6,1	0,2	3,5	6	311090R	▲			▲
611.0250.00	17,7	2,5	6,1	0,2	3,5	6	311090R	▲			▲
611.0300.00	17,7	3	6,1	0,2	3,5	6	311090R	▲			▲
611.0400.00	17,7	4	6,1	0,2	3,5	6	311090R	▲			▲

ab Schneidbreite 2,5 mm Kreuzverzahnung  
from width of groove 2,5 mm tothing with cross-cut

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

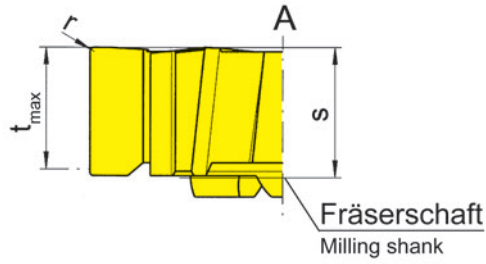
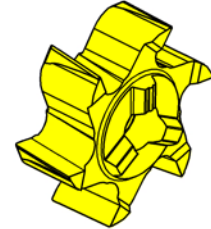
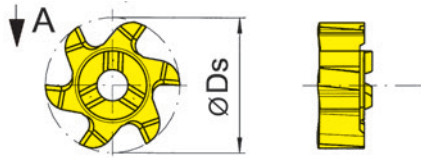


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS45	TF45	TI25
611.PL61.62	17,7	6	0,2	5,7	6,1	311090R	▲	▲	▲
							P ●	●	●
							M ●	●	●
							K ●	●	●
							N ○	●	●
							S ●	●	●
							H -	-	-

**B**

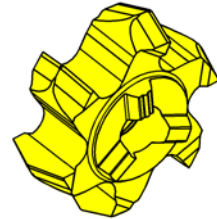
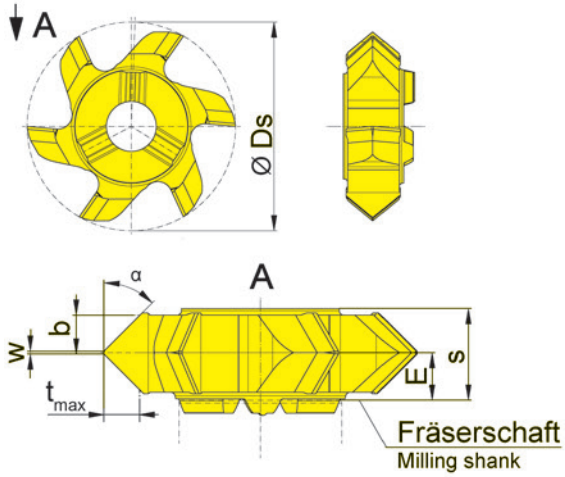
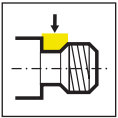


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	$\alpha$	b	t <sub>max</sub>	Z	HIS	AS45	TA45	TI25
611.1515.20	17,7	3,2	6,3	0,2	15°	2,8	0,75	6	311090R	▲	▲	
611.2020.20	17,7	3,2	6,3	0,2	20°	2,8	1	6	311090R	▲	▲	
611.3030.20	17,7	3,2	6,3	0,2	30°	2,8	1,6	6	311090R	▲	▲	
611.4545.20	17,7	3,2	6,3	0,2	45°	2,3	2,3	6	311090R	▲		▲
P	●	●	●									
M	●	●	●									
K	●	●	●									
N	○	●	●									
S	●	●	●									
H	-	-	-									



z6

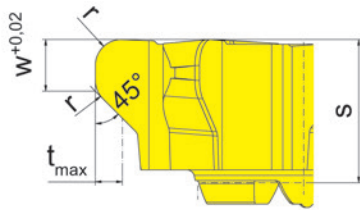
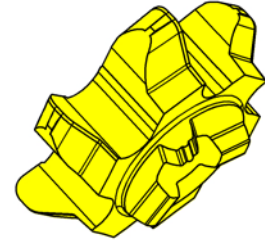
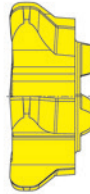
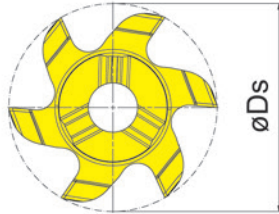


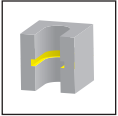
Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55
611.1725.61	17,7	2,2	6,1	1,1	1,3	6	311090R	▲
								P ●
								M o
								K o
								N -
								S -
								H -

Gewindefreistriche DIN 76  
Thread relief DIN 76

B



z9

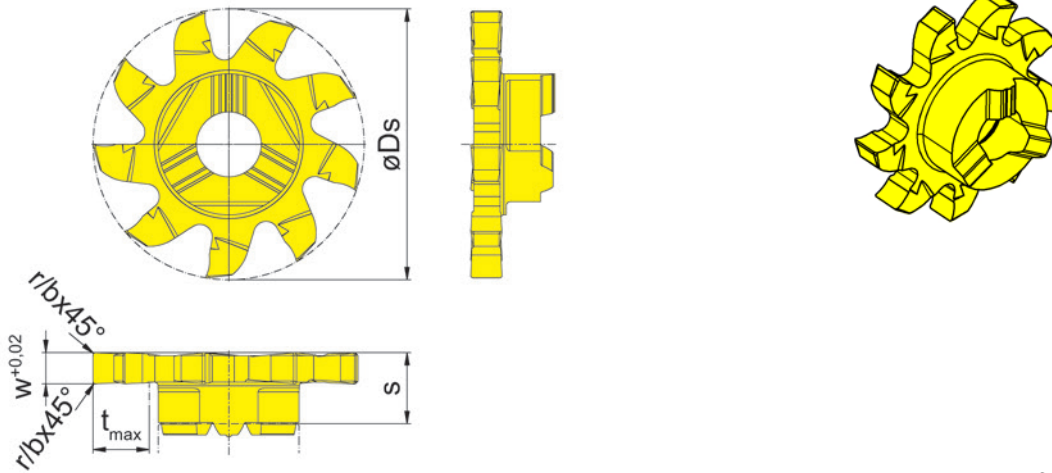


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	b x 45°	r	t <sub>max</sub>	Z	HIS	EG55	IG65
911.0150.00	17,7	1,5	6,1	0,05	-	3,5	9	311090R	▲	Δ
911.0200.00	17,7	2	6,1	-	0,2	3,5	9	311090R	▲	Δ
911.0250.00	17,7	2,5	6,1	-	0,2	3,5	9	311090R	▲	Δ
911.0300.00	17,7	3	6,1	-	0,2	3,5	9	311090R	▲	Δ
									P ● ●	
									M ○ ●	
									K ○ -	
									N - -	
									S - ○	
									H - -	





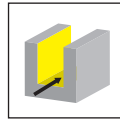
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



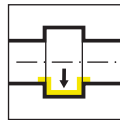
B

Frälerschaft  
Milling shank  
M116

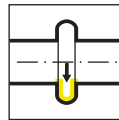


Seite/Page  
108

Schneidplatte  
Insert  
116



Seite/Page  
109-110



Seite/Page  
111

## M116



### Fräser mit wechselbarer Schneidplatte

ab Bohrung

stehend  $\varnothing$  16 mm

rotierend  $\varnothing$  20,4 mm

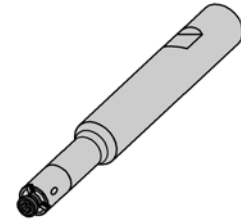
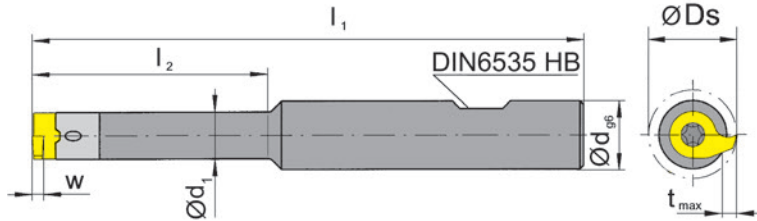
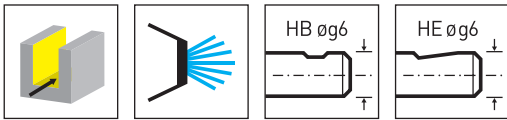
### Milling shank with exchangeable insert

from bore

non rotating  $\varnothing$  16 mm

rotating  $\varnothing$  20,4 mm

B



Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
M116.0012.01B	12	130	40	11	HB	116110R • 116110L
M116.0012.02B	12	130	56	11	HB	116110R • 116110L
M116.0016.01B	16	130	40	11	HB	116110R • 116110L
M116.0016.02B	16	130	56	11	HB	116110R • 116110L
M116.0016.03B	16	150	80	11	HB	116110R • 116110L
M116.0016.01E	16	130	40	11	HE	116110R • 116110L
M116.0016.03E	16	150	80	11	HE	116110R • 116110L

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

### Bearbeitungshinweis ab $\varnothing 16$ mm:

Nur Anspiegeln bei außermittigem Ein- und Ausfahren mit definiertem Spindelstop.

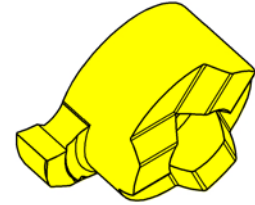
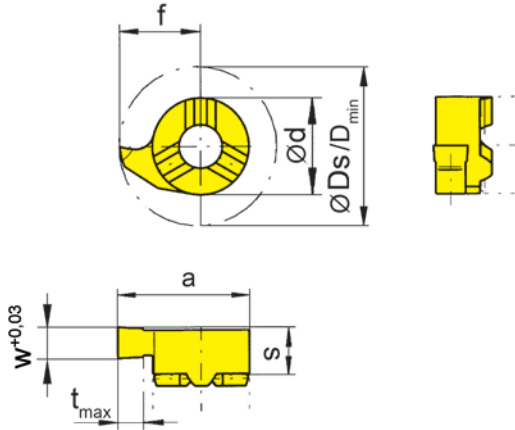
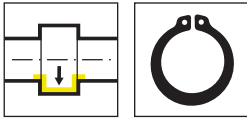
#### Note from $\varnothing 16$ mm:

Only back face milling with oriented spindlestop offset of centerline.

### Ersatzteile

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M116...	5.13T20EP	T20PQ



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

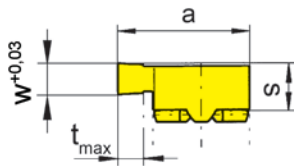
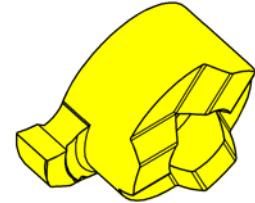
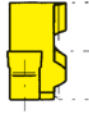
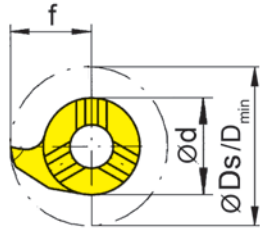
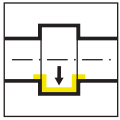
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	s	f	Ds	a	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TN35
<b>R116.0110.00</b>	1,19	1,1	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0130.00</b>	1,39	1,3	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0160.00</b>	1,69	1,6	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>L116.0110.00</b>	1,19	1,1	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0130.00</b>	1,39	1,3	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0160.00</b>	1,69	1,6	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

<b>P</b>	o	•	•	•
<b>M</b>	-	o	•	•
<b>K</b>	-	o	•	•
<b>N</b>	-	-	•	•
<b>S</b>	-	-	•	•
<b>H</b>	-	-	-	-

B



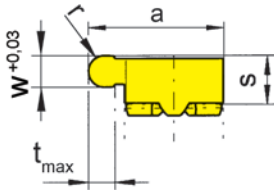
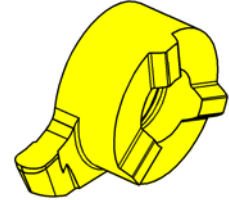
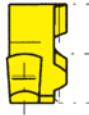
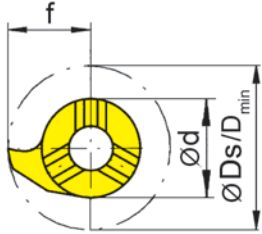
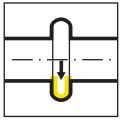
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
▲ 4 Wochen  
4 weeks

Bestellnummer Part number	w	s	f	Ds	a	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TN35
<b>R116.0200.00</b>	2	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0250.00</b>	2,5	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0300.00</b>	3	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0350.00</b>	3,5	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>R116.0400.00</b>	4	5,3	10,2	20,4	15,7	11	4,3	16	1	116110R	▲	▲	▲	▲
<b>L116.0200.00</b>	2	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0250.00</b>	2,5	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0300.00</b>	3	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0350.00</b>	3,5	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
<b>L116.0400.00</b>	4	5,3	10,2	20,4	15,7	11	4,3	16	1	116110L	▲	▲	▲	▲
											P	o	•	•
											M	-	o	•
											K	-	o	•
											N	-	-	•
											S	-	-	•
											H	-	-	-



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
▲ 4 Wochen  
4 weeks

Bestellnummer Part number	w	s	f	Ds	a	r	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	EG55	TH35	TN35
R116.0009.18	1,8	5,3	10,2	20,4	15,7	0,9	11	4,3	16	1	116110R	▲	▲	▲
R116.0011.22	2,2	5,3	10,2	20,4	15,7	1,1	11	4,3	16	1	116110R	▲	▲	▲
R116.0015.30	3	5,3	10,2	20,4	15,7	1,1	11	4,3	16	1	116110R	▲	▲	▲
R116.0020.40	4	5,3	10,2	20,4	15,7	2	11	4,3	16	1	116110R	▲	▲	▲
L116.0009.18	1,8	5,3	10,2	20,4	15,7	0,9	11	4,3	16	1	116110L	▲	▲	▲
L116.0011.22	2,2	5,3	10,2	20,4	15,7	1,1	11	4,3	16	1	116110L	▲	▲	▲
L116.0015.30	3	5,3	10,2	20,4	15,7	1,1	11	4,3	16	1	116110L	▲	▲	▲
L116.0020.40	4	5,3	10,2	20,4	15,7	2	11	4,3	16	1	116110L	▲	▲	▲
P	●	●	●											
M	○	●	●											
K	○	●	●											
N	-	●	●											
S	-	●	●											
H	-	-	-											

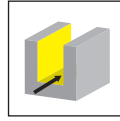
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



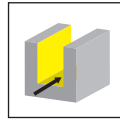
B

Frälerschaft  
Milling shank  
M313/M313.ST/M313.ER



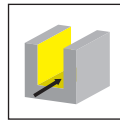
Seite/Page  
114-119

Grundaufnahme  
Basic Holder  
WFB



Seite/Page  
120

Einschraubfräser  
Screw-in cutter  
M313.M



Seite/Page  
121

Schneidplatte  
Insert  
313/L313/613/713  
913



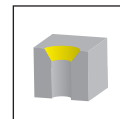
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122-126, 134-  
135



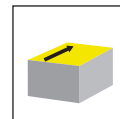
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136, 144, 146



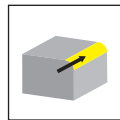
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131



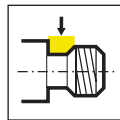
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132, 141-142



Seite/Page  
137-139, 145



Seite/Page  
140



Seite/Page  
143



## M313



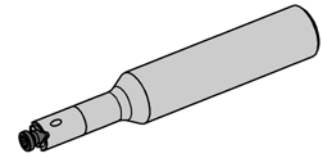
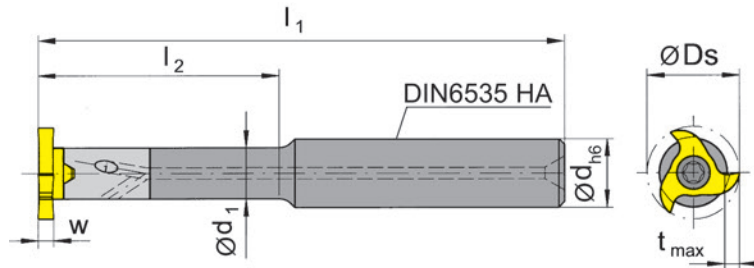
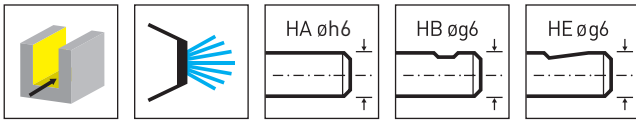
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  22 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  22 mm

B



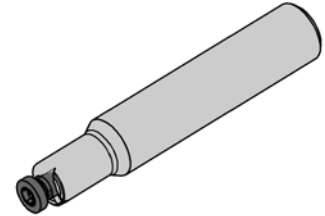
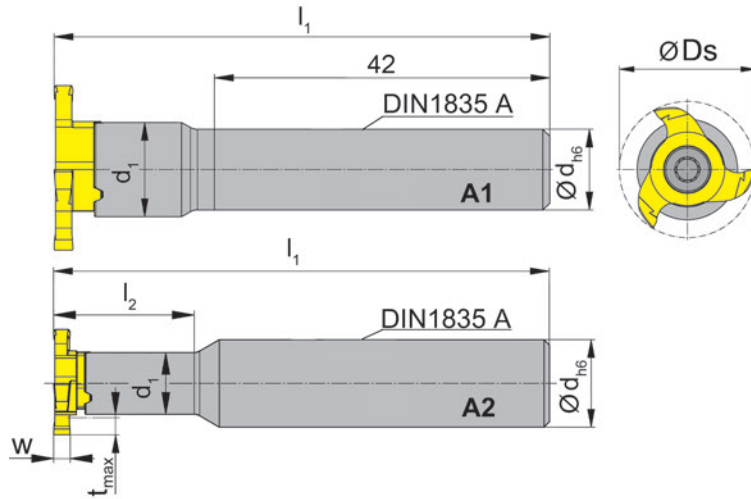
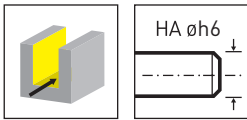
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M313.0012.01A	12	100	-	-	HA	313113R • 313113L
M313.0012.02A	12	130	-	-	HA	313113R • 313113L
M313.0016.01A	16	100	42	12	HA	313113R • 313113L
M313.0016.02A	16	130	60	12	HA	313113R • 313113L
M313.0016.03A	16	160	85	12	HA	313113R • 313113L
M313.0012.01B	12	100	-	-	HB	313113R • 313113L
M313.0012.02B	12	130	-	-	HB	313113R • 313113L
M313.0016.01B	16	100	42	12	HB	313113R • 313113L
M313.0016.02B	16	130	60	12	HB	313113R • 313113L
M313.0016.03B	16	160	85	12	HB	313113R • 313113L
M313.0012.01E	12	100	-	-	HE	313113R • 313113L
M313.0012.02E	12	130	-	-	HE	313113R • 313113L
M313.0016.01E	16	100	42	12	HE	313113R • 313113L
M313.0016.02E	16	130	60	12	HE	313113R • 313113L
M313.0016.03E	16	160	85	12	HE	313113R • 313113L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

## Ersatzteile

Spare Parts

Frärschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M313...	5.14T20P	T20PQ



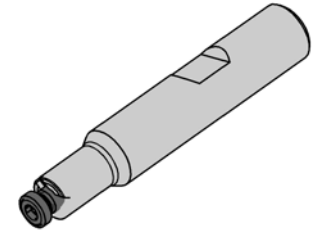
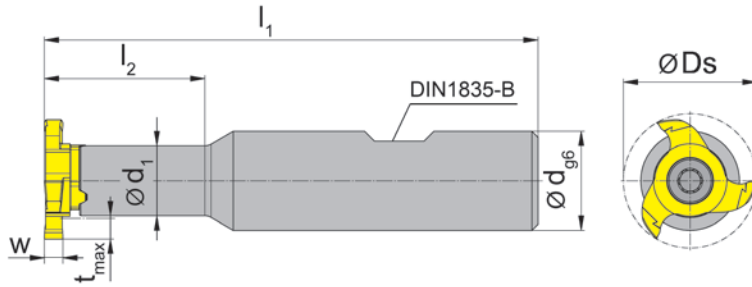
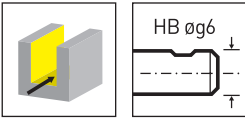
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.ST10.01A</b>	10	60	-	11,3	A1	313113R • 313113L
<b>M313.ST12.01A</b>	12	70	18	11,3	A2	313113R • 313113L
<b>M313.ST13.01A</b>	13	70	26	11,3	A2	313113R • 313113L
<b>M313.ST16.01A</b>	16	80	26	11,3	A2	313113R • 313113L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Frälerschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>

**B**



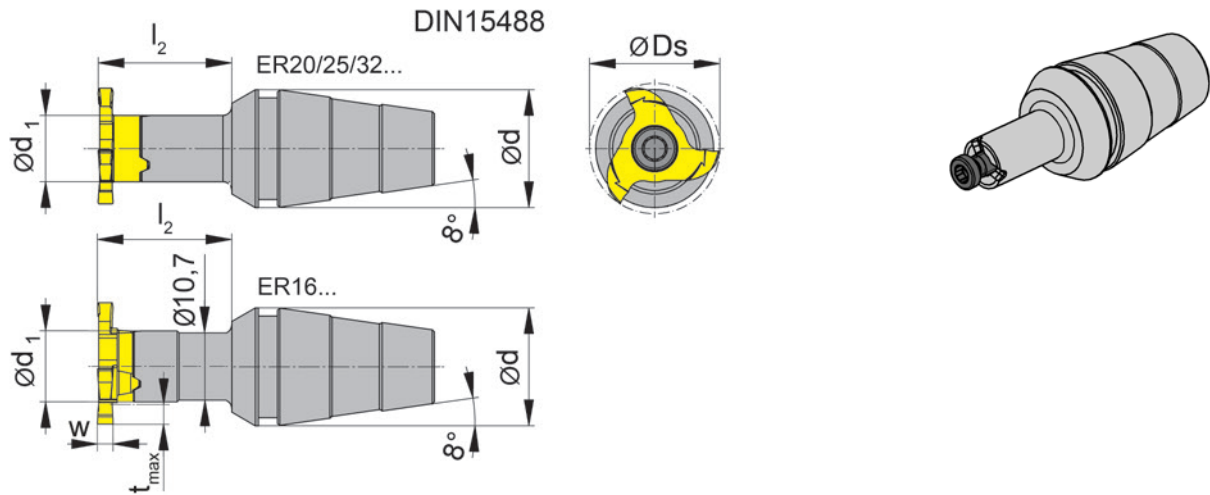
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<b>M313.ST12.01B</b>	12	70	18	11,3	HB	313113R • 313113L
<b>M313.ST16.01B</b>	16	80	26	11,3	HB	313113R • 313113L

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**

Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>



Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
M313.ER16.01	16	20	11,3	ER16.6499/ERM16.6499	313113R • 313113L
M313.ER16.02	16	30	11,3	ER16.6499/ERM16.6499	313113R • 313113L
M313.ER20.01	20	20	11,3	ER20.6499/ERM20.6499	313113R • 313113L
M313.ER20.02	20	30	11,3	ER20.6499/ERM20.6499	313113R • 313113L
M313.ER25.02	25	30	11,3	ER25.6499	313113R • 313113L
M313.ER32.02	32	30	11,3	ER32.6499	313113R • 313113L

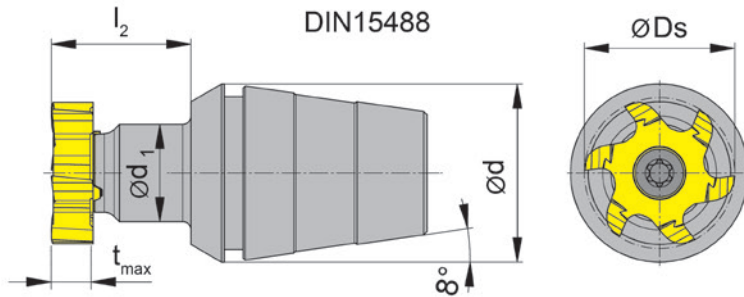
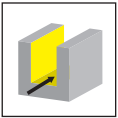
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M313...	5.14T20P	T20PQ

**B**



Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M313.ER25.14.01</b>	25	19,7	14	ER25.6499	313113R • 313113L
<b>M313.ER32.14.01</b>	32	19,7	14	ER32.6499	313113R • 313113L

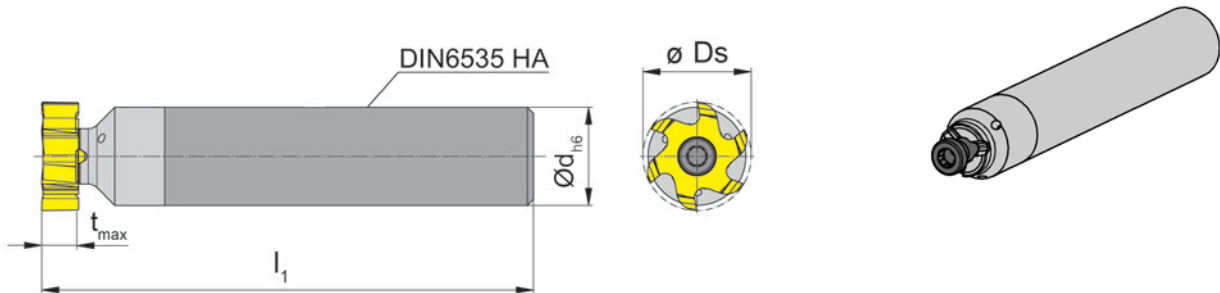
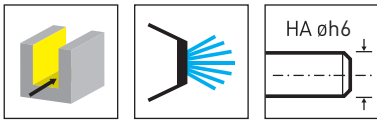
t<sub>max</sub> und D<sub>s</sub> siehe Schneidplatte  
t<sub>max</sub> and D<sub>s</sub> see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**

Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>



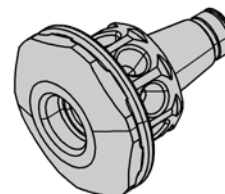
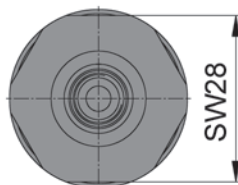
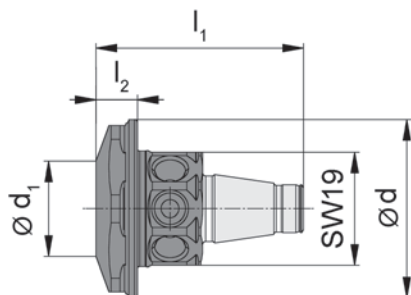
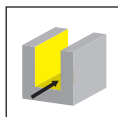
Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M313.0016.D.00A</b>	16	80	HA	313113R • 313113L
<b>M313.0020.D.00A</b>	20	80	HA	313113R • 313113L

t<sub>max</sub> und D<sub>s</sub> siehe Schneidplatte  
t<sub>max</sub> and D<sub>s</sub> see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>

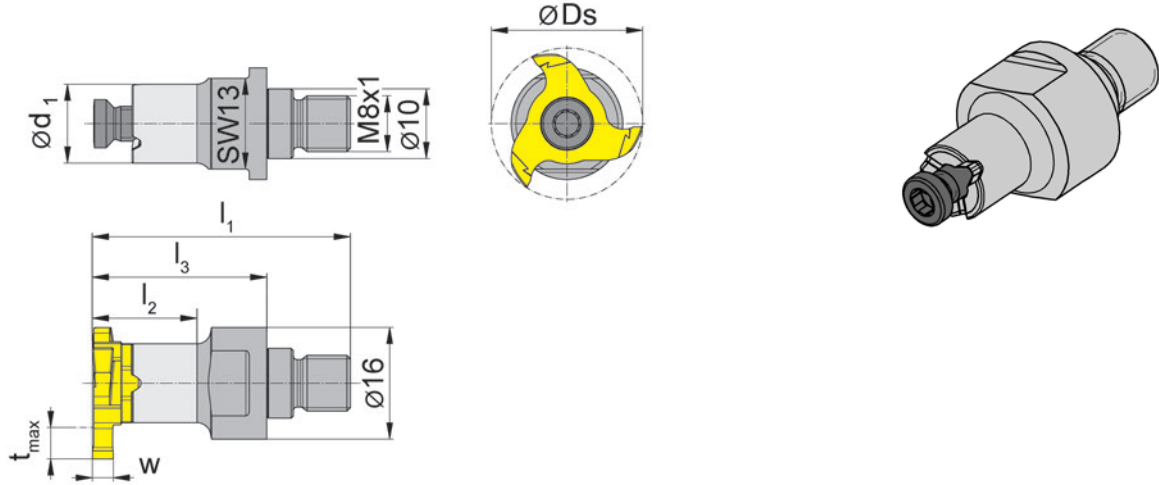
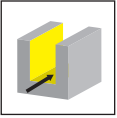
**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	d
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter





Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
<b>M313.M081.01</b>	37	15	25	11,3	13	313113R • 313113L	8201

w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M313.M081.01	<b>5.14T20P</b>	<b>T20PQ</b>

B

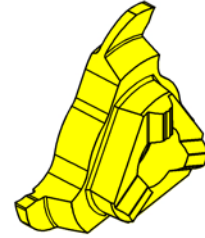
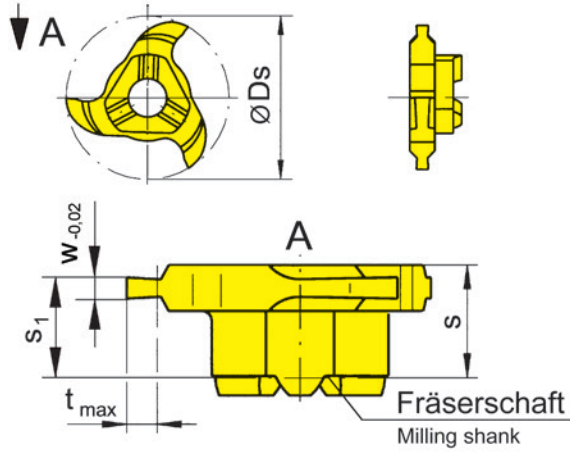


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	s <sub>1</sub>	t <sub>max</sub>	Z	HIS	EG55	TN35
313.0070.00	21,7	0,7	0,77	5,9	5,6	1,5	3	313113R	▲	▲
313.0080.00	21,7	0,8	0,87	5,9	5,6	1,7	3	313113R	▲	▲
313.0090.00	21,7	0,9	0,97	5,9	5,6	1,9	3	313113R	▲	▲
313.0100.00	21,7	1	1,07	5,9	5,6	2,2	3	313113R	▲	▲
313.0110.00	21,7	1,1	1,21	5,9	5,6	2,5	3	313113R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●	●
M	○	●
K	○	●
N	-	●
S	-	●
H	-	-

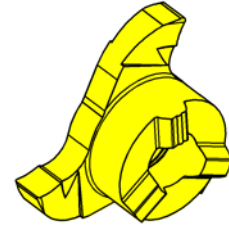
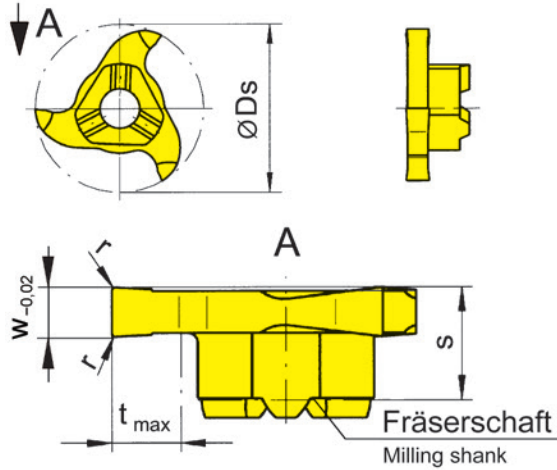


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TI25	TN35
313.0130.00	21,7	1,3	1,41	5,7	-	4,5	3	313113R	▲	▲	▲	▲
313.0160.00	21,7	1,6	1,71	5,7	-	4,5	3	313113R	▲	▲	▲	▲
313.0185.00	21,7	1,85	1,96	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0215.00	21,7	2,15	2,26	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0265.00	21,7	2,65	2,76	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0315.00	21,7	3,15	3,26	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0415.00	21,7	4,15	4,26	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0515.00	21,7	5,15	5,26	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

**Schneidplatten 313.0415.00 und 313.0515.00**  
nur in Verbindung mit Frälerschaftabmessung l<sub>2</sub> = max. 42 mm  
Inserts 313.0415.00 and 313.0515.00  
only with toolholder dimension l<sub>2</sub> = max. 42 mm

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

B

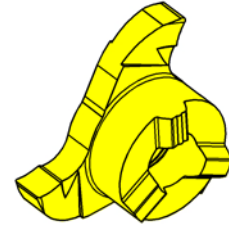
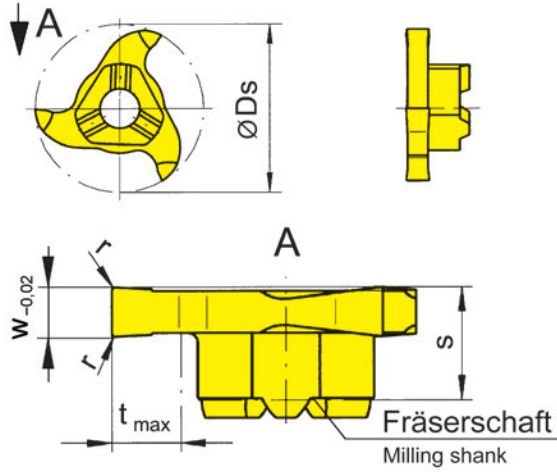


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	TI25
313.0130.40	21,7	1,3	1,41	5,7	-	4,5	3	313113R	▲
313.0160.40	21,7	1,6	1,71	5,7	-	4,5	3	313113R	▲
313.0185.40	21,7	1,85	1,96	5,7	0,2	4,5	3	313113R	▲
313.0215.40	21,7	2,15	2,26	5,7	0,2	4,5	3	313113R	▲
313.0265.40	21,7	2,65	2,76	5,7	0,2	4,5	3	313113R	▲
313.0315.40	21,7	3,15	3,26	5,7	0,2	4,5	3	313113R	▲
313.0415.40	21,7	4,15	4,26	5,7	0,2	4,5	3	313113R	▲
313.0515.40	21,7	5,15	5,26	5,7	0,2	4,5	3	313113R	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

**Schneidplatten 313.0415.40 und 313.0515.40**  
nur in Verbindung mit Fräuserschaftabmessung l2= max. 42 mm  
**Inserts 313.0415.40 and 313.0515.40**  
only with toolholder dimension l2 = max. 42 mm

P	-
M	-
K	-
N	●
S	-
H	-

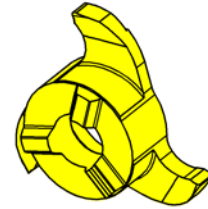
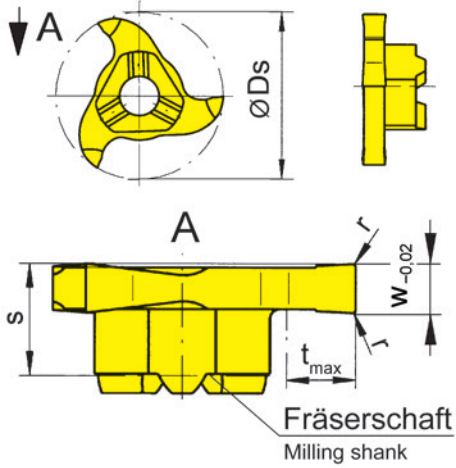


Abbildung = linksschneidend  
Picture = left hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten / Carbide grades			
									AS45	EG55	TI25	
L313.0130.00	21,7	1,3	1,41	5,7	-	4,5	3	313113L	Δ	Δ		
L313.0160.00	21,7	1,6	1,71	5,7	-	4,5	3	313113L	Δ	Δ		
L313.0185.00	21,7	1,85	1,96	5,7	0,2	4,5	3	313113L	Δ	Δ		
L313.0215.00	21,7	2,15	2,26	5,7	0,2	4,5	3	313113L	Δ	Δ	Δ	
L313.0265.00	21,7	2,65	2,76	5,7	0,2	4,5	3	313113L	Δ	Δ		
L313.0315.00	21,7	3,15	3,26	5,7	0,2	4,5	3	313113L	Δ	Δ		
L313.0415.00	21,7	4,15	4,26	5,7	0,2	4,5	3	313113L	Δ	Δ		
L313.0515.00	21,7	5,15	5,26	5,7	0,2	4,5	3	313113L	Δ	Δ		
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472									P	●	●	●
Bei Reduzierung der Frästiefe t <sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich. Inserts for widths of groove t <sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.									M	●	○	●
<b>Schneidplatten L313.0415.00 und L313.0515.00</b> nur in Verbindung mit Fräuserschaftabmessung l <sub>2</sub> = max. 42 mm Inserts L313.0415.00 and L313.0515.00 only with toolholder dimension l <sub>2</sub> = max. 42 mm									K	●	○	●
									N	○	-	●
									S	●	-	●
									H	-	-	-

B

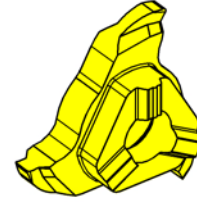
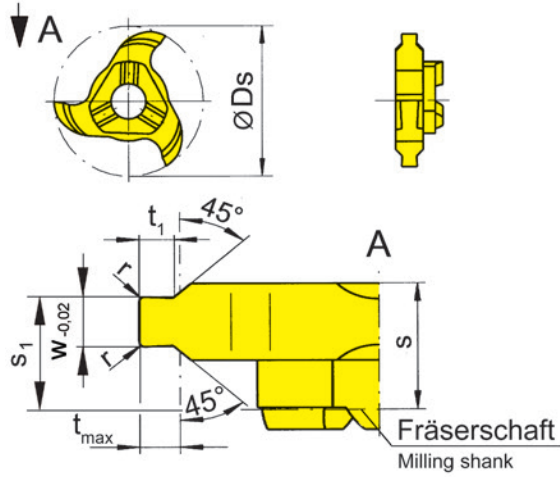


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

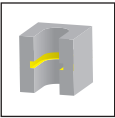
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TA45	TN35
313.1105.30	21,7	1,1	1,21	0,47	5,9	5,07	-	0,5	3	313113R		▲		▲
313.1307.30	21,7	1,3	1,41	0,65	5,9	5,17	-	0,7	3	313113R	△	▲		▲
313.1308.30	21,7	1,3	1,41	0,81	5,9	5,17	-	0,85	3	313113R		▲		▲
313.1609.35	21,7	1,6	1,71	0,81	5,9	5,07	-	0,85	3	313113R		▲		▲
313.1610.35	21,7	1,6	1,71	0,95	5,9	5,07	-	1	3	313113R	▲	▲		▲
313.1812.35	21,7	1,85	1,96	1,21	5,9	5,19	0,2	1,25	3	313113R	▲	▲		▲
313.2115.35	21,7	2,15	2,26	1,45	5,9	5,34	0,2	1,5	3	313113R	△	▲	△	▲
313.2616.45	21,7	2,65	2,76	1,45	5,9	5,09	0,2	1,5	3	313113R	▲	▲		▲
313.2617.45	21,7	2,65	2,76	1,7	5,9	5,09	0,2	1,75	3	313113R		▲		▲
313.3118.45	21,7	3,15	3,26	1,7	5,9	5,34	0,2	1,75	3	313113R	△	▲		▲
313.4120.55	21,7	4,15	4,26	1,95	5,9	5,34	0,2	2	3	313113R		▲		▲
313.4125.55	21,7	4,15	4,26	2,45	5,9	5,34	0,2	2,5	3	313113R		▲		▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

**Schneidplatten 313.4120.55 und 313.4125.55**  
nur in Verbindung mit Fräaserschaftabmessung l<sub>2</sub>= max. 42 mm  
**Inserts 313.4120.55 and 313.4125.55**  
only with toolholder dimension l<sub>2</sub> = max. 42 mm

	P	M	K	N	S	H
AS45	●	●	●	●	●	●
EG55	●	○	●	●	●	●
TA45	●	○	●	●	●	●
TN35	●	○	●	●	●	●
	-	-	-	-	-	-



z3

B

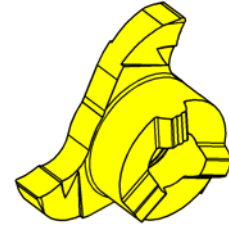
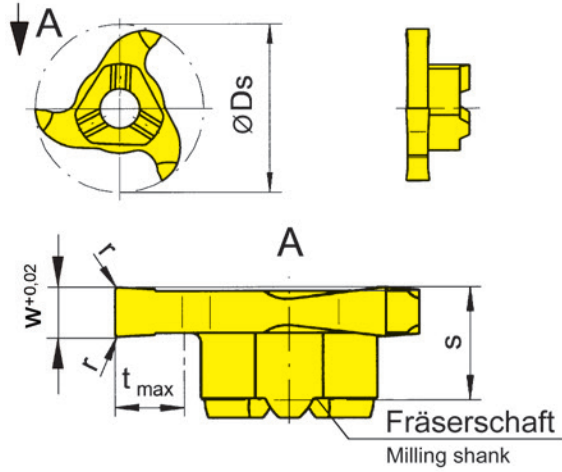


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TI25	TN35
313.0150.00	21,7	1,5	5,7	-	4,5	3	313113R	▲	▲		▲
313.0150.01	21,7	1,5	5,7	0,1	4,5	3	313113R	▲	▲		
313.0200.00	21,7	2	5,7	0,2	4,5	3	313113R	▲	▲		▲
313.0250.00	21,7	2,5	5,7	0,2	4,5	3	313113R	▲	▲	▲	▲
313.0300.00	21,7	3	5,7	0,2	4,5	3	313113R	▲	▲		▲
313.0350.00	21,7	3,5	5,7	0,2	4,5	3	313113R	▲	▲	▲	
313.0400.00	21,7	4	5,7	0,2	4,5	3	313113R	▲	▲		▲
313.0500.00	21,7	5	5,7	0,2	4,5	3	313113R	▲	▲		▲
313.0600.00	21,7	6	6,9	0,2	4,5	3	313113R	▲	▲		▲

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

Schneidplatte **313.0600.00** mit Spanteilern!  
Insert 313.0600.00 with chip divider!

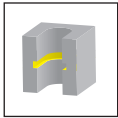
P	●	●	●	●
M	●	○	●	●
K	●	○	●	●
N	○	-	●	●
S	●	-	●	●
H	-	-	-	-

# Schneidplatte Insert

# 313



**B**



z3

.40

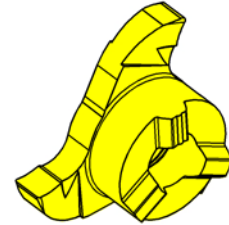
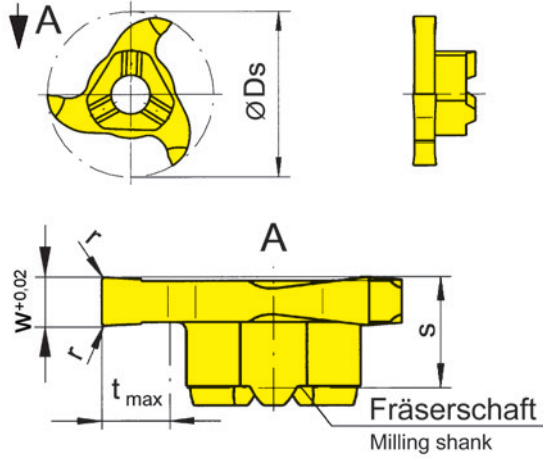
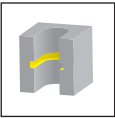


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	T125
313.0150.40	21,7	1,5	5,7	-	4,5	3	313113R	▲
313.0200.40	21,7	2	5,7	0,2	4,5	3	313113R	▲
313.0250.40	21,7	2,5	5,7	0,2	4,5	3	313113R	▲
313.0300.40	21,7	3	5,7	0,2	4,5	3	313113R	▲
313.0400.40	21,7	4	5,7	0,2	4,5	3	313113R	▲
								P -
								M -
								K -
								N ●
								S -
								H -





z3

B

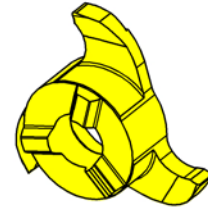
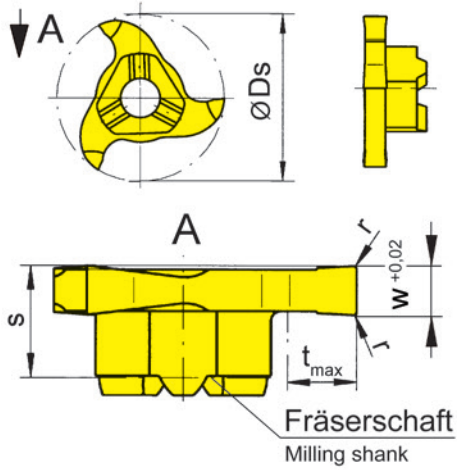


Abbildung = linksschneidend  
Picture = left hand cutting version

▲ ab Lager  
on stock

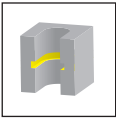
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TI25
L313.0150.00	21,7	1,5	5,7	-	4,5	3	313113L	Δ	Δ	
L313.0150.01	21,7	1,5	5,7	0,1	4,5	3	313113L	Δ	Δ	
L313.0200.00	21,7	2	5,7	0,2	4,5	3	313113L	Δ	Δ	
L313.0250.00	21,7	2,5	5,7	0,2	4,5	3	313113L	Δ	Δ	Δ
L313.0300.00	21,7	3	5,7	0,2	4,5	3	313113L	Δ	Δ	
L313.0350.00	21,7	3,5	5,7	0,2	4,5	3	313113L	Δ	Δ	Δ
L313.0400.00	21,7	4	5,7	0,2	4,5	3	313113L	▲	Δ	
L313.0500.00	21,7	5	5,7	0,2	4,5	3	313113L	Δ	Δ	
L313.0600.00	21,7	6	6,9	0,2	4,5	3	313113L	Δ	Δ	

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

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

B



z3

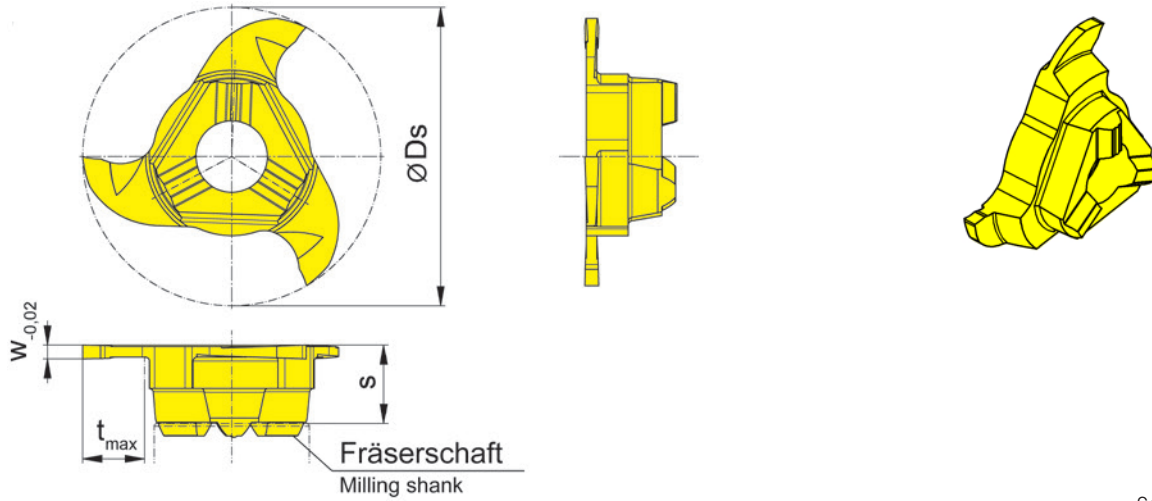


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	EG55	TI25	TN35
313.0100.1.00	21,7	1	5,7	4,5	3	313113R	▲	▲	▲
							P ●	●	●
							M ○	●	●
							K ○	●	●
							N -	●	●
							S -	●	●
							H -	-	-

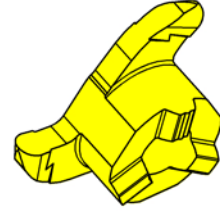
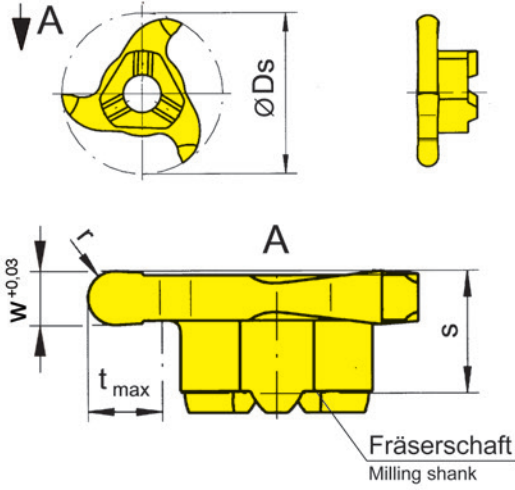


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
								AS45	EG55	TN35	
313.0005.10	21,7	1	5,7	0,5	4,5	3	313113R	▲	▲	▲	
313.0007.15	21,7	1,5	5,7	0,75	4,5	3	313113R	▲	▲	▲	
313.0010.20	21,7	2	5,7	1	4,5	3	313113R	▲	▲	▲	
313.0014.28	21,7	2,8	5,7	1,4	4,5	3	313113R	▲	▲	▲	
313.0015.30	21,7	3	5,7	1,5	4,5	3	313113R	▲	▲	▲	
313.0020.40	21,7	4	5,7	2	4,5	3	313113R	▲	▲	▲	
313.0025.50	21,7	5	5,7	2,5	4,5	3	313113R	▲	▲	▲	
								P	●	●	●
								M	●	○	●
								K	●	○	●
								N	○	-	●
								S	●	-	●
								H	-	-	-

B

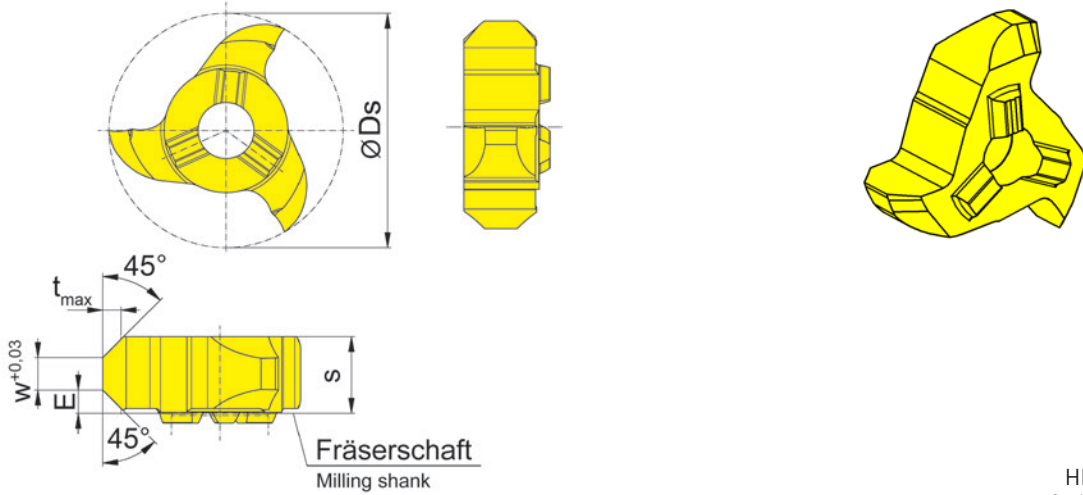


Abbildung = rechtsschneidend  
Picture = right hand cutting version

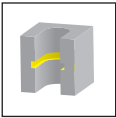
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	t <sub>max</sub>	Z	HIS	EG55	TA45	TN35
313.4545.00	21,7	2,15	7,1	3	1,7	3	313113R	▲	▲	▲
313.4545.30.00	21,7	3,6	9,4	2,6	3	3	313113R	▲	▲	▲

Für Schneidplatte s = 7,1 mm Schraube 5.17T20P verwenden  
Für Schneidplatte s = 9,4 mm Schraube 5.13T20P verwenden  
For Insert s = 7,1 mm use screw 5.17T20P  
For Insert s = 9,4 mm use screw 5.13T20P

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



z6

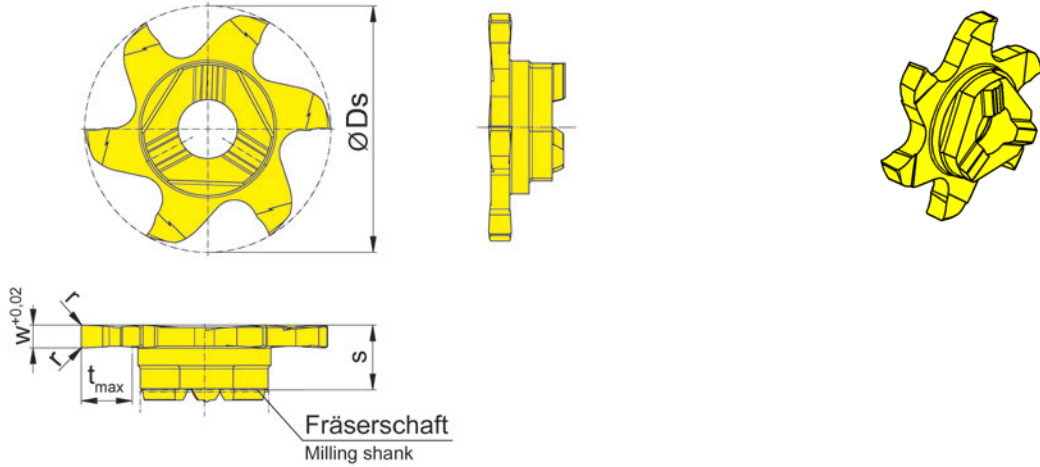


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TI25	
613.0150.00	21,7	1,5	5,7	-	4,5	6	313113R	▲	▲	▲	
613.0200.00	21,7	2	5,7	0,2	4,5	6	313113R	▲	▲	▲	
613.0250.00	21,7	2,5	5,7	0,2	4,5	6	313113R	▲	▲	▲	
613.0300.00	21,7	3	5,7	0,2	4,5	6	313113R	▲	▲	▲	
613.0400.00	21,7	4	5,7	0,2	4,5	6	313113R	▲	▲	▲	
613.0600.00	21,7	6	7,35	0,2	4,5	6	313113R		▲		
613.0800.00	21,7	8	9,15	0,2	4,5	6	313113R		▲		
ab Schneidbreite 2,5 mm Kreuzverzahnung from width of groove 2,5 mm toothing with cross-cut								P	●	●	●
<b>Schneidplatte w ≥ 4 mm</b>								M	●	○	●
nur in Verbindung mit Fräaserschaftabmessung l2= max. 42 mm								K	●	○	●
<b>Insert w ≥ 4 mm</b>								N	○	-	●
only with toolholder dimension l2 = max. 42 mm								S	●	-	●
								H	-	-	-

B



z6

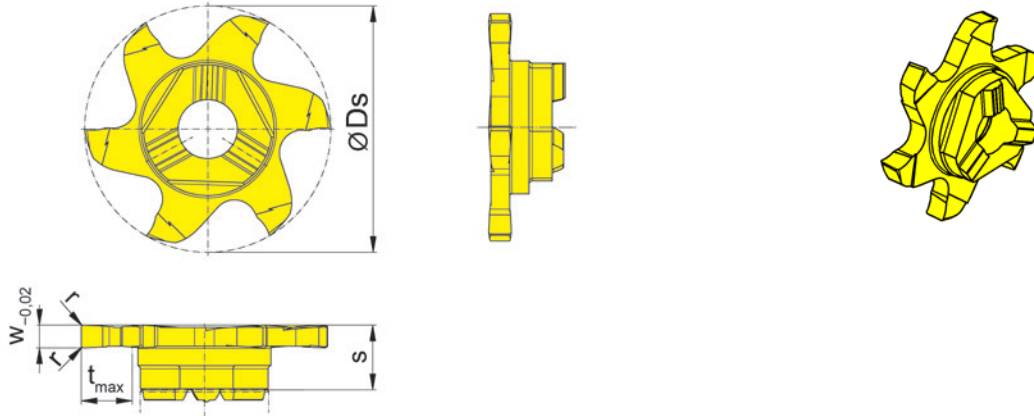
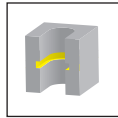


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55
613.0130.00	21,7	1,3	1,41	5,7	-	4,5	6	313113R	▲	▲
613.0215.00	21,7	2,15	2,26	5,7	0,2	4,5	6	313113R	▲	▲
613.0315.00	21,7	3,15	3,26	5,7	0,2	4,5	6	313113R	▲	▲
613.0415.00	21,7	4,15	4,26	5,7	0,2	4,5	6	313113R	▲	▲
613.0515.00	21,7	5,15	5,26	5,7	0,2	4,5	6	313113R	▲	▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

P	●	●
M	●	○
K	●	○
N	○	-
S	●	-
H	-	-



z6

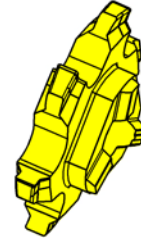
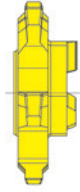
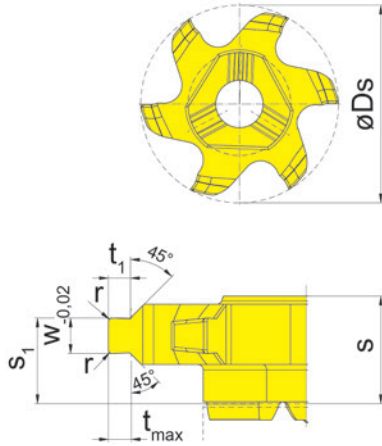
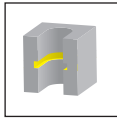


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	Z	HIS	AS45	EG55
613.1812.35	21,7	1,85	1,96	1,21	5,9	4,7	0,2	1,25	6	313113R	▲	▲
613.2115.35	21,7	2,15	2,26	1,45	5,9	4,9	0,2	1,5	6	313113R	Δ	▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●	●
M	●	○
K	●	○
N	○	-
S	●	-
H	-	-

B



z6

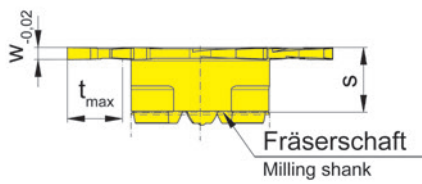
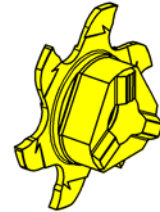
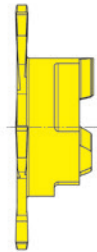
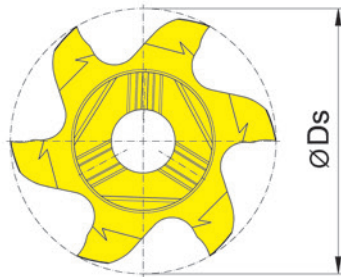


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	EG55	TI25
613.0100.1.00	21,7	1	5,7	4,5	6	313113R	▲	▲
							P ● ●	● ●
							M ○ ●	● ●
							K ○ ●	● ●
							N - ●	● ●
							S - ●	● ●
							H - -	● ●



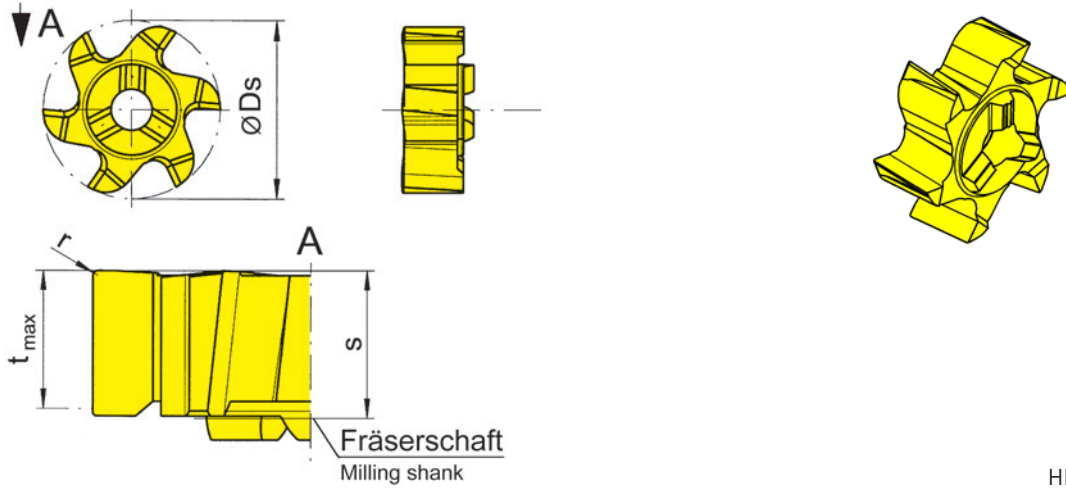


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS45	EG55	TF45	TI25
613.PL61.62	21,7	6	0,2	5,7	6,1	313113R	▲	▲	▲	▲
							P ●	●	●	●
							M ●	○	●	●
							K ●	○	●	●
							N ○	-	●	●
							S ●	-	●	●
							H -	-	-	-

B

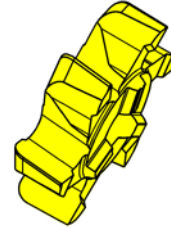
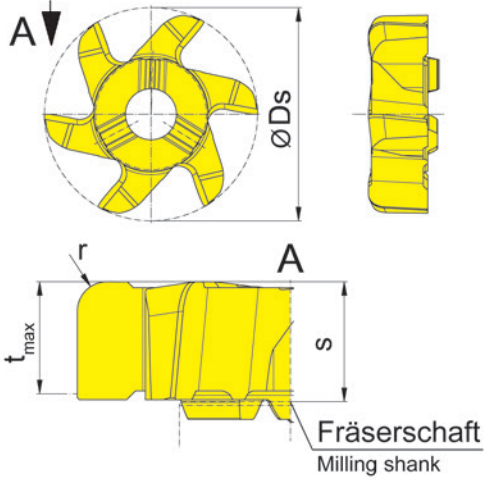


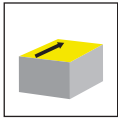
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS45	EG55	TI25
613.PLT6.15	21,7	6	1,5	5,7	6,1	313113R	▲	▲	▲
							P ●	●	●
							M ●	○	●
							K ●	○	●
							N ○	-	●
							S ●	-	●
							H -	-	-



z6

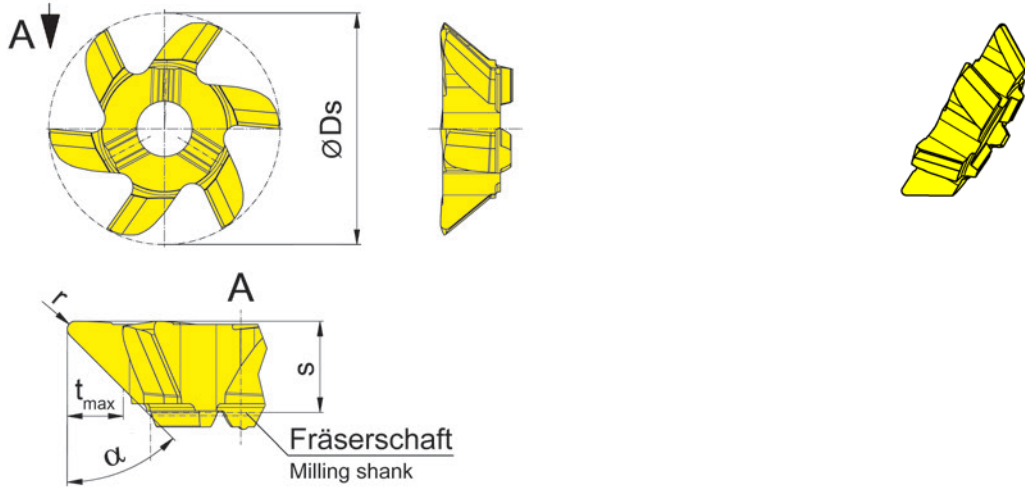


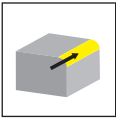
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	$\alpha$	$t_{max}$	s	HIS	AS45	EG55
613.0015.25	21,7	6	0,5	15°	1,1	5,7	313113R	▲	▲
613.0030.25	21,7	6	0,5	30°	2,3	5,7	313113R	▲	▲
613.0045.25	21,7	6	0,5	45°	3,5	5,7	313113R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ○
								S	● ●
								H	- -

B



z6

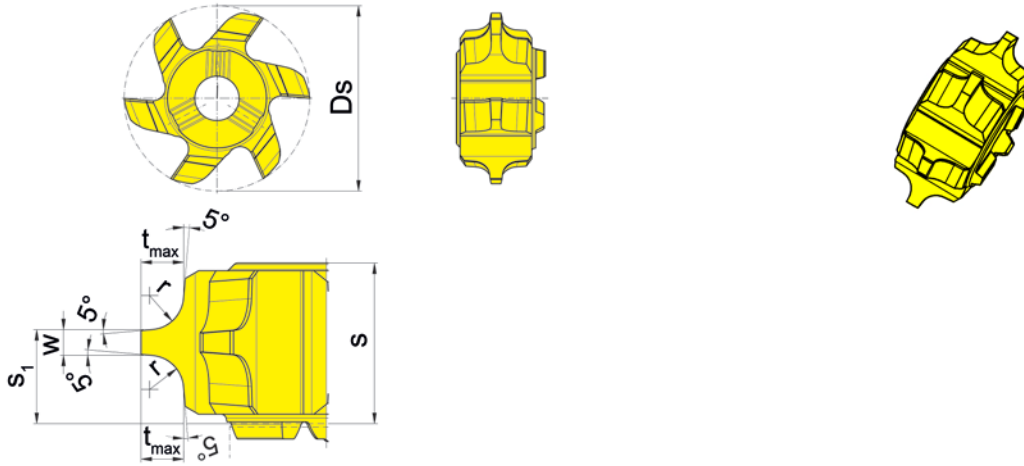


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	s	s <sub>1</sub>	r	w	t <sub>max</sub>	Z	HIS	AS/45
613.R100.00	21,7	6,3	4	1	1,5	1,5	6	313113R	▲
613.R150.00	21,7	7,6	4,6	1,5	1,5	2	6	313113R	▲
613.R200.00	21,7	9,4	5,5	2	1,5	2,5	6	313113R	▲
613.R250.00	21,7	9,9	5,75	2,5	1,5	3	6	313113R	▲
613.R300.00	21,7	9,9	5,75	3	1,5	3,5	6	313113R	▲

Für Schneidplatte s = 6,3 mm Schraube 5.14T20P verwenden  
 Für Schneidplatte s = 7,6 mm Schraube 5.17T20P verwenden  
 Für Schneidplatte s = 9,4-9,9 mm Schraube 5.13T20P verwenden  
 For Insert s = 6,3 mm use screw 5.14T20P  
 For Insert s = 7,6 mm use screw 5.17T20P  
 For Insert s = 9,4-9,9 mm use screw 5.13T20P

P	●
M	●
K	●
N	○
S	●
H	-

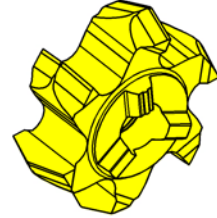
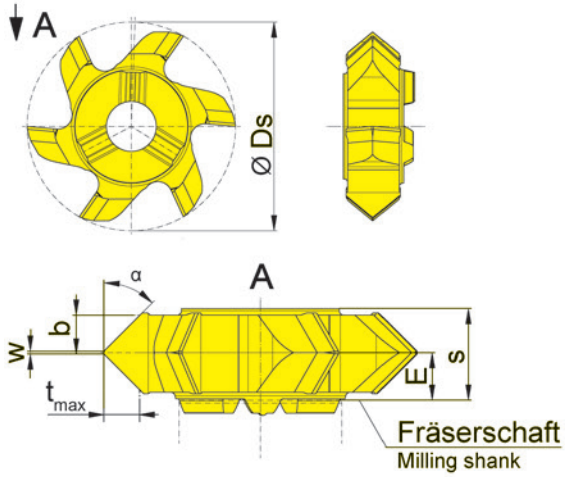
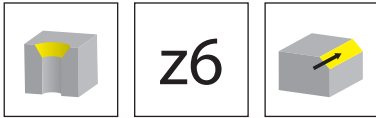


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	$\alpha$	b	t <sub>max</sub>	Z	HIS	EG55	TA45	TI25
613.1515.20	21,7	3,3	6,3	0,2	15°	2,7	0,75	6	313113R	▲	▲	
613.2020.20	21,7	3,3	6,3	0,2	20°	2,7	1	6	313113R	▲	▲	
613.3030.20	21,7	3,3	6,3	0,2	30°	2,7	1,6	6	313113R	▲	▲	
613.4545.20	21,7	3,3	6,3	0,2	45°	2,5	2,5	6	313113R	▲		▲
P	●	●	●									
M	○	●	●									
K	○	●	●									
N	-	●	●									
S	-	●	●									
H	-	-	-									

B

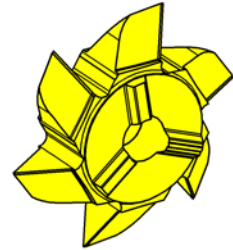
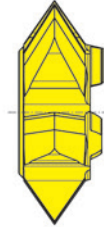
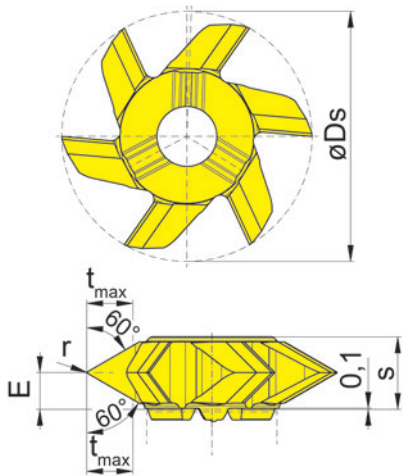
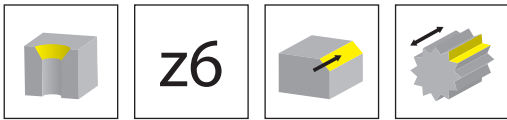
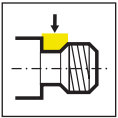


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	r	t <sub>max</sub>	Z	HIS	AS45
613.6060.05	21,7	3,2	6,3	0,05	4	6	313113R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -



z6

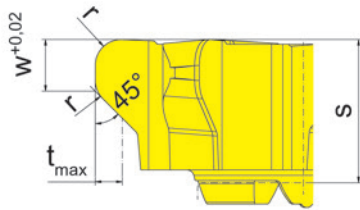
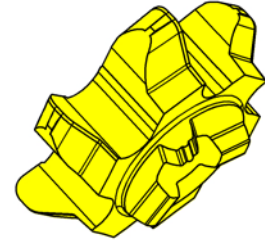
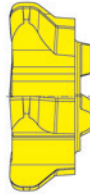
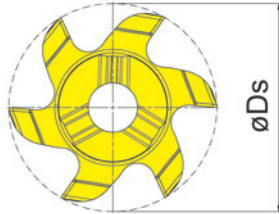


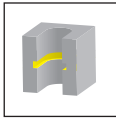
Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG55
613.3035.61	21,7	3,8	7,35	1,6	2,5	6	313113R	▲
								P ●
								M o
								K o
								N -
								S -
								H -

Gewindefreistriche DIN 76  
Thread relief DIN 76

B



z12

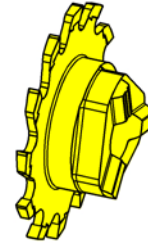
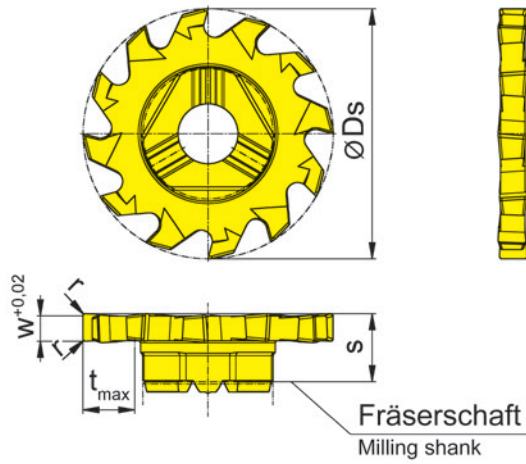


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	EG35	EG55	TI25
713.0025.00	21,7	0,25	5,9	-	2,3	12	313113R	▲		
713.0030.00	21,7	0,3	5,9	-	2,3	12	313113R	▲		
713.0040.00	21,7	0,4	5,9	-	2,3	12	313113R		▲	
713.0050.00	21,7	0,5	5,9	-	2,8	12	313113R		▲	
713.0070.00	21,7	0,7	5,9	-	4,5	12	313113R	▲		
713.0080.00	21,7	0,8	5,9	-	4,5	12	313113R		▲	
713.0090.00	21,7	0,9	5,9	-	4,5	12	313113R	▲		
713.0060.00	21,7	0,6	5,9	-	4,5	12	313113R	▲		
713.0100.00	21,7	1	5,9	-	4,5	12	313113R		▲	▲
713.0150.00	21,7	1,5	5,9	-	4,5	12	313113R		▲	▲
713.0200.00	21,7	2	5,9	0,2	4,5	12	313113R		▲	▲
713.0250.00	21,7	2,5	5,9	0,2	4,5	12	313113R		▲	▲
713.0300.00	21,7	3	5,9	0,2	4,5	12	313113R		▲	▲

ab Schneidbreite 2 mm Kreuzverzahnung  
from width of groove 2 mm toothing with cross-cut

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



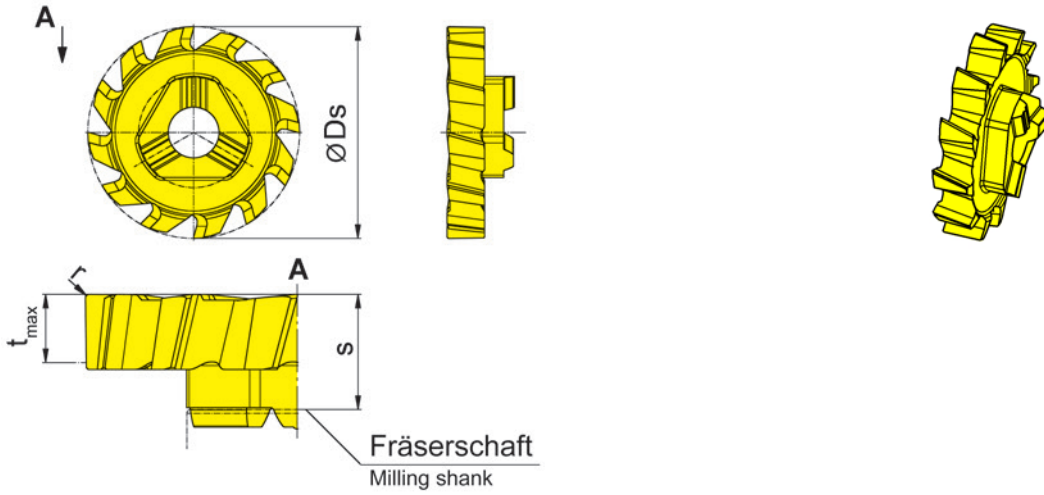


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

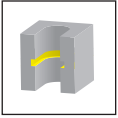
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	Z	r	$t_{max}$	s	HIS
713.PL35.15.02	21,7	12	0,2	3,5	5,9	313113R

Schrägverzahnung  
Helical teeth

	EG55	TI25
▲	▲	▲
P	●	●
M	○	●
K	○	●
N	-	●
S	-	●
H	-	-

B



z9

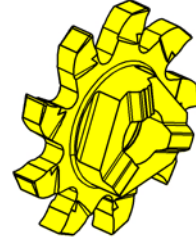
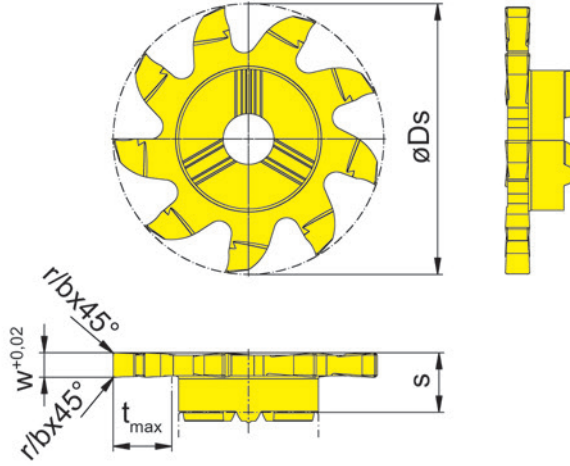


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	b x 45°	r	t <sub>max</sub>	Z	HIS	EG55	IG65
913.0150.00	21,7	1,5	5,7	0,05	-	4,5	9	313113R	▲	Δ
913.0200.00	21,7	2	5,7	-	0,2	4,5	9	313113R	▲	Δ
913.0250.00	21,7	2,5	5,7	-	0,2	4,5	9	313113R	▲	Δ
913.0300.00	21,7	3	5,7	-	0,2	4,5	9	313113R	▲	Δ
									P ● ●	
									M ○ ●	
									K ○ -	
									N - -	
									S - ○	
									H - -	



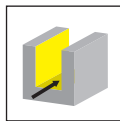
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



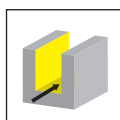
B

Frälerschaft  
Milling shank  
M328/M328.ST/M328.ER



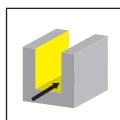
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150-155

Grundaufnahme  
Basic Holder  
WFB



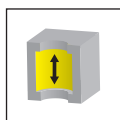
Seite/Page  
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Einschraubfräser  
Screw-in cutter  
M328.M



Seite/Page  
157

Schneidplatte  
Insert  
325/328/628/928



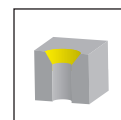
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168-170, 175



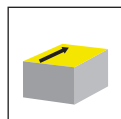
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160, 167



Seite/Page  
164, 173-174



Seite/Page  
165-166, 171



Seite/Page  
172

## M328



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  28 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  28 mm

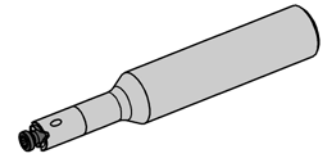
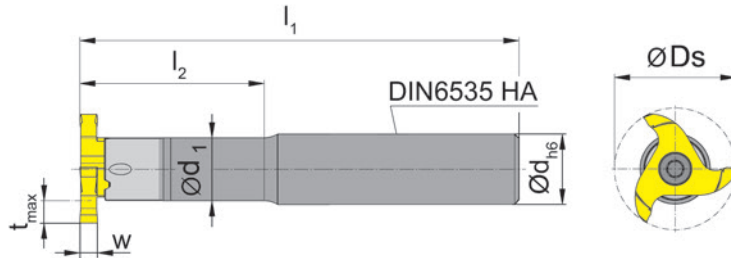
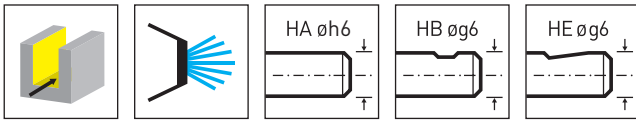
# Fräuserschaft

## Milling shank

# M328



B



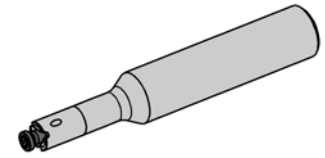
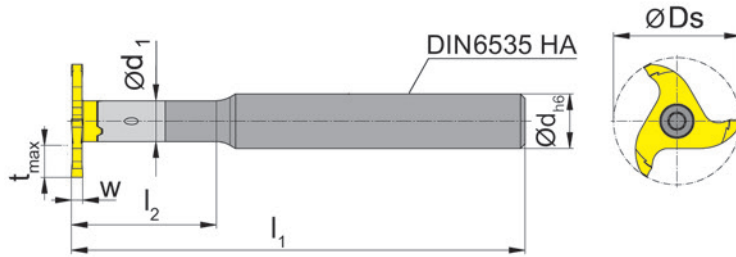
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M328.0016.01A	16	100	42	14,3	HA	328143R
M328.0016.02A	16	130	60	14,3	HA	328143R
M328.0016.03A	16	160	85	14,3	HA	328143R
M328.0020.01A	20	100	42	14,3	HA	328143R
M328.0020.02A	20	130	60	14,3	HA	328143R
M328.0020.03A	20	160	85	14,3	HA	328143R
M328.0016.01B	16	100	42	14,3	HB	328143R
M328.0016.02B	16	130	60	14,3	HB	328143R
M328.0016.03B	16	160	85	14,3	HB	328143R
M328.0020.01B	20	100	42	14,3	HB	328143R
M328.0020.02B	20	130	60	14,3	HB	328143R
M328.0020.03B	20	160	85	14,3	HB	328143R
M328.0016.01E	16	100	42	14,3	HE	328143R
M328.0016.02E	16	130	60	14,3	HE	328143R
M328.0016.03E	16	160	85	14,3	HE	328143R
M328.0020.01E	20	100	42	14,3	HE	328143R
M328.0020.02E	20	130	60	14,3	HE	328143R
M328.0020.03E	20	160	85	14,3	HE	328143R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

### Ersatzteile

Spare Parts

Fräuserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M328...	5.14T20P	T20PQ



Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M328.0909.01A</b>	9	114,3	-	9	HA	328090R
<b>M328.0912.01A</b>	12	100	32	9	HA	328090R
<b>M328.0912.01B</b>	12	100	32	9	HB	328090R

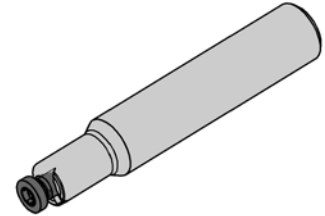
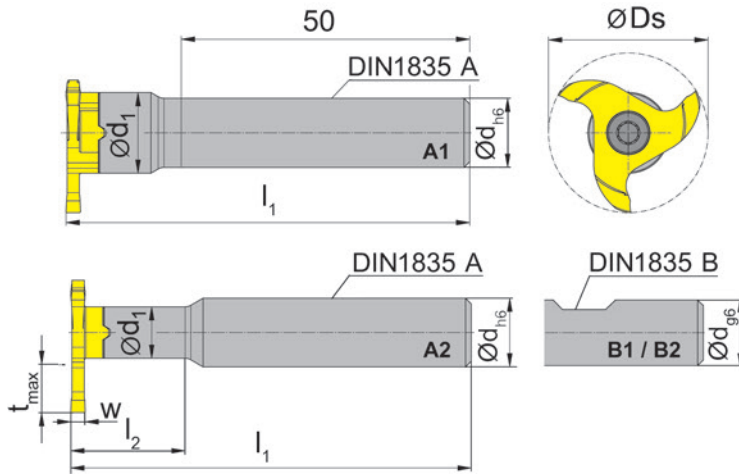
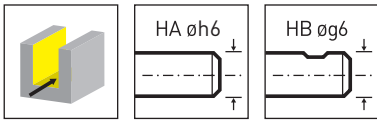
w, D<sub>s</sub>, t<sub>max</sub> siehe Schneidplatte  
w, D<sub>s</sub>, t<sub>max</sub> see inserts

Halter M328.0909.01A = ohne Kühlmittelzufuhr!  
Toolholder M328.0909.01A = no through coolant supply!

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M328...	<b>5.14T20P</b>	<b>T20PQ</b>

**B**



Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M328.ST12.01A</b>	12	70	-	14	A1	328143R
<b>M328.ST13.01A</b>	13	70	-	14	A1	328143R
<b>M328.ST12.2.01A</b>	12	70	20	9	A2	328090R
<b>M328.ST16.01A</b>	16	90	36	14	A2	328143R
<b>M328.ST20.01A</b>	20	100	36	14	A2	328143R
<b>M328.ST12.01B</b>	12	70	-	14	B1	328143R
<b>M328.ST12.2.01B</b>	12	70	20	9	B2	328090R
<b>M328.ST16.01B</b>	16	90	36	14	B2	328143R
<b>M328.ST20.01B</b>	20	100	36	14	B2	328143R

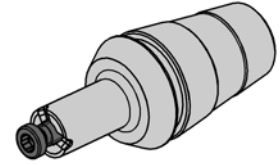
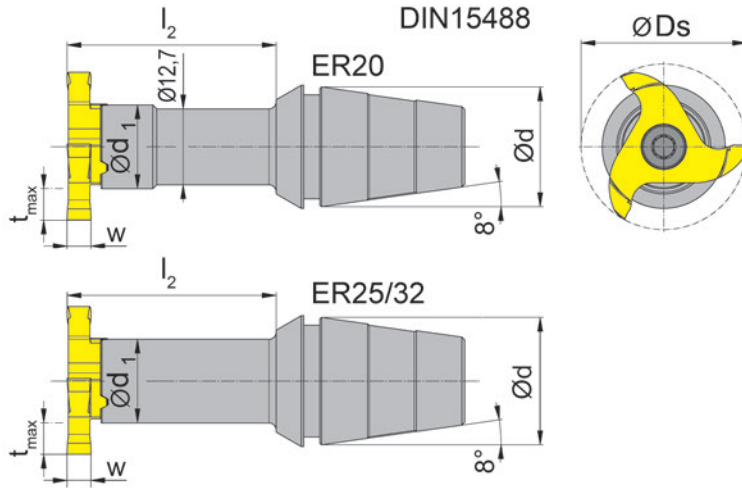
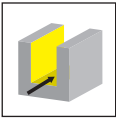
w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**

Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M328...	<b>5.14T20P</b>	<b>T20PQ</b>





Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M328.ER20.02</b>	20	35	14	ER20.6499/ERM20.6499	328143R
<b>M328.ER25.02</b>	25	35	14	ER25.6499	328143R
<b>M328.ER32.02</b>	32	35	14	ER32.6499	328143R

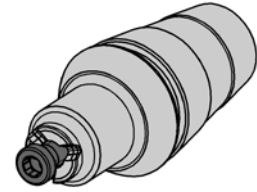
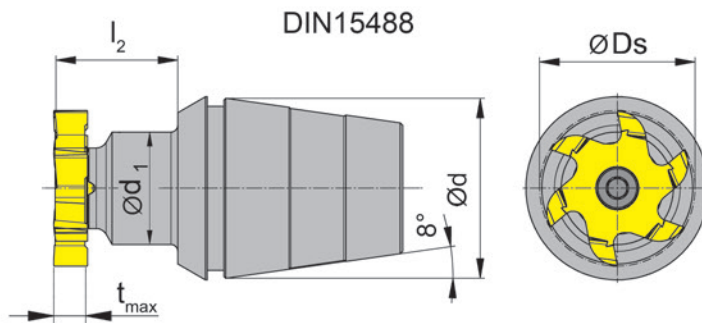
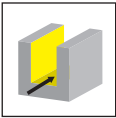
w, D<sub>s</sub>, t<sub>max</sub> siehe Schneidplatte  
w, D<sub>s</sub>, t<sub>max</sub> see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M328...	<b>5.14T20P</b>	<b>T20PQ</b>

**B**



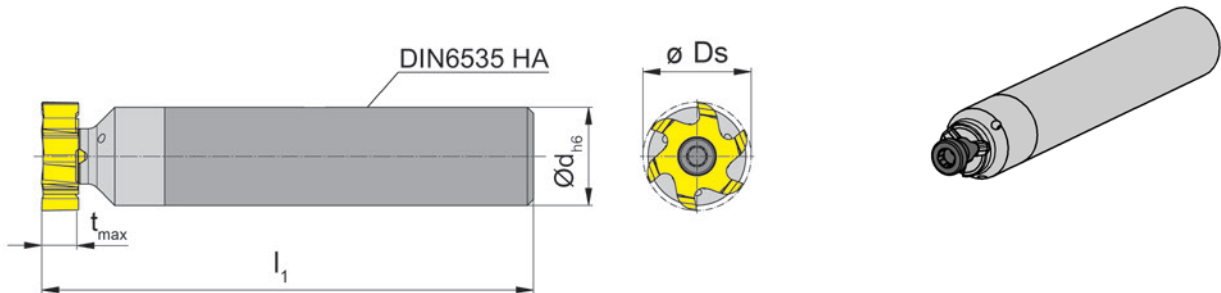
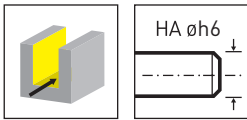
Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M328.ER25.16.01</b>	25	21,7	15	ER25.6499	328143R
<b>M328.ER32.16.01</b>	32	21,7	20	ER32.6499	328143R

tmax und Ds siehe Schneidplatte  
tmax and Ds see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M328...	<b>5.14T20P</b>	<b>T20PQ</b>



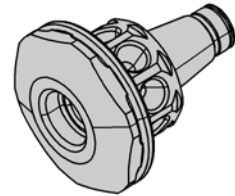
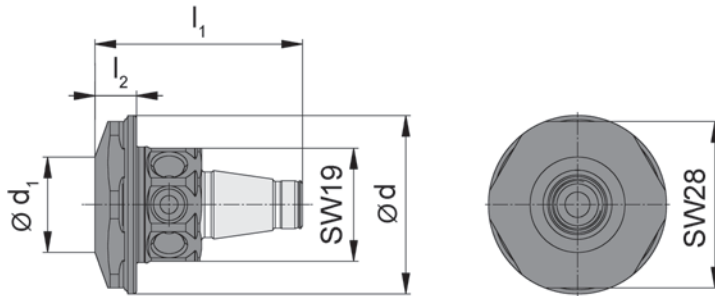
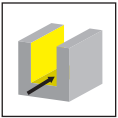
Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M328.0016.D.00A</b>	16	80	HA	328143R
<b>M328.0020.D.00A</b>	20	80	HA	328143R

t<sub>max</sub> und D<sub>s</sub> siehe Schneidplatte  
t<sub>max</sub> and D<sub>s</sub> see inserts

**Ersatzteile**  
Spare Parts

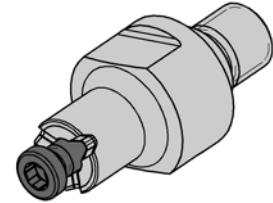
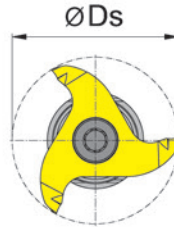
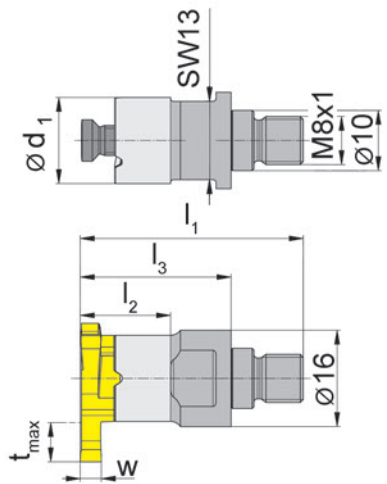
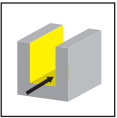
Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M328...	<b>5.14T20P</b>	<b>T20PQ</b>

**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	d
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter



Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS
<b>M328.M081.01</b>	37	15	25	14,3	13	328143R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Einschraubfräser</b> Screw-in cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M328.M081.01	<b>5.14T20P</b>	<b>T20PQ</b>

B

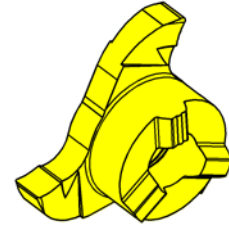
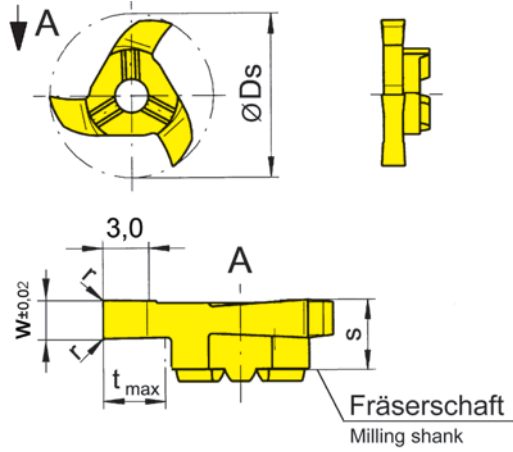
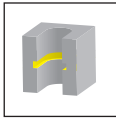


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$w$	$s$	$r$	$t_{max}$	Z	HIS	AS45	TN35
325.0350.52	24,8	3,5	5,7	0,2	5	3	328143R	▲	▲
								P ● ●	● ●
								M ● ●	● ●
								K ● ●	● ●
								N ○ ●	● ●
								S ● ●	● ●
								H - -	- -



**z3**

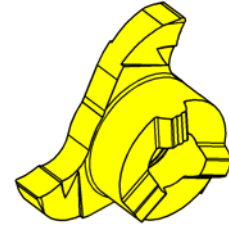
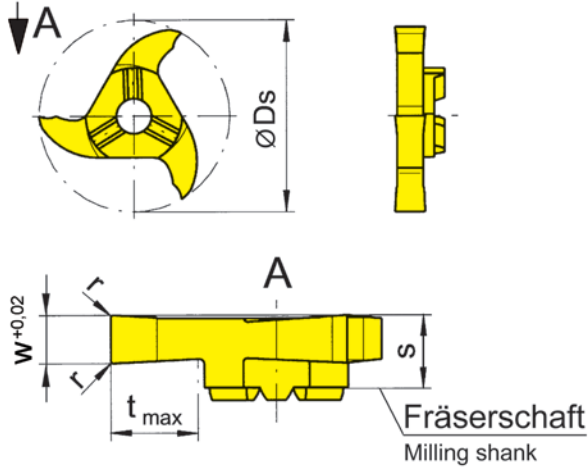


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TN35
328.0200.00	27,7	2	5,7	0,2	6,5	3	328143R	▲	▲
328.0250.00	27,7	2,5	5,7	0,2	6,5	3	328143R	▲	▲
328.0300.00	27,7	3	5,7	0,2	6,5	3	328143R	▲	▲
328.0350.00	27,7	3,5	5,7	0,2	6,5	3	328143R	▲	▲
328.0400.00	27,7	4	5,7	0,2	6,5	3	328143R	▲	▲
328.0500.00	27,7	5	5,7	0,2	6,5	3	328143R	▲	▲
328.0600.00	27,7	6	7	0,2	6,5	3	328143R	▲	▲
328.1000.00	27,7	10	10	0,2	6,5	3	328143R	▲	▲

Schneidplatte **328.1000.00** mit Schnittaufteilung (Z=1) und Schneidplatte **328.0600.00** mit Spanteilern (Z=3)!  
Insert 328.1000.00 with staggered tooth (Z=1) and insert 328.0600.00 with chip divider (Z=3)!

Für Schneidplatte s = 5,7 mm Schraube 5.14T20P verwenden  
Für Schneidplatte s = 7 mm Schraube 5.17T20P verwenden  
Für Schneidplatte s = 10 mm Schraube 5.13T20P verwenden  
For Insert s = 5,7 mm use screw 5.14T20P  
For Insert s = 7 mm use screw 5.17T20P  
For Insert s = 10 mm use screw 5.13T20P

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

B

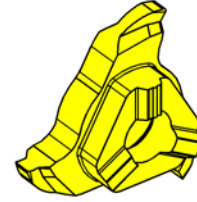
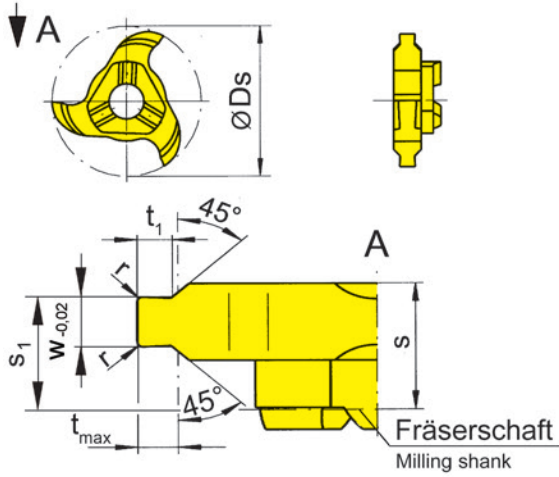


Abbildung = linksschneidend  
Picture = left hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	Z	HIS	AS45
328.1307.30	27,7	1,3	1,41	0,65	5,95	4,9	-	0,7	3	328143R	▲
328.1812.35	27,7	1,85	1,96	1,21	5,95	5,1	0,2	1,25	3	328143R	▲

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●
M	●
K	●
N	o
S	●
H	-



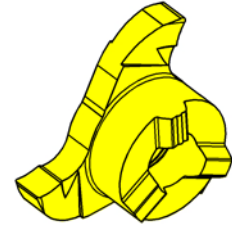
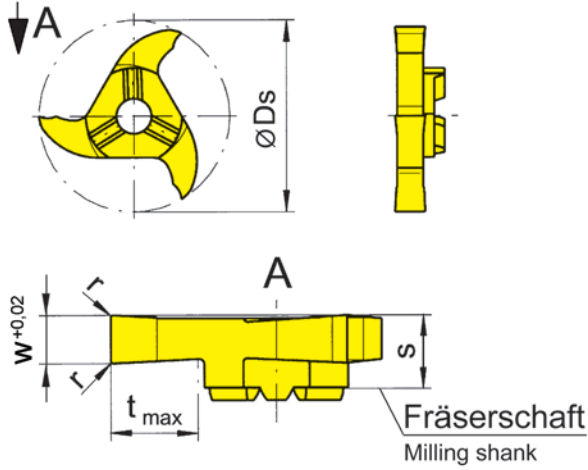


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$w$	$s$	$r$	$t_{max}$	Z	HIS	T125
328.0250.40	27,7	2,5	5,7	0,2	6,5	3	328143R	▲
328.0300.40	27,7	3	5,7	0,2	6,5	3	328143R	▲
328.0350.40	27,7	3,5	5,7	0,2	6,5	3	328143R	▲
328.0400.40	27,7	4	5,7	0,2	6,5	3	328143R	▲

Bei Reduzierung der Frästiefe  $t_{max}$  ist eine Schneidbreite  $w$  bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove  $t_{max}$  down to 0,5 mm can be delivered with reduced depth upon request.

P	-
M	-
K	-
N	●
S	-
H	-

B



z3

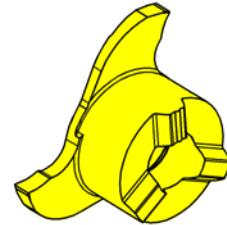
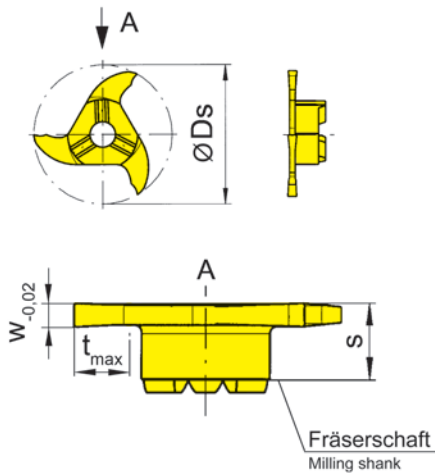
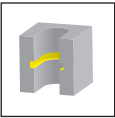


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS		TI25	TN35
328.0082.1.00	27,7	0,82	5,7	5	3	328143R	▲	▲	
							P	●	●
							M	●	●
							K	●	●
							N	●	●
							S	●	●
							H	-	-



z3

B

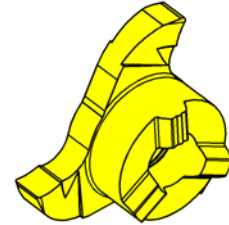
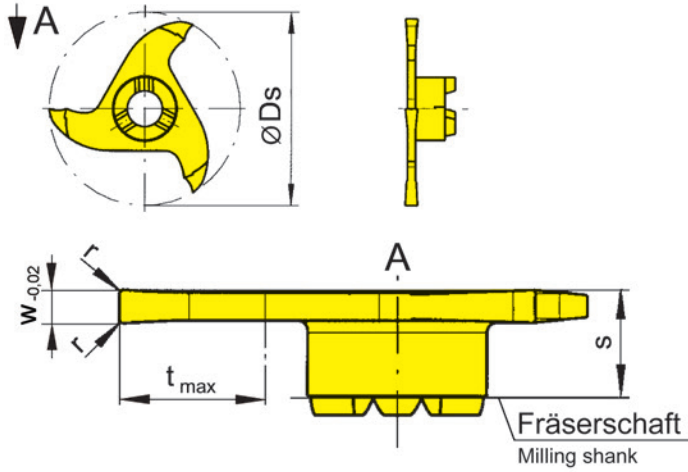


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TI25	TN35
328.0110.2.00	28	1,1	5,7	0,2	9,3	3	328090R		▲	▲
328.0120.2.00	28	1,2	5,7	0,2	9,3	3	328090R		▲	▲
328.0132.2.00	28	1,32	5,7	0,15	9,3	3	328090R		▲	▲
328.0150.2.00	28	1,5	5,7	0,2	9,3	3	328090R	▲	▲	▲
328.0160.2.00	28	1,6	5,7	0,2	9,3	3	328090R	▲	▲	▲
328.0200.2.00	28	2	5,7	0,2	9,3	3	328090R	▲	▲	▲
328.0250.2.00	28	2,5	5,7	0,2	9,3	3	328090R	▲	▲	▲
P	●	●	●							
M	●	●	●							
K	●	●	●							
N	○	●	●							
S	●	●	●							
H	-	-	-							

B

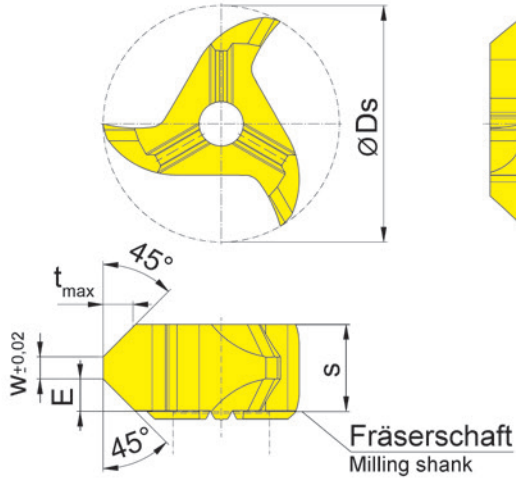


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	t <sub>max</sub>	Z	HIS	TA45
328.4545.35.00	27,7	3,8	10,2	2,6	3,5	3	328143R	▲

Für die Schneidplatte **328.4545.35.00** bitte nur die längere Schraube 5.13T20P verwenden.  
For insert 328.4545.35.00 please use only the longer screw 5.13T20P.

P	●
M	●
K	●
N	●
S	●
H	-

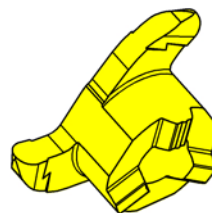
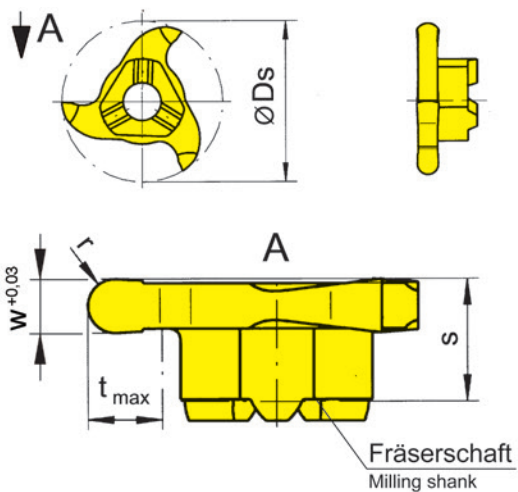
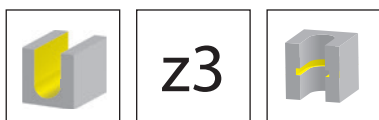


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
328.0010.20	27,7	2	5,7	1	6,5	3	328143R	▲
328.0014.28	27,7	2,8	5,7	1,4	6,5	3	328143R	▲
328.0015.30	27,7	3	5,7	1,5	6,5	3	328143R	▲
328.0020.40	27,7	4	5,7	2	6,5	3	328143R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -

**B**



**z6**

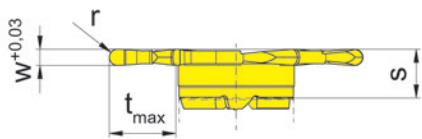
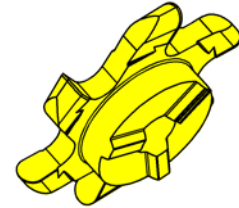
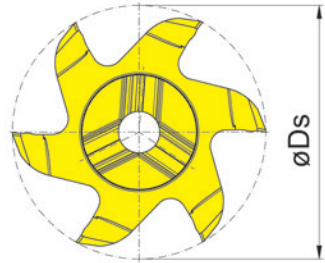
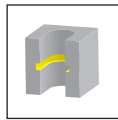


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
628.0010.20	27,7	2	6,1	1	6,5	6	328143R	▲
628.0015.30	27,7	3	6,1	1,5	6,5	6	328143R	▲
628.0020.40	27,7	4	6,1	2	6,5	6	328143R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -

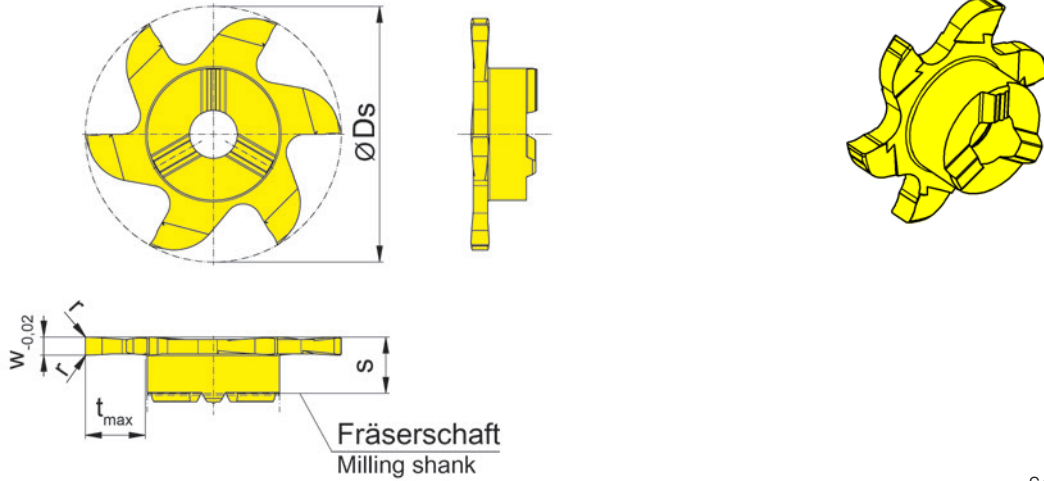
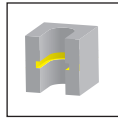
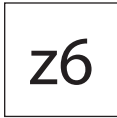


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	AS45	RC25	TI25	
628.0080.00	27,7	0,8	0,8	6,1	-	6,5	6	328143R		▲		
628.0130.00	27,7	1,3	1,41	6,1	-	6,5	6	328143R	▲		▲	
628.0160.00	27,7	1,6	1,71	6,1	-	6,5	6	328143R	▲		▲	
628.0185.00	27,7	1,85	1,96	6,1	0,2	6,5	6	328143R	▲		▲	
628.0215.00	27,7	2,15	2,26	6,1	0,2	6,5	6	328143R	▲		▲	
628.0265.00	27,7	2,65	2,76	6,1	0,2	6,5	6	328143R	▲		▲	
Abmessungen für Seegerringnuten DIN 471/472 Widths for circlip grooves DIN 471/472									P	●	●	●
									M	●	●	●
									K	●	●	●
									N	○	-	●
									S	●	-	●
									H	-	-	-

B

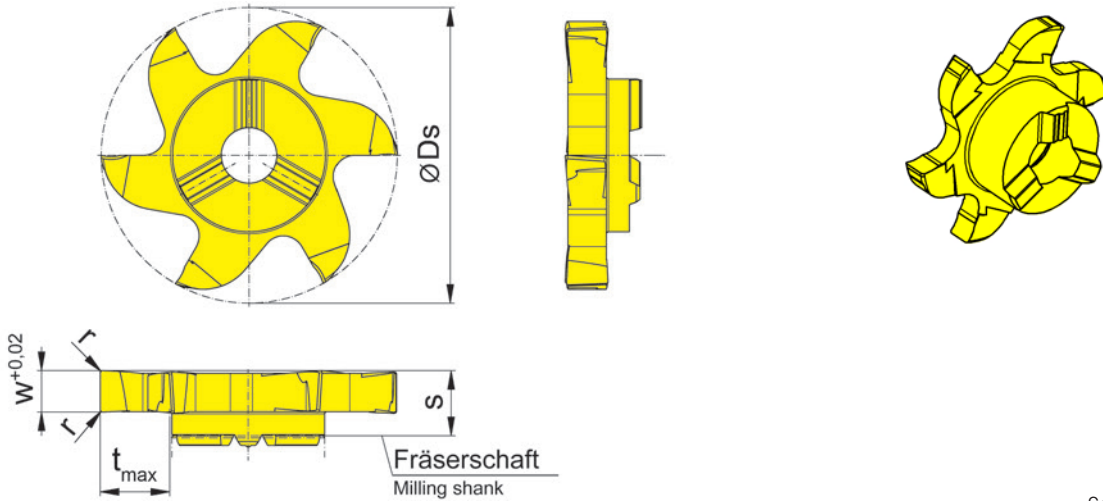
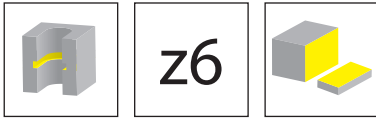


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG55	TH35	TI25
628.0100.00	27,7	1	6,1	-	6,5	6	328143R		▲		
628.0150.00	27,7	1,5	6,1	-	6,5	6	328143R	▲			
628.0200.00	27,7	2	6,1	0,2	6,5	6	328143R	▲			
628.0250.00	27,7	2,5	6,1	0,2	6,5	6	328143R	▲			▲
628.0300.00	27,7	3	6,1	0,2	6,5	6	328143R	▲			▲
628.0350.00	27,7	3,5	6,1	0,2	6,5	6	328143R	▲			▲
628.0400.00	27,7	4	6,1	0,2	6,5	6	328143R	▲		▲	▲

Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

**Schneidplatte 628.0400.00**

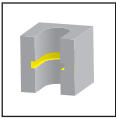
nur in Verbindung mit Fräuserschaftabmessung l<sub>2</sub>= max. 42 mm

**Insert 628.0400.00**

only with toolholder dimension l<sub>2</sub> = max. 42 mm

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





z6

B

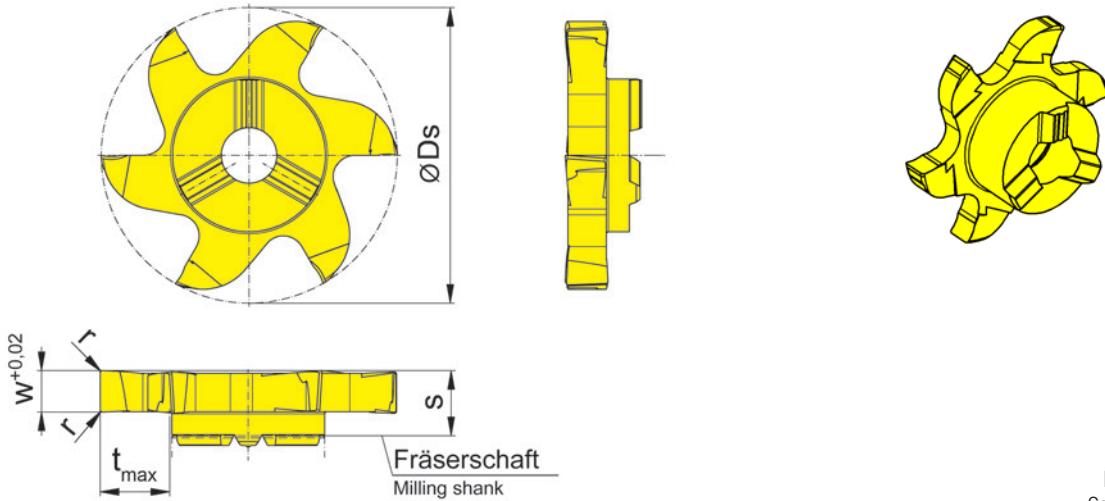


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
628.0300.04	27,7	3	6,1	0,4	6,5	6	328143R	▲
628.0300.08	27,7	3	6,1	0,8	6,5	6	328143R	▲
628.0400.04	27,7	4	6,1	0,4	6,5	6	328143R	▲
628.0400.08	27,7	4	6,1	0,8	6,5	6	328143R	▲
								P ●
								M ●
								K ●
								N o
								S ●
								H -

**B**

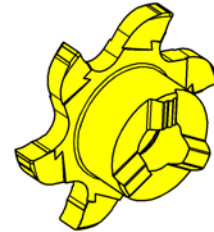
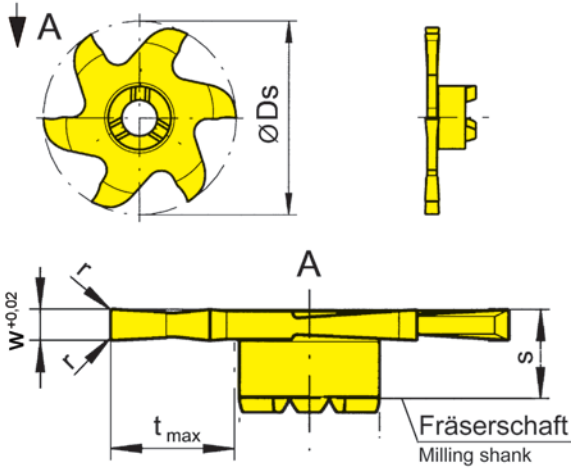


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

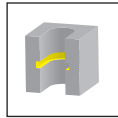
HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
								AS45	EG35	TI25	
628.0050.2.00	28	0,5	6,1	-	9,3	6	328090R		▲		
628.0100.2.00	28	1	6,1	-	9,3	6	328090R			▲	
628.0120.2.00	28	1,2	6,1	0,2	9,3	6	328090R			▲	
628.0150.2.00	28	1,5	6,1	0,2	9,3	6	328090R	▲		▲	
628.0160.2.00	28	1,6	6,1	0,2	9,3	6	328090R	▲		▲	
628.0200.2.00	28	2	6,1	0,2	9,3	6	328090R	▲		▲	
628.0240.2.00	28	2,4	6,1	0,2	9,3	6	328090R	▲		▲	
628.0250.2.00	28	2,5	6,1	0,2	9,3	6	328090R	▲		▲	
								P	●	●	●
								M	●	●	●
								K	●	○	●
								N	○	-	●
								S	●	-	●
								H	-	-	-



z6



B

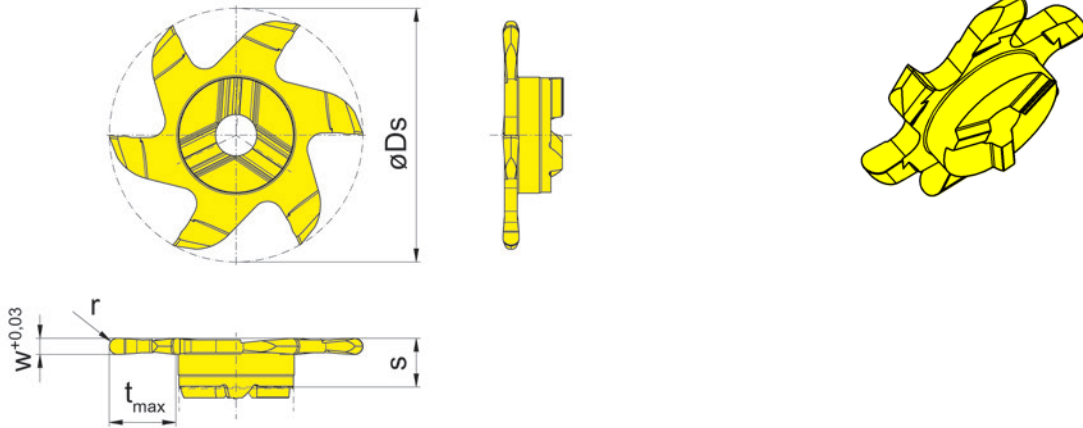


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
628.0080.2.16	28	1,6	6,1	0,8	9,3	6	328090R	▲
628.0100.2.20	28	2	6,1	1	9,3	6	328090R	▲
628.0125.2.25	28	2,5	6,1	1,25	9,3	6	328090R	▲
628.0150.2.30	28	3	6,1	1,5	9,3	6	328090R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -

B

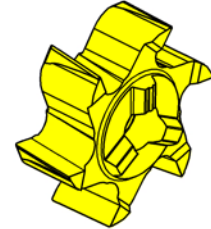
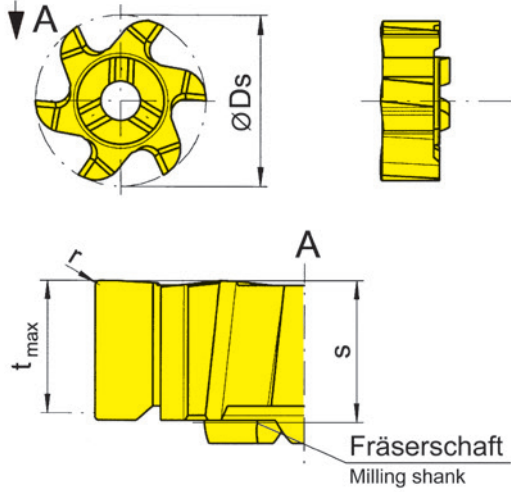


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS45	TF45	TI25
628.PL61.62	27,7	6	0,2	5,7	6,1	328143R	▲	▲	▲
Schrägverzahnung Helical teeth							P ●	●	●
							M ●	●	●
							K ●	●	●
							N ○	●	●
							S ●	●	●
							H -	-	-

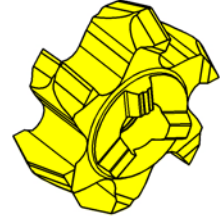
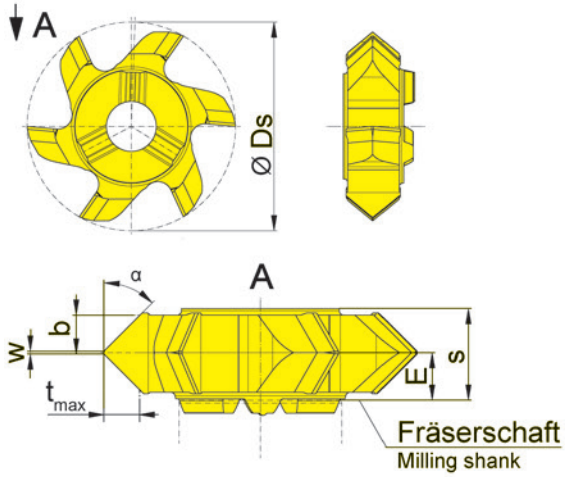
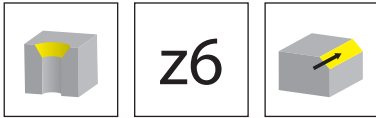


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	$\alpha$	b	$t_{max}$	Z	HIS	AS45	TA45
628.1515.20	27,7	3,2	6,3	0,2	15°	2,8	0,75	6	328143R	▲	
628.2020.20	27,7	3,2	6,3	0,2	20°	2,8	1	6	328143R	▲	
628.3030.20	27,7	3,2	6,3	0,2	30°	2,8	1,6	6	328143R	▲	▲
628.4545.20	27,7	3,2	6,3	0,2	45°	2,8	2,8	6	328143R	▲	▲
										P	●
										M	●
										K	●
										N	○
										S	●
										H	-

**B**

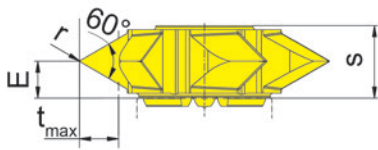
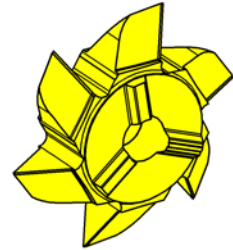
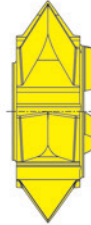
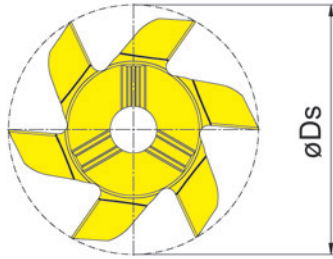
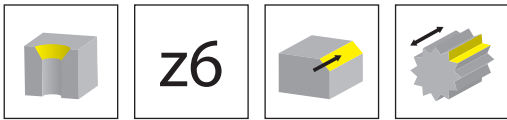
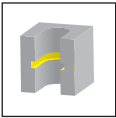


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	r	t <sub>max</sub>	Z	HIS	EG55
628.6060.05	27,7	4,1	8,05	0,05	5	6	328143R	▲
								P ●
								M ○
								K ○
								N -
								S -
								H -



z9

B

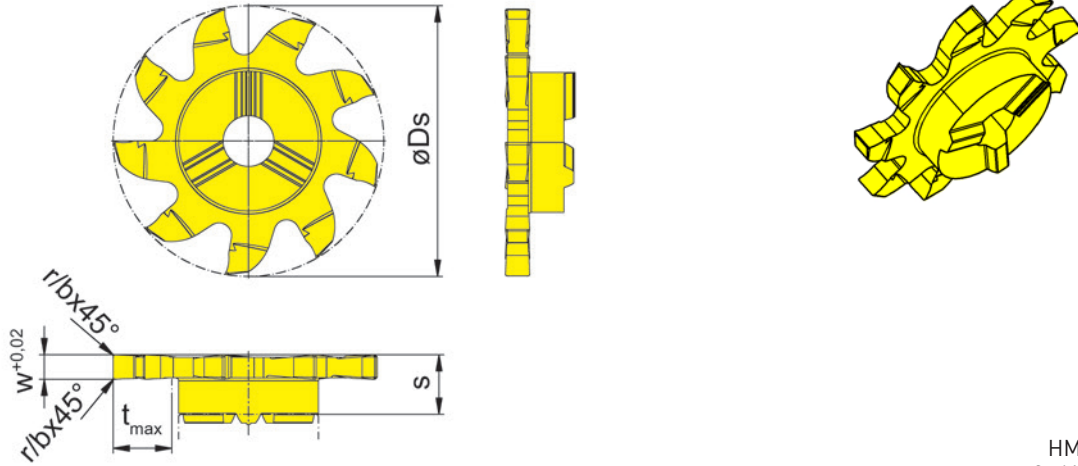


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	b x 45°	r	t <sub>max</sub>	Z	HIS	EG55	IG65
928.0150.00	27,7	1,5	6,1	0,05	-	6,5	9	328143R	▲	Δ
928.0200.00	27,7	2	6,1	-	0,2	6,5	9	328143R	▲	Δ
928.0250.00	27,7	2,5	6,1	-	0,2	6,5	9	328143R	▲	Δ
928.0300.00	27,7	3	6,1	-	0,2	6,5	9	328143R	▲	Δ
									P ● ●	
									M ○ ●	
									K ○ -	
									N - -	
									S - ○	
									H - -	

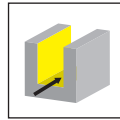
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



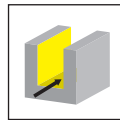
B

Frälerschaft  
Milling shank  
M332/M332.ST/M332.ER



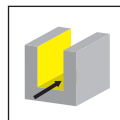
Seite/Page  
178-181

Grundaufnahme  
Basic Holder  
WFB



Seite/Page  
182

Einschraubfräser  
Screw-in cutter  
M332.M

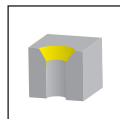


Seite/Page  
183

Schneidplatte  
Insert  
332/632/636/932  
939



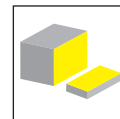
Seite/Page  
184-185, 189-  
190, 193-197



Seite/Page  
186



Seite/Page  
187-188, 199



Seite/Page  
191-192, 198



## M332



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\emptyset$  32 mm

**Milling shank with  
exchangeable insert**

from bore  $\emptyset$  32 mm

B

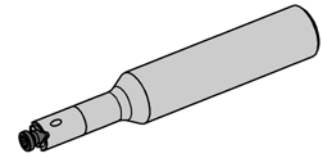
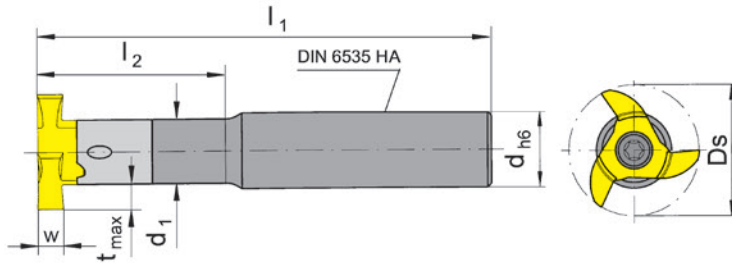
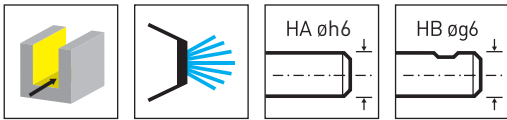


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M332.0016.01A	16	100	42	14,3	HA	332143R
M332.0016.02A	16	130	60	14,3	HA	332143R
M332.0016.03A	16	160	85	14,3	HA	332143R
M332.0020.01A	20	100	42	14,3	HA	332143R
M332.0020.02A	20	130	60	14,3	HA	332143R
M332.0020.03A	20	160	85	14,3	HA	332143R
M332.0016.01B	16	100	42	14,3	HB	332143R
M332.0016.02B	16	130	60	14,3	HB	332143R
M332.0016.03B	16	160	85	14,3	HB	332143R
M332.0020.01B	20	100	42	14,3	HB	332143R
M332.0020.02B	20	130	60	14,3	HB	332143R
M332.0020.03B	20	160	85	14,3	HB	332143R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

## Ersatzteile

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M332...	5.17T20P	T20PQ

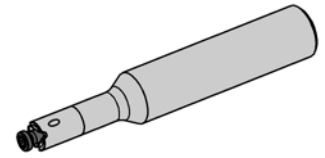
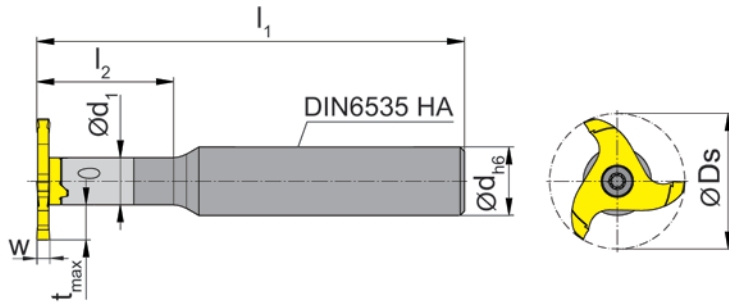
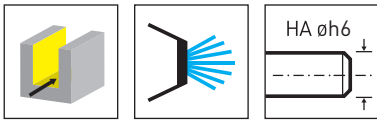


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M332.0012.2.01A</b>	12	100	32	11	HA	332110R
<b>M332.0012.3.00A</b>	12	100	-	12	HA	332120R
<b>M332.0016.2.02A</b>	16	130	68	11	HA	332110R
<b>M332.0016.2.01A</b>	16	100	32	11	HA	332110R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Frälerschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M332...	<b>5.17T20P</b>	<b>T20PQ</b>

B

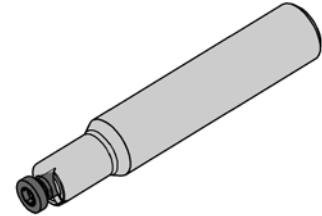
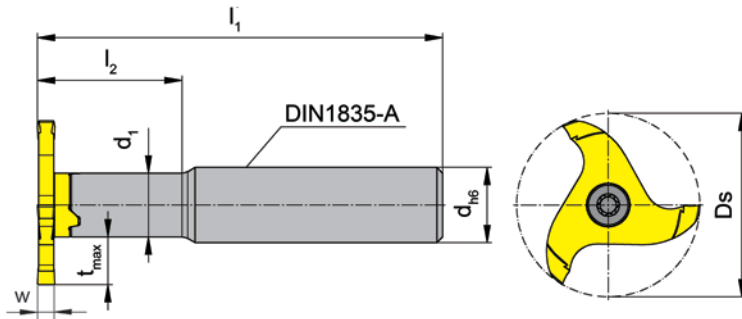
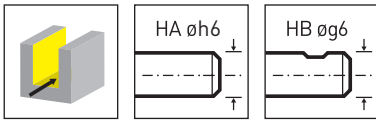


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M332.ST10.2.01A	10	70	25	11	HA	332110R
M332.ST12.2.01A	12	70	25	11	HA	332110R
M332.ST13.2.01A	13	70	25	11	HA	332110R
M332.ST16.01A	16	90	36	14,3	HA	332143R
M332.ST20.01A	20	100	36	14,3	HA	332143R
M332.ST12.2.01B	12	70	25	11	HB	332110R
M332.ST16.01B	16	90	36	14,3	HB	332143R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

Frälerschäfte **M332.ST12.2.01A**, **M332.ST12.2.01B** und **M332.ST13.2.01A** sind für Schneidplatten mit erhöhter Frästiefe!  
Milling shanks M332.ST12.2.01A, M332.ST12.2.01B and M332.ST13.2.01A are usable for inserts with increased milling depth!

## Ersatzteile

Spare Parts

Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M332...	5.17T20P	T20PQ

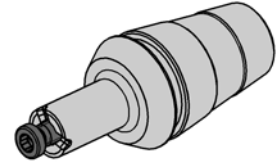
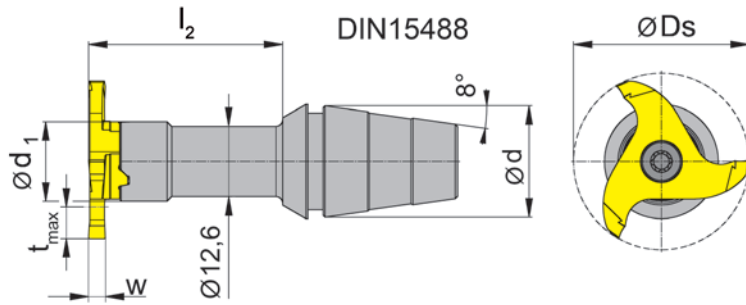
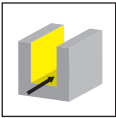


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M332.ER20.02</b>	20	35	14,3	ER20.6499/ERM20.6499	332143R

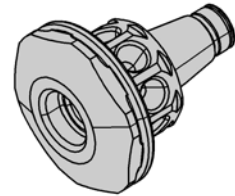
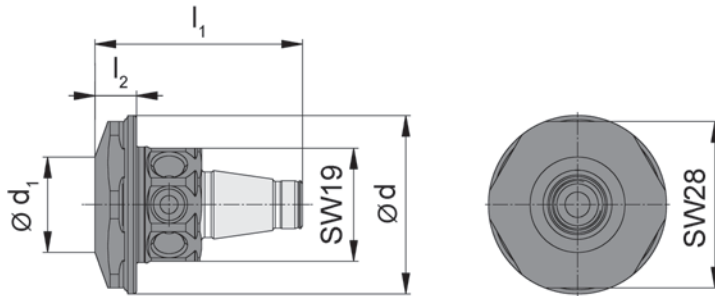
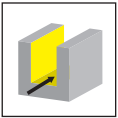
w, D<sub>s</sub>, t<sub>max</sub> siehe Schneidplatte  
w, D<sub>s</sub>, t<sub>max</sub> see inserts

Spannmutter ist nicht im Lieferumfang enthalten - bitte separat bestellen!  
Clamping nut is not combined with milling shank - separate order required!

**Ersatzteile**  
Spare Parts

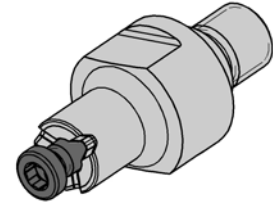
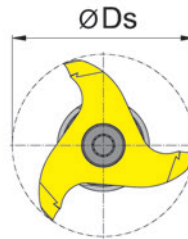
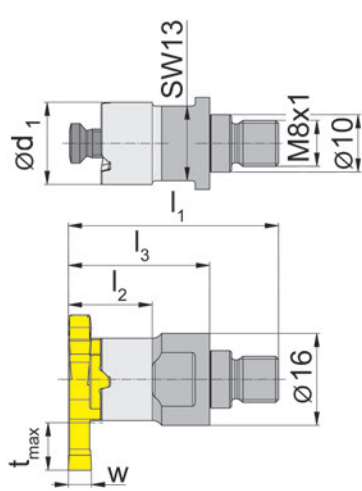
Frärschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M332.ER20.02	<b>5.17T20P</b>	<b>T20PQ</b>

**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	$d$
<b>WFB.2012.M081.01</b>	35	7	16	30

für Einschraubfräser  
for Screw-in cutter



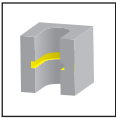
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
<b>M332.M081.01</b>	37	15	25	14,3	13	332143R	08001

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M332.M081.01	<b>5.17T20P</b>	<b>T20PQ</b>

B



z3

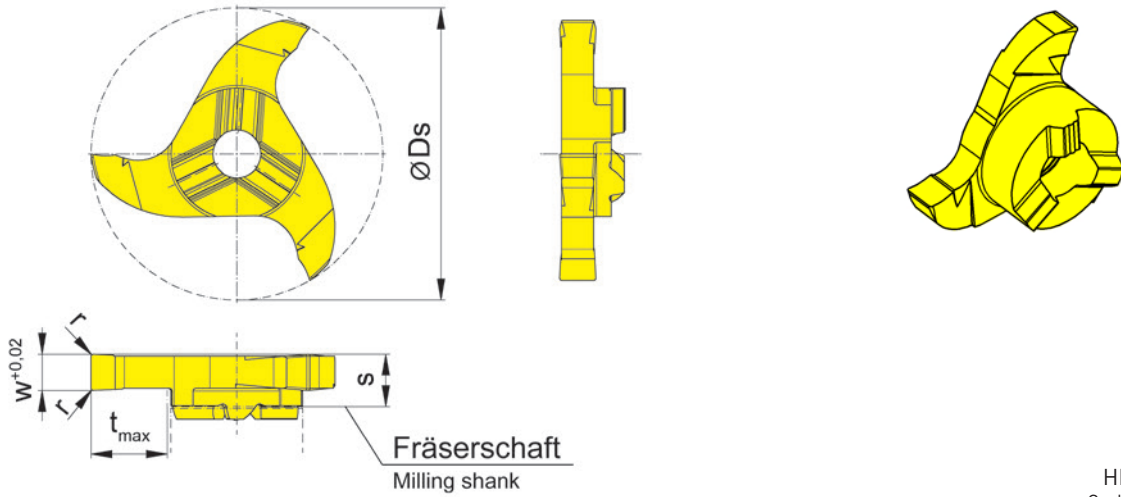


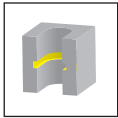
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TI25
332.0200.00	31,7	2	5,7	0,2	8,3	3	332143R	Δ	▲
332.0250.00	31,7	2,5	5,7	0,2	8,3	3	332143R	Δ	▲
332.0300.00	31,7	3	5,7	0,2	8,3	3	332143R	▲	▲
332.0350.00	31,7	3,5	5,7	0,2	8,3	3	332143R	▲	▲
332.0400.00	31,7	4	5,7	0,2	8,3	3	332143R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -





z3

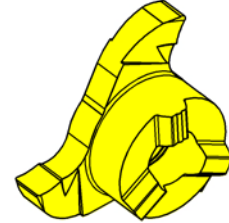
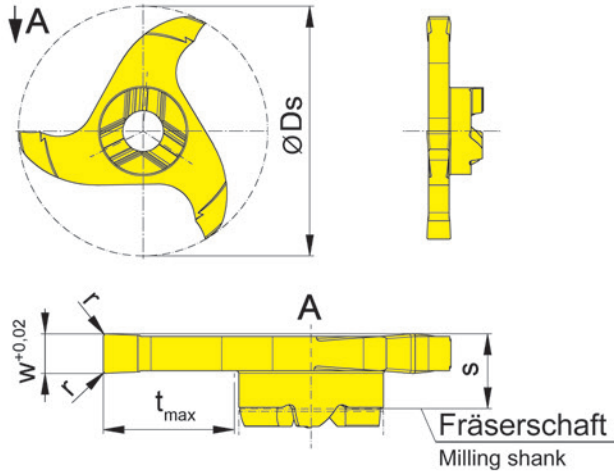


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	w	s	r	$t_{max}$	Z	HIS	AS45	TI25
332.0150.2.00	31,7	1,5	5,7	0,2	10	3	332110R	Δ	▲
332.0160.2.00	31,7	1,6	5,7	0,2	10	3	332110R	Δ	▲
332.0200.2.00	31,7	2	5,7	0,2	10	3	332110R	▲	▲
332.0250.2.00	31,7	2,5	5,7	0,2	10	3	332110R	▲	▲
332.0300.2.00	31,7	3	5,7	0,2	10	3	332110R	▲	▲
								P	●
								M	●
								K	●
								N	○
								S	●
								H	-

B

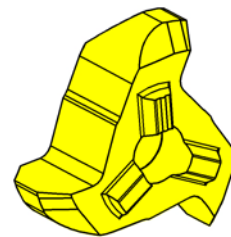
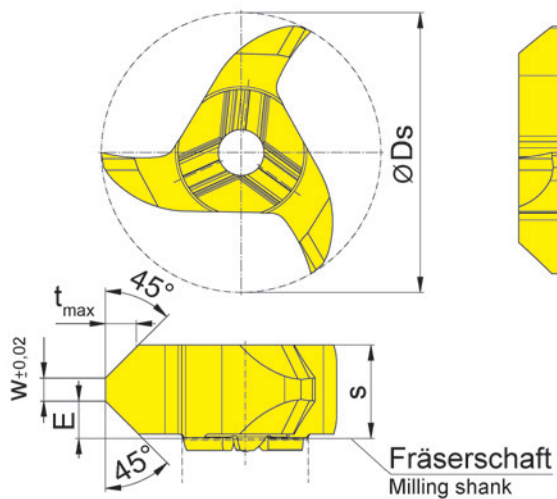
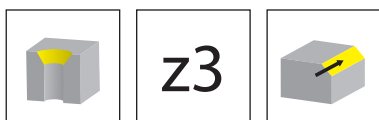


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	t <sub>max</sub>	Z	HIS	TA45
332.4545.35.00	31,7	4,25	10,6	2,6	3,5	3	332143R	▲

Für Schneidplatte s = 10,6 mm Schraube 5.13T20P verwenden  
For Insert s = 10,6 mm use screw 5.13T20P

P	●
M	●
K	●
N	●
S	●
H	-

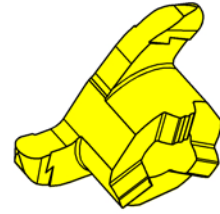
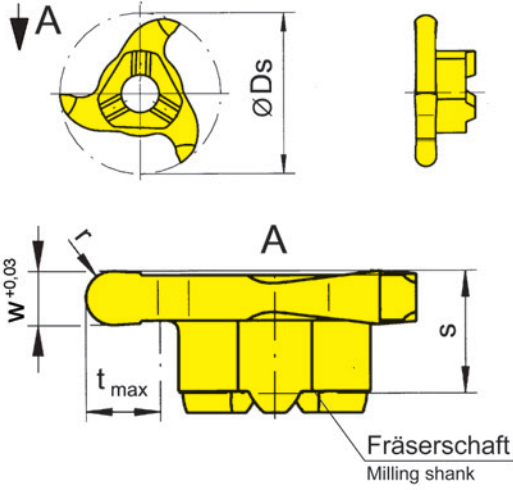


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
332.0010.20	31,7	2	5,7	1	8,3	3	332143R	▲
332.0015.30	31,7	3	5,7	1,5	8,3	3	332143R	▲
332.0020.40	31,7	4	5,7	2	8,3	3	332143R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -

**B**



**z6**

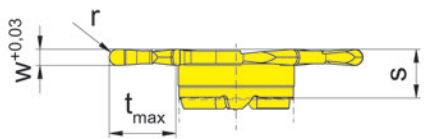
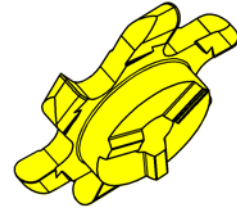
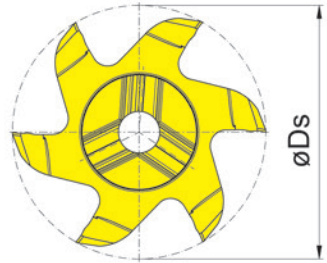
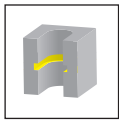
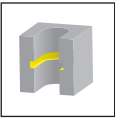


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
632.0010.20	31,7	2	6,1	1	8,3	6	332143R	▲
632.0015.30	31,7	3	6,1	1,5	8,3	6	332143R	▲
632.0020.40	31,7	4	6,1	2	8,3	6	332143R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -



z6

B

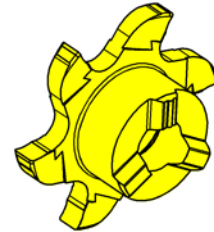
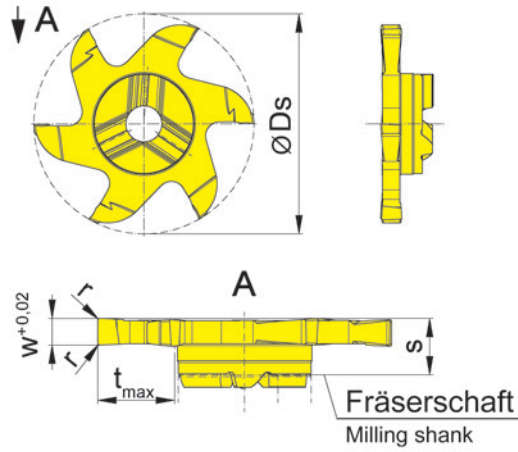


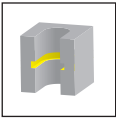
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	w	s	r	$t_{max}$	Z	HIS	AS45	TA45
632.0200.00	31,7	2	6,1	0,2	8,3	6	332143R	▲	▲
632.0250.00	31,7	2,5	6,1	0,2	8,3	6	332143R	▲	▲
632.0300.00	31,7	3	6,1	0,2	8,3	6	332143R	▲	▲
632.0400.00	31,7	4	6,1	0,2	8,3	6	332143R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -

B



z6

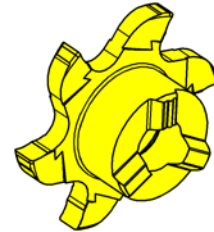
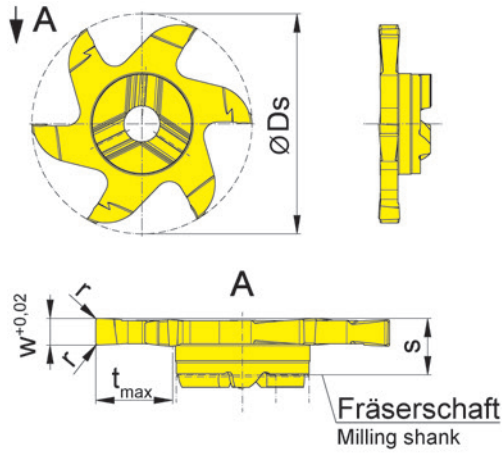
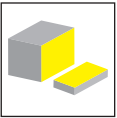


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TA45
632.0100.2.00	31,7	1	6,1	-	10	6	332110R	▲	
632.0120.2.00	31,7	1,2	6,1	0,1	10	6	332110R	▲	
632.0150.2.00	31,7	1,5	6,1	0,2	10	6	332110R	▲	▲
632.0160.2.00	31,7	1,6	6,1	0,2	10	6	332110R	▲	▲
632.0200.2.00	31,7	2	6,1	0,2	10	6	332110R	▲	▲
632.0250.2.00	31,7	2,5	6,1	0,2	10	6	332110R	▲	▲
632.0300.2.00	31,7	3	6,1	0,2	10	6	332110R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -



z6

B

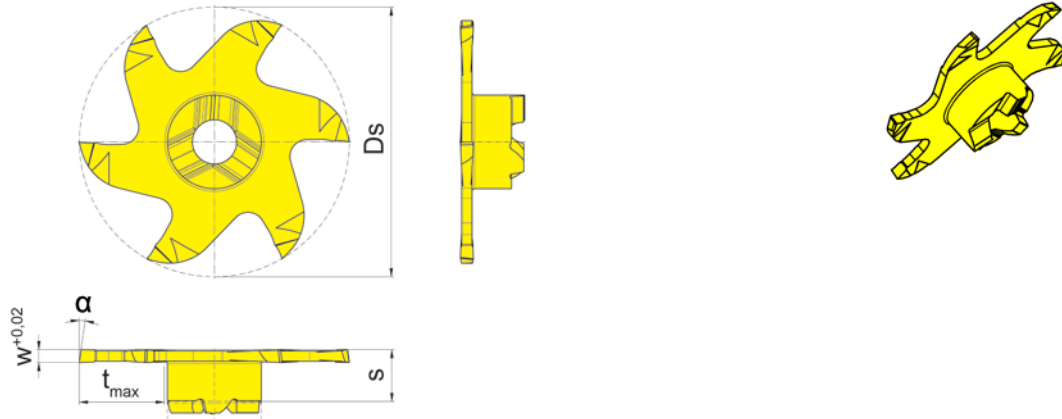


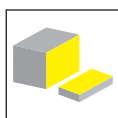
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	α	t <sub>max</sub>	Z	HIS	RC25
632.L810.2.00	31,7	1	6,1	8°	10	6	332110R	▲
632.L815.2.00	31,7	1,5	6,1	8°	10	6	332110R	▲
632.L820.2.00	31,7	2	6,1	8°	10	6	332110R	▲
								P ●
								M ●
								K ●
								N -
								S -
								H -

B



z6

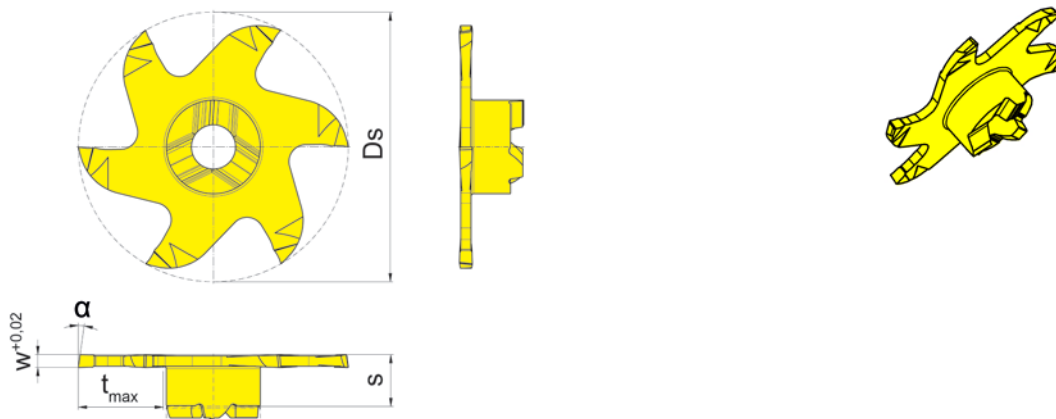


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	α	t <sub>max</sub>	Z	HIS	RC25
636.L810.2.00	35,7	1	6,1	8°	12	6	332110R	▲
636.L815.2.00	35,7	1,5	6,1	8°	12	6	332110R	▲
636.L820.2.00	35,7	2	6,1	8°	12	6	332110R	▲

ab Schneidbreite 2,5 mm Kreuzverzahnung  
from width of groove 2,5 mm toothing with cross-cut

P	●
M	●
K	●
N	-
S	-
H	-





z6

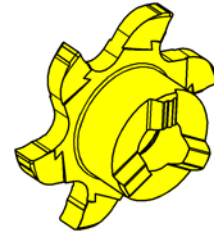
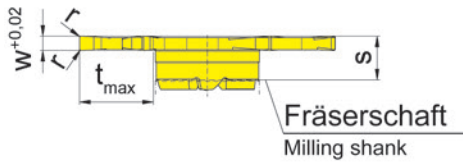


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

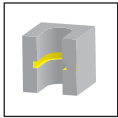
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TA45
636.0150.00	35,7	1,5	6,1	0,1	10,2	6	332143R	▲	▲
636.0200.00	35,7	2	6,1	0,2	10,2	6	332143R	▲	▲
636.0250.00	35,7	2,5	6,1	0,2	10,2	6	332143R	▲	▲
636.0300.00	35,7	3	6,1	0,2	10,2	6	332143R	▲	▲

Bitte Verzahnungs- $\varnothing$  d1 von Frärschaft beachten!  
Please consider pocket seat  $\varnothing$  d1 of the milling shank!

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

**B**



**z6**

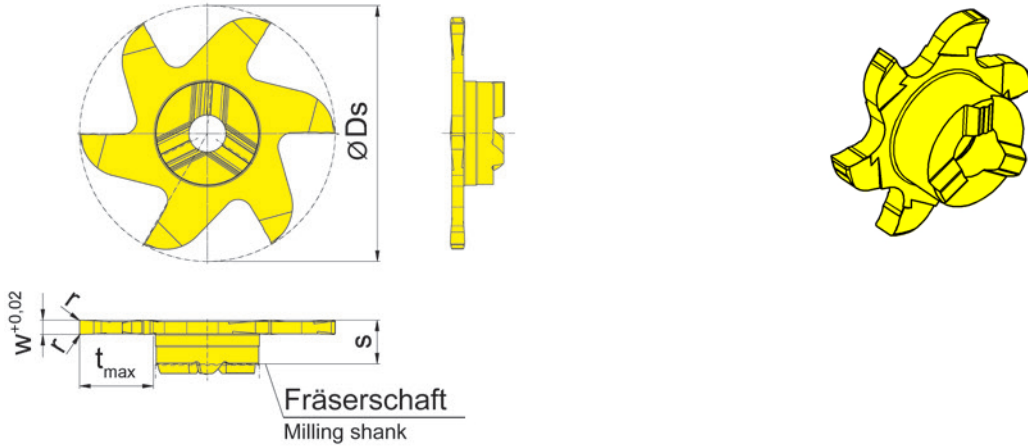
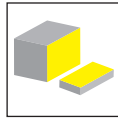


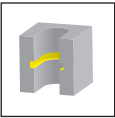
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	EG35	EG55	TA45	
636.0050.00	35,7	0,5	6,1	-	10,2	6	332143R		▲			
636.0100.00	35,7	1	6,1	-	10,2	6	332143R			▲		
636.0110.2.00	35,7	1,1	6,1	0,1	12	6	332110R	▲				
636.0130.2.00	35,7	1,3	6,1	0,1	12	6	332110R	▲				
636.0150.2.00	35,7	1,5	6,1	0,1	12	6	332110R	▲			▲	
636.0200.2.00	35,7	2	6,1	0,2	12	6	332110R	▲			▲	
636.0250.2.00	35,7	2,5	6,1	0,2	12	6	332110R	▲			▲	
ab Schneidbreite 2,5 mm Kreuzverzahnung from width of groove 2,5 mm toothing with cross-cut								P	●	●	●	●
Bitte Verzahnungs- $\varnothing$ d1 von Fräserschaft beachten! Please consider pocket seat $\varnothing$ d1 of the miling shank!								M	●	●	○	●
								K	●	○	○	●
								N	○	-	-	●
								S	●	-	-	●
								H	-	-	-	-



z9

B

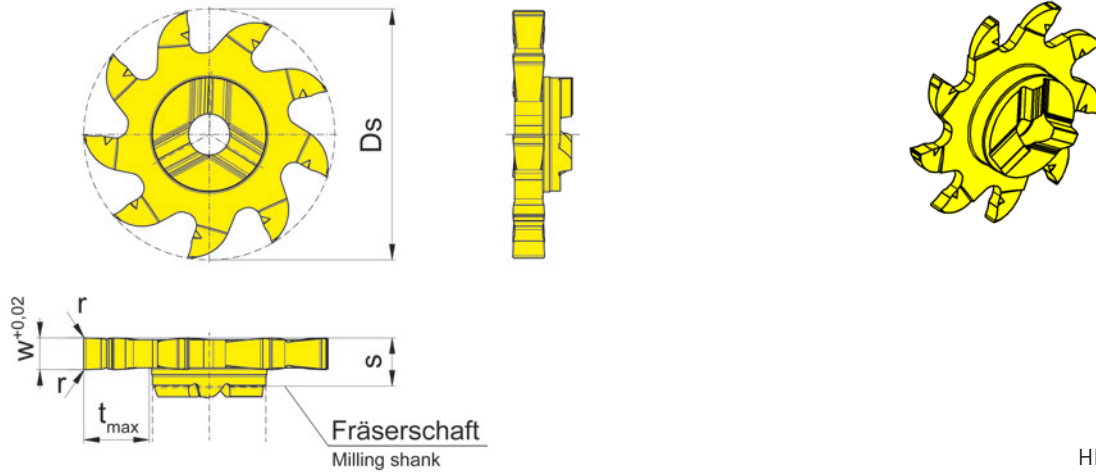


Abbildung = rechtsschneidend  
Picture = right hand cutting version

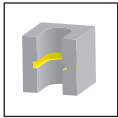
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45
932.0200.00	31,7	2	6,1	0,2	8,3	9	332143R	▲
932.0250.00	31,7	2,5	6,1	0,2	8,3	9	332143R	▲
932.0300.00	31,7	3	6,1	0,2	8,3	9	332143R	▲
932.0400.00	31,7	4	6,1	0,2	8,3	9	332143R	▲
								P ●
								M ●
								K ●
								N o
								S ●
								H -

**B**



**z9**

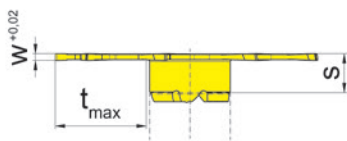
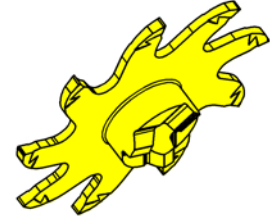
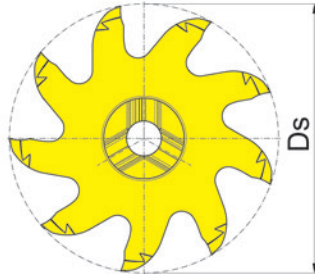
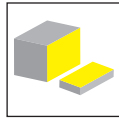


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	RC25
939.0100.3.00	40	1	5,8	13,5	9	332120R	▲
939.0150.3.00	40	1,5	5,8	13,5	9	332120R	▲
939.0200.3.00	40	2	5,8	13,5	9	332120R	▲
939.0250.3.00	40	2,5	5,8	13,5	9	332120R	▲
							P ●
							M ●
							K ●
							N -
							S -
							H -

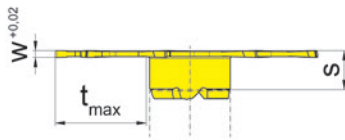
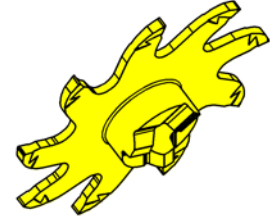
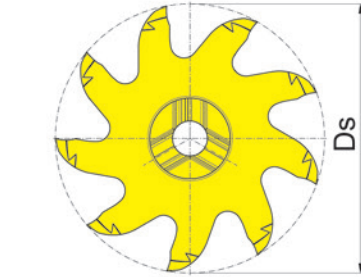
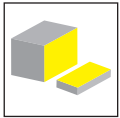


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	RC25
939.0040.4.00	40	0,4	5,8	14	9	332110R	▲
939.0050.4.00	40	0,5	5,8	14	9	332110R	▲
939.0060.4.00	40	0,6	5,8	14	9	332110R	▲
939.0070.4.00	40	0,7	5,8	14	9	332110R	▲
939.0080.4.00	40	0,8	5,8	14	9	332110R	▲
939.0090.4.00	40	0,9	5,8	14	9	332110R	▲
939.0100.4.00	40	1	5,8	14	9	332110R	▲
939.0150.4.00	40	1,5	5,8	14	9	332110R	▲
							P ●
							M ●
							K ●
							N -
							S -
							H -

**B**



**z9**

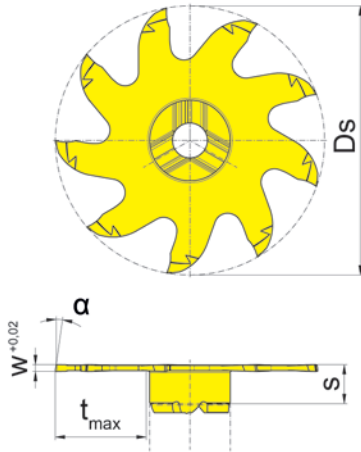


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	α	t <sub>max</sub>	Z	HIS	RC25
939.L810.3.00	40	1	5,8	8°	13,5	9	332120R	▲
939.L810.4.00	40	1	5,8	8°	14	9	332110R	Δ
939.L815.4.00	40	1,5	5,8	8°	14	9	332110R	Δ
								P ●
								M ●
								K ●
								N -
								S -
								H -



z9

B

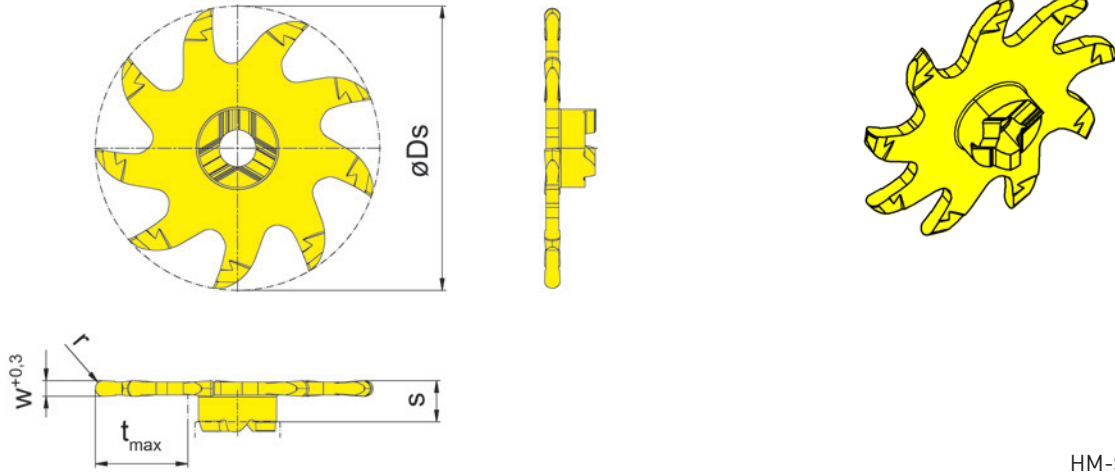


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	RC45
939.0007.4.14	40	1,4	5,8	0,7	14	9	332110R	▲
939.0011.4.22	40	2,2	5,8	1,1	14	9	332110R	▲
								P ●
								M ●
								K ●
								N -
								S -
								H -

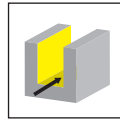
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



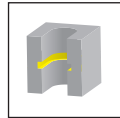
B

Fräserschaft  
Milling shank  
M335



Seite/Page  
202

Schneidplatte  
Insert  
335



Seite/Page  
203



## M335



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  35 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  35 mm

**B**

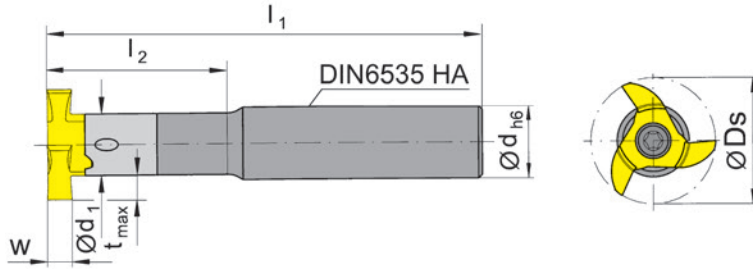
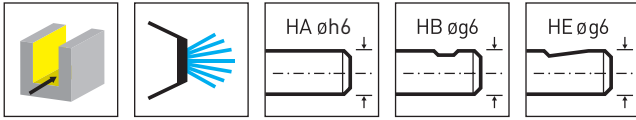


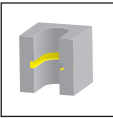
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M335.0020.01A</b>	20	100	40	17,5	HA	335175R
<b>M335.0020.02A</b>	20	130	60	17,5	HA	335175R
<b>M335.0020.03A</b>	20	150	80	17,5	HA	335175R
<b>M335.0020.01B</b>	20	100	40	17,5	HB	335175R
<b>M335.0020.02B</b>	20	130	60	17,5	HB	335175R
<b>M335.0020.02E</b>	20	130	60	17,5	HE	335175R

w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**Ersatzteile**  
Spare Parts

<b>Frärschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M335...	<b>6.17T25P</b>	<b>T25PQ</b>



z3

B

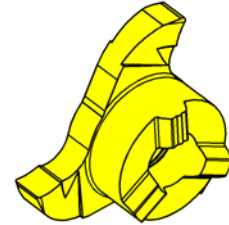
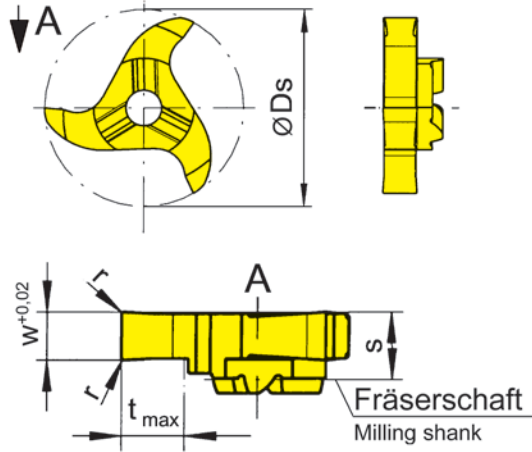


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TI25
335.0200.00	34,7	2	8,7	0,2	8	3	335175R	▲	▲
335.0300.00	34,7	3	8,7	0,2	8	3	335175R	▲	▲
335.0400.00	34,7	4	8,7	0,2	8	3	335175R	▲	▲
335.0500.00	34,7	5	8,7	0,2	8	3	335175R	▲	▲
335.0600.00	34,7	6	8,7	0,2	8	3	335175R	▲	▲

**Auf Anfrage:**

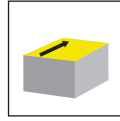
Schneidplatten mit 8,0 - 15,0 mm Breite nur als Formplatten, abhängig vom zu zerspanenden Werkstoff, lieferbar!

**Upon request:**

Insert widths of 8,0 - 15,0 mm are only available as special profiled inserts. Use of these widths depend from the workpiece material to be machined.

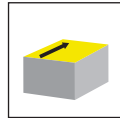
P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

Fräaserschaft  
Milling shank  
M620



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Schneidplatte  
Insert  
620



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# M620



**Fräser mit wechselbarer  
Schneidplatte**

Schneidkreis Ø 21,7 mm

**Milling shank with  
exchangeable insert**

Cutting edge Ø 21,7 mm

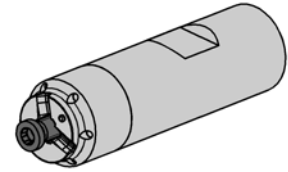
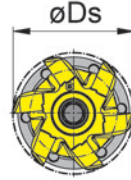
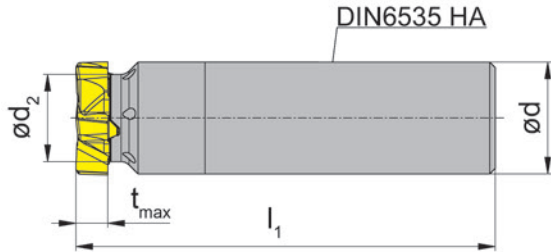
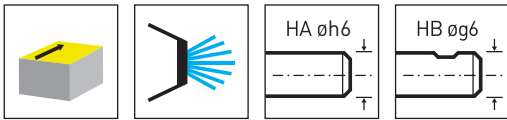
# Fräuserschaft

Milling shank

# M620



B



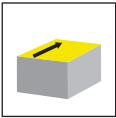
Bestellnummer Part number	Ds	d	l <sub>1</sub>	d <sub>2</sub>	Form	HWS
M620.0020.D.00A	21,7	20	75	15,6	HA	620156R
M620.0020.D.00B	21,7	20	75	15,6	HB	620156R
M620.0020.D.04A	21,7	20	130	15,6	HA	620156R
M620.0020.D.04B	21,7	20	130	15,6	HB	620156R

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

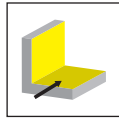
## Ersatzteile

Spare Parts

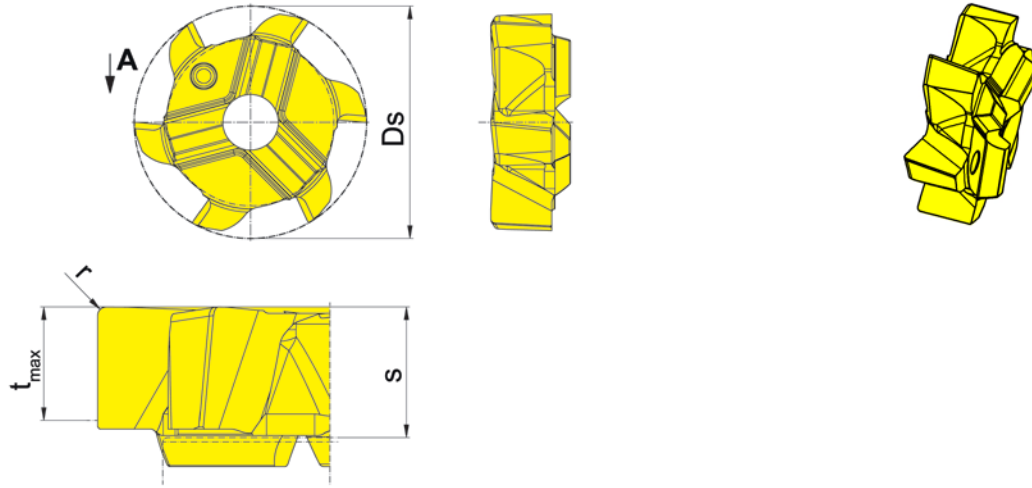
Fräuserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M620...	5.14T20P	T20PQ



z6



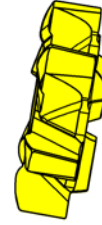
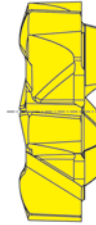
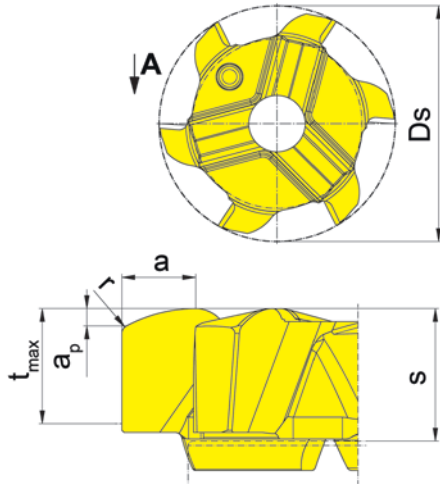
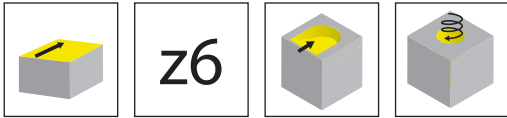
B



HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS45
620.PL53.64	21,7	6	0,4	5,3	6,1	620156R	▲
							P ●
							M ●
							K ●
							N ○
							S ●
							H -

B



HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

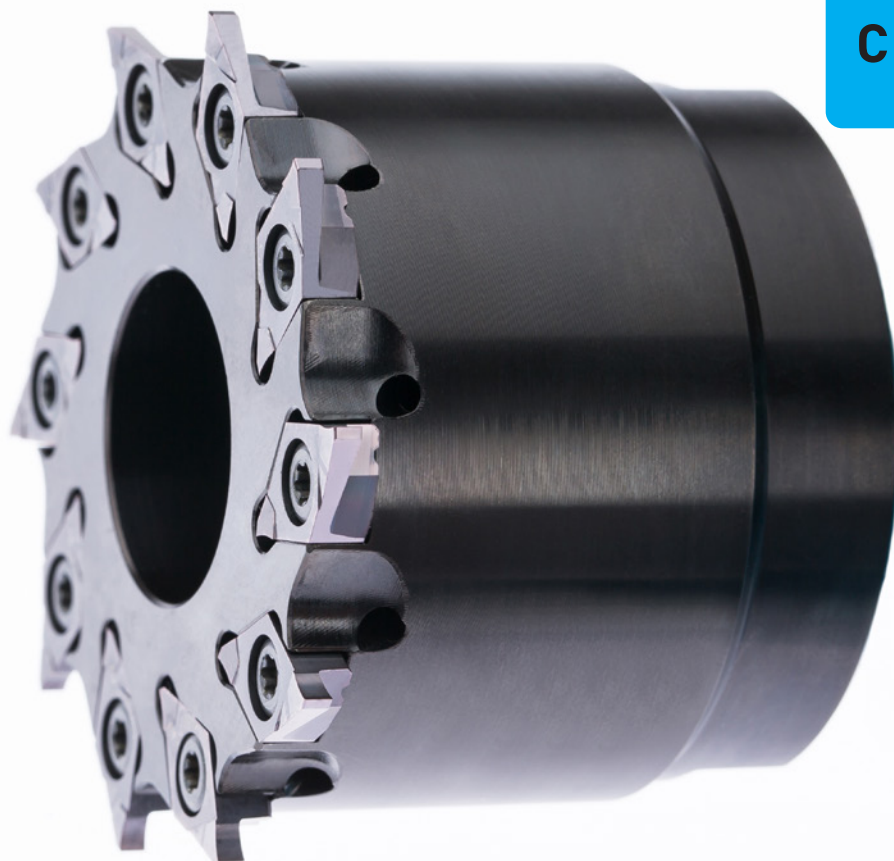
Bestellnummer Part number	Ds	a	Z	r	t <sub>max</sub>	a <sub>p</sub>	s	HIS	AS45
620.HV08.04	21,7	4,4	6	0,4	5,3	0,8	6,1	620156R	▲
									P ●
									M ●
									K ●
									N ○
									S ●
									H -

**Hochvorschubfräsen**  
High Feed Milling

Eintauchwinkel Diving angle	theoretischer Eckenradius r <sub>th</sub> = Programmerradius theoretical corner radius r <sub>th</sub> = programming radius	max. Abweichung max. difference
1°	1,15 mm	0,43 mm



## M275



C

**Schaftfräser**  
**Einschraubfräser**  
**Aufsteckfräser**  
**Scheibenfräser**

ab Schneidkreis Ø 31 mm

**End Mill**  
**Screw-in Cutter**  
**Arbour Mounted Cutter**  
**Disc Milling Cutter**

from cutting edge Ø 31 mm

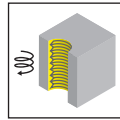
# Nutfräsen (zirkular)

Groove Milling by circular interpolation



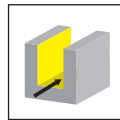
C

Schaftfräser  
End Mill  
M275



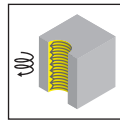
Seite/Page  
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Einschraubfräser  
Screw-in cutter  
M275



Seite/Page  
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Aufsteckfräser  
Arbour Mounted Cutter  
M275

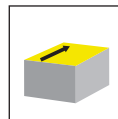


Seite/Page  
213

Wendeschneidplatte  
Indexable insert  
S275/RS275



Seite/Page  
214-216



Seite/Page  
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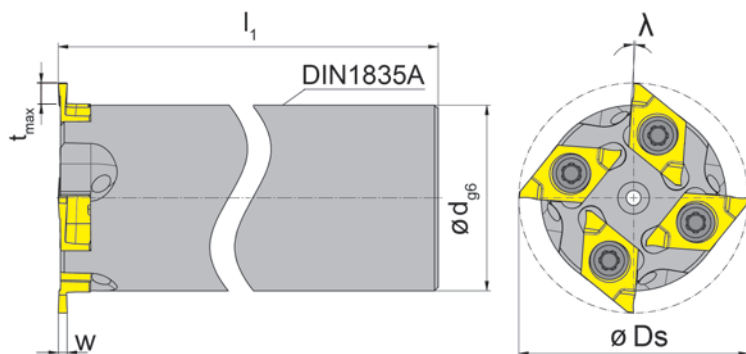
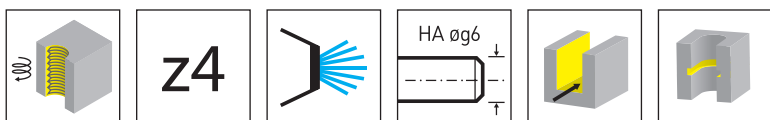


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d	l <sub>1</sub>	λ	HWS
<b>M275.031.D25.3.04A</b>	31	25	125	4°	275041R • 275043R

w und tmax siehe WSP  
w and tmax see inserts

Schaftmaterial: Stahl (nicht schrumpfbar)  
Material of shank: Steel (not recommended for shrink fitting)

## Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M275.031.D25.3.04A	<b>3.5.10T10P</b>	<b>T10PL</b>

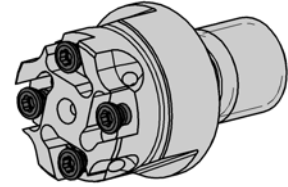
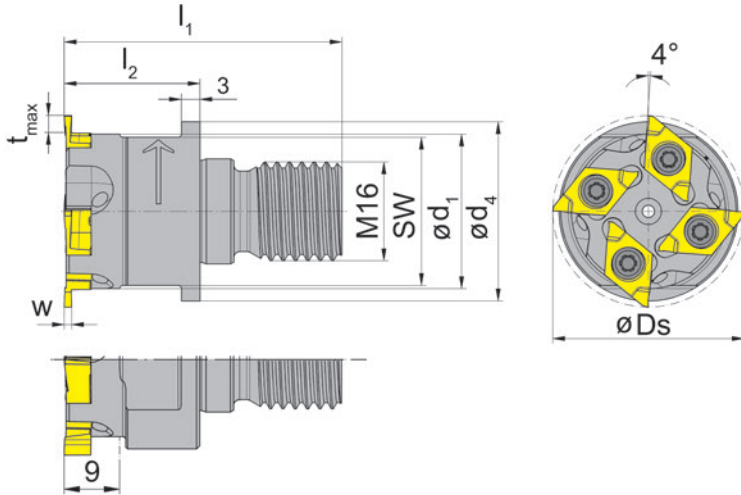
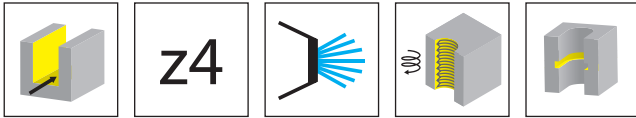


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d <sub>4</sub>	SW	HWS
M275.031.M16.1.04	4	31	45	22	25	29	24	275041R • 275043R
M275.036.M16.1.04	4	36	45	22	30	29	27	275041R • 275043R

w und tmax siehe WSP  
w and tmax see inserts

**Ersatzteile**

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M275...	3.5.10T10P	T10PL

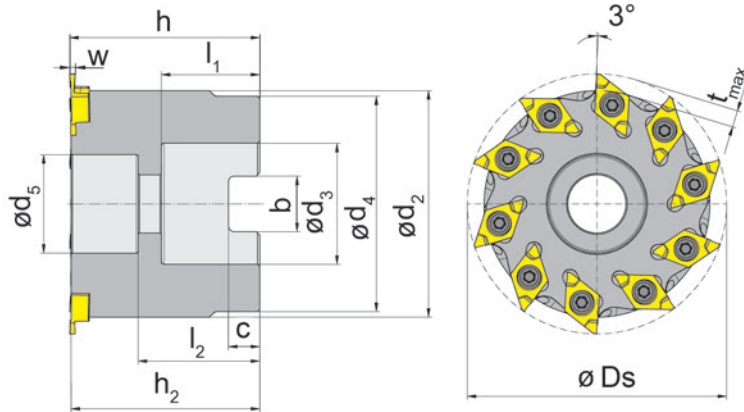
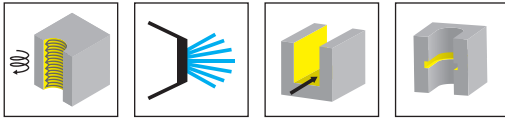


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>4</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	HWS
<b>M275.0038.A16.05</b>	5	38	32,7	33	13,5	32	16	18	22,7	8,4	5,6	32	275041R • 275043R
<b>M275.0048.A22.08</b>	8	48	36,7	37	18,5	40,5	22	20	24,7	10,4	6,3	40,5	275041R • 275043R
<b>M275.0058.A27.10</b>	10	58	42,2	42,5	22	48	27	22	27,2	12,4	7	50	275041R • 275043R
<b>M275.0078.A32.14</b>	14	78	49,7	50	33	58	32	25	36,7	14,4	8	70,5	275041R • 275043R

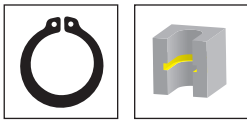
w und tmax siehe WSP  
w and tmax see inserts

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

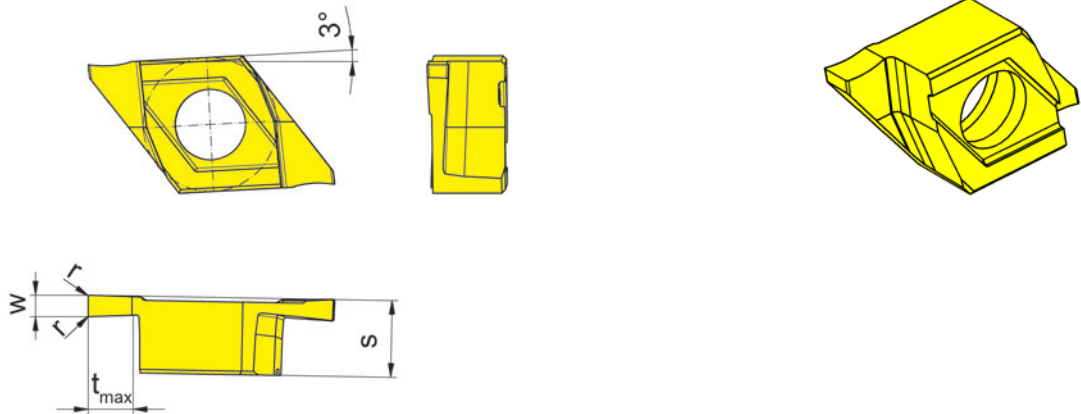
**Ersatzteile**  
Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M275...	<b>3.5.10T10P</b>	<b>T10PL</b>





C



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

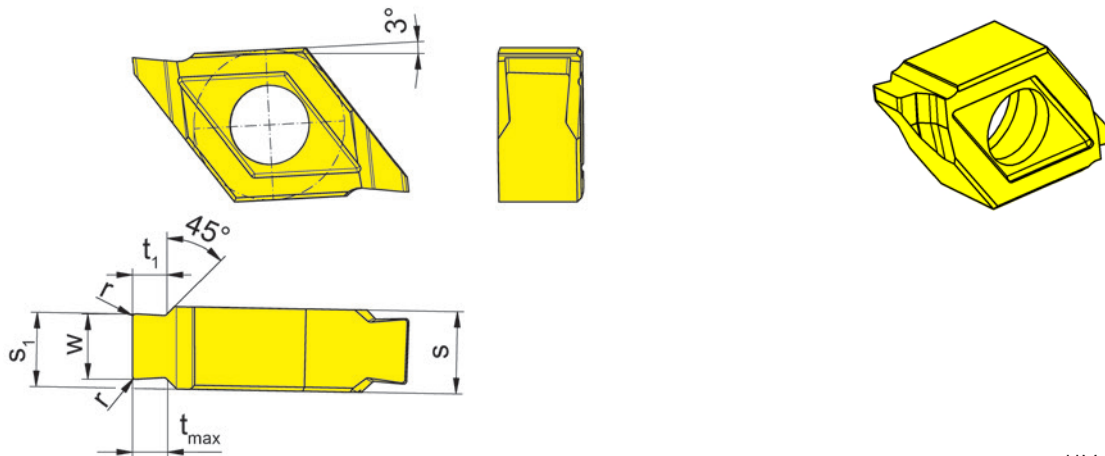
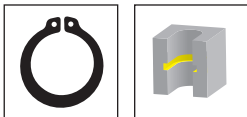
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	s	r	t <sub>max</sub>	HIS	AS45
RS275.0110.00	1,1	1,2	4,3	0,1	2,5	275043R	Δ
RS275.0130.00	1,3	1,4	4,3	0,1	2,5	275043R	▲
RS275.0185.00	1,85	1,95	4,3	0,15	2,5	275043R	▲
RS275.0215.00	2,15	2,25	4,3	0,15	2,5	275043R	▲
RS275.0265.00	2,65	2,75	4,3	0,15	2,5	275043R	▲
RS275.0315.00	3,15	3,25	4,3	0,15	2,5	275043R	▲
LS275.0130.00	1,3	1,4	4,3	0,1	2,5	275043L	Δ
LS275.0265.00	2,65	2,75	4,3	0,15	2,5	275043L	▲
LS275.0315.00	3,15	3,25	4,3	0,15	2,5	275043L	Δ

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	●
M	●
K	●
N	○
S	●
H	-



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	HIS	AS45
RS275.1610.41	1,6	1,7	0,95	4,1	3,17	0,1	1	275041R	▲
RS275.1812.41	1,85	1,95	1,21	4,1	3,29	0,15	1,25	275041R	▲
RS275.2115.41	2,15	2,25	1,45	4,1	3,44	0,15	1,5	275041R	▲
RS275.2617.41	2,65	2,75	1,7	4,1	3,39	0,15	1,75	275041R	▲
RS275.3118.41	3,15	3,25	1,7	4,1	3,7	0,15	1,75	275041R	▲

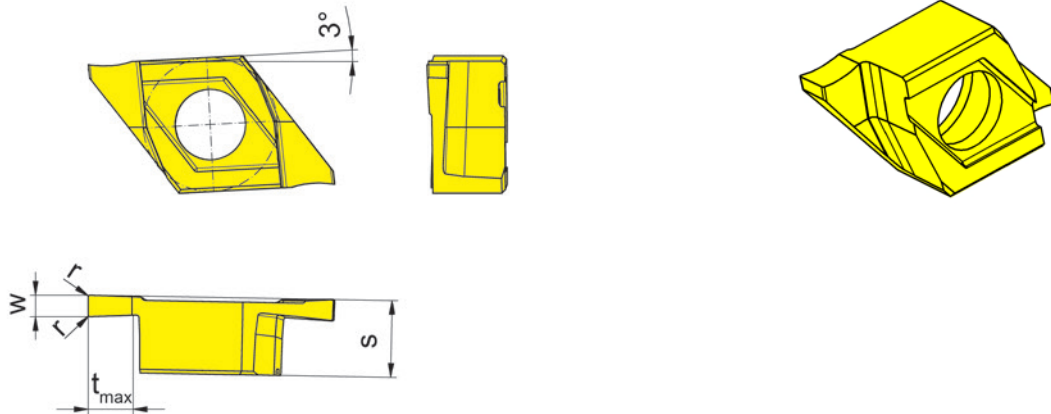
Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

P	●
M	●
K	●
N	o
S	●
H	-





C



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

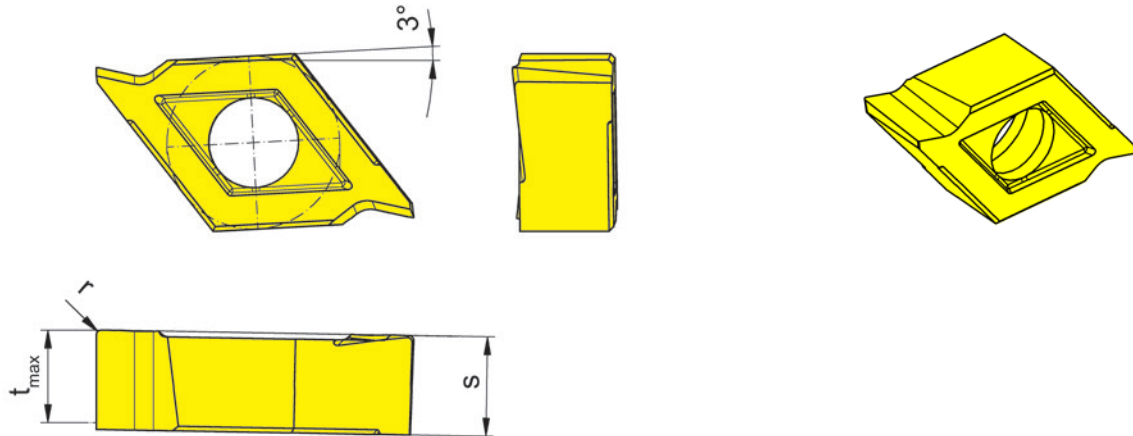
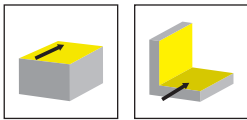
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	s	r	t <sub>max</sub>	HIS	TA45
RS275.0130.40	1,3	1,4	4,3	0,1	2,5	275043R	▲
RS275.0215.40	2,15	2,25	4,3	0,15	2,5	275043R	Δ
RS275.0265.40	2,65	2,75	4,3	0,15	2,5	275043R	Δ
RS275.0315.40	3,15	3,25	4,3	0,15	2,5	275043R	Δ
LS275.0315.40	3,15	3,25	4,3	0,15	2,5	275043L	Δ

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

P	-
M	-
K	-
N	●
S	-
H	-





R = rechts wie gezeichnet  
R = right hand version shown

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	r	t <sub>max</sub>	s	HIS	AS45	TA45
<b>RS275.PL40.62</b>	0,15	4	4,3	275043R		▲
<b>RS275.PL43.52</b>	0,2	4	4,3	275043R	▲	
					P ● ●	● ●
					M ● ●	● ●
					K ● ●	● ●
					N ○ ●	● ●
					S ● ●	● ●
					H - -	- -



C



## M380/M381



D

**Schaftfräser**  
**Aufsteckfräser**  
**Monoblockfräser**  
**Scheibenfräser**

ab Bohrung  $\varnothing$  45 mm

**End Mill**  
**Arbour Mounted Cutter**  
**Mono Milling Cutter**  
**Disc Milling Cutter**

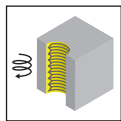
from bore  $\varnothing$  45 mm

# Nutfräsen (zirkular)

Groove Milling by circular interpolation

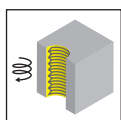


Schaftfräser  
End Mill  
380

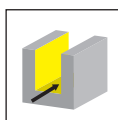


Seite/Page  
221

Aufsteckfräser  
Arbour Mounted Cutter  
380/380...IK

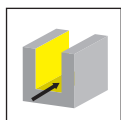


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222



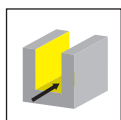
Seite/Page  
223-225

Monoblockfräser  
Mono Milling Cutter  
ABS..380



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226

Scheibenfräser  
Disc Milling Cutter  
381



Seite/Page  
227

Wendeschneidplatte  
Indexable insert  
314



Seite/Page  
228-229

D

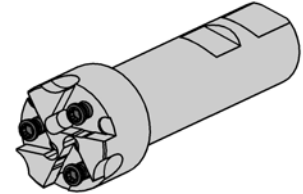
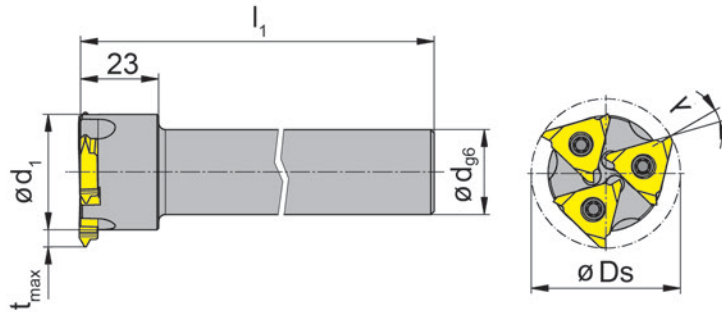
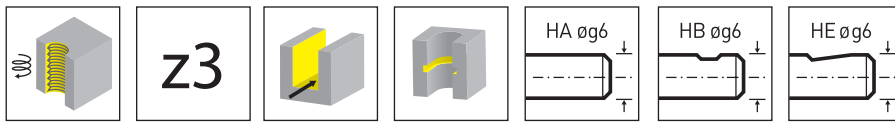


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d	l <sub>1</sub>	d <sub>1</sub>	λ	Form	HWS
<b>380.0044.03A</b>	44	25	125	34	14°	HA	314027R • 314041R • 314052R
<b>380.0044.03B</b>	44	25	125	34	14°	HB	314027R • 314041R • 314052R
<b>380.0044.03E</b>	44	25	125	34	14°	HE	314027R • 314041R • 314052R

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

## Ersatzteile

Spare Parts

<b>Schaftfräser</b> End Mill	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380...	<b>5.12T20P</b>	<b>T20PQ</b>

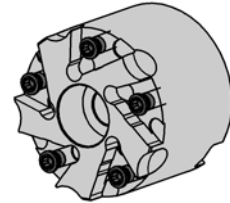
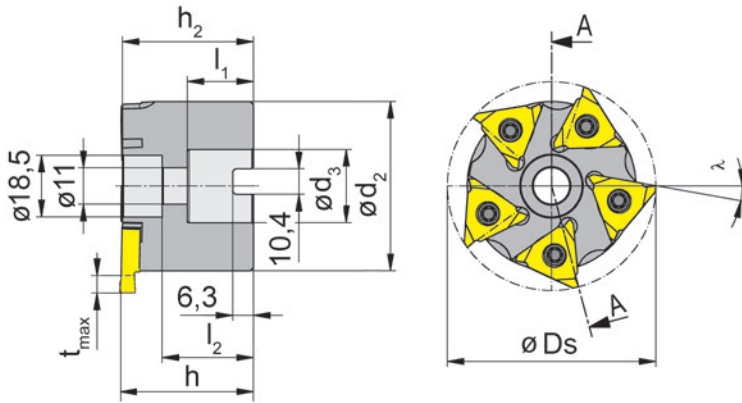


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	h <sub>2</sub>	h	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	λ	d <sub>2</sub>	HWS
<b>380.0063.05</b>	63	39,6	40	22	20	27,6	10°	51	314027R • 314041R • 314052R

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

## Ersatzteile

Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380.0063.05	<b>5.12T20P</b>	<b>T20PQ</b>

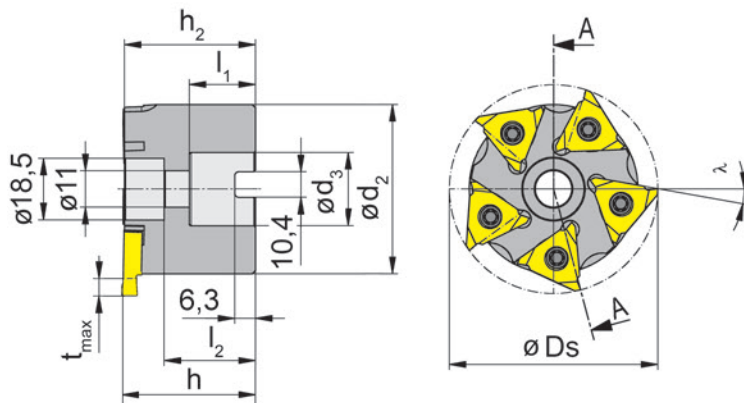
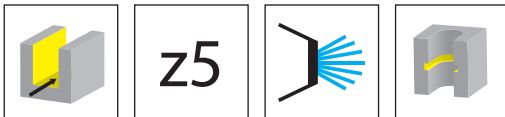


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	h <sub>2</sub>	h	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	λ	d <sub>2</sub>	HWS
<b>380.0063.05IK</b>	5	63	39,6	40	22	20	27,6	10°	51	314027R • 314041R • 314052R

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

Fräsdorn gehört nicht zum Lieferumfang. Bitte separat bestellen!  
Milling arbour is not combined with milling cutter - seperate order required!

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380.0063.05IK	<b>5.12T20P</b>	<b>T20PQ</b>

# Aufsteckfräser

Arbour Mounted Cutter

# 380

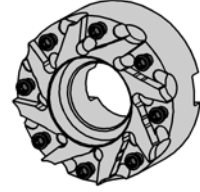
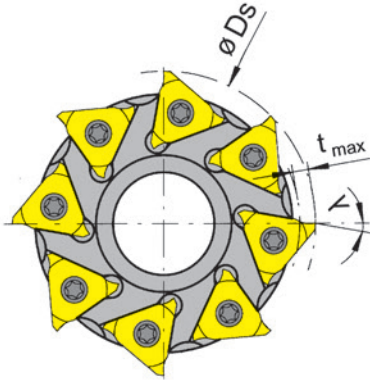
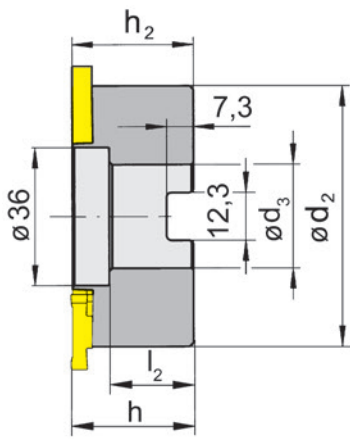


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h <sub>2</sub>	h	d <sub>3</sub>	l <sub>2</sub>	λ	d <sub>2</sub>	HWS
<b>380.0080.08</b>	8	80	5	31,6	32	27	21,6	10°	68	314027R • 314041R • 314052R

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

Fräseranzugsschraube **030.0012.0726** gehört zum Lieferumfang.  
Bolt screw 030.0012.0726 is combined with the milling cutter.

## Ersatzteile

Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380.0080.08	<b>5.12T20P</b>	<b>T20PQ</b>



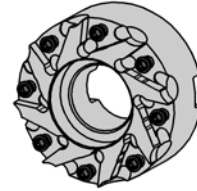
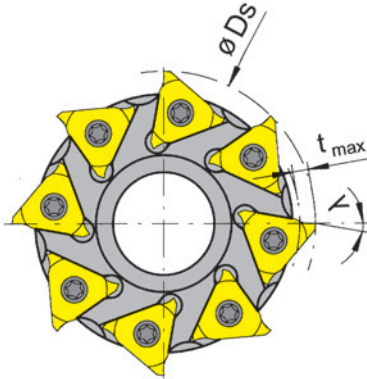
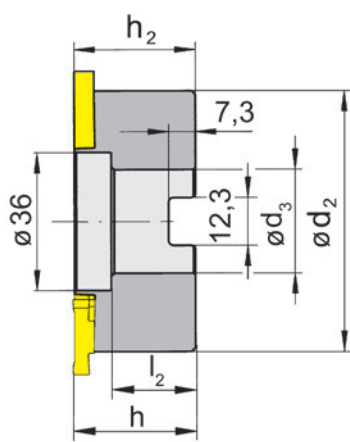
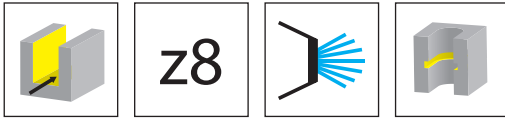


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h <sub>2</sub>	h	d <sub>3</sub>	l <sub>2</sub>	λ	d <sub>2</sub>	HWS
<b>380.0080.08IK</b>	8	80	5	39,8	40	27	21,6	10°	68	314027R • 314041R • 314052R

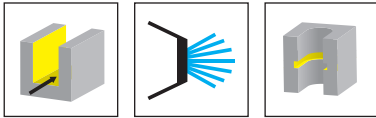
Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

Fräseranzugsschraube **030.0012.0726** gehört zum Lieferumfang.  
Bolt screw 030.0012.0726 is combined with the milling cutter.

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380.0080.08IK	<b>5.12T20P</b>	<b>T20PQ</b>





D

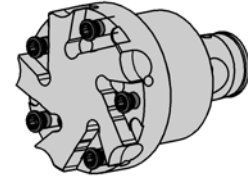
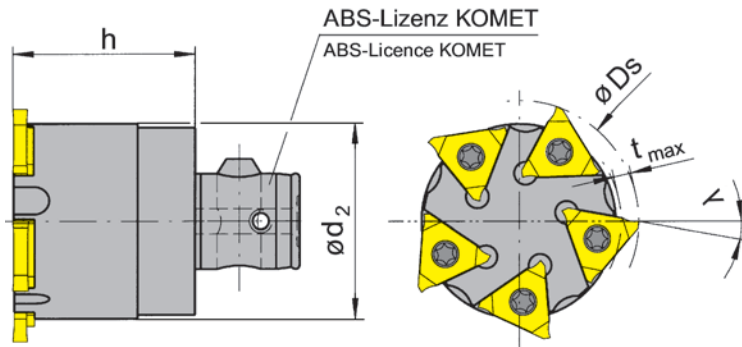


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	Z	t <sub>max</sub>	h	d <sub>2</sub>	λ	HWS
<b>ABS32.380.0044.03</b>	44	3	4	35	34	14°	314027R • 314041R • 314052R
<b>ABS40.380.0050.04</b>	50	4	4,5	40	40	14°	314027R • 314041R • 314052R
<b>ABS50.380.0063.05</b>	63	5	5	50	51	10°	314027R • 314041R • 314052R
<b>ABS50.380.0080.08</b>	80	8	5	50	68	10°	314027R • 314041R • 314052R
<b>ABS63.380.0080.08</b>	80	8	5	63	68	10°	314027R • 314041R • 314052R

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

**Ersatzteile**

Spare Parts

Monoblockfräser Mono Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
ABS32...	<b>5.12T20P</b>	<b>T20PQ</b>

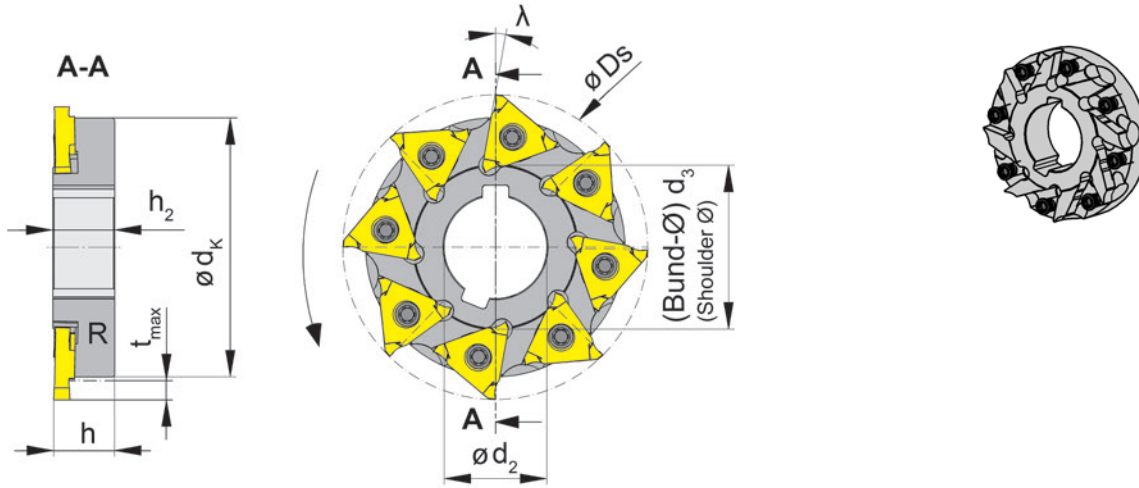
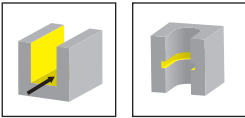


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d <sub>2</sub>	h <sub>2</sub>	h	d <sub>k</sub>	λ	d <sub>3</sub>	HWS
<b>R381.0063.05</b>	5	63	22	14,2	14	51	14°	34	314027R • 314041R • 314052R
<b>R381.0080.08</b>	8	80	27	16,2	16	68	10°	43	314027R • 314041R • 314052R
<b>R381.0100.10</b>	10	100	32	20,2	20	88	10°	48	314027R • 314041R • 314052R
<b>L381.0063.05</b>	5	63	22	14,2	14	51	14°	34	314027L • 314041L • 314052L
<b>L381.0080.08</b>	8	80	27	16,2	16	68	10°	43	314027L • 314041L • 314052L
<b>L381.0100.10</b>	10	100	32	20,2	20	88	10°	48	314027L • 314041L • 314052L

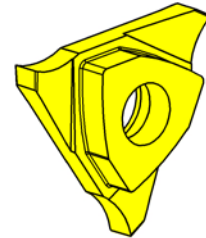
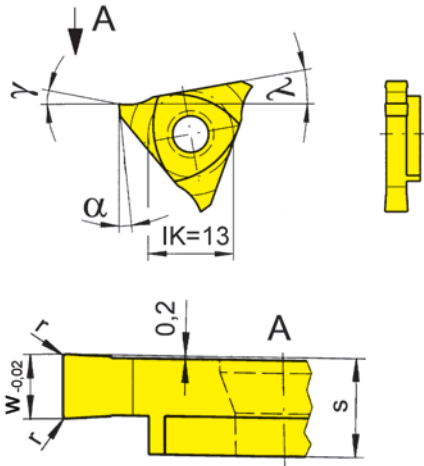
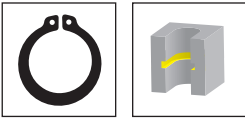
Bohrung (d<sub>2</sub>) mit Längsnut nach DIN 138  
Bore (d<sub>2</sub>) with longitudinal keyway to DIN 138

t<sub>max</sub> siehe Schneidplatten  
t<sub>max</sub> see inserts

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
R/L381...	<b>5.12T20P</b>	<b>T20PQ</b>



D

R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

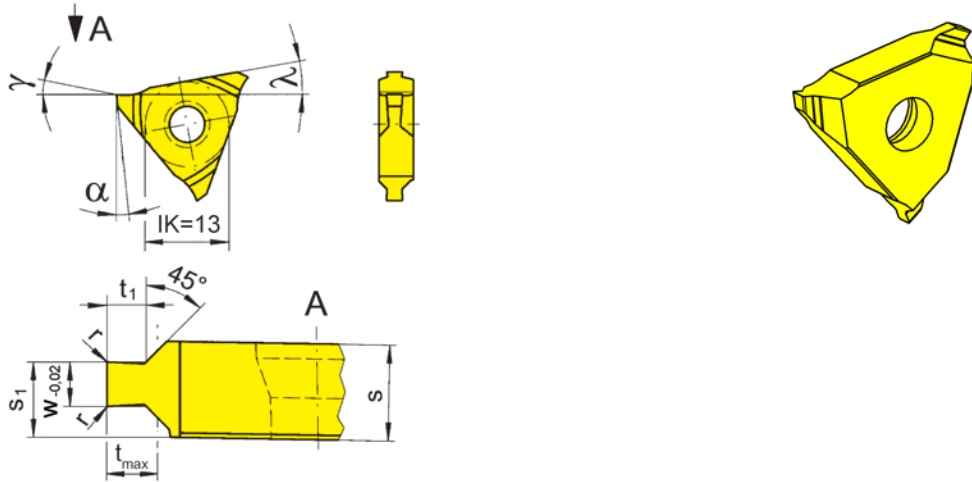
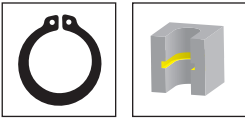
Bestellnummer Part number	Nw	w	r	s	HIS	AS45	TI25	TN35
R314.0130.00	1,3	1,41	0,1	5,4	314027R	▲		▲
R314.0160.00	1,6	1,71	0,1	5,4	314027R	▲		▲
R314.0185.00	1,85	1,96	0,15	5,4	314027R	▲		▲
R314.0215.00	2,15	2,26	0,15	5,4	314027R	▲		▲
R314.0265.00	2,65	2,76	0,15	5,4	314027R	▲	▲	▲
R314.0315.00	3,15	3,26	0,15	5,4	314027R	▲	▲	▲
R314.0415.00	4,15	4,26	0,15	5,4	314041R	▲	▲	▲
R314.0515.00	5,15	5,26	0,15	5,4	314052R	▲	▲	▲
L314.0130.00	1,3	1,41	0,1	5,4	314027L			▲
L314.0160.00	1,6	1,71	0,1	5,4	314027L			▲
L314.0185.00	1,85	1,96	0,15	5,4	314027L	▲		
L314.0215.00	2,15	2,26	0,15	5,4	314027L	▲		
L314.0265.00	2,65	2,76	0,15	5,4	314027L			▲
L314.0315.00	3,15	3,26	0,15	5,4	314027L	▲		▲
L314.0415.00	4,15	4,26	0,15	5,4	314041L	△		▲
L314.0515.00	5,15	5,26	0,15	5,4	314052L	▲		▲

Abmessungen für Seegerringnuten DIN 471/472  
Widths for circlip grooves DIN 471/472

Geometrie in Abhängigkeit des Einlegewinkel  $\lambda$   
Geometry depending on angle of seating  $\lambda$

$\lambda$	$\gamma$	$\alpha$
10°	15°	6°
14°	11°	10°

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



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	r	s <sub>1</sub>	s	t <sub>max</sub>	t <sub>1</sub>	HIS	AS45	TN35
R314.1307.54	1,3	1,41	0,1	4,62	5,45	0,75	0,67	314041R	Δ	Δ
R314.1609.54	1,6	1,71	0,1	4,52	5,45	0,85	0,83	314041R	▲	▲
R314.1610.54	1,6	1,71	0,1	4,52	5,45	1	0,97	314041R	Δ	Δ
R314.1812.54	1,85	1,96	0,15	4,64	5,45	1,25	1,23	314041R	▲	▲
R314.2115.54	2,15	2,26	0,15	4,79	5,45	1,5	1,47	314041R	▲	▲
R314.2616.54	2,65	2,76	0,15	4,54	5,45	1,5	1,47	314041R	▲	▲
R314.2617.54	2,65	2,76	0,15	4,54	5,45	1,75	1,72	314041R	▲	▲
R314.3118.54	3,15	3,26	0,15	4,54	5,45	1,75	1,72	314041R	▲	▲
R314.4120.54	4,15	4,26	0,15	4,99	5,45	2	1,97	314041R	▲	▲
R314.4125.54	4,15	4,26	0,15	4,99	5,45	2,5	2,47	314041R	▲	▲
R314.5130.61	5,15	5,26	0,15	5,85	6,1	3	2,97	314052R	▲	▲
L314.1307.54	1,3	1,41	0,1	4,62	5,45	0,75	0,67	314041L		Δ
L314.1609.54	1,6	1,71	0,1	4,52	5,45	0,85	0,83	314041L	▲	▲
L314.1610.54	1,6	1,71	0,1	4,52	5,45	1	0,97	314041L		▲
L314.1812.54	1,85	1,96	0,15	4,64	5,45	1,25	1,23	314041L		▲
L314.2115.54	2,15	2,26	0,15	4,79	5,45	1,5	1,47	314041L		▲
L314.2616.54	2,65	2,76	0,15	4,54	5,45	1,5	1,47	314041L		▲
L314.2617.54	2,65	2,76	0,15	4,54	5,45	1,75	1,72	314041L		▲
L314.3118.54	3,15	3,26	0,15	4,54	5,45	1,75	1,72	314041L	Δ	
L314.4120.54	4,15	4,26	0,15	4,99	5,45	2	1,97	314041L	Δ	Δ
L314.4125.54	4,15	4,26	0,15	4,99	5,45	2,5	2,47	314041L		Δ
L314.5130.61	5,15	5,26	0,15	5,85	6,1	3	2,97	314052L		Δ

Abmessungen für Seegerringnuten DIN 471/472 mit Nutaußenkantenfasung  
Widths for circlip grooves DIN 471/472 with chamfer

Geometrie in Abhängigkeit des Einlegewinkel λ  
Geometry depending on angle of seating λ

λ	γ	α
10°	15°	6°
14°	11°	10°

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

D

D



**M101**



**E**

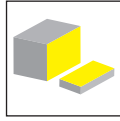
**Nutfräser**

ab Schneidkreis  $\varnothing$  63 mm  
Nutbreite 1,2 - 4,6 mm

**Groove milling cutter**

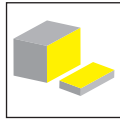
from cutting edge  $\varnothing$  63 mm  
Width of groove 1,2 - 4,6 mm

Nutfräser  
Groove milling cutter  
M101



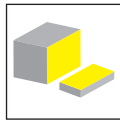
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233

Scheibenfräser  
Disc Milling Cutter  
M101



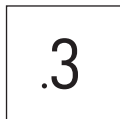
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234-235

Aufsteckfräser  
Arbour Mounted Cutter  
M101



Seite/Page  
236-237

Schneidplatte  
Insert  
S101



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239-240



Seite/Page  
242

Technische Hinweise  
Technical Instructions

Seite/Page  
243



# Nutfräser

## Groove milling cutter

# M101

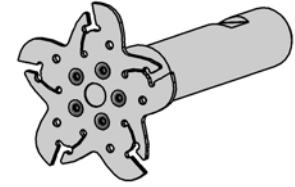
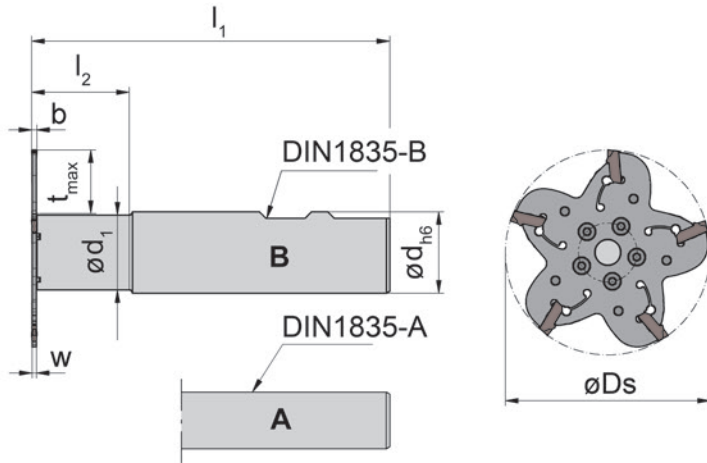
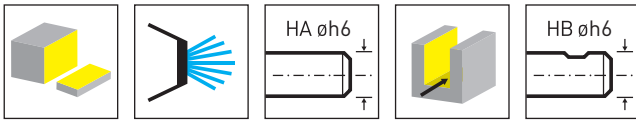


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	b	t <sub>max</sub>	Form	Schneidbreite Width of groove	n <sub>max</sub>	HWS
M101.063.D16.23.2.12A	5	63	16	110	30	23	0,95	19,5	A	1,2-1,2	7500	10112
M101.063.D16.23.2.14A	5	63	16	110	30	23	1,15	19,5	A	1,4-1,4	7500	10114
M101.063.D16.23.2.16A	5	63	16	110	30	23	1,3	19,5	A	1,6-1,8	7500	10116
M101.063.D16.23.2.20A	5	63	16	110,35	30,4	23	1,6	19,5	A	2,0-2,3	7500	10120
M101.063.D20.23.2.12B	5	63	20	110	30	23	0,95	19,5	B	1,2-1,2	7500	10112
M101.063.D20.23.2.14B	5	63	20	110	30	23	1,15	19,5	B	1,4-1,4	7500	10140
M101.063.D20.23.2.16B	5	63	20	110	30	23	1,3	19,5	B	1,6-1,8	7500	10116
M101.063.D20.23.2.20B	5	63	20	110,35	30,4	23	1,6	19,5	B	2,0-2,3	7500	10120
M101.063.D25.23.2.12B	5	63	25	110	30	23	0,95	19,5	B	1,2-1,2	7500	10112
M101.063.D25.23.2.16B	5	63	25	110	30	23	1,3	19,5	B	1,6-1,8	7500	10116
M101.063.D25.23.2.20B	5	63	25	110	30	23	1,6	19,5	B	2,0-2,3	7500	10120

w siehe Schneidplatten  
w see inserts

Der Schlüssel P101.01 gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 is not combined with slotting cutter - separate order required!

### Ersatzteile

Spare Parts

Nutfräser Groove milling cutter	Schaft Shank	Stammbblatt Blade	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Spannschraube Clamping Screw
M101.063.D16.23.2.12A	020.D16.23.2.12 A	M101.0063.28.23.12	T8PL	
M101.063.D16.23.2.14A	020.D16.23.2.12 A	M101.0063.28.23.14	T8PL	
M101.063.D16.23.2.16A	020.D16.23.2.16A	M101.0063.28.23.16	T8PL	
M101.063.D16.23.2.20A	020.D16.23.2.16A	M101.0063.28.23.20	T8PL	
M101.063.D20.23.2.12B	020.D20.23.2.12B	M101.0063.28.23.12	T8PL	
M101.063.D20.23.2.14B	020.D20.23.2.12B	M101.0063.28.23.14	T8PL	
M101.063.D20.23.2.16B	020.D20.23.2.16B	M101.0063.28.23.16	T8PL	
M101.063.D20.23.2.20B	020.D20.23.2.16B	M101.0063.28.23.20	T8PL	
M101.063.D25.23.2.12B	020.D25.23.2.12B	M101.0063.28.23.12	T8PL	030.3543.T8P
M101.063.D25.23.2.16B	020.D25.23.2.16B	M101.0063.28.23.16	T8PL	030.3543.T8P
M101.063.D25.23.2.20B	020.D25.23.2.20B	M101.0063.28.23.20	T8PL	030.3543.T8P

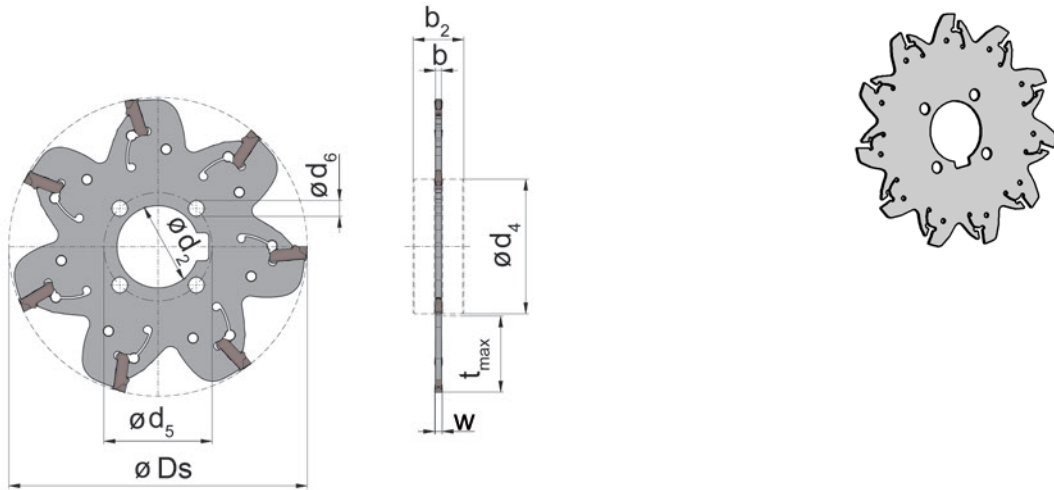
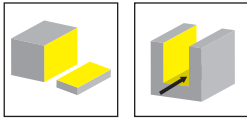


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	b	d <sub>2</sub>	b <sub>2</sub>	d <sub>4</sub>	d <sub>6</sub>	d <sub>5</sub>	Schneidbreite Width of groove	n <sub>max</sub>	HWS
M101.0080.22.12	7	80	20	0,95	22	13	36	4,25	29	1,2-1,2	6000	10112
M101.0080.22.14	7	80	20	1,15	22	13,1	36	4,25	29	1,4-1,4	6000	10114
M101.0080.22.16	7	80	20	1,3	22	13,3	36	4,25	29	1,6-1,8	6000	10116
M101.0100.22.16	9	100	30	1,3	22	13,3	36	4,25	29	1,6-1,8	5000	10116
M101.0125.32.16	11	125	33	1,3	32	21,3	55	6,25	45	1,6-1,8	4000	10116
M101.0080.22.20	7	80	20	1,6	22	13,6	36	4,25	29	2,0-2,3	6000	10120
M101.0100.22.20	9	100	30	1,6	22	13,6	36	4,25	29	2,0-2,3	5000	10120
M101.0125.32.20	11	125	33	1,6	32	21,6	55	6,25	45	2,0-2,3	4000	10120
M101.0080.22.25	7	80	20	2	22	14	36	4,25	29	2,5-2,5	6000	10120
M101.0100.22.25	9	100	20	2	22	14	36	4,25	29	2,5-2,5	5000	10120
M101.0125.32.25	11	125	33	2	32	22	55	4,25	45	2,5-2,5	4000	10120

w siehe Schneidplatten  
w see inserts

Der Schlüssel **P101.01** gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 is not combined with slotting cutter - separate order required!

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Mitnehmerringsatz Driving hole ringset
M101....	<b>020.22.06.36</b>
M101.0125.32...	<b>020.32.10.55</b>

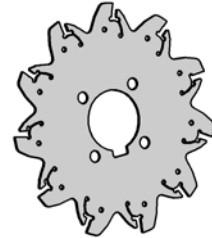
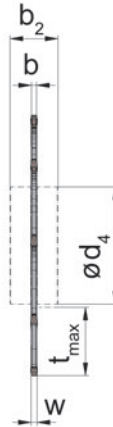
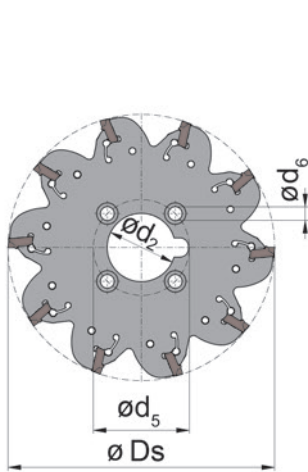
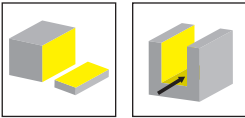


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	b	d <sub>2</sub>	b <sub>2</sub>	d <sub>4</sub>	d <sub>6</sub>	d <sub>5</sub>	Schneidbreite Width of groove	n <sub>max</sub>	HWS
M101.0080.22.30	6	80	20	2,4	22	14,4	36	4,25	29	2,8-3,4	6000	10130
M101.0100.22.30	8	100	26	2,4	22	22,4	46	5,25	32	2,8-3,4	5000	10130
M101.0125.32.30	10	125	34	2,4	32	22,4	55	6,25	45	2,8-3,4	4000	10130
M101.0160.40.30	12	160	39	2,4	40	26,4	80	11,25	63	2,8-3,4	3000	10130
M101.0080.22.40	6	80	20	3,2	22	15,2	36	4,25	29	3,8-4,6	6000	10140
M101.0100.22.40	8	100	26	3,2	22	23,2	46	5,25	32	3,8-4,6	5000	10140
M101.0125.32.40	10	125	34	3,2	32	23,2	55	6,25	45	3,8-4,6	4000	10140
M101.0160.40.40	12	160	39	3,2	40	27,2	80	11,25	63	3,8-4,6	3000	10140
M101.0200.40.40	16	200	59	3,2	40	27,2	80	11,25	63	3,8-4,6	2500	10140

w siehe Schneidplatten  
w see inserts

Der Schlüssel P101.02 gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 is not combined with slotting cutter - separate order required!

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Mitnehmerringsatz Driving hole ringset
M101.0080.22...	020.22.06.36
M101.0100.22...	020.22.10.46
M101.0125.32...	020.32.10.55
M101....	020.40.12.80

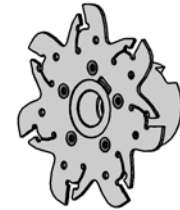
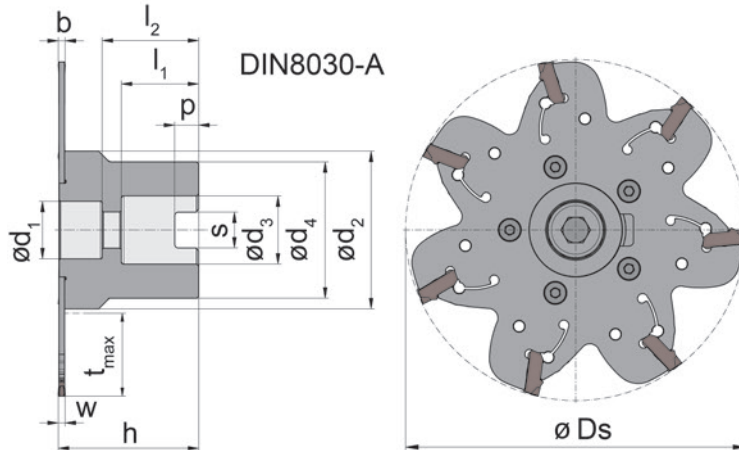
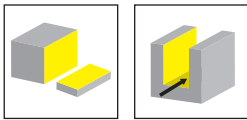


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	b	d <sub>1</sub>	d <sub>4</sub>	l <sub>1</sub>	l <sub>2</sub>	s	P	d <sub>2</sub>	d <sub>3</sub>	n <sub>max</sub>	Schneidbreite Width of groove	HWS
<b>M101.0080.A16.12</b>	7	80	20	33	0,95	13,5	32	18	22,7	8,4	5,6	37	16	6000	1,2-1,2	10112
<b>M101.0080.A16.14</b>	7	80	20	33,2	1,15	13,5	32	18	22,7	8,4	5,6	37	16	6000	1,4-1,4	10114
<b>M101.0080.A16.16</b>	7	80	20	33	1,3	13,5	32	18	22,7	8,4	5,6	37	16	6000	1,6-1,8	10116
<b>M101.0100.A22.16</b>	9	100	28	37	1,3	18,5	40,5	20	24,7	10,4	6,3	40,5	22	5000	1,6-1,8	10116
<b>M101.0125.A32.16</b>	11	125	34	50	1,3	28,5	45	25	36,7	14,4	8	55	32	4000	1,6-1,8	10116
<b>M101.0080.A16.20</b>	7	80	20	33	1,6	13,5	32	18	22,7	8,4	5,6	37	16	6000	2,0-2,3	10120
<b>M101.0100.A22.20</b>	9	100	28	37	1,6	18,5	40,5	20	24,7	10,4	6,3	40,5	22	5000	2,0-2,3	10120
<b>M101.0125.A32.20</b>	11	125	34	50	1,6	28,5	45	25	36,7	14,4	8	55	32	4000	2,0-2,3	10120

w siehe Schneidplatten  
w see inserts

Der Schlüssel **P101.01** gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 is not combined with slotting cutter - separate order required!

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	Stammblatt Blade	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M101.0080.A16.12	<b>030.3543.T8P</b>	<b>M101.0080.28.12</b>	<b>T8PL</b>
M101.0080.A16.14	<b>030.3543.T8P</b>	<b>M101.0080.28.14</b>	<b>T8PL</b>
M101.0080.A16.16	<b>030.3543.T8P</b>	<b>M101.0080.28.16</b>	<b>T8PL</b>
M101.0100.A22.16	<b>030.3543.T8P</b>	<b>M101.0100.28.16</b>	<b>T8PL</b>
M101.0125.A32.16	<b>030.3543.T8P</b>	<b>M101.0125.28.16</b>	<b>T8PL</b>
M101.0080.A16.20	<b>030.3543.T8P</b>	<b>M101.0080.28.20</b>	<b>T8PL</b>
M101.0100.A22.20	<b>030.3543.T8P</b>	<b>M101.0100.28.20</b>	<b>T8PL</b>
M101.0125.A32.20	<b>030.3543.T8P</b>	<b>M101.0125.28.20</b>	<b>T8PL</b>

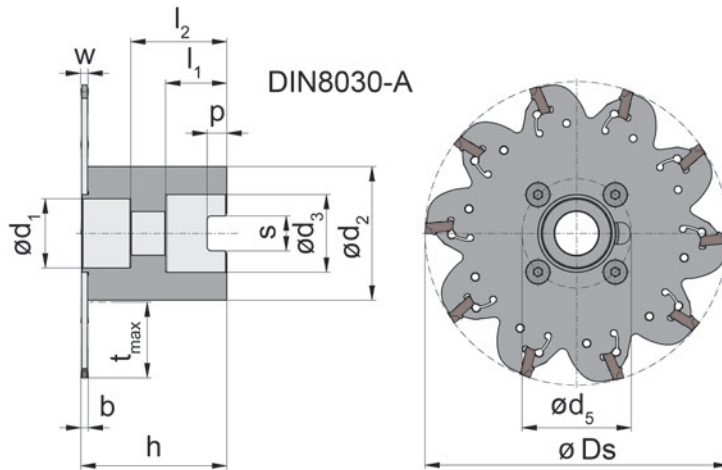
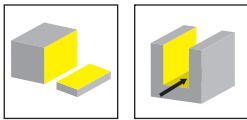


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	b	d <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	s	P	d <sub>2</sub>	d <sub>3</sub>	n <sub>max</sub>	Schneidbreite Width of groove	HWS
<b>M101.0080.A22.30</b>	6	80	19	37	2,4	18,5	20	24,7	10,4	6,3	22	22	5000	2,8-3,4	10130
<b>M101.0100.A22.30</b>	8	100	29	37	2,4	18,5	20	24,7	10,4	6,3	40	22	5000	2,8-3,4	10130
<b>M101.0125.A32.30</b>	10	125	34	50	2,4	28,5	25	36,7	14,4	8	55	32	4000	2,8-3,4	10130
<b>M101.0160.A40.30</b>	12	160	39	50	2,4	34,5	28	35	16,4	9	80	40	3000	2,8-3,4	10130
<b>M101.0080.A22.40</b>	6	80	19	37,9	3,2	18,5	20	24,7	10,4	6,3	22	22	5000	3,8-4,6	10140
<b>M101.0100.A22.40</b>	8	100	29	37,9	3,2	18,5	20	24,7	10,4	6,3	40	22	5000	3,8-4,6	10140
<b>M101.0125.A32.40</b>	10	125	34	50,9	3,2	28,5	25	36,7	14,4	8	55	32	4000	3,8-4,6	10140
<b>M101.0160.A40.40</b>	12	160	39	50,9	3,2	34,5	28	35	16,4	9	80	40	3000	3,8-4,6	10140
<b>M101.0200.A40.40</b>	16	200	59	50,9	3,2	34,5	28	35	16,4	9	80	40	2500	3,8-4,6	10140

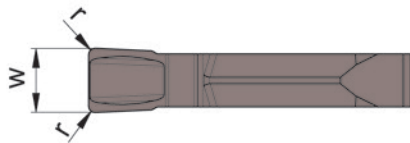
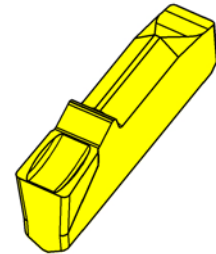
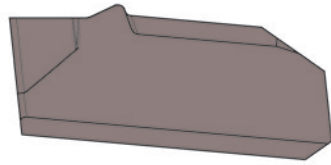
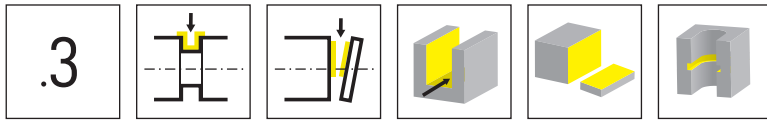
w siehe Schneidplatten  
w see inserts

Der Schlüssel **P101.02** gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 is not combined with slotting cutter - separate order required!

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	Stammblatt Blade	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M101.0080.A22.30	<b>030.0520.0912</b>	<b>M101.0080.28.30</b>	<b>T15PQ</b>
M101.0100.A22.30	<b>030.0520.0912</b>	<b>M101.0100.22.30</b>	<b>T15PQ</b>
M101.0125.A32.30	<b>030.0620.0913</b>	<b>M101.0125.32.30</b>	<b>T20PQ</b>
M101.0160.A40.30	<b>030.1030.0911</b>	<b>M101.0160.40.30</b>	
M101.0080.A22.40	<b>030.0520.0912</b>	<b>M101.0080.28.40</b>	<b>T15PQ</b>
M101.0100.A22.40	<b>030.0520.0912</b>	<b>M101.0100.22.40</b>	<b>T15PQ</b>
M101.0125.A32.40	<b>030.0620.0913</b>	<b>M101.0125.32.40</b>	<b>T20PQ</b>
M101.0160.A40.40	<b>030.1030.0911</b>	<b>M101.0160.40.40</b>	
M101.0200.A40.40	<b>030.1030.0911</b>	<b>M101.0080.28.40</b>	



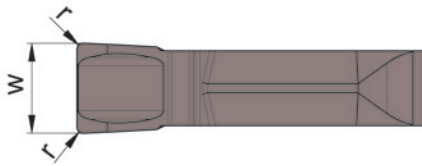
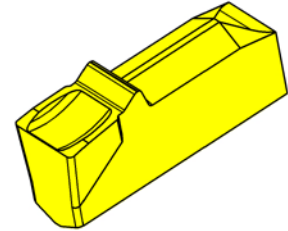
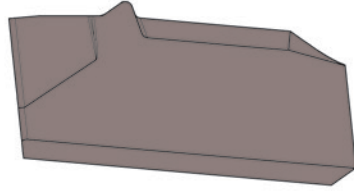
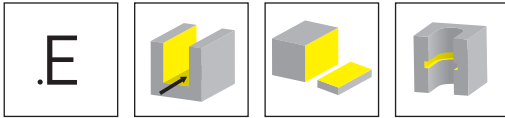
E

HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	HIS	AS45	IG35
S101.0120.315	1,2	0,15	10112	▲	▲
S101.0140.315	1,4	0,15	10114	▲	▲
S101.0160.315	1,6	0,15	10116	▲	▲
S101.0200.320	2	0,2	10120	▲	▲
S101.0250.320	2,5	0,2	10120	▲	△
				P ● -	
				M ● ●	
				K ● -	
				N ○ -	
				S ● ●	
				H - -	



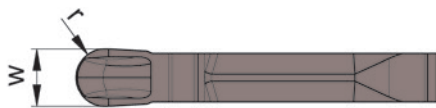
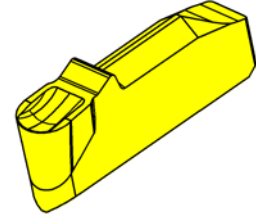
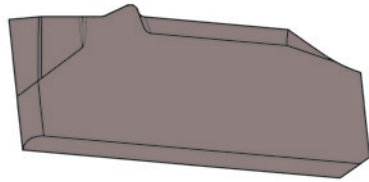
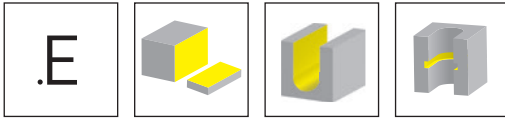
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	HIS	AS45
S101.0300.E32	3	0,2	10130	▲
S101.0400.E33	4	0,3	10140	▲
				P ●
				M ●
				K ●
				N ○
				S ●
				H -





E

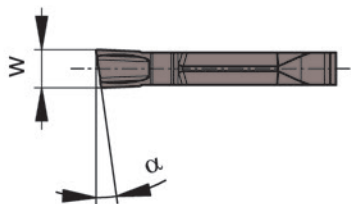
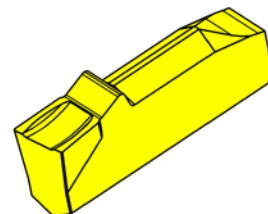
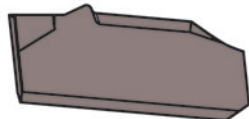
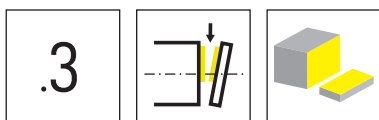
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	HIS	AS45
S101.0160.E3.R08	1,6	0,8	10116	▲
S101.0200.E3.R10	2	1	10120	▲
S101.0300.E3.R15	3	1,5	10130	▲
				P ●
				M ●
				K ●
				N ○
				S ●
				H -





R = rechts wie gezeichnet  
R = right hand version shown

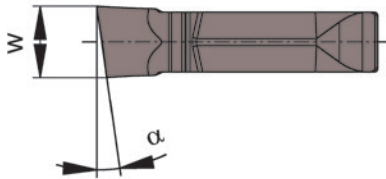
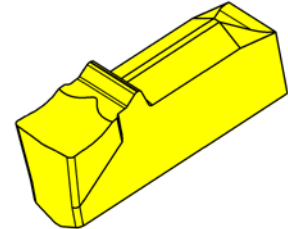
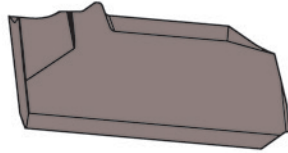
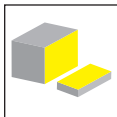
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	α	HIS	AS45	EG55	IG35
RS101.0812.30	1,2	8°	10112		▲	▲
RS101.0816.30	1,6	8°	10116	▲		▲
RS101.0820.30	2	8°	10120	▲		▲
RS101.0825.30	2,5	8°	10120	▲		▲
LS101.0812.30	1,2	8°	10112		▲	▲
LS101.0816.30	1,6	8°	10116	▲		▲
LS101.0820.30	2	8°	10120	▲		▲
LS101.0825.30	2,5	8°	10120	▲		▲
P	●	●	-			
M	●	○	●			
K	●	○	-			
N	○	-	-			
S	●	-	●			
H	-	-	-			

E



E

R = rechts wie gezeichnet  
R = right hand version shown

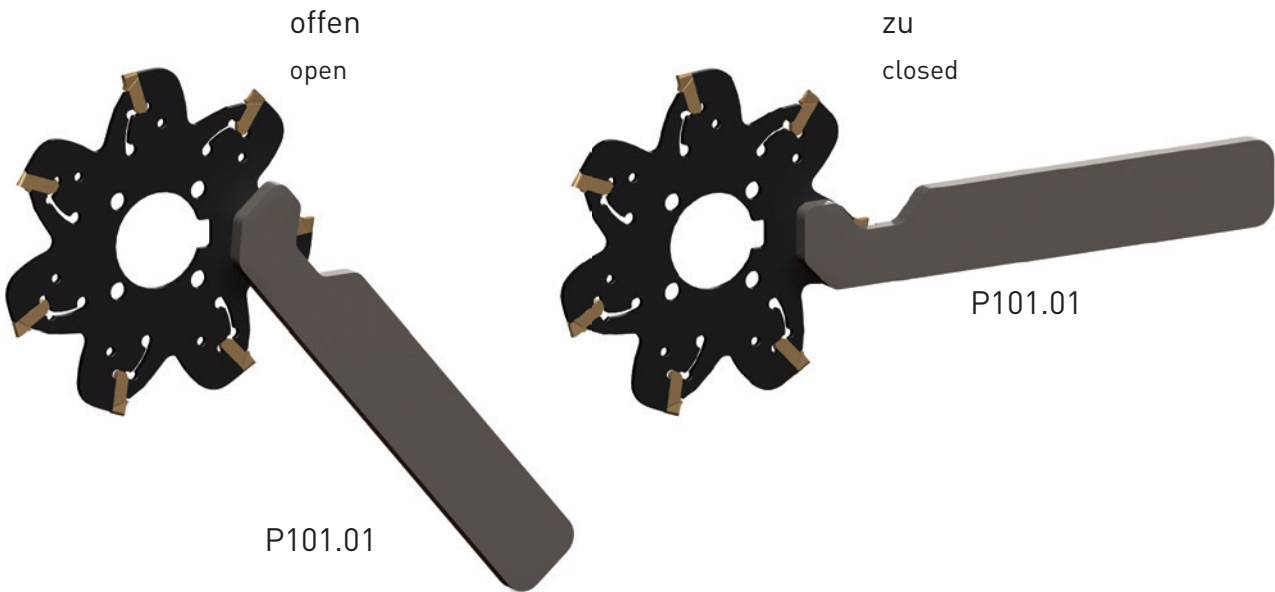
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	α	HIS	AS45	IG35
RS101.0830.FY0	3	8°	10130	▲	▲
LS101.0830.FY0	3	8°	10130	▲	▲
				P ● -	
				M ● ●	
				K ● -	
				N ○ -	
				S ● ●	
				H - -	

Spannsituation Schlüssel P101.01  
 Setting position clamping wrench P101.01



Nach Möglichkeit nur Gegenlaufräsen um Späneklemmer zu vermeiden.  
 Nach dem Wechseln der Platten, Vorschub bis zum Erreichen einer Anschnitttiefe von 0,5 - 1 mm um 50% reduzieren

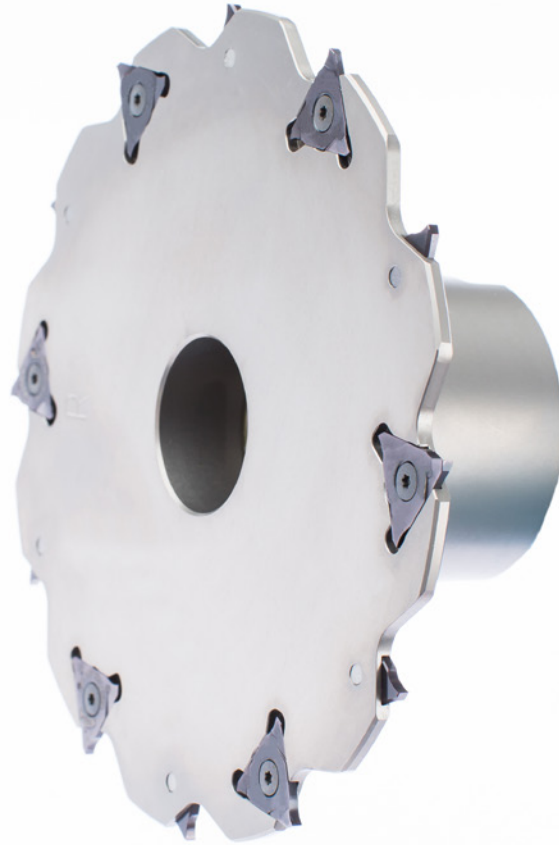
Use only conventional milling to avoid chip jamming.  
 After changing inserts, reduce the feed rate by 50% until an initial depth of cut of 0.5 - 1 mm is reached

Maximale Drehzahlen beachten!  
 Please note the max. revolutions!

Ø Scheibenfräser Ø Disc milling cutter	max. Drehzahl $n_{max}$ max. Revolutions $n_{max}$
Ø 63 mm	7.500 min <sup>-1</sup>
Ø 80 mm	6.000 min <sup>-1</sup>
Ø 100 mm	5.000 min <sup>-1</sup>
Ø 125 mm	4.000 min <sup>-1</sup>
Ø 160 mm	3.000 min <sup>-1</sup>
Ø 200 mm	2.500 min <sup>-1</sup>

E

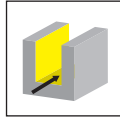




**F**

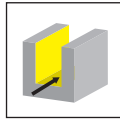
System/System	Seite/Page
<b>382/383</b>	<b>246</b>
<b>M310</b>	<b>260</b>
<b>M475</b>	<b>272</b>

Scheibenfräser  
Disc Milling Cutter  
382



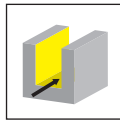
Seite/Page  
248-251

Aufsteckfräser  
Arbour Mounted Cutter  
383



Seite/Page  
252-254

Wendeschneidplatte  
Indexable insert  
314



Seite/Page  
255



Seite/Page  
256-258

F

**382/383**



**F**

**Scheibenfräser**  
**Aufsteckfräser**

Nutbreite 6 - 10 mm  
Schneidkreis-Ø 80 - 200 mm

**Disc Milling Cutter**  
**Arbour Mounted Cutter**

Width of groove 6 - 10 mm  
Cutting edge Ø 80 - 200 mm

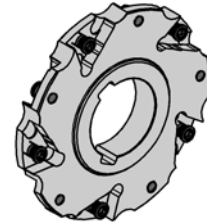
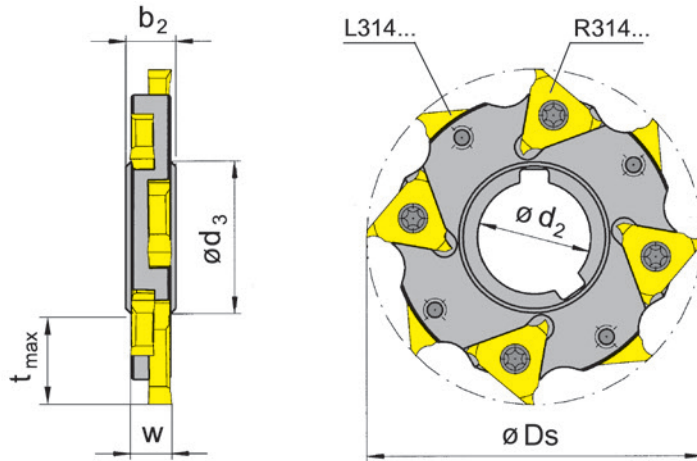
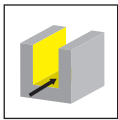


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
382.0080.27.06	4	80	21	27	10	36	6	4x R314....	4x L314...	314027R • 314027L
382.0080.27.08	4	80	21	27	12	36	8	4x R314....	4x L314...	314041R • 314041L
382.0080.27.10	4	80	21	27	12	36	10	4x R314....	4x L314...	314052R • 314052L

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
382.0080.27.06	5F.06T15P	T15PQ
382.0080.27.08	5F.08T20P	T20PQ
382.0080.27.10	5.10T20P	T20PQ



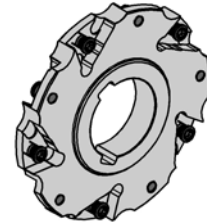
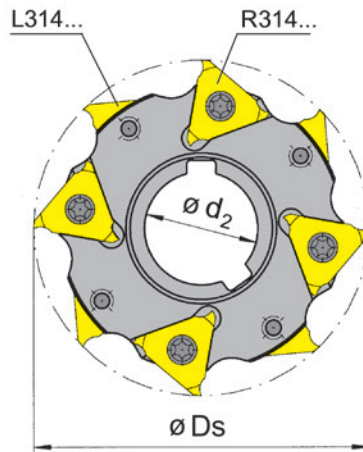
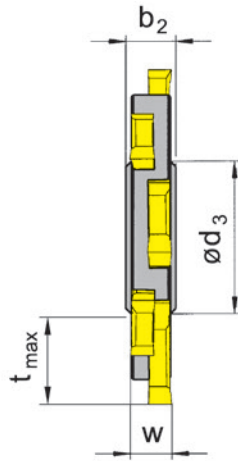
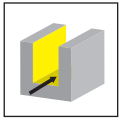


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>382.0100.32.06</b>	5	100	25,5	32	10	47	6	5x R314...	5x L314...	314027R • 314027L
<b>382.0100.32.08</b>	5	100	25,5	32	12	47	8	5x R314...	5x L314...	314041R • 314041L
<b>382.0100.32.10</b>	5	100	25,5	32	12	47	10	5x R314...	5x L314...	314052R • 314052L

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

**Ersatzteile**  
Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
382.0100.32.06	<b>5F.06T15P</b>	<b>T15PQ</b>
382.0100.32.08	<b>5F.08T20P</b>	<b>T20PQ</b>
382.0100.32.10	<b>5.10T20P</b>	<b>T20PQ</b>



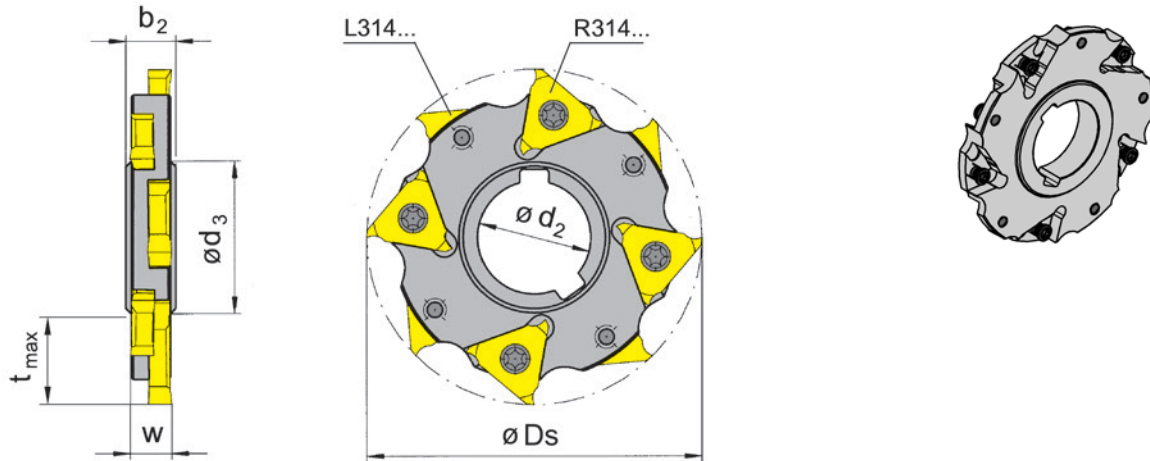
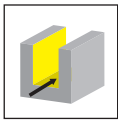


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
382.0125.40.06	6	125	32,5	40	10	58	6	6x R314...	6x L314...	314027R • 314027L
382.0125.40.08	6	125	32,5	40	12	58	8	6x R314...	6x L314...	314041R • 314041L
382.0125.40.10	6	125	32,5	40	14	58	10	6x R314...	6x L314...	314052R • 314052L
382.0160.40.06	8	160	50	40	10	58	6	8x R314...	8x L314...	314027R • 314027L
382.0160.40.08	8	160	50	40	12	58	8	8x R314...	8x L314...	314041R • 314041L
382.0160.40.10	8	160	50	40	14	58	10	8x R314...	8x L314...	314052R • 314052L
382.0160.40.12	5	160	50	40	14	58	12	2x5 R314...	5x L314...	314052R • 314052L

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
382...06	5F.06T15P	T15PQ
382...08	5F.08T20P	T20PQ
382...10/12	5.10T20P	T20PQ

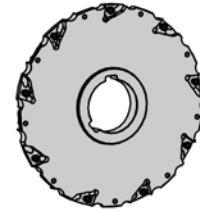
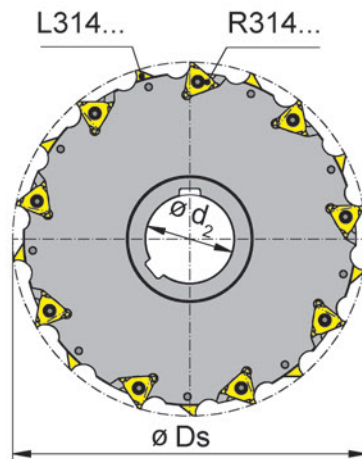
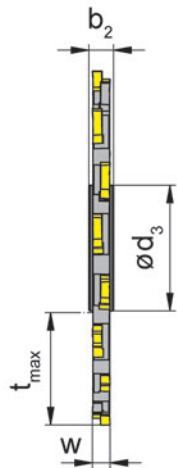
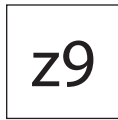
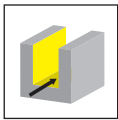


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
382.0200.50.06	9	200	63,5	50	10	71	6	9x R314...	9x L314...	314027R • 314027L
382.0200.50.08	9	200	63,5	50	12	71	8	9x R314...	9x L314...	314041R • 314041L
382.0200.50.10	9	200	63,5	50	14	71	10	9x R314...	9x L314...	314052R • 314052L
382.0200.50.12	9	200	63,5	50	14	71	12	2x6 R314...	6x L314...	314052R • 314052L
382.0200.50.14	9	200	63,5	50	16	71	14	2x6 R314...	6x L314...	314052R • 314052L

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
382.0200.50.06	5F.06T15P	T15PQ
382.0200.50.08	5F.08T20P	T20PQ
382.0200.50....	5.10T20P	T20PQ



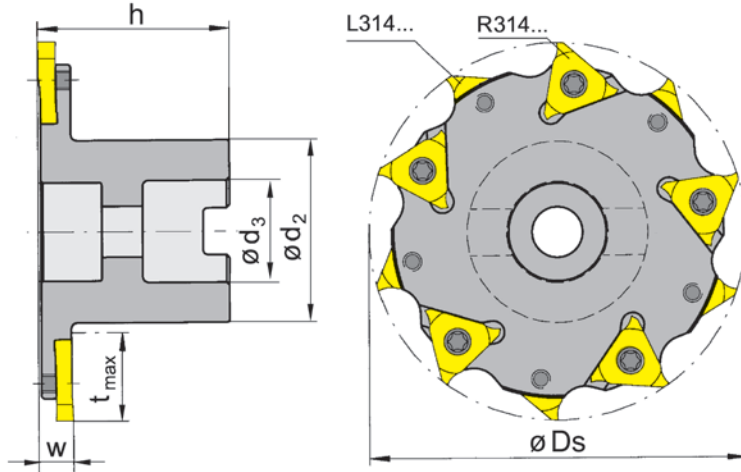
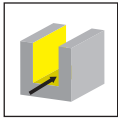


Abbildung = rechtsschneidend  
Picture = right hand cutting version

**F**

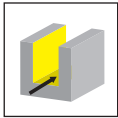
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>383.0100.27.06</b>	5	100	25	50	48	27	6	5x R314...	5x L314...	314027R • 314027L
<b>383.0100.27.08</b>	5	100	25	50	48	27	8	5x R314...	5x L314...	314041R • 314041L
<b>383.0100.27.10</b>	5	100	25	50	48	27	10	5x R314...	5x L314...	314052R • 314052L

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

**Ersatzteile**

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
383.0100.27.06	<b>5F.06T15P</b>	<b>T15PQ</b>
383.0100.27.08	<b>5F.08T20P</b>	<b>T20PQ</b>
383.0100.27.10	<b>5.10T20P</b>	<b>T20PQ</b>



**z6**

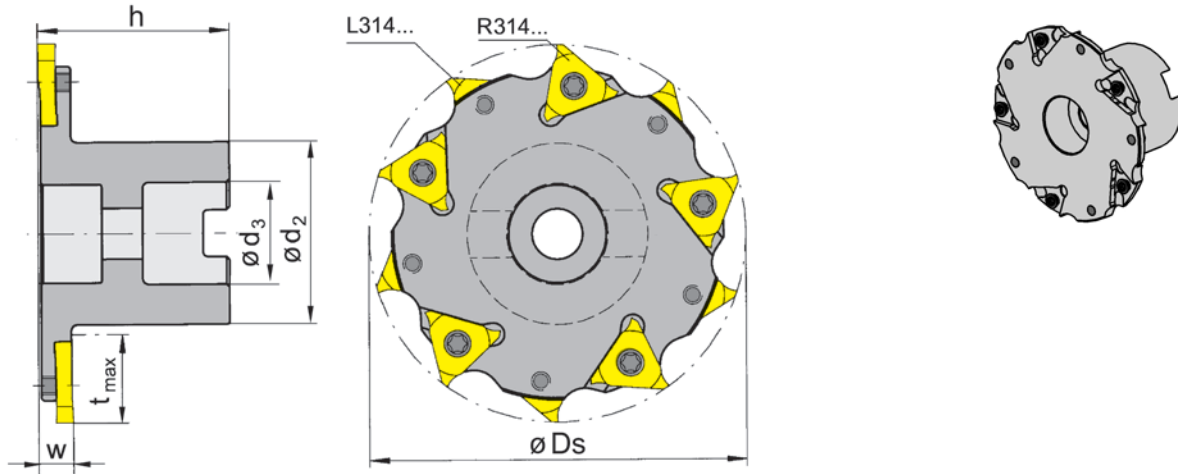


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>383.0125.32.06</b>	12	125	32	50	56	32	6	6x R314...	6x L314...	314027R • 314027L
<b>383.0125.32.08</b>	12	125	32	50	56	32	8	6x R314...	6x L314...	314041R • 314041L

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

**Ersatzteile**  
Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
383.0125.32.06	<b>5F.06T15P</b>	<b>T15PQ</b>
383.0125.32.08	<b>5F.08T20P</b>	<b>T20PQ</b>



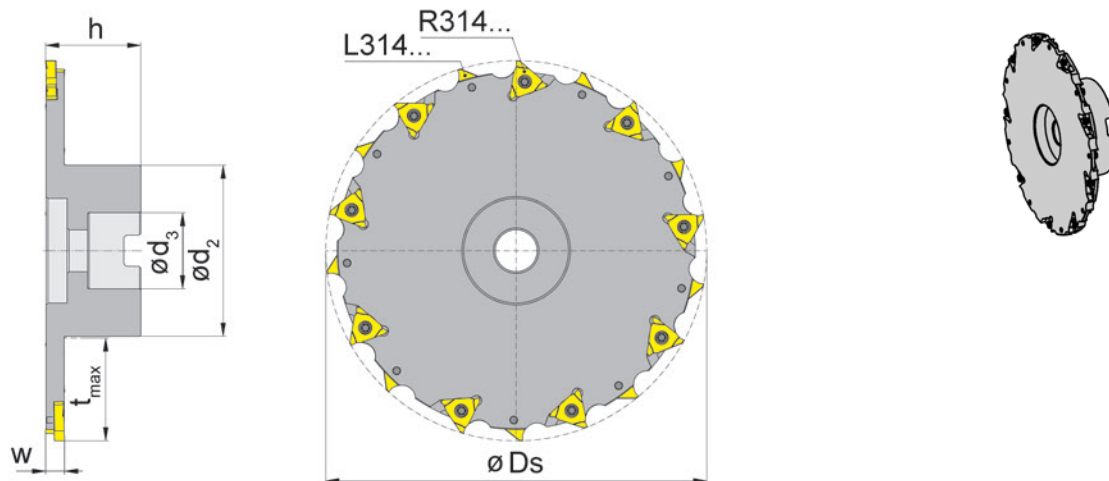
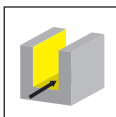


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

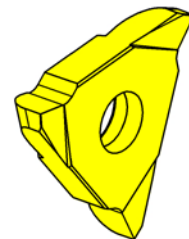
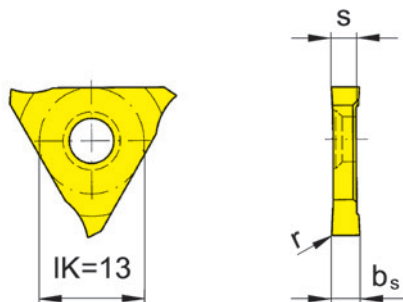
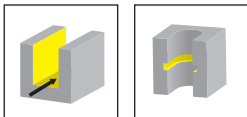
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
383.0160.40.06	8	160	44	60	70	40	6	8x R314...	8x L314...	314027R • 314027L
383.0160.40.08	8	160	44	60	70	40	8	8x R314...	8x L314...	314041R • 314041L
383.0200.40.06	9	200	54	50	90	40	6	9x R314...	9x L314...	314027R • 314027L
383.0200.40.08	9	200	54	50	90	40	8	9x R314...	9x L314...	314041R • 314041L
383.0200.40.10	9	200	54	50	90	40	10	9x R314...	9x L314...	314052R • 314052L
383.0200.40.12	6	200	54	50	90	40	12	2x6 R314...	6x L314...	314052R • 314052L

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
383.160...06	5F.06T15P	T15PQ
383.160...08	5F.08T20P	T20PQ
383.0200.40.10/.12	5.10T20P	T20PQ



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

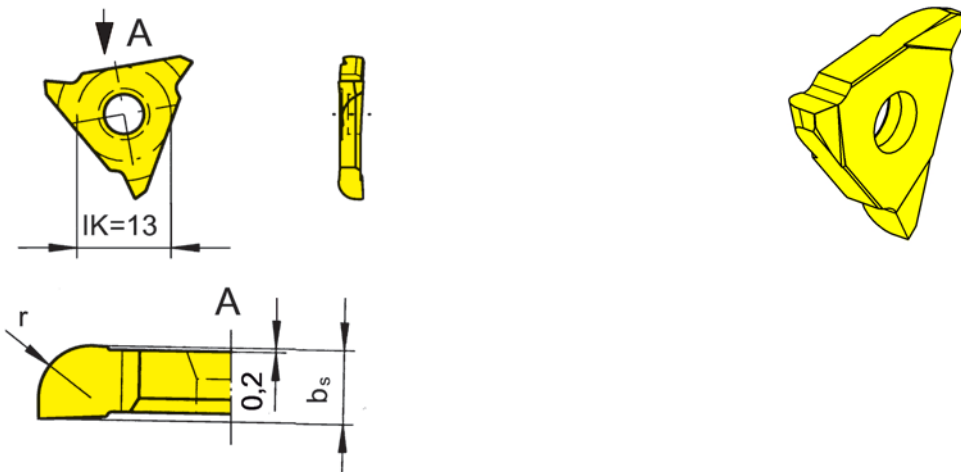
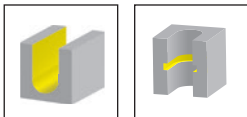
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$b_s$	$r$	$s$	HIS	AS45	Ti25	TN35
<b>R314.6032.00</b>	3,2	0,2	2,7	314027R	▲	▲	▲
<b>R314.8043.00</b>	4,3	0,2	4,1	314041R	▲	▲	▲
<b>R314.0054.00</b>	5,4	0,2	5,2	314052R	▲	▲	▲
<b>L314.6032.00</b>	3,2	0,2	2,7	314027L	▲	▲	▲
<b>L314.8043.00</b>	4,3	0,2	4,1	314041L	▲	▲	▲
<b>L314.0054.00</b>	5,4	0,2	5,2	314052L	▲	▲	▲
<b>N314.0056.00</b>	5,6	0,2	5,2	314052N	▲	▲	▲

**Hinweis:**  
Standard-WSP **N314.0056.00** für Verwendung in Sonderbauförmern.  
**Note:**  
Standard insert N314.0056.00 for use with special cutters.

<b>P</b>	●	●	●
<b>M</b>	●	●	●
<b>K</b>	●	●	●
<b>N</b>	○	●	●
<b>S</b>	●	●	●
<b>H</b>	-	-	-





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

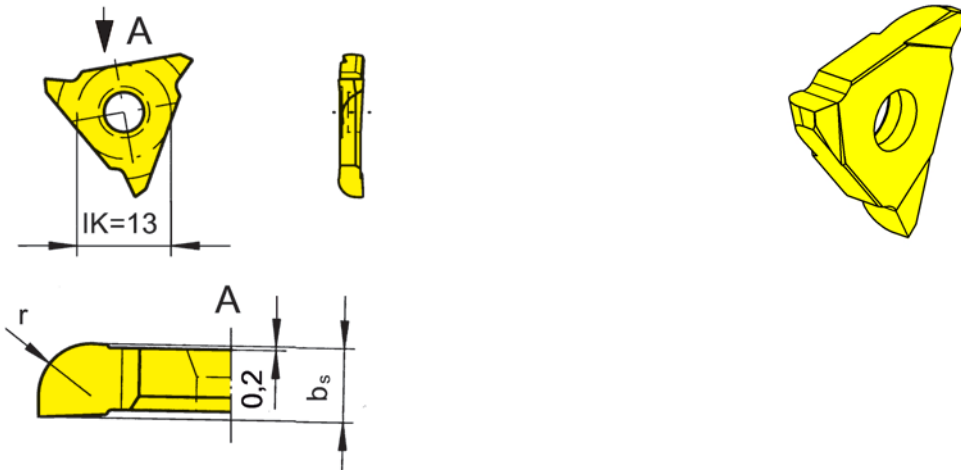
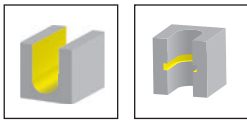
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

F

Bestellnummer Part number	$b_s$	$r$	HIS	AS45	TI25
R314.0320.20	3,2	2	314027R	▲	▲
R314.0430.20	4,3	2	314041R	▲	▲
R314.0430.25	4,3	2,5	314041R	▲	▲
R314.0540.20	5,43	2	314052R	▲	▲
R314.0540.25	5,44	2,5	314052R	▲	▲
R314.0540.40	5,47	4	314052R	▲	▲
L314.0320.20	3,2	2	314027L	▲	▲
L314.0430.20	4,3	2	314041L	▲	▲
L314.0430.25	4,3	2,5	314041L	▲	▲
L314.0540.20	5,43	2	314052L	▲	▲
L314.0540.25	5,44	2,5	314052L	▲	▲
L314.0540.40	5,47	4	314052L	▲	▲
				P ● ●	
				M ● ●	
				K ● ●	
				N ○ ●	
				S ● ●	
				H - -	





R = rechts wie gezeichnet  
R = right hand version shown

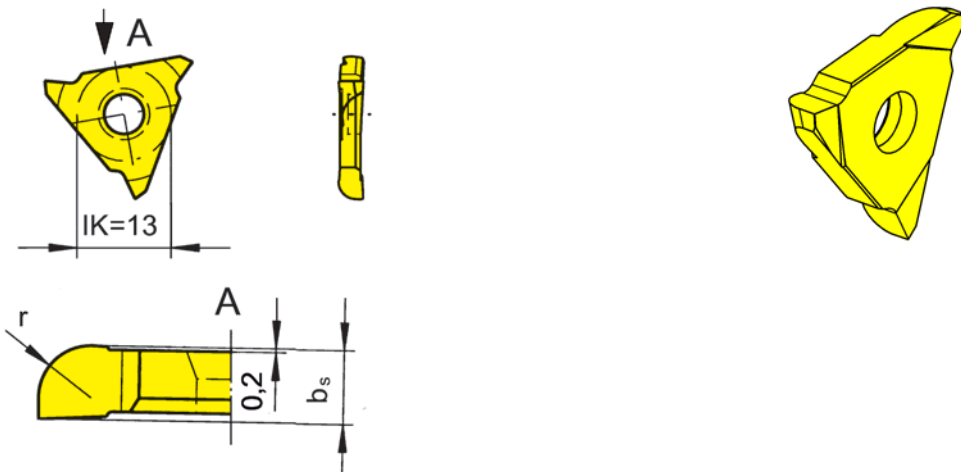
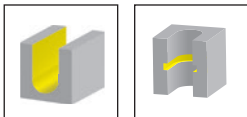
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$b_s$	$r$	HIS	AS45	TI25
R314.0320.04	3,2	0,4	314027R	Δ	
R314.0320.05	3,2	0,5	314027R	▲	
R314.0320.10	3,2	1	314027R	▲	
R314.0320.15	3,2	1,5	314027R	▲	
R314.0320.16	3,2	1,6	314027R	Δ	
R314.0320.20	3,2	2	314027R	▲	▲
R314.0430.04	4,3	0,4	314041R	▲	
R314.0430.05	4,3	0,5	314041R	▲	
R314.0430.10	4,3	1	314041R	▲	
R314.0430.15	4,3	1,5	314041R	▲	
R314.0430.16	4,3	1,6	314041R	▲	
R314.0430.20	4,3	2	314041R	▲	▲
R314.0430.25	4,3	2,5	314041R	▲	▲
L314.0320.04	3,2	0,4	314027L	Δ	
L314.0320.05	3,2	0,5	314027L	▲	
L314.0320.10	3,2	1	314027L	▲	
L314.0320.15	3,2	1,5	314027L	▲	
L314.0320.16	3,2	1,6	314027L	Δ	
L314.0320.20	3,2	2	314027L	▲	▲
L314.0430.04	4,3	0,4	314041L	▲	
L314.0430.05	4,3	0,5	314041L	▲	
L314.0430.10	4,3	1	314041L	▲	
L314.0430.15	4,3	1,5	314041L	▲	
L314.0430.16	4,3	1,6	314041L	▲	
L314.0430.20	4,3	2	314041L	▲	▲
L314.0430.25	4,3	2,5	314041L	▲	▲
P	•	•			
M	•	•			
K	•	•			
N	○	•			
S	•	•			
H	-	-			





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

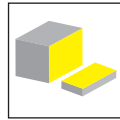
F

Bestellnummer Part number	$b_s$	$r$	HIS	AS45	TI25
R314.0540.04	5,43	0,4	314052R	▲	
R314.0540.05	5,43	0,5	314052R	▲	
R314.0540.10	5,43	1	314052R	▲	
R314.0540.15	5,43	1,5	314052R	Δ	
R314.0540.16	5,43	1,6	314052R	Δ	
R314.0540.20	5,43	2	314052R	▲	▲
L314.0540.04	5,43	0,4	314052L	Δ	
L314.0540.05	5,43	0,5	314052L	Δ	
L314.0540.10	5,43	1	314052L	▲	
L314.0540.15	5,43	1,5	314052L	Δ	
L314.0540.16	5,43	1,6	314052L	Δ	
L314.0540.20	5,43	2	314052L	▲	▲
				P ● ●	
				M ● ●	
				K ● ●	
				N ○ ●	
				S ● ●	
				H - -	



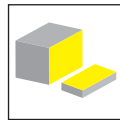
F

Scheibenfräser  
Disc Milling Cutter  
M310



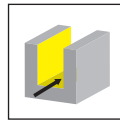
Seite/Page  
262

Einschraubfräser  
Screw-in cutter  
M310



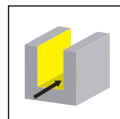
Seite/Page  
263-264

Aufsteckfräser  
Arbour Mounted Cutter  
M310



Seite/Page  
265-267

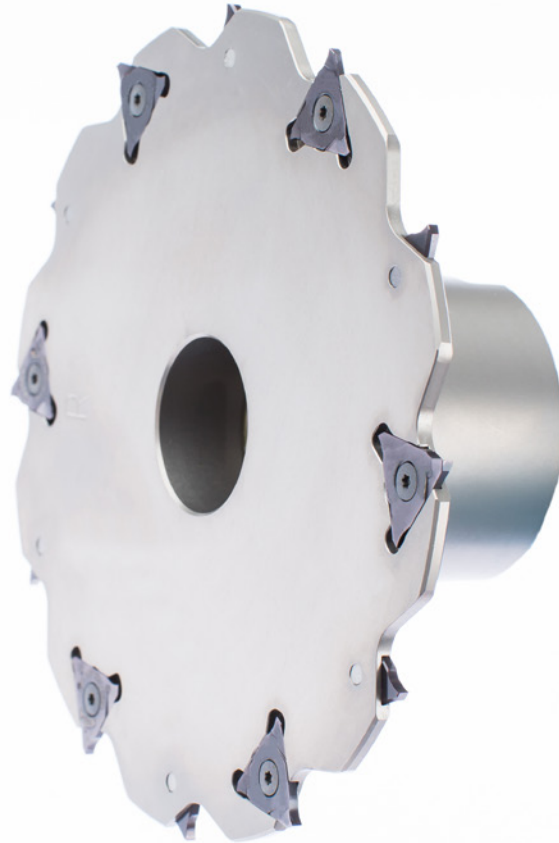
Wendeschneidplatte  
Indexable insert  
S310



Seite/Page  
268-270

F

# M310



F

**Scheibenfräser**  
**Einschraubfräser**  
**Aufsteckfräser**

Trennbreite            3 - 5 mm  
Schneidkreis-Ø 50 - 200 mm

**Disc Milling Cutter**  
**Screw-in Cutter**  
**Arbour Mounted Cutter**

Width of slot            3 - 5 mm  
Cutting edge Ø 50 - 200 mm

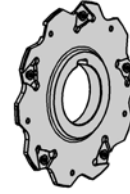
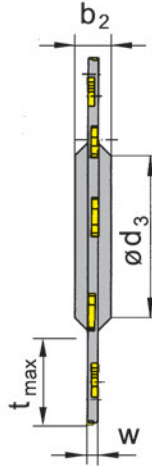
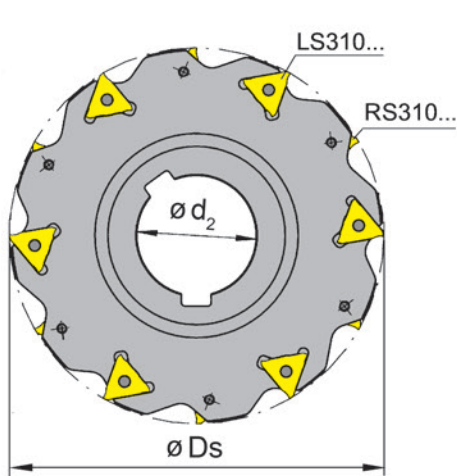
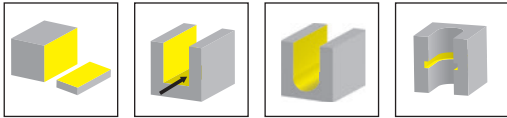


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
M310.0080.27.03	4	80	18	27	8	40	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.27.04	4	80	18	27	8	40	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.27.05	4	80	18	27	8	40	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.0100.32.03	5	100	25	32	8	46	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
M310.0100.32.04	5	100	25	32	8	46	4	5x RS310.4023...	5x LS310.4023...	310023R • 310023L
M310.0100.32.05	5	100	25	32	8	46	5	5x RS310.5028...	5x LS310.5028...	310028R • 310028L
M310.0125.40.03	6	125	32	40	10	54	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.0125.40.04	6	125	32	40	10	54	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.0125.40.05	6	125	32	40	10	54	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.0160.40.03	8	160	50	40	10	54	3	8x RS310.3017...	8x LS310.3017...	310017R • 310017L
M310.0160.40.04	8	160	50	40	10	54	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
M310.0160.40.05	8	160	50	40	10	54	5	8x RS310.5028...	8x LS310.5028...	310028R • 310028L
M310.0200.40.04	10	200	70	40	10	54	4	10x RS310.4023...	10x LS310.4023...	310023R • 310023L
M310.0200.40.05	10	200	70	40	10	54	5	10x RS310.5028...	10x LS310.5028...	310028R • 310028L

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

### Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	030.0324.T7P	T7PL
M310...04	030.3535.T8P	T8PL
M310...05	030.3543.T8P	T8PL

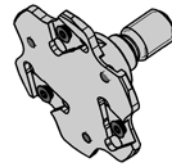
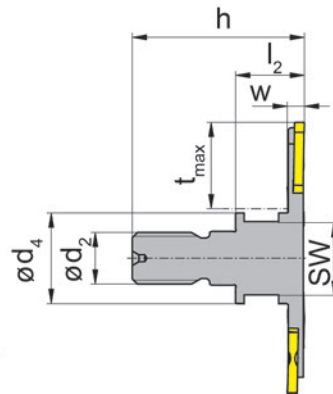
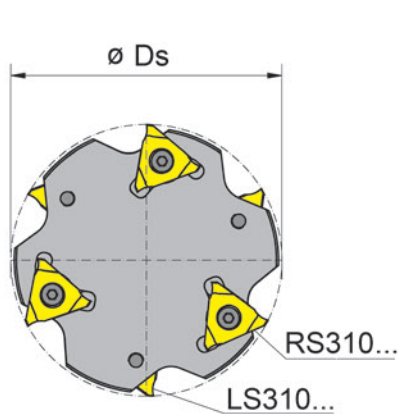
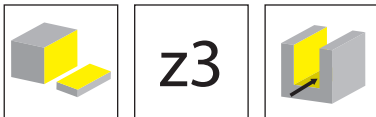


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	h	$l_2$	$d_2$	$d_4$	SW	w	$t_{max}$	rechte WSP right hand insert	linke WSP left hand insert	HWS	HMS
<b>M310.0050.M10.03</b>	3	50	33	13	M10	18	15	3	15	3x RS310.3017...	3x LS310.3017...	310017R • 310017L	10001
<b>M310.0050.M10.04</b>	3	50	34	14	M10	18	15	4	15	3x RS310.4023...	3x LS310.4023...	310023R • 310023L	10001
<b>M310.0050.M10.05</b>	3	50	35	15	M10	18	15	5	15	3x RS310.5028...	3x LS310.5028...	310028R • 310028L	10001
<b>M310.0063.M12.03</b>	3	63	39	15	M12	21	17	3	20	3x RS310.3017...	3x LS310.3017...	310017R • 310017L	12001
<b>M310.0063.M12.04</b>	3	63	40	16	M12	21	17	4	20	3x RS310.4023...	3x LS310.4023...	310023R • 310023L	12001
<b>M310.0063.M12.05</b>	3	63	41	17	M12	21	17	5	20	3x RS310.5028...	3x LS310.5028...	310028R • 310028L	12001

## Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	<b>030.0324.T7P</b>	<b>T7PL</b>
M310...04	<b>030.3535.T8P</b>	<b>T8PL</b>
M310...05	<b>030.3543.T8P</b>	<b>T8PL</b>



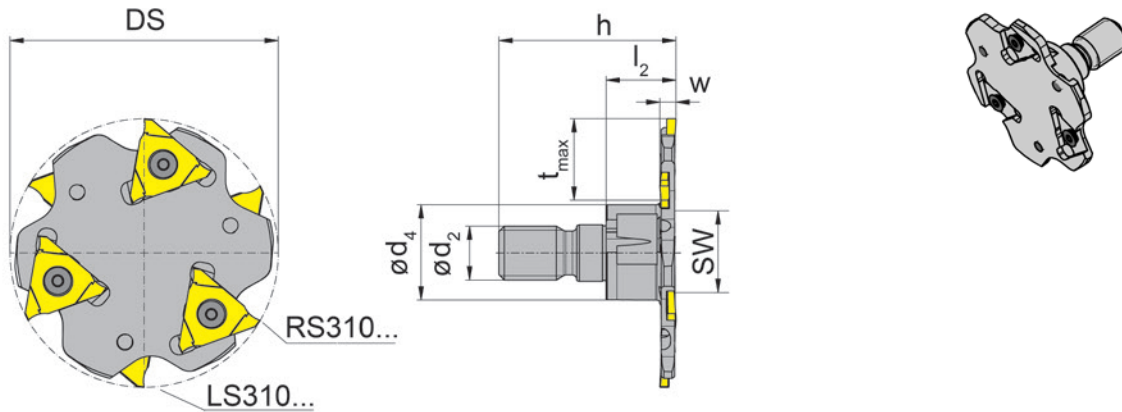
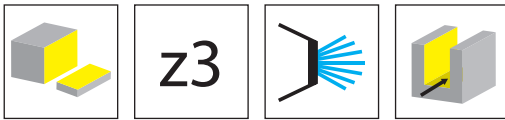


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	h	l <sub>2</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	w	t <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS	HMS
M310.0050.M10.03.IK	3	50	33	13	M10	18	15	3	15	3xRS310.3017..	3xLS310.3017..	310017R • 310017L	10001
M310.0050.M10.04.IK	3	50	34	14	M10	18	15	4	15	3xRS310.4023..	3xLS310.4023..	310023R • 310023L	10001
M310.0050.M10.05.IK	3	50	35	15	M10	18	15	5	15	3xRS310.5028..	3xLS310.5028..	310028R • 310028L	10001
M310.0063.M12.03.IK	3	63	39	15	M12	21	17	3	20	3xRS310.3017..	3xLS310.3017..	310017R • 310017L	12001
M310.0063.M12.04.IK	3	63	40	16	M12	21	17	4	20	3xRS310.4023..	3xLS310.4023..	310023R • 310023L	12001
M310.0063.M12.05.IK	3	63	41	17	M12	21	17	5	20	3xRS310.5028..	3xLS310.5028..	310028R • 310028L	12001

### Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	030.0324.T7P	T7PL
M310...04	030.3535.T8P	T8PL
M310...05	030.3543.T8P	T8PL



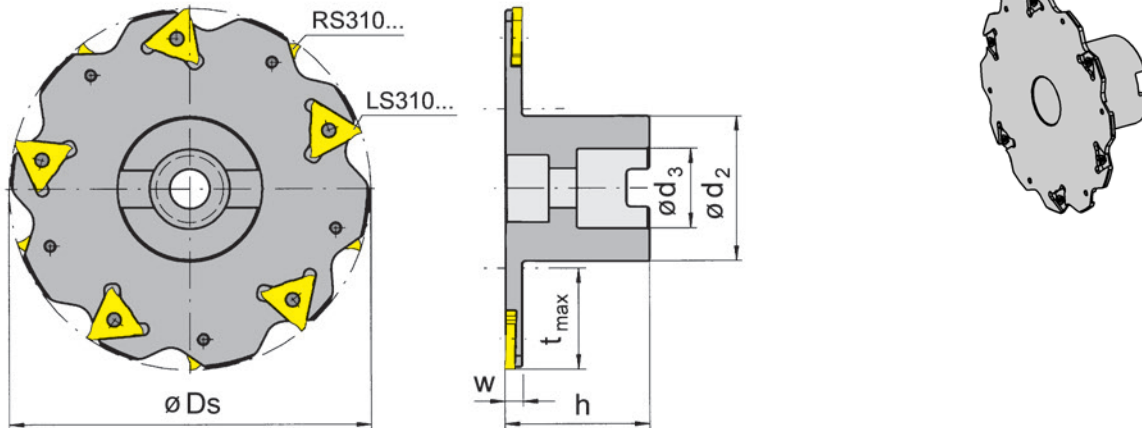
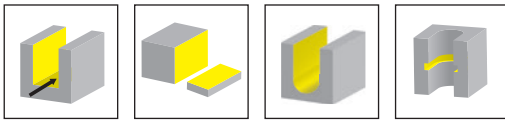


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
M310.0080.22.03	4	80	23	40	33	22	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.1100.27.03	4	100	25	50	48	27	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
M310.1125.27.03	4	125	35,7	50	48	27	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.1125.32.03	5	125	32,5	50	58	32	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.1125.40.03	5	125	26,5	50	70	40	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.1160.40.03	5	160	44	50	70	40	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.0080.22.04	6	80	23	40	33	22	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.22.05	6	80	23	40	33	22	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.1100.27.04	6	100	25	50	48	27	4	5x RS310.4023...	5x LS310.4023...	310023R • 310023L
M310.1100.27.05	6	100	25	50	48	27	5	5x RS310.5028...	5x LS310.5028...	310028R • 310028L
M310.1125.27.04	6	125	37,5	50	48	27	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.32.04	6	125	32	50	56	32	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.40.04	6	125	26,5	50	70	40	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.27.05	6	125	37,5	50	48	27	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1125.32.05	6	125	32,5	50	56	32	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1125.40.05	8	125	26,5	50	70	40	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1160.40.04	8	160	44	50	70	40	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
M310.1160.40.05	8	160	44	50	70	40	5	8x RS310.5028...	8x LS310.5028...	310028R • 310028L
M310.1200.40.04	10	200	64	50	70	40	4	10x RS310.4023...	10x LS310.4023...	310023R • 310023L
M310.1200.40.05	10	200	64	50	70	40	5	10x RS310.5028...	10x LS310.5028...	310028R • 310028L

Bohrung [d3] mit Quernut nach DIN 138  
Bore [d3] with cross keyway to DIN 138

### Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	030.0324.T7P	T7PL
M310...04	030.3535.T8P	T8PL
M310...05	030.3543.T8P	T8PL



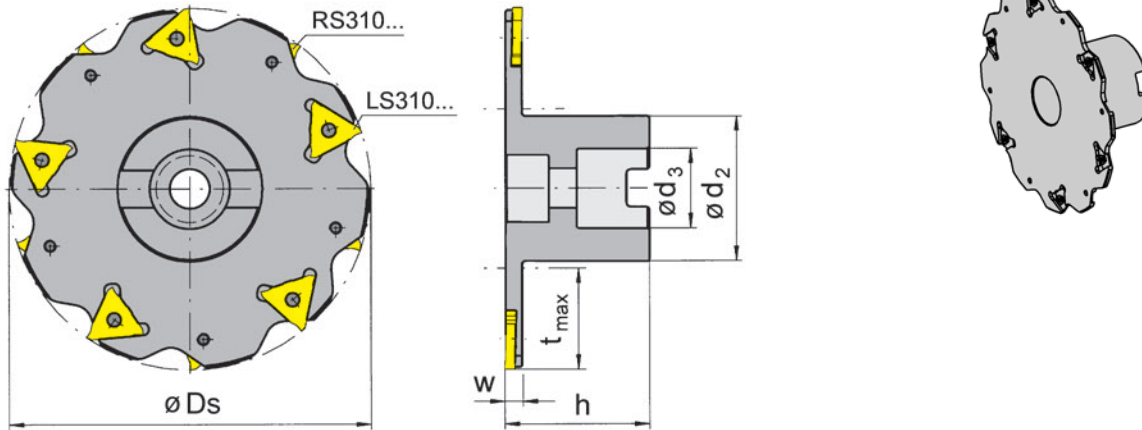
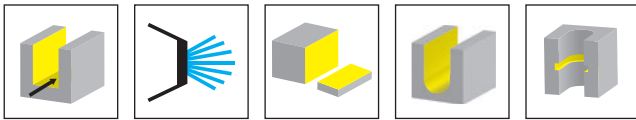


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
M310.0063.16.03.IK	3	63	17,5	35	26	16	3	3x RS310.3017...	3x LS310.3017...	310017R • 310017L
M310.0063.16.04.IK	3	63	17,5	35	26	16	4	3x RS310.4023...	3x LS310.4023...	310023R • 310023L
M310.0063.16.05.IK	3	63	17,5	35	26	16	5	3x RS310.5028...	3x LS310.5028...	310028R • 310028L
M310.0080.16.03.IK	4	80	25	40	28	16	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.16.04.IK	4	80	25	40	28	16	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.16.05.IK	4	80	25	40	28	16	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.0080.22.03.IK	4	80	23	40	33	22	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.22.04.IK	4	80	23	40	33	22	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.22.05.IK	4	80	23	40	33	22	5	4x RS310.5028...	4x RS310.5028...	310028R • 310028L
M310.1100.27.03.IK	5	100	25	50	48	27	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
M310.1100.27.04.IK	5	100	25	50	48	27	4	5x RS310.4023...	5x LS310.4023...	310023R • 310023L

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	030.0324.T7P	T7PL
M310...04	030.3535.T8P	T8PL
M310...05	030.3543.T8P	T8PL

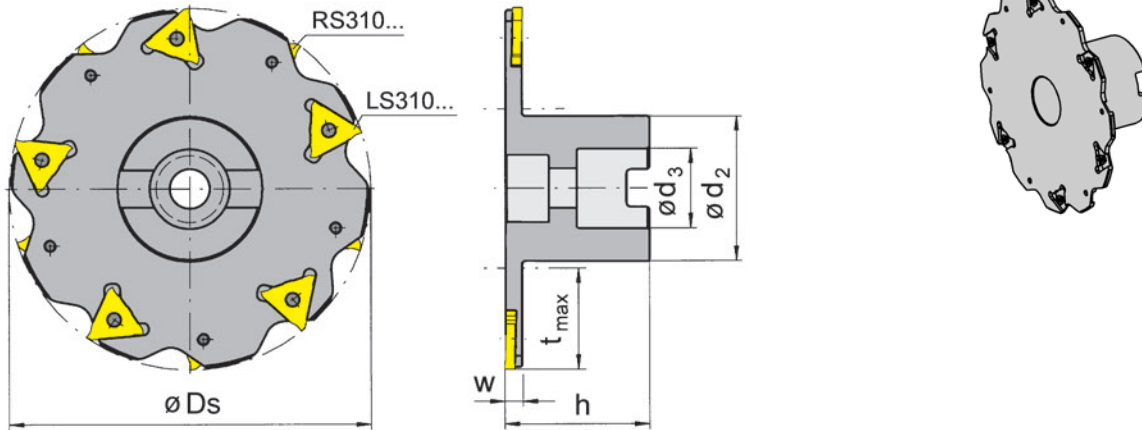
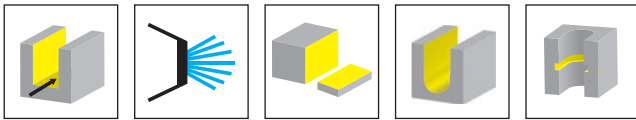


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M310.1125.27.03.IK</b>	6	125	37,5	50	48	27	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
<b>M310.1125.27.04.IK</b>	6	125	37,5	50	48	27	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
<b>M310.1125.27.05.IK</b>	6	125	37,5	50	48	27	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
<b>M310.1125.32.03.IK</b>	6	125	32	50	56	32	3	6x LS310.3017...	6x LS310.3017...	310017R • 310017L
<b>M310.1125.32.04.IK</b>	6	125	32	50	56	32	4	6x LS310.4023...	6x RS310.4023...	310023R • 310023L
<b>M310.1125.32.05.IK</b>	6	125	32	50	56	32	5	6x LS310.5028...	6x RS310.5028...	310028R • 310028L
<b>M310.1125.40.05.IK</b>	6	125	26,5	50	70	40	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
<b>M310.1160.40.03.IK</b>	8	160	44	50	70	40	3	8x RS310.3017...	8x LS310.3017...	310017R • 310017L
<b>M310.1160.40.04.IK</b>	8	160	44	50	70	40	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
<b>M310.1160.40.05.IK</b>	8	160	44	50	70	40	5	8x LS310.5028...	3x RS310.5028...	310028R • 310028L
<b>M310.1200.40.04.IK</b>	10	200	64	50	70	40	4	10x LS310.4023...	10x RS310.4023...	310023R • 310023L
<b>M310.1200.40.05.IK</b>	10	200	64	50	70	40	5	10x LS310.5028...	10x RS310.5028...	310028R • 310028L

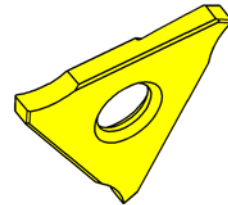
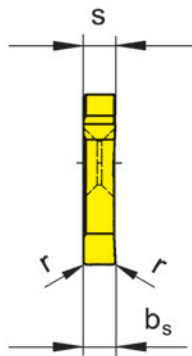
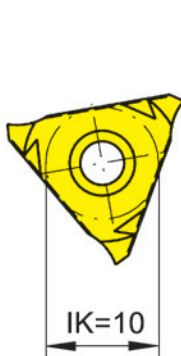
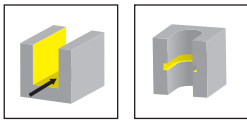
Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

**Ersatzteile**

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...03	<b>030.0324.T7P</b>	<b>T7PL</b>
M310...04	<b>030.3535.T8P</b>	<b>T8PL</b>
M310...05	<b>030.3543.T8P</b>	<b>T8PL</b>





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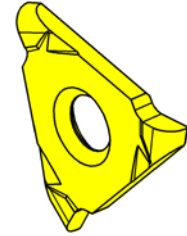
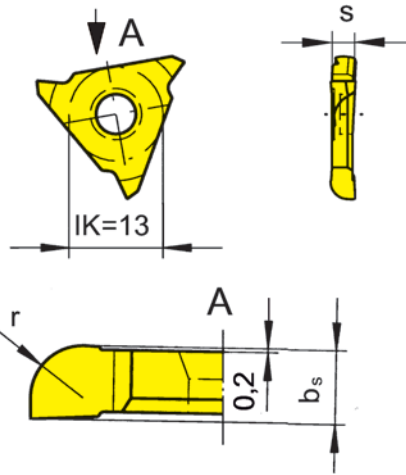
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	r	b <sub>s</sub>	s	HIS	AS45	DD25	IG35	TN35
RS310.3017.00	0,15	1,7	1,6	310017R	▲	▲	▲	
RS310.3118.00	0,15	1,8	1,6	310017R	▲			
RS310.4023.00	0,2	2,3	2,2	310023R	▲	▲	▲	▲
RS310.5028.00	0,2	2,8	2,7	310028R	▲	▲	▲	▲
LS310.3017.00	0,15	1,7	1,6	310017L	▲	▲	▲	
LS310.3118.00	0,15	1,8	1,6	310017L	▲			
LS310.4023.00	0,2	2,3	2,2	310023L	▲	▲	▲	▲
LS310.5028.00	0,2	2,8	2,7	310028L	▲	▲	▲	▲
					P ●	-	-	●
					M ●	-	●	●
					K ●	-	-	●
					N ○	●	-	●
					S ●	○	●	●
					H -	-	-	-



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

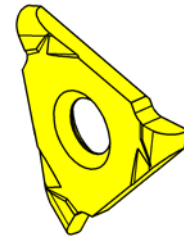
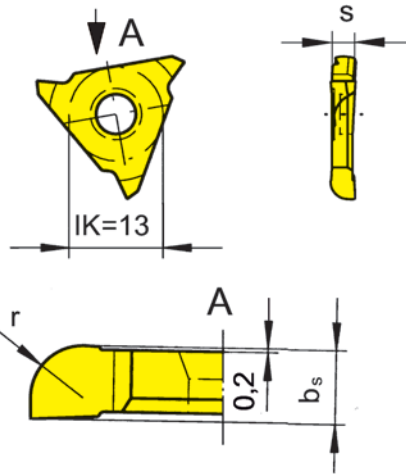
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	r	b <sub>s</sub>	s	HIS	AS45
RS310.3017.04	0,4	1,7	1,57	310017R	▲
RS310.3017.05	0,5	1,7	1,57	310017R	▲
RS310.3017.10	1	1,7	1,57	310017R	▲
RS310.3017.15	1,5	1,7	1,57	310017R	▲
RS310.4023.04	0,4	2,3	2,17	310023R	▲
RS310.4023.05	0,5	2,3	2,17	310023R	Δ
RS310.4023.10	1	2,3	2,17	310023R	▲
RS310.4023.15	1,5	2,3	2,17	310023R	▲
RS310.4023.16	1,6	2,3	2,17	310023R	▲
RS310.4023.20	2	2,3	2,17	310023R	▲
LS310.3017.04	0,4	1,7	1,57	310017L	▲
LS310.3017.05	0,5	1,7	1,57	310017L	▲
LS310.3017.10	1	1,7	1,57	310017L	▲
LS310.3017.15	1,5	1,7	1,57	310017L	▲
LS310.4023.04	0,4	2,3	2,17	310023L	▲
LS310.4023.05	0,5	2,3	2,17	310023L	Δ
LS310.4023.10	1	2,3	2,17	310023L	▲
LS310.4023.15	1,5	2,3	2,17	310023L	▲
LS310.4023.16	1,6	2,3	2,17	310023L	▲
LS310.4023.20	2	2,3	2,17	310023L	▲

P	●
M	●
K	●
N	○
S	●
H	-





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

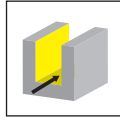
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Bestellnummer Part number	r	b <sub>s</sub>	s	HIS	AS45
RS310.5028.04	0,4	2,68	2,62	310028R	Δ
RS310.5028.05	0,5	2,68	2,62	310028R	▲
RS310.5028.10	1	2,68	2,62	310028R	▲
RS310.5028.15	1,5	2,68	2,62	310028R	▲
RS310.5028.16	1,6	2,68	2,62	310028R	▲
RS310.5028.20	2	2,68	2,62	310028R	▲
LS310.5028.04	0,4	2,68	2,62	310028L	Δ
LS310.5028.05	0,5	2,68	2,62	310028L	▲
LS310.5028.10	1	2,68	2,62	310028L	▲
LS310.5028.15	1,5	2,68	2,62	310028L	▲
LS310.5028.16	1,6	2,68	2,62	310028L	▲
LS310.5028.20	2	2,68	2,62	310028L	▲
				P ●	
				M ●	
				K ●	
				N o	
				S ●	
				H -	



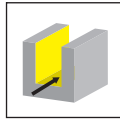
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Scheibenfräser  
Disc Milling Cutter  
M475



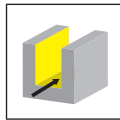
Seite/Page  
274-275

Einschraubfräser  
Screw-in cutter  
M475



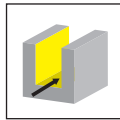
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Aufsteckfräser  
Arbour Mounted Cutter  
M475



Seite/Page  
277-278

Wendeschneidplatte  
Indexable insert  
S475



Seite/Page  
279-280

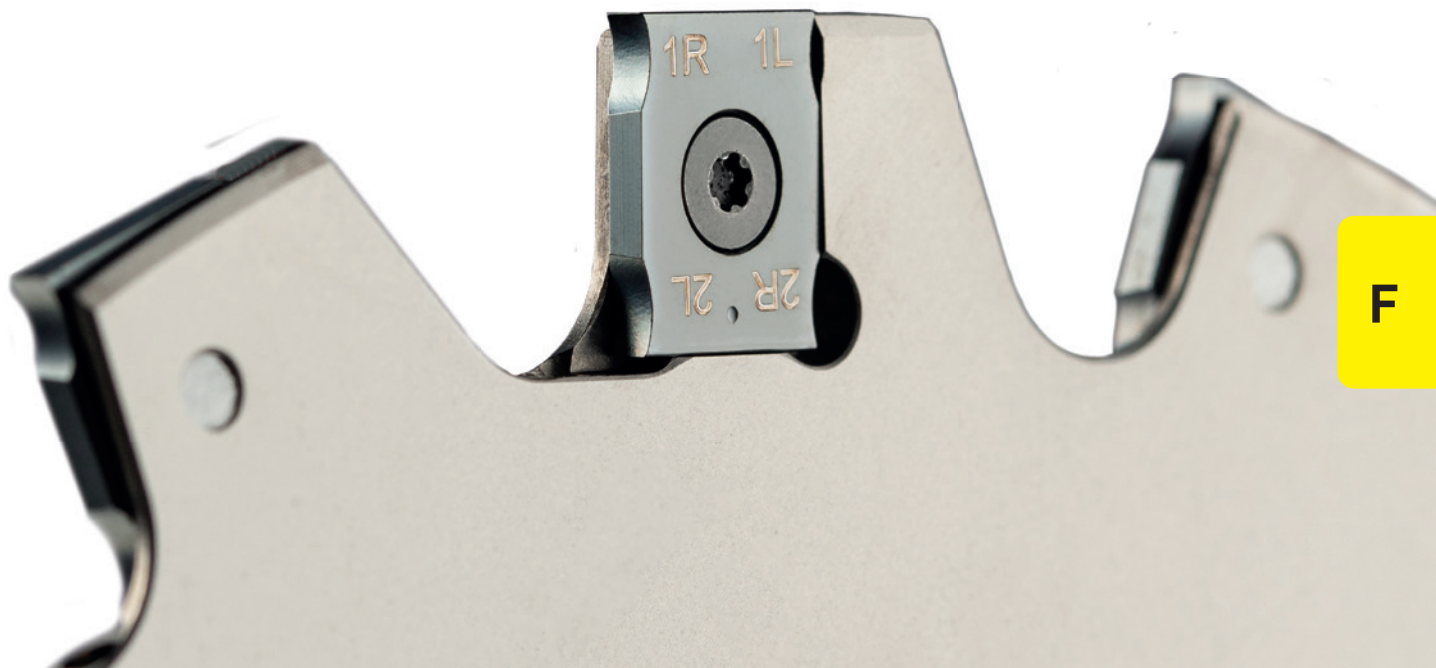
Schnittdaten  
Cutting data

Seite/Page  
281

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# M475



**Scheibenfräser**  
**Einschraubfräser**  
**Aufsteckfräser**

Nutbreite 3 - 8 mm  
Schneidkreis-Ø 40 - 200 mm

**Disc Milling Cutter**  
**Screw-in Cutter**  
**Arbour Mounted Cutter**

Width of groove 3 - 8 mm  
Cutting edge Ø 40 - 200 mm

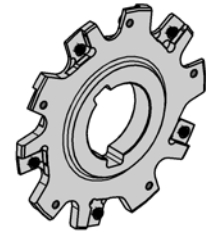
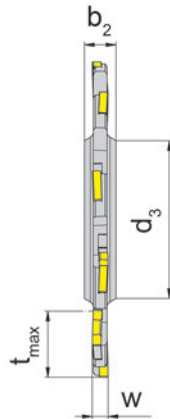
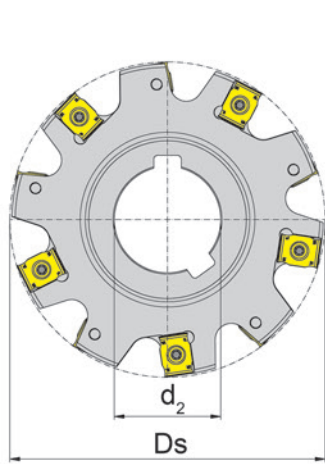
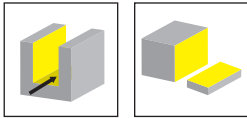


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	n <sub>max</sub>	HWS
M475.0080.27.03	5	80	18	27	8	40	3	20000	475016N
M475.0080.27.04	5	80	18	27	8	40	4	21000	475022N
M475.0100.32.03	6	100	25	32	8	46	3	17000	475016N
M475.0100.32.04	6	100	25	32	8	46	4	18000	475022N
M475.0125.40.03	8	125	32	40	10	54	3	15000	475016N
M475.0125.40.04	8	125	32	40	10	54	4	15000	475022N
M475.0160.40.03	10	160	50	40	10	54	3	12000	475016N
M475.0160.40.04	10	160	50	40	10	54	4	13000	475022N
M475.0200.40.04	13	200	70	40	10	54	4	11000	475022N

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M475...03	030.2523.T6P	T6PL
M475...04	030.0330.1217	T7PL

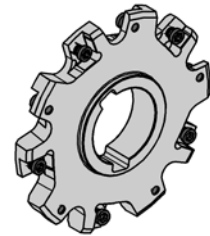
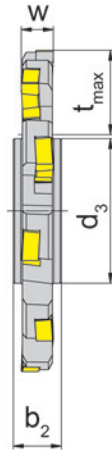
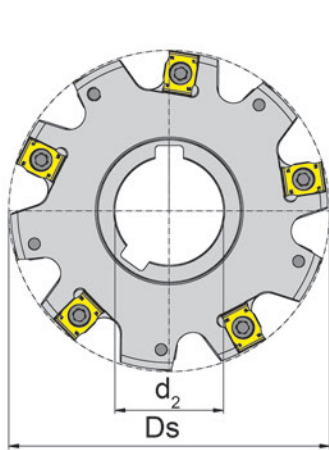
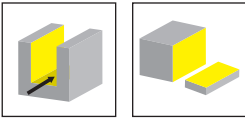


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	n <sub>max</sub>	HWS
M475.0080.27.05	5	80	18	27	8	40	5	22000	475027N
M475.0080.27.06	5	80	21	27	10	36	6	21000	475032N
M475.0080.27.08	5	80	21	27	12	36	8	17000	475043N
M475.0100.32.05	6	100	25	32	8	46	5	19000	475027N
M475.0100.32.06	6	100	25,5	32	10	47	6	18000	475032N
M475.0100.32.08	6	100	25,5	32	12	47	8	15000	475043N
M475.0125.40.05	8	125	32	40	10	54	5	17000	475027N
M475.0125.40.06	8	125	32,5	40	10	58	6	15000	475032N
M475.0125.40.08	8	125	32,5	40	12	58	8	12000	475043N
M475.0160.40.05	10	160	50	40	10	54	5	14000	475027N
M475.0160.40.06	10	160	50	40	10	58	6	13000	475032N
M475.0160.40.08	10	160	50	40	12	58	8	10000	475027N
M475.0200.40.05	13	200	70	40	10	54	5	12000	475027N
M475.0200.50.06	13	200	63,5	50	10	71	6	11000	475032N
M475.0200.50.08	13	200	63,5	50	12	71	8	8000	475043N

Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M475...05	030.3541.T8P	T8PL
M475...06	030.3550.T10P	T10PL
M475...08	030.350P.1110	T15PQ



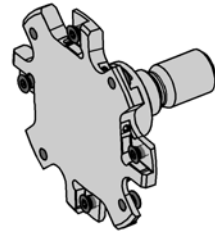
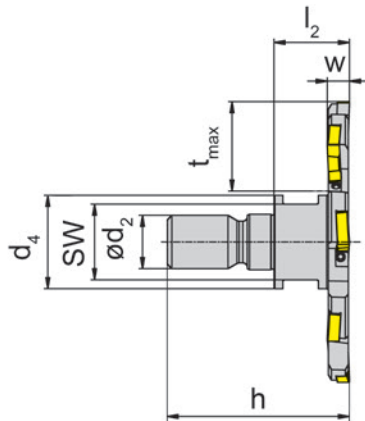
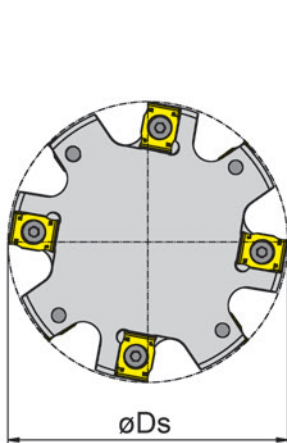
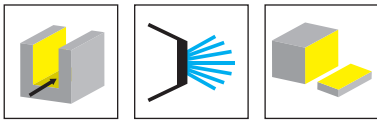


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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Bestellnummer Part number	Z	Ds	h	$l_2$	$d_4$	$d_2$	SW	w	$t_{max}$	$n_{max}$	HWS
M475.0040.M8.03.IK	2	40	33	15	13	M8	10	3	13	32000	475016N
M475.0040.M8.04.IK	2	40	33	15	13	M8	10	4	13	33000	475022N
M475.0040.M8.05.IK	2	40	33	15	13	M8	10	5	13	35000	475027N
M475.0050.M10.03.IK	3	50	35	15	18	M10	15	3	15	28000	475016N
M475.0050.M10.04.IK	3	50	35	15	18	M10	15	4	15	28000	475022N
M475.0050.M10.05.IK	3	50	35	15	18	M10	15	5	15	30000	475027N
M475.0063.M12.03.IK	4	63	41	17	21	M12	17	3	20	24000	475016N
M475.0063.M12.04.IK	4	63	41	17	21	M12	17	4	20	25000	475022N
M475.0063.M12.05.IK	4	63	41	17	21	M12	17	5	20	26000	475027N

## Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M475.0...03	030.2523.T6P	T6PL
M475.0...04	030.0330.1217	T7PL
M475.0...05	030.3541.T8P	T8PL

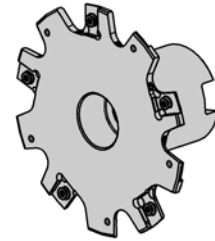
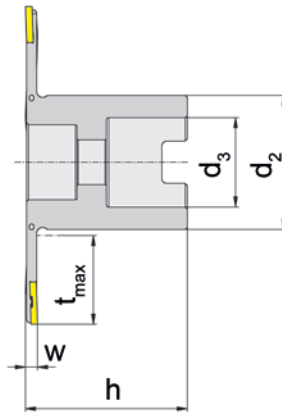
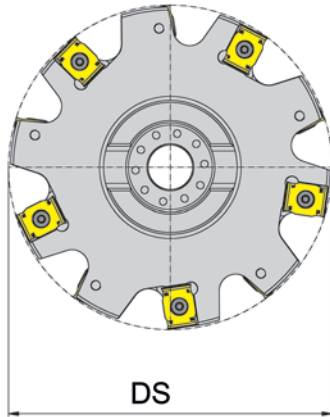
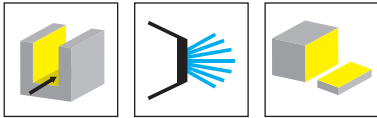


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>3</sub>	d <sub>2</sub>	n <sub>max</sub>	w	HWS
M475.0063.16.03.IK	4	63	17,5	35	16	32	24000	3	475016N
M475.0063.16.04.IK	4	63	17,5	35	16	32	25000	4	475022N
M475.0080.16.03.IK	5	80	25	40	16	28	20000	3	475016N
M475.0080.16.04.IK	5	80	25	40	16	28	21000	4	475022N
M475.0080.22.03.IK	5	80	23	40	22	33	20000	3	475016N
M475.0080.22.04.IK	5	80	23	40	22	33	21000	4	475022N
M475.0100.27.03.IK	6	100	25	50	27	48	17000	3	475016N
M475.0100.27.04.IK	6	100	25	50	27	48	18000	4	475022N
M475.0125.27.03.IK	8	125	37,5	50	27	48	15000	3	475016N
M475.0125.27.04.IK	8	125	37,5	50	27	48	15000	4	475022N
M475.0125.32.03.IK	8	125	32,5	50	32	56	15000	3	475016N
M475.0125.32.04.IK	8	125	23,5	50	32	56	15000	4	475022N
M475.0125.40.03.IK	8	125	26,5	50	40	70	15000	3	475016N
M475.0125.40.04.IK	8	125	26,5	50	40	70	15000	4	475022N
M475.0160.40.03.IK	10	160	44	50	40	70	12000	3	475016N
M475.0160.40.04.IK	10	160	44	50	40	70	13000	4	475022N
M475.0200.40.04.IK	13	200	64	50	40	70	11000	4	475022N

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M475...03	030.2523.T6P	T6PL
M475...04	030.0330.1217	T7PL



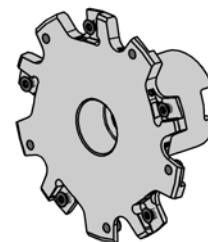
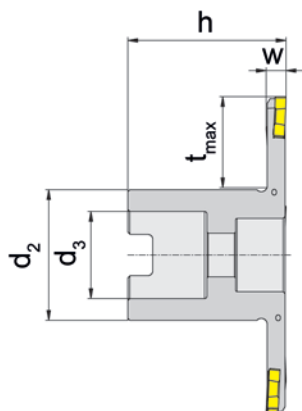
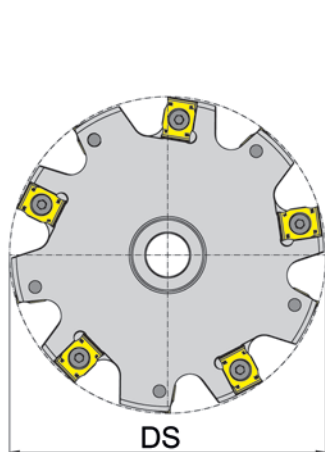
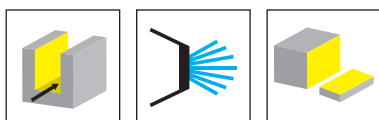


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

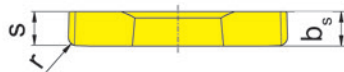
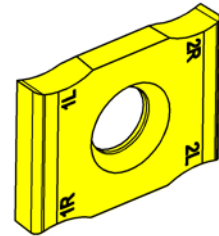
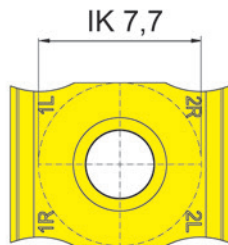
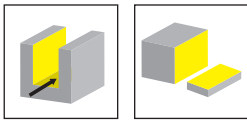
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>3</sub>	d <sub>2</sub>	n <sub>max</sub>	w	HWS
M475.0063.16.05.IK	4	63	17,5	35	16	32	26000	5	475027N
M475.0080.16.05.IK	5	80	25	40	16	28	22000	5	475027N
M475.0080.22.05.IK	5	80	23	40	22	33	22000	5	475027N
M475.0100.27.05.IK	6	100	25	50	27	48	19000	5	475027N
M475.0100.27.06.IK	6	100	25	50	27	48	18000	6	475032N
M475.0100.27.08.IK	6	100	25	50	27	48	15000	8	475043N
M475.0125.27.05.IK	8	125	37,5	50	27	48	17000	5	475027N
M475.0125.32.05.IK	8	125	32,5	50	32	56	17000	5	475027N
M475.0125.32.06.IK	8	125	32	50	32	56	15000	6	475032N
M475.0125.32.08.IK	8	125	32	50	32	56	12000	8	475043N
M475.0125.40.05.IK	8	125	26,5	50	40	70	17000	5	475027N
M475.0160.40.05.IK	10	160	44	50	40	70	14000	5	475027N
M475.0160.40.06.IK	10	160	44	60	40	70	13000	6	475032N
M475.0160.40.08.IK	10	160	44	60	40	70	10000	8	475043N
M475.0200.40.05.IK	13	200	64	50	40	70	12000	5	475027N
M475.0200.40.06.IK	13	200	54	50	40	90	11000	6	475032N
M475.0200.40.08.IK	13	200	54	50	40	90	8000	8	475043N

Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

### Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M475...05	030.3541.T8P	T8PL
M475...06	030.3550.T10P	T10PL
M475...08	030.350P.1110	T15PQ



▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

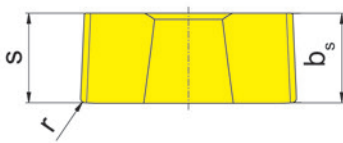
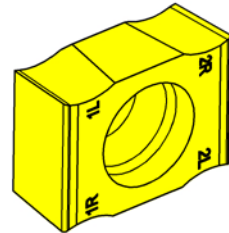
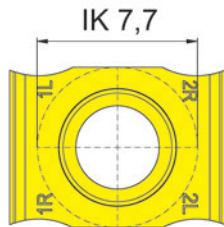
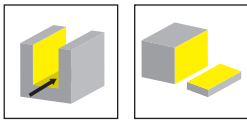
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$b_s$	$r$	$s$	HIS	RC4G
<b>S475.0162.10.02</b>	1,6	0,2	1,62	475016N	▲
<b>S475.0163.10.04</b>	1,61	0,4	1,63	475016N	Δ
<b>S475.0163.10.05</b>	1,61	0,5	1,63	475016N	Δ
<b>S475.0222.10.02</b>	2,2	0,2	2,22	475022N	▲
<b>S475.0223.10.04</b>	2,21	0,4	2,23	475022N	Δ
<b>S475.0223.10.05</b>	2,21	0,5	2,23	475022N	Δ
<b>S475.0222.10.08</b>	2,22	0,8	2,22	475022N	Δ

mittlere Spandicke $h_m$ medium thickness of chip			
sehr stabil very rigid	0,05	stabil rigid	0,03
		nicht stabil not rigid	0,01

P	●
M	●
K	●
N	-
S	-
H	-





HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

F

Bestellnummer Part number	$b_s$	$r$	$s$	HIS	RC4G
S475.0273.10.02	2,7	0,2	2,73	475027N	▲
S475.0274.10.04	2,71	0,4	2,74	475027N	△
S475.0275.10.05	2,72	0,5	2,75	475027N	△
S475.0275.10.08	2,74	0,8	2,74	475027N	△
S475.0275.10.10	2,75	1	2,75	475027N	△
S475.0276.10.12	2,76	1,2	2,76	475027N	△
S475.0323.10.02	3,2	0,2	3,23	475032N	▲
S475.0324.10.04	3,21	0,4	3,24	475032N	△
S475.0325.10.05	3,22	0,5	3,25	475032N	△
S475.0325.10.08	3,24	0,8	3,24	475032N	△
S475.0325.10.10	3,25	1	3,25	475032N	△
S475.0326.10.12	3,26	1,2	3,26	475032N	△
S475.0327.10.15	3,27	1,5	3,27	475032N	△
S475.0433.10.02	4,3	0,2	4,33	475043N	▲
S475.0434.10.04	4,31	0,4	4,34	475043N	△
S475.0435.10.05	4,32	0,5	4,35	475043N	△
S475.0435.10.08	4,34	0,8	4,34	475043N	△
S475.0435.10.10	4,35	1	4,35	475043N	△
S475.0436.10.12	4,36	1,2	4,36	475043N	△
S475.0437.10.15	4,37	1,5	4,37	475043N	△
S475.0439.10.20	4,39	2	4,39	475043N	△

mittlere Spandicke $h_m$ medium thickness of chip		
sehr stabil very rigid	0,05	stabil rigid
	0,03	nicht stabil not rigid
	0,01	

P	●
M	●
K	●
N	-
S	-
H	-

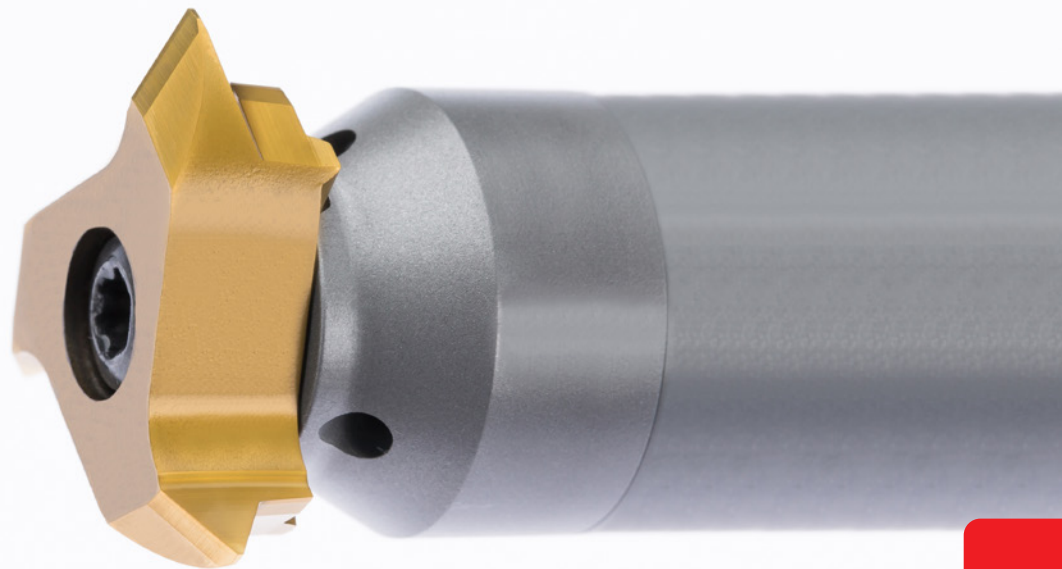


Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit Cutting speed vc (m/min) RC4G	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	160-240
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	160-240
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	160-240
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	160-240
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	160-240
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	160-240
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	180-220
		vergütet quenched	P2.2	280	960	14NiCr10	180-220
		vergütet quenched	P2.3	350	1250	34CrMo4	180-220
		vergütet quenched	P2.4	430	1450	55Cr3	180-220
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18	80-120
		gehärtet hardened	P3.2	350	1200	X210Cr2	80-100
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200	160-220
		legiert alloyed	P4.2	220	750	GX40CrSi28	80-140
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39	
<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	80-140
		austenitisch austenitic ferritic	M1.2	300	1000	X6CrNiMo- Ti17-12-2	70-120
		austenitisch ferritisch austenitic	M1.3	230	780	X2CrNiMo- N17-13-3	70-120
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	180-250
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	120-180
	Kugelgraphit- guss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	120-160
		perlitisch perlitic	K2.1	260	700	GGG-60	120-160
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45	60-120
		perlitisch perlitic	K3.2	260	700	GTS-55-04	80-140



F





**G**

System/System	Seite/Page
<b>DCG</b>	<b>284</b>
<b>M304</b>	<b>294</b>
<b>M306</b>	<b>302</b>
<b>M308</b>	<b>314</b>
<b>M311</b>	<b>324</b>
<b>M313</b>	<b>334</b>
<b>M328</b>	<b>344</b>
<b>M332</b>	<b>354</b>
<b>M275</b>	<b>360</b>
<b>380</b>	<b>366</b>

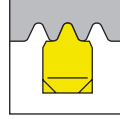
Gewindefräser  
Thread Milling Cutter  
DCG



Seite/Page  
286-287, 289



Seite/Page  
288



Seite/Page  
290

Schnittdaten  
Cutting data

Seite/Page  
291-292

**DC**



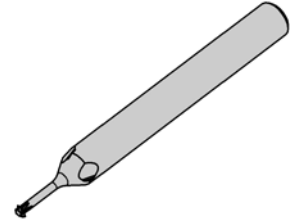
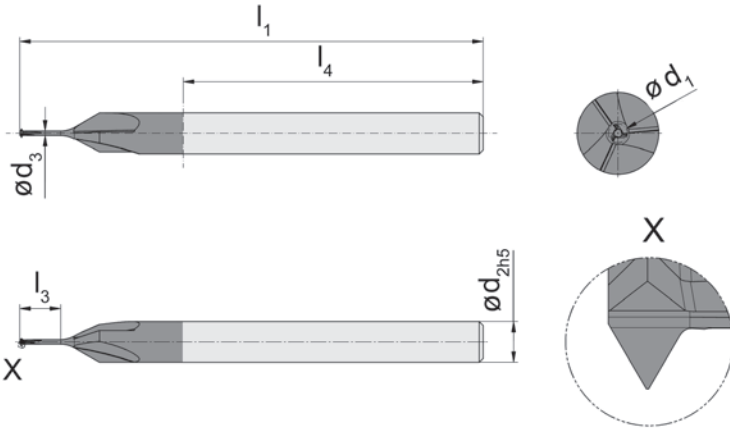
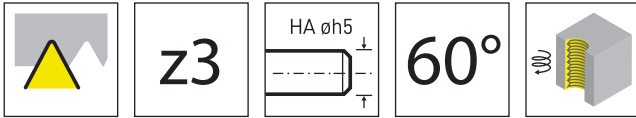
**G**

**Gewindefräser  
(zirkular)**

**Thread Milling Cutter  
(by circular interpolation)**

# Gewindefräser Thread Milling Cutter

## DCG



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

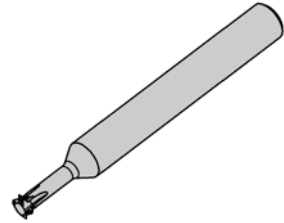
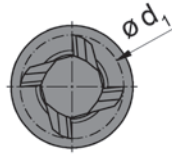
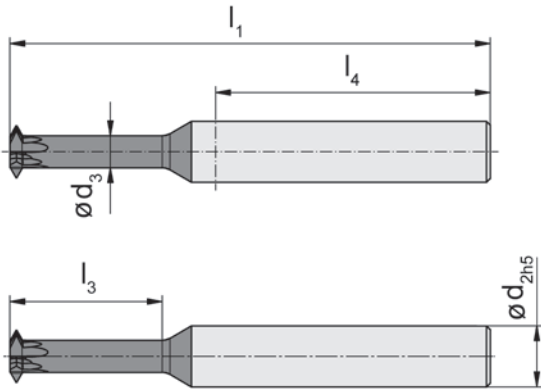
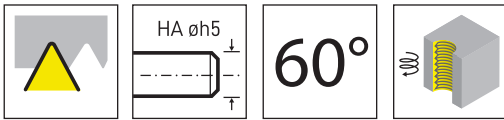
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	ES15
DCG.3.M1.025.2.1.03	M1	3	0,25	0,7	3	0,33	34	2,5	22	▲
DCG.3.M11.025.2.1.03	M1,1	3	0,25	0,75	3	0,4	34	2,75	22	▲
DCG.3.M12.025.2.1.03	M1,2	3	0,25	0,8	3	0,43	34	3	22	▲
DCG.3.M14.030.2.1.03	M1,4	3	0,3	1	3	0,55	34	4	22	▲
DCG.3.M16.035.2.1.03	M1,6	3	0,35	1,18	3	0,64	34	4	22	▲
DCG.3.M18.035.2.1.03	M1,8	3	0,35	1,38	3	0,84	34	4	22	▲
DCG.3.M2.040.2.1.03	M2	3	0,4	1,53	3	0,93	34	6	22	▲
DCG.3.M22.045.2.1.03	M2,2	3	0,45	1,68	3	0,98	34	6	22	▲
DCG.3.M25.045.2.1.03	M2,5	3	0,45	1,98	3	1,28	34	8	22	▲
	P	●								
	M	●								
	K	○								
	N	-								
	S	-								
	H	-								

G

# Gewindefräser Thread Milling Cutter

## DCG



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

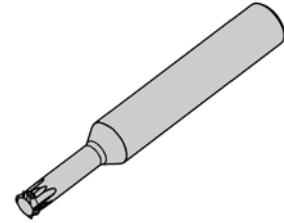
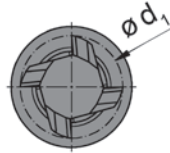
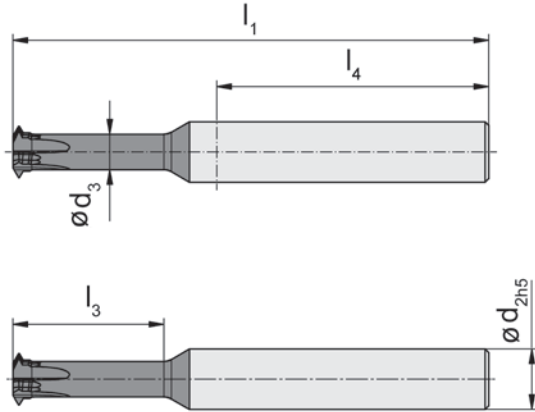
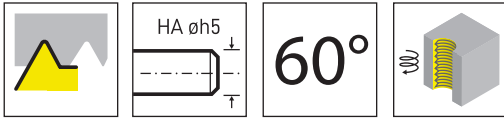
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	Z	P	P <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC25	RC45
DCG.3.M3.025.2.1.04	M3	3	0,25	-	2	4	1,45	39	8	22	▲	
DCG.3.M3.035.2.1.04	M3	3	0,35	-	2	4	1,35	39	8	22	▲	
DCG.3.M3.050.2.1.04	M3	3	0,5	-	2	4	1,2	39	9	22	▲	
DCG.3.M35.050.2.1.04	M3,5	3	0,5	0,6	2,3	4	1,35	39	9	22	▲	
DCG.3.M4.070.3.1.06	M4	3	0,7	0,75	2,8	6	1,7	50	10	36	▲	
DCG.3.M5.050.3.1.06	M5	3	0,5	0,75	3,6	6	2,5	50	10	36	▲	
DCG.3.M5.080.3.1.06	M5	3	0,8	1	3,6	6	2,2	50	10	36	▲	
DCG.4.M6.100.3.1.06	M6	4	1	1,25	4,2	6	2,4	63	10	36		▲
DCG.4.M6.100.5.1.06	M6	4	1	1,25	4,2	6	2,4	63	16	36		▲
DCG.4.M8.075.5.1.08	M8-M10	4	0,75	1	5,5	8	3,85	63	16	36		▲
DCG.4.M8.075.6.1.08	M8-M10	4	0,75	1	5,5	8	3,85	63	20	36		▲
DCG.4.M8.075.7.1.08	M8-M10	4	0,75	1	5,5	8	3,85	77	25	36		▲
DCG.4.M8.125.6.1.08	M8-M10	4	1,25	1,5	5,5	8	3,4	63	20	36		▲
DCG.4.M8.125.8.1.08	M8-M10	4	1,25	1,5	5,5	8	3,4	77	30	36		▲
DCG.4.M10.150.6.1.08	M10-M12	4	1,5	1,75	6,8	8	4,1	63	20	36		▲
DCG.4.M10.150.8.1.08	M10-M12	4	1,5	1,75	6,8	8	4,1	77	30	36		▲
											P	● ●
											M	● ●
											K	● ●
											N	- -
											S	- -
											H	- -



# Gewindefräser Thread Milling Cutter

## DCG



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC25	RC45
DCG.3.M3.035.2.2.04	M3	3	0,35	2	4	1,4	39	8	22	▲	
DCG.3.M3.050.2.2.04	M3	3	0,5	2	4	1,25	39	8	22	▲	
DCG.3.M35.060.2.2.04	M3,5	3	0,6	2,3	4	1,45	39	9	22	▲	
DCG.3.M4.070.3.2.06	M4	3	0,7	2,8	6	1,9	50	10	36	▲	
DCG.3.M5.050.3.2.06	M5	3	0,5	3,6	6	2,85	50	10	36	▲	
DCG.4.M6.075.5.2.06	M6	4	0,75	4,2	6	3,1	63	16	36		▲
DCG.4.M6.100.5.2.06	M6	4	1	4,2	6	2,8	63	16	36		▲
DCG.4.M8.125.5.2.08	M8	4	1,25	5,5	8	3,7	63	16	36		▲
DCG.4.M10.100.6.2.08	M10	4	1	6,8	8	5,4	63	20	36		▲
DCG.4.M10.100.7.2.08	M10	4	1	6,8	8	5,4	77	25	36		▲
DCG.4.M10.150.6.2.08	M10	4	1,5	6,8	8	4,7	63	20	36		▲
DCG.4.M12.100.6.2.10	M12	4	1	8	10	6,3	63	20	36		▲
DCG.4.M12.125.8.2.10	M12	4	1,25	8	10	6,1	77	30	36		▲
DCG.4.M12.125.9.2.08	M12	4	1,25	8	8	6,1	80	40	36		▲
DCG.4.M12.175.6.2.10	M12	4	1,75	8	8	5,5	63	20	36		▲
DCG.4.M12.175.8.2.10	M12	4	1,75	8	10	5,5	77	30	40		▲
DCG.4.M12.175.9.2.08	M12	4	1,75	8	8	5,5	80	40	36		▲

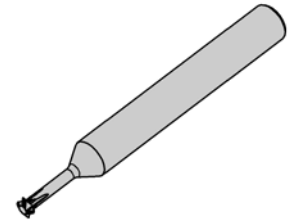
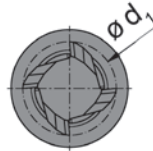
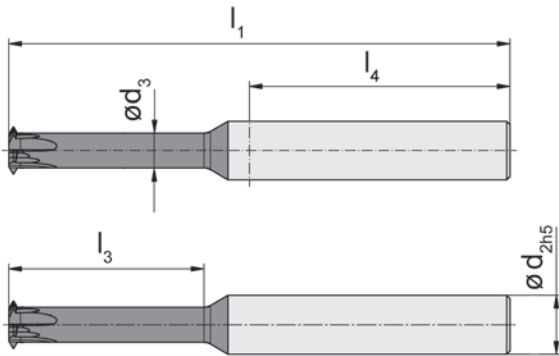
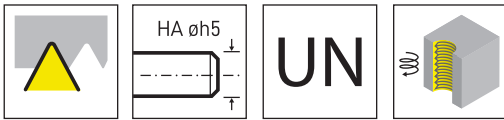
P	●	●
M	●	●
K	●	●
N	-	-
S	-	-
H	-	-

G



# Gewindefräser Thread Milling Cutter

## DCG



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

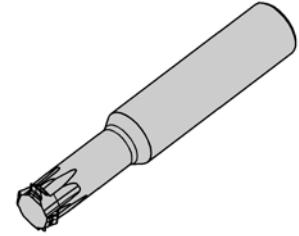
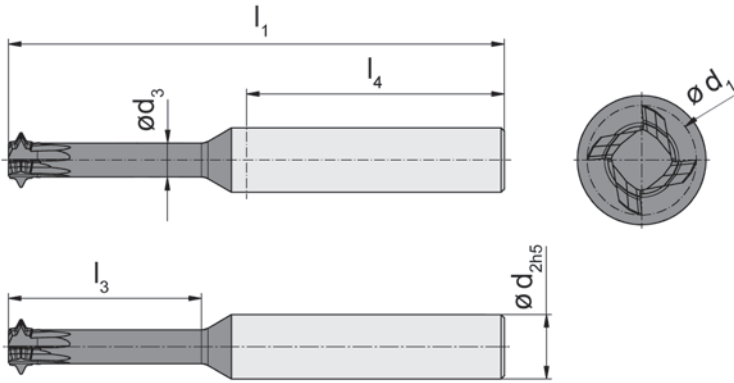
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC25	RC45
<b>DCG.3.60.1024.3.06</b>	#10 - 24UNC #12 - 24UNC	3	1,058	2	4	1,1	39	8	22	▲	
<b>DCG.3.60.540.2.04</b>	#5 - 40 UNC	3	0,635	2	4	1,1	39	8	22	▲	
<b>DCG.3.60.632.2.04</b>	#6 - 32UNC #8 - 32UNC	3	0,794	2,2	4	1,05	39	8	22	▲	
<b>DCG.4.60.1213.7.08</b>	1/2" - 13 UNC	4	1,953	7,9	8	5,3	77	-	36		▲
<b>DCG.4.60.1420.3.06</b>	1/4" - 20 UNC	4	1,27	3,5	6	1,7	63	-	36	▲	
<b>DCG.4.60.1428.3.06</b>	1/4" - 28 UNF	4	0,907	3,5	6	2,15	63	-	36	▲	
<b>DCG.4.60.3816.7.08</b>	3/8" - 16 UNC	4	1,588	5,5	8	3,5	77	-	36		▲
<b>DCG.4.60.51618.3.06</b>	5/16" - 18 UNC	4	1,411	4,2	6	2,25	63	-	36		▲
<b>DCG.4.60.71620.7.08</b>	7/16" - 20 UNF	4	1,27	7,2	8	5,35	77	-	36		▲
										P	● ●
										M	● ●
										K	● ●
										N	- -
										S	- -
										H	- -



# Gewindefräser Thread Milling Cutter

## DCG



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	RC45
<b>DCG.4.55.G14.6.10</b>	G 1/4"	4	1,34	9,5	10	7,1	63	20	36	▲
<b>DCG.4.55.G18.5.08</b>	G 1/8"	4	0,91	6,6	8	5	63	16	36	▲
<b>DCG.4.55.G38.8.10</b>	G 3/8"	4	1,34	9,8	10	7,4	77	30	40	▲
										P ●
										M ●
										K ●
										N -
										S -
										H -



Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit $v_c$ (m/min) / Startwerte Cutting speed $v_c$ (m/min) / Start values		
						RC25 RC45	fz	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	250-180	0,01 -0,03
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	220-160	0,01 -0,03
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	200-140	0,01 -0,03
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	180-120	0,01 -0,03
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	150-90	0,01 -0,03
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	250-180	0,01 -0,03
	niedrig legierter Stahl (<5%) Alloyed steel	gegüht annealed	P2.1	180	590	100Cr6	200-140	0,01 -0,03
		vergütet quenched	P2.2	280	960	14NiCr10	150-90	0,01 -0,03
		vergütet quenched	P2.3	350	1250	34CrMo4	140-80	0,01 -0,03
		vergütet quenched	P2.4	430	1450	55Cr3	140-80	0,01 -0,03
	hochlegierter Stahl (>5%) high alloyed steel	gegüht annealed	P3.1	200	680	X10CrAl18	180-120	0,01 -0,03
		gehärtet hardened	P3.2	350	1200	X210Cr2	140-80	0,01 -0,03
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200	250-180	0,01 -0,03
		legiert alloyed	P4.2	220	750	GX40CrSi28	220-160	0,01 -0,03
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39		0,01 -0,03
<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	150-90	0,01 -0,03
		austenitisch austenitic ferritic	M1.2	300	1000	X6CrNiMo- Ti17-12-2	140-80	0,01 -0,03
		austenitisch ferritisch austenitic	M1.3	230	780	X2CrNi- MoN17-13-3	120-60	0,01 -0,03



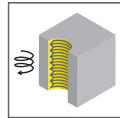
Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit R <sub>m</sub> [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	Schnittgeschwindigkeit vc (m/min) / Startwerte Cutting speed vc (m/min) / Start values		
						E15 RC25 RC45	fz	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	230-190	0,01 -0,03
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	230-190	0,01 -0,03
	Kugelgraphit- guss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	220-160	0,01 -0,03
		perlitisch perlitic	K2.1	260	700	GGG-60	220-160	0,01 -0,03
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45	220-160	0,01 -0,03
		perlitisch perlitic	K3.2	260	700	GTS-55-04	220-160	0,01 -0,03
	Ausferritisches Gusseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800			
		vergütet quenched	K4.2	350	1050			
		vergütet quenched	K4.3	450	1400			
<b>N</b>	Al-Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	bis 1000	0,02 - 0,04
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	600-200	0,02 - 0,04
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	400-200	0,02 - 0,04
		6-10% Si	N2.2	100	320	AlSi7Mg		
		10-15 % Si	N2.3	130	450	AlSi12		
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	400-200	0,02 - 0,04
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb	400-200	0,02 - 0,04
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40	400-200	0,02 - 0,04
		hochfest high strength	N3.4	300	1000	CuZn25Al- 5Mn4Fe3	160-100	0,02 - 0,04
	Graphit Graphite		N4.1					
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670		120-60	0,02 - 0,04
		gehärtet hardened	S1.2	275	930		120-60	0,02 - 0,04
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600	90-30	0,02 - 0,04
		gehärtet hardened	S2.2	350	1200	Inconel 713	90-30	0,02 - 0,04



Übersicht  
Overview

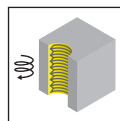
Seite/Page  
296

Frälerschaft  
Milling shank  
M304



Seite/Page  
297

Schneidplatte  
Insert  
304



Seite/Page  
298-300

G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M304



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  7,7 mm

**Thread Milling Cutter  
(by circular interpolation)**

from Cutting edge  $\varnothing$  7,7 mm

### Teilprofil, 60°, metrisch, Typ 304

Partial profile, 60°, metric, type 304



Steigung/ Pitch P	0,5	0,75	1,0	1,25	1,5
Nenndurchmesser / Nominal diameter					
Typ / type <b>304</b> / Ds 7,7					
304.0515.01	≥ 9	≥ 9	≥ 9	≥ 10	≥ 10

### Vollprofil, 60°, metrisch, Typ 304

Full profile, 60°, metric, type 304

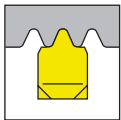


Steigung/ Pitch P	1,5
Nenndurchmesser Nominal diameter	
Typ / type <b>304</b> / Ds 7,7	
304.0815.02	≥ 12

G

### Vollprofil, 55°, Whitworth, Typ 304

Full profile, 55°, Whitworth, type 304



Gg/'' / tpi	19	14	11
Gewinde / Thread			
Typ / type <b>304</b> / Ds 7,7			
304.05519.02	G¼''		



# Fräserschaft

Milling shank

# M304

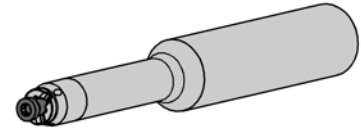
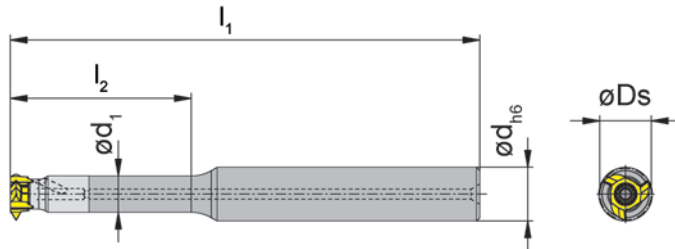
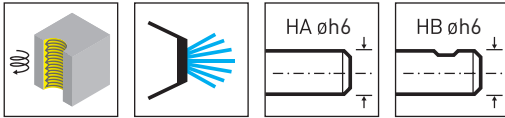


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M304.0508.02A</b>	8	63	20	5,4	HA	304044R
<b>M304.0508.03A</b>	8	70	27	5,4	HA	304044R
<b>M304.0508.02B</b>	8	63	20	5,4	HB	304044R
<b>M304.0508.03B</b>	8	70	27	5,4	HB	304044R

Ds siehe Schneidplatten  
Ds see inserts

## Ersatzteile

Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M304...	<b>1.8.4T6EP</b>	<b>T6PL</b>



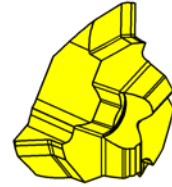
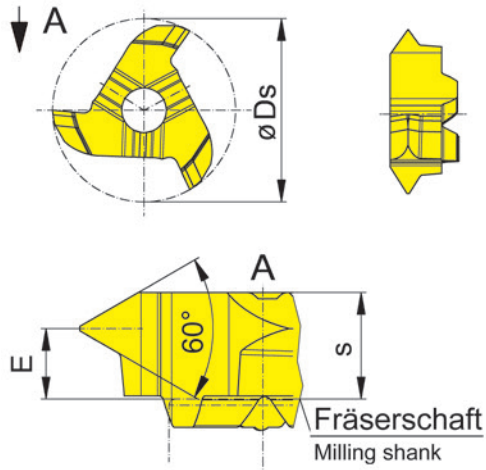


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	AS45
304.0515.01	0,5	1,5	1,9	2,75	7,7	304044R	▲
	P ●						
	M ●						
	K ●						
	N ○						
	S ●						
	H -						

G

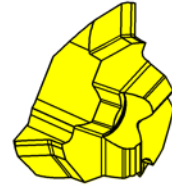
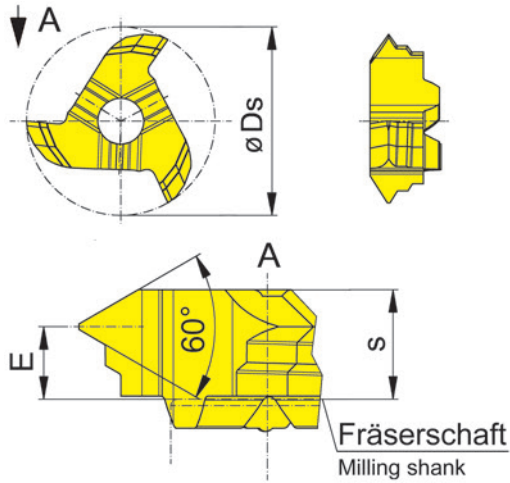
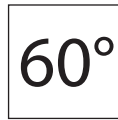
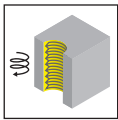


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	AS45
304.0815.02	1,5	2	2,75	7,7	304044R	▲
	P ●					
	M ●					
	K ●					
	N ○					
	S ●					
	H -					



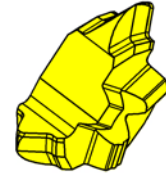
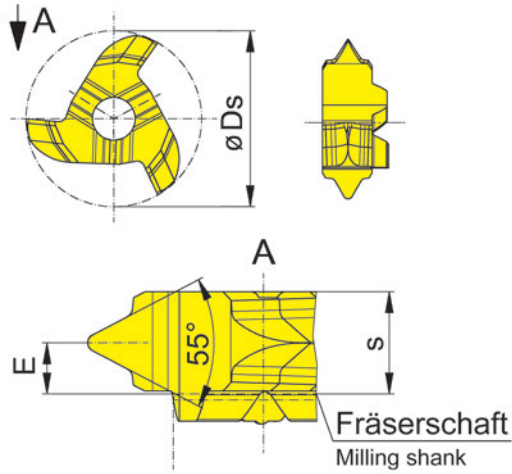


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45
304.5519.02	19	1,5	2,75	7,7	304044R	▲
						P ●
						M ●
						K ●
						N ○
						S ●
						H -

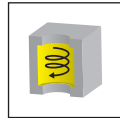
G



Übersicht  
Overview

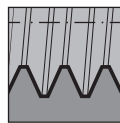
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304

Frälerschaft  
Milling shank  
M306

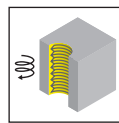


Seite/Page  
305

Schneidplatte  
Insert  
108/306/606



Seite/Page  
306



Seite/Page  
307-312

G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M306



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  9,6 mm

**Thread Milling Cutter  
(by circular interpolation)**

from Cutting edge  $\varnothing$  9,6 mm

Teilprofil, 60°, metrisch, Typ 108, 306, 606  
 Partial, 60°, profile, metric, type 108, 306, 606



Steigung/ Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Nenn Durchmesser / Nominal diameter									
Typ / type <b>108</b> / Ds 9,6									
R/L 108.0205.01	≥ 12	≥ 12							
R/L108.0510.01			≥ 14	≥ 14					
R/L108.0815.01					≥ 16	≥ 16			
Typ / type <b>306</b> / Ds 10,0									
306.0515.01	≥ 12	≥ 12	≥ 13	≥ 13	≥ 14				
306.1020.01							≥ 16		
Typ / type <b>306</b> / Ds 11,7									
306.0815.01					≥ 18				
306.0720.01			≥ 16	≥ 16	≥ 16	≥ 16	≥ 16		
306.2530.01								≥ 20	≥ 20
Typ / type <b>606</b> / Ds 10,0									
606.0515.01	≥ 12	≥ 12	≥ 13	≥ 13	≥ 14				
Typ / type <b>606</b> / Ds 11,7									
606.0720.01			≥ 16	≥ 16	≥ 16	≥ 16	≥ 16		

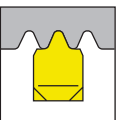
Vollprofil, 60°, metrisch, Typ 306, 606  
 Full profile, 60°, metric, type 306, 606



Steigung/ Pitch P	1,5	2,0
Nenn Durchmesser Nominal diameter		
Typ / type <b>306</b> / Ds 11,7		
306.0815.02	≥ 22	
Typ / type <b>306</b> / Ds 10,0		
306.1020.02		≥ 24

Steigung/ Pitch P	1,5
Nenn Durchmesser Nominal diameter	
Typ / type <b>606</b> / Ds 11,7	
606.0815.02	≥ 22

Vollprofil, 55°, Whitworth, Typ 306, 606  
 Full profile, 55°, Whitworth, type 306, 606



Gg/'' / tpi	19	14	11
Gewinde / Thread			
Typ / type <b>306</b> / Ds 9,7			
306.5519.10.02	G <sup>1</sup> / <sub>4</sub> ''		
Typ / type <b>306</b> / Ds 11,7			
306.5519.02	G <sup>3</sup> / <sub>8</sub> ''		
306.5514.02		G <sup>1</sup> / <sub>2</sub> ''	
306.5511.02			G1''
Typ / type <b>606</b> / Ds 9,7			
606.5519.10.02	G <sup>1</sup> / <sub>4</sub> ''		
Typ / type <b>606</b> / Ds 11,7			
606.5519.02	G <sup>3</sup> / <sub>8</sub> ''		
606.5514.02		G <sup>1</sup> / <sub>2</sub> ''	



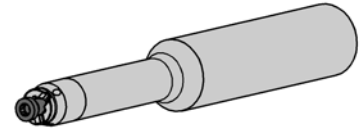
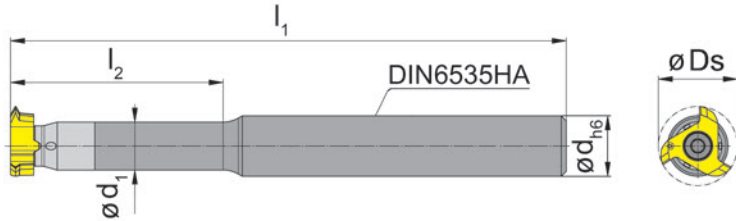
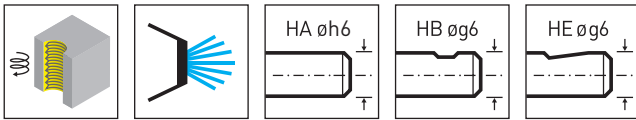


Abbildung = rechtsschneidend  
Picture = right hand cutting version

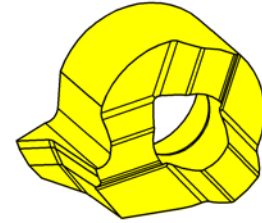
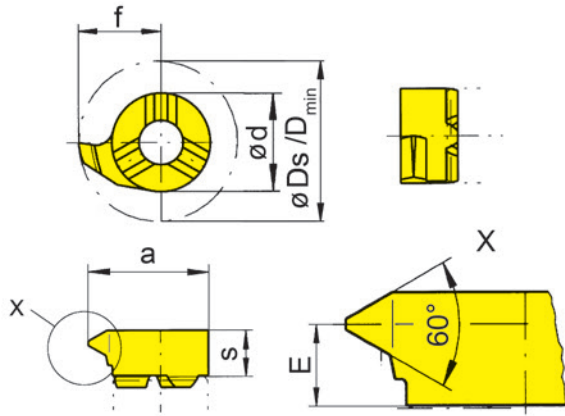
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M306.0712.02A</b>	12	90	30	7,3	HA	306060R • 306060L
<b>M306.0716.01A</b>	16	100	25	7,3	HA	306060R • 306060L
<b>M306.0716.02A</b>	16	110	35	7,3	HA	306060R • 306060L
<b>M306.0712.02B</b>	12	90	30	7,3	HB	306060R • 306060L
<b>M306.0716.01B</b>	16	100	25	7,3	HB	306060R • 306060L
<b>M306.0716.02B</b>	16	110	35	7,3	HB	306060R • 306060L
<b>M306.0712.02E</b>	12	90	30	7,3	HE	306060R • 306060L
<b>M306.0716.01E</b>	16	100	25	7,3	HE	306060R • 306060L
<b>M306.0716.02E</b>	16	110	35	7,3	HE	306060R • 306060L

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M306...	<b>2.6.5T8EP</b>	<b>T8PL</b>





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	f	a	d	s	D <sub>min</sub>	D <sub>s</sub>	HIS	EG55	TH35	TI25	TN35
R108.0205.01	0,5	0,75	2,8	4,8	7,8	6	3,6	8	9,6	108060R	▲	▲		▲
R108.0815.01	1,5	1,75	2,6	4,8	7,8	6	3,6	8	9,6	108060R	▲	▲		▲
R108.0510.01	1	1,25	2,8	4,8	7,8	6	3,6	8	9,6	108060R	▲	▲	▲	▲
L108.0205.01	0,5	0,75	2,8	4,8	7,8	6	3,6	8	9,6	108060L	▲	▲		▲
L108.0815.01	1,5	1,75	2,6	4,8	7,8	6	3,6	8	9,6	108060L	▲	▲		▲
L108.0510.01	1	1,25	2,8	4,8	7,8	6	3,6	8	9,6	108060L	▲	▲	▲	▲
											P	●	●	●
											M	○	●	●
											K	○	●	●
											N	-	●	●
											S	-	●	●
											H	-	-	-

G

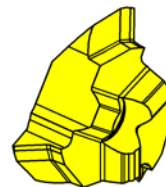
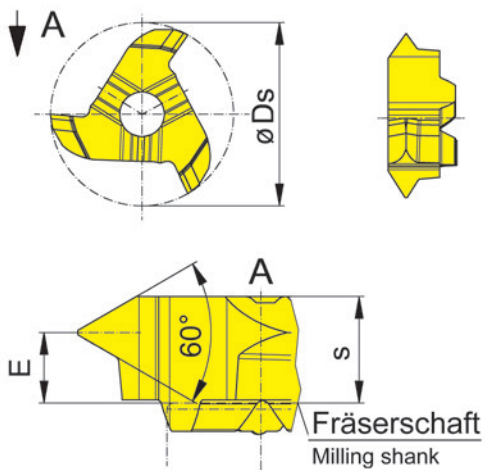


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
▲ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	AS45	TA45	TI25	TN35
306.0515.01	0,5	1,5	2,3	3,4	10	306060R	▲	▲		
306.0720.01	1	2	1,95	3,4	11,7	306060R	▲		▲	▲
306.0815.01	1,5	1,5	2,25	3,4	11,7	306060R	▲		▲	▲
306.1020.01	2	2	2,2	3,4	10	306060R	▲		▲	
306.2530.01	2,5	3	1,7	3,4	11,7	306060R	▲		▲	▲
	P	•	•	•	•		•	•	•	•
	M	•	•	•	•		•	•	•	•
	K	•	•	•	•		•	•	•	•
	N	o	•	•	•		•	•	•	•
	S	•	•	•	•		•	•	•	•
	H	-	-	-	-		-	-	-	-



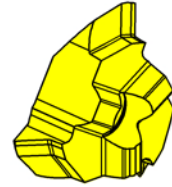
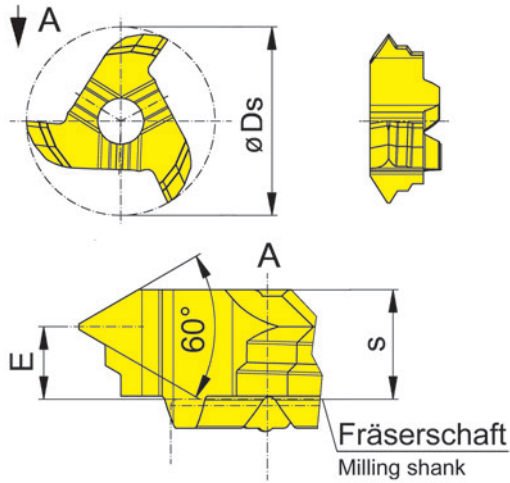


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	D <sub>s</sub>	HIS	HM-Sorten Carbide grades	
						AS45	TA45
306.0510.02	1	2,5	3,4	11,7	306060R	▲	▲
306.0815.02	1,5	2,25	3,4	11,7	306060R	▲	▲
306.1020.02	2	2,2	3,4	10	306060R	▲	▲
						P	●
						M	●
						K	●
						N	○
						S	●
						H	-

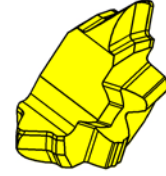
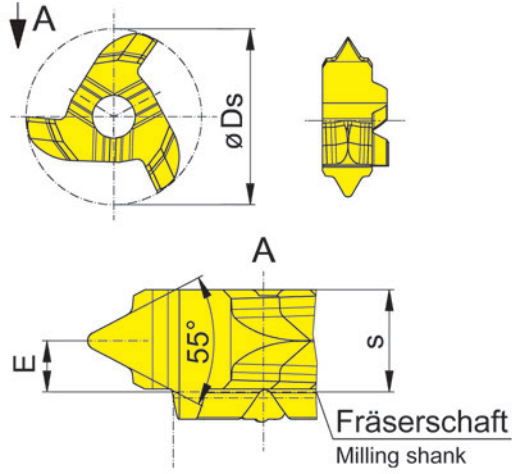


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TA45	TI25	TN35
306.5511.02	11	1,7	3,4	11,7	306060R	▲	▲	Δ	
306.5514.02	14	2	3,4	11,7	306060R	▲	▲		Δ
306.5519.02	19	2,2	3,4	11,7	306060R	▲	▲		
306.5519.10.02	19	2,2	3,4	9,7	306060R	▲	▲		
P	●	●	●	●	●				
M	●	●	●	●	●				
K	●	●	●	●	●				
N	○	●	●	●	●				
S	●	●	●	●	●				
H	-	-	-	-	-				



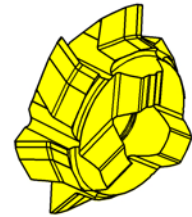
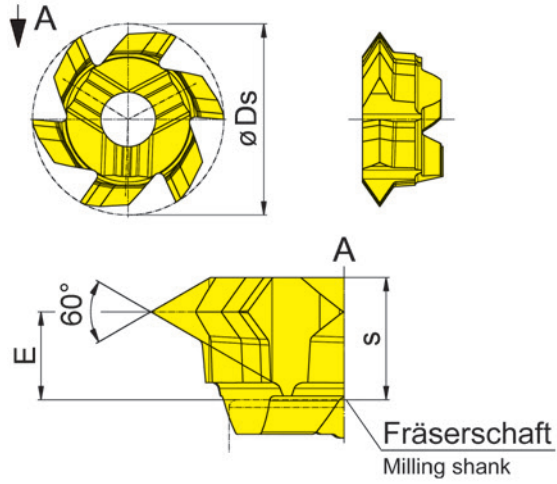


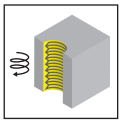
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	AS45	TA45
606.0515.01	0,5	1,5	2,3	3,15	10	306060R	▲	▲
606.0720.01	1	2	1,95	3,15	11,7	306060R	▲	▲
	P	●	●					
	M	●	●					
	K	●	●					
	N	○	●					
	S	●	●					
	H	-	-					

G



z6



60°

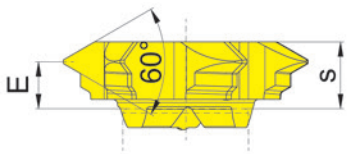
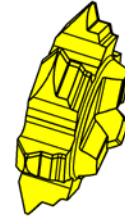
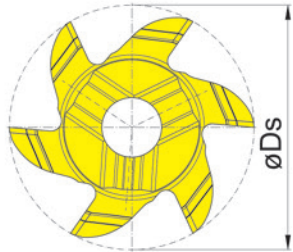


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	AS45	TA45
606.0510.02	1	2,5	3,2	11,7	306060R	▲	▲
606.0815.02	1,5	2,25	3,2	11,7	306060R	▲	▲
	P	●	●				
	M	●	●				
	K	●	●				
	N	○	○				
	S	●	●				
	H	-	-				



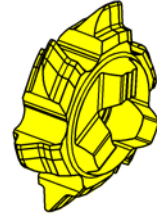
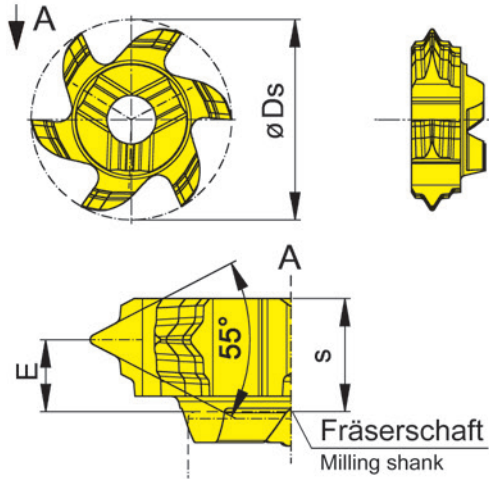


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TA45	TI25
606.5519.10.02	19	2,1	3,3	9,7	306060R	▲	▲	Δ
606.5514.02	14	2	3,3	11,7	306060R	▲	▲	
606.5519.02	19	2,1	3,3	11,7	306060R	▲	▲	Δ
P	●	●	●					
M	●	●	●					
K	●	●	●					
N	○	●	●					
S	●	●	●					
H	-	-	-					

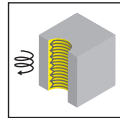




Übersicht  
Overview

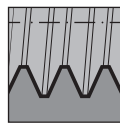
Seite/Page  
316

Frälerschaft  
Milling shank  
M308

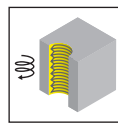


Seite/Page  
317

Schneidplatte  
Insert  
111/308/608



Seite/Page  
318-319



Seite/Page  
320-323

G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M308



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  13,4 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  13,4 mm

## Teilprofil, 60°, metrisch, Typ 111, 308

Partial profile 60°, metric, type 111, 308



Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Nenndurchmesser / Nominal diameter									
Typ / type <b>111</b> / Ds 13,4									
R/L111.0205.01	≥ 18	≥ 16							
R/L111.0510.01			≥ 18	≥ 18					
R/L111.0815.01					≥ 20	≥ 20			
R/L111.1020.01							≥ 22		
R/L111.1325.01								≥ 24	
Typ / type 308 / Ds 13,2									
308.1325.01								≥ 18	
Typ / type 308 / Ds 15,7									
308.0815.01					≥ 22				
308.0720.01			≥ 20	≥ 20	≥ 20	≥ 20	≥ 20		
308.2530.01								≥ 24	≥ 24

## Teilprofil, 60°, metrisch, Typ 608

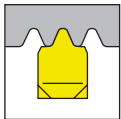
Partial profile, 60°, metric, type 608



Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Nenndurchmesser / Nominal diameter									
Typ / type <b>608</b> / Ds 13,2									
608.1325.01								≥ 18	
Typ / type <b>608</b> / Ds 15,7									
608.0720.01			≥ 20	≥ 20	≥ 20	≥ 20	≥ 20		
608.2530.01								≥ 24	≥ 24

## Vollprofil, 55°, Whitworth, Typ 111, 608

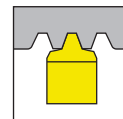
Full profile, 55°, Whitworth, type 111, 608



Gg"/" / tpi	19	14
Nenndurchmesser Nominal diameter		
Typ / type <b>111</b> / Ds 13,4		
111.5519.02	≥ 18	
111.5514.02		≥ 21
Gewinde/ Thread		
Typ / type <b>608</b> / Ds 13,5		
608.5514.02		G <sup>1</sup> / <sub>2</sub> "/G <sup>3</sup> / <sub>4</sub> "

## Trapezgewinde, 30°, metrisch, Typ 608

Trapezoidal thread, 30°, metric, type 608



608.1525.01	Tr24x2,5
608.1730.01	Tr24x3
608.2240.01	Tr24x4

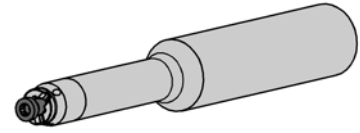
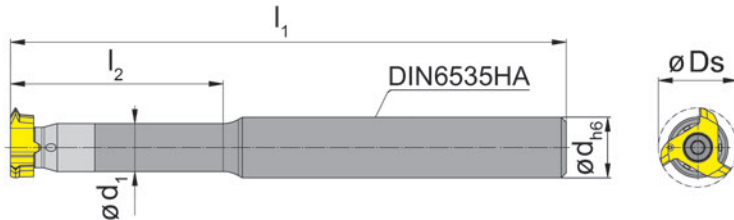
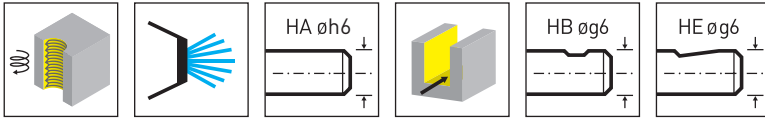


Abbildung = rechtsschneidend  
Picture = right hand cutting version

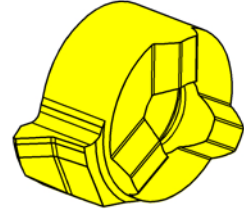
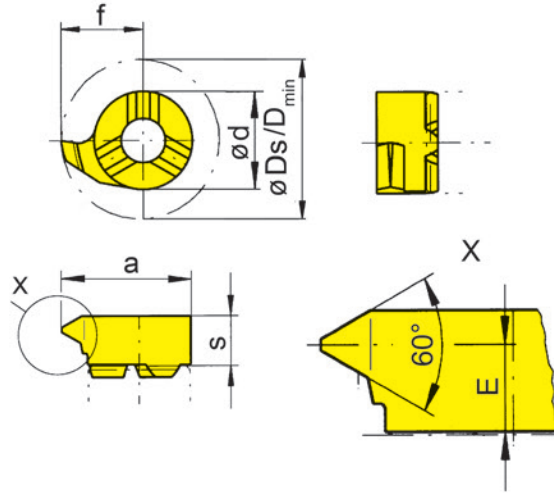
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M308.0012.07A</b>	12	160	-	8	HA	308080R • 308080L
<b>M308.1012.02A</b>	12	110	42	9,5	HA	308080R • 308080L
<b>M308.1016.01A</b>	16	110	33	9,5	HA	308080R • 308080L
<b>M308.1016.02A</b>	16	110	45	9,5	HA	308080R • 308080L
<b>M308.1016.03A</b>	16	130	64	9,5	HA	308080R • 308080L
<b>M308.1012.02B</b>	12	110	42	9,5	HB	308080R • 308080L
<b>M308.1016.01B</b>	16	110	33	9,5	HB	308080R • 308080L
<b>M308.1016.02B</b>	16	110	45	9,5	HB	308080R • 308080L
<b>M308.1016.03B</b>	16	130	64	9,5	HB	308080R • 308080L
<b>M308.1012.02E</b>	12	110	42	9,5	HE	308080R • 308080L
<b>M308.1016.01E</b>	16	110	33	9,5	HE	308080R • 308080L
<b>M308.1016.02E</b>	16	110	45	9,5	HE	308080R • 308080L
<b>M308.1016.03E</b>	16	130	64	9,5	HE	308080R • 308080L

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M308...	<b>3.5.12T10EP</b>	<b>T10PL</b>





R = rechts wie gezeichnet  
R = right hand version shown

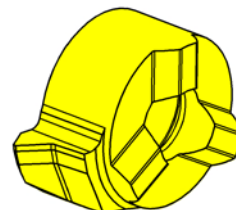
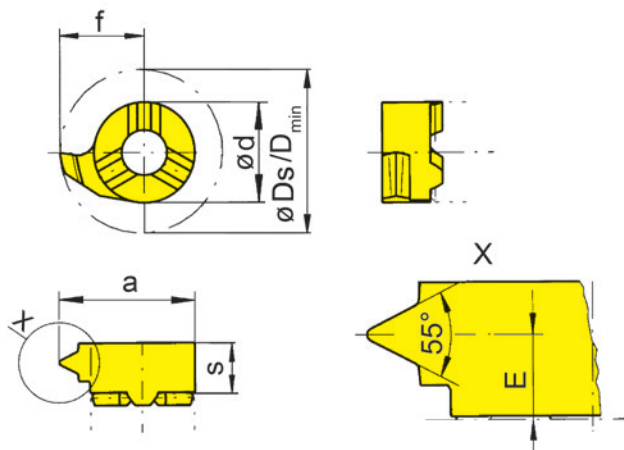
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	f	a	d	Ds	D <sub>min</sub>	HIS	HM-Sorten Carbide grades			
											EG55	TH35	TN35	
R111.0205.01	0,5	0,75	3,5	4,15	6,7	10,7	8	13,4	11	111080R	▲	▲	▲	
R111.0510.01	1	1,25	3,3	4,15	6,7	10,7	8	13,4	11	111080R	▲	▲	▲	
R111.0815.01	1,5	1,75	3,3	4,15	6,7	10,7	8	13,4	11	111080R	▲	▲	▲	
R111.1020.01	2	2	3	4,15	6,7	10,7	8	13,4	11	111080R	▲	▲	▲	
L111.0205.01	0,5	0,75	3,5	4,15	6,7	10,7	8	13,4	11	111080L	△	△	▲	
L111.0510.01	1	1,25	3,3	4,15	6,7	10,7	8	13,4	11	111080L	▲	△	▲	
L111.0815.01	1,5	1,75	3,3	4,15	6,7	10,7	8	13,4	11	111080L	▲	△	▲	
L111.1020.01	2	2	3	4,15	6,7	10,7	8	13,4	11	111080L	△	△	▲	
											P	●	●	●
											M	○	●	●
											K	○	●	●
											N	-	●	●
											S	-	●	●
											H	-	-	-

G



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	f	a	d	Ds	D <sub>min</sub>	HIS	EG55	TA45	TN35
<b>R111.5514.02</b>	14	2,5	4,15	6,7	10,7	8	13,4	11	111080R	▲		▲
<b>R111.5519.02</b>	19	2,9	4,15	6,7	10,7	8	13,4	11	111080R	▲	Δ	▲
<b>L111.5514.02</b>	14	2,5	4,15	6,7	10,7	8	13,4	11	111080L	Δ		▲
<b>L111.5519.02</b>	19	2,9	4,15	6,7	10,7	8	13,4	11	111080L		Δ	▲
<b>P</b>										●	●	●
<b>M</b>										○	●	●
<b>K</b>										○	●	●
<b>N</b>										-	●	●
<b>S</b>										-	●	●
<b>H</b>										-	-	-



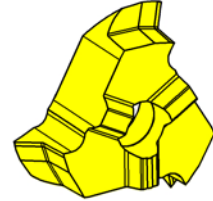
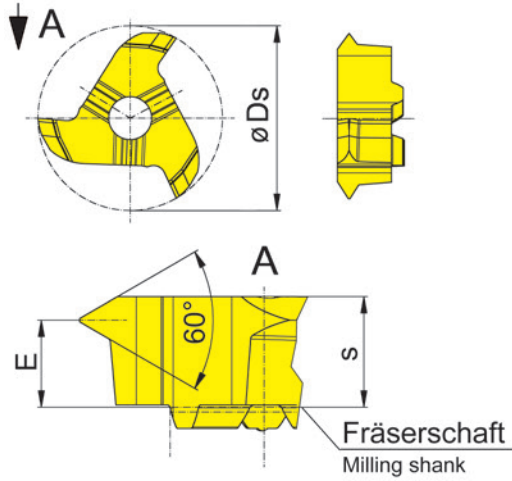


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	AS45	TA45	TN35
308.1325.01	2,5	2,5	3,3	4,7	13,2	308080R	▲	▲	
308.0720.01	1	2	3,3	4,7	15,7	308080R	▲		▲
308.0815.01	1,5	1,5	3,7	4,7	15,7	308080R	▲		▲
308.2530.01	2,5	3	2,7	4,7	15,7	308080R	▲		▲

**Hinweis:**  
308.0815.01 auch zur Herstellung von Gewinde UNF 7/8"-14 geeignet  
**Note:**  
308.0815.01 also suitable for production of thread UNF 7/8"-14

	P	M	K	N	S	H
AS45	●	●	●	○	●	-
TA45	●	●	●	●	●	-
TN35	●	●	●	●	●	-

G



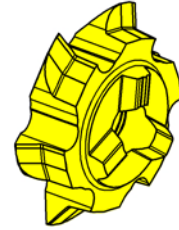
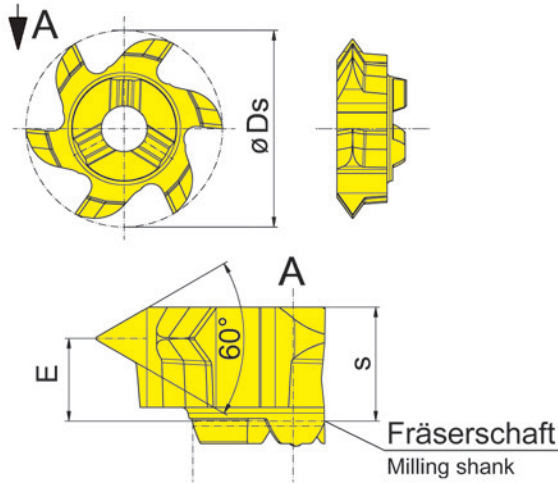


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	TA45	TI25
608.0720.01	1	2	3,3	4,55	15,7	308080R	▲		▲
608.1325.01	2,5	2,5	3,3	4,55	13,2	308080R	▲	▲	
608.2530.01	2,5	3	2,9	4,55	15,7	308080R	▲		▲
<b>Hinweis:</b> 608.1325.01 auch zur Herstellung von Gewinde UNF 7/8"-14 geeignet							P	●	●
<b>Note:</b> 608.1325.01 also suitable for production of thread UNF 7/8"-14							M	●	●
							K	●	●
							N	○	●
							S	●	●
							H	-	-



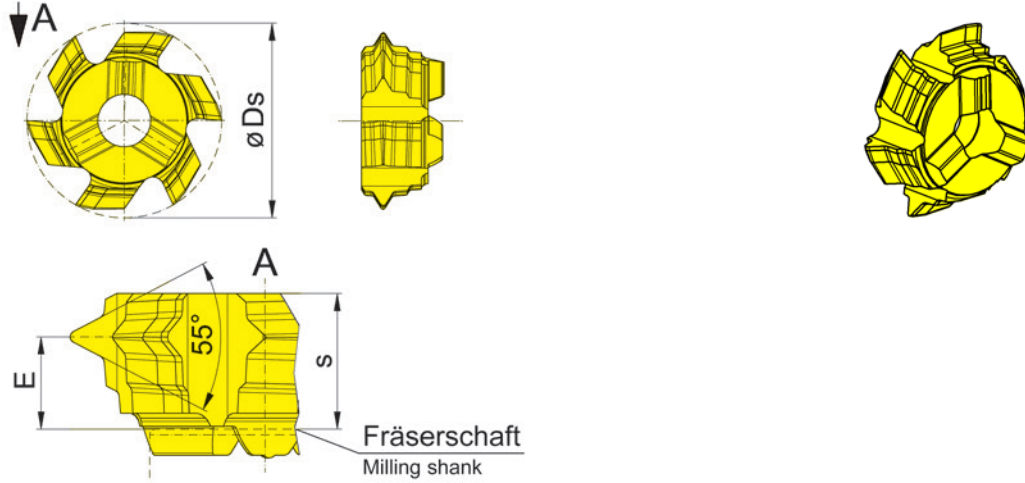


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TA45	TI25
608.5514.02	14	3,2	4,7	13,5	308080R	▲	▲	Δ
						P ●	●	●
						M ●	●	●
						K ●	●	●
						N ○	●	●
						S ●	●	●
						H -	-	-

G

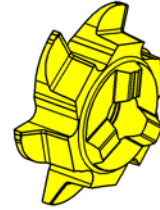
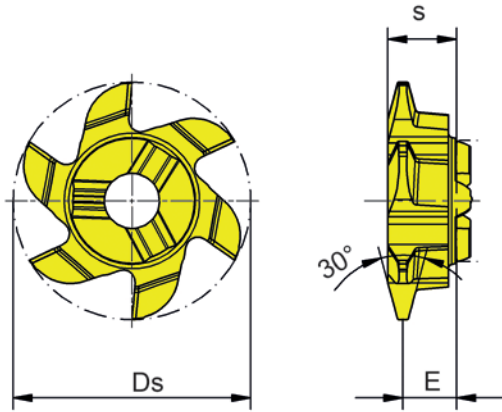


Abbildung = rechtsschneidend  
Picture = right hand cutting version

HM-Sorten  
Carbide grades  
▲ ab Lager  
on stock  
Δ 4 Wochen  
4 weeks

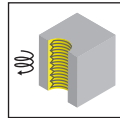
Bestellnummer Part number	P	s	E	Ds	HIS	EG55
608.1525.01	2,5	4,55	3,56	15,7	308080R	▲
608.1730.01	3	4,55	3,4	15,7	308080R	▲
608.2240.01	4	4,55	3,16	15,7	308080R	▲
	P	●				
	M	o				
	K	o				
	N	-				
	S	-				
	H	-				



Übersicht  
Overview

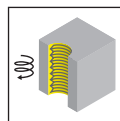
Seite/Page  
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Frälerschaft  
Milling shank  
M311



Seite/Page  
327

Schneidplatte  
Insert  
311/611



Seite/Page  
328-332

G

### **Achtung:**

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### **Attention:**

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M311



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  17,7 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  17,7 mm

## Teilprofil, 60°, metrisch, Typ 311, 611

Partial profile, 60°, metric, type 311, 611



Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5
Nenndurchmesser / Nominal diameter										
<b>Typ / type 311 / Ds 17,7</b>										
311.0515.01	≥ 20	≥ 20	≥ 20	≥ 20	≥ 22					
311.0510.01			≥ 22							
311.0720.01			≥ 22	≥ 22	≥ 22	≥ 22	≥ 22			
311.0815.01					≥ 24					
311.1020.01							≥ 28			
311.1325.01								≥ 34		
311.1630.01									≥ 34	
311.1835.01										≥ 34
311.2535.01								≥ 28	≥ 24	≥ 26
<b>Typ / type 611 / Ds 17,7</b>										
611.0515.01	≥ 20	≥ 20	≥ 20	≥ 20	≥ 22					
611.0720.01			≥ 22	≥ 22	≥ 22	≥ 22	≥ 22			
611.2535.01								≥ 28	≥ 24	≥ 26

## Vollprofil, 60°, metrisch, Typ 311, 611

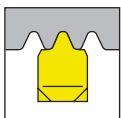
Full profile, 60°, metric type 311, 611



Steigung/Pitch P	1,5	1,75	2,0	2,5	3,0	3,5
Nenndurchmesser / Nominal diameter						
<b>Typ / type 311 / Ds 17,7</b>						
311.0815.02	≥ 23					
311.0917.02		≥ 24,5				
311.1020.02			≥ 25,5			
311.1325.02				≥ 28,5		
311.1630.02					≥ 32	
311.1835.02						≥ 35
<b>Typ / type 611 / Ds 17,7</b>						
611.0815	≥ 23					

## Vollprofil, 55°, Whitworth, Typ 311

Full profile, 55°, Whitworth, type 311



Gg/'' / tpi	14	11
Gewinde / Thread		
<b>Typ / type 311 / Ds 17,7</b>		
311.5514.02	G <sup>3</sup> / <sub>4</sub> ''	
311.5511.02		G1''

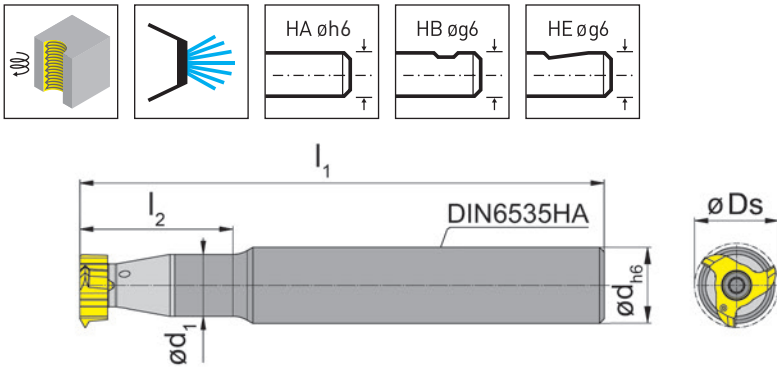


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M311.0012.05A</b>	12	130	20	9	HA	311090R
<b>M311.1316.01A</b>	16	110	32	13	HA	311090R
<b>M311.1316.02A</b>	16	130	45	13	HA	311090R
<b>M311.1316.03A</b>	16	145	64	13	HA	311090R
<b>M311.1316.01B</b>	16	110	32	13	HB	311090R
<b>M311.1316.02B</b>	16	130	45	13	HB	311090R
<b>M311.1316.03B</b>	16	145	64	13	HB	311090R
<b>M311.1316.01E</b>	16	110	32	13	HE	311090R
<b>M311.1316.02E</b>	16	130	45	13	HE	311090R
<b>M311.1316.03E</b>	16	145	64	13	HE	311090R

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311...	<b>4.14T15P</b>	<b>T15PQ</b>



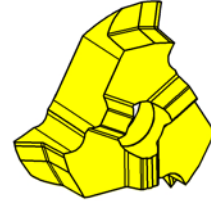
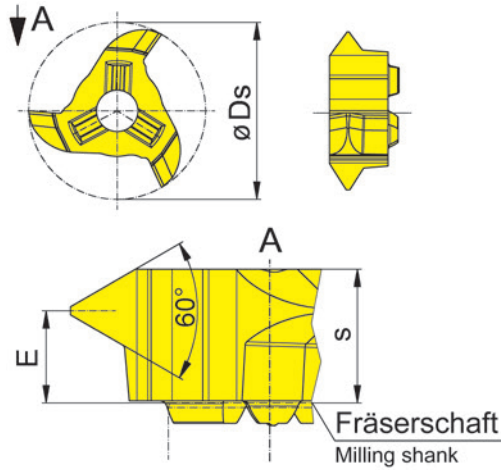


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	HM-Sorten Carbide grades		
							AS45	TA45	TN35
311.0515.01	0,5	1,5	4,8	5,95	17,7	311090R	▲	▲	
311.0510.01	1	1	5	5,95	17,7	311090R	▲		▲
311.0720.01	1	2	4,6	5,95	17,7	311090R	▲		▲
311.0815.01	1,5	1,5	4,8	5,95	17,7	311090R	▲		▲
311.1020.01	2	2	4,6	5,95	17,7	311090R	▲		▲
311.1325.01	2,5	2,5	4,4	5,95	17,7	311090R	▲		▲
311.2535.01	2,5	3,5	3,7	5,95	17,7	311090R	▲		▲
311.1630.01	3	3	4,3	5,95	17,7	311090R	▲		▲
311.1835.01	3,5	3,5	4,1	5,95	17,7	311090R	▲		▲
	<b>P</b>	•	•	•					
	<b>M</b>	•	•	•					
	<b>K</b>	•	•	•					
	<b>N</b>	o	•	•					
	<b>S</b>	•	•	•					
	<b>H</b>	-	-	-					

G



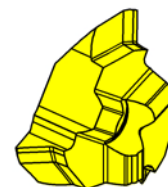
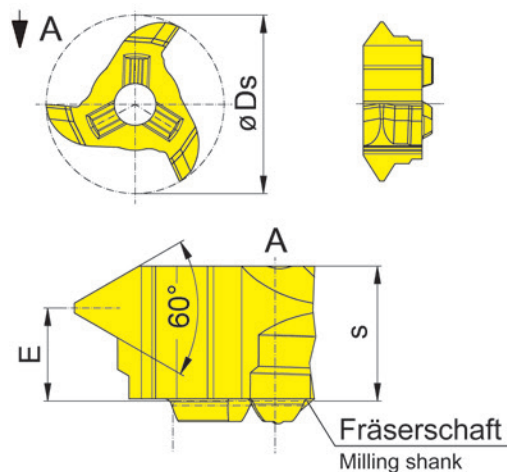


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	HM-Sorten Carbide grades			
						AS45	EG35	TN35	
311.0815.02	1,5	4,8	5,95	17,7	311090R	▲		▲	
311.0917.02	1,75	4,7	5,95	17,7	311090R		▲		
311.1020.02	2	4,6	5,95	17,7	311090R	▲		▲	
311.1325.02	2,5	4,4	5,95	17,7	311090R	▲		△	
311.1630.02	3	4,3	5,95	17,7	311090R	▲		▲	
311.1835.02	3,5	4,1	5,95	17,7	311090R	▲		▲	
						P	●	●	●
						M	●	●	●
						K	●	○	●
						N	○	-	●
						S	●	-	●
						H	-	-	-



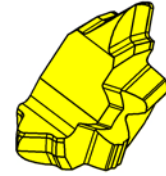
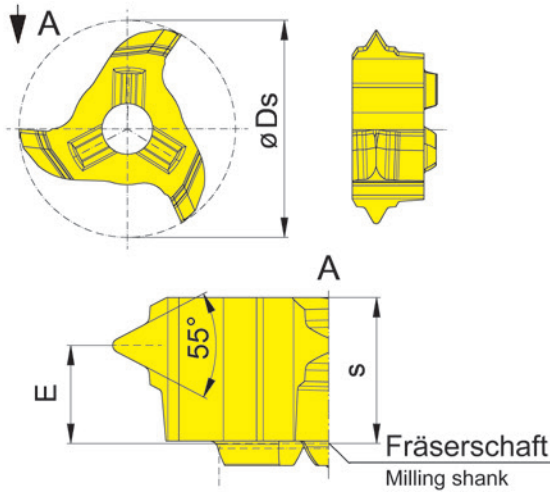


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TN35
311.5511.02	11	4	5,95	17,7	311090R	▲	▲
311.5514.02	14	4,35	5,95	17,7	311090R	▲	▲
						P ● ●	● ●
						M ● ●	● ●
						K ● ●	● ●
						N ○ ●	● ●
						S ● ●	● ●
						H - -	- -

G

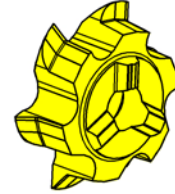
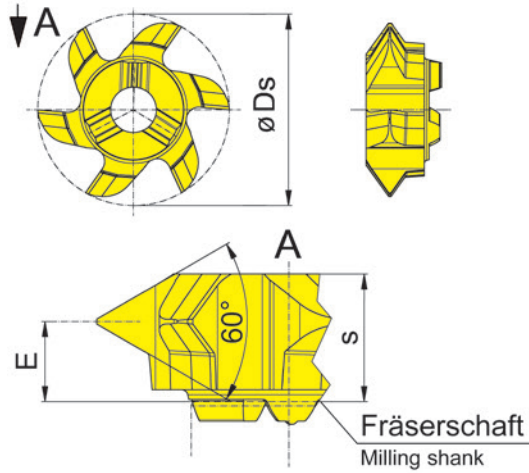


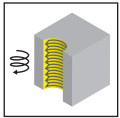
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	TA45	TI25
611.0515.01	0,5	1,5	4,8	5,75	17,7	311090R	▲	▲	▲
611.0720.01	1	2	4,6	5,75	17,7	311090R	▲	▲	▲
611.2535.01	2,5	3,5	3,7	5,75	17,7	311090R	▲	▲	▲
<b>Hinweis:</b> 611.2535.01 auch zur Herstellung von Gewinde UNF 1 1/4"-12, 1 1/8"-12 und 1 5/8"-12 geeignet							P ●	●	●
<b>Note:</b> 611.2535.01 also suitable for production of thread UNF 1 1/4"-12, 1 1/8"-12 and 1 5/8"-12							M ●	●	●
							K ●	●	●
							N ○	●	●
							S ●	●	●
							H -	-	-





z6



60°

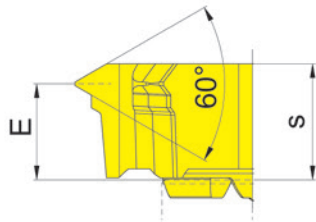
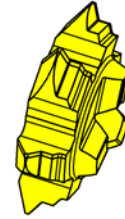
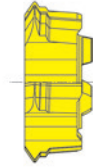
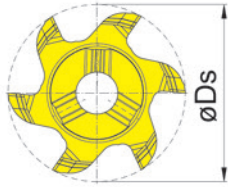


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	AS45
611.0815.02	1,5	4,8	5,95	17,7	311090R	▲
	P ●					
	M ●					
	K ●					
	N ○					
	S ●					
	H -					

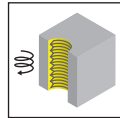
G



Übersicht  
Overview

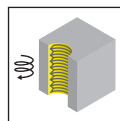
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Fräaserschaft  
Milling shank  
M313



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337-338

Schneidplatte  
Insert  
313/613



Seite/Page  
339-343

G

### **Achtung:**

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### **Attention:**

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M313



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  21,7 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  21,7 mm

## Teilprofil, 60°, metrisch, Typ 313, 613

Partial profile, 60°, metric, type 313, 613



Steigung/Pitch P	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	4,5
Nenndurchmesser / Nominal diameter										
Typ / type <b>313</b> / Ds 21,7										
313.0720.01	≥ 27	≥ 26	≥ 26	≥ 26	≥ 26					
313.0815.01			≥ 30							
313.1020.01					≥ 32					
313.1630.01							≥ 36			
313.1835.01								≥ 36		
313.2140.01									≥ 36	
313.2445.01										≥ 38
313.2545.01						≥ 33	≥ 32	≥ 30	≥ 30	≥ 30
Typ / type <b>613</b> / Ds 21,7										
613.0720.01	≥ 27	≥ 26	≥ 26	≥ 26	≥ 26					
613.2545.01						≥ 33	≥ 32	≥ 30	≥ 30	≥ 30

## Vollprofil, 60°, metrisch, Typ 313

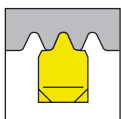
Full profile, 60°, metric, type 313



Steigung/Pitch P	1,5	2,0	3,0	3,5	4,0	4,5
Nenndurchmesser / Nominal diameter						
Typ / type <b>313</b> / Ds 21,7						
313.0815.02	≥ 27					
313.1020.02		≥ 30				
313.1630.02			≥ 37			
313.1835.02				≥ 40		
313.2140.02					≥ 44	
313.2445.02						≥ 48

## Vollprofil, 55°, Whitworth, Typ 313, 613

Full profile, 55°, Whitworth, type 313, 613



Gg/" / tpi	11	8	6
Nenndurchmesser Nominal diameter			
Typ / type <b>313</b> / Ds 21,7			
313.5508.02		≥ 40	
313.5506.02			≥ 48
Gewinde/ Thread			
Typ / type <b>313</b> / Ds 21,7			
313.5511.02	G1"		
Typ / type <b>613</b> / Ds 21,7			
613.5511.02	G1"		



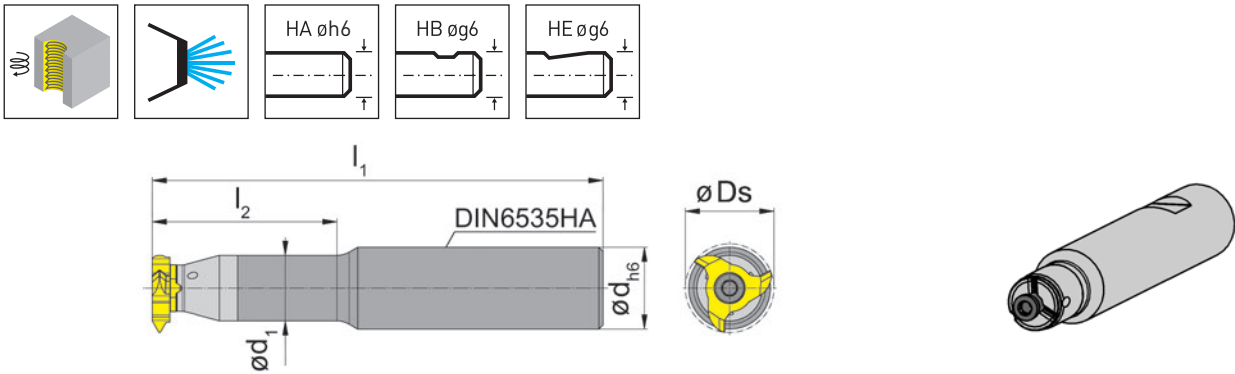


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.1620.01A</b>	20	110	45	16	HA	313113R • 313113L
<b>M313.1620.02A</b>	20	130	65	16	HA	313113R • 313113L
<b>M313.1620.03A</b>	20	160	85	16	HA	313113R • 313113L
<b>M313.1620.01B</b>	20	110	45	16	HB	313113R • 313113L
<b>M313.1620.02B</b>	20	130	65	16	HB	313113R • 313113L
<b>M313.1620.03B</b>	20	160	85	16	HB	313113R • 313113L
<b>M313.1620.01E</b>	20	110	45	16	HE	313113R • 313113L
<b>M313.1620.02E</b>	20	130	65	16	HE	313113R • 313113L
<b>M313.1620.03E</b>	20	160	85	16	HE	313113R • 313113L

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Frärschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>



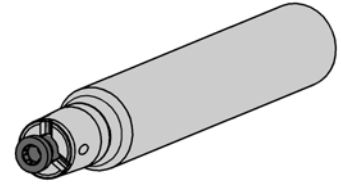
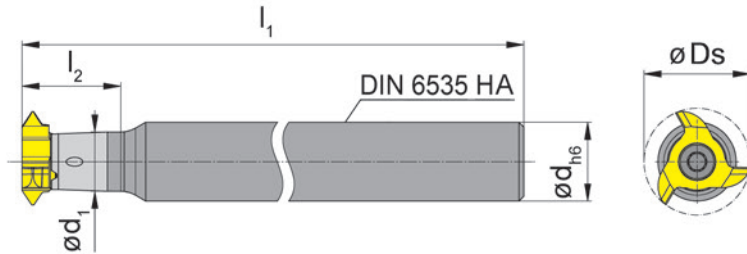
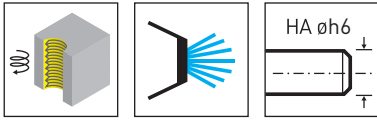


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.0016.07A</b>	16	160	20	12	HA	313113R • 313113L

Ds siehe Schneidplatten  
Ds see inserts

**G**

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313.0016.07A	<b>5.14T20P</b>	<b>T20PQ</b>

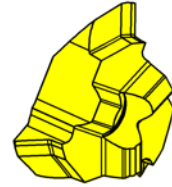
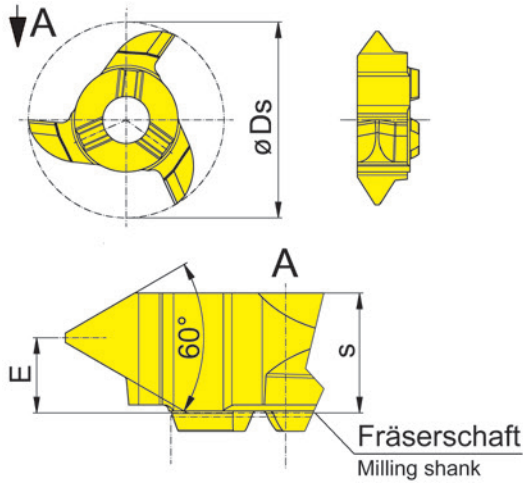
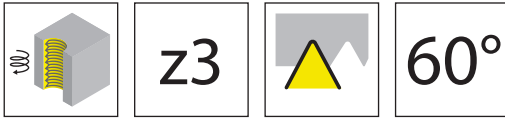


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	EG55	TN35
313.0720.01	1	2	4,6	5,9	21,7	313113R	▲	▲	▲
313.0815.01	1,5	1,5	4,8	5,9	21,7	313113R	▲	▲	▲
313.1020.01	2	2	4,6	5,9	21,7	313113R	▲	▲	▲
313.1630.01	3	3	4,3	5,9	21,7	313113R	▲	▲	▲
313.1835.01	3,5	3,5	4,1	5,9	21,7	313113R	▲	▲	△
313.2140.01	4	4	3,9	5,9	21,7	313113R	▲	▲	▲
313.2445.01	4,5	4,5	3,7	5,9	21,7	313113R	▲	▲	▲
313.2545.01	2,5	4,5	3,7	5,9	21,7	313113R	▲	▲	▲
<b>Hinweis:</b> 313.1020.01 auch zur Herstellung von Gewinde UNF 1 1/4"-12, 1 1/8"-12 und 1 5/8"-12 geeignet							P	●	●
<b>Note:</b> 313.1020.01 also suitable for production of thread UNF 1 1/4"-12, 1 1/8"-12 and 1 5/8"-12							M	●	○
							K	●	○
							N	○	-
							S	●	-
							H	-	-



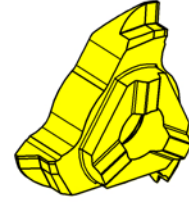
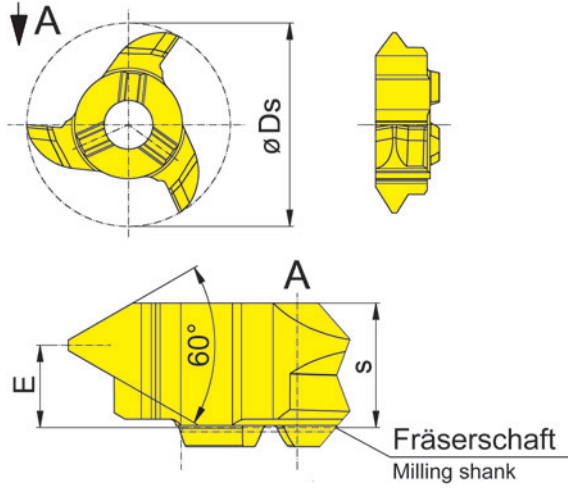


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	D <sub>s</sub>	HIS	HM-Sorten Carbide grades			
						AS45	EG55	TN35	
313.0815.02	1,5	4,8	5,9	21,7	313113R	▲	▲	▲	
313.1020.02	2	4,6	5,9	21,7	313113R	▲	▲	▲	
313.1630.02	3	4,3	5,9	21,7	313113R	▲	▲	▲	
313.1835.02	3,5	4,1	5,9	21,7	313113R	▲	▲	▲	
313.2140.02	4	3,9	5,9	21,7	313113R	▲	▲	▲	
313.2445.02	4,5	3,8	5,9	21,7	313113R	▲	▲	▲	
						P	●	●	●
						M	●	○	●
						K	●	○	●
						N	○	-	●
						S	●	-	●
						H	-	-	-

G

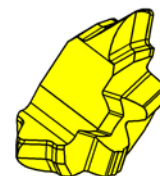
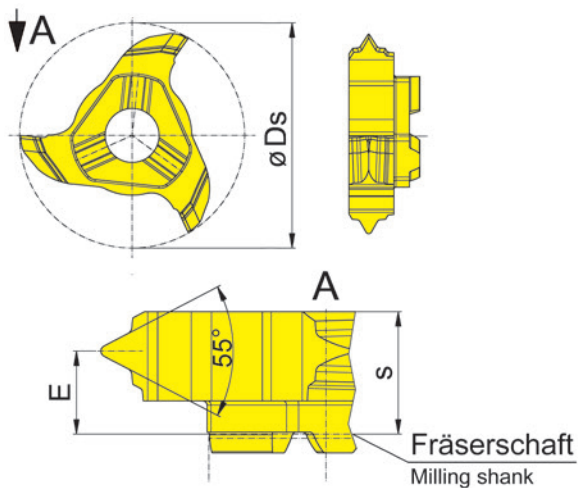


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	EG55	TN35
313.5506.02	6	3	5,9	21,7	313113R	▲	▲	Δ
313.5508.02	8	3,6	5,9	21,7	313113R	▲	▲	▲
313.5511.02	11	4	5,9	21,7	313113R	▲	▲	▲
						P ●	●	●
						M ●	○	●
						K ●	○	●
						N ○	-	●
						S ●	-	●
						H -	-	-



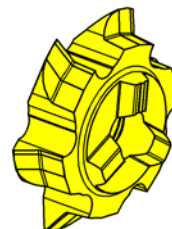
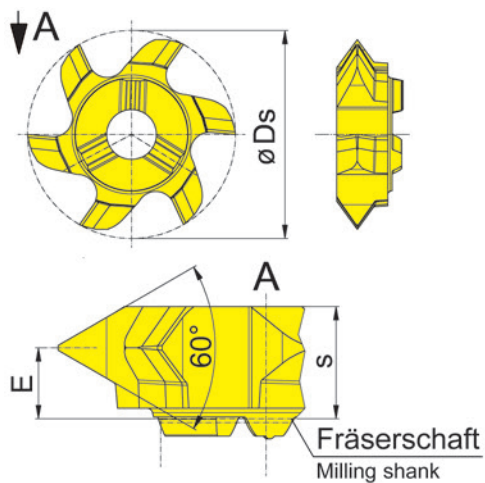


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	EG55	TI25
613.0720.01	1	2	4,6	5,6	21,7	313113R	▲	▲	▲
613.2545.01	2,5	4,5	3,7	5,75	21,7	313113R	▲	▲	▲
	P	●	●	●			●	●	●
	M	●	○	●			●	○	●
	K	●	○	●			●	○	●
	N	○	-	●			○	-	●
	S	●	-	●			●	-	●
	H	-	-	-			-	-	-

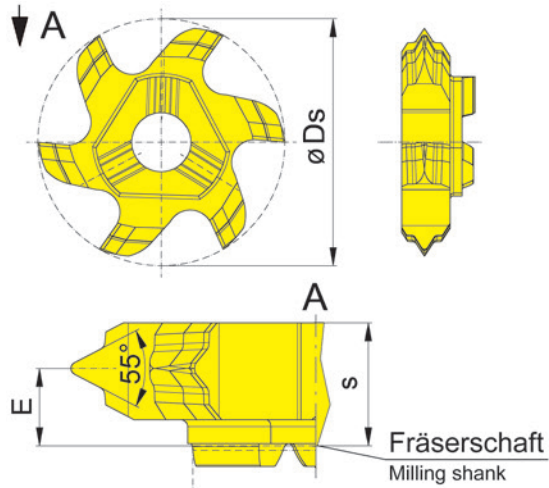


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

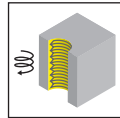
Bestellnummer Part number	TPI	E	s	Ds	HIS	HM-Sorten Carbide grades			
						AS45	EG55	TA45	TI25
613.5511.02	11	3,4	5,4	21,7	313113R	▲	▲	▲	▲
						P	●	●	●
						M	●	○	●
						K	●	○	●
						N	○	-	●
						S	●	-	●
						H	-	-	-



Übersicht  
Overview

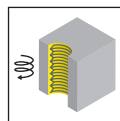
Seite/Page  
346

Frälerschaft  
Milling shank  
M328/SM328



Seite/Page  
347-348

Schneidplatte  
Insert  
328/628



Seite/Page  
349-352

G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.



# M328



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  27,7 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  27,7 mm

## Teilprofil, 60°, metrisch, Typ 328, 628

Partial profile, 60°, metric, type 328, 628

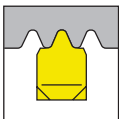


Steigung/Pitch P	1,0	1,25	1,5	1,75	2,0	2,5
Nenndurchmesser / Nominal diameter						
Typ / type <b>328</b> / Ds 27,7						
328.0720.01	≥ 32	≥ 32	≥ 32	≥ 32	≥ 32	
328.1525.01			≥ 34	≥ 34	≥ 34	≥ 34
Typ / type <b>628</b> / Ds 27,7						
628.1525.01			≥ 34	≥ 34	≥ 34	≥ 34

Steigung/Pitch P	3,0	3,5	4,0	4,5	5,0	5,5	6,0
Nenndurchmesser / Nominal diameter							
Typ / type <b>328</b> / Ds 27,7							
328.3050.01	≥ 40	≥ 38	≥ 38	≥ 38	≥ 38		
328.5060.01					≥ 48	≥ 46	≥ 44
Typ / type <b>628</b> / Ds 27,7							
628.3050.01	≥ 40	≥ 38	≥ 38	≥ 38	≥ 38		
628.5060.01					≥ 48	≥ 46	≥ 44

## Vollprofil, 55°, Whitworth, Typ 328, 628

Full profile, 55°, Whitworth, type 328, 628



Gg/'' / tpi	11
Gewinde / Thread	
Typ / type <b>328</b> / Ds 27,7	
328.5511.02	G1½''
Typ / type <b>628</b> / Ds 27,7	
628.5511.02	G1½''

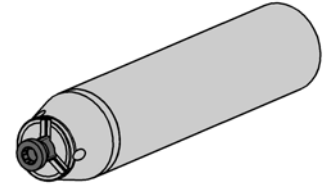
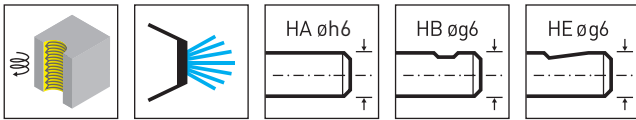


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M328.0020.10A</b>	20	250	HA	328143R
<b>M328.0020.D.05A</b>	20	145	HA	328143R
<b>M328.0020.D.06A</b>	20	160	HA	328143R
<b>M328.0020.D.07A</b>	20	180	HA	328143R
<b>M328.0020.D.05B</b>	20	145	HB	328143R
<b>M328.0020.D.06B</b>	20	160	HB	328143R
<b>M328.0020.D.07B</b>	20	180	HB	328143R
<b>M328.0020.D.05E</b>	20	145	HE	328143R
<b>M328.0020.D.06E</b>	20	160	HE	328143R
<b>M328.0020.D.07E</b>	20	180	HE	328143R

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M328.0020.10A	<b>5.14T20P</b>	<b>T20PQ</b>
M328.0020.D....	<b>5.17T20P</b>	<b>T20PQ</b>



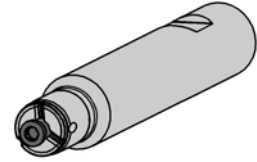
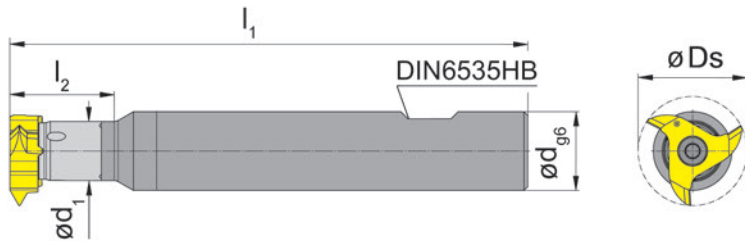
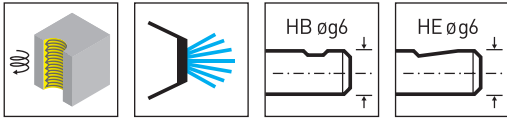


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>SM328.0020.05B</b>	20	130	25	15	HB	328143R
<b>SM328.0020.06B</b>	20	145	-	20	HB	328143R
<b>SM328.0020.07B</b>	20	160	25	15	HB	328143R
<b>SM328.0020.08B</b>	20	200	-	20	HB	328143R
<b>SM328.0020.05E</b>	20	130	25	15	HE	328143R
<b>SM328.0020.06E</b>	20	145	-	20	HE	328143R
<b>SM328.0020.07E</b>	20	160	25	15	HE	328143R
<b>SM328.0020.08E</b>	20	200	-	20	HE	328143R

Schaftmaterial: Schwermetall (schwingungsarm)  
Material of shank: tungsten alloy (giving good vibration resistance)

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
SM328...	<b>5.17T20P</b>	<b>T20PQ</b>

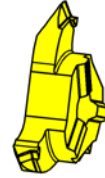
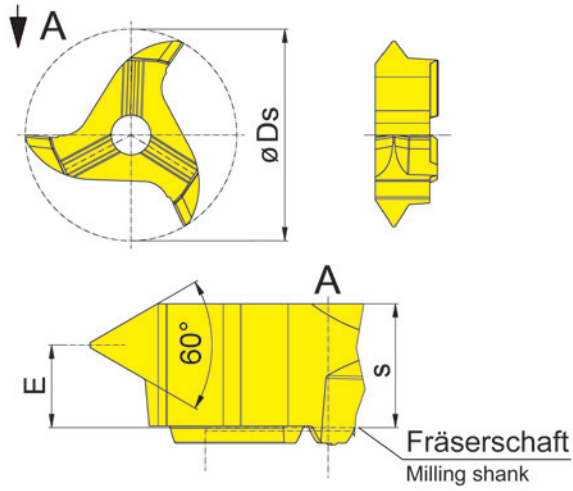
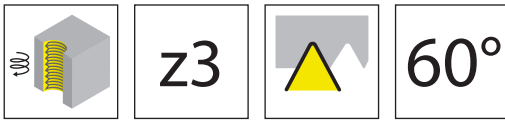


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	TI25	TN35
328.0720.01	1	2	4,6	5,95	27,7	328143R	▲		▲
328.1525.01	1,5	2,5	4,3	5,95	27,7	328143R	▲		▲
328.3050.01	3	5	4,8	7,2	27,7	328143R	▲	▲	▲
328.5060.01	5	6	4,4	7,2	27,7	328143R	▲		▲
	P						●	●	●
	M						●	●	●
	K						●	●	●
	N						○	●	●
	S						●	●	●
	H						-	-	-



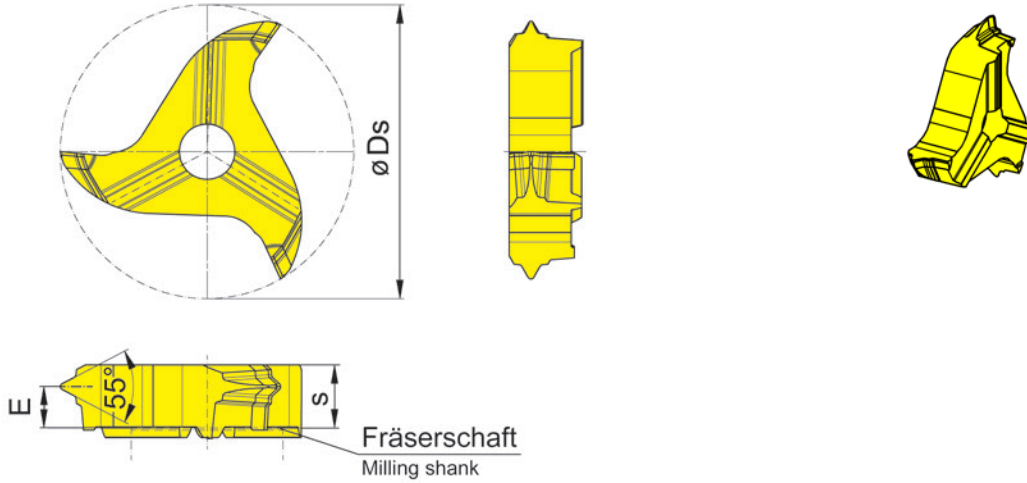


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45
328.5511.02	11	3,9	5,95	27,7	328143R	▲
						P ●
						M ●
						K ●
						N ○
						S ●
						H -

G

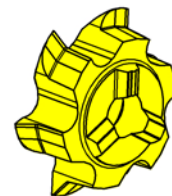
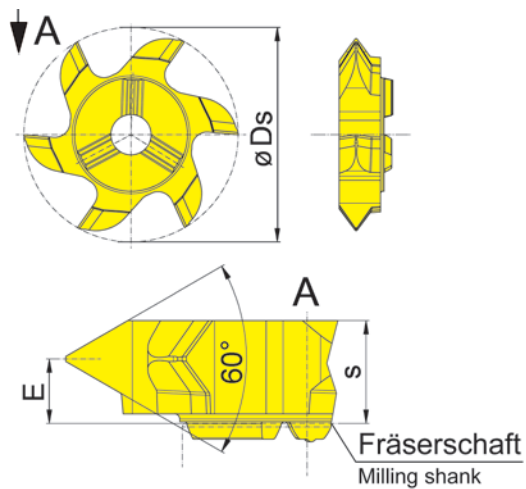


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	HIS	AS45	TI25
628.1525.01	1,5	2,5	4,8	6	27,7	328143R	▲	▲
628.3050.01	3	5	3,7	5,75	27,7	328143R	▲	▲
628.5060.01	5	6	3,2	5,75	27,7	328143R	▲	▲
	P	●	●					
	M	●	●					
	K	●	●					
	N	○	●					
	S	●	●					
	H	-	-					



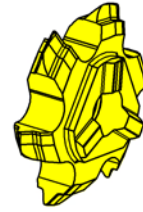
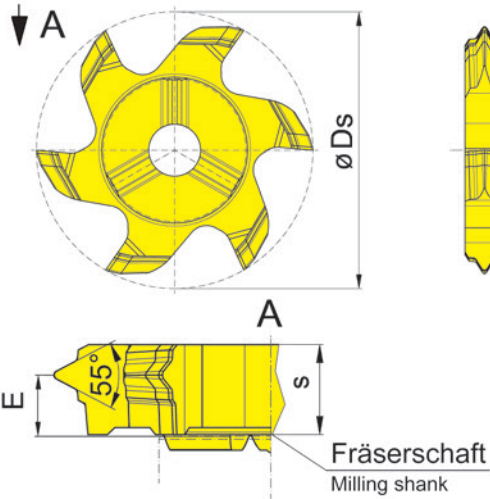


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45
628.5511.02	11	3,9	5,85	27,7	328143R	▲
						P ●
						M ●
						K ●
						N ○
						S ●
						H -

G

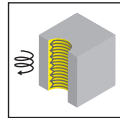




Übersicht  
Overview

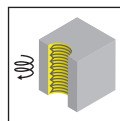
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Frälerschaft  
Milling shank  
M332



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Schneidplatte  
Insert  
632



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G

### **Achtung:**

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.

Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### **Attention:**

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# M332



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  31,7 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  31,7 mm

Teilprofil, 60°, metrisch, Typ 632  
 Partial profile, 60°, metric, type 632



Steigung/Pitch P	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0
Nenndurchmesser / Nominal diameter								
Typ / type <b>632</b> / Ds 31,7								
632.2545.01	≥ 42	≥ 42	≥ 46	≥ 42	≥ 42			
632.4060.01				≥ 46	≥ 46	≥ 46	≥ 46	≥ 46



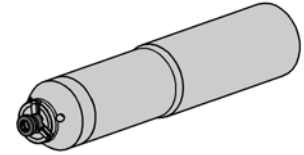
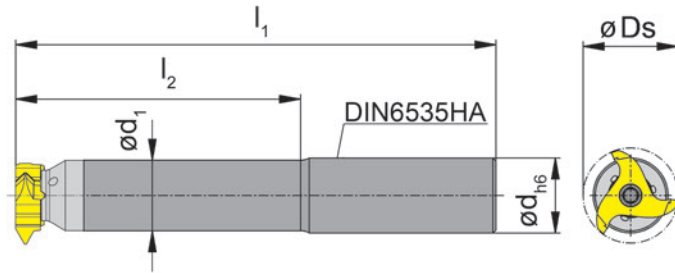


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M332.2325.06A</b>	25	160	95	23,5	HA	332143R
<b>M332.2325.07A</b>	25	180	115	23,5	HA	332143R
<b>M332.2325.08A</b>	25	200	135	23,5	HA	332143R
<b>M332.2325.09A</b>	25	250	185	23,5	HA	332143R

Ds siehe Schneidplatten  
Ds see inserts



**Ersatzteile**  
Spare Parts

<b>Fräuserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M332...	<b>5.17T20P</b>	<b>T20PQ</b>

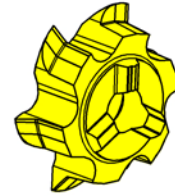
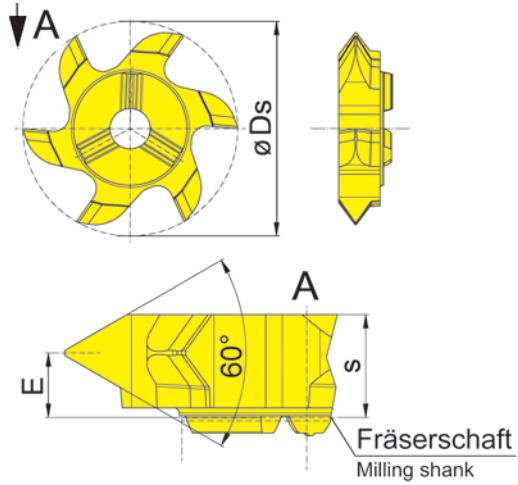
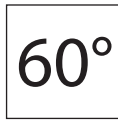
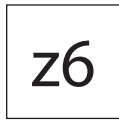
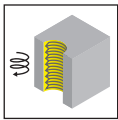


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

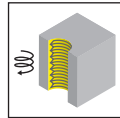
Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	HIS	AS45	TI25
632.2545.01	2,5	4,5	3,7	5,8	31,7	332143R	▲	▲
632.4060.01	4	6	3,2	5,8	31,7	332143R	▲	▲
	P	●	●					
	M	●	●					
	K	●	●					
	N	○	●					
	S	●	●					
	H	-	-					



Übersicht  
Overview

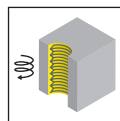
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Schaftfräser  
End Mill  
M275



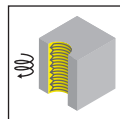
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Aufsteckfräser  
Arbour Mounted Cutter  
M275



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Wendeschneidplatte  
Indexable insert  
RS275



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365

G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.  
Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.



**M275**



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  31 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  31 mm

Teilprofil, 60°, metrisch, Typ S275  
 Partial profile, 60°, metric, type S275



Steigung/Pitch P	1,5	2,0	2,5	3,0	3,5
Nenn Durchmesser / Nominal diameter					
<b>Typ / type S275 / Ds 31</b>					
RS275.1535.01	≥ 45				
<b>Typ / type S275 / Ds 38</b>					
RS275.1535.01	≥ 54				
<b>Typ / type S275 / Ds 48</b>					
RS275.1535.01	≥ 70				
<b>Typ / type S275 / Ds 58</b>					
RS275.1535.01	≥ 83				



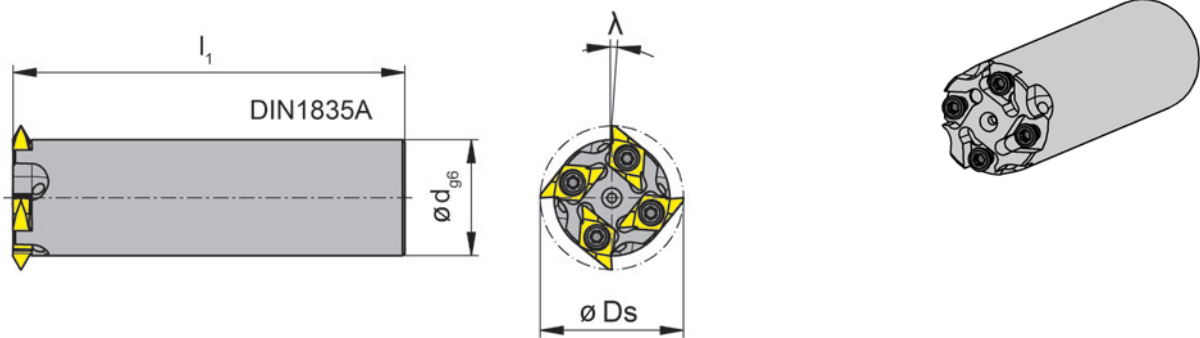
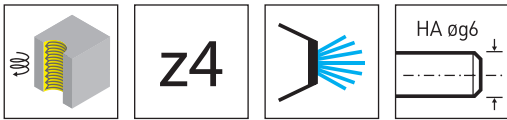


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d	l <sub>1</sub>	λ	HWS
M275.031.D25.3.04A	31	25	125	4°	275041R • 275043R

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M275.031.D25.3.04A	3.5.10T10P	T10PL



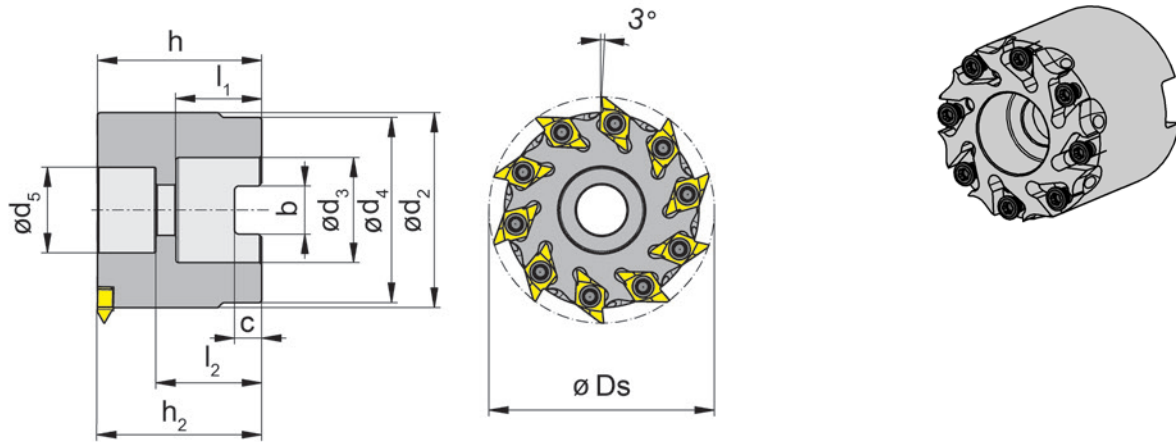
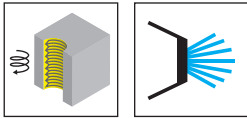


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>4</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	b	c	d <sub>2</sub>	HWS
<b>M275.0038.A16.05</b>	5	38	32,7	33	13,5	32	16	18	22,7	8,4	5,6	32	275041R • 275043R
<b>M275.0048.A22.08</b>	8	48	36,7	37	18,5	40,5	22	20	24,7	10,4	6,3	40,5	275041R • 275043R
<b>M275.0058.A27.10</b>	10	58	42,2	42,5	22	48	27	22	27,2	12,4	7	50	275041R • 275043R
<b>M275.0078.A32.14</b>	14	78	49,7	50	33	58	32	25	36,7	14,4	8	70,5	275041R • 275043R

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

## Ersatzteile

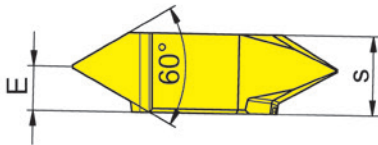
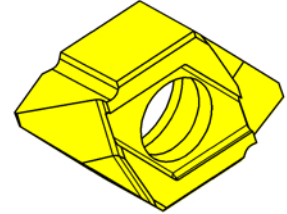
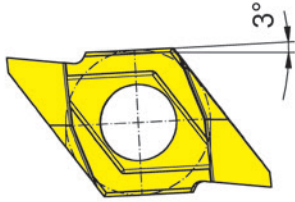
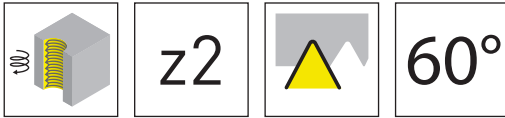
Spare Parts

Aufsteckfräser Arbor Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M275...	<b>3.5.10T10P</b>	<b>T10PL</b>

# Wendeschnidplatte

Indexable insert

# RS275



R = rechts wie gezeichnet  
R = right hand version shown

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

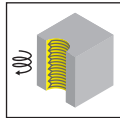
Bestellnummer Part number	P	P <sub>max</sub>	E	s	HIS	TA45
RS275.1535.01	1,5	3,5	2,3	4,1	275041R	▲
	P ●					
	M ●					
	K ●					
	N ●					
	S ●					
	H -					



Übersicht  
Overview

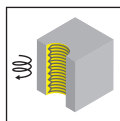
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Schaftfräser  
End Mill  
380



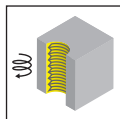
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Messerkopf  
Milling cutter  
380



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Wendeschneidplatte  
Indexable insert  
314



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G

### Achtung:

Beim Nenndurchmesser handelt es sich immer um den größten  $\emptyset$  am Gewinde. In der Regel richtet sich die Bezeichnung nach der Größe des Gewindes.  
Bsp: M12 x 1 -> Nenndurchmesser 12

Bei Unterschreitung des angegebenen Nenndurchmessers wird durch den Nachschnitt des Werkzeugs kein lehrenhaltiges Gewinde mehr erreicht.

### Attention:

The nominal diameter is always the largest  $\emptyset$  on the thread. As a rule, the designation is based on the size of the thread.

Example: M12 x 1 -> nominal diameter 12

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

**380**



**G**

**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  44 mm

**Thread Milling Cutter  
(by circular interpolation)**

from cutting edge  $\varnothing$  44 mm

Teilprofil, 60°, metrisch, Typ 314  
 Partial profile, 60°, metric, type 314



Steigung/Pitch P	1,5	2,0	2,5	3,0	4,0	5,0	5,5	6,0
Nenndurchmesser / Nominal diameter								
<b>Typ / type 314 / Ds 44</b>								
R314.1535.01	≥ 52	≥ 50	≥ 50	≥ 50				
R314.2140.01					≥ 72			
R314.3260.01								≥ 85
R314.4060.01					≥ 65		≥ 56	≥ 64
<b>Typ / type 314 / Ds 63</b>								
R314.1535.01	≥ 72	≥ 70	≥ 70	≥ 70				
R314.2140.01					≥ 95			
R314.3260.01								≥ 110
R314.4060.01					≥ 88			≥ 80





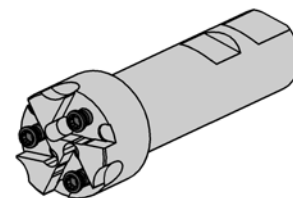
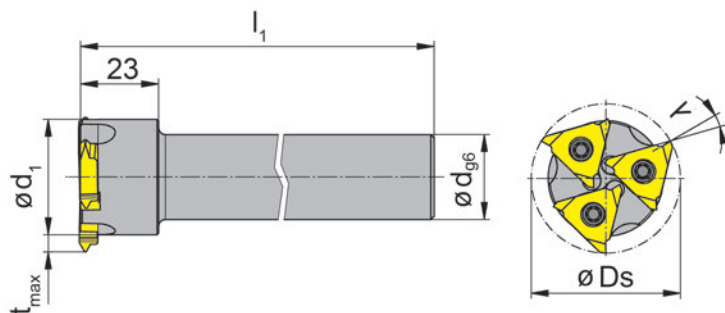
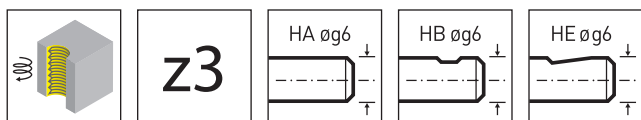


Abbildung = rechtsschneidend  
Picture = right hand cutting version

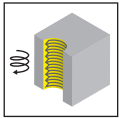
Bestellnummer Part number	Ds	d	l <sub>1</sub>	d <sub>1</sub>	λ	Form	HWS
<b>380.0044.03A</b>	44	25	125	34	14°	HA	314027R • 314041R • 314052R
<b>380.0044.03B</b>	44	25	125	34	14°	HB	314027R • 314041R • 314052R
<b>380.0044.03E</b>	44	25	125	34	14°	HE	314027R • 314041R • 314052R



## Ersatzteile

Spare Parts

<b>Schaftfräser</b> End Mill	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380...	<b>5.12T20P</b>	<b>T20PQ</b>



**z5**

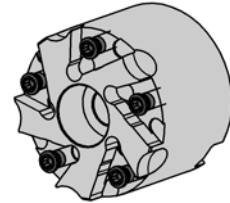
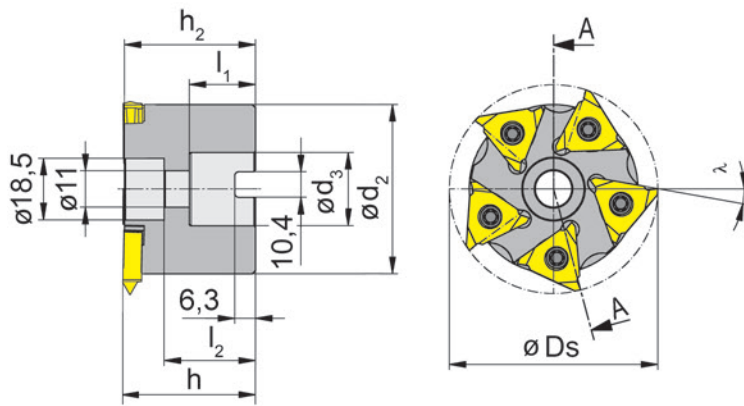


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	h <sub>2</sub>	h	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	λ	d <sub>2</sub>	HWS
<b>380.0063.05</b>	63	39,6	40	22	20	27,6	10°	51	314027R • 314041R • 314052R

Aufnahmebohrung und Mitnahme nach DIN 138  
Cutterhole and cross keyway as per DIN 138

**G**

**Ersatzteile**  
Spare Parts

<b>Messerkopf</b> Milling cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
380.0063.05	<b>5.12T20P</b>	<b>T20PQ</b>

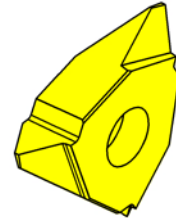
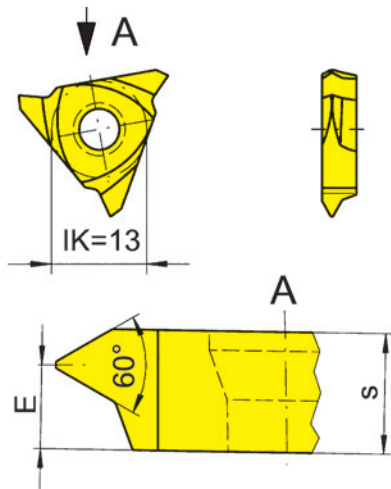
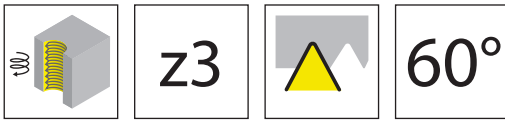


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	HIS	TN35
R314.1535.01	1,5	3,5	3,3	5,45	314052R	▲
R314.2140.01	4	4	3	5,45	314052R	▲
R314.4060.01	4	6	2,7	5,45	314052R	▲
R314.3260.01	6	6	2,7	5,45	314052R	▲

**Hinweis:**

R314.3260.01 ausschließlich für Messerkopf 380.0063.05

**Note:**

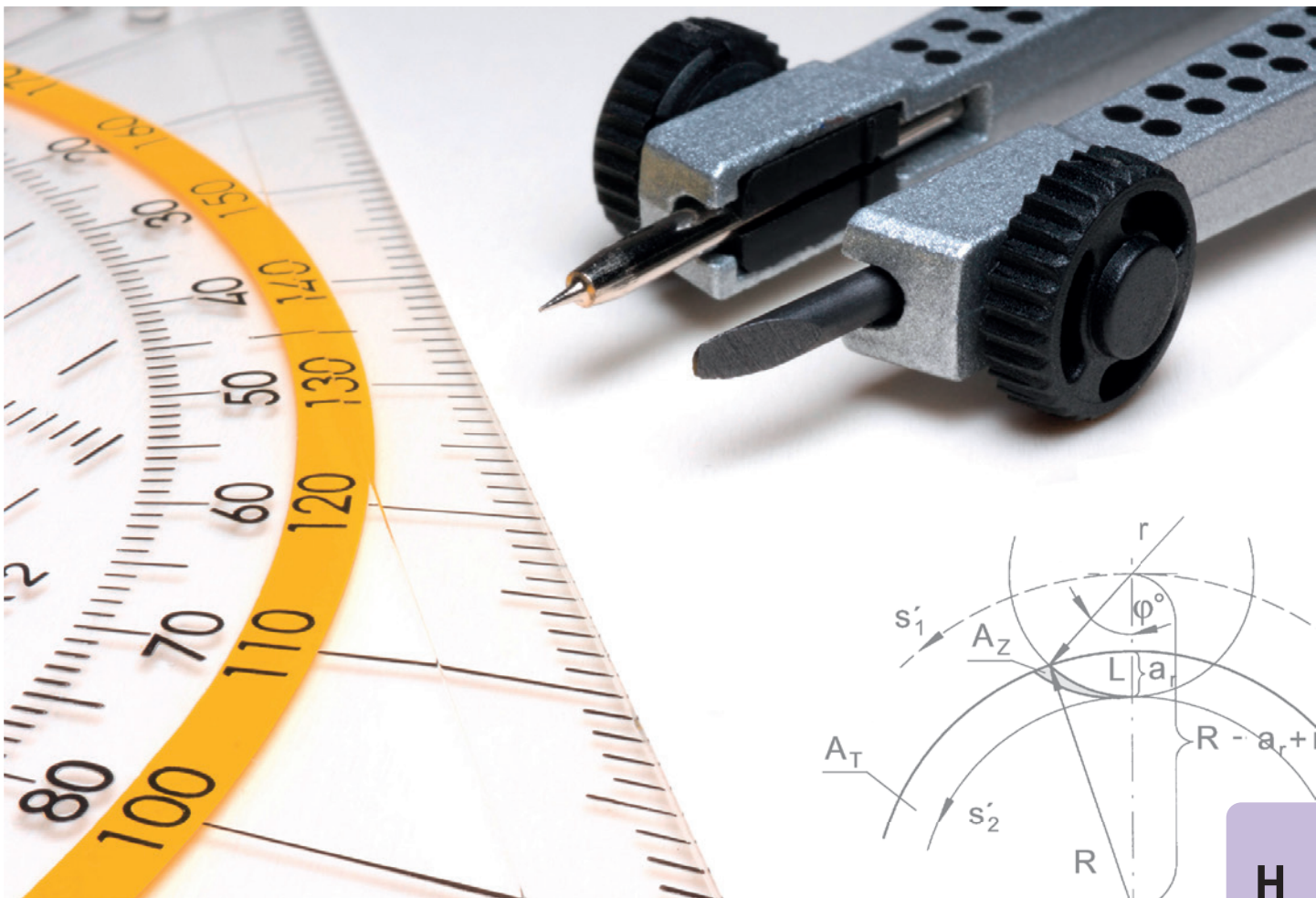
R314.3260.01 only for milling cutter 380.0063.05

P	●
M	●
K	●
N	●
S	●
H	-





G



Inhalt/Summary	Seite/Page
Ermittlung des Vorschubs Calculating the Feed Rate	374
Formelzeichen Symbols	375
Formeln Formulas	376 - 377
Schnittdaten Cutting Data	378 - 383



### Mittlere Spandicke $h_m$ zur Ermittlung des Vorschubs

Medium chip thickness  $h_m$  for calculating the feed rate

ISO	108,111,116, 306-336, 606-636,911-939	S310 / 314 / S275 / S475	S101
	$h_m$ (mm)	$h_m$ (mm)	$h_m$ (mm)
<b>P</b>	0,01 - 0,05	0,01 - 0,05	0,01 - 0,04
<b>M</b>	0,01 - 0,04	0,01 - 0,04	0,01 - 0,03
<b>K</b>	0,01 - 0,05	0,01 - 0,05	0,01 - 0,03
<b>N</b>	0,01 - 0,05	0,01 - 0,05	0,01 - 0,06
<b>S</b>	0,01 - 0,04	0,01 - 0,04	0,01 - 0,02

H

$$f_z = (h_m \times \pi \times d_e \times \phi_s) / (360^\circ \times a_e) \text{ [vereinfacht } f_z = h_m \times \sqrt{d_e/a_e} \text{ bei } a_e/d_e < 0,3]$$

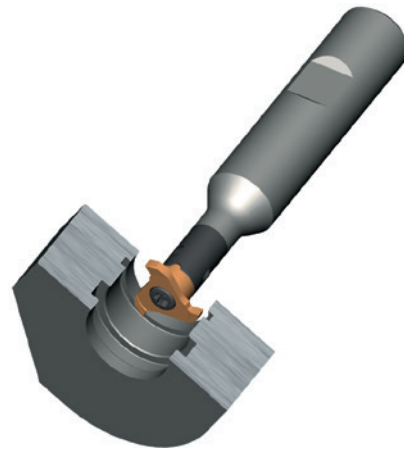
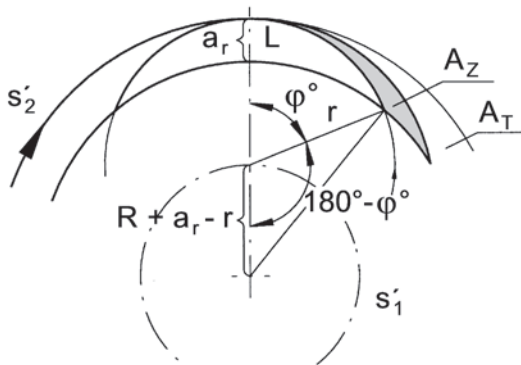
$$f_z = (h_m \times \pi \times d_e \times \phi_s) / (360^\circ \times a_e) \text{ [simplified } f_z = h_m \times \sqrt{d_e/a_e} \text{ with } a_e/d_e < 0,3]$$

### ISO

$a_r$	$a_e$	radiale Schnitttiefe radial depth of cut
$d$	$d_e$	Schneidkreis-Ø [mm] Cutting edge Ø [mm]
$f$		Vorschub pro Umdrehung $f = f_z \cdot Z$ [mm/U] [mm/rev] Feed per revolutions
$f_z$	$s_z$	Vorschub/Zahn $f_z = \frac{v_f}{Z \cdot n}$ [mm] Feed/tooth
$h_m$		mittlere Spandicke Medium thickness of chip
$n$		Drehzahl $n = \frac{v_c \cdot 1000}{d \cdot \pi}$ [1/min] Revolutions
$r$		Radius Fräser Radius of cutter
$R$		Radius Werkstück Radius of workpiece
$v_c$		Schnittgeschwindigkeit $v_c = \frac{d \cdot \pi \cdot n}{1000}$ [m/min] Cutting speed
$v_f$	$s'$	Vorschubgeschwindigkeit $v_f = f_z \cdot Z \cdot n$ [mm/min] Feed rate
$v_{f2}$	$s'_2$	Vorschubgeschwindigkeit der Schneide (Nutgrund-Ø) Feed rate of tool tip
$v_{f3}$	$s'_1$	Vorschubgeschwindigkeit der Fräsmittelpunktsbahn Feed rate of tool centre
$Z$		Zähnezahl Number of teeth
$\phi_s$		Eingriffswinkel Pressure angle

## Innennutfräsen

Milling of an internal groove



$$\cos [180^\circ - \varphi^\circ] = \frac{r^2 + [R + a_r - r]^2 - R^2}{2r [R + a_r - r]} \longrightarrow 180^\circ - \varphi^\circ \longrightarrow \varphi^\circ$$

Eingriffslänge  $L = \frac{\pi \cdot 2r \cdot \varphi^\circ}{360^\circ}$  mm  
Length of cut

Spandicke  $A_z = L \cdot h_m$  mm<sup>2</sup>  
Area of chip

Insgesamt zu zerspanende Fläche  $A_T = \pi [(R + a_r)^2 - R^2]$  mm<sup>2</sup>  
Area of groove section

Gesamt-Zerspanzeit (für AT)  $t = \frac{A_T}{n \cdot z \cdot A_z}$  min  
Time for cut (for AT)

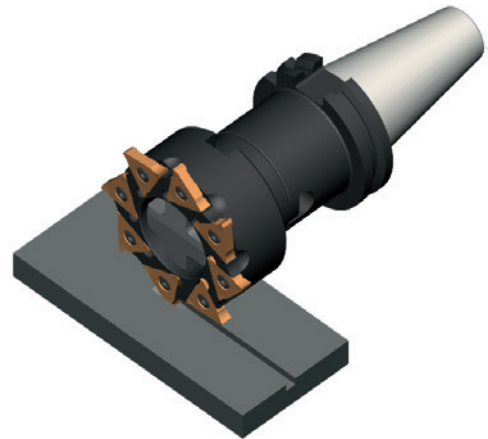
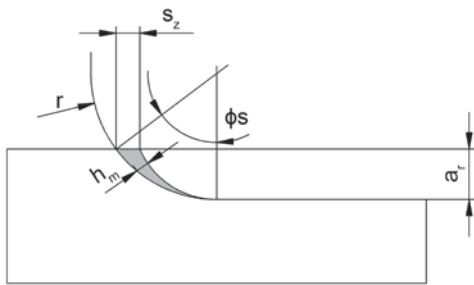
Vorschubgeschwindigkeit der Fräsmittelpunktsbahn  $s'_1 = \frac{\pi \cdot 2 (R - r + a_r)}{t}$  mm/min  
Feed rate of tool centre

Vorschubgeschwindigkeit der Schneide (Nutgrund-Ø)  $s'_2 = s'_1 \frac{R + a_r}{R - r + a_r}$  mm/min  
Feed rate of tool tip



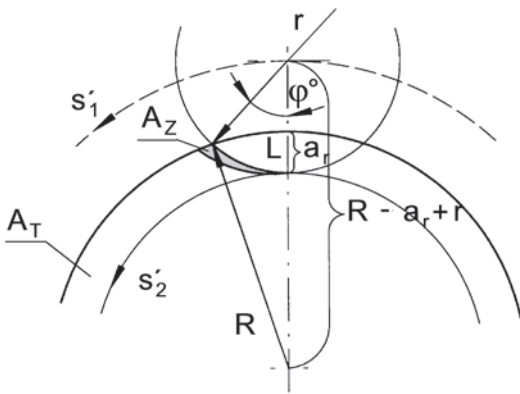
### Fräsen gerader Nuten - außen

Milling of a linear groove - external



$$s_z = h_m \sqrt{\frac{2r}{a_r}}$$

$$s = n \cdot z \cdot s_z \text{ mm/min}$$



$$\cos \varphi^\circ = \frac{r^2 + [R + r - a_r]^2 - R^2}{2r [R + r - a_r]} \rightarrow \varphi^\circ$$

Eingriffslänge  $L = \frac{\pi \cdot 2r \cdot \varphi^\circ}{360^\circ}$  mm  
Length of cut

Spandicke  $A_z = L \cdot h_m$  mm<sup>2</sup>  
Area of chip

Insgesamt zu zerspanende Fläche  $A_T = \pi [R^2 - (R - a_r)^2]$  mm<sup>2</sup>  
Area of groove section

Gesamt-Zerspanzeit (für AT)  $t = \frac{A_T}{n \cdot z \cdot A_z}$  min  
Time for cut (for AT)

Vorschubgeschwindigkeit der Fräsmittelpunktsbahn  $s'_1 = \frac{\pi \cdot 2 (R + r - a_r)}{t}$  mm/min  
Feed rate of tool centre

Vorschubgeschwindigkeit der Schneide (Nutgrund-Ø)  $s'_2 = s'_1 \frac{R - a_r}{R + r - a_r}$  mm/min  
Feed rate of tool tip

# Schnittdaten Nut- und Zirkularfäsen

## Cutting Data Groove and Circular Milling



Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	MG12	TI2_ TN3_	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15		300-160
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6		250-170
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5		230-170
		~ 0,6% C geglüht annealed	P1.4	190	610	C55		190-120
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60		170-120
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28		190-120
	niedrig legierter Stahl (<5%) Alloyed steel	gegült annealed	P2.1	180	590	100Cr6		180-110
		vergütet quenched	P2.2	280	960	14NiCr10		160-100
		vergütet quenched	P2.3	350	1250	34CrMo4		130-70
		vergütet quenched	P2.4	430	1450	55Cr3		120-70
	hochlegierter Stahl (>5%) high alloyed steel	gegült annealed	P3.1	200	680	X10CrAl18		140-80
		gehärtet hardened	P3.2	350	1200	X210Cr2		
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200		220-160
		legiert alloyed	P4.2	220	750	GX40CrSi28		140-80
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39		140-80
<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13		
		austenitisch austenitic	M1.2	300	1000	X6CrNiMo- Ti17-12-2		
		austenitisch ferritisch austenitic ferritic	M1.3	230	780	X2CrNiMo- N17-13-3		

H

# Schnittdaten Nut- und Zirkularfäsen

## Cutting Data Groove and Circular Milling



Schnittgeschwindigkeit  $v_c$  (m/min) / Startwerte  
Cutting speed  $v_c$  (m/min) / Start values

	AS4_ TH3_ TA4_	RC2_ RC4_	EG5_	IG3_	SG3_	DD2_				
	300-160	300-180	280-140							
	250-170	280-170	230-150	280-170						
	230-170	260-160	210-150	260-160						
	190-120	200-120	180-110	200-120						
	170-120	200-120	160-110	200-120						
	190-120	200-120	180-110	200-120						
	180-110	180-110	170-100	180-110						
	160-100	180-110	160-100	180-110						
	130-70	140-80	140-80	140-80						
	120-70	100-60	120-80	100-60						
	140-80	140-80	130-70	140-80						
		-		-						
	220-160	230-140	200-140	230-140						
	140-80	150-90	140-80	150-90						
	140-80	160-100	140-80	160-100						
	120-60	150-90		150-90						
	110-60	140-80		140-80						
	90-50	120-70		120-70						



# Schnittdaten Nut- und Zirkularfäsen

## Cutting Data Groove and Circular Milling



Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit R <sub>m</sub> [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	MG12	TI2_ TN3_		
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25		150-90	
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40		100-70	
	Kugelgraphit- guss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40		130-90	
		perlitisch perlitic	K2.1	260	700	GGG-60		100-50	
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45		120-60	
		perlitisch perlitic	K3.2	260	700	GTS-55-04		140-80	
	Ausferritisches Gusseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800				
		vergütet quenched	K4.2	350	1050				
		vergütet quenched	K4.3	450	1400				
<b>N</b>	Al-Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	550-300		
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	220-180		
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	220-180		
		6-10% Si	N2.2	100	320	AlSi7Mg	100-80		
		10-15 % Si	N2.3	130	450	AlSi12	120-100		
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	120-100		
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb			
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40			
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3			
	Graphit Graphite		N4.1						

H

# Schnittdaten Nut- und Zirkularfäsen

## Cutting Data Groove and Circular Milling



Schnittgeschwindigkeit  $v_c$  (m/min) / Startwerte  
Cutting speed  $v_c$  (m/min) / Start values

AS4_ TH3_ TA4_	RC2_ RC4_	EG5_	IG3_	SG3_	DD2_					
150-90	170-100	120-60	170-100							
100-70	120-70	100-70	120-70							
130-90	150-90	110-70	150-90							
100-50	110-70	100-50	110-70							
120-60	140-80	120-60	140-80							
140-80	150-90	140-80	150-90							
						850-650				
						350-200				
						350-200				
						230-90				
						100-70				
						100-70				



# Schnittdaten Nut- und Zirkularfäsen

## Cutting Data Groove and Circular Milling



Werkstoff Material			Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit R <sub>m</sub> [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	MG12	TI2_ TN3_
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			
		gehärtet hardened	S1.2	275	930			
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		
		gehärtet hardened	S2.2	350	1200	Inconel 713		
	Titan	Titanlegierung α Titanium alloy α	S3.1	120	240			
		Titanlegierung α-β Titanium alloy α-β	S3.2	360	1200			
Titanlegierung β Titanium alloy β		S3.3	410	1400				
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1	-	-			
		55-60 HRC	H1.2	-	-			
		60-63 HRC	H1.3	-	-			
		> 63HRC	H1.4	-	-			
<b>O</b>	Thermoplaste Thermoplastics		O1.1				150 - 50	
	Duroplaste Duro plaste		O1.2				150 - 50	
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3				150 - 50	
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4				300 - 150	

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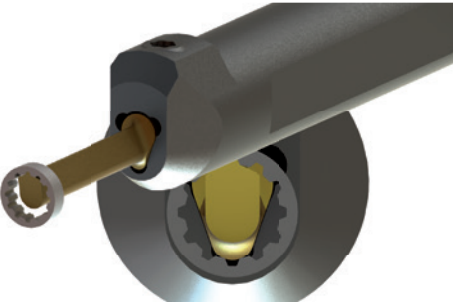


System	Seite/Page
<b>Verzahnungsfräsen / Gear Milling</b>	<b>389</b>
<b>Fräsen von Zahnwellen / Spline Milling</b>	<b>405</b>
<b>Verzahnungsstoßen / Gear Broaching</b>	<b>411</b>
<b>Wälzschälen / Gear Skiving</b>	<b>415</b>
<b>Entgraten / Deburing</b>	<b>421</b>
<b>Abwälzstoßen / Gear Shaping</b>	<b>423</b>
<b>Schlagzahnfräsen / Single-Point Gear Milling</b>	<b>425</b>
<b>Kegelradfräsen / Bevel Gear Milling</b>	<b>427</b>
<b>5-Achs-Fräsen / 5-Axis Milling of Gear Teeth</b>	<b>431</b>



# Übersicht Verzahnungsverfahren

## Overview Gear Processes







Technologie Technology	Kleinserie Small series	Mittlere Losgrößen Medium batch sizes	Großserie Large series
Verzahnungsfräsen (außen) Gear milling (external) 	+++	++	-
Verzahnungsstoßen (außen und innen) Gear broching (external and internal) 	+++	++	+
Wälzschälen (außen und innen) Gear skiving (external and internal) 	-	+	+++
Abwälzstoßen (außen) Gear shaping (external) 	-	+	+++

# Übersicht Verzahnungsverfahren

## Overview Gear Processes

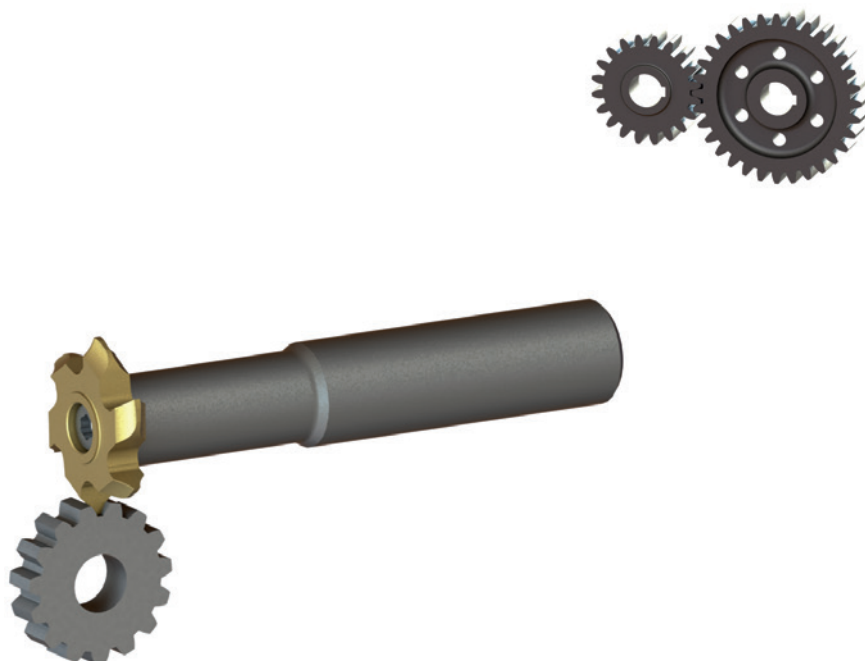


Technologie Technology	Kleinserie Small series	Mittlere Losgrößen Medium batch sizes	Großserie Large series
Schlagzahnfräsen (außen) Single-point gear milling (external) 	-	+++	+
Kegelradfräsen (außen) Bevel gear milling (external) 	+	+	+++
5-Achsfräsen von Verzahnungen (außen) 5-Axis milling of gears (external) 	+++	-	-
Entgraten von Verzahnungen Deburring of gears 	+++	+++	+++



## Fräsplatten für Stirnräder und Zahnwellen

Milling inserts for spur gears and gear shafts



Stirnräder, Zahnstangen Bezugsprofil 1 nach DIN 3972 Cylindrical gears, Tooth bars Basic profile 1 according to DIN 3972	Zahnwellen, Welle-Nabe, Kerbverzahnung DIN 5480/ANSI B92.1 Gear shafts, Shaft-hub, Serration DIN 5480/ANSI B92.1	Schneidplatte Insert  Typ type	Ds [mm]
$mn \leq 0,8$	$mn \leq 1 / dB \geq 40$	606	11,7
$mn \leq 1$	$mn \leq 1,5 / dB \geq 40$	608	15,7
$mn \leq 1,25$	$mn \leq 2 / dB \geq 40$	611	17,7
$mn \leq 1,5$	$mn \leq 3 / dB \geq 22$	613	21,7
$mn \leq 2$	$mn \leq 2,5 / dB \geq 40$	628	27,7
$mn \leq 2,5 / \text{Nr. 5 - 8}$	$mn \leq 2,5 / dB \geq 30$	632	31,7
$mn \leq 2,25 / \text{Nr. 2 - 8}$	$mn \leq 2,5 / dB \geq 30$	632	31,7
$mn \leq 2 \text{ Nr. 1 - 8}$	$mn \leq 2,5 / dB \geq 30$	632	31,7
$mn \leq 3$	$mn \leq 3 / dB \geq 50$	635	34,7
$mn \leq 1,5$	$mn \leq 2 / dB \geq 60$	636	35,7



## **Verzahnungsfräsen**

Modulgrößen  
von 0,5 bis 4 mm

## **Gear Milling**

Module sizes  
from 0.5 up to 4 mm

# Bestellbeispiel

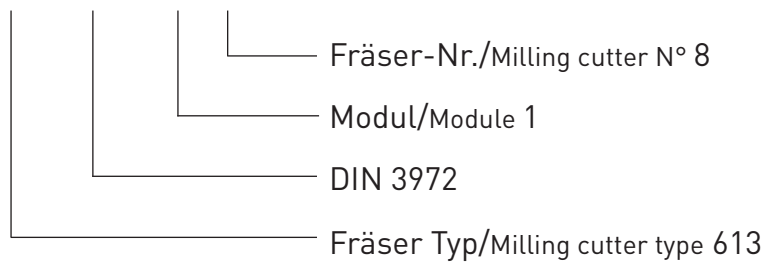
## Ordering Example



Fräser-Nr. Milling cutter N°	*z (Zähnezahl Stirnrad) *z (N° of teeth cylindrical gear)
1	12 - 13
2	14 - 16
3	17 - 20
4	21 - 25
5	26 - 34
6	35 - 54
7	55 - 134
8	≥ 135...Zahnstange/Tooth bar



613.3972.100.8



Die heutigen Anforderungen an die Verzahnungen werden immer komplexer. Wir haben mit unserem HTC (Horn Tool Configurator) das richtige Instrument und mit einer Vielzahl von Rohlingen die perfekte Lösung, wenn es um Schnelligkeit und Flexibilität geht.

Verzahnungsbearbeitungen erfordern oft schnelle Lieferzeiten. Mit nur wenigen Angaben zur Verzahnung erhalten Sie mit dem HTC (Horn Tool Configurator) in kürzester Zeit ein Angebot inklusive Ausführungszeichnung des Werkzeugs. Sind alle Details geklärt, beginnt die Produktion und Sie erhalten nach nur einer Woche Ihre Werkzeuge. Unabhängig ob es sich um klassische Verzahnungen nach DIN 867, Profile nach DIN 5480 oder Sonderlösungen handelt.

In der Tabelle auf Seite 390 und 391 finden Sie verfügbare Durchmesser und Zähnezahl der Schneidplatten in Abhängigkeit vom Modul.

**[www.horn-group.com/de/kontakt/technical-request-gear-cutting](http://www.horn-group.com/de/kontakt/technical-request-gear-cutting)**

Today's gears are becoming increasingly complex. We have the right tool with our HTC (Horn Tool Configurator) and the perfect solution for machining a variety of blanks when speed and flexibility are required.

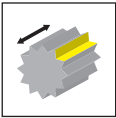
Gear machining requires having the right tools available and the gears often need to be delivered quickly. With just a few details about the gear teeth, the configurator will provide you with a quotation including a detailed drawing of the tool in the shortest possible time. Once all details have been clarified, production begins and you receive your tools after just one week, irrespective of whether it involves classic gears according to DIN 867, profiles according to DIN 5480 or special solutions.

In the table on page 390 and 391 you will find available diameters and number of teeth according to the module.

**[www.horn-group.com/contact/technical-request-gear-cutting](http://www.horn-group.com/contact/technical-request-gear-cutting)**

# Auswahl der Schneidplatte

## Selection of the insert

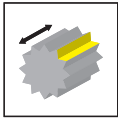


Typ / Type	304								X06								X08								X11							
Schneidkreis-Ø Ds / Cutting edge Ø Ds	Ø 7,7								Ø 11,7								Ø 15,7								Ø 17,7							
Modul / Module	Zähnezahl / Number of teeth				Zähnezahl / Number of teeth				Zähnezahl / Number of teeth				Zähnezahl / Number of teeth				Zähnezahl / Number of teeth				Zähnezahl / Number of teeth											
	3	6	9	12	3	6	9	12	3	6	9	12	3	6	9	12	3	6	9	12												
	Eingriffswinkel / Pressure angle				Eingriffswinkel / Pressure angle				Eingriffswinkel / Pressure angle				Eingriffswinkel / Pressure angle				Eingriffswinkel / Pressure angle															
	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°	20°	30°												
0,2	□	•								□	•	□	•							□	•	□	•	□	•							
0,3	□	•								□	•	□	•							□	•	□	•	□	•							
0,4	□	•								□	•	□	•							□	•	□	•	□	•							
0,5	□	•								□	•	□	•							□	•	□	•	□	•							
0,6	□	•								□	•	□	•							□	•	□	•	□	•							
0,7										□	•	□	•							□	•	□	•	□	•							
0,8										□	•	□	•							□	•	□	•	□	•							
0,9										□	•									□	•	□	•	□	•							
1										□	•									□	•	□	•	□	•							
1,1																						•										
1,2																						•										
1,3																						□	•									
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2,6																																
2,7																																
2,8																																
2,9																																
3																																
Fräseschaft Typ / Milling Shank Type	M304								M306								M308								M311							

- Weitere Modulgrößen auf Anfrage
- Schneidkreis- und Plattensitzdurchmesser können verändert werden
- Bei der Angabe des Typs ist **X** der Platzhalter für die Zähnezahl, z.B. **913**
- Other module sizes on request
- Cutting edge and seating diameter can be changed
- When specifying the type, **X** is the placeholder for the number of teeth, e.g. **913**

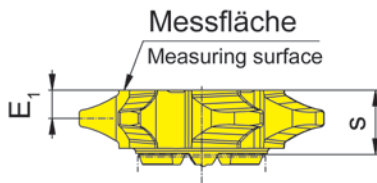
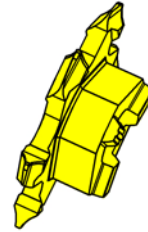
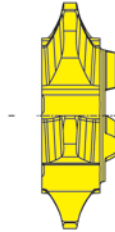
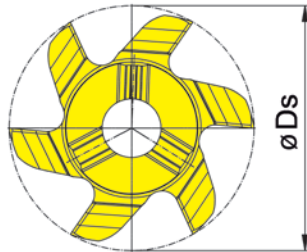






z6

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

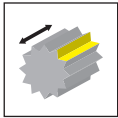
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	$D_s$	HIS	AS45
613.3972.050.1	0,5	12	13	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.050.2	0,5	14	16	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.050.3	0,5	17	20	1,1	5,7	1,1	21,7	313113R	▲
613.3972.050.4	0,5	21	25	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.050.5	0,5	26	34	1,1	5,7	1,1	21,7	313113R	▲
613.3972.050.6	0,5	35	55	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.050.7	0,5	55	134	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.050.8	0,5	135	999	1,1	5,7	1,1	21,7	313113R	Δ
613.3972.070.1	0,7	12	13	1,6	5,3	1,5	21,7	313113R	Δ
613.3972.070.2	0,7	14	16	1,6	5,3	1,5	21,7	313113R	Δ
613.3972.070.3	0,7	17	20	1,6	5,3	1,5	21,7	313113R	Δ
613.3972.070.4	0,7	21	25	1,6	5,3	1,5	21,7	313113R	Δ
613.3972.070.5	0,7	26	34	1,6	5,3	1,6	21,7	313113R	Δ
613.3972.070.6	0,7	35	55	1,6	5,3	1,6	21,7	313113R	Δ
613.3972.070.7	0,7	55	134	1,6	5,3	1,6	21,7	313113R	Δ
613.3972.070.8	0,7	135	999	1,6	5,3	1,6	21,7	313113R	Δ

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverchiebungsfaktor 0

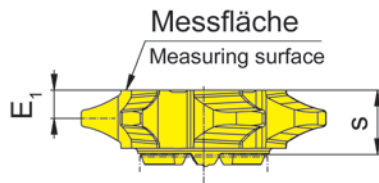
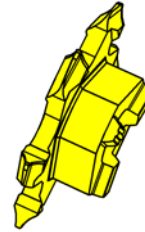
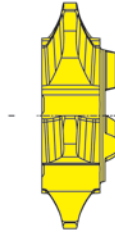
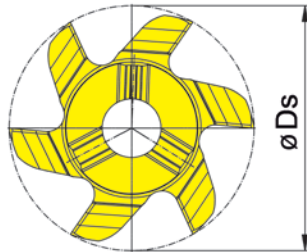
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	o
S	●
H	-



z6

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

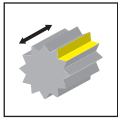
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	$D_s$	HIS	AS45
613.3972.080.1	0,8	12	13	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.2	0,8	14	16	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.3	0,8	17	20	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.4	0,8	21	25	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.5	0,8	26	34	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.6	0,8	35	55	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.7	0,8	55	134	1,6	5,3	1,8	21,7	313113R	▲
613.3972.080.8	0,8	135	999	1,6	5,3	1,8	21,7	313113R	▲
613.3972.090.1	0,9	12	13	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.2	0,9	14	16	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.3	0,9	17	20	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.4	0,9	21	25	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.5	0,9	26	34	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.6	0,9	35	55	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.7	0,9	55	134	2,5	5,7	2,1	21,7	313113R	△
613.3972.090.8	0,9	135	999	2,5	5,7	2,1	21,7	313113R	△

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverschiebungsfaktor 0

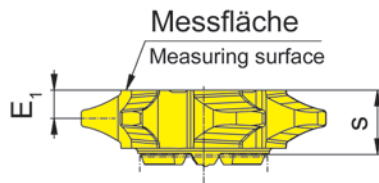
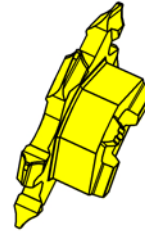
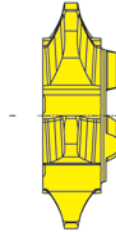
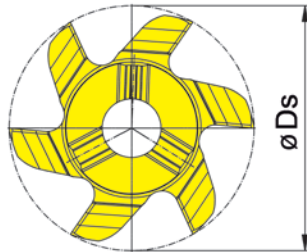
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	○
S	●
H	-



**z6**

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

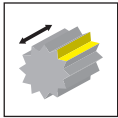
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	$D_s$	HIS	AS45
613.3972.100.1	1	12	13	2,5	5,7	2,2	21,7	313113R	▲
613.3972.100.2	1	14	16	2,5	5,7	2,2	21,7	313113R	▲
613.3972.100.3	1	17	20	2,5	5,7	2,2	21,7	313113R	▲
613.3972.100.4	1	21	25	2,5	5,7	2,2	21,7	313113R	▲
613.3972.100.5	1	26	34	2,5	5,7	2,2	21,7	313113R	▲
613.3972.100.6	1	35	54	2,5	5,7	2,3	21,7	313113R	▲
613.3972.100.7	1	55	134	2,5	5,7	2,3	21,7	313113R	▲
613.3972.100.8	1	135	999	2,5	5,7	2,4	21,7	313113R	▲
613.3972.125.1	1,25	12	13	2,5	5,7	2,6	21,7	313113R	▲
613.3972.125.2	1,25	14	16	2,5	5,7	2,7	21,7	313113R	▲
613.3972.125.3	1,25	17	20	2,5	5,7	2,7	21,7	313113R	△
613.3972.125.4	1,25	21	25	2,5	5,7	2,7	21,7	313113R	△
613.3972.125.5	1,25	26	34	2,5	5,7	2,7	21,7	313113R	▲
613.3972.125.6	1,25	35	54	2,5	5,7	2,7	21,7	313113R	▲
613.3972.125.7	1,25	55	134	2,5	5,7	2,8	21,7	313113R	△
613.3972.125.8	1,25	135	999	2,5	5,7	2,8	21,7	313113R	▲

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverchiebungsfaktor 0

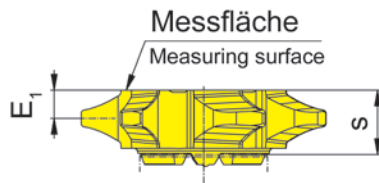
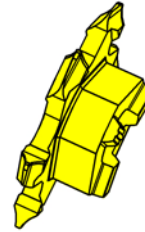
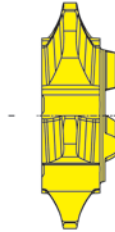
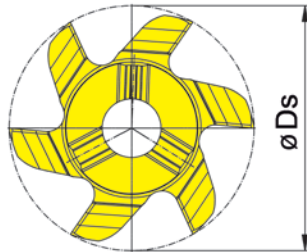
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	o
S	●
H	-



z6

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

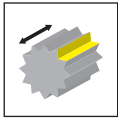
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	$s$	$t_{max}$	$D_s$	HIS	AS/45
613.3972.150.1	1,5	12	13	2,5	5,7	3,1	21,7	313113R	▲
613.3972.150.2	1,5	14	16	2,5	5,7	3,2	21,7	313113R	▲
613.3972.150.3	1,5	17	20	2,5	5,7	3,2	21,7	313113R	▲
613.3972.150.4	1,5	21	25	2,5	5,7	3,3	21,7	313113R	▲
613.3972.150.5	1,5	26	34	2,5	5,7	3,3	21,7	313113R	▲
613.3972.150.6	1,5	35	54	2,5	5,7	3,3	21,7	313113R	▲
613.3972.150.7	1,5	55	134	2,5	5,7	3,3	21,7	313113R	▲
613.3972.150.8	1,5	135	999	2,5	5,7	3,3	21,7	313113R	▲

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972  
für Fertigbearbeitung, Profilverschiebungsfaktor 0

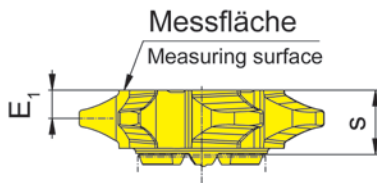
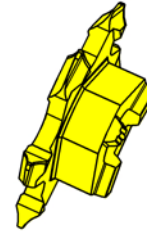
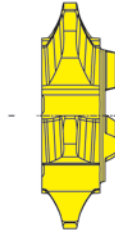
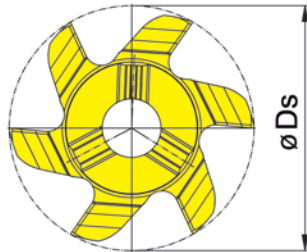
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing,  
addendum shift 0

P	●
M	●
K	●
N	○
S	●
H	-



**z6**

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

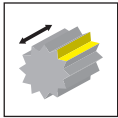
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	$s$	$t_{max}$	$D_s$	HIS	AS45
628.3972.175.1	1,75	12	13	3,4	7,45	3,8	27,7	328143R	△
628.3972.175.2	1,75	14	16	3,4	7,45	3,8	27,7	328143R	△
628.3972.175.3	1,75	17	20	3,4	7,45	3,8	27,7	328143R	△
628.3972.175.4	1,75	21	25	3,4	7,45	3,9	27,7	328143R	△
628.3972.175.5	1,75	26	34	3,4	7,45	3,9	27,7	328143R	△
628.3972.175.6	1,75	35	54	3,4	7,45	3,9	27,7	328143R	△
628.3972.175.7	1,75	55	134	3,4	7,45	3,9	27,7	328143R	▲
628.3972.175.8	1,75	135	999	3,4	7,45	3,9	27,7	328143R	△
628.3972.200.1	2	12	13	3,4	7,45	4,2	27,7	328143R	△
628.3972.200.2	2	14	16	3,4	7,45	4,2	27,7	328143R	▲
628.3972.200.3	2	17	20	3,4	7,45	4,2	27,7	328143R	▲
628.3972.200.4	2	21	25	3,4	7,45	4,3	27,7	328143R	▲
628.3972.200.5	2	26	34	3,4	7,45	4,4	27,7	328143R	▲
628.3972.200.6	2	35	54	3,4	7,45	4,4	27,7	328143R	▲
628.3972.200.7	2	55	134	3,4	7,45	4,4	27,7	328143R	▲
628.3972.200.8	2	135	999	3,4	7,45	4,5	27,7	328143R	▲

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverschiebungsfaktor 0

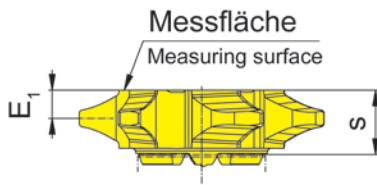
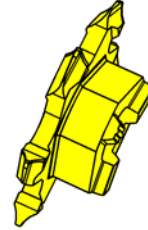
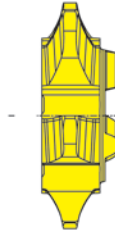
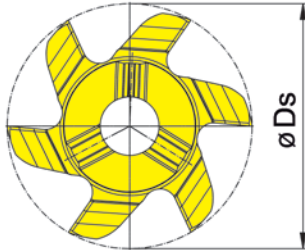
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	o
S	●
H	-



z6

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

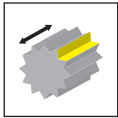
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	$s$	$t_{max}$	$D_s$	HIS	AS45
632.3972.225.2	2,25	14	16	3,45	7,5	4,7	31,7	332143R	Δ
632.3972.225.3	2,25	17	20	3,45	7,5	4,8	31,7	332143R	Δ
632.3972.225.4	2,25	21	25	3,45	7,5	4,9	31,7	332143R	Δ
632.3972.225.5	2,25	26	34	3,45	7,5	4,9	31,7	332143R	Δ
632.3972.225.6	2,25	35	54	3,45	7,5	5	31,7	332143R	Δ
632.3972.225.7	2,25	55	134	3,45	7,5	5	31,7	332143R	Δ
632.3972.225.8	2,25	135	999	3,45	7,5	5	31,7	332143R	Δ

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972  
für Fertigbearbeitung, Profilverschiebungsfaktor 0

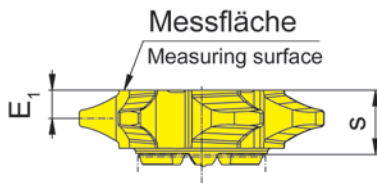
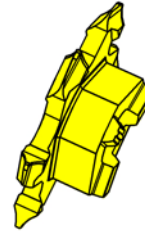
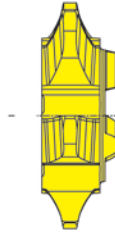
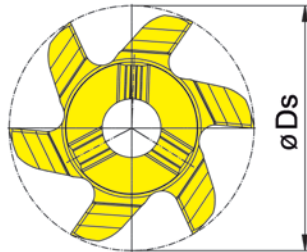
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing,  
addendum shift 0

P	●
M	●
K	●
N	○
S	●
H	-



**z6**

DIN  
3972



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	$s$	$t_{max}$	$D_s$	HIS	AS45
635.3972.225.1	2,25	12	13	5,5	11,9	4,7	34,7	335175R	△
635.3972.250.1	2,5	12	13	5,5	11,9	5,4	34,7	335175R	△
635.3972.250.2	2,5	14	16	5,5	11,9	5,4	34,7	335175R	△
635.3972.250.3	2,5	17	20	5,5	11,9	5,4	34,7	335175R	△
635.3972.250.4	2,5	21	25	5,5	11,9	5,5	34,7	335175R	▲
635.3972.250.5	2,5	26	34	5,5	11,9	5,5	34,7	335175R	▲
635.3972.250.6	2,5	35	54	5,5	11,9	5,5	34,7	335175R	▲
635.3972.250.7	2,5	55	134	5,5	11,9	5,7	34,7	335175R	▲
635.3972.250.8	2,5	135	999	5,5	11,9	5,7	34,7	335175R	▲
635.3972.275.1	2,75	12	13	5,5	11,9	5,7	34,7	335175R	△
635.3972.275.2	2,75	14	16	5,5	11,9	5,8	34,7	335175R	△
635.3972.275.3	2,75	17	20	5,5	11,9	5,8	34,7	335175R	△
635.3972.275.4	2,75	21	25	5,5	11,9	5,9	34,7	335175R	△
635.3972.275.5	2,75	26	34	5,5	11,9	5,9	34,7	335175R	△
635.3972.275.6	2,75	35	54	5,5	11,9	6	34,7	335175R	△
635.3972.275.7	2,75	55	134	5,5	11,9	6,1	34,7	335175R	△
635.3972.275.8	2,75	135	999	5,5	11,9	6,1	34,7	335175R	▲
635.3972.300.1	3	12	13	5,5	11,9	6,2	34,7	335175R	▲
635.3972.300.2	3	14	16	5,5	11,9	6,4	34,7	335175R	▲
635.3972.300.3	3	17	20	5,5	11,9	6,4	34,7	335175R	▲
635.3972.300.4	3	21	25	5,5	11,9	6,4	34,7	335175R	▲
635.3972.300.5	3	26	34	5,5	11,9	6,5	34,7	335175R	▲
635.3972.300.6	3	35	54	5,5	11,9	6,5	34,7	335175R	▲
635.3972.300.7	3	55	134	5,5	11,9	6,6	34,7	335175R	▲
635.3972.300.8	3	135	999	5,5	11,9	6,6	34,7	335175R	▲

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverschiebungsfaktor 0

Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

Für Schneidplatte  $s = 11,9$  mm Schraube 6.23T25P verwenden  
For Insert  $s = 11,9$  mm use screw 6.23T25P

P	●
M	●
K	●
N	○
S	●
H	-



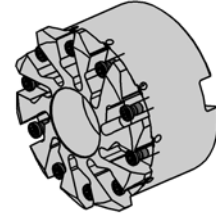
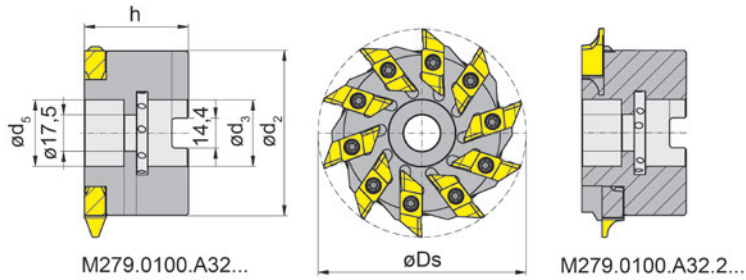
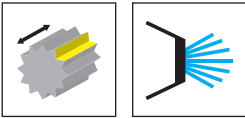
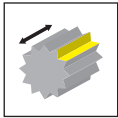


Abbildung = rechtsschneidend  
Picture = right hand cutting version

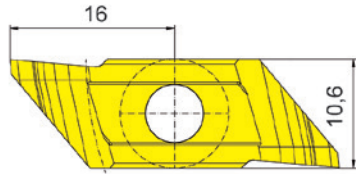
Bestellnummer Part number	Z	Ds	h	d <sub>5</sub>	d <sub>2</sub>	d <sub>3</sub>	HWS
<b>M279.0100.A32.10.10.IK</b>	10	100	50	17,5	79	32	279105R
<b>M279.0100.A32.2.10.05.IK</b>	10	100	50	17,5	79	32	279105R • 279105L

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M279...	<b>030.0516.T20P</b>	<b>T20PQ</b>



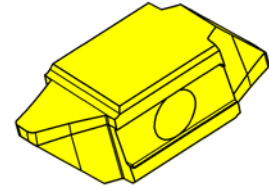
DIN  
3972



A



B



Form A = einreihig  
Form A = single row

Form B = zweireihig  
Form A = two row

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

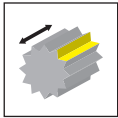
Bestellnummer Part number	Modul Module	Z <sub>min</sub>	Z <sub>max</sub>	E <sub>1</sub>	s	t <sub>max</sub>	Z	Form	HIS	AS45
RS279.3972.325.1	3,25	12	13	5,25	10,5	6,7	2	A	279105R	Δ
RS279.3972.325.2	3,25	14	16	5,25	10,5	6,8	2	A	279105R	Δ
RS279.3972.325.3	3,25	17	20	5,25	10,5	7	2	A	279105R	Δ
RS279.3972.325.4	3,25	21	25	5,25	10,5	7	2	A	279105R	Δ
RS279.3972.325.5	3,25	26	24	5,25	10,5	7,1	2	A	279105R	Δ
RS279.3972.325.6	3,25	35	54	5,25	10,5	7,2	2	A	279105R	Δ
RS279.3972.325.7	3,25	55	134	5,25	10,5	7,2	2	A	279105R	Δ
RS279.3972.325.8	3,25	135	999	5,25	10,5	7,2	2	A	279105R	Δ
RS279.3972.350.1L	3,5	12	13	5,25	10,5	7,35	2	B	279105L	Δ
RS279.3972.350.1R	3,5	12	13	5,25	10,5	7,35	2	B	279105R	Δ
RS279.3972.350.2L	3,5	14	16	5,25	10,5	7,45	2	B	279105L	Δ
RS279.3972.350.2R	3,5	14	16	5,25	10,5	7,45	2	B	279105R	Δ
RS279.3972.350.3	3,5	17	20	5,25	10,5	7,4	2	A	279105R	Δ
RS279.3972.350.4	3,5	21	25	5,25	10,5	7,5	2	A	279105R	Δ
RS279.3972.350.5	3,5	26	34	5,25	10,5	7,65	2	A	279105R	Δ
RS279.3972.350.6	3,5	35	54	5,25	10,5	7,7	2	A	279105R	Δ
RS279.3972.350.7	3,5	55	134	5,25	10,5	7,8	2	A	279105R	Δ
RS279.3972.350.8	3,5	135	999	5,25	10,5	7,8	2	A	279105R	Δ

Eingriffswinkel 20°  
Pressure angle 20°

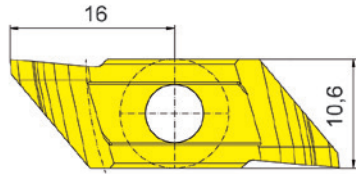
Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverchiebungsfaktor 0

Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	○
S	●
H	-



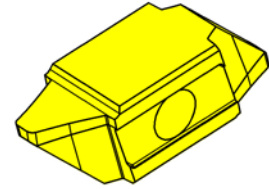
DIN  
3972



A



B



Form A = einreihig  
Form A = single row

Form B = zweireihig  
Form A = two row

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
▲ 4 Wochen  
4 weeks

Bestellnummer Part number	Modul Module	$Z_{min}$	$Z_{max}$	$E_1$	s	$t_{max}$	Z	Form	HIS	AS45
RS279.3972.375.1L	3,75	12	13	5,25	10,5	7,8	2	B	279105L	Δ
RS279.3972.375.1R	3,75	12	13	5,25	10,5	7,8	2	B	279105R	Δ
RS279.3972.375.2L	3,75	14	16	5,25	10,5	7,85	2	B	279105L	Δ
RS279.3972.375.2R	3,75	14	16	5,25	10,5	7,85	2	B	279105R	▲
RS279.3972.375.3L	3,75	17	20	5,25	10,5	8	2	B	279105L	Δ
RS279.3972.375.3R	3,75	17	20	5,25	10,5	8	2	B	279105R	Δ
RS279.3972.375.4L	3,75	21	25	5,25	10,5	8,1	2	B	279105L	▲
RS279.3972.375.4R	3,75	21	25	5,25	10,5	8,1	2	B	279105R	Δ
RS279.3972.375.5	3,75	26	34	5,25	10,5	8,1	2	A	279105R	Δ
RS279.3972.375.6	3,75	35	54	5,25	10,5	8,2	2	A	279105R	Δ
RS279.3972.375.7	3,75	55	134	5,25	10,5	8,3	2	A	279105R	Δ
RS279.3972.375.8	3,75	135	999	5,25	10,5	8,35	2	A	279105R	Δ
RS279.3972.400.1L	4	12	13	5,25	10,5	8,3	2	B	279105L	Δ
RS279.3972.400.1R	4	2	13	5,25	10,5	8,3	2	B	279105R	Δ
RS279.3972.400.2L	4	14	16	5,25	10,5	8,4	2	B	279105R	Δ
RS279.3972.400.2R	4	14	16	5,25	10,5	8,4	2	B	279105R	Δ
RS279.3972.400.3L	4	17	20	5,25	10,5	8,55	2	B	279105L	Δ
RS279.3972.400.3R	4	17	20	5,25	10,5	8,55	2	B	279105R	Δ
RS279.3972.400.4L	4	21	25	5,25	10,5	8,65	2	B	279105L	Δ
RS279.3972.400.4R	4	21	25	5,25	10,5	8,65	2	B	279105R	Δ
RS279.3972.400.5L	4	26	34	5,25	10,5	8,75	2	B	279105R	Δ
RS279.3972.400.5R	4	26	34	5,25	10,5	8,75	2	B	279105R	Δ
RS279.3972.400.6L	4	35	54	5,25	10,5	8,8	2	B	279105L	Δ
RS279.3972.400.6R	4	35	54	5,25	10,5	8,8	2	B	279105R	Δ
RS279.3972.400.7	4	55	134	5,25	10,5	8,8	2	A	279105R	Δ
RS279.3972.400.8	4	135	999	5,25	10,5	8,9	2	A	279105R	Δ

Eingriffswinkel 20°  
Pressure angle 20°

Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverchiebungsfaktor 0

Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	○
S	●
H	-





## Fräsen von Zahnwellen

Lösungen für Zapfwellen  
nach DIN 9611 / 5003

## Spline Milling

Solutions for power take-off  
shafts according to DIN 9611 / 5003

### Fräsen von Zapfwellenprofilen mit HORN

Komplettbearbeitungen auf Dreh-Fräszentren rücken immer mehr in den Fokus. Mit Blick auf Zapfwellenverbindungen hat HORN diesbezüglich ein darauf ausgelegtes Fräsprogramm standardisiert. Die Fräser decken dabei die meistverwendeten Profile 1 3/8" und 1 3/4" ab. Das Programm umfasst auch spezielle Fräser für eingeschränkte Ausläufe der Wellen. Die optimale Abstimmung von Substrat, Geometrie und Beschichtung sorgen für eine hohe Leistungsfähigkeit der Fräswerkzeuge.

### PTO profile milling with HORN

Complete machining on turn-mill centres is becoming increasingly popular. With regard to power take-off shaft connections, HORN has a standard milling program for this purpose. The milling cutters cover the most commonly used profiles 1 3/8" and 1 3/4". The program also includes special milling cutters for restricted shaft outlets. The optimal matching of substrate, geometry and coating ensure high performance of the milling tools.

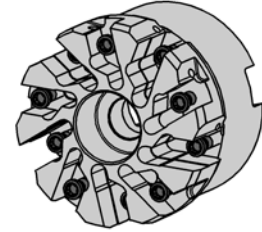
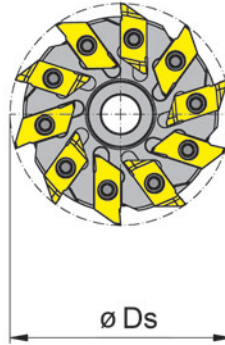
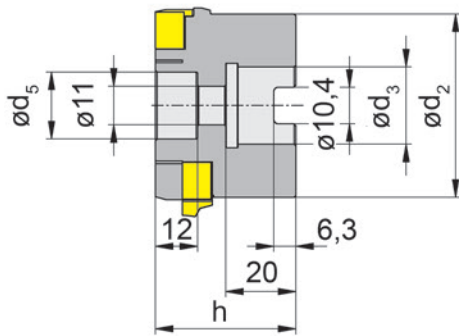
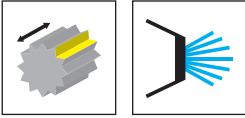
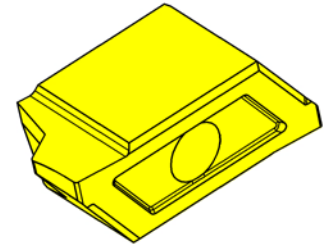
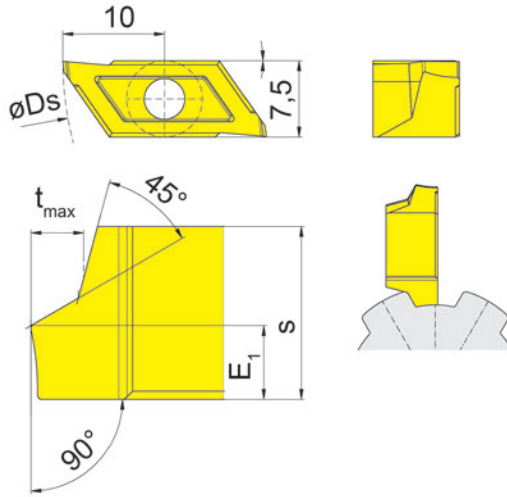
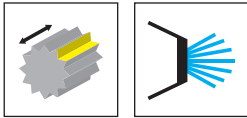


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	h	d <sub>5</sub>	d <sub>3</sub>	d <sub>2</sub>
<b>M274.0063.A22.7.5.IK</b>	10	63	40	22	19	52



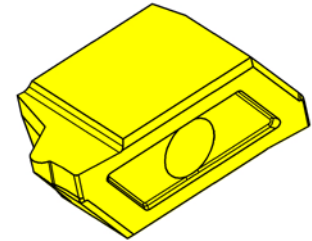
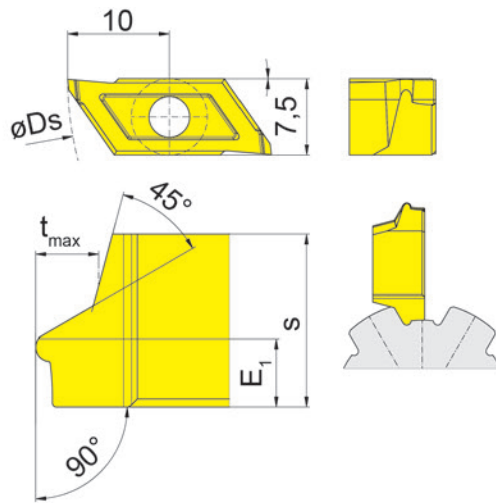
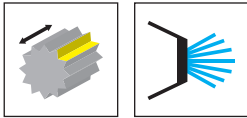
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	Ds	Z	Ausführung Type	RC45
RS274.5003.134.0.L	5	10	4,3	8,5	3,7	63	2	1 3/4"	▲
RS274.5003.134.0.R	5	10	4,3	8,5	3,7	63	2	1 3/4"	▲
RS274.5003.138.0.L	5	10	3,6	8,5	2,6	63	2	1 3/8"	▲
RS274.5003.138.0.R	5	10	3,6	8,5	2,6	63	2	1 3/8"	▲
									P ●
									M ●
									K ●
									N -
									S -
									H -





HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$z_{min}$	$z_{max}$	$E_1$	$s$	$t_{max}$	$D_s$	Z	Ausführung Type	RC45
RS274.5003.134.1.L	5	10	5,6	8,5	4,2	63	2	1 3/4"	▲
RS274.5003.134.1.R	5	10	5,6	8,5	4,2	63	2	1 3/4"	▲
RS274.5003.138.1.L	5	10	3,3	8,5	3,1	63	2	1 3/8"	▲
RS274.5003.138.1.R	5	10	3,3	8,5	3,1	63	2	1 3/8"	▲
									P ●
									M ●
									K ●
									N -
									S -
									H -





## **Verzahnungsstoßen**

Bis Modul 5

## **Gear Broaching**

Up to module 5



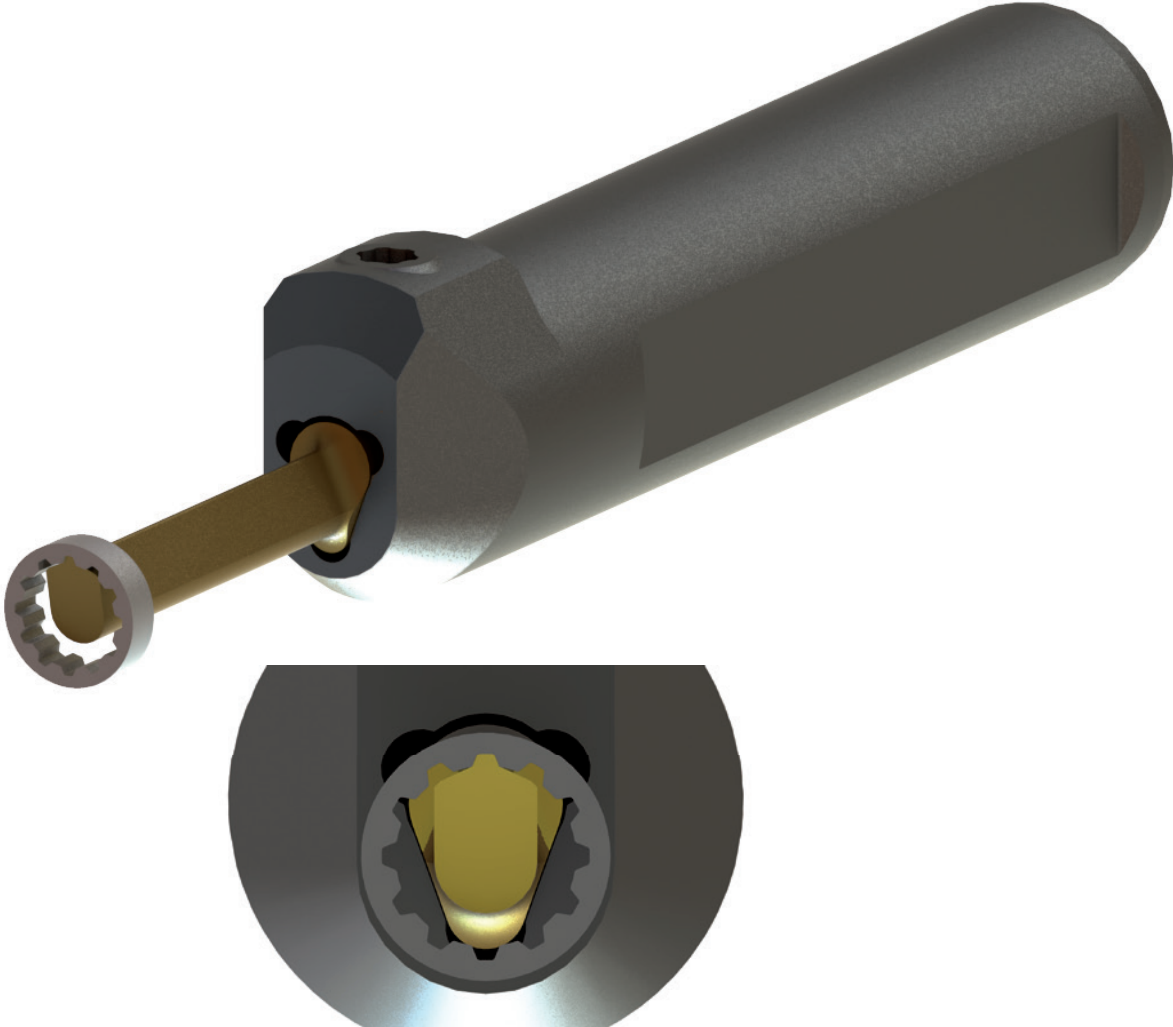
# Verzahnungsstoßen

Gear Broaching



## Beispiel: Supermini

Example:



### Schneidplatte

Insert

**N105**

**N110**

**S117**

Typ Type	max. Modulgröße $m_n$ max. Module size $m_n$	min. Kopfkreis bei Hohlrad min. tip circle for ring gear	max. Flankenlänge max. length of flank
<b>N105</b>	1,5	4	20
<b>N110</b>	1,5	5	40
<b>S117</b>	5	14	-

#### Vorteile:

- Sonderwerkzeuge, abgestimmt auf Ihren Anwendungsfall
- Hohe Produktivität in Kombination mit Nutstoßgeräten
- Fertigbearbeitung auf einer Maschine
- Bis Modul 5 mm
- Kurze Lieferzeiten

#### Advantages:

- Special tools designed for your application
- High productivity in combination with broaching devices
- Finishing on one machine
- Up to module 5 mm
- Short delivery times





## Wälzschälen

Verzahnungsbereich  
Modul 0,2 - 8 mm

## Gear Skiving

Gear teeth from  
module 0,2 - 8 mm



### Produktgruppe WSA:

- Ab Modul  $m = 0,2$  mm mit Treppenschliff
- Ab  $d = 7$  mm
- Bis Modul  $m = 1$  mm
- Bis  $d = 30$  mm
- Vollhartmetallausführung
- Nachschärfbar
- Bei Bedarf Kopfschneidend (patentiert)

### Product range WSA:

- From module  $m_n = 0.2$  mm with step cut
- From  $d = 7$  mm
- Up to module  $m = 1$
- Up to  $d = 30$  mm
- Solid carbide version
- Resharpenable
- Head cutting if required (patented)





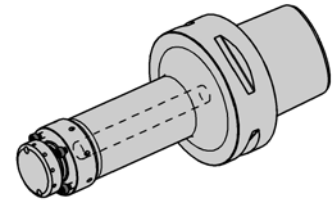
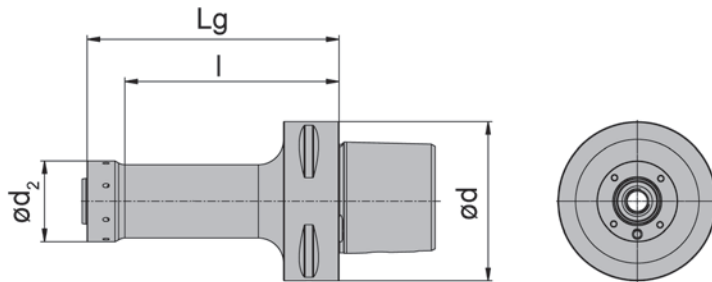
## Produktgruppe WSR:

- Präzisionsschnittstelle für höchste Rundlaufgenauigkeit (patentiert)
- Wechselplattensystem bis Modul  $m_n = 4$  mm
- Ab  $d = 25$  mm
- Unterschiedliche Kühlmittelzuführungen einstellbar
- Standardschäfte unterschiedlicher Länge ab Lager

## Product range WSR:

- Precision interface for high concentricity (patented)
- Interchangeable insert systems up to module  $m_n = 4$  mm
- From  $d = 25$  mm
- Adjustable coolant supply
- Standard shanks of different lengths from stock





Bestellnummer Part number	l	Lg	d	d <sub>2</sub>	Kühlung Coolant	Größe Size
MDR.044.C6.060.W	45	60	63	32	D	04
MDR.044.C6.080.W	65	80	63	32	D	04
MDR.044.C6.100.W	85	100	63	32	D	04
MDR.044.HSKT063.060.W	45	60	63	32	D	04
MDR.044.HSKT063.100.W	85	100	63	32	D	04
MDR.052.C6.060.W	45	60	63	39	D	05
MDR.052.C6.100.W	85	100	63	39	D	05
MDR.052.HSKT063.060.W	45	60	63	39	D	05
MDR.052.HSKT063.100.W	85	100	63	56	D	05
MDR.081.C6.060.W	45	60	63	56	D	08
MDR.081.C6.100.W	77	100	63	56	D	08
MDR.081.C6.125.W	102	125	63	56	D	08
MDR.081.C8.060.W	45	60	80	56	D	08
MDR.081.C8.100.W	77	100	80	56	D	08
MDR.081.C8.125.W	102	125	80	56	D	08
MDR.081.HSKT063.060.W	45	60	63	56	D	08
MDR.081.HSKT063.100.W	77	100	63	56	D	08
MDR.081.HSKT063.125.W	102	125	63	56	D	08
MDR.081.HSKT100.125.W	102	125	100	56	D	08

Die Schäfte sind für das Wälzschälsystem WSR konzipiert und mit DR-Reibschneiden kompatibel. Standardmäßige Ausführung mit innerer Kühlmittelzufuhr „D“. Mittels Austausch des Kühlmittel-Verschlussstopfens durch den optional erhältlichen Kühlmittelverteiler, können die Schäfte auf Kühlmittelzufuhr Variante „A“ umgebaut werden.

The shanks are designed for the WSR Gear Skiving System and are compatible with DR reaming inserts. Standard version with internal coolant supply „D“. By replacing the coolant plug with the optionally available coolant distributor, the shanks can be converted to coolant supply version „A“.

## Ersatzteile

Spare Parts

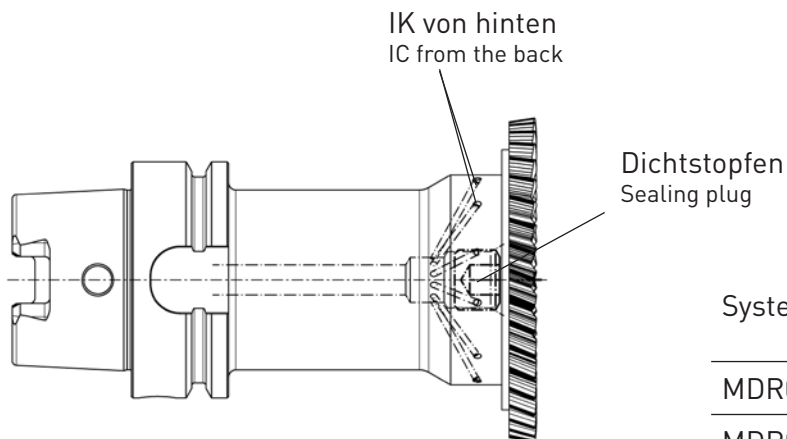
Wälzschälschaft Gear Skiving Holder	Schraube Screw	Torx-Schlüssel Torx Wrench
MDR....	C009002	T8L
MDR.081...	C00 90 04	T15Q

### Ausführung innere Kühlmittelzufuhr

Internal coolant supply design

Ausführung "D" - mit Dichtstopfen

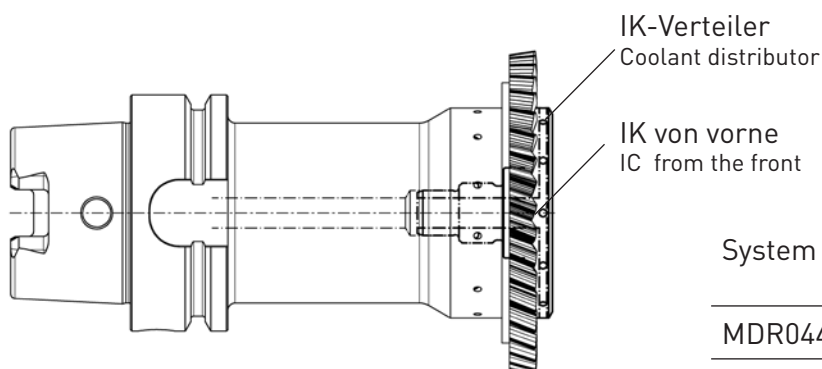
Version "D" - with Sealing plug



System	Dichtstopfen Sealing plug
MDR044	10.1.08.913
MDR052	12.1.12.913
MDR081	16.1.12.913

Ausführung "A" - mit IK-Verteiler

Version "A" - with Coolant distributor



System	IK-Verteiler Coolant distributor
MDR044	020.2510.6506
MDR052	020.3212.6505
MDR081	020.5616.6246



Kühlmittelrohr Coolant tube	für System-Aufnahme for System Holder
020.4012.1306	HSK-A 40
020.5016.1307	HSK-A 50
020.6318.1308	HSK-A 63
020.0024.1310	HSK-A 100

## Produktgruppe M117:

- Wechselplattensystem bis Modul 8
- Wechselplatte mit selbstzentrierendem Plattensitz
- Als Aufsteckversion für unterschiedliche Aufnahmen
- Mit integrierter Kühlmittelzuführung je nach Bearbeitungssituation

## Product range M117:

- Interchangeable insert system up to module 8
- Interchangeable insert with self-centring insert seat
- Arbor version with different adapters
- With integrated coolant supply depending on the machining application





**Entgraten von  
Verzahnungen**

**Deburring  
of Gears**



Das Anfasen von Stirnrädern erlaubt die Komplettbearbeitung auf einer Maschine mit exakten Geometrien. Gekoppelte Achsen von Werkstück und Werkzeug ermöglichen kurze Bearbeitungszeiten auch für Verzahnungen mit Schultern. Für jede Verzahnung wird das Werkzeug exakt ausgelegt und die Prozessdaten ermittelt.

The chamfering of spur gears allows complete machining on one machine with exact geometries. Synchronized rotation of workpiece and tool allow short machining times, even for gears with shoulders. The tool is designed exactly for each gear and the process data is determined.

#### Anwendungsbeispiel

Material: 1.7137 / 16MnCr5

Zähnezahl: 25

Modul: 1,25

Taktzeit: 8 s

Vc: 200 m/min

f: 150 mm/min

#### Machining example

Material: 1.7137 / 16MnCr5

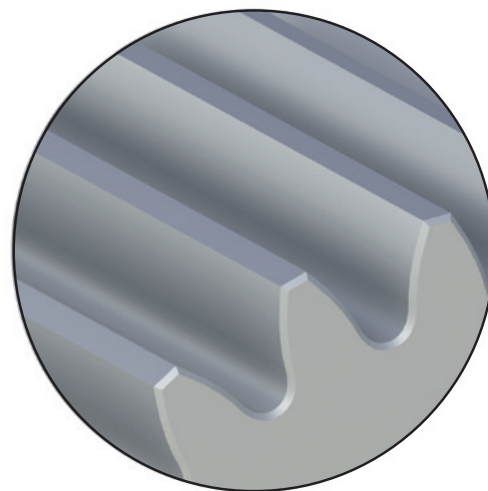
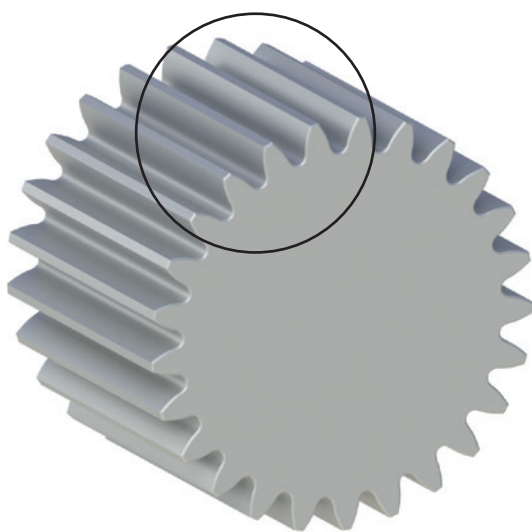
Number of teeth: 25

Module: 1.25

Cycle time: 8 s

Cutting speed: 200 m/min

f: 150 mm/min





## Abwälzstoßen

Für Außen- und  
Innenverzahnung

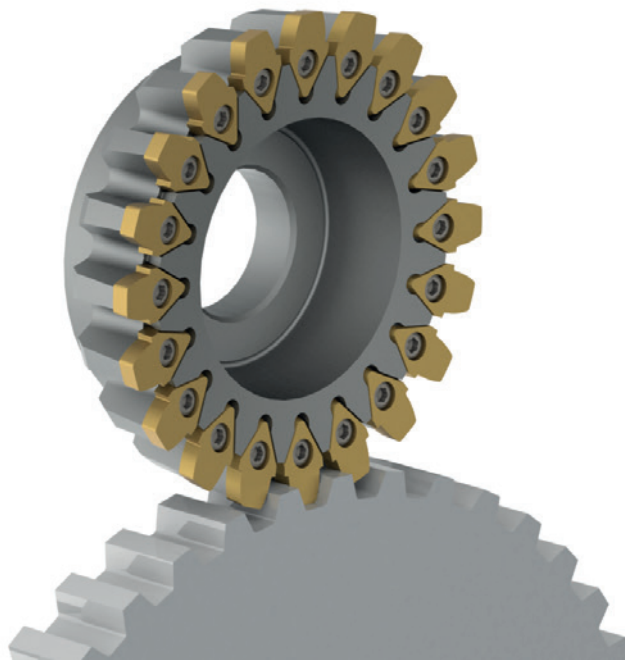
## Gear Shaping

For external and  
internal gears



- Sonderwerkzeuge, abgestimmt auf Ihren Anwendungsfall
- Für Außen- und Innenverzahnungen
- Für Evolventen- und Passverzahnungen
- Für Sonderprofile
- Vom Modulgröße 0,2 mm bis 5 mm
- Werkzeug inklusive Prozessauslegung

- Special tools designed for your application
- For external and internal gears
- For involute and parallel splines
- For special profiles
- From module size 0.2 mm to 5 mm
- Tool incl. process design







## Schlagzahnfräsen

Verfahren mit reduzierten  
Werkzeugbewegungen

## Single-Point Gear Milling

Process with fewer  
tool movements



Das Schlagzahnfräsen ist ein spanendes Fertigungsverfahren, bei dem das Werkstück und das Werkzeug in einem bestimmten Drehzahlverhältnis rotiert. Das Werkzeug wird hierbei in einem bestimmten Winkel gegenüber dem Werkstück angestellt. Wichtig ist, dass Werkstückspindel und Werkzeug gekoppelt zueinander laufen.

Mit dem Verfahren lassen sich neben Plan- und Stirnverzahnungen auch Evolventen oder Spline-Verzahnungen effizient herstellen. Hierzu lassen sich fast alle Frässysteme von HORN einsetzen.

Die Vorteile des Verfahrens sind reduzierte Werkzeugbewegungen, da alle Zahnlücken in einem Durchgang hergestellt werden. Das Verfahren lässt sich auf so gut wie allen Drehfräszentren umsetzen und ist somit sehr universell einsetzbar.

Single-point gear milling is a machining process in which the workpiece and the tool rotate at a given speed ratio. The tool is set at a fixed angle to the workpiece. It is important that the spindle and tool run in synchrony with each other.

The process can be used to efficiently produce involute or spline gears in addition to crown and spur gears. Almost all HORN milling systems can be used for this purpose.

The advantages of the process are reduced tool movements as all tooth spaces are produced in one pass. The process can be implemented on almost all turn-mill centres and is therefore universally applicable.

### Steckverzahnung

Material: 1.7137 / 16MnCr5

Zähnezahl: 36

Modul: 0,5

Takzeit: 15 s

Vc: 150 m/min

f<sub>z</sub>: 0,1 mm / Z

### Spline gearing

Material: 1.7137 / 16MnCr5

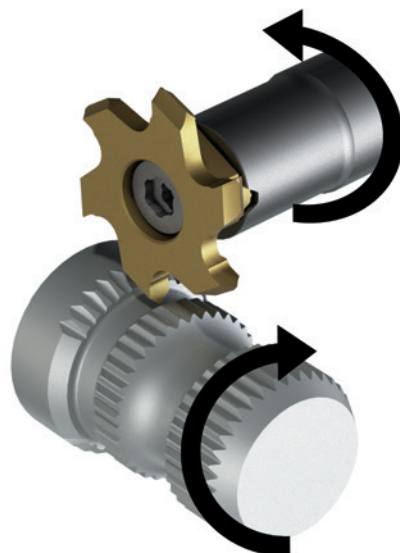
Number of teeth: 36

Module: 0.5

Cycle time: 15 s

Cutting speed: 150 m/min

f<sub>z</sub>: 0,1 mm / Z





**Kegelradfräsen**

Modul 0,6 - 4 mm

**Bevel Gear Milling**

Module 0.6 - 4 mm



Das Produktprogramm umfasst Werkzeuge zur Herstellung spiralförmiger Kegelräder mit epizykloidischer Zahn längsform und konstantem Zahnhöhenverlauf. Andere Verzahnungsformen bedürfen einer besonderen Prüfung.

Die Auslegung des Verzahnungsprozesses inklusive aller Bearbeitungsparameter erfolgt in Kooperation mit Index anhand des Kundenbauteils. Die Definition der Werkzeuggeometrie und Abstimmung der Werkzeugparameter ist abhängig vom Werkstückstoff und erfolgt mit dem Ziel hoher Werkstückgenauigkeiten und wirtschaftlicher Bearbeitungszeit.

Die Vor- und Rückseitenbearbeitung in einer Maschine ermöglicht die Komplettbearbeitung, dabei werden alle funktionsrelevanten Elemente in einer Aufspannung bearbeitet, mit dem Ziel höchster Präzision. Kegelräder von der Stange auf Universalmaschinen.

Produktprogramm:

Unser Produktprogramm umfasst Fräser für Systemschnittstellen in HSK-T40 und HSK-T63 in verschiedenen Flugkreisen und Zahnreihen/Gängigkeiten. Ein Fräsersatz kann für verschiedene Module und Kegelradabmessungen eingesetzt werden.

Zwei unterschiedliche Schneidplattengrößen decken Verzahnungsgrößen von Modul  $m = 0,6$  mm bis Modul  $m = 4$  mm ab.

The product range includes tools for the manufacture of spiral bevel gears with epicycloidal longitudinal tooth shape and constant tooth height. Other tooth forms require special testing.

The design of the gear cutting process including all machining parameters is carried out in cooperation with Index based on the customer's component. The definition of the tool geometry and coordination of the tool parameters depends on the workpiece material and is carried out with the aim of achieving high workpiece accuracy and economical machining time.

Front and rear machining in one set-up enables complete machining with all functionally relevant features are machined in one clamping with the aim of achieving maximum precision. Bevel gears from bar on universal machines.

Product range:

Our product range includes milling cutters with HSK-T40 and HSK-T63 interfaces in various flight circles and tooth rows/gear speeds. One set of cutters can be used for different modules and bevel gear dimensions.

Two different insert sizes cover gear tooth sizes from module  $m = 0.6$  mm to module  $m = 4$  mm.

Das Werkzeugprogramm wurde auf Index-Maschinen abgestimmt und beinhaltet folgenden Umfang:

- Fräskörper mit HSK-T40 oder HSK-T63 Schnittstelle
- Separater Messerkopf für Innen- und Außenschneider – 1-Flankenbearbeitung für höhere Präzision und Flexibilität bei Korrekturen
- Identische Grundkörper für die Innen- und Außenschneider
- Systemschneidplatten in 2 Größen für unterschiedliche Modulgrößen
- Systeme für Drehrichtung links oder rechts
- Adapterscheiben zur Anpassung der Werkzeuge an unterschiedliche Durchmesser/Flugkreisradien
- Flexible Korrektur der Zahn längsform durch Einstellen der Exzentrizität von Außen- und Innenradius durch verschiedene Distanzplatten
- Abgestimmte Substrate für unterschiedliche Werkstoffe

The tool program has been adapted to Index machines and includes the following:

- Milling body with HSK-T40 or HSK-T63 interface
- Separate cutter head for inside and outside cutters – 1 flank machining for higher precision and flexibility when making corrections
- Identical body for the internal and external cutters
- System inserts in 2 sizes for different module sizes
- Systems for clockwise or counter-clockwise rotation
- Adapter discs for adapting the tools to different diameters / flight circle radii
- Flexible correction of the longitudinal shape of the tooth by adjusting the eccentricity of the outer and inner radius using various spacer plates
- Coordinated substrates for different materials







**5-Achs-Fräsen von  
Verzahnungen**

**B5-Axis Milling  
of Gear Teeth**

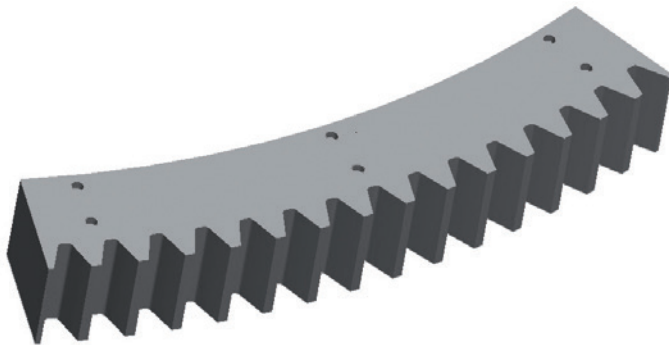


## Modul 30 gerade verzahnt, bis Ø 4000 mm

Module 30 straight fluted, up to Ø 4000 mm

Schruppen Hochvorschubfräsen / Schlichten Abzeilen

Roughing high feed milling / Finishing copy milling



DAHM.37



DGH

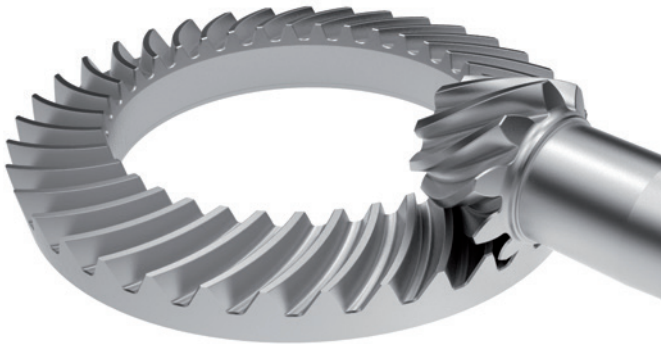


## Modul 13,56

Module 13,56

Schruppen Hochvorschubfräsen / Schlichten Abzeilen

Roughing high feed milling / Finishing copy milling



DGH



DSDS

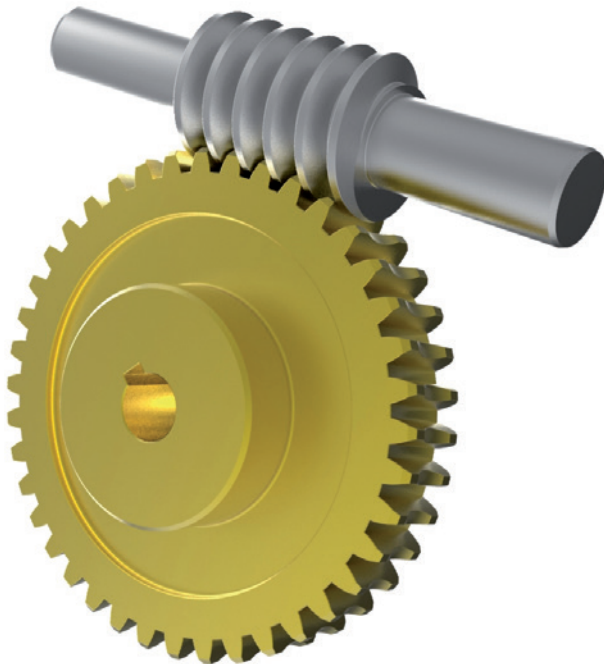
Werkstoff Material	Werkzeuge Tools	Ds [mm]	$v_c$ [m/min]	Bearbeitungszentrum Machining centre
C45	DGH	12/16	300	5-Achs 5-axis
C45	DSDS	8	200	5-Achs 5-axis
C45	DSK	10	190	5-Achs 5-axis
C45	DSM	12	260	5-Achs 5-axis

## Axialmodul 7,9 / Ø 420 mm

Axial module 7,9 / Ø 420 mm

Schruppen konventionell / Schlichten Abzeilen

Roughing conventionally / Finishing copy milling



DPTP



DSK



DPTR

Werkstoff Material	Werkzeuge Tools	Ds [mm]	v <sub>c</sub> [m/min]	Q [cm <sup>3</sup> /min]	Bearbeitungszentrum Machining centre
CuSn12Ni	DPTP	8	200	145	5-Achs 5-axis
CuSn12Ni	DSK	8	225	80	5-Achs 5-axis
CuSn12Ni	DPTR	6	225		5-Achs 5-axis

### Bearbeitungstechnologie / Machining technology

<input type="checkbox"/> Wälzschälen Gear Skiving	<input type="checkbox"/> Verzahungsfräsen Gear milling	<input type="checkbox"/> Verzahnungsstoßen Gear broaching
--	---	--

### Werkstückdaten / Workpiece data

Werkstückzeichnungsnr. Workpiece drawing no.		
Werkstoff Material		gehärtet hardened
Bezugsprofil bitte eintragen Basic rack		
Normalmodul / DP Normal module / diametral pitch		
Normaleingriffswinkel Normal pressure angle		
Zähnezahl Number of teeth		
Schrägungswinkel $\beta$ (°) Helix angle		
Flankenrichtung Helix direction		
Kopfkreis- $\emptyset$ Tip diameter	min	max
Fußkreis- $\emptyset$ d_f (mm) Root diameter	min	max
Fußformkreis- $\emptyset$ d_Ff (mm) Root form diameter oder/or Fußrundungsradius $\rho_f$ (mm) Tooth root radius	min	max
	min	max
Radialbetrag Kopfkantenbruch h_k (mm) Height of semi topping		
Kopfformkreis- $\emptyset$ d_Fa (mm) Tip form diameter		
Kopfrundungsradius $\rho_{aPO}$ (mm) Tool tip radius		

### Prüfmaß Verzahnung / Measuring type

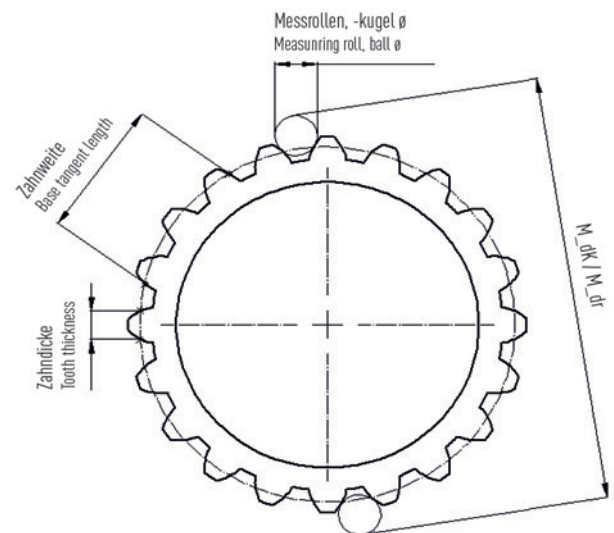
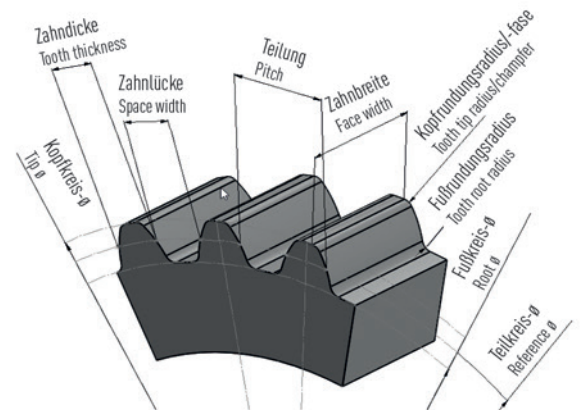
Bitte wählen! Please choose!		
2-Kugelmaß M_dK (mm) Measurement between 2 balls	min	max
2-Rollenmaß M_dr Measurement between 2 rolls	min	max
Zahnweite über ___ Zähne Base tangent length	min	max
Zahndicke Tooth thickness	min	max
Zahnlückenweite Gap width	min	max
Messkörper- $\emptyset$ (mm) Measuring body $\emptyset$		

### Zusätzliche Zahnradparameter / Additional gear parameters

Vor- / Fertigbearbeitung (Aufmaß) Roughing / finishing (stock)		
Kopf- / Fußrücknahme / K-Profil Tip relief / root relief / K-chart	ja yes	nein no
Protuberanz Protuberance	ja yes	nein no
Höhenballigkeit / Längsballigkeit Profile crowning / length crowning	ja yes	nein no

### Firma Company

### Vertretung Distributor

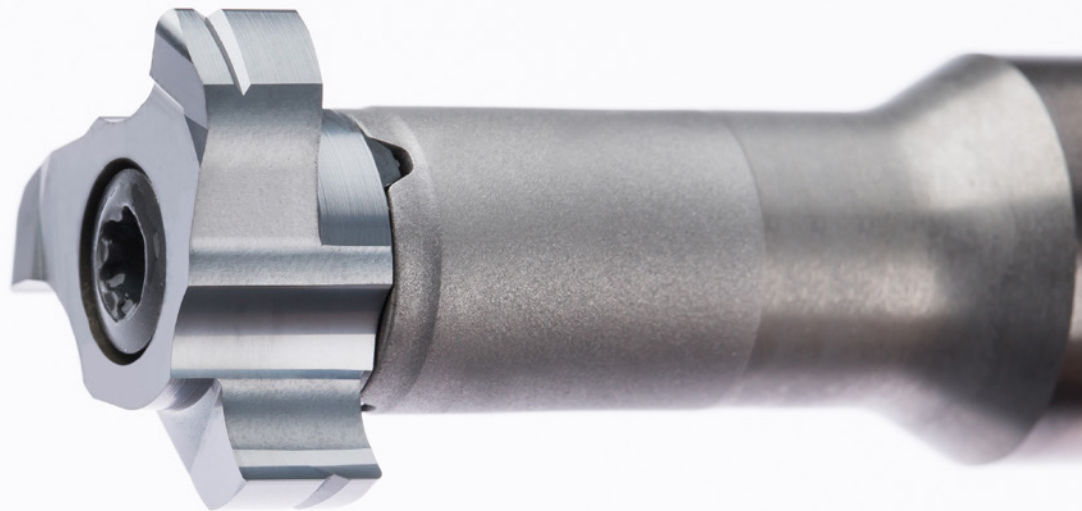


### Maschinendaten / Machine data

Spindelaufnahme Spindle connection		
Schwenkwinkel Fräsachse Swivel angle of milling spindle	+	-
Maximale Drehzahl (synchronisiert) Maximum revolution (synchronized)		

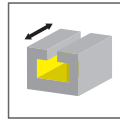
### Bemerkungen / Notes





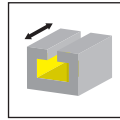
System/System	Seite/Page
<b>M311</b>	<b>438</b>
<b>M313</b>	<b>444</b>
<b>M328</b>	<b>448</b>
<b>M406/M409</b>	<b>454</b>

Fräserschaft  
Milling shank  
M311

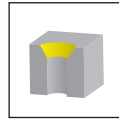


Seite/Page  
440

Schneidplatte  
Insert  
311



Seite/Page  
441



Seite/Page  
442

# M311



**T-Nuten-Fräser mit  
wechselbarer Schneidplatte**

ab Schneidkreis  $\varnothing$  17 mm

**T-Slot Cutter  
with exchangeable inserts**

from cutting edge  $\varnothing$  17 mm

J

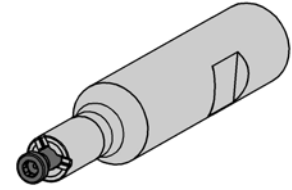
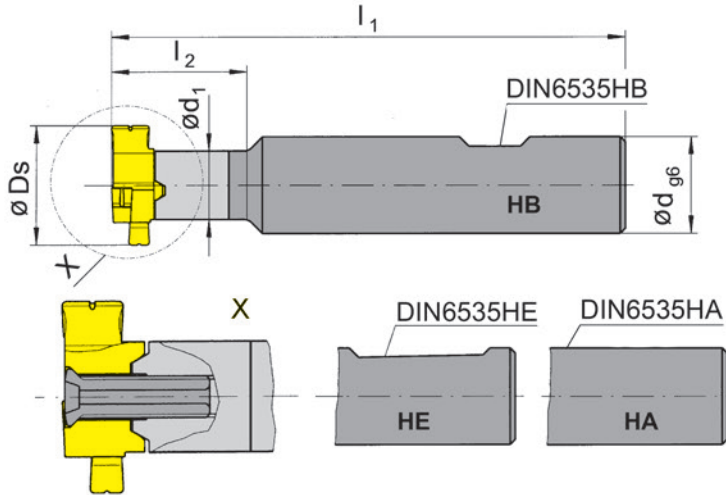
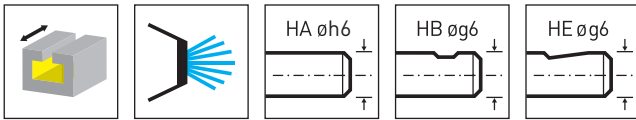


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M311.0016.00A</b>	16	90	25	9	HA	311090R
<b>M311.0016.00B</b>	16	90	25	9	HB	311090R
<b>M311.0016.00E</b>	16	90	25	9	HE	311090R

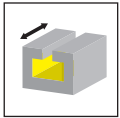
Ds siehe Schneidplatten  
Ds see inserts



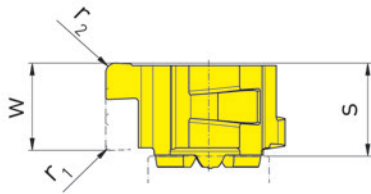
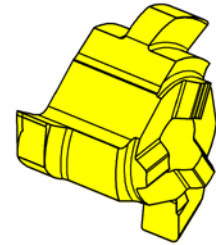
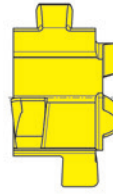
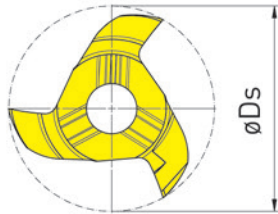
**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M311...	<b>4.16T15KP</b>	<b>T15PQ</b>





z1



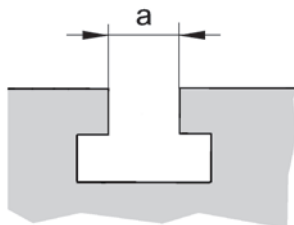
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	s	w	r <sub>1</sub>	r <sub>2</sub>	a	HIS	RC45
311.1016.1.00	17	1	7,7	7,2	0,5	0,8	10	311090R	▲
									P ●
									M ●
									K ●
									N -
									S -
									H -

T-Nuten DIN 650  
T-Slots DIN 650



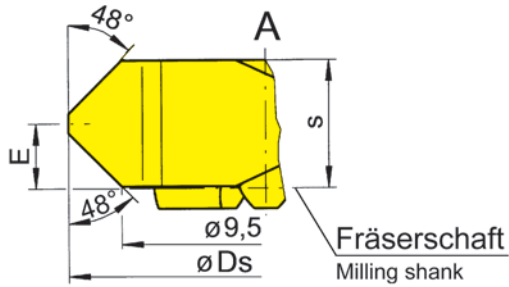
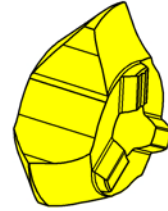
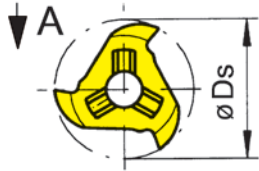


Abbildung = rechtsschneidend  
Picture = right hand cutting version

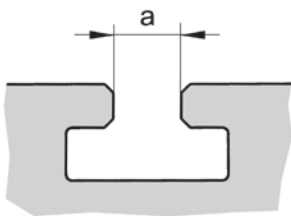
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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311.4216.00	15,8	3	5,95	10	311090R	▲

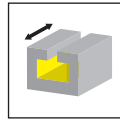
T-Nuten DIN 650  
T-Slots DIN 650

P	●
M	●
K	●
N	●
S	●
H	-



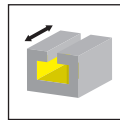


Fräserschaft  
Milling shank  
M313



Seite/Page  
446

Schneidplatte  
Insert  
313



Seite/Page  
447

# M313



**T-Nuten-Fräser mit  
wechselbarer Schneidplatte**

ab Schneidkreis  $\varnothing$  20 mm

**T-Slot Cutter  
with exchangeable inserts**

from cutting edge  $\varnothing$  20 mm

J

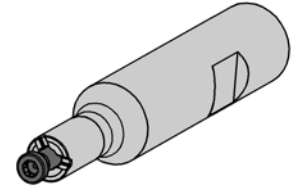
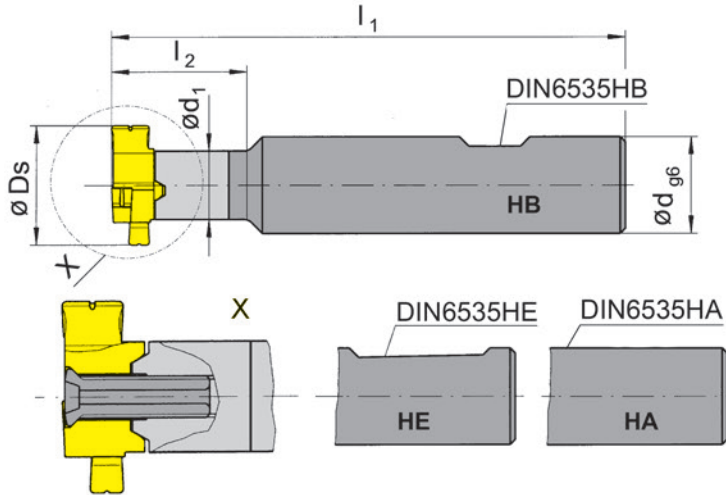
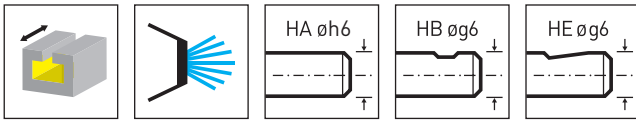


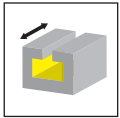
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.0016.00A</b>	16	93	30	11,5	HA	313113R • 313113L
<b>M313.0016.00B</b>	16	93	30	11,5	HB	313113R • 313113L
<b>M313.0016.00E</b>	16	93	30	11,5	HE	313113R • 313113L

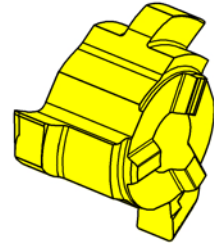
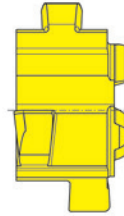
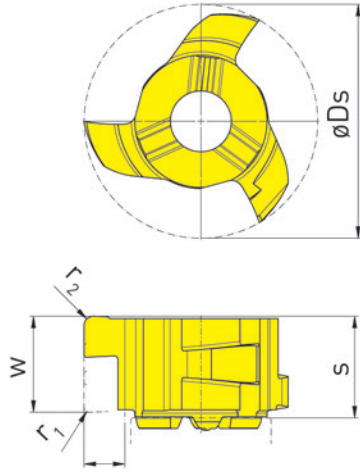
Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313...	<b>5.13T20KP</b>	<b>T20PQ</b>



z1



HM-Sorten  
Carbide grades

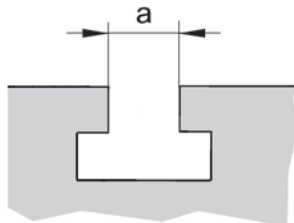
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

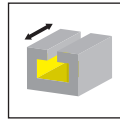
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313.1219.1.00	20	1	8,7	8,2	0,5	0,8	12	313113R	▲

T-Nuten DIN 650  
T-Slots DIN 650

P	●
M	●
K	●
N	-
S	-
H	-

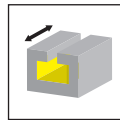


Fräserschaft  
Milling shank  
M328



Seite/Page  
450

Schneidplatte  
Insert  
328



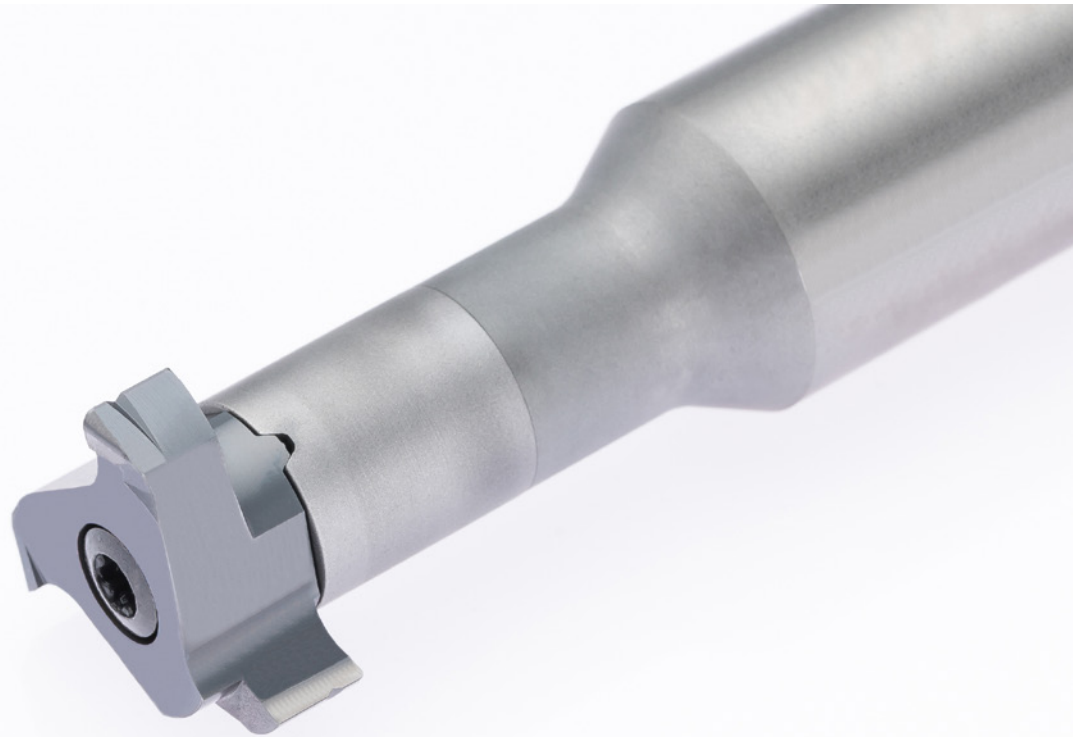
Seite/Page  
451

Technische Hinweise  
Technical Instructions

Seite/Page  
452



**M328**



**T-Nuten-Fräser mit  
wechselbarer Schneidplatte**

ab Schneidkreis  $\varnothing$  24 mm

**T-Slot Cutter  
with exchangeable inserts**

from cutting edge  $\varnothing$  24 mm

**J**

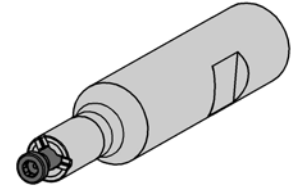
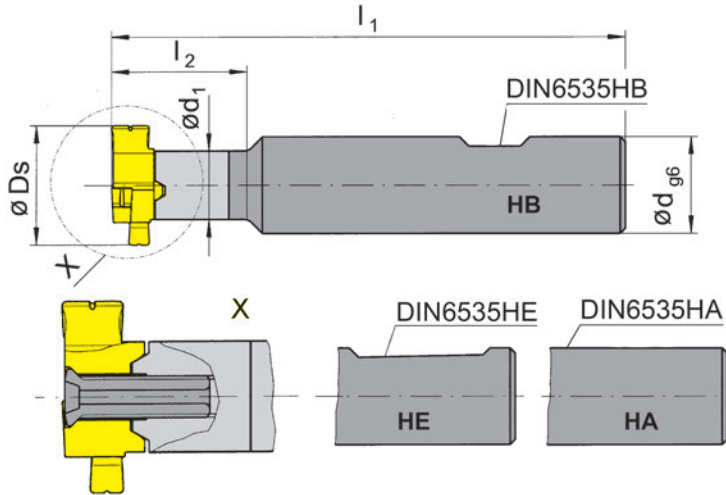
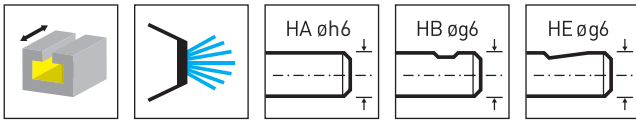


Abbildung = rechtsschneidend  
Picture = right hand cutting version

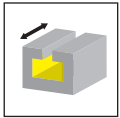
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<b>M328.0020.00A</b>	20	104	35	13,5	HA	328143R
<b>M328.0020.00B</b>	20	104	35	13,5	HB	328143R
<b>M328.0020.00E</b>	20	104	35	13,5	HE	328143R

Ds siehe Schneidplatten  
Ds see inserts

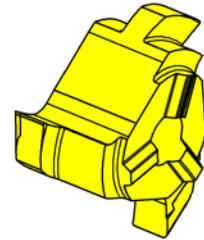
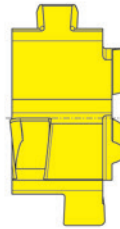
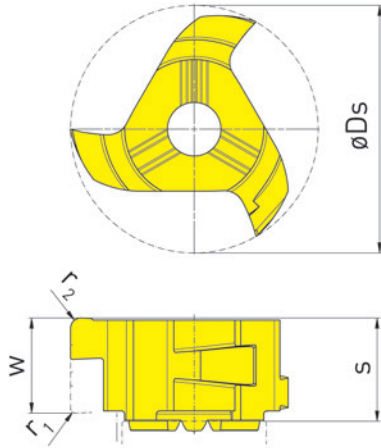


**Ersatzteile**  
Spare Parts

<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M328...	<b>5.13T20KP</b>	<b>T20PQ</b>



z1



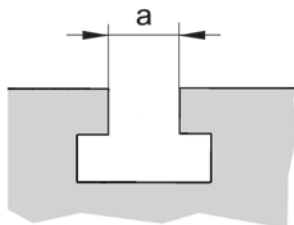
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	s	w	r <sub>1</sub>	r <sub>2</sub>	a	HIS	RC45
328.1423.1.00	24	1	10	9,2	0,5	1	14	328143R	▲

T-Nuten DIN 650  
T-Slots DIN 650



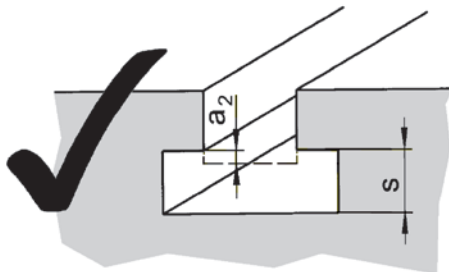
P	●
M	●
K	●
N	-
S	-
H	-



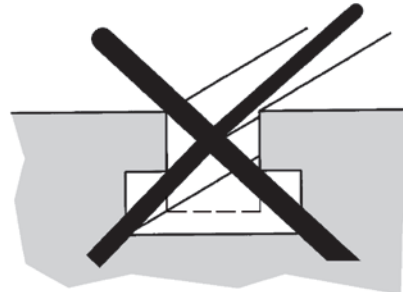
**Anwendungstechnologie**

Application Technology

$$a_2 \approx 0,2 \times s$$



sehr empfehlenswert  
 recommended



weniger empfehlenswert  
 not recommended

**Schnittdaten**

Cutting data

**T-Nuten-Fräsen**

Milling of T-slots

bearbeitbare Werkstoffe Workpiece material	Schneidstoff Cutting material	$v_c$ (m/min)	$f_z$ (mm), Z=1 Ds 17 mm	$f_z$ (mm), Z=1 Ds 20-24 mm
Kohlenstoffstahl Carbon steel	Tl25 / RC45	200 - 300	0,03 - 0,06	0,05 - 0,08
Legierter Stahl Alloyed steel	Tl25 / RC45	140 - 220	0,02 - 0,04	0,03 - 0,05
Grauguss Grey cast iron	Tl25 / RC45	100 - 160	0,03 - 0,06	0,05 - 0,10

**T-Nuten-Fasen**

Chamfering of T-slots

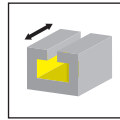
bearbeitbare Werkstoffe Workpiece material	Schneidstoff Cutting material	$v_c$ (m/min)	$f_z$ (mm), Z=3
Kohlenstoffstahl Carbon steel	Tl25 / RC45	300 - 400	0,10 - 0,13
Legierter Stahl Alloyed steel	Tl25 / RC45	180 - 300	0,13 - 0,21
Grauguss Grey cast iron	Tl25 / RC45	140 - 240	0,16 - 0,27

Diese Werte sind nur gültig mit dem zur Verfügung stehenden schwingungsdämpfenden Standard-Vollhartmetallschäften.

The cutting data is only valid for standard carbide toolholders (shanks) listed in this chapter.

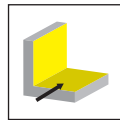


Schaftfräser  
End Mill  
M406/M409



Seite/Page  
456-457

Wendeschnidplatte  
Indexable insert  
406/409



Seite/Page  
458-459

Technische Hinweise  
Technical Instructions

Seite/Page  
460

# M406/M409



**T-Nuten-Fräser mit  
Wendeschneidplatten**

Schneidkreis-Ø 25-50 mm

**T-slots Cutter with  
exchangeable inserts**

cutting edge Ø 25-50 mm

J

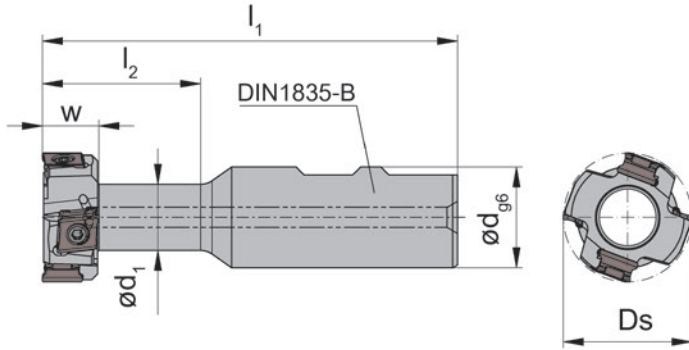
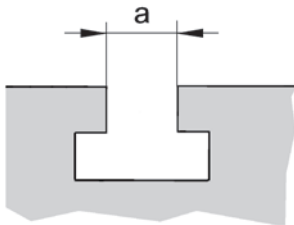


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	w	a	n <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M406.025.11.D16.1.02.B</b>	4	2	25	16	83	31	12,4	11	12,9	19000	2x R406.063.U...	2x L406.063.U...	40600R • 40600L

ab Ø 25 mm 2 Spannflächen  
from Ø 25 mm 2 clamping flats



J

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M406.025.11.D16.1.02.B	<b>030.2608.T8P</b>	<b>T8PL</b>



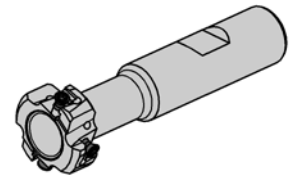
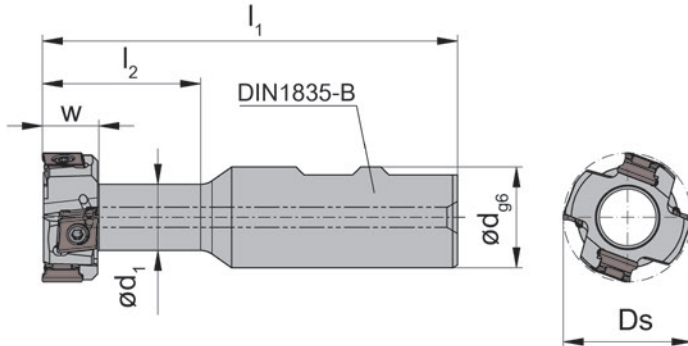
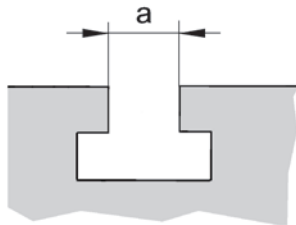


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	w	a	n <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M409.032.14.D25.1.02.B</b>	4	2	32	25	103	39	16,4	14	16,9	15600	2x R409.093.U...	2x L409.093.U...	40900R • 40900L
<b>M409.040.18.D25.1.02.B</b>	4	2	40	25	109	48	20,4	18	20,9	13900	2x R409.093.U...	2x L409.093.U...	40900R • 40900L
<b>M409.050.22.D32.1.02.B</b>	6	2	50	32	125	59	26,4	22	26,9	12500	4x R409.093.U...	2x L409.093.U...	40900R • 40900L

ab Ø 25 mm 2 Spannflächen  
from Ø 25 mm 2 clamping flats



**Ersatzteile**  
Spare Parts

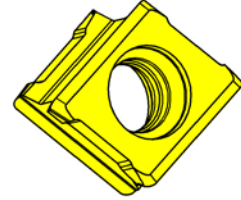
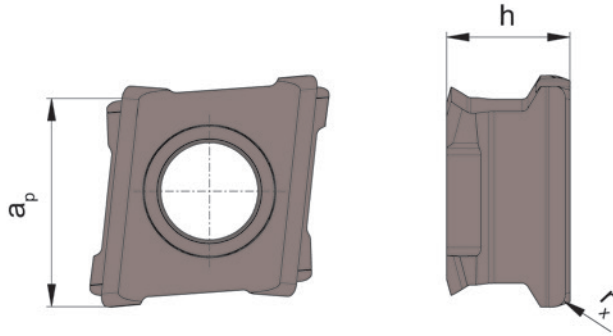
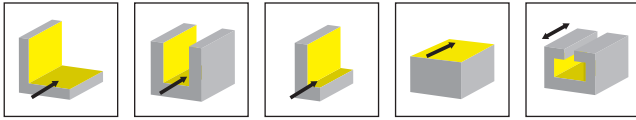
Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>



# Wendeschnidplatte

Indexable insert

# 406



▲ ab Lager  
on stock

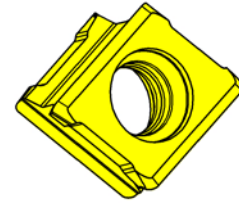
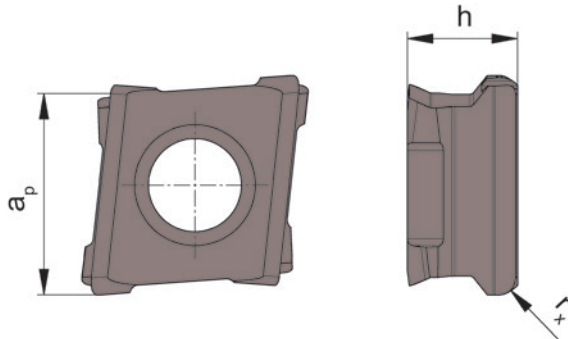
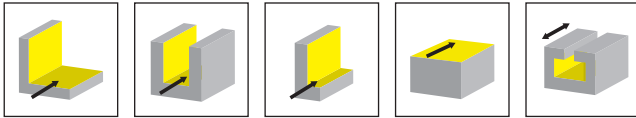
HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	a <sub>p</sub>	h	r <sub>x</sub>	HIS	HM-Sorten Carbide grades	
					AS46	AS4B
R406.063.U.02	6,3	3,85	0,2	40600R	Δ	▲
R406.063.U.04	6,3	3,85	0,4	40600R	▲	▲
R406.063.U.08	6,3	3,85	0,8	40600R	▲	▲
L406.063.U.02	6,3	3,85	0,2	40600L	Δ	▲
L406.063.U.04	6,3	3,85	0,4	40600L	▲	▲
L406.063.U.08	6,3	3,85	0,8	40600L	▲	▲
					P	○ ●
					M	○ ●
					K	● ●
					N	○ ○
					S	○ ●
					H	- -

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges





HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	AS46	AS4B
R409.093.U.04	9,3	5,2	0,4	40900R	▲	▲
R409.093.U.08	9,3	5,2	0,8	40900R	▲	▲
R409.093.U.12	9,3	5,2	1,2	40900R	▲	▲
L409.093.U.04	9,3	5,2	0,4	40900L	▲	▲
L409.093.U.08	9,3	5,2	0,8	40900L	▲	▲
L409.093.U.12	9,3	5,2	1,2	40900L	▲	▲
					P	o ●
					M	o ●
					K	● ●
					N	o o
					S	o ●
					H	- -

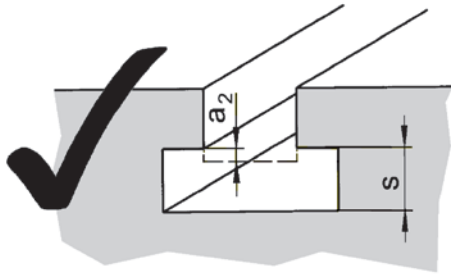
mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges



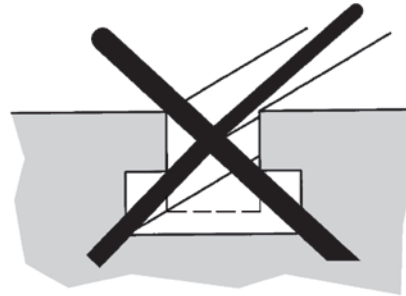
**Anwendungstechnologie**

Application Technology

$$a_2 \approx 0,2 \times s$$



sehr empfehlenswert  
 recommended



weniger empfehlenswert  
 not recommended

**Schnittdaten**

Cutting Data

**T-Nuten-Fräsen Ø25 / Ø32 mm**

Milling of T-Slots

bearbeitbare Werkstoffe Workpiece material	Schneidstoff Cutting material	$v_c$ (m/min)	$f_z$ (mm)
Vergütungsstahl heat-treatable steel	AS4B/AS46	120 - 160	0,07 - 0,14
Grauguss Grey cast iron	AS4B/AS46	100 - 160	0,07 - 0,14

**T-Nuten-Fräsen Ø40 / Ø50 mm**

Milling of T-Slots

bearbeitbare Werkstoffe Workpiece material	Schneidstoff Cutting material	$v_c$ (m/min)	$f_z$ (mm)
Vergütungsstahl heat-treatable steel	AS4B/AS46	60 - 90	0,06 - 0,08
Grauguss Grey cast iron	AS4B/AS46	90 - 140	0,06 - 0,08

J



System/System

Seite/Page

**M275**

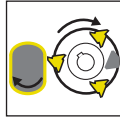
**462**

**381**

**468**

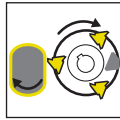
**K**

Schlagmesser  
Cutter  
M275



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464-465

Wendeschneidplatte  
Indexable insert  
S275



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466

# M275



## Schlagmesser

ab Schneidkreis  $\varnothing$  40 mm

## Cutter

from cutting edge  $\varnothing$  40 mm

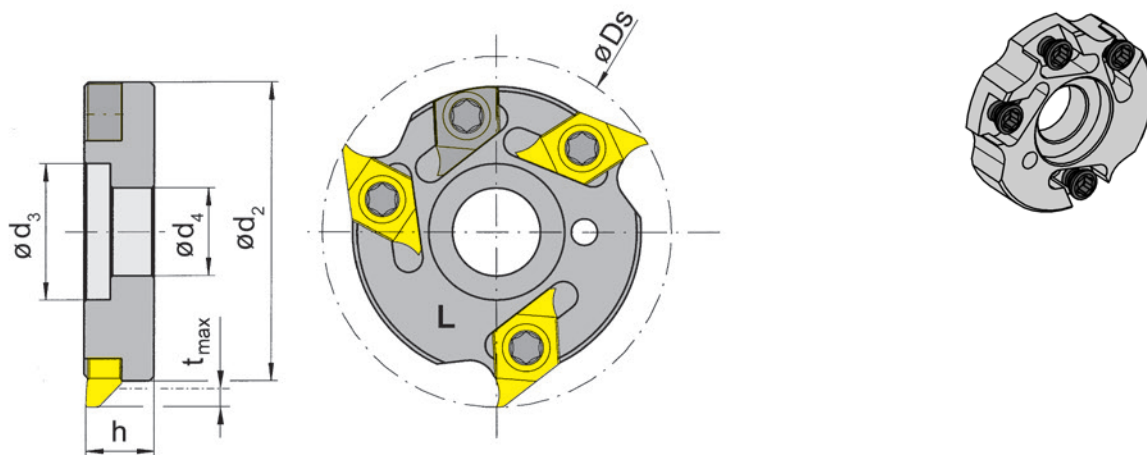
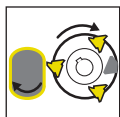


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>4</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
RM275.D040.10.04	40	33	7,9	3	10	15,5	EvoDECO 10	275041R
LM275.D040.10.04	40	33	7,9	3	10	15,5	EvoDECO 10	275041L

für Maschine: Tornos  
for machine: Tornos

Ersatzteile  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element	Wuchtelement rechts Right hand balancing element
LM275.D040.10.04	030.357P.0315	T10PL	LS275.AT41.HM	
RM275.D040.10.04	030.357P.0315	T10PL		RS275.AT41.HM



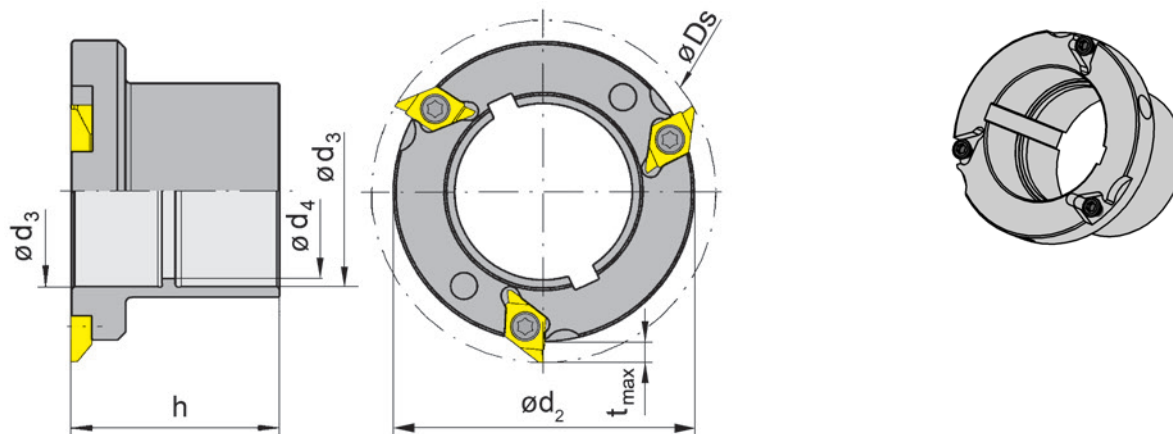
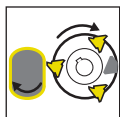


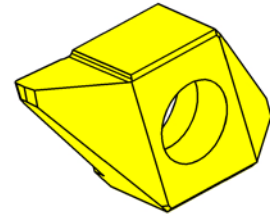
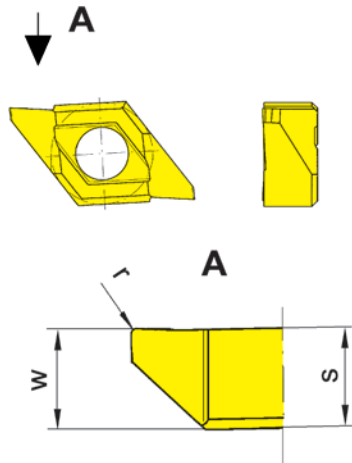
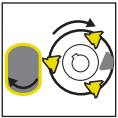
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>4</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>RM275.T064.3325.03</b>	64	56	36	3	10	15,5	EvoDECO 10	275041R

für Maschine: **Tornos**  
for machine: Tornos

**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
RM275.T064.3325.03	<b>3.5.10T10P</b>	<b>T10PL</b>



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

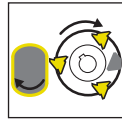
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	s	HIS	AS45	TI25
RS275.MK13.M0	1,3	0,2	3,9	275041R	▲	▲
LS275.MK13.M0	1,3	0,2	3,9	275041L	▲	▲
					P ● ●	● ●
					M ● ●	● ●
					K ● ●	● ●
					N ○ ●	● ●
					S ● ●	● ●
					H - -	- -

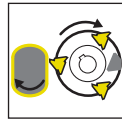


Schlagmesser  
Cutter  
381



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Wendeschneidplatte  
Indexable insert  
N314/314



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Technische Hinweise  
Technical Instructions

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Übersicht  
Overview

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491-492

**381**



**Schlagmesser**

ab Schneidkreis  $\varnothing$  60 mm

**Cutter**

from cutting edge  $\varnothing$  60 mm

**K**

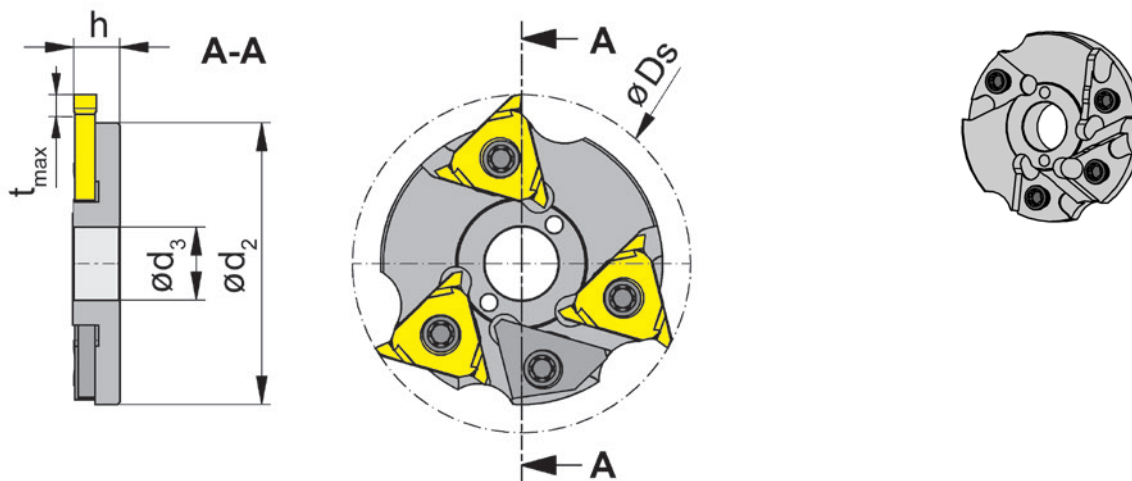
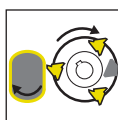


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.A060.13.04</b>	60	50	8,2	4,5	13	Star SR-20J	314027N

für Maschine: **Star**  
for machine: Star

## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element
L381.A060.13.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

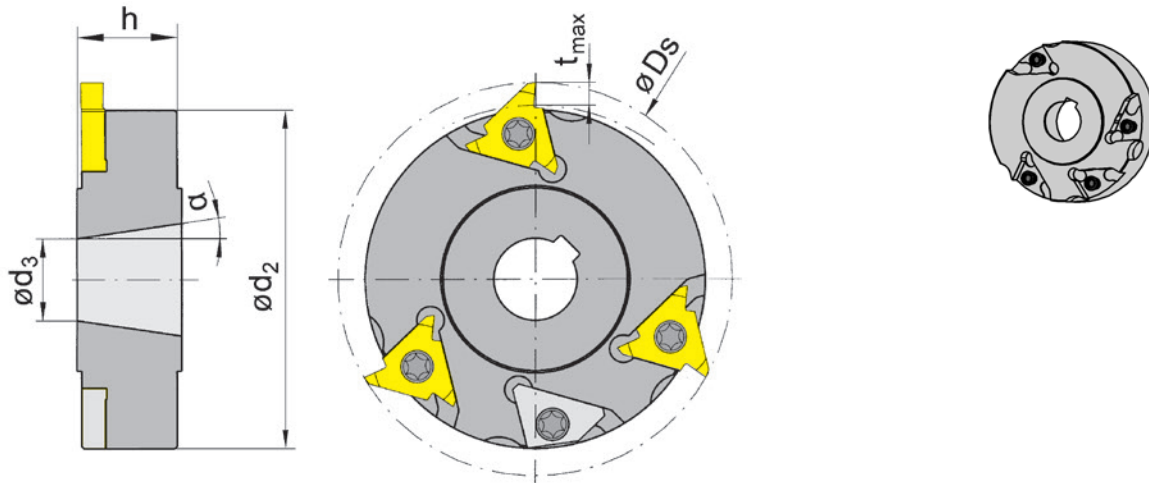
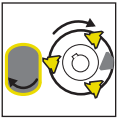


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	D <sub>s</sub>	d <sub>2</sub>	h	α	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.G070.15.04</b>	70	58	15	8,16°	5	11,5	GLD25/GD32	314041L
<b>L381.G086.25.04</b>	86	74	23	8,16°	5	18	GM20-6,-35-8/GMC35	314041L
<b>L381.G098.26.04</b>	98	86	23	8,32°	5	20	GM35-6,-35-8,-42-6/GMC35	314041L

für Maschine: **Gildemeister**  
for machine: Gildemeister



**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement Balancing element
L381.G070.15.04	<b>5.10T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>
L381.G...	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>

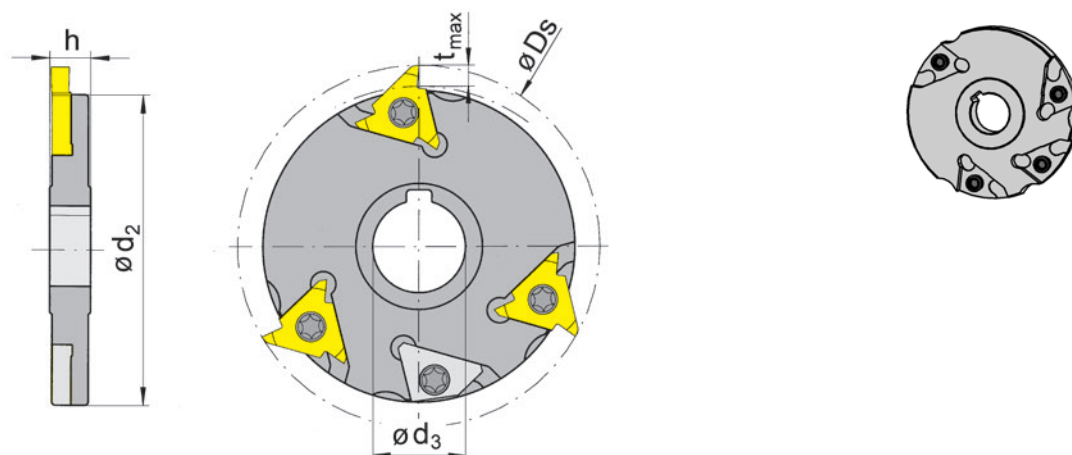
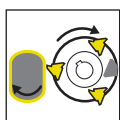


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.G080.16.04</b>	80	68	9	5	16	SPRINT 20/32	314027N

für Maschine: **Gildemeister**  
for machine: Gildemeister

K

**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element
L381.G080.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>



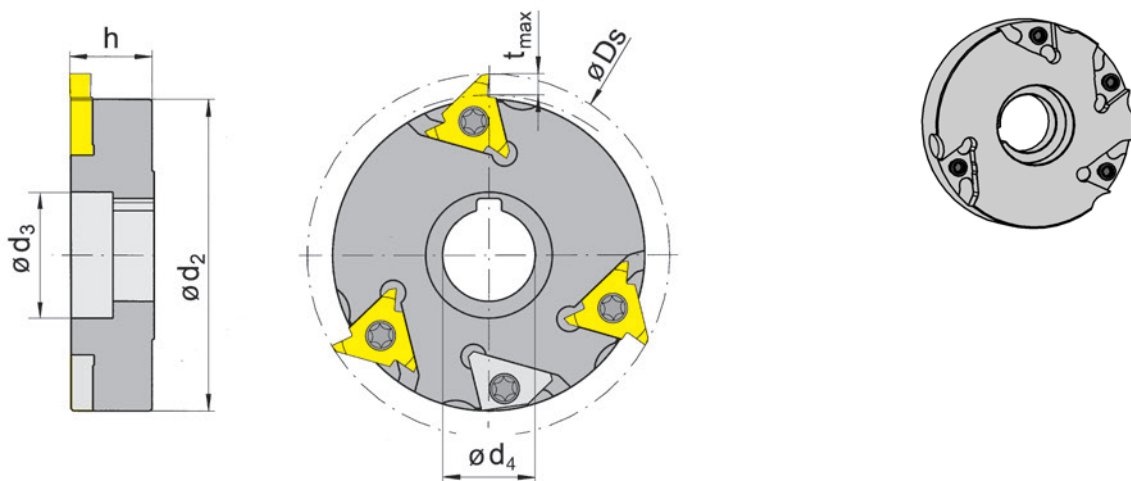
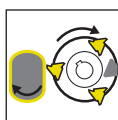


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>4</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.G090.22.04</b>	90	78	20	5	22	30	SPRINT 32L/-42L	314041L

für Maschine: **Gildemeister**  
for machine: Gildemeister



## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement Balancing element
L381.G090.22.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>

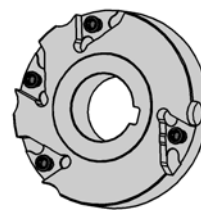
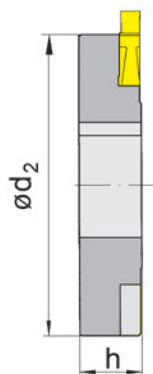
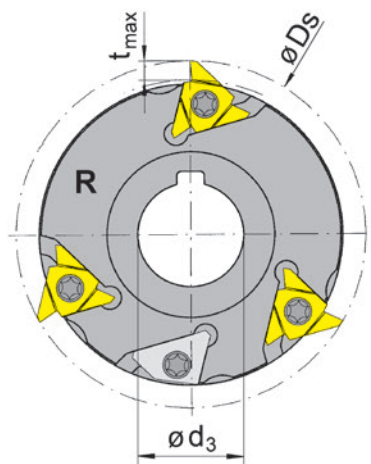
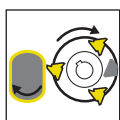


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>R381.X090.27.04</b>	90	78	16,2	5	27	Index ABC	314041R
<b>L381.X090.27.04</b>	90	78	16,2	5	27	Index ABC	314041L

für Maschine: **INDEX**  
for machine: INDEX

## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement Balancing element
R/L381.X090.27.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>020.0314.1531</b>

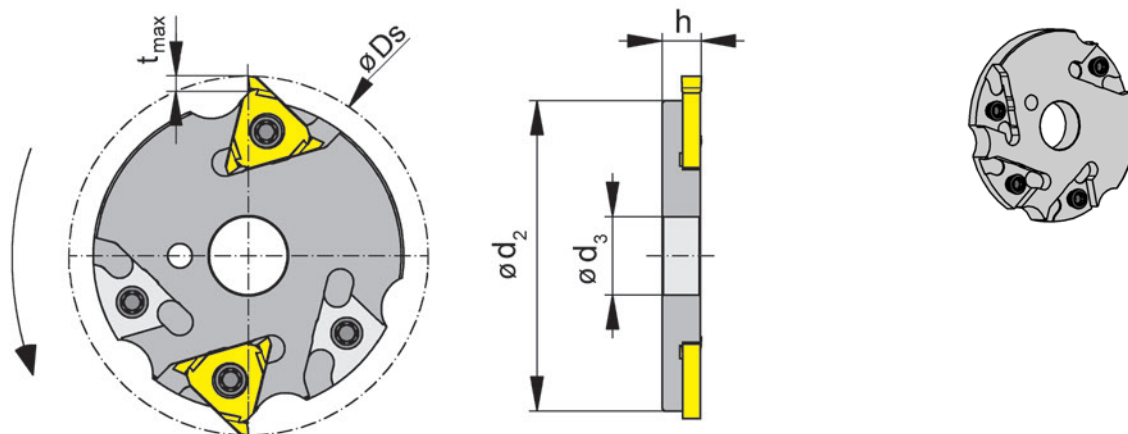
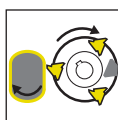


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$t_{max}$	$d_3$	Maschinentyp Machine type	HWS
<b>R381.X073.16.04</b>	73,5	63,5	8	5	16	Index MS25	314027N

für Maschine: **INDEX**  
for machine: INDEX



**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement rechts Right hand balancing element
R381.X073.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>R314.AT30.HM</b>

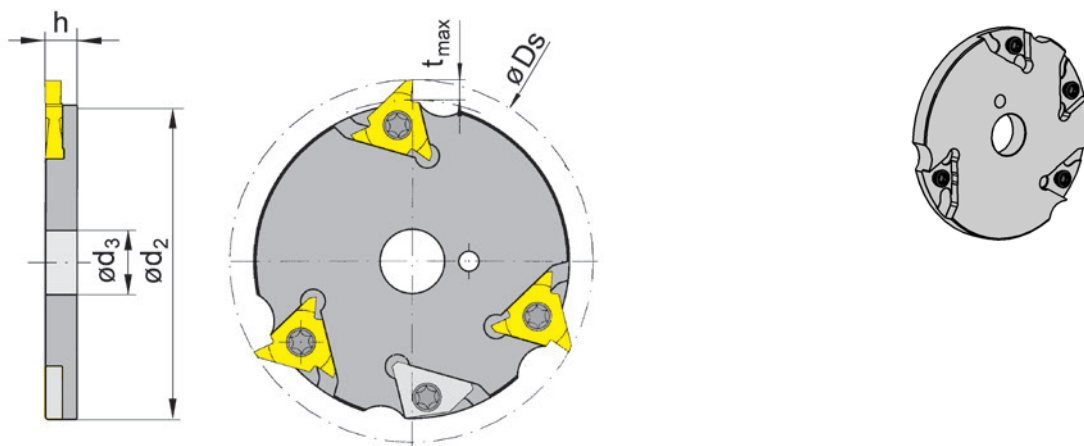
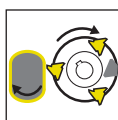


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$t_{max}$	$d_3$	Maschinentyp Machine type	HWS
<b>L381.N090.16.04</b>	90	80	7,8	5	16	WT250	314027N

für Maschine: **Nakamura**  
for machine: Nakamura

K

## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element
L381.N090.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

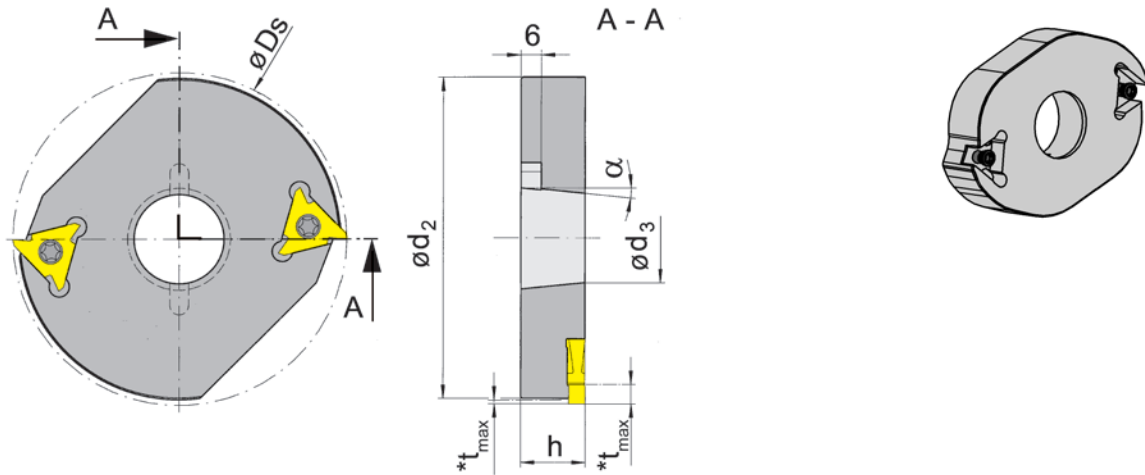
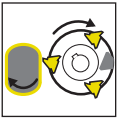


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$\alpha$	$^*t_{max}$	$d_3$	Maschinentyp Machine type	HWS
L381.S078.30.02	78	66	19	5,42°	5	26,8	SG18, SG20, AG18	314052L
L381.S098.30.02	98	94,6	19	5,42°	5	26,8	SG20/SF26,-S,-L/SE18/AF26,32	314052L
L381.S118.30.02	118	115	19	5,42°	5	26,8	SF32,42,51,67/AF42	314052L

für Maschine: **A.H. Schütte**  
for machine: A.H. Schütte

geschlossener Plattensitz, Vorschub in Axialrichtung  
reinforced pocket, feed in axial direction

\*  $t_{max}$  Längsfräsen = 5,0 mm / Einstechfräsen = 1,2 mm  
\*  $t_{max}$  Side Milling = 5,0 mm / Groove Milling = 1,2 mm

**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
L381...	5.15T20P	T20PQ

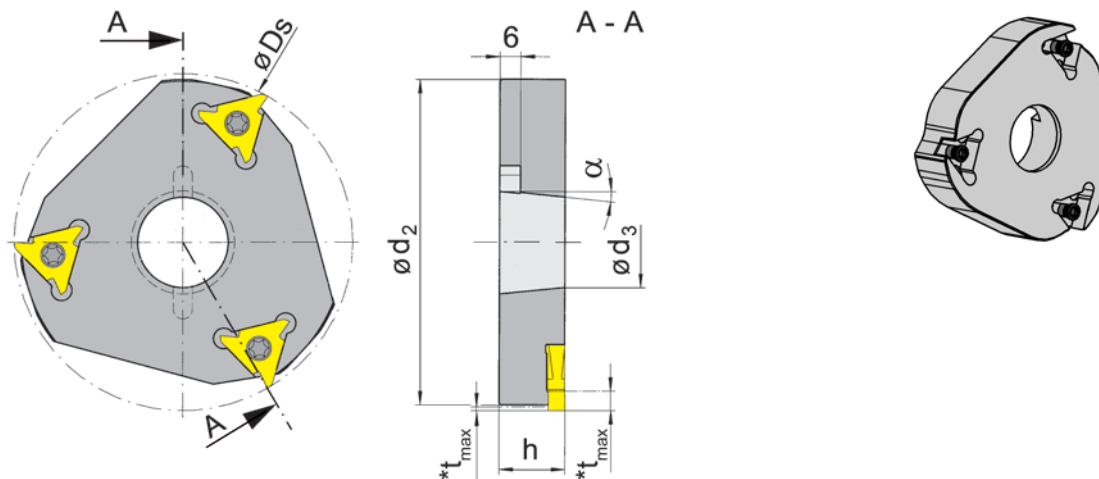
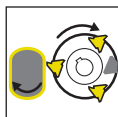


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	α	*t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.S078.30.03</b>	78	77	19	5,42°	5	26,8	SG18, SG20, AG18	314052L
<b>L381.S098.30.03</b>	98	94,6	19	5,42°	5	26,8	SG20/SF26,-S,-L/SE18/AF26,32	314052L
<b>L381.S118.30.03</b>	118	115	19	5,42°	5	26,8	SF32,42,51,67/AF42	314052L

für Maschine: **A.H. Schütte**  
for machine: A.H. Schütte

geschlossener Plattensitz, Vorschub in Axialrichtung  
reinforced pocket, feed in axial direction

\* t<sub>max</sub> Längsfräsen = 5,0 mm / Einstechfräsen = 1,2 mm

\* t<sub>max</sub> Side Milling = 5,0 mm / Groove Milling = 1,2 mm

## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
L381...	<b>5.15T20P</b>	<b>T20PQ</b>

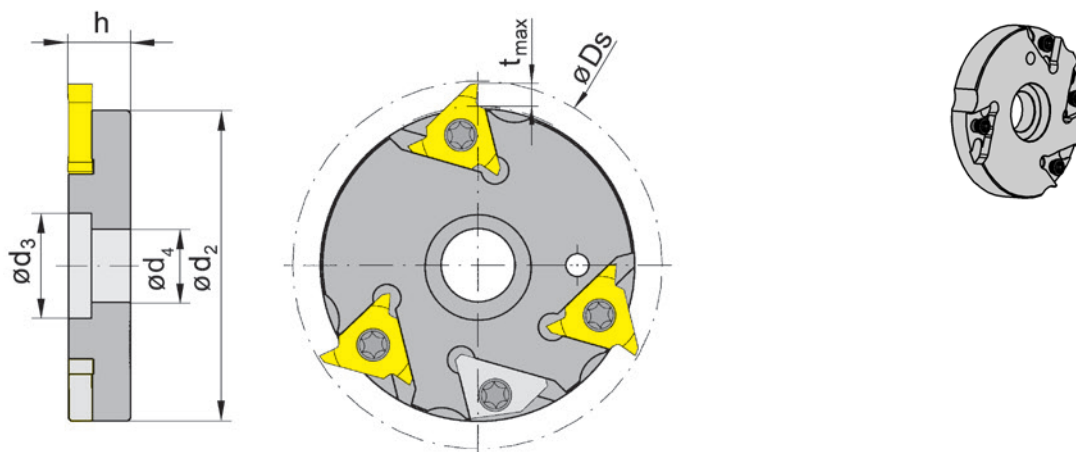
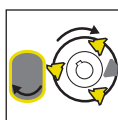


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>4</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
L381.D080.16.04	80	57,5	13,6	5	16	23	DECO 2000/DECO 13/20/26	314027N

für Maschine: **Tornos**  
for machine: Tornos



**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element
L381.D080.16.04	5F.08T20P	T20PQ	L314.AT30.HM

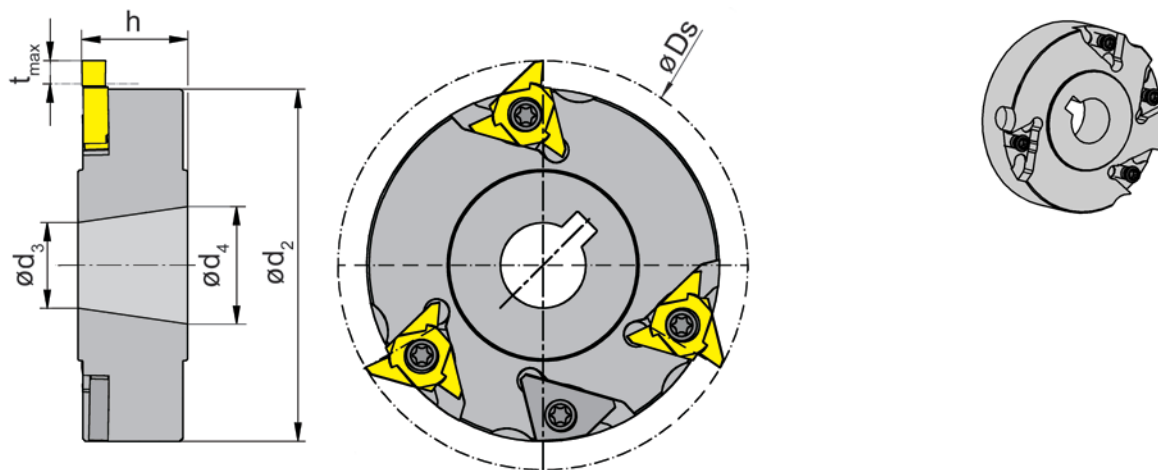
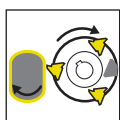


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	D <sub>s</sub>	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>4</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.D086.25.04</b>	86	74	23	5	24,7	18	Tornos Multi-Deco	314041L

für Maschine: **Tornos**  
for machine: Tornos

K

## Ersatzteile

Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement Balancing element
L381.D086.25.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>



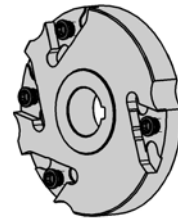
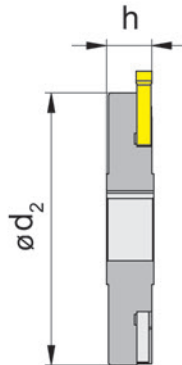
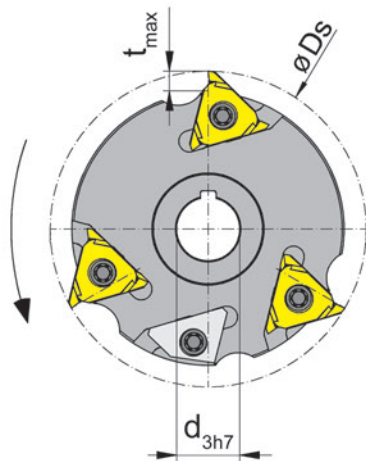
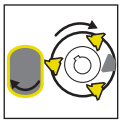


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>R381.T080.16.04</b>	80	69	12	5	16	TRAUB TNL18	314027N

für Maschine: **Traub**  
for machine: Traub

**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement rechts Right hand balancing element
R381.T080.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>R314.AT30.HM</b>

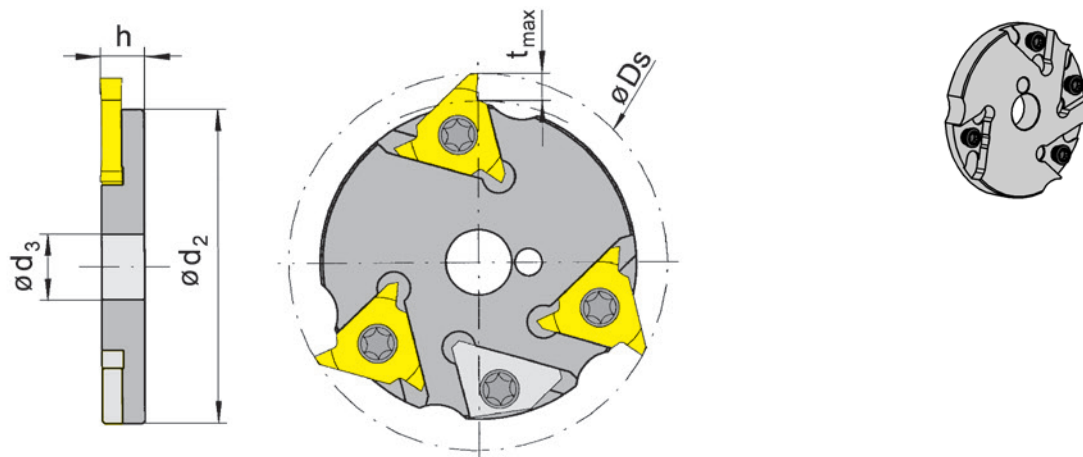
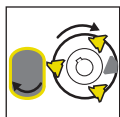


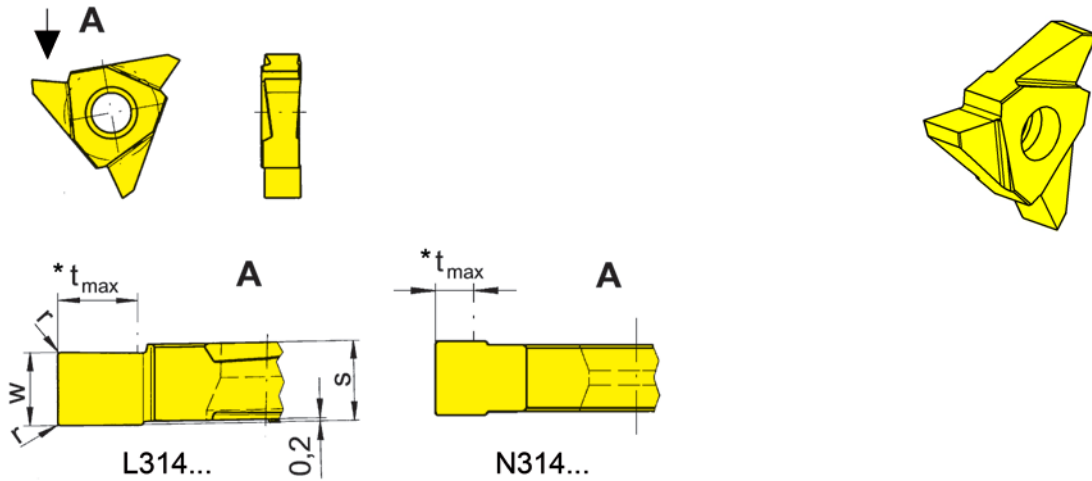
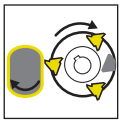
Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.T069.12.04</b>	69	57,5	8	5	12	TNL12-7/TNL26/TNK36	314027N

für Maschine: **Traub**  
for machine: Traub

**Ersatzteile**  
Spare Parts

Schlagmesser Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Wuchtelement links Left hand balancing element
L381.T069.12.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>



HM-Sorten  
Carbide grades

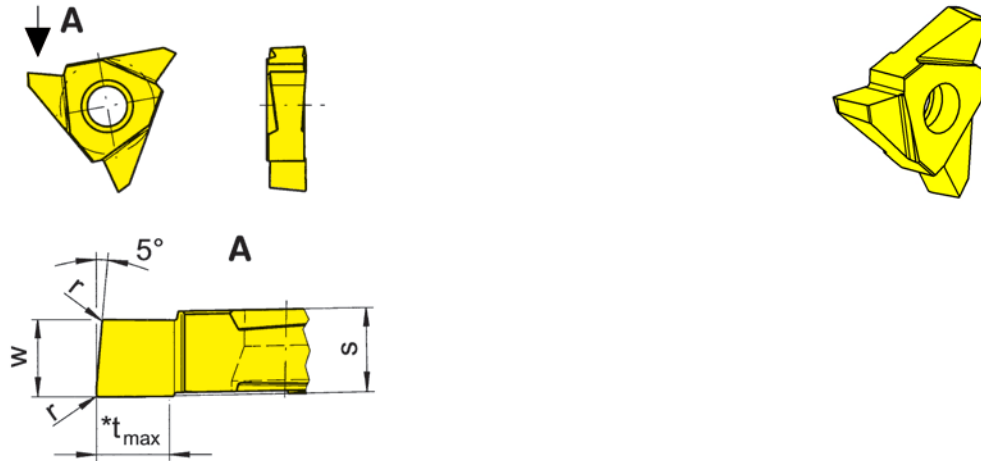
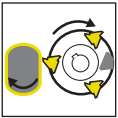
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	s	HIS	MG12	AS45	TI25	TN35
R314.MK50.20	5	0,15	5,2	314041R		▲	▲	
L314.MK50.20	5	0,15	5,2	314041L		▲	▲	
L314.MK70.M0	7	0,15	7,4	314052L		▲	▲	▲
N314.MK40.20	4	-	3,6	314027N	▲	▲	▲	△
					P	o	•	•
					M	-	•	•
					K	-	•	•
					N	-	o	•
					S	-	•	•
					H	-	-	-

*t <sub>max</sub>	Einstecken Groove Milling	Längsfräsen Side Milling
N314.MK40.20	siehe Fräser/see cutter	2,5
R/L314.MK50.20	siehe Fräser/see cutter	5
L314.MK70.M0	siehe Fräser/see cutter	5





L = links wie gezeichnet  
L = left hand version shown

R = rechts spiegelbildlich  
R = right hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	s	t <sub>max</sub>	HIS	AS45	TI25
R314.MK50.5.20	5	0,15	5,4	5	314041R	▲	▲
R314.MK50.20.L	5,4	0,6	5,4	5	314041R	▲	▲
L314.MK50.5.20	5	0,15	5,4	5	314041L	▲	▲
L314.MK50.20.L	5,4	0,6	5,4	5	314041L	▲	▲
						P	●
						M	●
						K	●
						N	○
						S	●
						H	-

## Funktionsprinzip des Mehrkantschlagens

Beim Mehrkantschlagen auf der Drehmaschine werden Flächen am Umfang (Mantelfläche) der Drehteile mit einem Schlagmesser erzeugt. Das Werkstück (Hauptspindel) und das Werkzeug (rotierender Werkzeugantrieb) müssen in einem synchronen Übersetzungsverhältnis laufen.

### **Mehrkantschlagen wird nur im Gegenlauf ausgeführt!**

Die Anzahl der erzeugten Flächen am Werkstück steht in Abhängigkeit vom Übersetzungsverhältnis zwischen dem Werkstück und dem Werkzeug sowie der Anzahl der Schneiden des Werkzeugs.

Bei einem Übersetzungsverhältnis von 2:1 wird eine leicht konvexe Oberfläche erzielt. Die geringe Formabweichung ist für Flächen zweiter Ordnung (Schlüsselflächen) brauchbar. Bei einem Übersetzungsverhältnis von 1:1 ergeben sich stark konvexe Flächen, die für Schlüsselflächen nicht zu empfehlen sind. Bei einem Übersetzungsverhältnis von 3:1 werden stark konkave Flächen erzeugt, die ebenfalls für Schlüsselflächen nicht zu empfehlen sind.

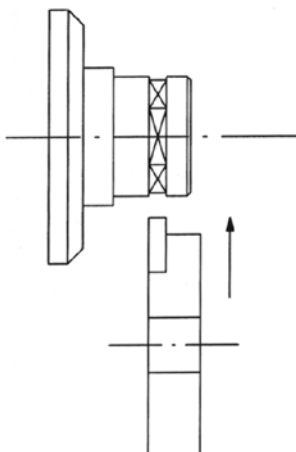
Demzufolge wird in den meisten Fällen das Übersetzungsverhältnis 2:1 angewendet. Schlagmesser mit  $Z = 2$  erzeugen 4 Flächen am Werkstück.

Zur Berechnung der Konvexität der erzeugten Flächen sind folgende Punkte notwendig:

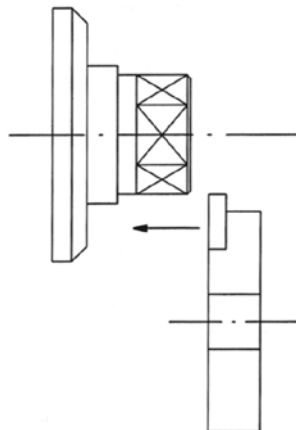
1. Schneidkreisdurchmesser des Schlagmessers
2. Zu erzeugende Schlüsselweite
3. Vorgeahreter Werkstückdurchmesser
4. Anzahl der Flächen
5. Übersetzungsverhältnis Werkstück:Werkzeug

Die Flächen können im Einstechverfahren sowie im Längsdrehverfahren erzeugt werden. Ebenfalls kann damit eine Fase kopiert werden (entgraten der Fläche).

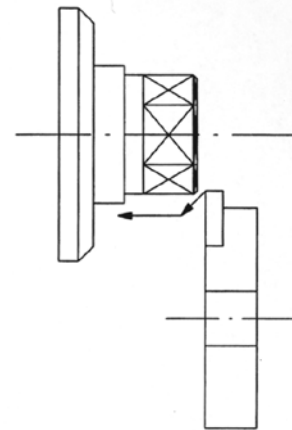
Einstechfräsverfahren



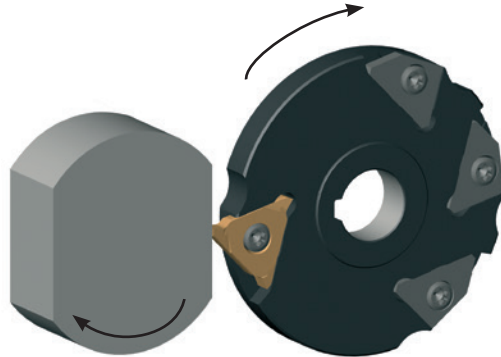
Längsfräsverfahren



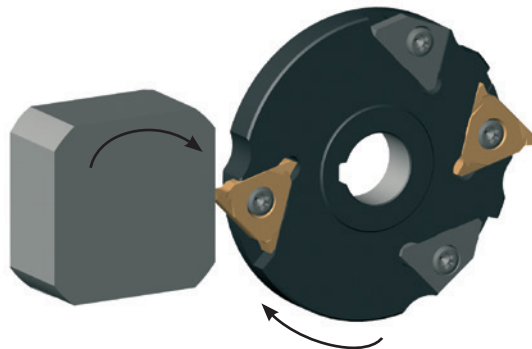
Kopieren und Längsfräsverfahren



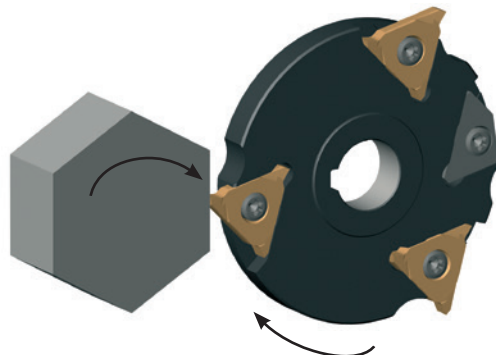
Zweikant mit 1 Schneide im Übersetzungsverhältnis von 2:1 zur Hauptspindel hergestellt.



Vierkant mit 2 Schneiden im Übersetzungsverhältnis von 2:1 zur Hauptspindel hergestellt.



Sechskant mit 3 Schneiden im Übersetzungsverhältnis von 2:1 zur Hauptspindel hergestellt.



## The concept of Polygon Milling

Polygon milling describes the manufacturing of flats while rotating components with polygon milling cutters on CNC lathes, Swiss Automatics lathes or Multi Spindle machines. The component (main spindle) and the milling cutter (live tool) have to run with synchronized rotations.

### The operation only works in conventional milling!

The number of flats depends on the rotation ratio between component and milling cutter as well as on the number of inserts of the milling cutter.

At a revolution ratio of 2:1, the shape of the produced flats are little convex. The form error is suitable for most applications such as across-flats.

At a revolution ratio of 1:1, the shape of the produced flats are heavily convex. This shape is not suitable for across-flats.

At a revolution ratio of 3:1, the shape of the produced flats are heavily concave. This shape is as well not suitable for across-flats.

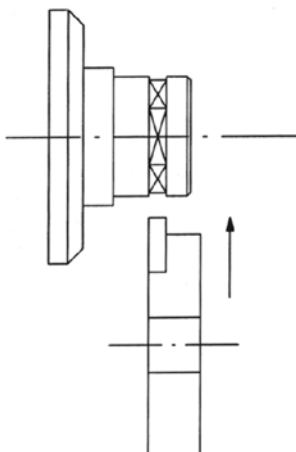
According to this, the number of flats at the component is twice the number of cutting inserts on the milling cutter.

To calculate the shape of the flats following parameter are necessary:

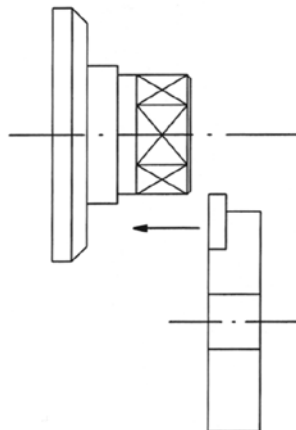
1. Cutting diameter of the polygon milling cutter
2. Across-flats dimension
3. Premachined diameter of the component
4. Number of flats
5. Revolution ratio of component and milling cutter

The flats can be produced by grooving or by turning. Chamfers can be produced by profiling (deburring).

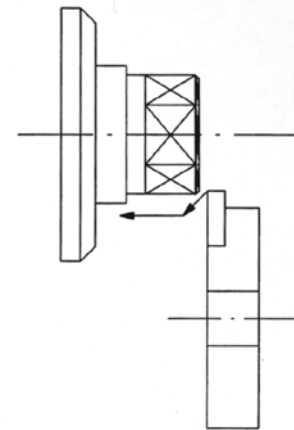
Groove milling



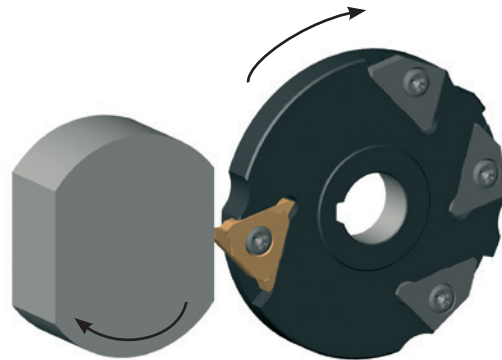
Side milling



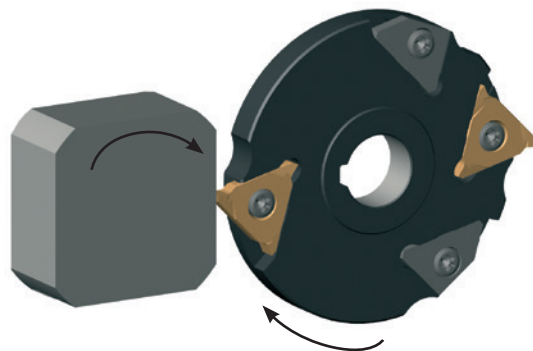
Copymilling and Side milling



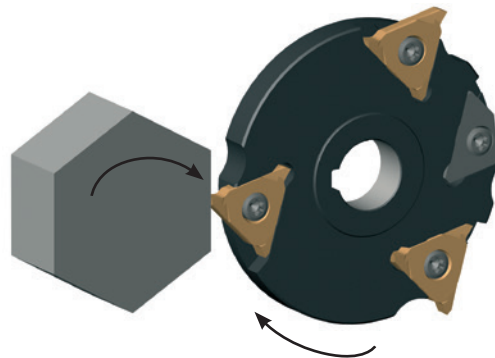
Two flats machined with 1 cutting edge. Revolution ratio 2:1 to the main spindle.



Four flats machined with 2 cutting edges. Revolution ratio 2:1 to the main spindle.



Six flats machined with 3 cutting edges. Revolution ratio 2:1 to the main spindle.





Form	Schneiden im Schlagmesser	l = WKZ:HSP	Erzeugte Flächen
	1	1 : 1	nicht empfehlenswert, stark konvex
	2 1	1 : 1 2 : 1	nicht empfehlenswert, konvex gut, leicht konvex
	3 2 1	1 : 1 1,5 : 1 3 : 1	nicht empfehlenswert, konvex empfehlenswert, konvex gut, leicht konkav
	2 1	2 : 1 4 : 1	gut, leicht konvex nicht empfehlenswert, konkav
	3 2 1	1,66 : 1 2,5 : 1 5 : 1	empfehlenswert, konvex gut, leicht konkav nicht empfehlenswert, konkav
	3 2	2 : 1 3 : 1	gut, leicht konvex nicht empfehlenswert, konkav
	4 2	2 : 1 4 : 1	gut, leicht konvex nicht empfehlenswert, konkav

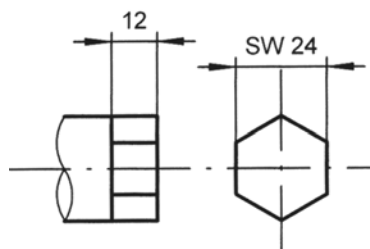
**Richtwerte**

Werkstoff	Sorten	v <sub>c</sub> m/min	Vorschub f <sub>z</sub> mm	
			Längsfräsverfahren	Einstechfräsverfahren
Al	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
Ms58	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
9SMnPb28	TH35, TI25, AS45	200 - 500	0,08 - 0,15	0,04 - 0,08
16MnCr5/C45	TH35, TI25, AS45	150 - 250	0,05 - 0,10	0,03 - 0,05

**Vorschubswerte sind nur beim Längsfräsverfahren gültig!**  
**Beim Einstechfräsverfahren muss der Vorschub pro Zahn, je nach Schneidbreite der Wendeschneidplatte, um 30 - 50 % reduziert werden!**

Beispiel:  
 Längsfräsverfahren  
 Werkstoff: Stahl

Schlagmesser Ø 90 mm  
 SW 24 mm (Ø 27,7 mm)  
 v<sub>c eff</sub> = 448,00 m/min  
 f<sub>z</sub> = 0,08 mm  
 3 Schneiden, l = 2:1  
 Länge des Sechskants: 12 mm  
 Bearbeitungszeit: ~ 2,19 s



Werkzeug:  
 n<sub>WZ</sub> = 1372,00 mm<sup>-1</sup>  
 v<sub>c WZ</sub> = 388,25 m/min

Werkstück:  
 n<sub>WS</sub> = 686,00 mm<sup>-1</sup>  
 v<sub>c WS</sub> = 59,75 m/min



Form	No. of inserts on the cutter	Ratio = Tool:Spindel	Flats
	1	1 : 1	not suitable, heavily convex
	2 1	1 : 1 2 : 1	not suitable, convex very suitable, little convex
	3 2 1	1 : 1 1,5 : 1 3 : 1	not suitable, convex suitable, convex very suitable, little concave
	2 1	2 : 1 4 : 1	very suitable, little convex not suitable, concave
	3 2 1	1,66 : 1 2,5 : 1 5 : 1	suitable, convex very suitable, little concave not suitable, concave
	3 2	2 : 1 3 : 1	very suitable, little convex not suitable, concave
	4 2	2 : 1 4 : 1	very suitable, little convex not suitable, concave

## Cutting data

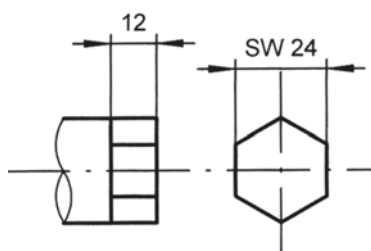
Material	Grades	$v_c$ m/min	Feed rate $f_z$ mm	
			Side milling	Groove milling
Al	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
Ms58	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
9SMnPb28	TH35, TI25, AS45	200 - 500	0,08 - 0,15	0,04 - 0,08
16MnCr5/C45	TH35, TI25, AS45	150 - 250	0,05 - 0,10	0,03 - 0,05

**Feed rate values only valid for side milling process!**

**At groove milling process the feed rate has to be reduced by 30 - 50 %, depending on the insert width!**

Example:  
Side milling  
Material: Steel

Cutter  $\varnothing$  90 mm  
SW 24 mm ( $\varnothing$  27,7 mm)  
 $v_{c\text{eff}} = 448,00$  m/min  
 $f_z = 0,08$  mm  
3 Cutting edges,  $l = 2:1$   
Flat length: 12 mm  
Cycle time:  $\sim 2,19$  s



Tool:  
 $n_{WZ} = 1372,00$  mm<sup>-1</sup>  
 $v_{cWZ} = 388,25$  m/min

Workpiece:  
 $n_{WS} = 686,00$  mm<sup>-1</sup>  
 $v_{cWS} = 59,75$  m/min

# Übersicht Maschinenhersteller

## Overview Machine manufacturer



Hersteller Machine manufacturer	Maschine Machine	Schlagmesser Cutter	Wendeschneidplatten Indexable inserts	Z	n <sub>max</sub> Fräser n <sub>max</sub> Milling cutter
Gildemeister	GD32	L381.G070.15.04	L314.MK50.20 TN35	2/3	13.000 min-1
Gildemeister	GLD25	L381.G070.15.04	L314.MK50.20 TN35	2/3	13.000 min-1
Gildemeister	GM20-6	L381.G086.25.04	L314.MK50.20 TN35	2/3	11.000 min-1
Gildemeister	GM26-6	L381.G080.16.04	L314.MK40.20 TN35	2/3	12.000 min-1
Gildemeister	GM35-6	L381.G098.26.04	L314.MK50.20 TN35	2/3	10.000 min-1
Gildemeister	GM35-8	L381.G086.25.04	L314.MK50.20 TN35	2/3	11.000 min-1
Gildemeister	GM35-8	L381.G098.26.04	L314.MK50.20 TN35	2/3	10.000 min-1
Gildemeister	GM42-6	L381.G098.26.04	L314.MK50.20 TN35	2/3	10.000 min-1
Gildemeister	GMC35	L381.G086.25.04	L314.MK50.20 TN35	2/3	11.000 min-1
Gildemeister	GMC35	L381.G098.26.04	L314.MK50.20 TN35	2/3	10.000 min-1
Gildemeister	SPRINT20/32	L381.G080.16.04	L314.MK40.20 TN35	2/3	12.000 min-1
Gildemeister	SPRINT32L	L381.G090.22.04	L314.MK50.20 TN35	2/3	13.000 min-1
Gildemeister	SPRINT44L	L381.G090.22.04	L314.MK50.20 TN35	2/3	13.000 min-1
INDEX	ABC	R381.X090.27.04	R314.MK50.20 TN35	2/3	11.000 min-1
INDEX	ABC	L381.X090.27.04	L314.MK50.20 TN35	2/3	11.000 min-1
INDEX	MS25	L381.X073.16.04	N314.MK40.20 TN35	2/3	13.000 min-1
NAKAMURA	WT250	L381.N090.16.04	N314.MK40.20 TN35	2/3	11.000 min-1
Alfred H. Schütte	AF26	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	AF26	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	AF32	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	AF32	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	AF42	L381.S118.30.03	L314.MK70.M0 TN35	3	12.000 min-1*
Alfred H. Schütte	AF42	L381.S118.30.02	L314.MK70.M0 TN35	2	12.000 min-1*
Alfred H. Schütte	AG18	L381.S078.30.03	L314.MK70.M0 TN35	3	20.000 min-1*
Alfred H. Schütte	AG18	L381.S078.30.02	L314.MK70.M0 TN35	2	20.000 min-1*
Alfred H. Schütte	SE18	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	SE18	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	SF20	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	SF20	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	SF26L	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	SF26L	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	SF26	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	SF26S	L381.S098.30.03	L314.MK70.M0 TN35	3	15.000 min-1*
Alfred H. Schütte	SF26S	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	SF26	L381.S098.30.02	L314.MK70.M0 TN35	2	15.000 min-1*
Alfred H. Schütte	SF32	L381.S118.30.03	L314.MK70.M0 TN35	3	12.000 min-1*
Alfred H. Schütte	SF32	L381.S118.30.02	L314.MK70.M0 TN35	2	12.000 min-1*
Alfred H. Schütte	SF42	L381.S118.30.03	L314.MK70.M0 TN35	3	12.000 min-1*
Alfred H. Schütte	SF42	L381.S118.30.02	L314.MK70.M0 TN35	2	12.000 min-1*
Alfred H. Schütte	SF51	L381.S118.30.03	L314.MK70.M0 TN35	3	12.000 min-1*
Alfred H. Schütte	SF51	L381.S118.30.02	L314.MK70.M0 TN35	2	12.000 min-1*
Alfred H. Schütte	SF67	L381.S118.30.03	L314.MK70.M0 TN35	3	12.000 min-1*
Alfred H. Schütte	SF67	L381.S118.30.02	L314.MK70.M0 TN35	2	12.000 min-1*



# Übersicht Maschinenhersteller

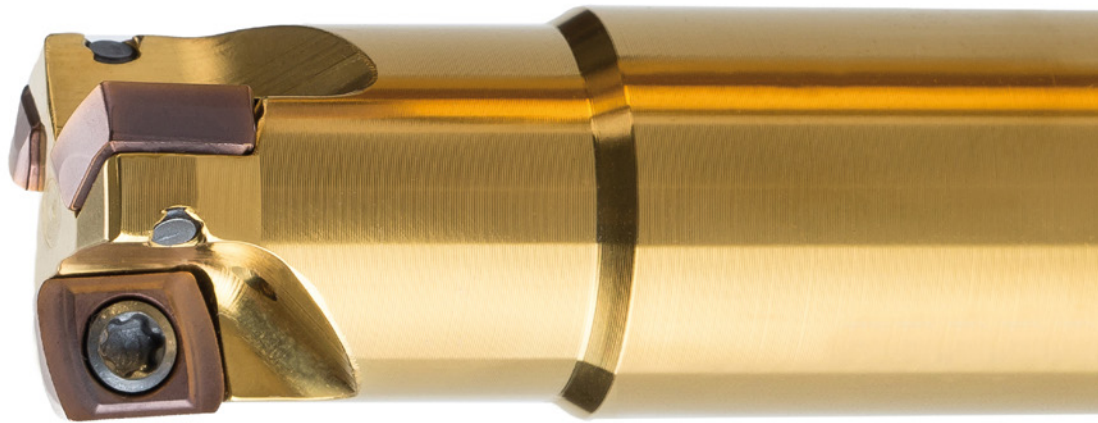
## Overview Machine manufacturer



Hersteller Machine manufacturer	Maschine Machine	Schlagmesser Cutter	Wendeschneidplatten Indexable inserts	Z	n <sub>max</sub> Fräser n <sub>max</sub> Milling cutter
Alfred H. Schütte	SG18	L381.S078.30.03	L314.MK70.M0 TN35	3	20.000 min-1*
Alfred H. Schütte	SG18	L381.S078.30.02	L314.MK70.M0 TN35	2	20.000 min-1*
Alfred H. Schütte	SG20	L381.S078.30.03	L314.MK70.M0 TN35	3	20.000 min-1*
Alfred H. Schütte	SG20	L381.S078.30.02	L314.MK70.M0 TN35	2	20.000 min-1*
Star	SR-20J	L381.A060.12.04	314.MK40.20	1/3	12.000 min-1
TORNOS	Deco7/10	R/LM275.D040.10.04	R/LS275.MK13.M0 TN35	2/3	15.000 min-1
TORNOS	Deco13	L381.D080.16.04	N314.MK40.20 TN35	2/3	12.000 min-1
TORNOS	Deco20	L381.D080.16.04	N314.MK40.20 TN35	2/3	12.000 min-1
TORNOS	Deco26	L381.D080.16.04	N314.MK40.20 TN35	2/3	12.000 min-1
TORNOS	Deco2000	L381.D080.16.04	N314.MK40.20 TN35	2/3	12.000 min-1
TORNOS	Multi Deco	L381.D086.25.04	L314.MK50.20 TN35	3	15.000 min-1
TRAUB	TNL12-7	RM275.T064.33.03	RS275.MK13.M0TN35	3	13.000 min-1
TRAUB	TNL12-7	L381.T069.12.04	N314.MK40.20 TN35	2/3	13.000 min-1
TRAUB	TNL26	L381.T069.12.04	N314.MK40.20 TN35	2/3	13.000 min-1
TRAUB	TNK36	L381.T069.12.04	N314.MK40.20 TN35	2/3	13.000 min-1

Mehrkantschlagmesser für weitere Maschinen auf Anfrage.  
Polygon cutter for further machines upon request.

\* geschlossener Plattensitz  
\* reinforced pocket



System/System

Seite/Page

**DA**

**496**

**DAH**

**520**

# Übersicht Radial-Fäser

## Overview Radial Mill



Systeme  
Systems

DAM31

DAM32

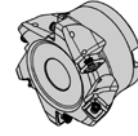
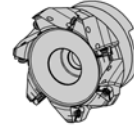
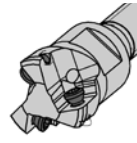
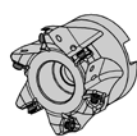
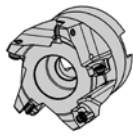
DAM62

DAH25

DAH37

DAH82

DAH84



x

x

x

x

x

x

x



x

x



x

x

x



x

x



x

x

x

x

x

x

x



x

x

x

x

x

x

x



x

x

x

x

x

x

x

Eignung  
Suitability

P	•	•	•	•	•	•	•
M	•	•	○	•	•	○	○
K	•	•	•	•	•	•	•
N	•	•	•	•	•	•	•
S	•	•	○	•	•	○	○
H							

$D_c$  (mm)

16-32

20-63

20-80

12-25

20-80

20-50

50-125

$a_{pmax}$  (mm)

3

4,8

4,5

1

1,2

1

1,5

DA31

DAM32

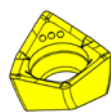
DA62

DAH25

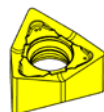
DAH37

DAH82

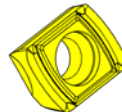
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3



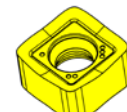
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2



3



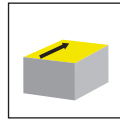
8

Schneidkanten  
Cutting edges

L



Schaftfräser  
End Mill  
DAM31/DAM32/DAM62

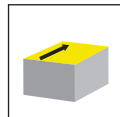


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Technische Hinweise  
Technical Instructions

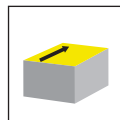
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Aufsteckfräser  
Arbour Mounted Cutter  
DAM32/DAM62

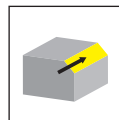


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503-504

Einschraubfräser  
Screw-in cutter  
DAM31/DAM32/DAM62

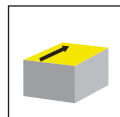


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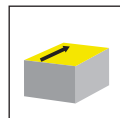
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Aufnahme  
Adaptor  
MD



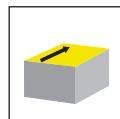
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508-509

Reduzierstück  
Reducer  
MD



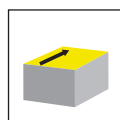
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510

Verlängerung  
Extension  
MD



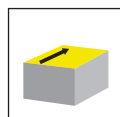
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Wendeschneidplatte  
Indexable insert  
DA31/DA32/DA62/  
SDA62

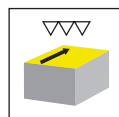


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512-513, 516-517

Schneidplatte  
Insert  
DA32



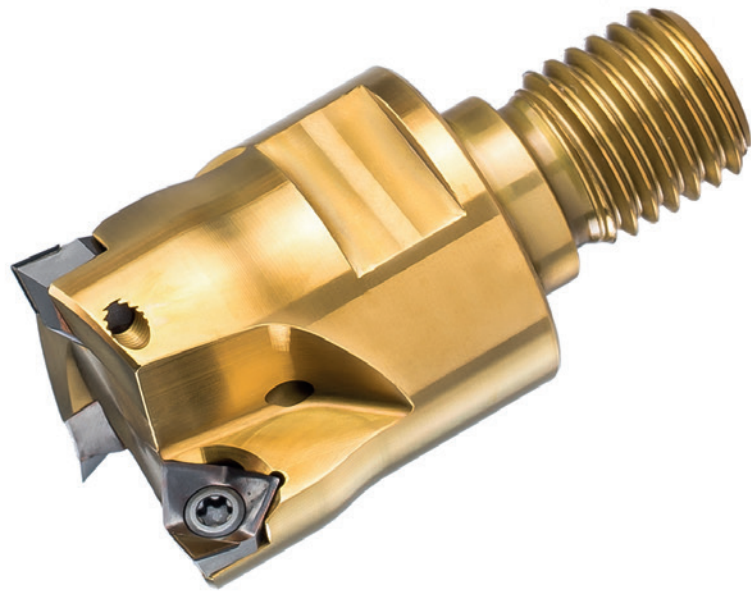
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# DA

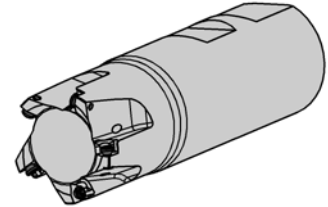
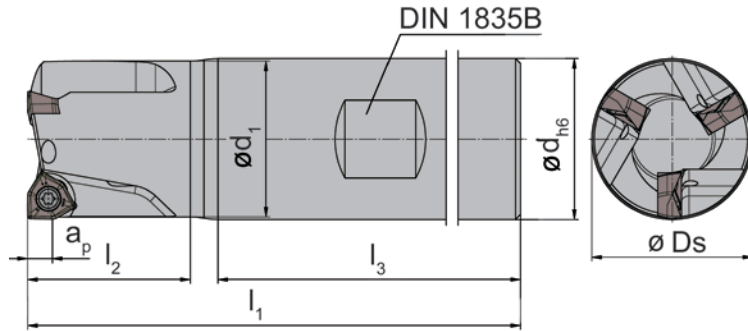
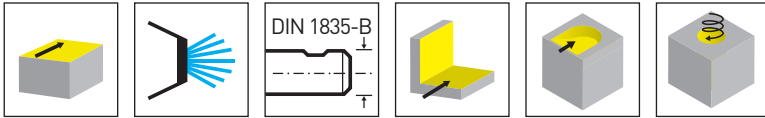


## System DA

- Schaftfräser
- Aufsteckfräser
- Einschraubfräser
- Wendeschneidplatten

## System DA

- End Mill
- Arbour Mounted Cutter
- Screw-in Cutter
- Indexable Inserts



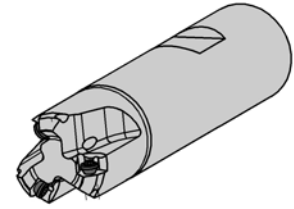
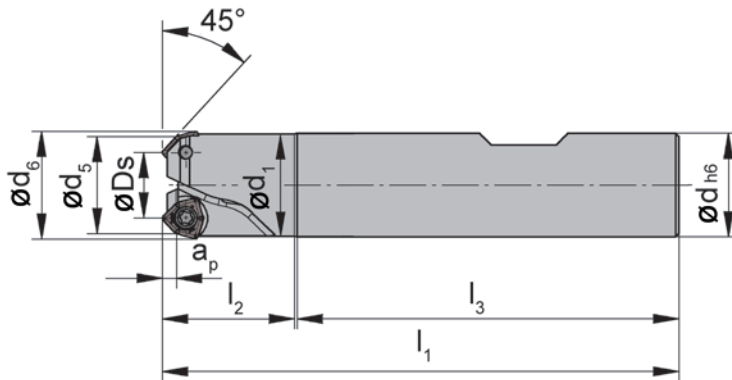
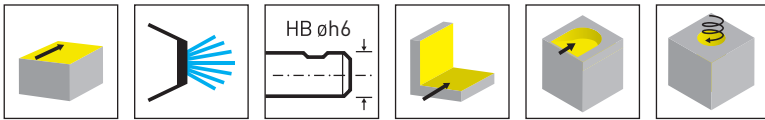
Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAM31.016.D163.02B	2	16	16	79	17	15	54	3	DA3116
DAM31.020.D204.03B	3	20	20	86	21	19	59	3	DA3120
DAM31.025.D255.04B	4	25	25	97	27	24	64	3	DA3125
DAM31.032.D326.05B	5	32	32	106	32	31	68	3	DA3132
DAM32.020.D205.02B	2	20	20	87	22	19	19	4,8	DA3220
DAM32.025.D256.03B	3	25	25	102	32	24	64	4,8	DA3225
DAM32.032.D327.03B	3	32	32	106	32	31	68	4,8	DA3232

ab Ø 25 mm 2 Spannflächen  
from Ø 25 mm 2 clamping flats

### Ersatzteile

Spare Parts

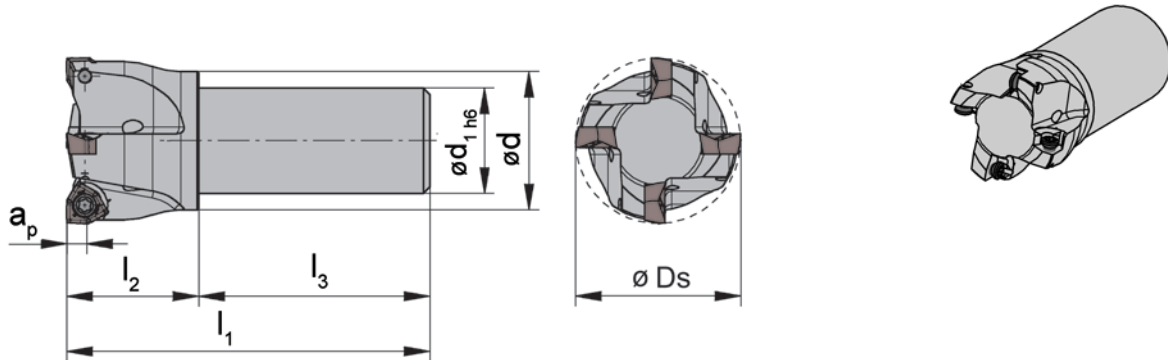
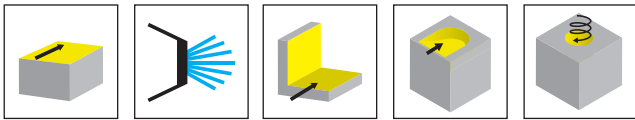
Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
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DAM31.025.D255.04B	030.2553.T8P	T8PL
DAM31.032.D326.05B	030.2557.T8P	T8PL
DAM32.020.D205.02B	030.3562.T10P	T10PL
DAM32.025.D256.03B	030.3569.T10P	T10PL
DAM32.032.D327.03B	030.3576.T10P	T10PL



Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	d <sub>6</sub>	d <sub>5</sub>	HWS
DAM31.411.D163.02B	2	10,4	16	80	20	15,8	59	2	16,9	15	DA3116
DAM31.414.D204.03B	3	14,4	20	87	23	18,8	62	2	20,9	19	DA3120

Ersatzteile  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM31.411.D163.02B	030.2541.T8P	T8PL
DAM31.414.D204.03B	030.2547.T8P	T8PL

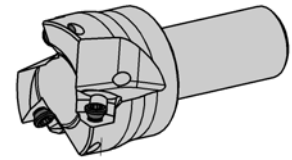
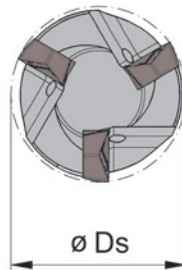
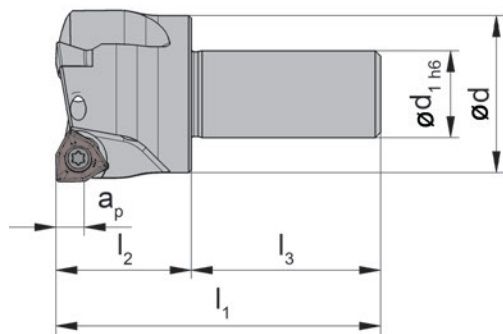
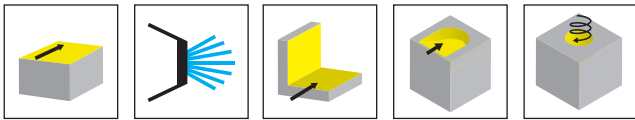


Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAM31.020.D160.03A	3	20	19	52	17	16	35	3	DA3120
DAM31.025.D161.04A	4	25	24	55	20	16	35	3	DA3125
DAM31.032.D162.05A	5	32	31	60	25	16	35	3	DA3132
DAM31.032.D202.05A	5	32	31	60	25	20	35	3	DA3132

**Ersatzteile**

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM31.020.D160.03A	030.2547.T8P	T8PL
DAM31.025.D161.04A	030.2553.T8P	T8PL
DAM31.032....	030.2557.T8P	T8PL



Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAM32.020.D160.02A	2	20	19	52	17	16	35	4,5	DA3220
DAM32.025.D161.03A	3	25	24	55	20	16	35	4,5	DA3225
DAM32.032.D162.03A	3	32	31	60	25	16	35	4,5	DA3232

Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM32.020.D160.02A	030.3562.T10P	T10PL
DAM32.025.D161.03A	030.3569.T10P	T10PL
DAM32.032.D162.03A	030.3576.T10P	T10PL

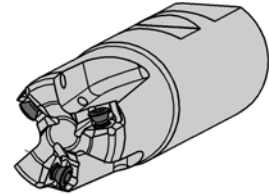
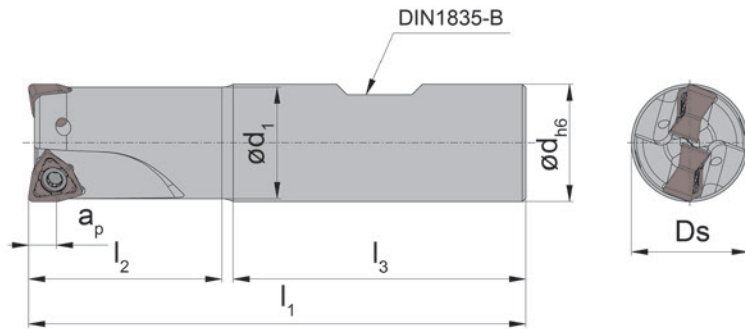
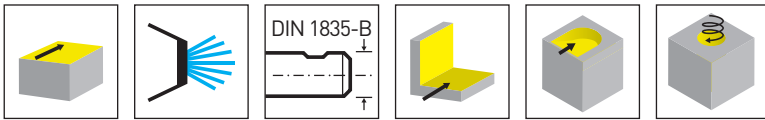


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
<b>DAM62.020.D20.4.02B</b>	2	20	20	85	33	19	50	4,5	DA6200
<b>DAM62.025.D25.5.03B</b>	3	25	25	95	37	24	56	4,5	DA6200
<b>DAM62.032.D32.6.04B</b>	4	32	32	111	47	31	60	4,5	DA6200

L

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM62...	<b>030.3070.T10P</b>	<b>T10PL</b>

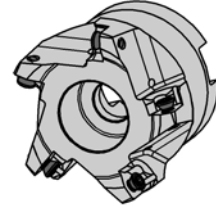
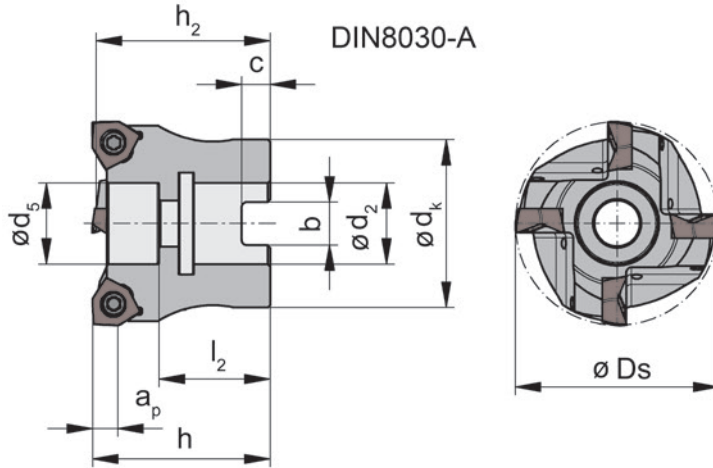
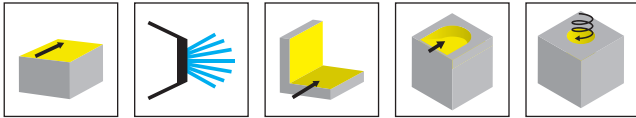


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	HWS
<b>DAM32.040.A1635.04</b>	4	40	4,8	34,4	35	16	16	22	8,4	5,6	33	DA3232
<b>DAM32.050.A2240.05</b>	5	50	4,8	39,4	40	19,5	22	24	10,4	6,3	41	DA3232
<b>DAM32.063.A2745.06</b>	6	63	4,8	44,4	45	21,5	27	27	12,4	7	49	DA3232

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
DAM32...	<b>030.3576.T10P</b>	<b>T10PL</b>

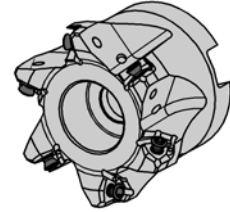
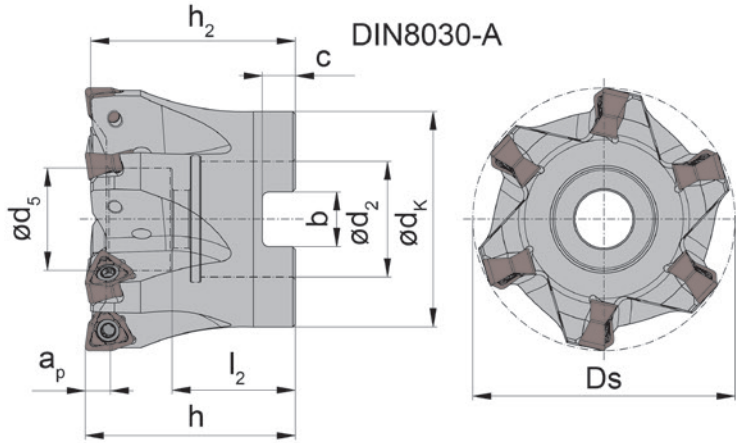
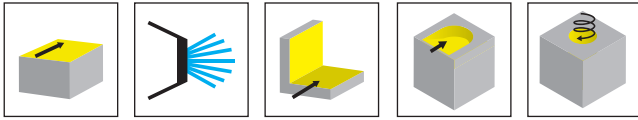


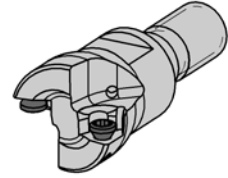
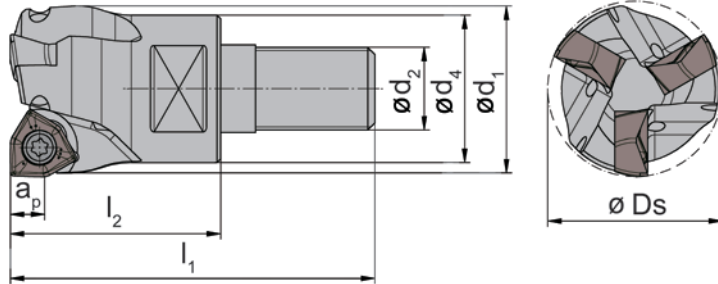
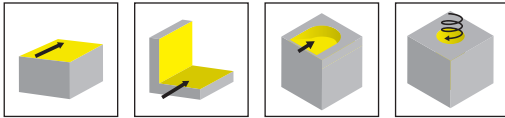
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>2</sub>	l <sub>2</sub>	b	c	dk	HWS
<b>DAM62.0040.A16.05</b>	5	40	4,5	34	35	16	16	21,5	8,4	5,6	33	DA6200
<b>DAM62.0050.A22.06</b>	6	50	4,5	39	40	19,5	22	23,5	10,4	6,3	41	DA6200
<b>DAM62.0063.A22.08</b>	8	63	4,5	39	40	19,5	22	24	10,4	6,3	49	DA6200
<b>DAM62.0080.A27.10</b>	10	80	4,5	49	50	21,5	27	27,5	12,4	7	59	DA6200

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
DAM62...	<b>030.3070.T10P</b>	<b>T10PL</b>



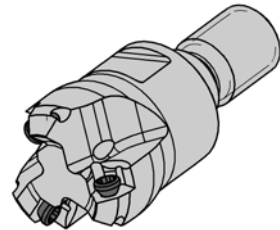
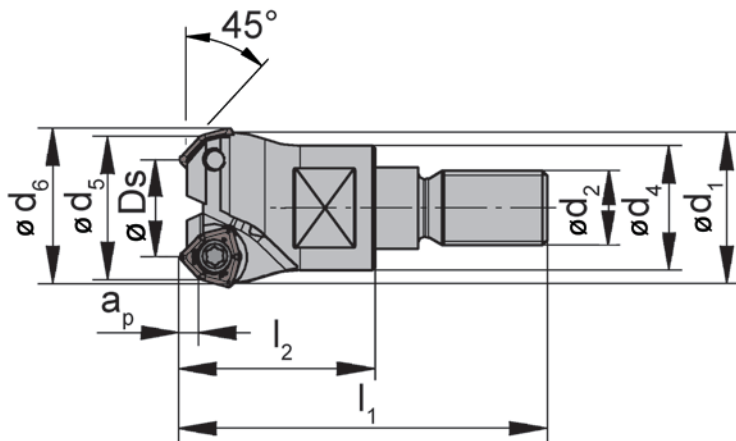
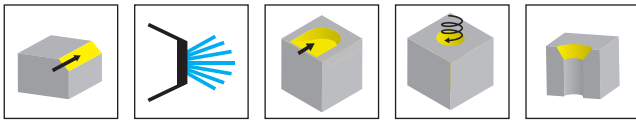


Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	HWS	HMS
DAM31.016.M083.02B	2	16	38	20	15	3	M8	13	10	DA3116	08001
DAM31.020.M104.03B	3	20	45	25	19	3	M10	18	15	DA3120	10001
DAM31.025.M125.04B	4	25	52	30	24	3	M12	21	17	DA3125	12001
DAM31.032.M166.05B	5	32	58	35	31	3	M16	29	24	DA3132	16001
DAM32.020.M104.02B	2	20	45	25	19	4,8	M10	18	15	DA3220	10001
DAM32.025.M125.03B	3	25	52	30	24	4,8	M12	21	17	DA3225	12001
DAM32.032.M166.03B	3	32	58	35	31	4,8	M16	29	24	DA3232	16001

### Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM31.016.M083.02B	030.2541.T8P	T8PL
DAM31.020.M104.03B	030.2547.T8P	T8PL
DAM31.025.M125.04B	030.2553.T8P	T8PL
DAM31.032.M166.05B	030.2557.T8P	T8PL
DAM32.020.M104.02B	030.3562.T10P	T10PL
DAM32.025.M125.03B	030.3569.T10P	T10PL
DAM32.032.M166.03B	030.3576.T10P	T10PL



Bestellnummer Part number	Z	D <sub>s</sub>	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>6</sub>	SW	HWS	HMS
<b>DAM31.411.M083.02B</b>	2	10,5	38	20	15,8	2	M8	13	15	16,9	10	DA3116	08001
<b>DAM31.414.M104.03B</b>	3	14,4	45	25	19,8	2	M10	18	19	20,9	15	DA3120	10001
<b>DAM32.417.M125.03B</b>	3	17,6	52	30	24,8	3,2	M12	21	24	28,3	17	DA3225	12001

### Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM31.411.M083.02B	<b>030.2541.T8P</b>	<b>T8PL</b>
DAM31.414.M104.03B	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM32.417.M125.03B	<b>030.3569.T10P</b>	<b>T10PL</b>

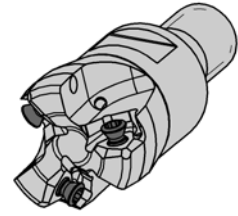
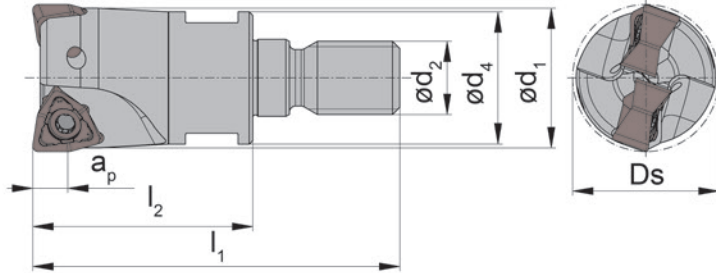
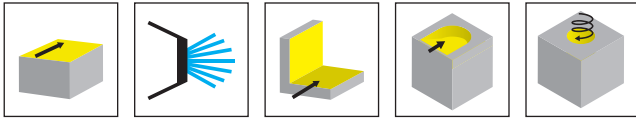
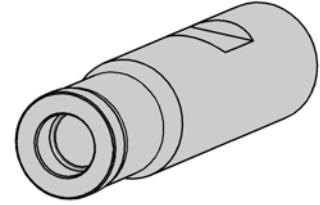
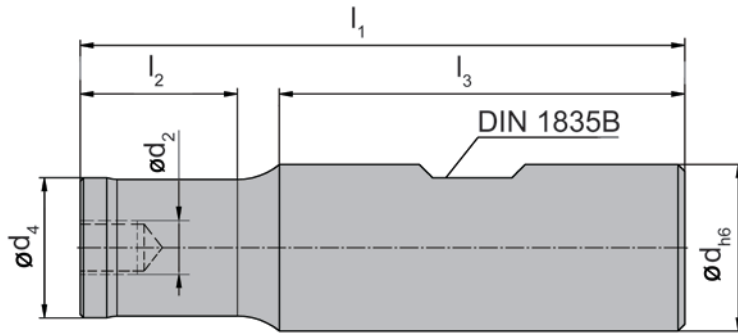


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	$l_1$	$l_2$	$d_1$	$a_p$	$d_2$	$d_4$	SW	HWS	HMS
DAM62.025.M12.5.03	3	25	57	35	24	4,5	M12	21	17	DA6200	12001
DAM62.032.M16.6.04	4	32	66	43	31	4,5	M16	29	24	DA6200	16001

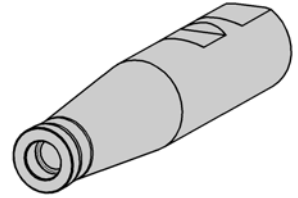
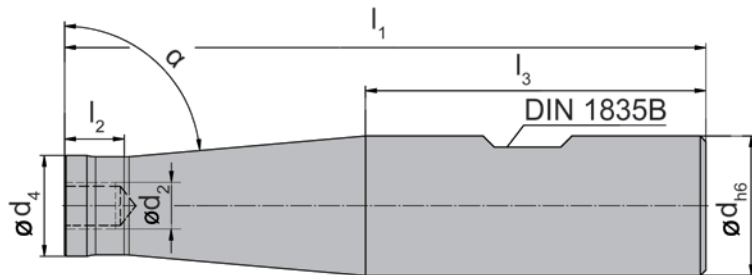
**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM62...	030.3070.T10P	T10PL



Bestellnummer Part number	$l_1$	$l_2$	$l_3$	d	$d_4$	$d_2$
<b>MD13.02.00.D16B</b>	73	14	53	16	13	M8
<b>MD18.04.00.D20B</b>	80	20	55	20	18	M10
<b>MD21.06.00.D25B</b>	91	23	61	25	21	M12
<b>MD29.08.00.D32B</b>	100	29	65	32	29	M16

ab  $\varnothing$  25 mm 2 Spannflächen  
from  $\varnothing$  25 mm 2 clamping flats



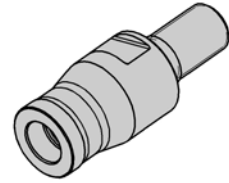
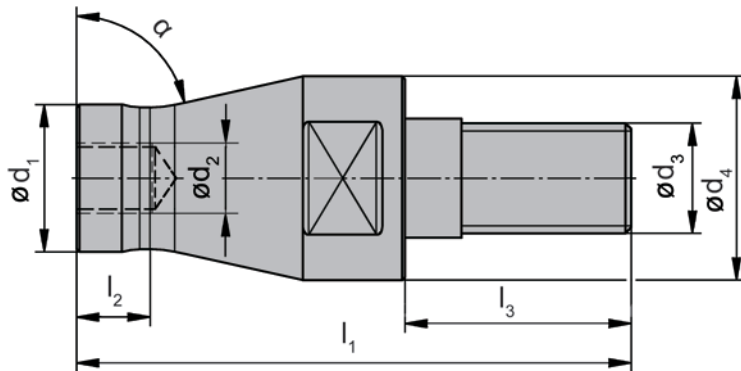
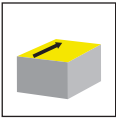
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	d	$d_4$	$d_2$	$\alpha$
<b>MD13.02.85.D20B</b>	105	7	55	20	13	M8	85°
<b>MD18.04.85.D25B</b>	115	10	61	25	18	M10	85°
<b>MD21.06.85.D32B</b>	140	8	65	32	21	M12	85°
<b>MD29.08.85.D40B</b>	150	8	75	40	29	M16	85°

ab  $\varnothing$  25 mm 2 Spannflächen  
from  $\varnothing$  25 mm 2 clamping flats

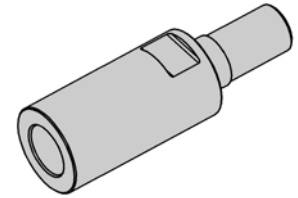
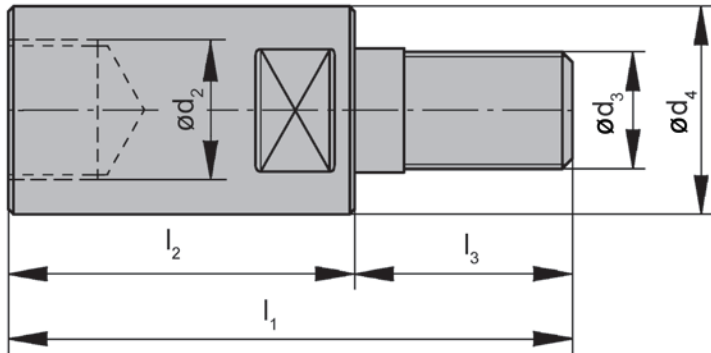
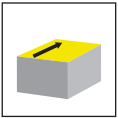
# Reduzierstück

Reducer

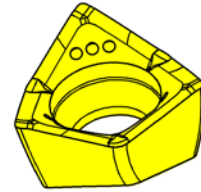
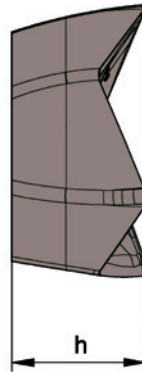
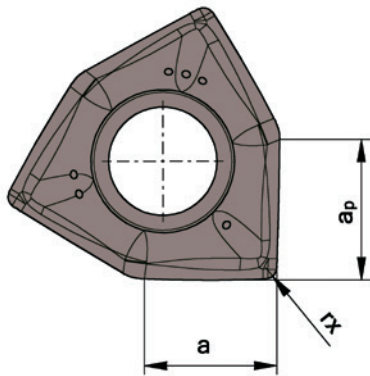
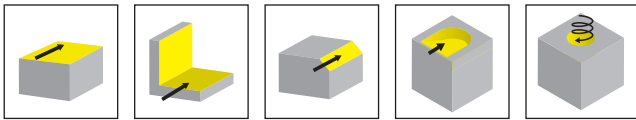
# MD



Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	$d_2$	$d_3$	$d_4$	SW	$\alpha$
<b>MD18.02.77.M10</b>	49	6	20	13	M8	M10	18	15	77,5°
<b>MD21.04.77.M12</b>	56	10	22	18	M10	M12	21	17	77,5°
<b>MD29.06.77.M16</b>	52	6	23	21	M12	M16	29	24	77,5°



Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_2$	$d_3$	$d_4$	SW
<b>MD13.02.00.M08</b>	48	30	18	M8	M8	13	10
<b>MD18.04.00.M10</b>	55	35	20	M10	M10	18	15
<b>MD21.06.00.M12</b>	57	35	22	M12	M12	21	17
<b>MD29.08.00.M16</b>	58	35	23	M16	M16	29	24



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	a <sub>p</sub>	a	h	r <sub>x</sub>	HIS	SA4B	TA45
DA31.016.A.00	16	3	3	3,1	-	DA3116	▲	▲
DA31.016.A.02	16	3	3	3,1	0,2	DA3116	▲	▲
DA31.016.A.04	16	3	3	3,1	0,4	DA3116	▲	▲
DA31.020.A.00	20	3	3	3,1	-	DA3120	△	▲
DA31.020.A.02	20	3	3	3,1	0,2	DA3120	▲	▲
DA31.020.A.04	20	3	3	3,1	0,4	DA3120	▲	▲
DA31.025.A.00	25	3	3	3,1	-	DA3125	▲	▲
DA31.025.A.02	25	3	3	3,1	0,2	DA3125	▲	▲
DA31.025.A.04	25	3	3	3,1	0,4	DA3125	▲	△
DA31.032.A.00	32	3	3	3,1	-	DA3132	▲	▲
DA31.032.A.02	32	3	3	3,1	0,2	DA3132	▲	▲
DA31.032.A.04	32	3	3	3,1	0,4	DA3132	▲	▲

HM-Sorte TA45 bevorzugt für leichte Zerspanaufgaben, Aluminium und Schlichten. HM-Sorte SA4B bevorzugt für mittlere und schwere Zerspanaufgaben.

Carbide grade TA45 preferred for easy to machine materials, aluminium and finishing. Carbide grade SA4B preferred for middle and difficult to machine materials.

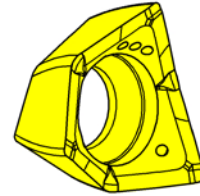
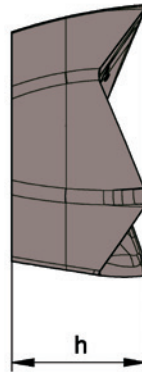
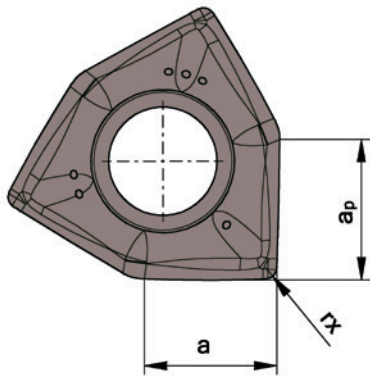
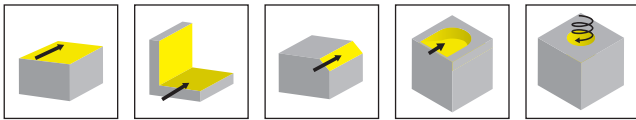
P	●	●
M	●	●
K	●	●
N	●	●
S	-	●
H	-	-



# Wendeschneidplatte

Indexable insert

# DA32



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

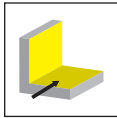
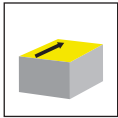
Bestellnummer Part number	Ds	a <sub>p</sub>	a	h	r <sub>x</sub>	HIS	SA4B	TA45
DA32.020.A.00	20	4,8	4,6	4,7	-	DA3220	△	△
DA32.020.A.02	20	4,8	4,6	4,7	0,2	DA3220	▲	△
DA32.020.A.04	20	4,8	4,6	4,7	0,4	DA3220	▲	
DA32.020.A.08	20	4,8	4,6	4,7	0,8	DA3220	▲	▲
DA32.020.A.10	20	4,8	4,6	4,7	1	DA3220	▲	▲
DA32.025.A.00	25	4,8	4,6	4,7	-	DA3225	△	△
DA32.025.A.02	25	4,8	4,6	4,7	0,2	DA3225	▲	△
DA32.025.A.04	25	4,8	4,6	4,7	0,4	DA3225	▲	▲
DA32.025.A.08	25	4,8	4,6	4,7	0,8	DA3225	▲	▲
DA32.025.A.10	25	4,8	4,6	4,7	1	DA3225	△	▲
DA32.032.A.00	32	4,8	4,6	4,7	-	DA3232	△	△
DA32.032.A.02	32	4,8	4,6	4,7	0,2	DA3232	▲	▲
DA32.032.A.04	32	4,8	4,6	4,7	0,4	DA3232	▲	▲
DA32.032.A.08	32	4,8	4,6	4,7	0,8	DA3232	▲	▲
DA32.032.A.10	32	4,8	4,6	4,7	1	DA3232	▲	▲

HM-Sorte TA45 bevorzugt für leichte Zerspanaufgaben, Aluminium und Schlichten. HM-Sorte SA4B bevorzugt für mittlere und schwere Zerspanaufgaben.

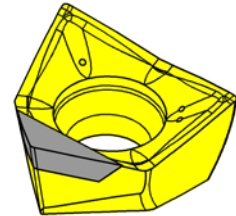
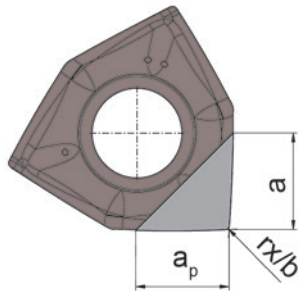
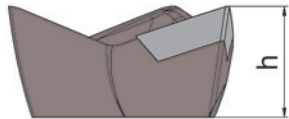
Carbide grade TA45 preferred for easy to machine materials, aluminium and finishing. Carbide grade SA4B preferred for middle and difficult to machine materials.

P	●	●
M	●	●
K	●	●
N	●	●
S	-	●
H	-	-





CVD-D

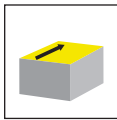
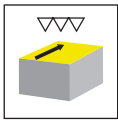


HM-Sorten  
Carbide grades

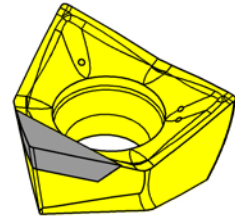
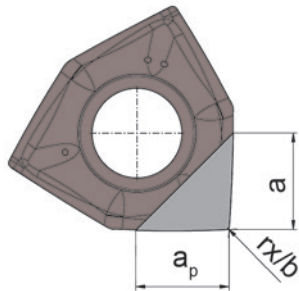
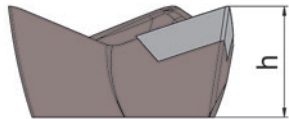
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	D <sub>s</sub>	a <sub>p</sub>	a	h	r <sub>x</sub>	b x 45°	HIS	HD05
DA32.020.25.02.C	20	3,8	3,5	4,7	0,2	-	DA3220	▲
DA32.020.25.X2.C	20	3,8	3,5	4,7	-	0,2	DA3220	△
DA32.025.25.02.C	25	3,8	3,5	4,7	0,2	-	DA3225	▲
DA32.025.25.X2.C	25	3,8	3,5	4,7	-	0,2	DA3225	△
DA32.032.25.02.C	32	3,8	3,5	4,7	0,2	-	DA3232	▲
DA32.032.25.X2.C	32	3,8	3,5	4,7	-	0,2	DA3232	▲
								P -
								M -
								K -
								N ●
								S -
								H -



PKD  
PCD

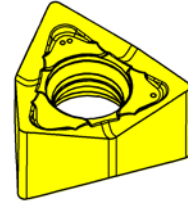
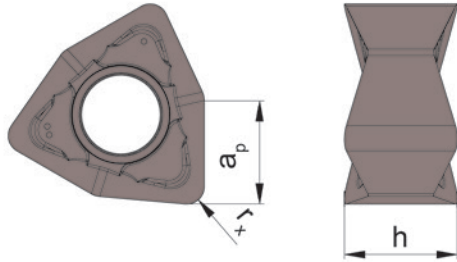
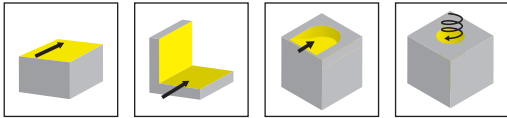


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	a <sub>p</sub>	a	h	r <sub>x</sub>	HIS	PD75
DA32.020.25.02.P	20	3,8	3,5	4,7	0,2	DA3220	▲
DA32.025.25.02.P	25	3,8	3,5	4,7	0,2	DA3225	▲
DA32.032.25.02.P	32	3,8	3,5	4,7	0,2	DA3232	▲
							P -
							M -
							K -
							N ●
							S -
							H -

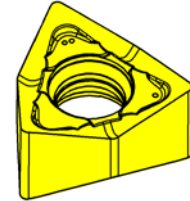
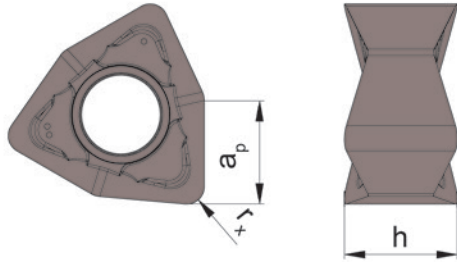
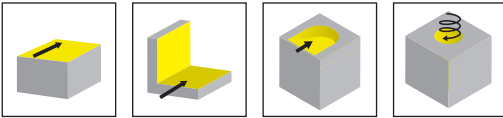


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	SA4B	SD6A
DA62.0400.A.04	4,5	5,2	0,4	DA6200	▲	▲
DA62.0400.A.08	4,5	5,16	0,8	DA6200	▲	▲
					P ● ○	
					M ● -	
					K ● ●	
					N ● -	
					S - -	
					H - -	



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	SA4B
SDA62.0400.A.08	4,5	5,16	0,8	DA6200	▲
					P ●
					M ●
					K ●
					N ●
					S -
					H -

präzisionsgesintert  
precision sintered



### Eintauchwinkel, senkrecht Eintauchen seitlich und ins Volle, Aufbohren beim 90° Fräsen

Ramp angle and plunging with a 90° milling cutter

Ø (mm) Plattengröße / Insert size	32 DA32	25 DA32	20 DA32	32 DA31	25 DA31	20 DA31	16 DA31
Eintauchwinkel (°) Diving angle (°)	3,5°	3,5°	3,5°	4,0°	3,5°	3,5°	3,0°
max. senkrecht eintauchen ins Volle (mm) vertical full diving max. (mm)	1,0	0,6	0,4	1,7	0,8	0,6	0,4
Senkrecht eintauchen, max. seitliche Zustellung $a_e$ (mm) vertical side diving $a_e$ max. (mm)	4,6	4,6	4,6	3,1	3,1	3,1	3,1
Aufbohren, mind. Vorbohren mit $D_b$ (mm) Predrilling $D_b$ min. (mm)	22,8	15,8	10,8	25,8	18,8	13,8	9,8

### Eintauchwinkel und senkrecht Eintauchen beim 45°-Fräsen

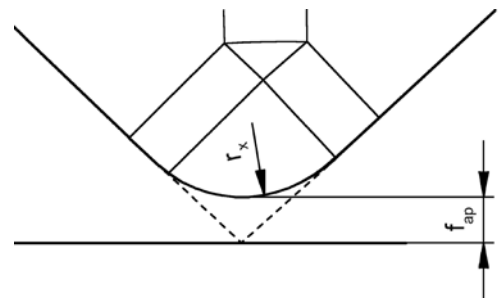
Ramp angle and plunging with a 45° milling cutter

Ø (mm) Plattengröße / Insert size	17 DA32	14,4 DA31	10,5 DA31
Eintauchwinkel (°) Diving angle (°)	11°	7°	10,5°
max. senkrecht eintauchen ins Volle (mm) vertical full diving max. (mm)	3,2	2,0	2,0

### Korrekturfaktor für verringerte Schnitttiefe in Abhängigkeit vom Eckenradius beim 45° Fräsen

Correction factor for reduced cutting depth in consideration to the corner radius when 45° milling

DA31/32 Eckenradius $r_x$ (mm) Corner radius $r_x$ (mm)	DA31/32 Korrekturfaktor $f_{ap}$ (mm) DA31/DA32 Correction factor $f_{ap}$ (mm)
0	0
0,2	0,078
0,4	0,17
0,8	0,33
1,0	0,41



### Eintauchwinkel DA62

Ramp angle DA62

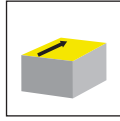
Schneidkreis-Ø [mm] Cutting edge Ø [mm]	Eintauchwinkel [°] Diving angle [°]
20	2,4
25	1,75
32	1,25
40	0,95
50	0,7
63	0,55
80	0,4

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

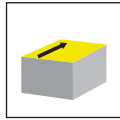


Schaftfräser  
End Mill  
DAH25/DAH37/  
DAH82



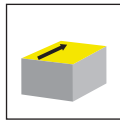
Seite/Page  
522-523, 527, 533

Einschraubfräser  
Screw-in cutter  
DAH25/DAH37/  
DAH82



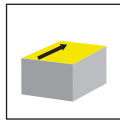
Seite/Page  
524, 528, 534

Wendeschneidplatte  
Indexable insert  
DAH25/DAH37/DAH82/  
DAH84



Seite/Page  
525, 530-531,  
536, 538

Aufsteckfräser  
Arbour Mounted Cutter  
DAH37/DAH82/  
DAH84



Seite/Page  
529, 535, 537

Technische Hinweise  
Technical Instructions

Seite/Page  
526, 532, 539-547



# DAH

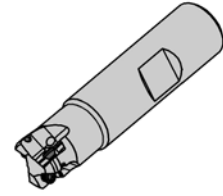
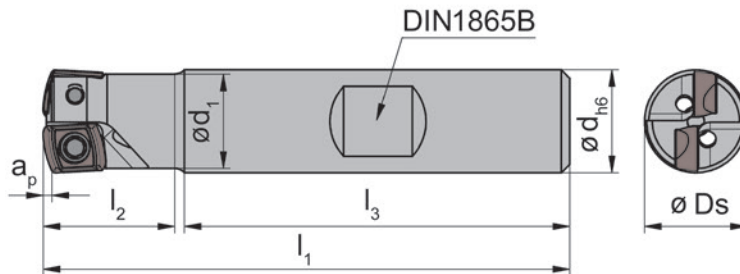
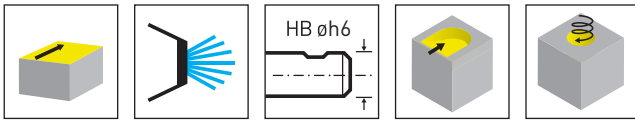


## **Hochvorschubfräsen System DAH**

- Schaftfräser
- Aufsteckfräser
- Einschraubfräser
- Wendeschneidplatten

## **High feed milling System DAH**

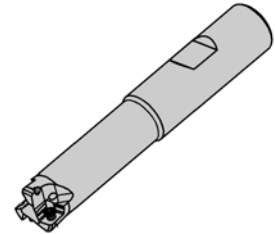
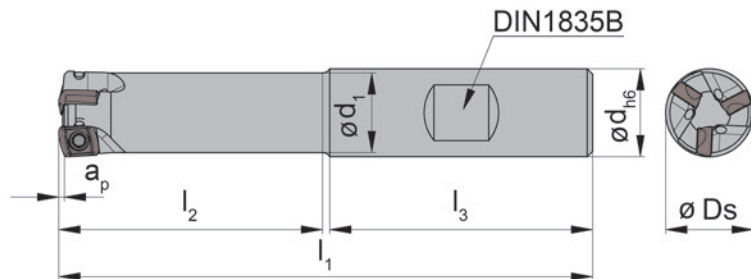
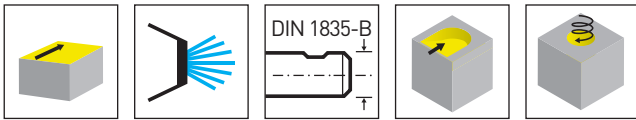
- End Mill
- Arbor Mounted Cutter
- Screw-in Cutter
- Indexable Inserts



Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAH25.012.D122.02B	2	12	12	61,5	15	11	45	1	DAH25
DAH25.016.D163.03B	3	16	16	69,5	20	14,5	48	1	DAH25
DAH25.020.D204.03B	3	20	20	76,5	25	18	50	1	DAH25

**Ersatzteile**  
Spare Parts

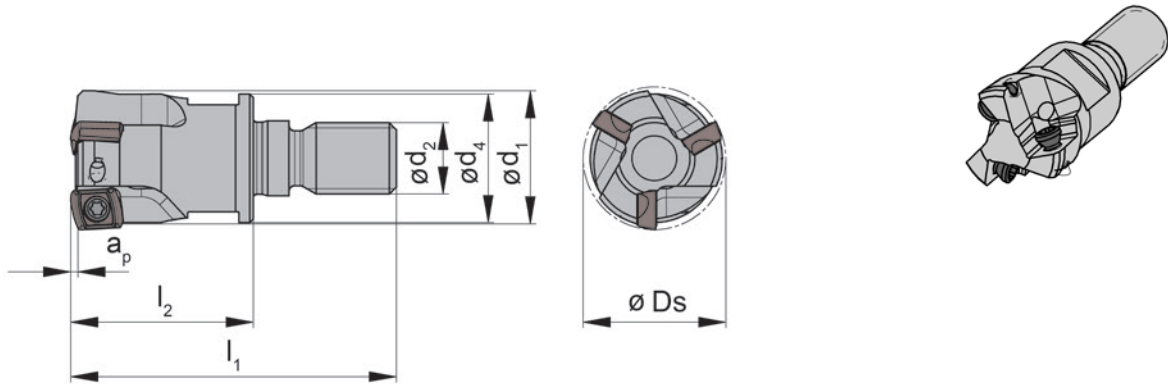
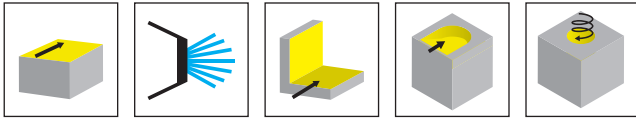
Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH25.012.D122.02B	030.2547.T8P	T8PL
DAH25.016.D163.03B	030.2553.T8P	T8PL



Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAH25.25.012.D124.02B	2	12	12	82,5	36	11,5	45	1	DAH25
DAH25.25.016.D165.02B	2	16	16	97,5	48	15,4	48	1	DAH25
DAH25.25.016.D165.03B	3	16	16	97,5	48	15,4	48	1	DAH25
DAH25.25.020.D206.03B	3	20	20	111,5	60	19	50	1	DAH25
DAH25.25.025.D257.04B	4	25	25	132,5	75	24	56	1	DAH25

Ersatzteile  
Spare Parts

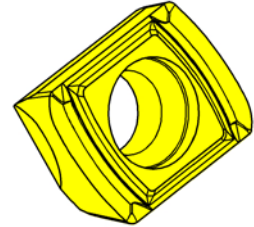
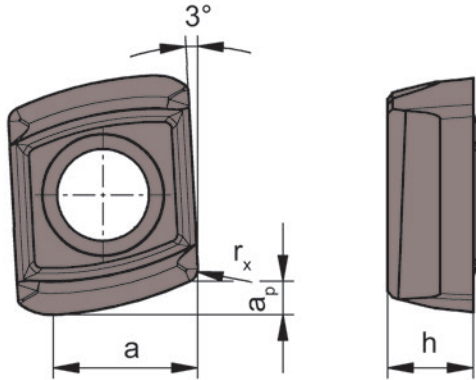
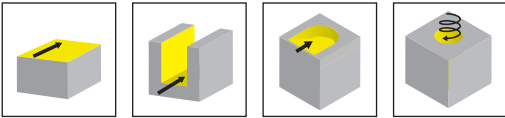
Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH25.25.012.D124.02B	030.2547.T8P	T8PL
DAH25.25....	030.2553.T8P	T8PL



Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	HWS	HMS
DAH25.012.M062.02	2	12	26	13,5	11	1	M6	11,5	DAH25	6001
DAH25.016.M083.02	2	16	39	20,5	13	1	M8	15,4	DAH25	08001
DAH25.016.M083.03	3	16	39	20,5	13	1	M8	15,4	DAH25	08001
DAH25.020.M104.03	3	20	45	25,5	18	1	M10	19	DAH25	10001
DAH25.025.M125.04	4	25	50	28	21	1	M12	24	DAH25	12001

**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH25.012.M062.02	030.2547.T8P	T8PL
DAH25.016.M083.02	030.2553.T8P	T8PL



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	a	h	$r_x$	HIS	SA4B
DAH.25.011.D.04	1	4,4	2,6	0,4	DAH25	▲
						P ●
						M ●
						K ●
						N ●
						S -
						H -

### Eintauchwinkel

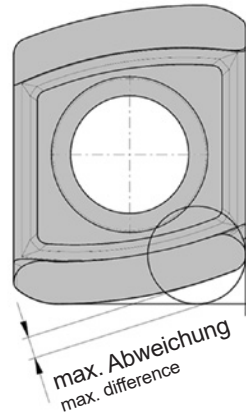
Diving angle

Schneidkreis-Ø (mm) Cutting edge Ø (mm)	Eintauchwinkel (°) Diving angle (°)
12	6,5
16	2,5
20	1,5
25	1,0

### Programmierradius und Abweichung

Programming radius and difference

$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
1,4	0,61



theoretischer Eckenradius  $r_{th}$   
= Programmierradius  
theoretical corner radius  $r_{th}$   
= programming radius

max. Abweichung  
max. difference

Zur Ermittlung der Drehzahl und der Schnittgeschwindigkeit muss mit dem effektiven Durchmesser  $d_{eff}$  gerechnet werden.

Dieser berechnet sich in Abhängigkeit der Schnitttiefe  $a_p$ , dem Schneidkreisdurchmesser  $D_s$  und dem Korrekturwert  $K_D$  zu:

$$d_{eff} = K_D + (D_s - 12)$$

The effective cutting diameter  $d_{eff}$  must be calculated to obtain the correct RPM and the cutting feed.

The effective cutting diameter is calculated using the following values and formula.

$a_p$  = depth of cut

$D_s$  = cutter diameter

$K_D$  = from Correction value chart

$$d_{eff} = K_D + (D_s - 12)$$

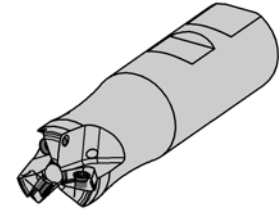
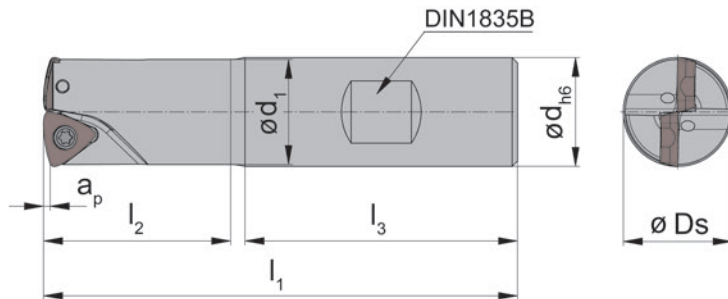
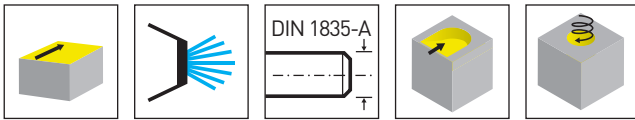
### Korrekturwert

Correction value

$a_p$ [mm]	$K_D$ [mm]
0,1	5,3
0,2	6,5
0,3	7,4
0,4	8,1
0,5	8,8
0,6	9,4
0,7	10,0
0,8	10,5
0,9	11,0
1,0	12,0

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

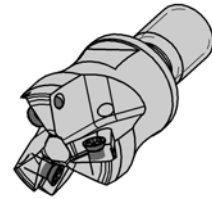
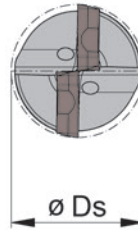
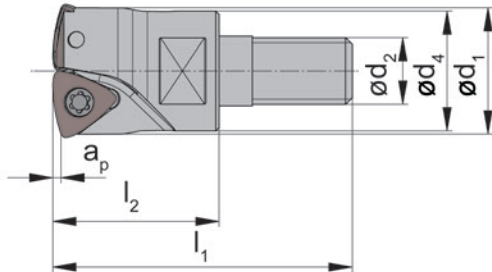
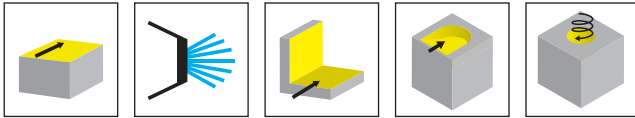
Cutting speeds can be found in chapter N in this catalogue.



Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAH37.020.D204.02B	2	20	20	87	34	19	50	1,2	DAH37
DAH37.025.D255.03B	3	25	25	101	41	24	56	1,2	DAH37
DAH37.032.D326.04B	4	32	32	111	47	31	60	1,2	DAH37

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH37...	030.3070.T10P	T10PL



Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	HWS	HMS
DAH37.020.M104.02	2	20	45	25	19	1,2	M10	18	15	DAH37	10001
DAH37.025.M125.03	3	25	52	30	24	1,2	M12	21	17	DAH37	12001
DAH37.032.M166.04	4	32	58	35	31	1,2	M16	29	24	DAH37	16001
DAH37.040.M166.05	5	40	58	35	39	1,2	M16	29	24	DAH37	16001

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH37...	030.3070.T10P	T10PL



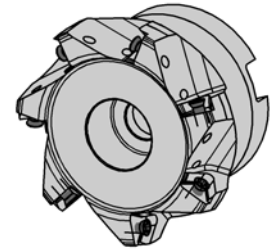
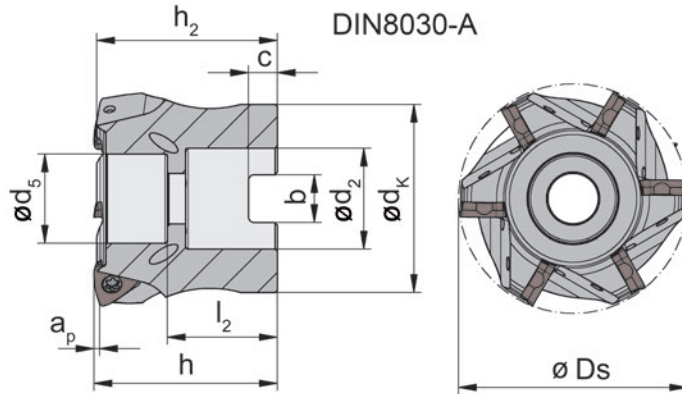
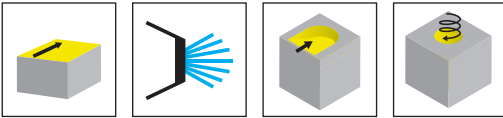


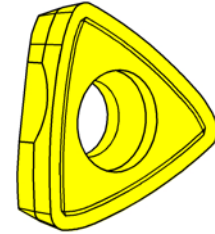
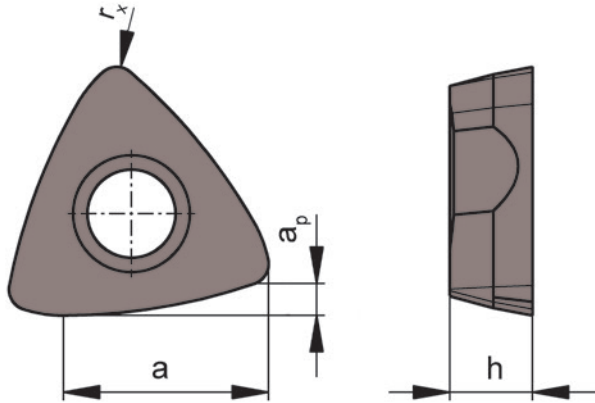
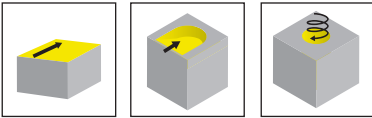
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>k</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	HWS
<b>DAH37.040.A1635.05</b>	5	40	1,2	34,4	35	16	33	22	8,4	5,6	16	DAH37
<b>DAH37.050.A2235.06</b>	6	50	1,2	39,4	40	19,5	41	24	10,4	6,3	22	DAH37
<b>DAH37.063.A2240.07</b>	7	63	1,2	39,4	40	19,5	49	24	10,4	6,3	22	DAH37
<b>DAH37.063.A2740.07</b>	7	63	1,2	44,4	45	21,5	49	27	12,4	7	27	DAH37
<b>DAH37.080.A3245.08</b>	8	80	1,2	54,4	55	29,5	59	33	12,4	8	32	DAH37

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
DAH37...	<b>030.3070.T10P</b>	<b>T10PL</b>



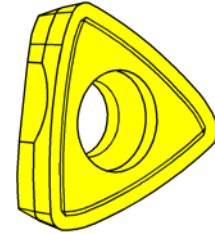
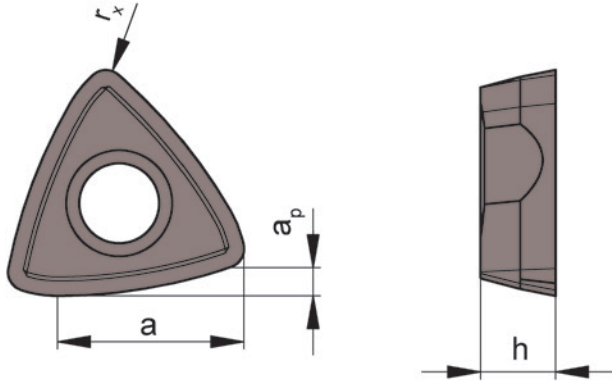
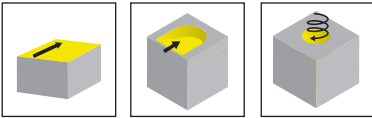


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	a	h	$r_x$	HIS	SA4B	SC6A
DAH.37.022.N.08	1,2	7,9	3,18	0,8	DAH37	▲	▲
neutrale Geometrie neutral geometry						P ●	●
						M ●	●
						K ●	●
						N ●	●
						S -	-
						H -	-



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$a$	$h$	$r_x$	HIS	SA4B
DAH.37.022.S.08	1,2	7,9	3,18	0,8	DAH37	▲
						P ●
						M ●
						K ●
						N ●
						S -
						H -

positive Geometrie  
positive geometry



### Eintauchwinkel

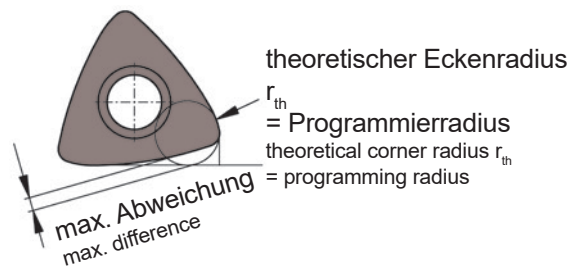
Diving angle

Ø (mm)	Eintauchwinkel (°) Diving angle (°)
20	5,0
25	4,0
32	1,0
40	0,5
50	0,5
63	0,4
80	0,4

### Programmierradius und Abweichung

Programming radius and difference

$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
2	0,83



Zur Ermittlung der Drehzahl und der Schnittgeschwindigkeit muss mit dem effektiven Durchmesser  $d_{eff}$  gerechnet werden.

Dieser berechnet sich in Abhängigkeit der Schnitttiefe  $a_p$ , dem Schneidkreisdurchmesser  $D_s$  und dem Korrekturwert  $K_D$  zu:

$$d_{eff} = K_D + (D_s - 20)$$

The effective cutting diameter  $d_{eff}$  must be calculated to obtain the correct RPM and the cutting feed.

The effective cutting diameter is calculated using the following values and formula.

$a_p$  = depth of cut

$D_s$  = cutter diameter

$K_D$  = from Correction value chart

$$d_{eff} = K_D + (D_s - 20)$$

### Korrekturwert

Correction value

$a_p$ [mm]	$K_D$ [mm]
0,1	9,71
0,2	11,47
0,3	12,81
0,4	13,93
0,5	14,92
0,6	15,82
0,7	16,63
0,8	17,39
0,9	18,10
1,0	18,77
1,1	19,40
1,2	20,00

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

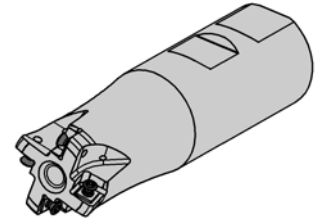
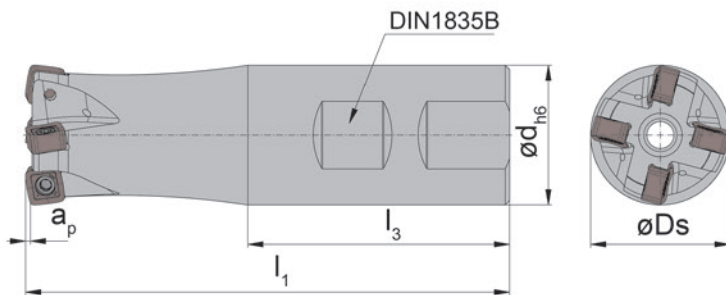
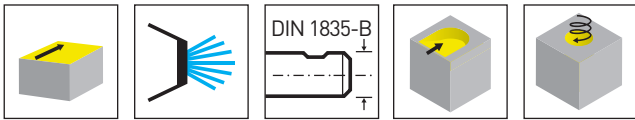


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	$l_1$	$l_3$	$a_p$	$n_{max}$	HWS
DAH82.020.D204.02B	2	20	20	87	50	1	21000	DAH82
DAH82.025.D255.03B	3	25	25	101	56	1	18500	DAH82
DAH82.032.D326.04B	4	32	32	111	60	1	16500	DAH82
DAH82.035.D326.04B	4	35	32	111	60	1	15500	DAH82
DAH82.040.D326.05B	5	40	32	111	60	1	14500	DAH82

Ersatzteile  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH82...	030.3070.T10P	T10PL

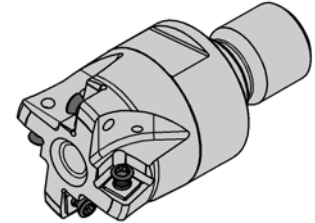
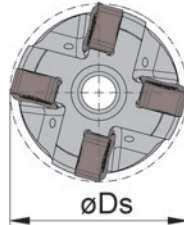
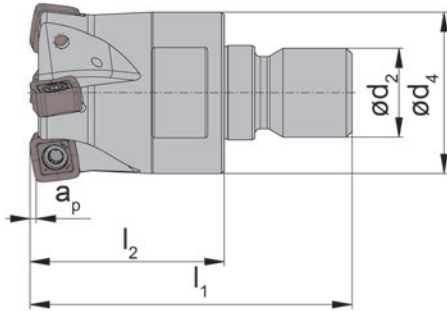
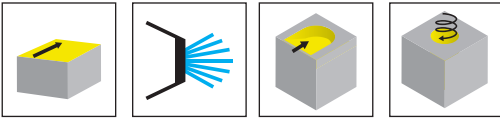


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>4</sub>	a <sub>p</sub>	d <sub>2</sub>	SW	n <sub>max</sub>	HWS	HMS
DAH82.020.M104.02	2	20	45	25	18	1	M10	15	21000	DAH82	10001
DAH82.025.M125.03	3	25	52	30	21	1	M12	17	18500	DAH82	12001
DAH82.032.M166.04	4	32	58	35	29	1	M16	24	16500	DAH82	16001
DAH82.035.M166.04	4	35	58	35	29	1	M16	24	15500	DAH82	16001
DAH82.040.M166.05	5	40	58	35	29	1	M16	24	14500	DAH82	16001

L

**Ersatzteile**  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH82...	030.3070.T10P	T10PL

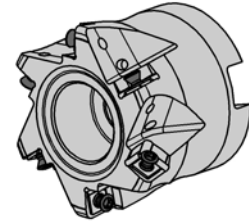
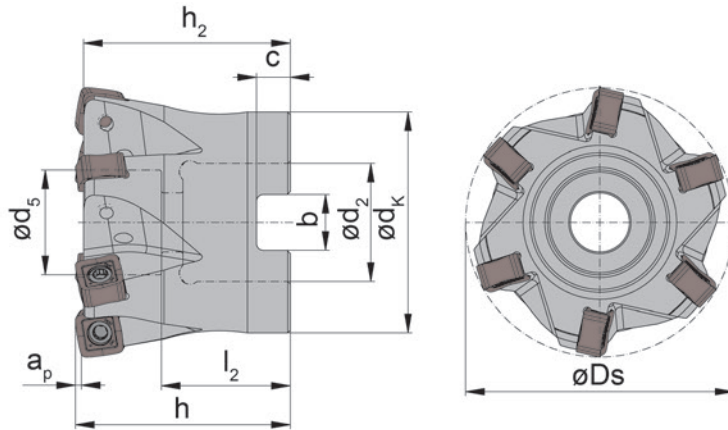
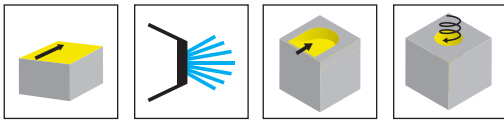


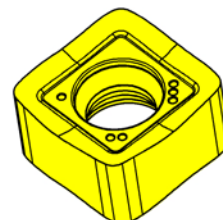
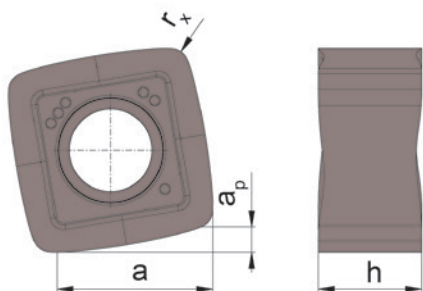
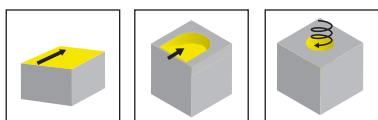
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>k</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	n <sub>max</sub>	HWS
DAH82.040.A1635.05	5	40	1	33,5	35	16	33	22	8,4	5,6	16	14500	DAH82
DAH82.042.A1635.05	5	42	1	33,5	35	16	33	22	8,4	5,6	16	14000	DAH82
DAH82.050.A2240.06	6	50	1	38,5	40	19,5	41	24	10,4	6,3	22	13000	DAH82
DAH82.052.A2240.06	6	52	1	38,5	40	19,5	41	24	10,4	6,3	22	13000	DAH82
DAH82.063.A2240.07	7	63	1	38,5	40	19,5	49	24	10,4	6,3	22	13000	DAH82

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH82...	030.3070.T10P	T10PL



HM-Sorten  
Carbide grades

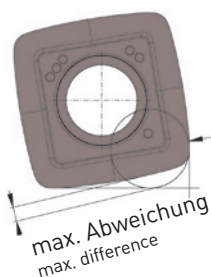
▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	a	h	$r_x$	HIS	IG6B	SA4B	SC6A
DAH.82.030.S.08	1	6,8	4,5	0,8	DAH82	▲	▲	▲
positive Geometrie positive geometry						P ●	M ●	K ●
						N ●	S ●	H -

**Programmierradius und Abweichung**

Programming radius and difference



theoretischer Eckenradius  $r_{th}$   
= Programmierradius  
theoretical corner radius  $r_{th}$   
= programming radius

$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
2	0,72



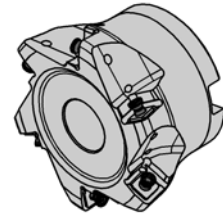
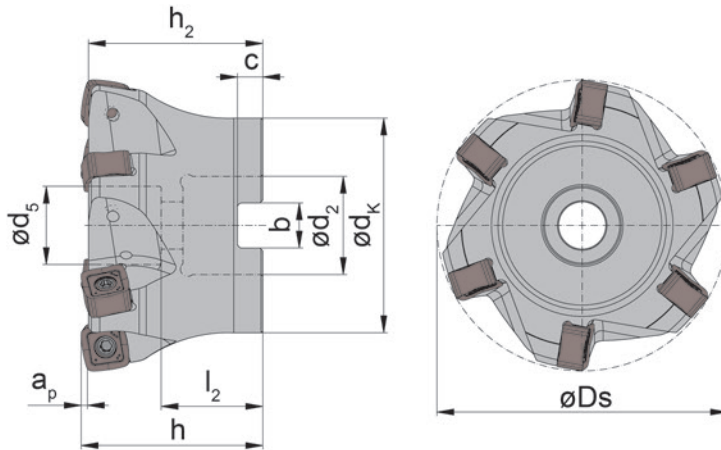
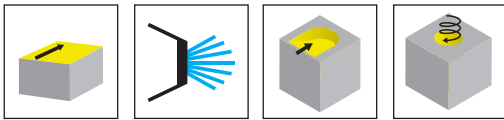


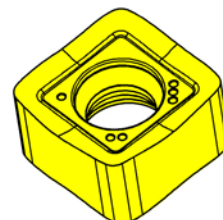
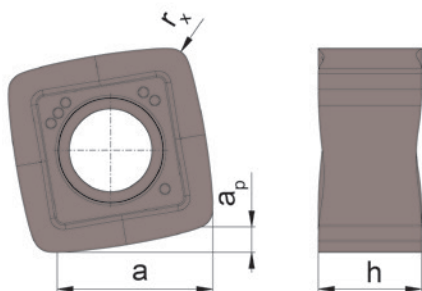
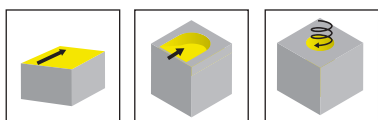
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>k</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	n <sub>max</sub>	HWS
DAH84.050.A2240.04	4	50	1,5	38	40	16,5	41	25	10,4	6,3	22	8000	DAH84
DAH84.052.A2240.04	4	52	1,5	38	40	16,5	41	25	10,4	6,3	22	7500	DAH84
DAH84.063.A2240.05	5	63	1,5	38	40	19,5	49	25	10,4	6,3	22	6500	DAH84
DAH84.066.A2240.05	5	66	1,5	38	40	19,5	49	25	10,4	6,3	22	6500	DAH84
DAH84.080.A2750.06	6	80	1,5	48	50	21,5	59	28	12,4	7	27	5500	DAH84
DAH84.085.A2750.06	6	85	1,5	48	50	21,5	59	28	12,4	7	27	5500	DAH84
DAH84.100.A3250.07	7	100	1,5	48	50	30	80	33	14,4	8	32	5000	DAH84
DAH84.125.A4063.08	8	125	1,5	61	63	56	89	35	16,4	9	40	4000	DAH84

## Ersatzteile

Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
DAH84...	030.0412.T15P	T15PQ	
DAH84.125.A4063.08	030.0412.T15P	T15PQ	20.30.6367



HM-Sorten  
Carbide grades

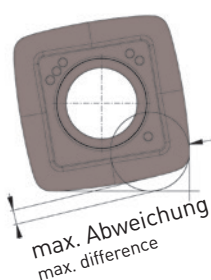
▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$a$	$h$	$r_x$	HIS	IG6B	SA4B	SC6A
DAH.84.030.S.12	1,5	9,8	7	1,2	DAH84	▲	▲	▲
positive Geometrie positive geometry						P ●	M ●	K ●
						N ○	S ○	H -

### Programmierradius und Abweichung

Programming radius and difference

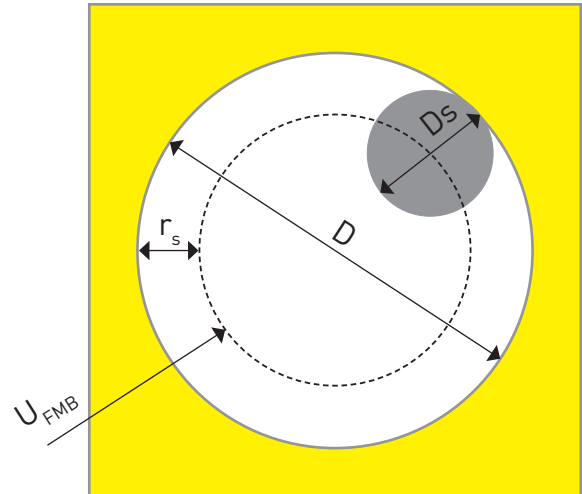


theoretischer Eckenradius  $r_{th}$   
= Programmierradius  
theoretical corner radius  $r_{th}$   
= programming radius

$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
3,25	0,96

## Berechnung Fräsermittelpunktsbahn

- D = Bohrungsdurchmesser Werkstück
- D<sub>s</sub> = Schneidkreisdurchmesser
- r<sub>s</sub> = Schneidkreisradius
- U<sub>FMB</sub> = Umfang Fräsermittelpunktsbahn



$$U_{FMB} = \pi \times (\text{Bohrungsdurchmesser Werkstück} - \text{Schneidkreisdurchmesser})$$

$$\longrightarrow U_{FMB} = \pi \times (D - D_s)$$

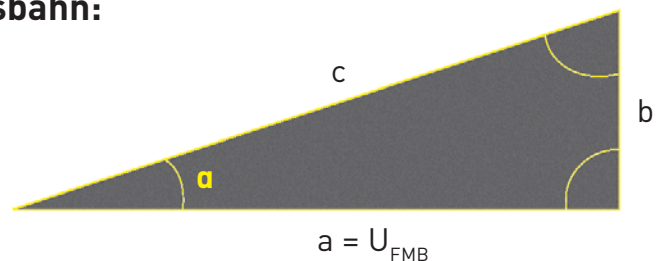
oder

$$U_{FMB} = \pi \times (\text{Bohrungsdurchmesser Werkstück} - (2 \times \text{Schneidkreisradius}))$$

$$\longrightarrow U_{FMB} = \pi \times (D - (2 \times r_s))$$

## Berechnung über Fräsermittelpunktsbahn: Basis ist das rechtwinklige Dreieck

- a = Rampenwinkel
- b = Schnitttiefe je Umdrehung (Steigung)
- a = Umfang Fräsermittelpunktsbahn



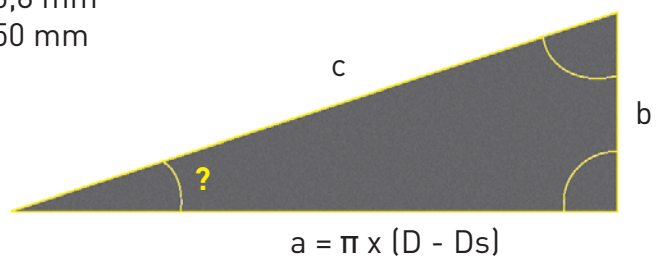
## Beispielbetrachtung fehlender Rampenwinkel = ?

- Bohrungsdurchmesser Werkstück D = 98 mm
- Schnitttiefe je Umdrehung b = 0,8 mm
- Schneidkreisdurchmesser D<sub>s</sub> = 50 mm

$$\tan \alpha = \frac{\text{Gegenkathete } b}{\text{Ankathete } a}$$

$$\tan \alpha = \frac{0,8 \text{ mm}}{150,8 \text{ mm}}$$

$$\alpha = 0,30^\circ$$



## Fräsermittelpunktsbahn - Theoretisch ermittelte Werte

DAH82	
Schneidkreis-Ø [mm]	Eintauchwinkel [°]
20	5
25	3,9
32	2,8
35	2,4
40	1,9
42	1,8
50	1,4

DAH84	
Schneidkreis-Ø [mm]	Eintauchwinkel [°]
50	2,7
52	2,5
63	1,8
66	1,7
80	1,3
85	1,2
100	1,0
125	0,8

### Empfehlung helikales Eintauchen DAH82:

$$a_{p \max} = 1 \text{ mm}$$

→ Zustellung je Umdrehung: 50% des  $a_{p \max}$  als Startwert

→ je nach Verhältnisse bis 80 % des  $a_{p \max}$  möglich

→ 0,5 mm bis 0,8 mm Zustellung je Umdrehung

### Empfehlung helikales Eintauchen DAH84:

$$a_{p \max} = 1,5 \text{ mm}$$

→ Zustellung je Umdrehung: 67% des  $a_{p \max}$  als Startwert

→ je nach Verhältnisse bis 80 % des  $a_{p \max}$  möglich

→ 1,0 mm bis 1,2 mm Zustellung je Umdrehung

## Berechnung Bohrungsdurchmesser ebener Grund DAH82

$$D_{\min} = (D_s - a) \times 2$$

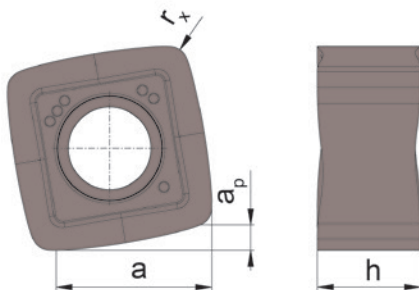
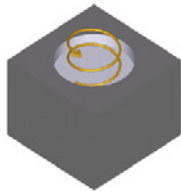
$$D_{\min} = (50 \text{ mm} - 6,8 \text{ mm}) \times 2$$

$$D_{\min} = 86,4 \text{ mm}$$



Bedeutet:

Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 86,4 mm mit ebenem Grund zu erreichen.



$$D_{\max} = (D_s - r_x) \times 2$$

$$D_{\max} = (50 \text{ mm} - 0,8 \text{ mm}) \times 2$$

$$D_{\max} = 98,4 \text{ mm}$$



Bedeutet:

Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 98,4 mm **ohne** ebenem Grund zu erreichen. Es bleibt Restmaterial in der Mitte stehen.

$$r_x = 0,8 \text{ mm}$$

$$a = 6,8 \text{ mm}$$

## Berechnung Bohrungsdurchmesser ebener Grund DAH84

$$D_{\min} = (D_s - a) \times 2$$

$$D_{\min} = (50 \text{ mm} - 9,8 \text{ mm}) \times 2$$

$$D_{\min} = 80,4 \text{ mm}$$

$$D_{\max} = (D_s - r_x) \times 2$$

$$D_{\max} = (50 \text{ mm} - 1,2 \text{ mm}) \times 2$$

$$D_{\max} = 97,6 \text{ mm}$$



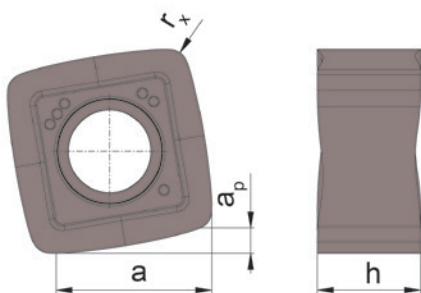
Bedeutet:

Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 80,4 mm mit ebenem Grund zu erreichen.



Bedeutet:

Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 97,6 mm **ohne** ebenem Grund zu erreichen. Es bleibt Restmaterial in der Mitte stehen.

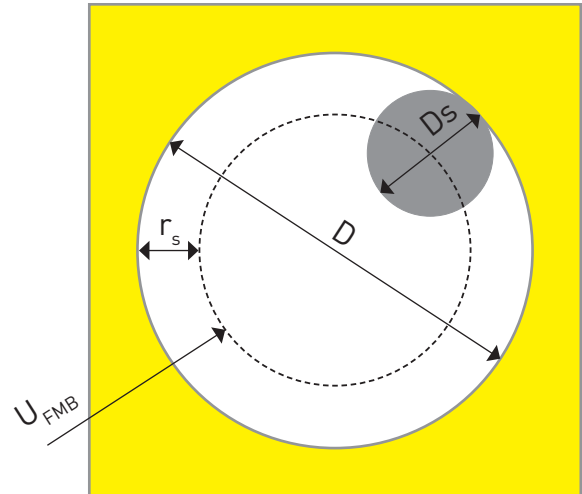


$$r_x = 1,2 \text{ mm}$$

$$a = 9,8 \text{ mm}$$

## Calculation of cutter centre path

- D = Bore diameter of workpiece
- D<sub>s</sub> = Cutting diameter
- r<sub>s</sub> = Cutting radius
- U<sub>FMB</sub> = Circumference of cutter centre path



$$U_{FMB} = \pi \times (\text{Bore diameter of workpiece} - \text{Cutting diameter})$$

$$\longrightarrow U_{FMB} = \pi \times (D - D_s)$$

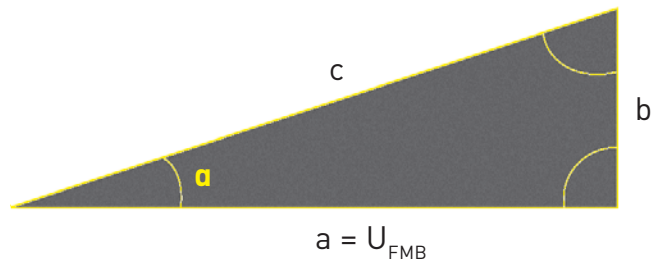
or

$$U_{FMB} = \pi \times (\text{Bore diameter of workpiece} - (2 \times \text{Cutting radius}))$$

$$\longrightarrow U_{FMB} = \pi \times (D - (2 \times r_s))$$

## Calculation using cutter centre path: The basis is the right-angled triangle

- a = Ramp angle
- b = Depth of cut per rotation (Pitch)
- a = Circumference of cutter centre path



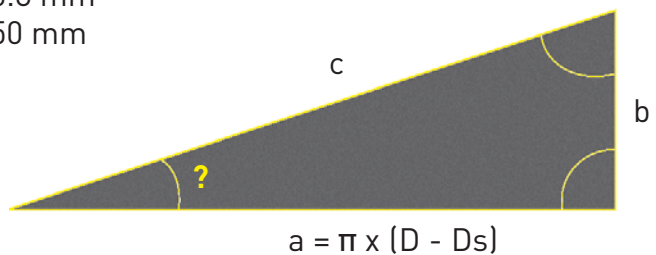
## Example of missing ramp angle = ?

- Bore diameter of workpiece D = 98 mm
- Depth of cut per rotation b = 0.8 mm
- Cutting diameter D<sub>s</sub> = 50 mm

$$\tan \alpha = \frac{\text{Opposite side } b}{\text{Adjacent side } a}$$

$$\tan \alpha = \frac{0.8 \text{ mm}}{150.8 \text{ mm}}$$

$$\alpha = 0.30^\circ$$



## Cutter centre path - Theoretical values

DAH82	
Cutting Ø [mm]	Plunge angle [°]
20	5
25	3.9
32	2.8
35	2.4
40	1.9
42	1.8
50	1.4

DAH84	
Cutting Ø [mm]	Plunge angle [°]
50	2.7
52	2.5
63	1.8
66	1.7
80	1.3
85	1.2
100	1.0
125	0.8

### Recommendation for helical plunging DAH82:

$$a_{p \max} = 1 \text{ mm}$$

→ Feed per revolution: 50% of  $a_{p \max}$  as starting value

→ Depending on conditions, up to 80 % of the  $a_{p \max}$  possible

→ 0.5 mm up to 0.8 mm feed per revolution

### Recommendation for helical plunging DAH84:

$$a_{p \max} = 1.5 \text{ mm}$$

→ Feed per revolution: 67% of  $a_{p \max}$  as starting value

→ Depending on conditions, up to 80 % of the  $a_{p \max}$  possible

→ 1.0 mm up to 1.2 mm feed per revolution



## Calculation of bore diameter with flat base DAH82

$$D_{\min} = (D_s - a) \times 2$$

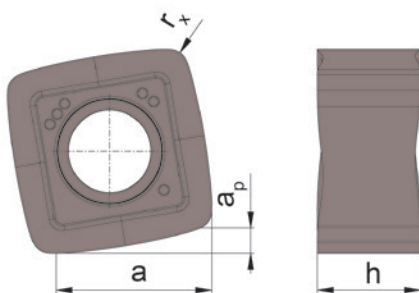
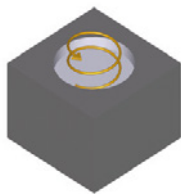
$$D_{\min} = (50 \text{ mm} - 6.8 \text{ mm}) \times 2$$

$$D_{\min} = 86.4 \text{ mm}$$



Meaning:

With a cutting diameter 50 mm, a bore diameter of 86.4 mm **with** a flat base can be achieved.



$$D_{\max} = (D_s - r_x) \times 2$$

$$D_{\max} = (50 \text{ mm} - 0.8 \text{ mm}) \times 2$$

$$D_{\max} = 98.4 \text{ mm}$$



Meaning:

With a cutting diameter 50 mm, a diameter of 98.4 mm **without** a flat base can be achieved. Material remains in the centre.

$$r_x = 0.8 \text{ mm}$$

$$a = 6.8 \text{ mm}$$

## Calculation of bore diameter with flat base DAH84

$$D_{\min} = (Ds - a) \times 2$$

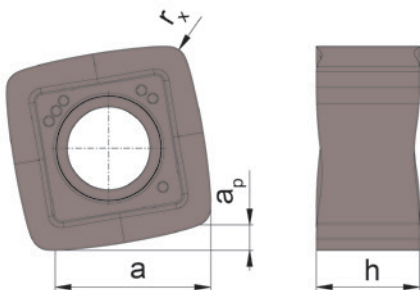
$$D_{\min} = (50 \text{ mm} - 9.8 \text{ mm}) \times 2$$

$$D_{\min} = 80.4 \text{ mm}$$



Meaning:

With a cutting diameter 50 mm, of a bore diameter of 80.4 mm **with** a flat base can be achieved.



$$D_{\max} = (Ds - r_x) \times 2$$

$$D_{\max} = (50 \text{ mm} - 1.2 \text{ mm}) \times 2$$

$$D_{\max} = 97.6 \text{ mm}$$



Meaning:

With a cutting diameter 50 mm, a diameter of 97.6 mm **without** a flat base can be achieved. Material remains in the centre.

$$r_x = 1.2 \text{ mm}$$

$$a = 9.8 \text{ mm}$$

### Korrekturwert - warum?

Correction factors - why?

- Bei der Verwendung eines Hochvorschubfräasers ist der effektive Schneidkreis durchmesser nicht identisch mit dem angegebenen Schneidkreis
- Die Korrekturwerte stehen in Abhängigkeit der Schnitttiefe  $a_p$ .
- Dies gilt für die Bearbeitung des Planfräsen.
- Berechnung für  $D_s$  effektiv für das Planfräsen:  **$D_s \text{ effektiv} = D_s - K$**

- When using a high feed milling cutter, the effective cutting diameter is not identical with the specified value.
- The correction factors are dependent on the cutting depth  $a_p$ .
- This applies to face milling.
- Calculation for  $D_s$  effective for face milling:  **$D_s \text{ effective} = D_s - K$**

DAH82	
Schnitttiefe Depth of cut $a_p$ [mm]	Korrekturwert Correction factor K [mm]
0,1	10,9
0,2	9,5
0,3	8,3
0,4	7,0
0,5	5,9
0,6	4,8
0,7	3,9
0,8	3,0
0,9	2,2
1,0	1,6

DAH84	
Schnitttiefe Depth of cut $a_p$ [mm]	Korrekturwert Correction factor K [mm]
0,1	16,3
0,2	14,6
0,3	13,0
0,4	11,7
0,5	10,4
0,6	9,3
0,7	8,2
0,8	7,3
0,9	6,4
1,0	5,6
1,1	4,9
1,2	4,1
1,3	3,5
1,4	2,8
1,5	2,3





System/System

Seite/Page

**M406**

**554**

**M409**

**564**

**M610**

**590**

# Übersicht Tangential-Fräser

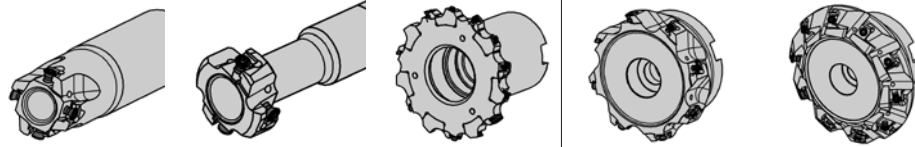
## Overview Tangential Mill



Systeme  
Systems

M406

M409



Eignung  
Suitability

P	•		•	•	•
M	•			•	•
K	•		•	•	•
N	•			•	•
S	•			•	•
H					

$D_c$  (mm)

16-40

25

100

32-250

40-250

$a_{pmax}$  (mm)

6,3

W = 11

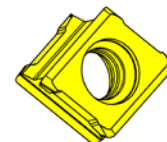
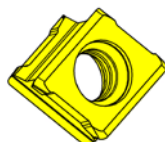
W = 9,6-12,9

9,3

6,2

406

409

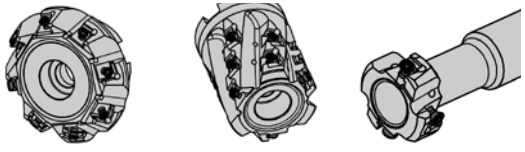


Schneidkanten  
Cutting edges

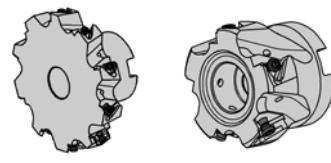
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4

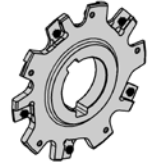
M409



M610



M475



X					X		
					X		
	X				X		
			X				
	X			X	X		X
							X
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	○
•	•	•	•	•	•	•	•

40-250  
7,7

40-63  
43,2

32-50  
W = 14-22

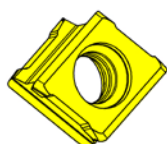
100-125  
W = 12,9-18,8

125  
w = 16

50-125  
9,9

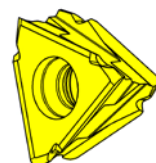
40-200  
SB = 3-8

409



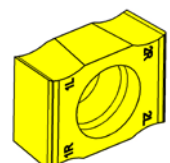
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610



6

S475







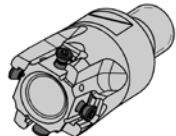
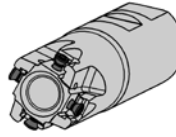
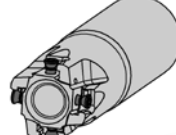
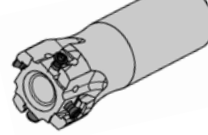
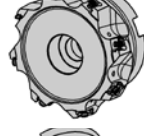
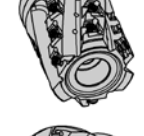
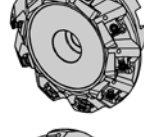
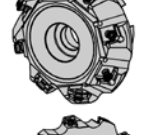

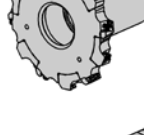
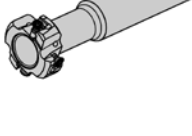


2+2

# Übersicht System 406 und 409

Overview System 406 and 409

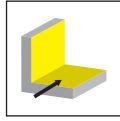


		M406	M409						
	$\kappa = 90^\circ$	x	x	x	x	x		x	
	$\kappa = 90^\circ$	x	x	x	x	x		x	
	$\kappa = 90^\circ$	x	x	x	x	x		x	
	$\kappa = 90^\circ$	x		x	x	x		x	
	$\kappa = 90^\circ$		x	x	x	x		x	
	$\kappa = 90^\circ$		x			x	x	x	
	$\kappa = 45^\circ$		x	x	x				
	$\kappa = 60^\circ$		x	x					
	$\kappa = 90^\circ$		x					x	
	$\kappa = 90^\circ$ w = einstellbar adjustable	x	x					x	
		x	x						x



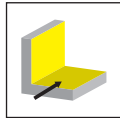


Schaftfräser  
End Mill  
M406



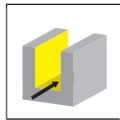
Seite/Page  
556-558

Einschraubfräser  
Screw-in cutter  
M406



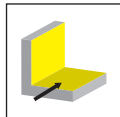
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559

Aufsteckfräser  
Arbour Mounted Cutter  
M406



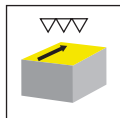
Seite/Page  
560

Wendeschneidplatte  
Indexable insert  
406



Seite/Page  
561

Schneidplatte  
Insert  
406



Seite/Page  
562

# M406



## **Tangentialfräsen mit System 406**

- 90° Schafffräser
- 90° Einschraubfräser
- Aufsteckfräser

## **Tangential milling with system 406**

- 90° End Mill
- 90° Screw-in Cutter
- Arbour Mounted Cutter

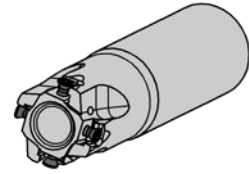
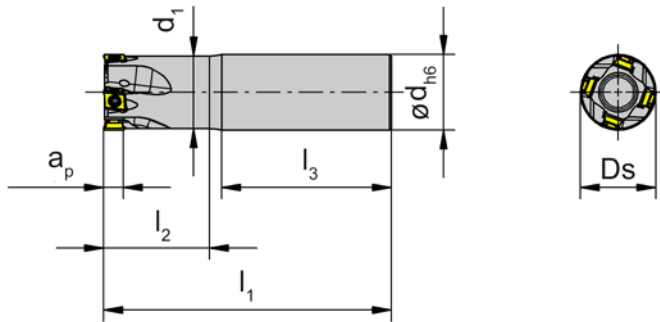
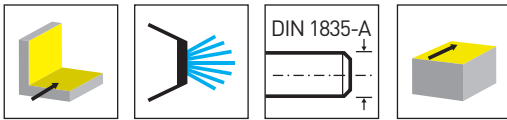


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	n <sub>max</sub>	HWS
M406.016.D16.3.02A	2	16	16	75	25	15	48	6,3	23700	40600R
M406.020.D20.4.03A	3	20	20	85	33	19	50	6,3	21200	40600R
M406.025.D25.5.04A	4	25	25	95	37	24	56	6,3	19000	40600R
M406.032.D32.6.05A	5	32	32	111	47	31	60	6,3	16700	40600R
M406.040.D32.6.06A	6	40	32	111	49	39	60	6,3	15000	40600R

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M406...02A -...03A	030.2669.T8P	T8PL
M406...04A -...06A	030.2608.T8P	T8PL

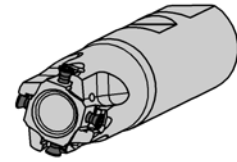
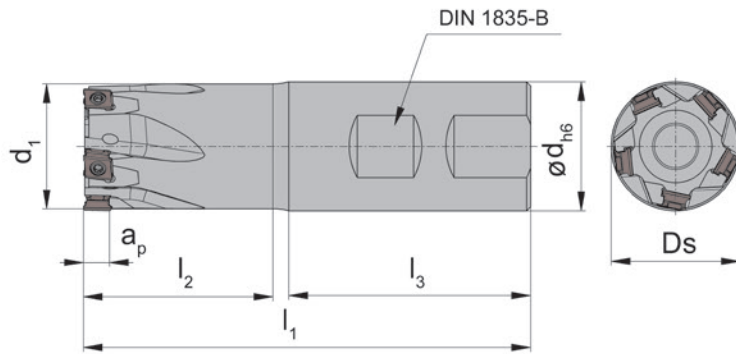
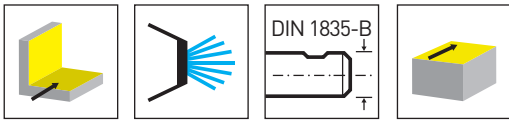


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	n <sub>max</sub>	HWS
M406.016.D16.3.02B	2	16	16	75	25	15	48	6,3	23700	40600R
M406.020.D20.4.03B	3	20	20	85	33	19	50	6,3	21200	40600R
M406.025.D25.5.04B	4	25	25	95	37	24	56	6,3	19000	40600R
M406.032.D32.6.05B	5	32	32	111	47	31	60	6,3	16700	40600R

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M406...02B -...03B	030.2669.T8P	T8PL
M406...04B -...06B	030.2608.T8P	T8PL

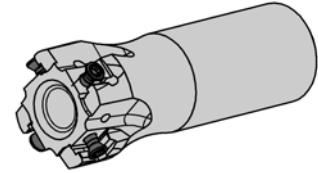
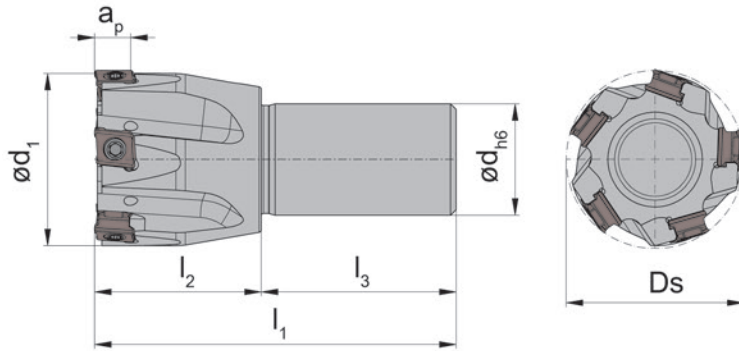


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	n <sub>max</sub>	HWS
M406.016.D12.1.02A	2	16	12	55	20	15	35	6,3	23700	40600R
M406.020.D16.1.03A	3	20	16	55	20	19	35	6,3	21200	40600R
M406.025.D16.2.04A	4	25	16	65	30	24	35	6,3	19000	40600R
M406.025.D20.2.04A	4	25	20	65	30	24	35	6,3	19000	40600R
M406.032.D16.2.05A	5	32	16	65	30	31	35	6,3	16700	40600R
M406.032.D20.2.05A	5	32	20	65	30	31	35	6,3	16700	40600R
M406.040.D16.2.06A	6	40	16	65	30	39	35	6,3	15000	40600R
M406.040.D20.2.06A	6	40	20	65	30	39	35	6,3	15000	40600R

Ersatzteile  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M406...02A -...03A	030.2669.T8P	T8PL
M406...04A -...06A	030.2608.T8P	T8PL

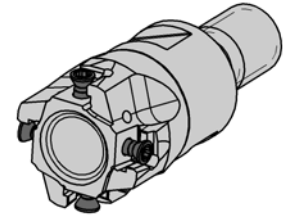
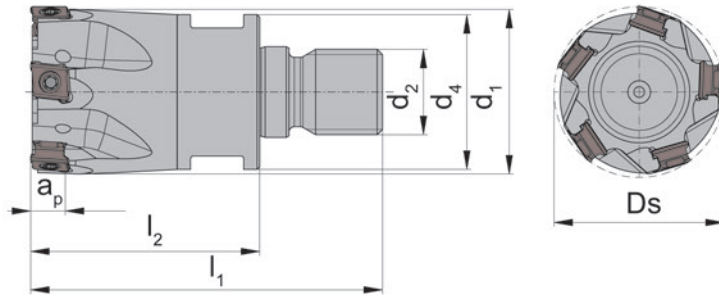


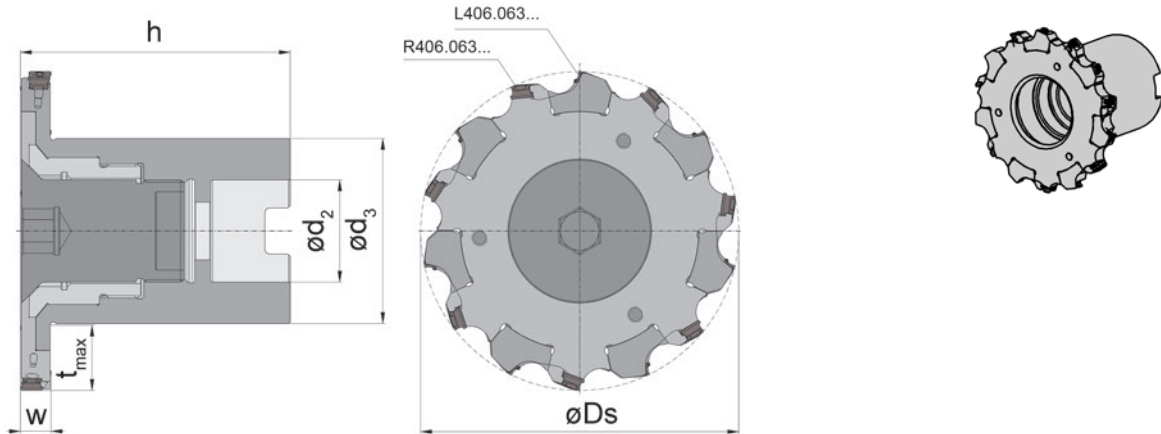
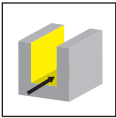
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	n <sub>max</sub>	HWS	HMS
<b>M406.016.M08.3.02</b>	2	16	41	23	15	6,3	M8	13	10	23700	40600R	08001
<b>M406.020.M10.4.03</b>	3	20	50	30	19	6,3	M10	18	15	21200	40600R	10001
<b>M406.025.M12.5.04</b>	4	25	57	35	24	6,3	M12	21	17	19000	40600R	12001
<b>M406.032.M16.6.05</b>	5	32	66	43	31	6,3	M16	29	24	16700	40600R	16001
<b>M406.040.M16.6.06</b>	6	40	66	43	39	6,3	M16	29	24	15000	40600R	16001

## Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M406...02 -...03	<b>030.2669.T8P</b>	<b>T8PL</b>
M406...04 -...06	<b>030.2608.T8P</b>	<b>T8PL</b>



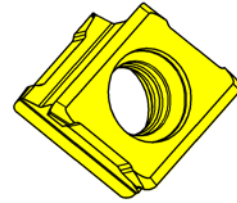
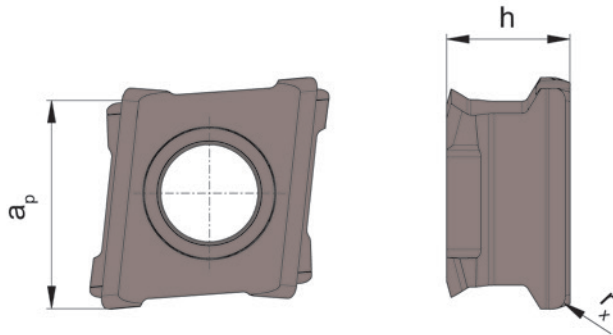
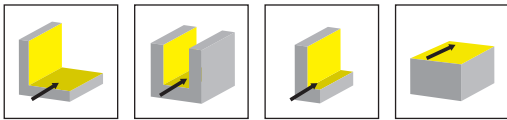
Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	t <sub>max</sub>	h <sub>min</sub>	h <sub>max</sub>	d <sub>3</sub>	d <sub>2</sub>	w <sub>min</sub>	w <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M406.0100.A32.ES.96</b>	14	7	100	20	84,8	88,1	58	32	9,6	12,9	7x R406.063...	7x L406.063...	40600R • 40600L

Aufsteckfräser einstellbar!  
Arbour mounted cutter is adjustable!

**Ersatzteile**  
Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Schraube Screw	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Verstelladapter Adjustment Adapter
M406.0100.A32.ES.96	<b>C406.0100.A32.ES.96</b>	<b>030.2608.T8P</b>	<b>T8PL</b>	<b>A406.0100.A32.ES.96</b>





HM-Sorten  
Carbide grades

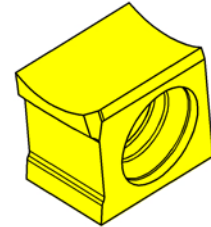
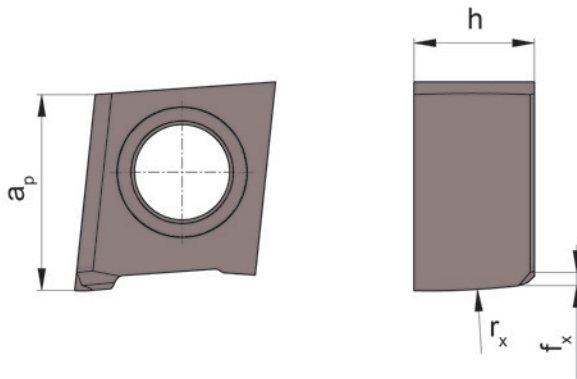
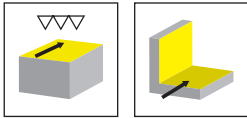
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	K10	AS46	AS4B	IG35	NE2B
R406.063.U.02	6,3	3,85	0,2	40600R		△	▲		
R406.063.U.04	6,3	3,85	0,4	40600R		▲	▲		
R406.063.U.08	6,3	3,85	0,8	40600R		▲	▲		
R406.063.W.02	6,3	3,85	0,2	40600R	▲			▲	▲
R406.063.W.04	6,3	3,85	0,4	40600R				▲	▲
R406.063.W.08	6,3	3,85	0,8	40600R				▲	▲
L406.063.U.02	6,3	3,85	0,2	40600L		△	▲		
L406.063.U.04	6,3	3,85	0,4	40600L		▲	▲		
L406.063.U.08	6,3	3,85	0,8	40600L		▲	▲		
L406.063.W.02	6,3	3,85	0,2	40600L	▲			▲	▲
L406.063.W.04	6,3	3,85	0,4	40600L				▲	▲
L406.063.W.08	6,3	3,85	0,8	40600L				▲	▲
P	●	○	●	-	-				
M	○	○	●	●	-				
K	●	●	●	-	-				
N	●	○	○	-	●				
S	○	○	●	●	-				
H	-	-	-	-	-				

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges

präzisionsgeschliffen  
precision ground



▲ ab Lager  
on stock

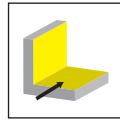
HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	$f_x$	HIS	AS46	AS4B
<b>R406.063.S.F4</b>	6	3,85	100	0,4	40600R	▲	▲
Breitschlichtschneide, präzisionsgeschliffen Wiper geometry, precision ground						P ●	●
1 nutzbare Schneidkante with 1 usable cutting edge						M ●	●
						K ●	●
						N ●	●
						S ●	●
						H -	-



Schafffräser  
End Mill  
M409

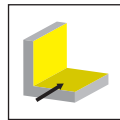


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566-569

Montageanleitung  
Mounting Instructions

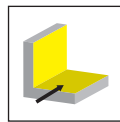
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Einschraubfräser  
Screw-in cutter  
M409



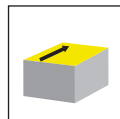
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570

Eckfräser  
Shoulder Mill  
M409



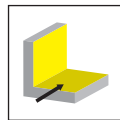
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Planfräser  
Face Mill  
M409



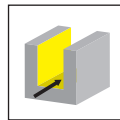
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Walzenstirnfräser  
Shell End Mill  
M409



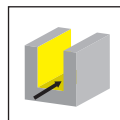
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Scheibenfräser  
Disc Milling Cutter  
M409



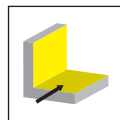
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Aufsteckfräser  
Arbour Mounted Cutter  
M409

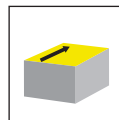


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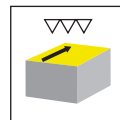
Wendeschneidplatte  
Indexable insert  
409



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580



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582

# M409



## **Tangentialfräsen mit System 409**

- 90° Schaftfräser
- 90° Einschraubfräser
- Eckfräser
- Planfräser
- Walzenstirnfräser
- Scheibenfräser
- Aufsteckfräser

## **Tangential milling with system 409**

- 90° End Mill
- 90° Screw-in cutter
- Shoulder Mill
- Face Mill
- Shell End Mill
- Disc Milling cutter
- Arbour Mounted Cutter

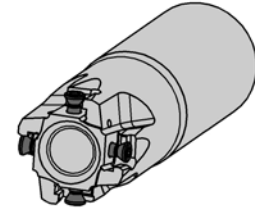
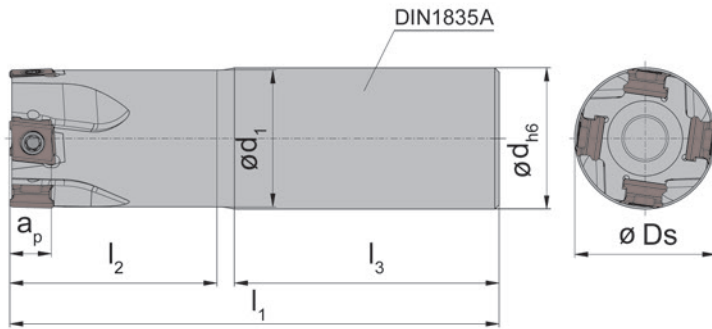
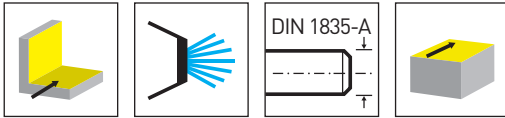


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	Form	n <sub>max</sub>	HWS
M409.032.D32.6.04A	4	32	32	111	47	31	60	9,3	A	15600	40900R
M409.040.D32.6.05A	5	40	32	111	47	39	60	9,3	A	13900	40900R

enge Teilung  
narrow pitch

**Ersatzteile**  
Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	030.3511.T10P	T10PL

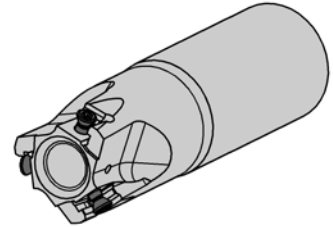
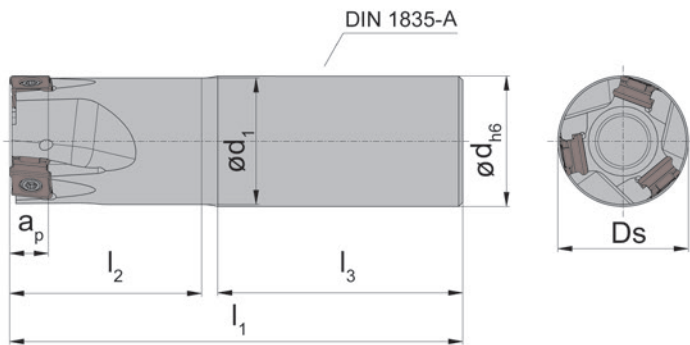
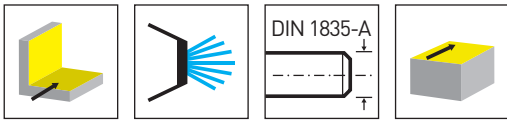


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	Form	n <sub>max</sub>	HWS
<b>M409.032.D32.6.03A</b>	3	32	32	111	47	31	60	9,3	A	15600	40900R
<b>M409.040.D32.6.04A</b>	4	40	32	111	47	39	60	9,3	A	13900	40900R

weite Teilung  
wide pitch

## Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

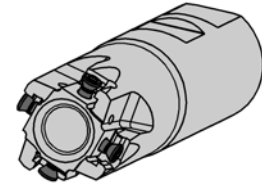
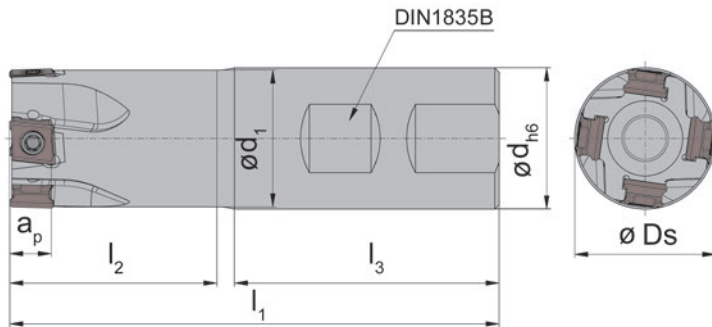
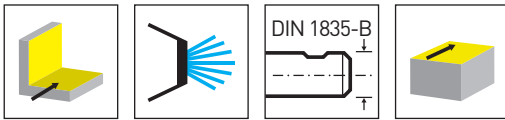


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	Form	n <sub>max</sub>	HWS
<b>M409.032.D32.6.04B</b>	4	32	32	111	47	31	60	9,3	B	15600	40900R
<b>M409.040.D32.6.05B</b>	5	40	32	111	47	39	60	9,3	B	13900	40900R

enge Teilung  
narrow pitch

## Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>



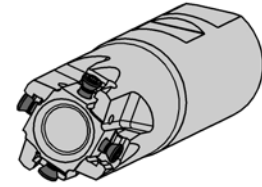
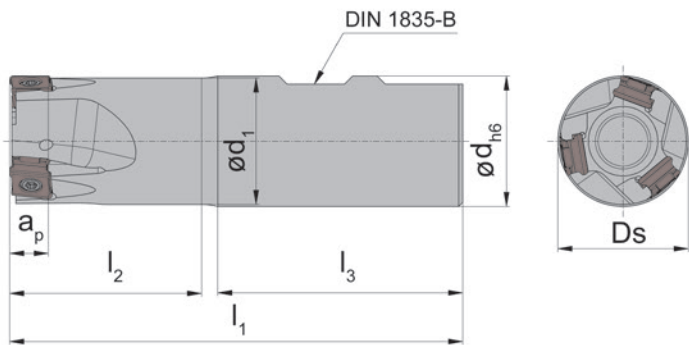
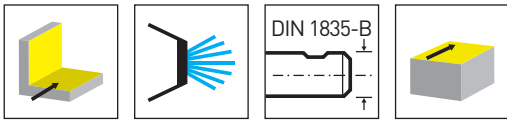


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	Form	n <sub>max</sub>	HWS
<b>M409.032.D32.6.03B</b>	3	32	32	111	47	31	60	9,3	B	15600	40900R
<b>M409.040.D32.6.04B</b>	4	40	32	111	47	39	60	9,3	B	13900	40900R

weite Teilung  
wide pitch

## Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

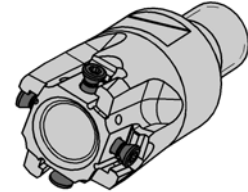
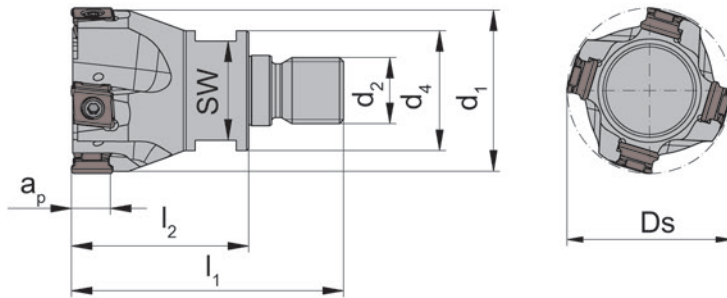
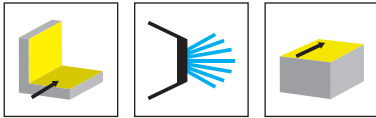


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	n <sub>max</sub>	HWS	HMS
<b>M409.032.M16.6.03</b>	3	32	66	43	31	9,3	M16	29	24	15600	40900R	16001
<b>M409.032.M16.6.04</b>	4	32	66	43	31	9,3	M16	29	24	15600	40900R	16001
<b>M409.040.M16.6.04</b>	4	40	66	43	39	9,3	M16	29	24	13900	40900R	16001
<b>M409.040.M16.6.05</b>	5	40	66	43	39	9,3	M16	29	24	13900	40900R	16001

passend für Aufnahme Typ MD  
suitable for Shank Type MD

## Ersatzteile

Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

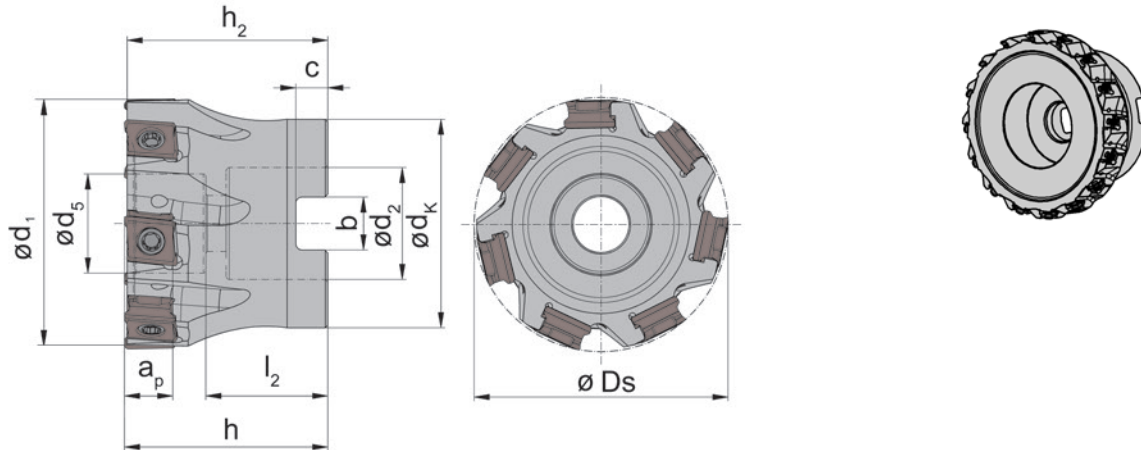
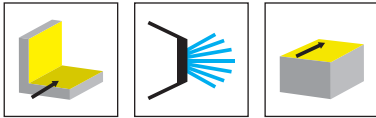


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
M409.0040.A16.05	5	40	9,3	34,5	35	16	39	16	22	8,4	5,6	33	13900	40900R
M409.0050.A22.07	7	50	9,3	39,5	40	19,5	49	22	24	10,4	6,3	41	12500	40900R
M409.0063.A22.08	8	63	9,3	39,5	40	19,5	62	22	25	10,4	6,3	49	11100	40900R
M409.0063.A27.08	8	63	9,3	39,5	40	23	62	27	27,5	12,4	7	49	11100	40900R
M409.0080.A27.10	10	80	9,3	49,5	50	21,5	79	27	28	12,4	7	59	9800	40900R
M409.0100.A32.12	12	100	9,3	49,5	50	30	99	32	33	14,4	8	80	8800	40900R
M409.0125.A40.16	16	125	9,3	62,5	63	56	124	40	35	16,4	9	89	7900	40900R
M409.0160.A40.20	20	160	9,3	62,5	63	90	159	40	29	16,4	9	110	6900	40900R
M409.0200.A60.24	24	200	9,3	62,5	63	135	199	60	42	25,7	14	130	6200	40900R
M409.0250.A60.30	30	250	9,3	62,5	63	150	249	60	42	25,7	14	160	5500	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 DIN8030-B, from ø160 mm DIN 8030-C

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

enge Teilung  
narrow pitch

## Ersatzteile

Spare Parts

Eckfräser Shoulder Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0...A40..	030.3511.T10P	T10PL	20.30.6367
M409.0...A60..	030.3511.T10P	T10PL	30.45.6367

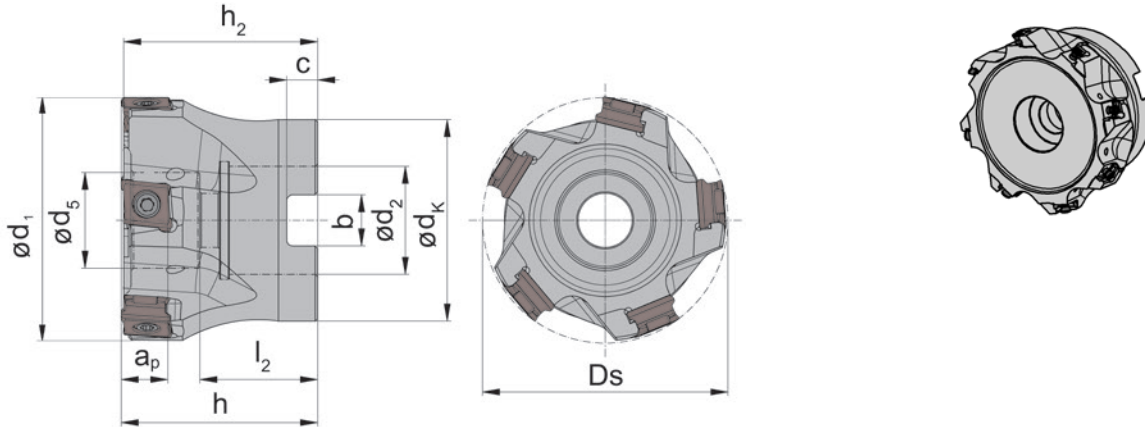
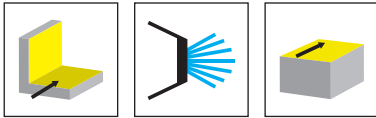


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
M409.0040.A16.04	4	40	9,3	34,5	35	16	39	16	22	8,4	5,6	33	13900	40900R
M409.0050.A22.05	5	50	9,3	39,5	40	19,5	49	22	24	10,4	6,3	41	12500	40900R
M409.0063.A22.06	6	63	9,3	39,5	40	19,5	62	22	25	10,4	6,3	49	11100	40900R
M409.0063.A27.06	6	63	9,3	39,5	40	23	62	27	27,5	12,4	7	49	11100	40900R
M409.0080.A27.07	7	80	9,3	49,5	50	21,5	79	27	28	12,4	7	59	9800	40900R
M409.0100.A32.08	8	100	9,3	49,5	50	30	99	32	33	14,4	8	80	8800	40900R
M409.0125.A40.10	10	125	9,3	62,5	63	56	124	40	35	16,4	9	89	7900	40900R
M409.0160.A40.14	14	160	9,3	62,5	63	90	159	40	29	16,4	9	110	6900	40900R
M409.0200.A60.16	16	200	9,3	62,5	63	135	199	60	42	25,7	14	130	6200	40900R
M409.0250.A60.20	20	250	9,3	62,5	63	150	249	60	42	25,7	14	160	5500	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 DIN8030-B, from ø160 mm DIN 8030-C

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

weite Teilung  
wide pitch

## Ersatzteile

Spare Parts

Eckfräser Shoulder Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0...A40..	030.3511.T10P	T10PL	20.30.6367
M409.0...A60..	030.3511.T10P	T10PL	30.45.6367

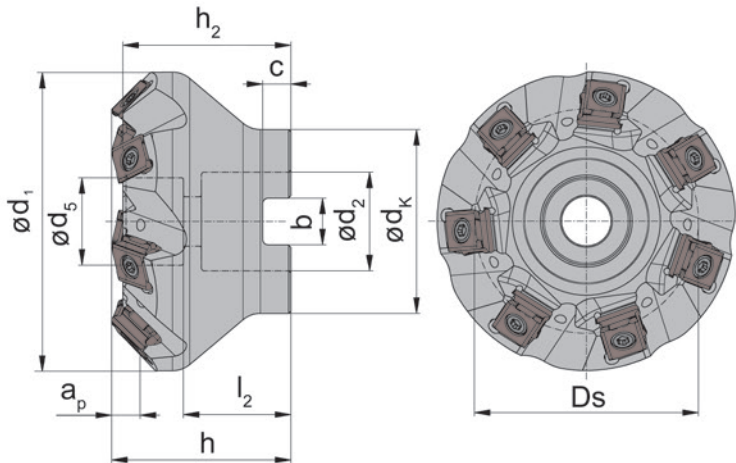
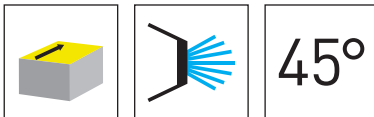


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	a <sub>p</sub>	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
M409.0040.A16.45.05	5	40	6,2	32,5	35	16	55	16	22	8,4	5,6	33	13900	40900R
M409.0050.A22.45.07	7	50	6,2	37,5	40	19,5	67	22	24	10,4	6,3	41	12500	40900R
M409.0063.A22.45.08	8	63	6,2	37,5	40	19,5	80	22	25	10,4	6,3	49	11100	40900R
M409.0063.A27.45.08	8	63	6,2	37,5	40	22	79	27	27,5	12,4	7	49	11100	40900R
M409.0080.A27.45.10	10	80	6,2	47,5	50	22	96	27	27,5	12,4	7	59	9800	40900R
M409.0125.A40.45.16	16	125	6,2	60,5	63	56	141	40	35	16,4	9	89	7900	40900R
M409.0160.A40.45.20	20	160	6,2	60,5	63	90	176	40	29	16,4	9	110	6900	40900R
M409.0200.A60.45.24	24	200	6,2	60,5	63	135	216	60	42	25,7	14	130	6200	40900R
M409.0250.A60.45.30	30	250	6,2	60,5	63	150	266	60	42	25,7	14	160	5500	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 mm DIN8030-B, from ø160 mm DIN 8030-C

a<sub>p</sub> = 6,2 mm bei r<sub>x</sub> = 0,8 mm

a<sub>p</sub> = 6,2 mm can be reached with r<sub>x</sub> = 0,8 mm

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

enge Teilung  
narrow pitch

### Ersatzteile Spare Parts

Planfräser Face Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0...A40..	030.3511.T10P	T10PL	20.30.6367
M409.0...A60..	030.3511.T10P	T10PL	30.45.6367

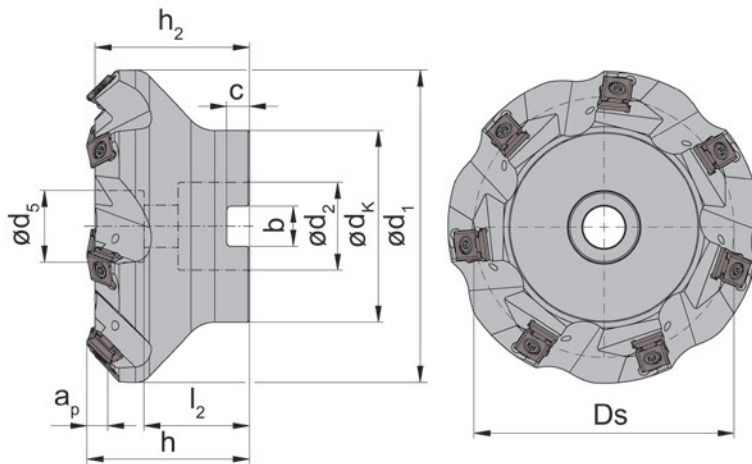
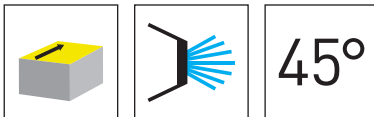


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
M409.0040.A16.45.04	4	40	6,2	32,5	35	17	55	16	18	8,4	5,6	33	13900	40900R
M409.0050.A22.45.05	5	50	6,2	37,5	40	20	67	22	20	10,4	6,3	41	12500	40900R
M409.0063.A22.45.06	6	63	6,2	37,5	40	20	79	22	20	10,4	6,3	49	11100	40900R
M409.0080.A27.45.07	7	80	6,2	47,5	50	22	96	27	27,5	12,4	7	59	9800	40900R
M409.0100.A32.45.08	8	100	6,2	47,5	50	30	116	32	32,5	14,4	8	80	8800	40900R
M409.0160.A40.45.14	14	160	6,2	60,5	63	90	176	40	29	16,4	9	110	6900	40900R
M409.0200.A60.45.16	16	200	6,2	60,5	63	135	216	40	42	25,7	14	130	6200	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 DIN8030-B, from ø160 mm DIN 8030-C

ap = 6,2 mm bei rx = 0,8 mm  
ap = 6,2 mm can be reached with rx = 0,8 mm

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

weite Teilung  
wide pitch

### Ersatzteile Spare Parts

Planfräser Face Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0160.A40.45.14	030.3511.T10P	T10PL	20.30.6367
M409.0200.A60.45.16	030.3511.T10P	T10PL	30.45.6367

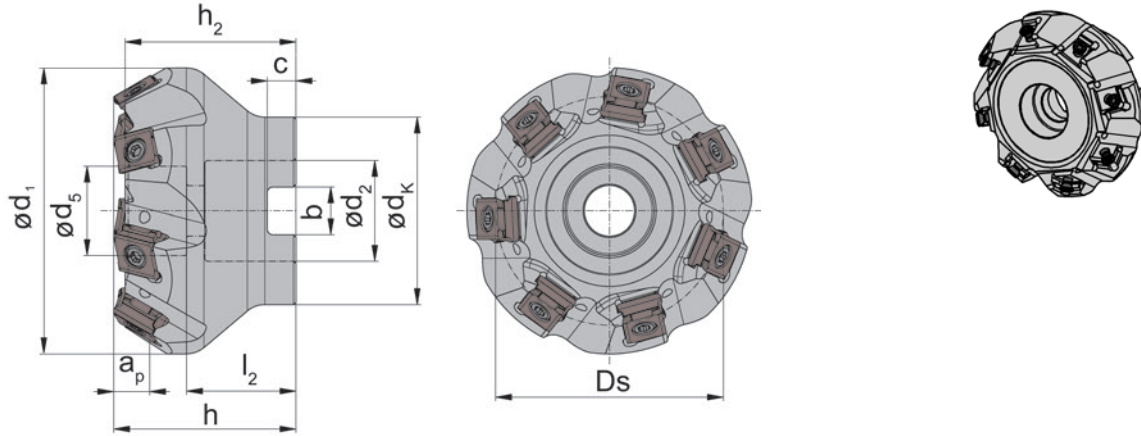
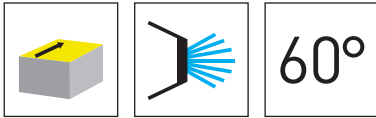


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	b	C	dk	n <sub>max</sub>	HWS
M409.0040.A16.60.05	5	40	7,7	32,5	35	16	50	16	8,4	5,6	33	13900	40900R
M409.0050.A22.60.07	7	50	7,7	37,5	40	19,5	63	22	10,4	6,3	41	12500	40900R
M409.0063.A22.60.08	8	63	7,7	37,5	40	19,5	73	22	10,4	6,3	49	11100	40900R
M409.0063.A27.60.08	8	63	7,7	37,5	40	19,5	75	27	12,4	7	49	11100	40900R
M409.0100.A32.60.12	12	100	7,7	47,5	50	22	112	32	14,4	8	59	8800	40900R
M409.0160.A40.60.20	20	160	7,7	60,5	63	90	172	40	16,4	9	110	6900	40900R
M409.0200.A60.60.24	24	200	7,7	60,5	63	135	212	60	25,7	14	130	6200	40900R
M409.0250.A60.60.30	30	250	7,7	60,5	63	150	262	60	25,7	14	160	5500	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 mm DIN8030-B, from ø160 mm DIN 8030-C

ap = 7,7 mm bei rx = 0,8 mm  
ap = 7,7 mm can be reached with rx = 0,8 mm

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

enge Teilung  
narrow pitch

### Ersatzteile Spare Parts

Planfräser Face Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0160.A40.60.20	030.3511.T10P	T10PL	20.30.6367
M409.0...	030.3511.T10P	T10PL	30.45.6367

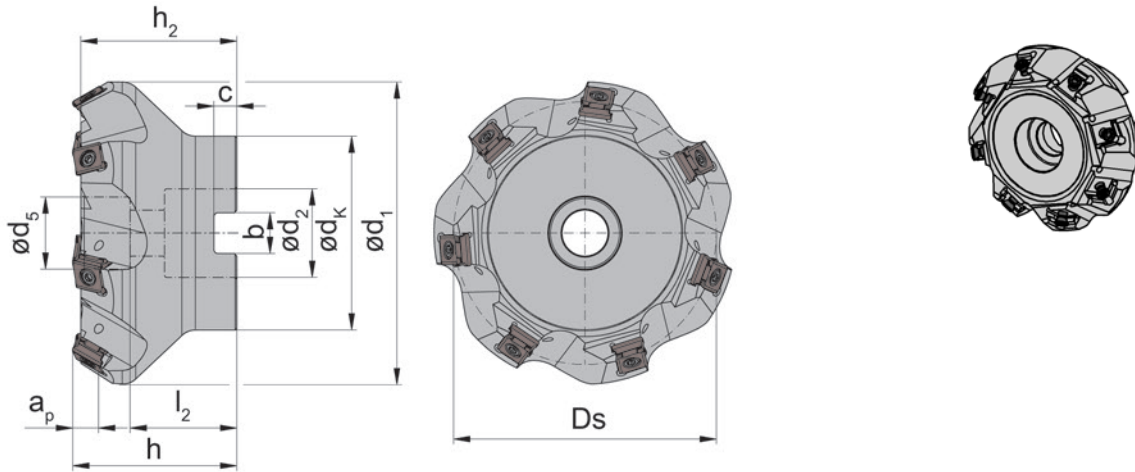
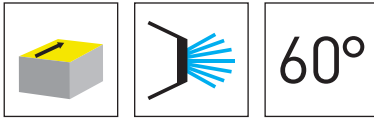


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
M409.0040.A16.60.04	4	40	7,7	32,5	35	17	52	16	8,4	5,6	33	13900	40900R
M409.0050.A22.60.05	5	50	7,7	37,5	40	20	62	22	10,4	6,3	41	12500	40900R
M409.0100.A32.60.08	8	100	7,7	47,5	50	30	112	32	14,4	8	80	8800	40900R
M409.0125.A40.60.10	10	125	7,7	60,5	63	56	137	40	16,4	9	89	7900	40900R
M409.0160.A40.60.14	14	160	7,7	60,5	63	90	172	40	16,4	9	110	6900	40900R
M409.0200.A60.60.16	16	200	7,7	60,5	63	135	212	60	25,7	14	130	6200	40900R
M409.0250.A60.60.20	20	250	7,7	60,5	63	150	262	60	25,7	14	160	5500	40900R

bis ø100 mm Aufsteckfräser nach DIN 8030-A, ø125 mm DIN8030-B, ab ø160 mm DIN8030-C  
up to ø100 mm arbour mounted cutter as per DIN 8030-A, ø125 DIN8030-B, from ø160 mm DIN 8030-C

ap = 7,7 mm bei rx = 0,8 mm  
ap = 7,7 mm can be reached with rx = 0,8 mm

ab ø160 mm: Verfügbarkeit und innere Kühlmittelzufuhr auf Anfrage  
from ø160 mm: availability and internal coolant upon customers request

weite Teilung  
wide pitch

### Ersatzteile Spare Parts

Planfräser Face Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	030.3511.T10P	T10PL	
M409.0125.../...160...	030.3511.T10P	T10PL	20.30.6367
M409.02...	030.3511.T10P	T10PL	30.45.6367



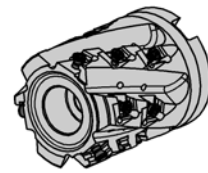
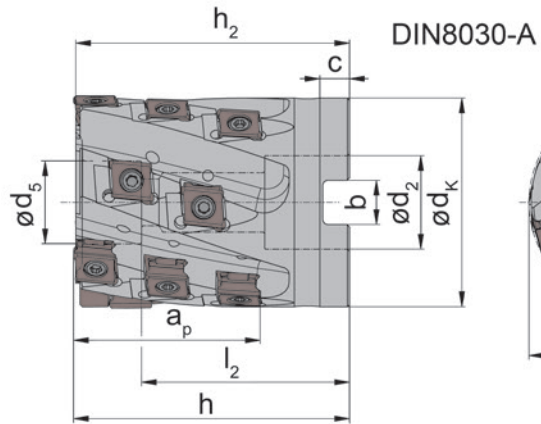


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	a <sub>p</sub>	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
<b>M409.0040.A16.W.10</b>	10	2	40	43,2	64,5	65	16	16	53,4	8,4	5,6	39	13900	40900R
<b>M409.0050.A22.W.15</b>	15	3	50	43,2	64,5	65	19,5	22	49	10,4	6,3	49	12500	40900R
<b>M409.0063.A27.W.20</b>	20	4	63	43,2	64,5	65	21,5	27	48,8	12,4	7	62	11100	40900R

Wendeschneidplatte R409.093.U.08 ist bevorzugt zu verwenden.  
Indexable insert R409.093.U.08 is preferred to use.

## Ersatzteile

Spare Parts

<b>Walzenstirnfräser</b> Shell End Mill	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

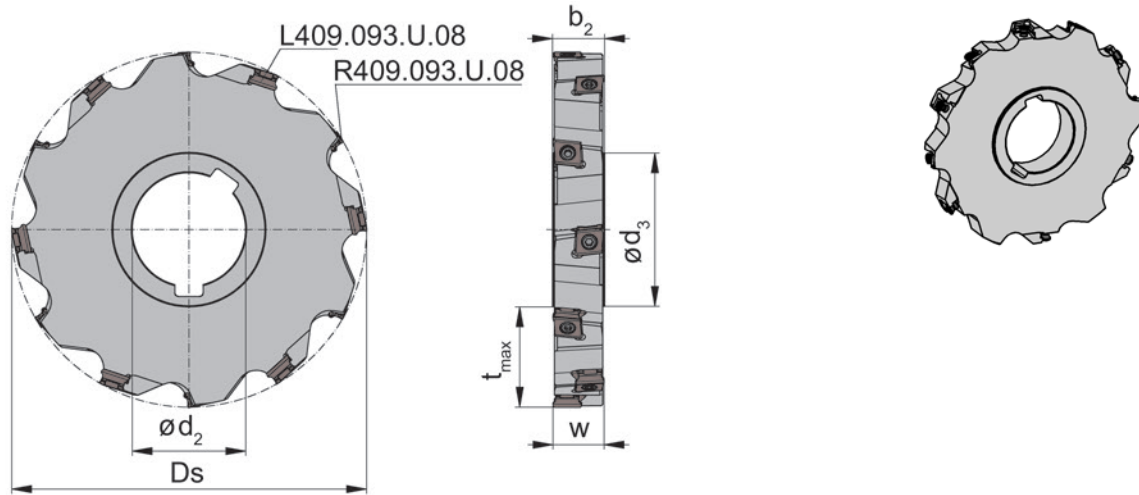


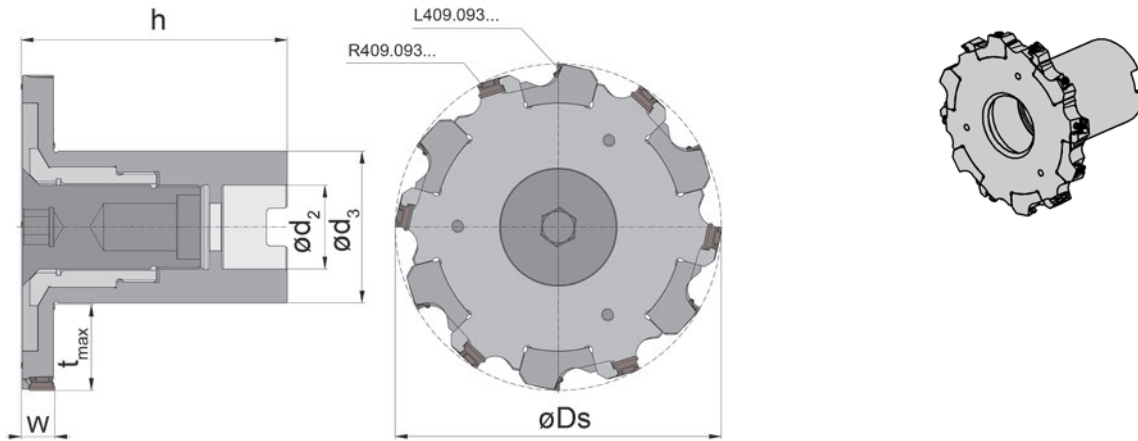
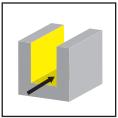
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	D <sub>s</sub>	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	n <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M409.0100.32.S.14</b>	10	5	100	26	32	14,4	46	14	8800	5x R409.093.U.08	5x L409.093.U.08	40900R • 40900L
<b>M409.0100.32.S.18</b>	10	5	100	26	32	18,4	46	18	8800	5x R409.093.U.08	5x L409.093.U.08	40900R • 40900L
<b>M409.0125.40.S.14</b>	12	6	125	34,5	40	14,4	54	14	7900	6x R409.093...	6x L409.093...	40900R • 40900L
<b>M409.0125.40.S.18</b>	12	6	125	34,5	40	18,4	54	18	7900	6x R409.093...	6x L409.093...	40900R • 40900L

## Ersatzteile

Spare Parts

Scheibenfräser Disc Milling Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

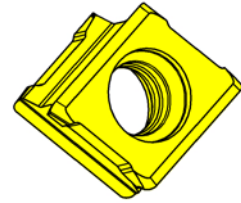
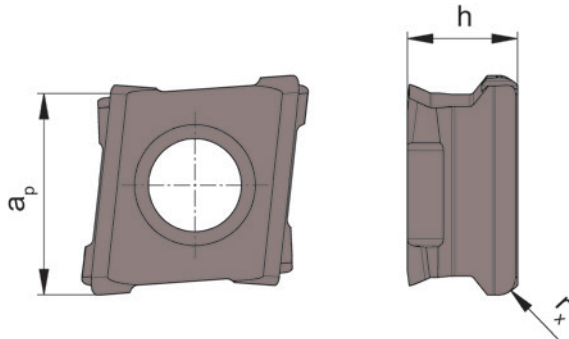
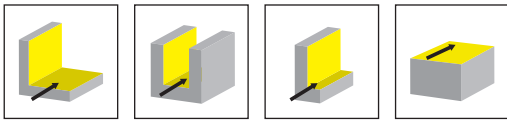


Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	t <sub>max</sub>	h <sub>min</sub>	h <sub>max</sub>	d <sub>3</sub>	d <sub>2</sub>	w <sub>min</sub>	w <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M409.0125.A32.ES.129</b>	12	6	125	32,5	102	107,9	58	32	12,9	18,8	6x R409.093...	6x L409.093...	40900R • 40900L

Aufsteckfräser einstellbar!  
Arbour mounted cutter is adjustable!

**Ersatzteile**  
Spare Parts

Aufsteckfräser Arbour Mounted Cutter	Schraube Screw	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Verstelladapter Adjustment Adapter
M409.0125.A32.ES.129	<b>C409.0125.A32.ES.129</b>	<b>030.3511.T10P</b>	<b>T10PL</b>	<b>A409.0125.A32.ES.129</b>



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

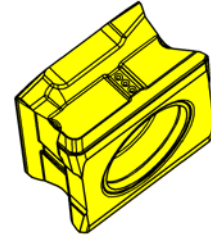
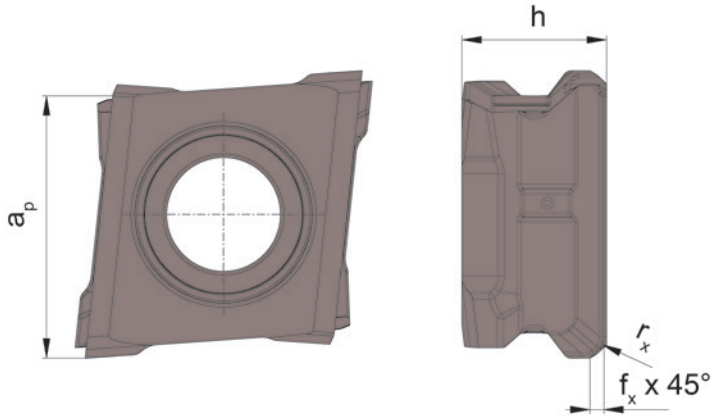
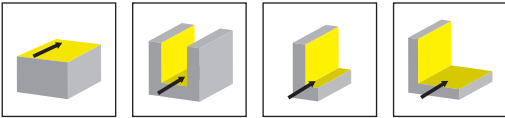
Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	K10	AS46	AS4B	IG35	NE2B
R409.093.U.02	9,3	5,2	0,2	40900R		△	▲		
R409.093.U.04	9,3	5,2	0,4	40900R		▲	▲		
R409.093.U.08	9,3	5,2	0,8	40900R		▲	▲		
R409.093.U.12	9,3	5,2	1,2	40900R		▲	▲		
R409.093.W.02	9,3	5,2	0,2	40900R	▲			▲	▲
R409.093.W.04	9,3	5,2	0,4	40900R				▲	▲
R409.093.W.08	9,3	5,2	0,8	40900R				▲	▲
R409.093.W.12	9,3	5,2	1,2	40900R				▲	▲
L409.093.U.02	9,3	5,2	0,2	40900L		△	▲		
L409.093.U.04	9,3	5,2	0,4	40900L		▲	▲		
L409.093.U.08	9,3	5,2	0,8	40900L		▲	▲		
L409.093.U.12	9,3	5,2	1,2	40900L			▲		
L409.093.W.02	9,3	5,2	0,2	40900L	▲			▲	▲
L409.093.W.04	9,3	5,2	0,4	40900L				▲	▲
L409.093.W.08	9,3	5,2	0,8	40900L				▲	▲
L409.093.W.12	9,3	5,2	1,2	40900L				▲	△
P	●	○	●	-	-				
M	○	○	●	●	-				
K	●	●	●	-	-				
N	●	○	○	-	●				
S	○	○	●	●	-				
H	-	-	-	-	-				

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges

# Wendeschnidplatte

Indexable insert

# 409



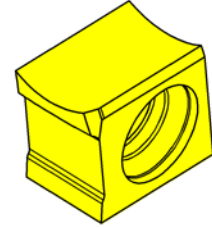
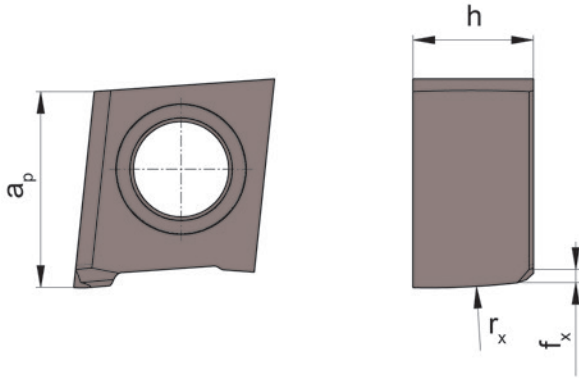
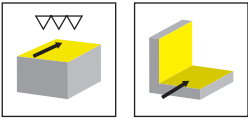
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	a <sub>p</sub>	h	r <sub>x</sub>	f <sub>x</sub>	HIS	HM-Sorten Carbide grades	
						AS45	AS46
<b>RS409.090.P.F05</b>	9	5,2	0,6	0,5	40900R	▲	▲
<b>LS409.090.P.F05</b>	9	5,2	0,6	0,5	40900L	▲	▲
						<b>P</b> ● ○	○ ●
						<b>M</b> ● ○	○ ●
						<b>K</b> ● ●	○ ●
						<b>N</b> ○ ○	○ ●
						<b>S</b> ● ○	○ ●
						<b>H</b> - -	○ ●

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges

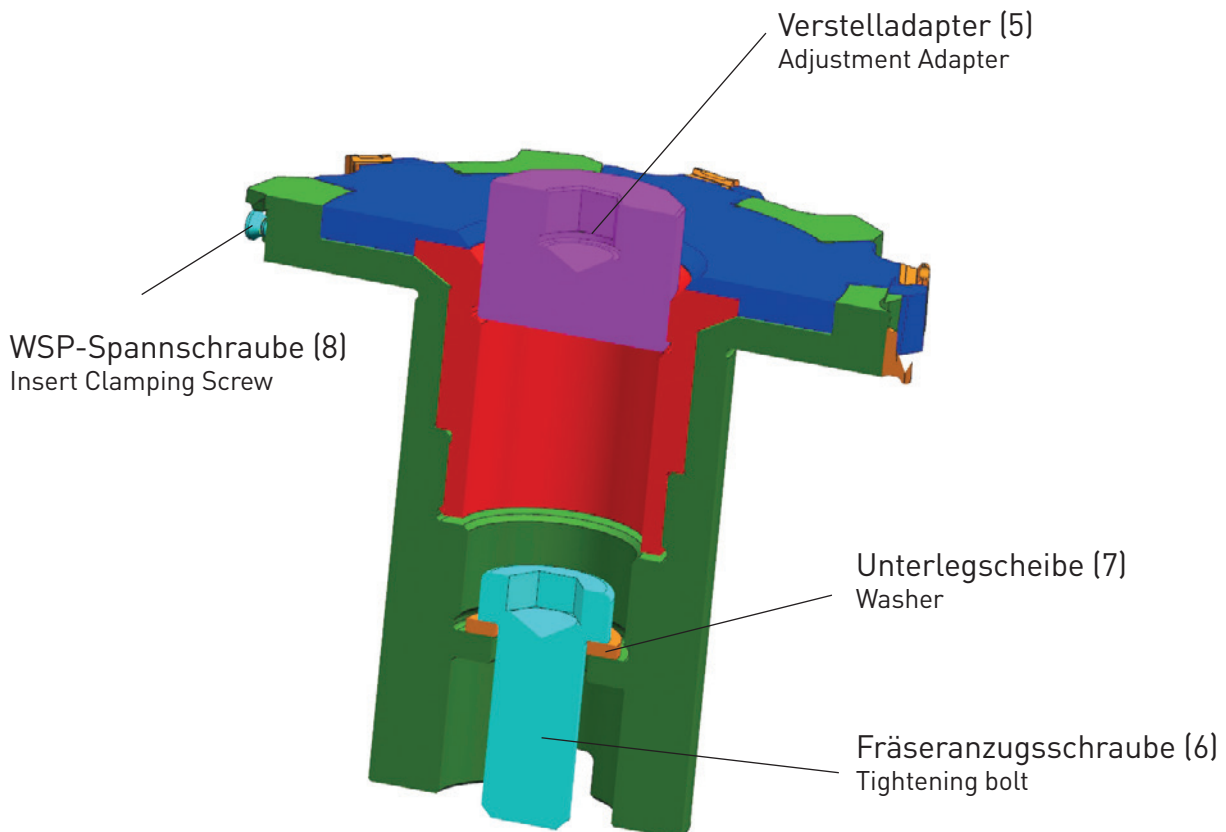
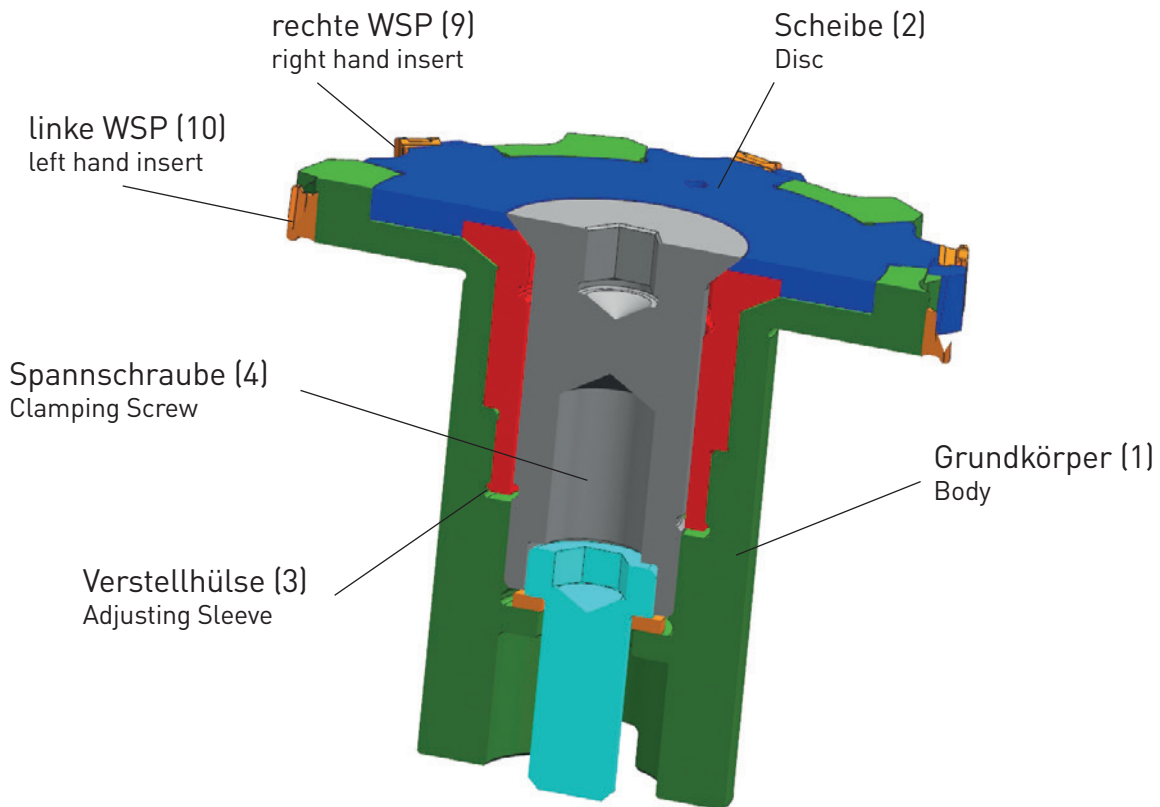


▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

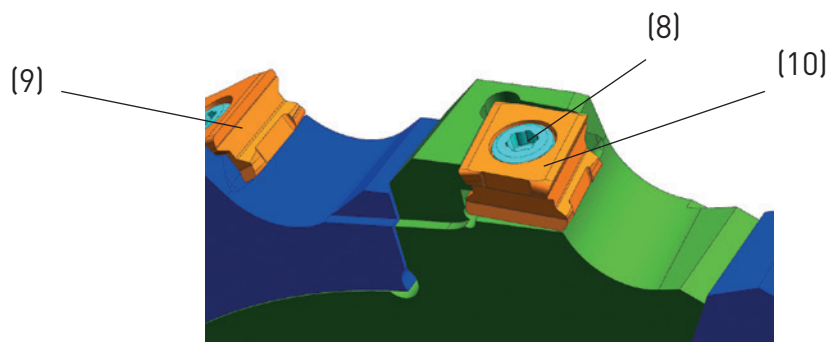
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	$f_x$	HIS	AS46	AS4B
<b>R409.093.S.F4</b>	9,3	5,2	100	0,4	40900R	▲	▲
Breitschlichtschneide, präzisionsgeschliffen Wiper geometry, precision ground						P ●	●
1 nutzbare Schneidkante with 1 usable cutting edge						M ○	●
						K ●	●
						N ○	○
						S ○	●
						H -	-

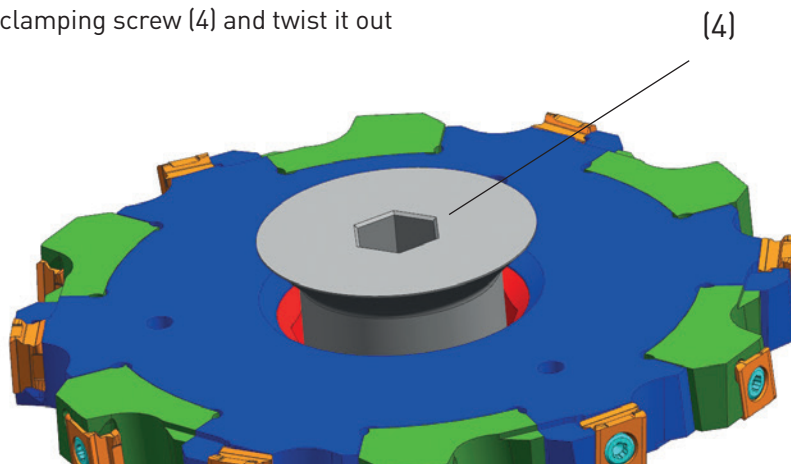


1. Montage der Wendeschneidplatten mittels WSP-Spannschraube (8);  
[rechte WSP (9) und linke WSP (10) Ausführung]

Mount the indexable insert using clamping screw(8);  
[right-hand insert (9) and left-hand insert (10) version]



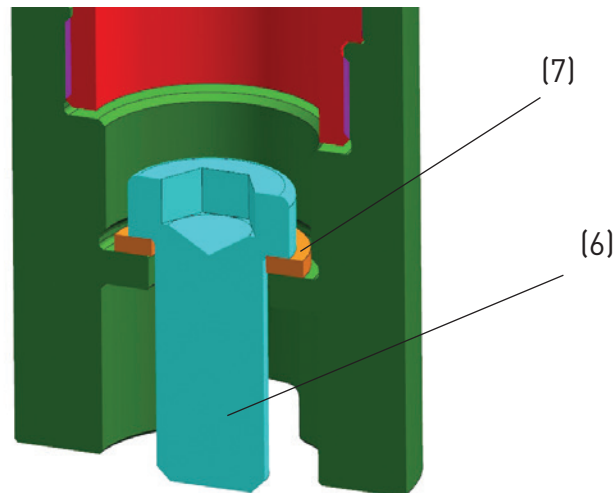
2. Spannschraube (4) lösen und heraus drehen  
Loosen the clamping screw (4) and twist it out





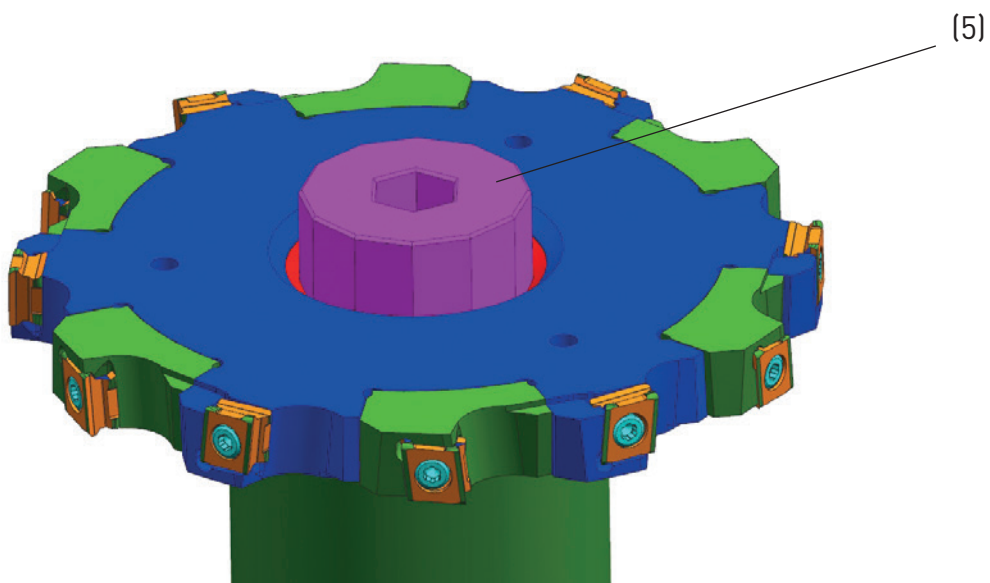
3. Fräs Werkzeug mit beigelegter Unterscheibe (7) und Fräseranzugschraube (6) auf die Werkzeugaufnahme (nicht abgebildet) montieren

Mount the milling tool with the enclosed washer (7) and cutter tightening bolt (6) on the toolholder (not shown)



4. Schneidbreite des Fräses mithilfe des Verstelladapters (5) auf das geforderte Maß voreinstellen

Pre-set the cutting width of the milling cutter to the required dimension with the aid of the adjustment adapter (5)



### Einstellung auf einem Werkzeugvoreinstellgerät:

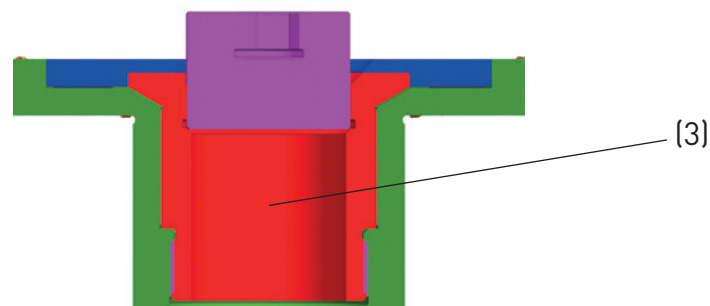
- Montiertes Werkzeug in die Adaption des Voreinstellgerätes einsetzen
- Sicher stellen, dass das Mindestmaß (System 409 → 12,9 mm; System 406 → 9,6 mm) des Werkzeugs eingestellt ist.

Anmerkung: Verstellhülse (3) ist auf Anschlag eingedreht

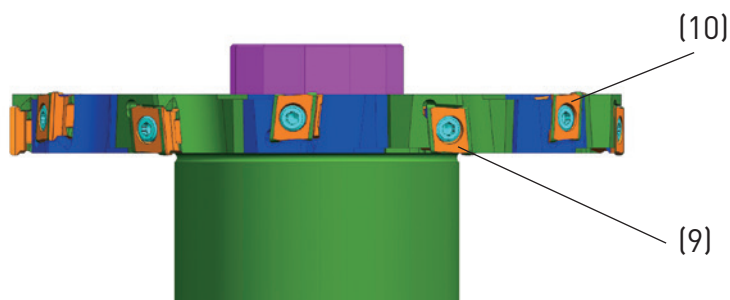
### Adjustment on a tool presetter:

- Insert the mounted tool into the adapter of the presetter.
- Ensure the minimum dimension (system 409 → 12.9 mm; System 406 → 9.6 mm) of the tool.

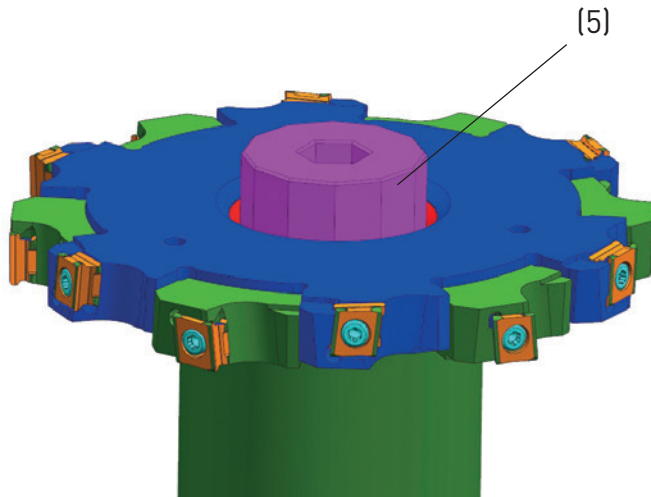
Note: Adjusting sleeve (3) is tightened fully



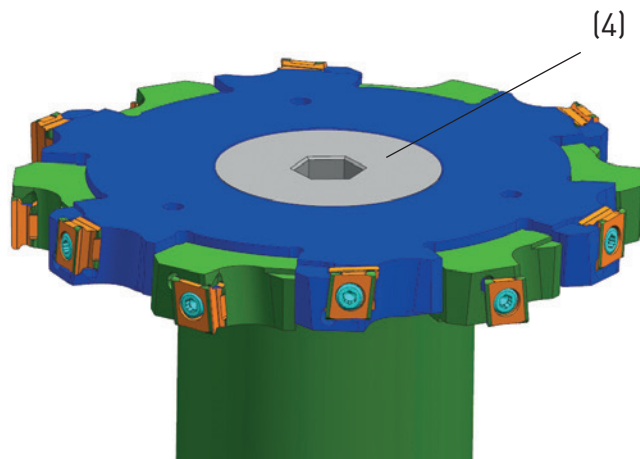
- Untere Schneidenreihe ausmessen [linke WSP's (9)]
  - Obere Schneidenreihe ausmessen [rechte WSP's (10)]
- Measure the lower cutting edge row [left hand inserts (9)]
  - Measure the upper cutting edge row [right hand inserts (10)]



- e. Mittels des Verstelladapters (5) die Schneidbreite justieren (axiale Verstellung je Umdrehung entspricht 1,5 mm)
- e. Adjust the cutting width by means of the adjustment adapter (5) (axial adjustment for each turn corresponds to 1.5 mm)



- f. Spannschraube (4) eindrehen und festziehen
- f. Screw in and tighten the clamping screw (4)



### Hinweis:

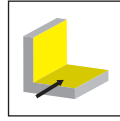
- 1) Nach der ersten gefertigten Nut ist diese zu messen bzw. zu prüfen. Eine Korrektur der Schneidbreite des Fräswerkzeugs ist gegebenenfalls vorzunehmen.
- 2) Grundsätzlich ist bei der Montage und Demontage auf Sauberkeit der einzelnen Teile zu achten.
- 3) Empfehlenswert ist das Schmieren bzw. Fetten der Lauf- und Gewindeflächen des Einstellmechanismus.
- 4) Die maximale Schneidbreite beachten:  
System 409 → 18,8 mm; System 406 → 12,9 mm

### Note:

- 1) After the first groove has been machined, it must be measured or checked. If necessary, the cutting width of the milling tool must be corrected.
- 2) The individual parts must be kept clean during assembly and disassembly
- 3) We recommend lubricating or greasing the contact and thread surfaces of the adjustment mechanism.
- 4) Observe the maximum cutting width:  
System 409 → 18.8 mm; System 406 → 12.9 mm

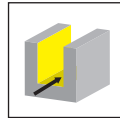


Eckfräser  
Shoulder Mill  
M610



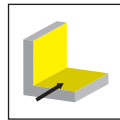
Seite/Page  
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Aufsteckfräser  
Arbour Mounted Cutter  
M610



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Wendeschneidplatte  
Indexable insert  
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# M610

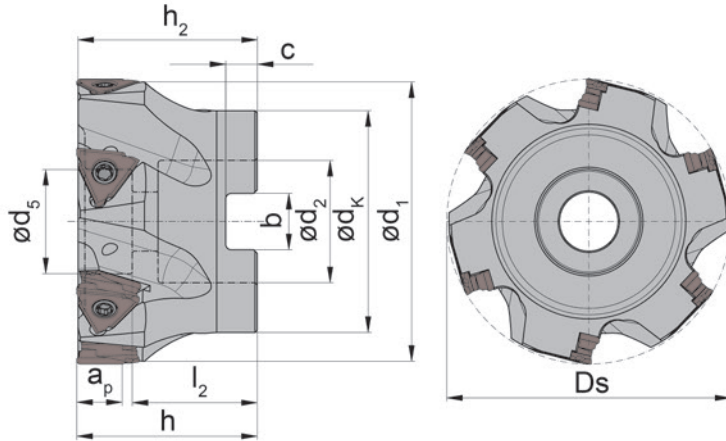


## **Tangentialfräsen mit System 610**

- Eckfräser
- Aufsteckfräser

## **Tangential milling with system 610**

- Shoulder Mill
- Arbor Mounted Cutter

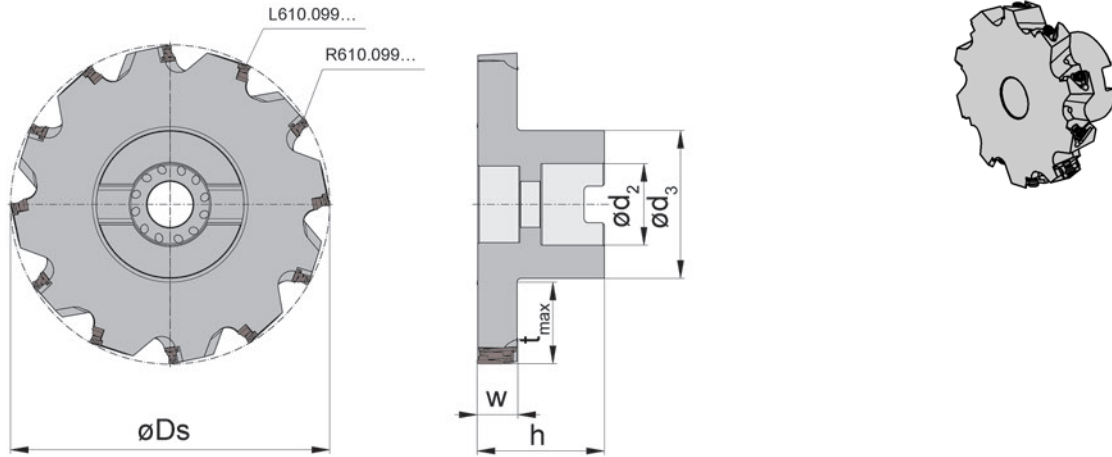
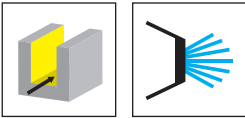


Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
<b>M610.0050.A22.05</b>	5	50	9,9	39,7	40	19,5	49	22	24	10,4	6,3	41	10000	61000R
<b>M610.0063.A22.06</b>	6	63	9,9	39,7	40	19,5	62	22	25	10,4	6,3	49	9000	61000R
<b>M610.0063.A27.06</b>	6	63	9,9	39,7	40	23	62	27	27,5	12,4	7	49	9000	61000R
<b>M610.0080.A27.08</b>	8	80	9,9	49,7	50	21,5	79	27	28	12,4	7	59	8000	61000R
<b>M610.0100.A32.10</b>	10	100	9,9	49,7	50	30	99	32	33	14,4	8	80	7000	61000R
<b>M610.0125.A40.12</b>	12	125	9,9	62,7	63	56	124	40	35	16,4	9	89	6000	61000R

**Ersatzteile**  
Spare Parts

Eckfräser Shoulder Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M610....	<b>030.3513.T15P</b>	<b>T15PQ</b>	
M610.0125.A40.12	<b>030.3513.T15P</b>	<b>T15PQ</b>	<b>20.30.6367</b>

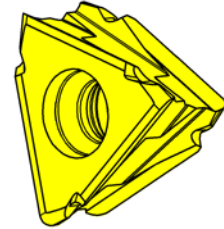
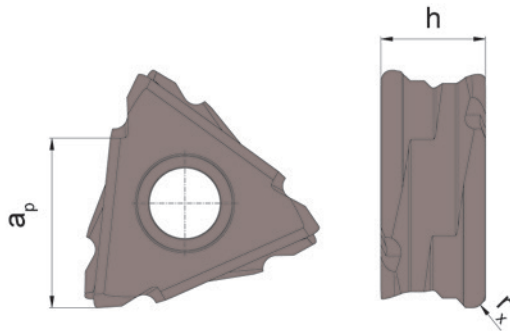
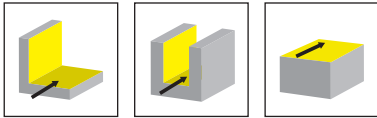




Bestellnummer Part number	Z	Z <sub>eff</sub>	D <sub>s</sub>	t <sub>max</sub>	h	d <sub>3</sub>	d <sub>2</sub>	n <sub>max</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M610.0125.A32.S.16</b>	12	6	125	32,5	50	58	32	6000	16	6x R610.099.U....	6x L610.099.U....	61000L

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M610.0125.A32.S.16	<b>030.3513.T15P</b>	<b>T15PQ</b>

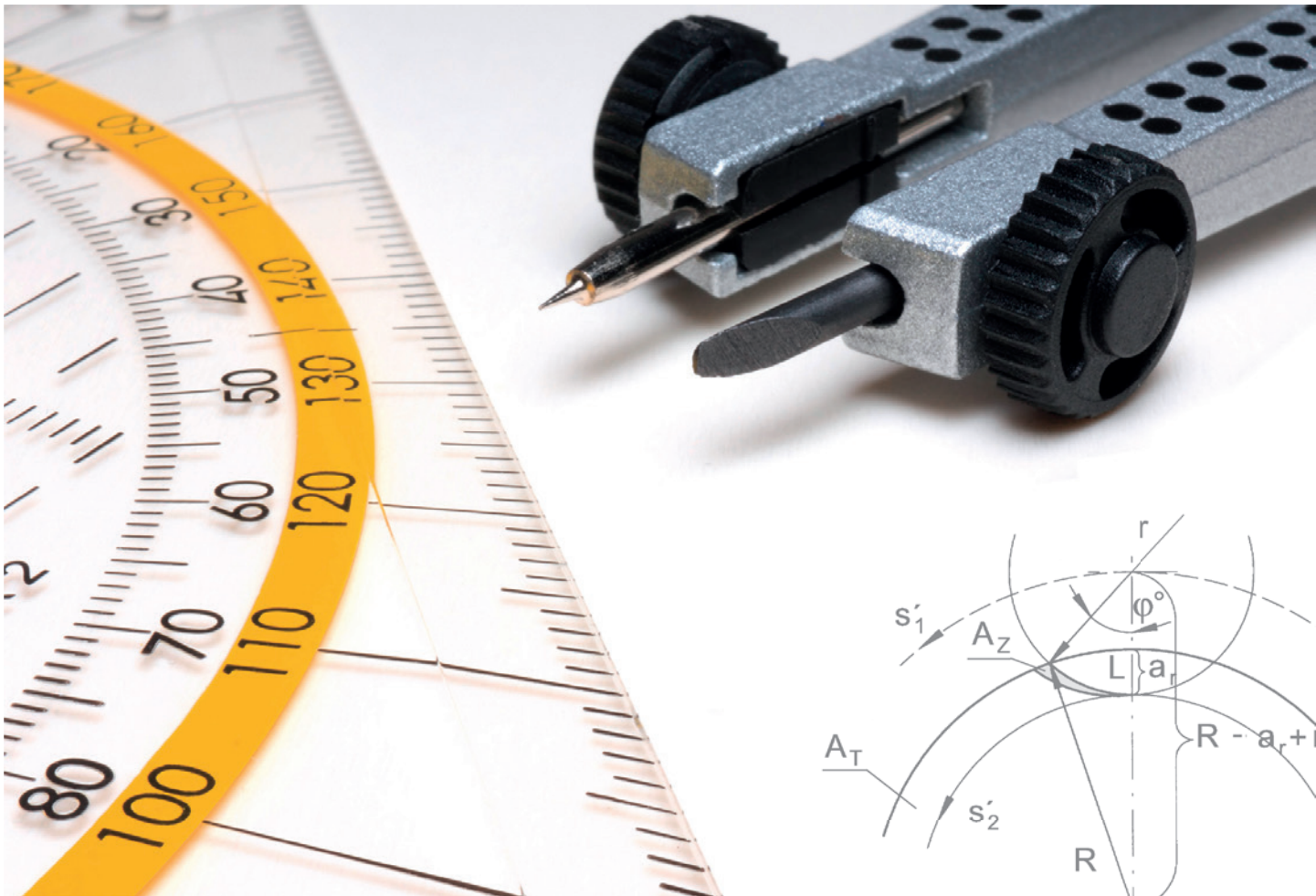


▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	$a_p$	$h$	$r_x$	HIS	AS46	AS4B	IG35	NE2B
R610.099.U.04	9,9	6,2	0,4	61000R	▲	▲	-	-
R610.099.W.04	9,9	6,2	0,4	61000R	-	-	▲	△
R610.099.W.08	9,9	6,2	0,8	61000R	-	-	▲	△
L610.099.U.04	9,9	6,2	0,4	61000L	△	▲	-	-
L610.099.W.04	9,9	6,2	0,4	61000L	-	-	△	△
L610.099.W.08	9,9	6,2	0,8	61000L	-	-	△	△
P	o	●	-	-	-	-	-	-
M	o	●	●	-	-	-	-	-
K	●	●	-	-	-	-	-	-
N	o	o	-	●	-	-	-	-
S	o	●	●	-	-	-	-	-
H	-	-	-	-	-	-	-	-



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Technische Hinweise Technical Instructions	598 - 599
Formelzeichen Cutting Data	600
Vorschübe Feed rate	601 - 607
Schnittdaten Cutting Data	608 - 641
Sortensübersicht Carbide Grades Overview	642 - 643
Zubehör Additional Equipment	644 - 649

Nachstehende Drehmomente sind für die Spannschrauben zulässig. Wir empfehlen keine zusätzlichen Gleitmittel wie Kupferpaste oder ähnliches für die Schrauben zu verwenden.

Following torques are allowed for screws of inserts. We do not recommend using any additional lubricants such as copper paste or similar for the screws.

Typ Type	Schraube Screw	$M_d$ Nm	Schlüssel Clamping wrench	Klinge Blade
380	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
381	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
382...06	5F.06T15P	<b>5,5</b>	T15PQ	DT15PK
382...08	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
382...10/12/14	5.10T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
383...06	5F.06T15P	<b>5,5</b>	T15PQ	DT15PK
383...08	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
383...10/12	5.10T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
ABS	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
DAHM.25.012...	030.2547.T8P	<b>1,3</b>	T8PL	DT8PK
DAHM.25	030.2553.T8P	<b>1,3</b>	T8PL	DT8PK
DAHM.37.../.82...	030.3070.T10P	<b>3,4</b>	T10PL	DT10PK
DAHM.62	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
DAHM.84	030.0412.T15P	<b>4,5</b>	T15PQ	DT15PK
DAM31...02B	030.2541.T8P	<b>1,1</b>	T8PL	DT8PK
DAM31...03A/B	030.2547.T8P	<b>1,1</b>	T8PL	DT8PK
DAM31...04A/B	030.2553.T8P	<b>1,1</b>	T8PL	DT8PK
DAM31...05A/B	030.2557.T8P	<b>1,1</b>	T8PL	DT8PK
DAM32...A...	030.3576.T10P	<b>3,5</b>	T10PL	DT10PK
DAM32...02A/B	030.3562.T10P	<b>3,5</b>	T10PL	DT10PK
DAM32.025.D...03A/B	030.3569.T10P	<b>3,5</b>	T10PL	DT10PK
DAM32.032.D...03A/B	030.3576.T10P	<b>3,5</b>	T10PL	DT10PK
DAM32.417...03B	030.3569.T10P	<b>3,5</b>	T10PL	DT10PK
DAM62	030.3070.T10P	<b>3,0</b>	T10PL	DT10PK
L381.A060...	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
L381.D080...	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
L381.D086...	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
L381.G070...	5.10T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
L381.G080...	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
L381.G086/090/098	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
L381.N090...	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
L381.S...	5.15T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
L381.T...	5F.08T20P	<b>5,5</b>	T20PQ	DT20PK
L381.X090...	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ

# Anzugsmomente

## Torque of Screws



N

Typ Type	Schraube Screw	$M_d$ Nm	Schlüssel Clamping wrench	Klinge Blade
M101	030.3543.T8P	<b>2,0</b>	T8PL	DT8PK
M101...A22...30/...40	030.0520.0912	<b>6,5</b>	T15PQ	DT15PK
M101...A32...30/...40	030.0620.0913	<b>8,0</b>	T20PQ	DT20PK / DT20PQ
M101...A40...30/...40	030.1030.0911	<b>15,0</b>	SW6,0 DIN911	
M116	5.13T20EP	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M275	3.5.10T10P	<b>3,0</b>	T10PL	DT10PK
M275.D	030.357P.0315	<b>3,0</b>	T10PL	DT10PK
M275.T	3.5.10T10P	<b>3,0</b>	T10PL	DT10PK
M279	030.0516.T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M304	1.8.4T6EP	<b>0,9</b>	T6PL	DT6K
M306	2.6.5T8EP	<b>1,2</b>	T8PL	DT8PK
M308	3.5.12T10EP	<b>3,0</b>	T10PL	DT10PK
M310...03	030.0324.T7P	<b>1,2</b>	T7PL	DT7PK
M310...04	030.3535.T8P	<b>2,0</b>	T8PL	DT8PK
M310...05	030.3543.T8P	<b>2,0</b>	T8PL	DT8PK
M311	4.14T15P	<b>5,0</b>	T15PQ	DT15PK
M311.0016.00.B/E	4.16T15KP	<b>5,0</b>	T15PQ	DT15PK
M313	5.14T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M313.0016.00.A/B/E	5.13T20KP	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M328	5.14T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M328.0020.00.A/B/E	5.13T20KP	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M328.0020.D...	5.17T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M332	5.17T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
M335	6.17T25P	<b>12,0</b>	T25PQ	DT20PQ
M406...02/.03	030.2669.T8P	<b>1,2</b>	T8PL	DT8PK
M406...04/.05/.06/.96	030.2608.T8P	<b>1,2</b>	T8PL	DT8PK
M406.025.11.D16.1.02.B	030.2608.T8P	<b>1,2</b>	T8PL	DT8PK
M409	030.3511.T10P	<b>3,5</b>	T10PL	DT10PK
M475...03	030.2523.T6P	<b>0,7</b>	T6PL	DT6PK
M475...04	030.0330.1217	<b>1,2</b>	T7PL	DT7PK
M475...05	030.2523.T6P	<b>0,7</b>	T8PL	DT8PK
M475...06	030.3350.T10P	<b>3,0</b>	T10PQ	DT10PK
M475...08	030.2523.T6P	<b>0,7</b>	T15PQ	DT15PK
M610	030.3513.T15P	<b>3,5</b>	T15Q	DT15K
M620	5.14T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
R381.T...	5F.08T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
R381.X073...	5F.08T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
R381.X090...	5.12T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ
SM328	5.17T20P	<b>6,5</b>	T20PQ	DT20PK / DT20PQ

## Vorschubwerte und Zeitberechnung

### Feed rates and time calculation

Einfach und problemlos lässt sich dies mit dem Rechenprogramm HCT bewältigen. Wir empfehlen, die Schnittdaten mit diesem Programm zu ermitteln, weil nur so die hohe Zerspanungsleistung und Standzeit der HORN-Zirkularfräser erreicht werden kann. Grundlagen der Berechnung finden Sie auf den nachfolgenden Seiten dargestellt.

It is simple and easy to calculate your speed and feeds using HORN'S HCT programme. We recommend that you calculate the cutting data with this programme as, it will provide you with the best cutting performance and results. Basic features of the calculations can be found on the following pages.

## Grundlegende Hinweise:

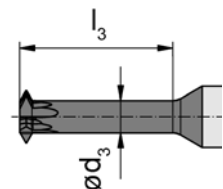
### Basic recommendations:

## Auskraglänge des Fräsers

### Overhang of the milling cutter

Wählen Sie die Aufnahmen oder die Fräserschäfte so kurz wie möglich und prüfen Sie den Rund- und Planlauf der Werkzeuge. Große Schnittbreiten kombiniert mit hoher Auskraglänge erfordern oftmals technische Maßnahmen wie Schnittaufteilung, um das gewünschte Fräsergebnis zu erreichen.

Select the shortest possible clamping device and milling shank, to control the runout tolerance of the tools. Large cutting widths in combination with long overhangs require specific manufacturing methods such as dividing the cutting width to achieve the best possible cutting result due to reduced cutting forces.



## Durchmesser des Fräsers

### Diameter of the milling cutter

Rechnerisch ergeben sich dem Bohrungsdurchmesser angenäherte Fräserdurchmesser, die kleinste Fräsermittelpunktsbahn, damit extrem hohe Vorschübe und kurze Bearbeitungszeiten realisiert werden können. Oftmals wird aber der Durchmesser von den Werkstückgegebenheiten bestimmt.

When using a large diameter cutter, whose relationship is close to the bore diameter, manufacturing cycle time can be reduced, due to the smaller centre of rotation and higher feed rates could be realized. Many times the rotation of the milling cutter centre will be defined by the parameters of the workpiece and the whole application setup.

### Gewindefräsen

#### Thread milling

Mit HORN-Zirkulargewindefräsern werden bei voller Frästiefe die Gewindegänge einzeln abgefahren. Dabei ergeben sich Gewinde mit hoher Zylindrizität, besonders in hochfesten Werkstoffen. In Sacklochbohrungen empfiehlt es sich vom Bohrungsgrund nach außen zu arbeiten. Damit vermeidet man das Auffahren auf Späne und vermindert die Gefahr der Beschädigung des Werkzeugs.

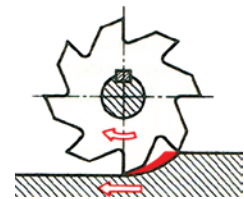
#### Als Faustformel beim Gewindefräsen gilt:

Das Werkzeug darf nicht größer sein als 70% des Kerndurchmessers, ansonsten schneidet es in den Gewindegängen nach.

With HORN thread milling inserts, the thread profile is generated in one full cut to the profile depth of the thread. This produces threads with minimal taper, especially in high alloyed steels. In blind holes, it is recommended to mill from the bottom to the top. Otherwise, there is the risk of damaging the tool because of milling into chips at the bottom of the blind hole.

#### A general recommendation for thread milling:

The milling cutter diameter should not exceed 70% of the minor diameter of the thread. Otherwise, recutting of the profile occurs, which could bring the whole thread out of tolerance.



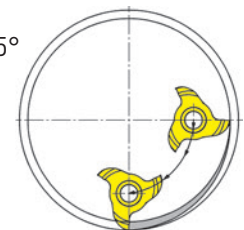
### Fräsrichtung

#### Milling direction

HORN-Zirkularfräswerkzeuge sind rechtsschneidend und es wird empfohlen, wie bei Hartmetall-Werkzeugen üblich, im Gleichlauf zu fräsen.

Most HORN milling tools are right-handed and it is recommended to use them with the climb milling process as this is generally recommended for carbide tools.

Einfahrschleife > 45°  
Ramp angle



### Eintauchen in das Werkstück

#### Milling entry into the workpiece

Einfaches radiales Eintauchen erzeugt aufgrund des hohen Umschlingungswinkels oftmals Schwingungen, die sich beim Nutfräsen bis zum Erreichen des Nutgrundes nicht mehr beruhigen. Empfohlen wird deshalb unter 45° bis 180° in einer Einfahrschleife auf Nuttiefe zu fräsen. Die ermittelten Vorschubwerte beziehen sich zwar auf die volle Frästiefe, werden aber auch beim Einfahren beibehalten.

A simple radial entry of the milling cutter creates a very long contact angle which leads to vibrations which will not disappear for the rest of the milling operation and are visual on the bottom of the groove. It is recommended to enter the groove with a ramp angle of 45° up to 180° to the maximum depth of cut. The calculated cutting data refers to the milling condition when the insert is in the full cut, but can be also used for the entry loop.

## ISO

$a_r$	$a_e$	radiale Schnitttiefe radial depth of cut
$d$		Schneidkreis-Ø [mm] Cutting edge Ø [mm]
$f$		Vorschub pro Umdrehung $f = f_z \cdot Z$ [mm/U] [mm/rev] Feed per revolutions
$f_z$	$s_z$	Vorschub/Zahn $f_z = \frac{v_f}{Z \cdot n}$ [mm] Feed/tooth
$h_m$		mittlere Spandicke medium thickness of chip
$n$		Drehzahl $n = \frac{v_c \cdot 1000}{d \cdot \pi}$ [1/min] Revolutions
$r$		Radius Fräser Radius of cutter
$R$		Radius Werkstück Radius of workpiece
$v_c$		Schnittgeschwindigkeit $v_c = \frac{d \cdot \pi \cdot n}{1000}$ [m/min] Cutting speed
$v_f$	$s'$	Vorschubgeschwindigkeit $v_f = f_z \cdot Z \cdot n$ [mm/min] Feed rate
$v_{f2}$	$s'_2$	Vorschubgeschwindigkeit der Schneide (Nutgrund-Ø) Feed rate of tool tip
$v_{f3}$	$s'_1$	Vorschubgeschwindigkeit der Fräsmittelpunktsbahn Feed rate of tool centre
$Z$		Zähnezahl Number of teeth



# Vorschubwerte Eckfräser DAM

## Feed rate shoulder mill



Werkstoff Material	Material- gruppe Material group	DAM31 Eckfräser Shoulder mill $\kappa = 90^\circ$				DAM32 Eckfräser Shoulder mill $\kappa = 90^\circ$				DAM62 Eckfräser Shoulder mill $\kappa = 90^\circ$				
		$a_e / D_c$				$a_e / D_c$				$a_e / D_c$				
		100%	50%	20%	10%	100%	50%	20%	10%	100%	50%	20%	10%	
<b>P</b> unlegierter Stahl Carbon steel	P1.1 - P1.5	0,12	0,14	0,15	0,20	0,16	0,18	0,20	0,27	0,15	0,17	0,19	0,25	
	niedrig legierter Stahl (<5%) Alloyed steel	P2.1 - P2.4	0,08	0,09	0,10	0,13	0,10	0,12	0,13	0,17	0,11	0,13	0,14	0,18
	hochlegierter Stahl (>5%) high alloyed steel	P3.1 - P3.2												
	Stahlguss Cast steel	P4.1 - P4.2												
	Sinterstahl Sintered steel	P5.1												
<b>M</b> Rostfreier Stahl Stainless steel	M1.1-M1.3	0,06	0,07	0,08	0,10	0,08	0,09	0,10	0,13	0,08	0,09	0,10	0,13	
<b>K</b> Grauguss Grey cast iron	K1.1-K1.2	0,12	0,14	0,15	0,20	0,16	0,18	0,20	0,27	0,19	0,22	0,24	0,32	
	Kugelgraphitguss Spheroidal graphite cast iron	K2.1-K2.2	0,10	0,12	0,13	0,17	0,13	0,15	0,16	0,22	0,15	0,17	0,19	0,25
	Temperguss Malleable cast iron	K3.1-K3.2	0,10	0,12	0,13	0,17	0,13	0,15	0,16	0,22	0,15	0,17	0,19	0,25
	Ausferritisches Gussseisen Ausferritic spheroidal cast iron ADI	K4.1-K4.3	0,08	0,09	0,10	0,13	0,11	0,13	0,14	0,18	0,11	0,13	0,14	0,18
<b>N</b> Al-Legierungen Al-alloys	N1.1-N1.2	0,08	0,09	0,10	0,13	0,11	0,13	0,14	0,18	0,11	0,13	0,14	0,18	
	Al-Guss-Legierung Al-cast-alloy	N2.1-N2.3	0,10	0,12	0,13	0,17	0,13	0,15	0,16	0,22	0,13	0,15	0,16	0,22
	Kupfer-Legierungen Copper-alloys	N3.1-N3.4	0,06	0,07	0,08	0,10	0,11	0,13	0,14	0,18	0,11	0,13	0,14	0,18
	Graphit Graphite	N4.1												
<b>S</b> Warmfeste Legierung (Fe) Heat resistant alloy	S1.1-S1.2	0,06	0,07	0,08	0,10	0,08	0,09	0,10	0,13	0,09	0,10	0,11	0,15	
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	S2.1-S2.2	0,06	0,07	0,08	0,10	0,08	0,09	0,10	0,13	0,09	0,10	0,11	0,15
	Titan Titan	S3.1-S3.3	0,06	0,07	0,08	0,10	0,08	0,09	0,10	0,13	0,09	0,10	0,11	0,15
<b>H</b> Gehärtete Stähle Hardened steels	H1.1-H1.4													
<b>O</b> Thermoplaste Thermoplastics	O1.1													
	Duroplaste Duro plaste	O1.2												
	Kunstst. glasfaserverstärkt Plastics glass fibre reinforced	O1.3												
	Kunstst. kohlefaserverstärkt Plastics carbon fibre reinforced	O1.4												

Werkstoff Material	Material- gruppe Material group	M406 Eckfräser Shoulder Mill $\kappa = 90^\circ$				M409 Eckfräser Shoulder Mill $\kappa = 90^\circ$				M406 T-Nut Fräser T-Slot Cutter $\kappa = 90^\circ$				
		$a_e / D_c$				$a_e / D_c$				$a_e / D_c$				
		100%	50%	20%	10%	100%	50%	20%	10%	100%	50%	20%		
<b>P</b> unlegierter Stahl Carbon steel	P1.1 - P1.5	0,16	0,18	0,20	0,27	0,20	0,23	0,25	0,33	0,10	0,12	0,13		
	niedrig legierter Stahl (<5%) Alloyed steel	P2.1 - P2.4	0,14	0,16	0,18	0,23	0,18	0,21	0,23	0,30	0,08	0,09	0,10	
	hochlegierter Stahl (>5%) high alloyed steel	P3.1 - P3.2												
	Stahlguss Cast steel	P4.1 - P4.2												
	Sinterstahl Sintered steel	P5.1												
<b>M</b> Rostfreier Stahl Stainless steel	M1.1-M1.3	0,10	0,12	0,13	0,17	0,12	0,12	0,13	0,17	0,06	0,07	0,08		
<b>K</b> Grauguss Grey cast iron	K1.1-K1.2	0,16	0,18	0,20	0,27	0,18	0,18	0,20	0,27	0,12	0,14	0,15		
	Kugelgraphitguss Spheroidal graphite cast iron	K2.1-K2.2	0,14	0,16	0,18	0,23	0,16	0,16	0,18	0,23	0,10	0,12	0,13	
	Temperguss Malleable cast iron	K3.1-K3.2	0,14	0,16	0,18	0,23	0,16	0,16	0,18	0,23				
	Ausferritisches Gussseisen/ADI Ausferritic spheroidal cast iron/ADI	K4.1-K4.3												
<b>N</b> Al-Legierungen Al-alloys	N1.1-N1.2	0,12	0,14	0,15	0,20	0,14	0,14	0,15	0,20					
	Al-Guss-Legierung Al-cast-alloy	N2.1-N2.3	0,15	0,17	0,19	0,25	0,14	0,17	0,19	0,25				
	Kupfer-Legierungen Copper-alloys	N3.1-N3.4	0,10	0,12	0,13	0,17	0,12	0,12	0,13	0,17				
	Graphit Graphite	N4.1												
<b>S</b> Warmfeste Legierung (Fe) Heat resistant alloy	S1.1-S1.2	0,08	0,09	0,10	0,13	0,10	0,09	0,10	0,13					
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	S2.1-S2.2	0,08	0,09	0,10	0,13	0,10	0,09	0,10	0,13				
	Titan Titan	S3.1-S3.3	0,08	0,09	0,10	0,13	0,10	0,09	0,10	0,13				
<b>H</b> Gehärtete Stähle Hardened steels	H1.1-H1.4													
<b>O</b> Thermoplaste Thermoplastics	O1.1													
	Duroplaste Duro plaste	O1.2												
	Kunststoffe glasfaserverstärkt Plastics glass fibre reinforced	O1.3												
	Kunststoffe kohlefaserverstärkt Plastics carbon fibre reinforced	O1.4												

	M409 T-Nut Fräser T-Slot Cutter $\kappa = 90^\circ$				M409 Walzenstirnfräser Shell End Mill $\kappa = 90^\circ$				M409 Planfräser Face Mill $\kappa = 45^\circ$				M409 Planfräser Face Mill $\kappa = 60^\circ$			
	$a_e / D_c$				$a_e / D_c$				$a_e / D_c$				$a_e / D_c$			
	100%	50%	20%	10%	100%	50%	20%	10%	100%	50%	20%	10%	100%	50%	20%	10%
	0,12	0,14	0,15	0,20	0,15	0,17	0,19	0,25	0,28	0,32	0,35	0,47	0,23	0,26	0,29	0,38
	0,10	0,12	0,13	0,17	0,12	0,14	0,15	0,20	0,25	0,29	0,31	0,42	0,21	0,24	0,26	0,35
	0,06	0,07	0,08	0,10	0,08	0,12	0,13	0,17	0,17	0,12	0,13	0,17	0,14	0,16	0,18	0,23
	0,14	0,16	0,18	0,23	0,16	0,18	0,20	0,27	0,25	0,18	0,20	0,27	0,21	0,24	0,26	0,35
	0,10	0,12	0,13	0,17	0,12	0,16	0,18	0,23	0,22	0,16	0,18	0,23	0,18	0,21	0,23	0,30
					0,12	0,16	0,18	0,23	0,22	0,16	0,18	0,23	0,18	0,21	0,23	0,30
					0,12	0,14	0,15	0,20	0,20	0,14	0,15	0,20	0,16	0,18	0,20	0,27
					0,10	0,17	0,19	0,25	0,20	0,17	0,19	0,25	0,16	0,18	0,20	0,27
					0,10	0,12	0,13	0,17	0,17	0,12	0,13	0,17	0,14	0,16	0,18	0,23
					0,10	0,09	0,10	0,13	0,14	0,09	0,10	0,13	0,12	0,14	0,15	0,20
					0,10	0,09	0,10	0,13	0,14	0,09	0,10	0,13	0,12	0,14	0,15	0,20
					0,10	0,09	0,10	0,13	0,14	0,09	0,10	0,13	0,12	0,14	0,15	0,20

Werkstoff Material	Material- gruppe Material group	M409 Scheibenfräser Disc Milling Cutter $\kappa = 90^\circ$				M610 Eckfräser Shoulder Mill $\kappa = 90^\circ$				
		$a_e / D_c$				$a_e / D_c$				
		100%	50%	20%	10%	100%	50%	20%	10%	
<b>P</b> unlegierter Stahl Carbon steel	P1.1 - P1.5	0,15	0,17	0,19	0,25	0,16	0,18	0,20	0,27	
	niedrig legierter Stahl (<5%) Alloyed steel	P2.1 - P2.4	0,13	0,15	0,16	0,22	0,14	0,16	0,18	0,23
	hochlegierter Stahl (>5%) high alloyed steel	P3.1 - P3.2								
	Stahlguss Cast steel	P4.1 - P4.2								
	Sinterstahl Sintered steel	P5.1								
<b>M</b> Rostfreier Stahl Stainless steel	M1.1-M1.3	0,08	0,09	0,10	0,13	0,10	0,12	0,13	0,17	
<b>K</b> Grauguss Grey cast iron	K1.1-K1.2	0,18	0,21	0,23	0,30	0,16	0,18	0,20	0,27	
	Kugelgraphitguss Spheroidal graphite cast iron	K2.1-K2.2	0,15	0,17	0,19	0,25	0,14	0,16	0,18	0,23
	Temperguss Malleable cast iron	K3.1-K3.2	0,15	0,17	0,19	0,25	0,14	0,16	0,18	0,23
	Ausferritisches Gussseisen/ADI Ausferritic spheroidal cast iron/ADI	K4.1-K4.3								
<b>N</b> Al-Legierungen Al-alloys	N1.1-N1.2	0,12	0,14	0,15	0,20	0,12	0,14	0,15	0,20	
	Al-Guss-Legierung Al-cast-alloy	N2.1-N2.3	0,10	0,12	0,13	0,17	0,15	0,17	0,19	0,25
	Kupfer-Legierungen Copper-alloys	N3.1-N3.4	0,10	0,12	0,13	0,17	0,10	0,12	0,13	0,17
	Graphit Graphite	N4.1								
<b>S</b> Warmfeste Legierung (Fe) Heat resistant alloy	S1.1-S1.2	0,08	0,09	0,10	0,13	0,08	0,09	0,10	0,13	
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	S2.1-S2.2	0,08	0,09	0,10	0,13	0,08	0,09	0,10	0,13
	Titan Titan	S3.1-S3.3	0,08	0,09	0,10	0,13	0,08	0,09	0,10	0,13
<b>H</b> Gehärtete Stähle Hardened steels	H1.1-H1.4									
<b>O</b> Thermoplaste Thermoplastics	O1.1									
	Duroplaste Duro plaste	O1.2								
	Kunststoffe glasfaserverstärkt Plastics glass fibre reinforced	O1.3								
	Kunststoffe kohlefaserverstärkt Plastics carbon fibre reinforced	O1.4								

	M610 Scheibenfräser Disc Milling Cutter $\kappa = 90^\circ$				M475 Scheibenfräser Disc Milling Cutter $w = 3 + 4 \text{ mm}$				M475 Scheibenfräser Disc Milling Cutter $w = 6 + 8 \text{ mm}$			
	$a_e / D_c$				$a_e / D_c$				$a_e / D_c$			
	100%	50%	20%	10%	100%	50%	20%	10%	100%	50%	20%	10%
	0,15	0,17	0,19	0,25	0,09	0,10	0,11	0,15	0,11	0,13	0,14	0,18
	0,13	0,15	0,16	0,22	0,07	0,08	0,09	0,12	0,09	0,10	0,11	0,15
	0,08	0,09	0,10	0,13	0,05	0,06	0,06	0,08	0,06	0,07	0,08	0,10
	0,18	0,21	0,23	0,30	0,11	0,13	0,14	0,18	0,14	0,16	0,18	0,23
	0,15	0,17	0,19	0,25	0,09	0,10	0,11	0,15	0,11	0,13	0,14	0,18
	0,15	0,17	0,19	0,25	0,09	0,10	0,11	0,15	0,11	0,13	0,14	0,18
	0,12	0,14	0,15	0,20	0,07	0,08	0,09	0,12	0,09	0,10	0,11	0,15
	0,10	0,12	0,13	0,17	0,06	0,07	0,08	0,10	0,08	0,09	0,10	0,13
	0,10	0,12	0,13	0,17								
	0,08	0,09	0,10	0,13	0,05	0,06	0,06	0,08	0,06	0,07	0,08	0,10
	0,08	0,09	0,10	0,13	0,05	0,06	0,06	0,08	0,06	0,07	0,08	0,10
	0,08	0,09	0,10	0,13	0,05	0,06	0,06	0,08	0,06	0,07	0,08	0,10

Werkstoff Material	Material- gruppe Material group	DAHM25 Hochvorschubfräser Disc Milling Cutter $\kappa = 24^\circ$				DAHM37 Hochvorschubfräser Disc Milling Cutter $\kappa = 19^\circ$					
		$a_e / D_c$				$a_e / D_c$					
		100%	50%	20%	10%	100%	50%	20%	10%		
<b>P</b> unlegierter Stahl Carbon steel	P1.1 - P1.5	0,90	1,04	1,13	1,50	1,20	1,38	1,50	2,00		
	niedrig legierter Stahl (<5%) Alloyed steel	P2.1 - P2.4	0,80	0,92	1,00	1,34	1,00	1,38	1,50	2,00	
	hochlegierter Stahl (>5%) high alloyed steel	P3.1 - P3.2									
	Stahlguss Cast steel	P4.1 - P4.2									
	Sinterstahl Sintered steel	P5.1									
<b>M</b> Rostfreier Stahl Stainless steel	M1.1-M1.3	0,40	0,46	0,50	0,67	0,50	1,38	1,50	2,00		
<b>K</b> Grauguss Grey cast iron	K1.1-K1.2	1,10	1,27	1,38	1,84	1,20	1,38	1,50	2,00		
	Kugelgraphitguss Spheroidal graphite cast iron	K2.1-K2.2	0,90	1,04	1,13	1,50	1,00	1,38	1,50	2,00	
	Temperguss Malleable cast iron	K3.1-K3.2	0,90	1,04	1,13	1,50	1,00	1,38	1,50	2,00	
	Ausferritisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	K4.1-K4.3									
<b>N</b> Al-Legierungen Al-alloys	N1.1-N1.2										
	Al-Guss-Legierung Al-cast-alloy	N2.1-N2.3									
	Kupfer-Legierungen Copper-alloys	N3.1-N3.4									
	Graphit Graphite	N4.1									
<b>S</b> Warmfeste Legierung (Fe) Heat resistant alloy	S1.1-S1.2	0,40	0,46	0,50	0,67	0,50	0,58	0,63	0,84		
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	S2.1-S2.2	0,40	0,46	0,50	0,67	0,50	0,58	0,63	0,84	
	Titan Titan	S3.1-S3.3	0,40	0,46	0,50	0,67	0,50	0,58	0,63	0,84	
<b>H</b> Gehärtete Stähle Hardened steels	H1.1-H1.4										
<b>O</b> Thermoplaste Thermoplastics	O1.1										
	Duroplaste Duro plaste	O1.2									
	Kunststoffe glasfaserverstärkt Plastics glass fibre reinforced	O1.3									
	Kunststoffe kohlefaserverstärkt Plastics carbon fibre reinforced	O1.4									

	DAHM82 Hochvorschubfräser Disc Milling Cutter $\kappa = 10^\circ$				DAHM84 Hochvorschubfräser Disc Milling Cutter $\kappa = 10^\circ$			
	$a_e / D_c$				$a_e / D_c$			
	100%	50%	20%	10%	100%	50%	20%	10%
	1,20	1,38	1,50	2,00	1,30	1,50	1,63	2,17
	1,00	1,38	1,50	2,00	1,10	1,27	1,38	1,84
	0,50	0,58	0,63	0,84	0,60	0,69	0,75	1,00
	1,20	1,38	1,50	2,00	1,30	1,50	1,63	2,17
	1,00	1,15	1,25	1,67	1,10	1,27	1,38	1,84
	1,00	1,15	1,25	1,67	1,10	1,27	1,38	1,84
	0,60	0,69	0,75	1,00	0,70	0,81	0,88	1,17
	0,60	0,69	0,75	1,00	0,70	0,81	0,88	1,17
	0,60	0,69	0,75	1,00	0,70	0,81	0,88	1,17

Werkstoff Material	Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_g/D_c$				
					100%	50%	20%		
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	160	200	240
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	160	200	240
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	160	200	240
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	160	200	240
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	160	200	240
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	160	200	240
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	180	200	220
		vergütet quenched	P2.2	280	960	14NiCr10	180	200	220
		vergütet quenched	P2.3	350	1250	34CrMo4	180	200	220
		vergütet quenched	P2.4	430	1450	55Cr3	180	200	220
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18			
		gehärtet hardened	P3.2	350	1200	X210Cr2			
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200			
		legiert alloyed	P4.2	220	750	GX40CrSi28			
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39			
	<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	80	105
austenitisch austenitic ferritic			M1.2	300	1000	X6CrNiMo- Ti17-12-2	80	105	130
austenitisch ferritisch austenitic			M1.3	230	780	X2CrNiMo- N17-13-3	80	105	130





# Schnittdaten Eck- und Planfräsen (radial)

## Cutting Data Corner and Face milling (radial)



Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e/D_c$			
						100%	50%	20%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	220	260	300
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	220	240	260
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	220	240	260
		perlisch perlitic	K2.1	260	700	GGG-60	220	240	260
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45			
		perlisch perlitic	K3.2	260	700	GTS-55-04			
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800				
		vergütet quenched	K4.2	350	1050				
		vergütet quenched	K4.3	450	1400				
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	350	675	1000
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	350	675	1000
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6			
		6-10% Si	N2.2	100	320	AlSi7Mg			
		10-15 % Si	N2.3	130	450	AlSi12			
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu			
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb			
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40			
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3			
	Graphit Graphite		N4.1						

**DAM31, DAM32, DAM62, DAHM25, DAHM37,  
DAHM82, DAHM84**



N

	TA45 a <sub>e</sub> /D <sub>c</sub>			HD05 a <sub>e</sub> /D <sub>c</sub>			PD75 a <sub>e</sub> /D <sub>c</sub>			SD6A a <sub>e</sub> /D <sub>c</sub>			SC6A a <sub>e</sub> /D <sub>c</sub>			IG6B a <sub>e</sub> /D <sub>c</sub>		
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%
	140	150	160							220	260	300	220	260	300	160	170	180
	140	150	160							220	240	260	220	240	260	160	170	180
	140	150	160							220	240	260	220	240	260	160	170	180
	140	150	160							220	240	260	220	240	260	160	170	180
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
				500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									
	500	850	1200	500	1750	3000	500	1750	3000									

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e/D_c$		
						100%	50%	20%
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			
		gehärtet hardened	S1.2	275	930			
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		
		gehärtet hardened	S2.2	350	1200	Inconel 713		
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240			
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200			
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400				
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1					
		55-60 HRC	H1.2					
		60-63 HRC	H1.3					
		> 63HRC	H1.4					
<b>O</b>	Thermoplaste Thermoplastics		O1.1					
	Duroplaste Duro plaste		O1.2					
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4					



Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_g/D_c$			
						100%	50%	20%	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15			
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6			
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5			
		~ 0,6% C geglüht annealed	P1.4	190	610	C55			
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60			
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28			
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6			
		vergütet quenched	P2.2	280	960	14NiCr10			
		vergütet quenched	P2.3	350	1250	34CrMo4			
		vergütet quenched	P2.4	430	1450	55Cr3			
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18			
		gehärtet hardened	P3.2	350	1200	X210Cr2			
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200			
		legiert alloyed	P4.2	220	750	GX40CrSi28			
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39			
	<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13		
austenitisch austenitic ferritic			M1.2	300	1000	X6CrNiMo- Ti17-12-2			
austenitisch ferritisch austenitic			M1.3	230	780	X2CrNiMo- N17-13-3			

	AS46 a <sub>e</sub> /D <sub>c</sub>			AS4B a <sub>e</sub> /D <sub>c</sub>			IG35 a <sub>e</sub> /D <sub>c</sub>			NE2B a <sub>e</sub> /D <sub>c</sub>								
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
	160	200	240	160	200	240	180	210	240									
	160	200	240	160	200	240	180	210	240									
	160	200	240	160	200	240	180	210	240									
	160	200	240	160	200	240	180	210	240									
	160	200	240	160	200	240	180	210	240									
	160	200	240	160	200	240	180	210	240									
	180	200	220	180	200	220	180	200	220									
	180	200	220	180	200	220	180	200	220									
	180	200	220	180	200	220	180	200	220									
	180	200	220	180	200	220												
	80	105	130	80	105	130	80	105	130									
	80	105	130	80	105	130	80	105	130									
	80	105	130	80	105	130	80	105	130									

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_e/D_c$			
						100%	50%	20%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25			
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40			
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40			
		perlisch perlitic	K2.1	260	700	GGG-60			
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45			
		perlisch perlitic	K3.2	260	700	GTS-55-04			
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800				
		vergütet quenched	K4.2	350	1050				
		vergütet quenched	K4.3	450	1400				
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1			
		vergütbar heat treatable	N1.2	100	340	AlMgSi1			
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	350	475	600
		6-10% Si	N2.2	100	320	AlSi7Mg	350	475	600
		10-15 % Si	N2.3	130	450	AlSi12			
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	180	205	230
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb	180	205	230
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40	180	205	230
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3	180	205	230
	Graphit Graphite		N4.1						



	AS46 $a_e/D_c$			AS4B $a_e/D_c$			IG35 $a_e/D_c$			NE2B $a_e/D_c$								
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
	220	260	300	220	260	300	160	170	180									
	220	240	260	220	240	260	160	170	180									
	220	240	260	220	240	260	160	170	180									
	220	240	260	220	240	260	160	170	180									
	350	675	1000	350	675	1000												
	350	675	1000	350	675	1000												
									500	1750	3000							
									500	1250	2000							
									350	925	1500							
									220	260	300							
									180	205	230							
									180	210	240							
									160	205	250							

# Schnittdaten Eck- und Planfräsen (tangential)

## Cutting Data Corner and Face milling (tangential)



Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_e/D_c$		
						100%	50%	20%
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			
		gehärtet hardened	S1.2	275	930			
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		
		gehärtet hardened	S2.2	350	1200	Inconel 713		
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240			
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200			
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400				
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1					
		55-60 HRC	H1.2					
		60-63 HRC	H1.3					
		> 63HRC	H1.4					
<b>O</b>	Thermoplaste Thermoplastics		O1.1			500	1000	1500
	Duroplaste Duro plaste		O1.2			500	1000	1500
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4					



Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_g/D_c$			
						100%	50%	20%	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15			
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6			
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5			
		~ 0,6% C geglüht annealed	P1.4	190	610	C55			
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60			
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28			
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6			
		vergütet quenched	P2.2	280	960	14NiCr10			
		vergütet quenched	P2.3	350	1250	34CrMo4			
		vergütet quenched	P2.4	430	1450	55Cr3			
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18			
		gehärtet hardened	P3.2	350	1200	X210Cr2			
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200			
		legiert alloyed	P4.2	220	750	GX40CrSi28			
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39			
<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13			
		austenitisch austenitic ferritic	M1.2	300	1000	X6CrNiMo- Ti17-12-2			
		austenitisch ferritisch austenitic	M1.3	230	780	X2CrNiMo- N17-13-3			

# Walzenstirnfräser M409

## Shell End Mill



N

	AS46 $a_e/D_c$			AS4B $a_e/D_c$			IG35 $a_e/D_c$			NE2B $a_e/D_c$								
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
	130	160	190	130	160	190	145	170	195									
	130	160	190	130	160	190	145	170	195									
	130	160	190	130	160	190	145	170	195									
	130	160	190	130	160	190	145	170	195									
	130	160	190	130	160	190	145	170	195									
	130	160	190	130	160	190	145	170	195									
	145	160	175	145	160	175	145	160	175									
	145	160	175	145	160	175	145	160	175									
	145	160	175	145	160	175	145	160	175									
	145	160	175	145	160	175	145	160	175									
	65	85	105	65	85	105	65	85	105									
	65	85	105	65	85	105	65	85	105									
	65	85	105	65	85	105	65	85	105									

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_e/D_c$			
						100%	50%	20%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25			
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40			
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40			
		perlisch perlitic	K2.1	260	700	GGG-60			
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45			
		perlisch perlitic	K3.2	260	700	GTS-55-04			
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800				
		vergütet quenched	K4.2	350	1050				
		vergütet quenched	K4.3	450	1400				
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1			
		vergütbar heat treatable	N1.2	100	340	AlMgSi1			
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	280	380	480
		6-10% Si	N2.2	100	320	AlSi7Mg	280	380	480
		10-15 % Si	N2.3	130	450	AlSi12			
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	145	165	185
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb	145	165	185
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40	180	205	230
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3	180	205	230
	Graphit Graphite		N4.1						

# Walzenstirnfräser M409

## Shell End Mill



N

	AS46 $a_e/D_c$			AS4B $a_e/D_c$			IG35 $a_e/D_c$			NE2B $a_e/D_c$								
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
	180	210	240	180	210	240	130	140	150									
	180	210	240	180	210	240	130	140	150									
	180	210	240	180	210	240	130	140	150									
	180	210	240	180	210	240	130	140	150									
	280	540	800	280	540	800												
	280	540	800	280	540	800												
										400	1400	2400						
										400	1000	1600						
										280	740	1200						
										180	210	240						
										145	165	185						
										145	165	185						
										130	165	200						

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10 $a_e/D_c$		
						100%	50%	20%
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			
		gehärtet hardened	S1.2	275	930			
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		
		gehärtet hardened	S2.2	350	1200	Inconel 713		
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240			
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200			
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400				
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1					
		55-60 HRC	H1.2					
		60-63 HRC	H1.3					
		> 63HRC	H1.4					
<b>O</b>	Thermoplaste Thermoplastics		O1.1			400	800	1200
	Duroplaste Duro plaste		O1.2			400	800	1200
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4					



# Walzenstirnfräser M409

## Shell End Mill



N

	AS46 $a_e/D_c$			AS4B $a_e/D_c$			IG35 $a_e/D_c$			NE2B $a_e/D_c$								
	100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
							30	55	80									
							30	55	80									
							30	55	80									
							30	55	80									
							30	55	80									
							30	55	80									
							30	55	80									
										400	800	1200						
										400	800	1200						

Werkstoff Material	Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	RC4G $a_e/D_c$			
					25%	10%		
<b>P</b> unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	160	240	
	~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	160	240	
	~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	160	240	
	~ 0,6% C geglüht annealed	P1.4	190	610	C55	160	240	
	~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	160	240	
	Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	160	240	
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	180	220
		vergütet quenched	P2.2	280	960	14NiCr10	180	220
		vergütet quenched	P2.3	350	1250	34CrMo4	180	220
		vergütet quenched	P2.4	430	1450	55Cr3	180	220
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18	80	120
		gehärtet hardened	P3.2	350	1200	X210Cr2	80	100
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200	160	220
		legiert alloyed	P4.2	220	750	GX40CrSi28	80	140
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39		
	<b>M</b> Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	80	140
austenitisch austenitic ferritic		M1.2	300	1000	X6CrNiMo- Ti17-12-2	70	120	
austenitisch ferritisch austenitic		M1.3	230	780	X2CrNiMo- N17-13-3	70	120	

# Scheibenfräser M406, M409, M475, M610

## Disc Milling Cutter



N

	K10 $a_e/D_c$		AS46 $a_e/D_c$		AS4B $a_e/D_c$		IG35 $a_e/D_c$		NE2B					
	25%	10%	25%	10%	25%	10%	25%	10%	25%	10%				
			130	190	130	190	145	190						
			130	190	130	190	145	190						
			130	190	130	190	145	190						
			130	190	130	190	145	190						
			130	190	130	190	145	190						
			130	190	130	190	145	190						
			145	175	145	175	145	175						
			145	175	145	175	145	175						
			145	175	145	175	145	175						
			145	175	145	175								
			65	105	60	105	65	105						
			65	105	60	105	65	105						
			65	105	60	105	65	105						

Werkstoff Material	Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	RC4G $a_e/D_c$			
					25%	10%		
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	180	250
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	120	180
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	120	160
		perlisch perlitic	K2.1	260	700	GGG-60	120	160
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45	60	120
		perlisch perlitic	K3.2	260	700	GTS-55-04	60	140
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800			
		vergütet quenched	K4.2	350	1050			
		vergütet quenched	K4.3	450	1400			
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1		
		vergütbar heat treatable	N1.2	100	340	AlMgSi1		
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6		
		6-10% Si	N2.2	100	320	AlSi7Mg		
		10-15 % Si	N2.3	130	450	AlSi12		
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu		
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb		
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40		
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3		
	Graphit Graphite		N4.1					

# Scheibenfräser M406, M409, M475, M610

## Disc Milling Cutter



N

	K10 $a_e/D_c$		AS46 $a_e/D_c$		AS4B $a_e/D_c$		IG35 $a_e/D_c$		NE2B					
	25%	10%	25%	10%	25%	10%	25%	10%	25%	10%				
			175	240	175	240	130	145						
			175	240	175	240	130	145						
			175	240	175	240	130	145						
			175	240	175	240	130	145						
			280	800	280	800								
			280	800	280	800								
	280	480							400	2400				
	280	480							400	1600				
									280	1200				
	145	185							175	240				
	145	185							145	185				
	145	185							145	190				
	145	185							130	200				

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	RC4G $a_e/D_c$	
						25%	10%
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670		
		gehärtet hardened	S1.2	275	930		
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600	
		gehärtet hardened	S2.2	350	1200	Inconel 713	
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240		
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200		
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400			
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1				
		55-60 HRC	H1.2				
		60-63 HRC	H1.3				
		> 63HRC	H1.4				
<b>O</b>	Thermoplaste Thermoplastics		O1.1				
	Duroplaste Duro plaste		O1.2				
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3				
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4				

# Scheibenfräser M406, M409, M475, M610

## Disc Milling Cutter



N

	K10 $a_e/D_c$		AS46 $a_e/D_c$		AS4B $a_e/D_c$		IG35 $a_e/D_c$		NE2B					
	25%	10%	25%	10%	25%	10%	25%	10%	25%	10%				
							25	65						
							25	65						
							25	65						
							25	65						
							25	65						
							25	65						
							25	65						
							25	65						
							25	65						
	400	1200							400	1200				
	400	1200							400	1200				

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e / D_c$		TA45 $a_e / D_c$		
						20%	10%	20%	10%	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	240	290	180	215
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	240	290	180	215
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	240	290	180	215
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	240	290	180	215
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	240	290	180	215
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	240	290		
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	220	265		
		vergütet quenched	P2.2	280	960	14NiCr10	220	265		
		vergütet quenched	P2.3	350	1250	34CrMo4	220	265		
		vergütet quenched	P2.4	430	1450	55Cr3	220	265		
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18				
		gehärtet hardened	P3.2	350	1200	X210Cr2				
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200				
		legiert alloyed	P4.2	220	750	GX40CrSi28				
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39				
	<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	130	155	
austenitisch austenitic ferritic			M1.2	300	1000	X6CrNiMo- Ti17-12-2	130	155		
austenitisch ferritisch austenitic			M1.3	230	780	X2CrNiMo- N17-13-3	130	155		



# Schnittdaten Fasen Fräsen DAM31, DAM32

## Cutting Data Chamfering milling



N

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e / D_c$		TA45 $a_e / D_c$		
						20%	10%	20%	10%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	300	360	160	195
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	260	360	160	195
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	260	360	160	195
		perlisch perlitic	K2.1	260	700	GGG-60	260	360	160	195
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45				
		perlisch perlitic	K3.2	260	700	GTS-55-04				
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800					
		vergütet quenched	K4.2	350	1050					
		vergütet quenched	K4.3	450	1400					
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	1000	1200	1200	1450
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	1000	1200	1200	1450
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6			1200	1450
		6-10% Si	N2.2	100	320	AlSi7Mg			1200	1450
		10-15% Si	N2.3	130	450	AlSi12				
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu			1200	1450
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb			1200	1450
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40			1200	1450
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3			1200	1450
	Graphit Graphite		N4.1							

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	AS46 $a_e/D_c$		AS4B $a_e/D_c$		
						100%	50%	100%	50%	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	130	160	130	160
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	130	160	130	160
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	130	160	130	160
		~ 0,6% C geglüht annealed	P1.4	190	610	C55	130	160	130	160
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	130	160	130	160
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	130	160	130	160
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	145	160	145	160
		vergütet quenched	P2.2	280	960	14NiCr10	145	160	145	160
		vergütet quenched	P2.3	350	1250	34CrMo4	145	160	145	160
		vergütet quenched	P2.4	430	1450	55Cr3	145	160	145	160
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18				
		gehärtet hardened	P3.2	350	1200	X210Cr2				
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200				
		legiert alloyed	P4.2	220	750	GX40CrSi28				
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39				
<b>M</b>	Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	65	85	65	85
		austenitisch austenitic ferritic	M1.2	300	1000	X6CrNiMo- Ti17-12-2	65	85	65	85
		austenitisch ferritisch austenitic	M1.3	230	780	X2CrNiMo- N17-13-3	65	85	65	85

# Schnittdaten T-Nuten Fräsen M406, M409

## Cutting Data T-slot milling



N

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	AS46 $a_e/D_c$		AS4B $a_e/D_c$		
						100%	50%	100%	50%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	180	210	180	210
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	180	210	180	210
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	180	210	180	210
		perlisch perlitic	K2.1	260	700	GGG-60	180	210	180	210
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45				
		perlisch perlitic	K3.2	260	700	GTS-55-04				
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800					
vergütet quenched		K4.2	350	1050						
vergütet quenched		K4.3	450	1400						
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	280	540	280	540
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	280	540	280	540
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6				
		6-10% Si	N2.2	100	320	AlSi7Mg				
		10-15% Si	N2.3	130	450	AlSi12				
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu				
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb				
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40				
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3				
	Graphit Graphite		N4.1							

Werkstoff Material	Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_g/D_c$				
					100%	50%	20%		
<b>P</b>  unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15	145	180	215	
	~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6	145	180	215	
	~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5	145	180	215	
	~ 0,6% C geglüht annealed	P1.4	190	610	C55	145	180	215	
	~ 0,6% C vergütet quenched	P1.5	300	1000	CK60	145	180	215	
	Automatenstahl Free cutting steel	P1.6	220	750	9SMn28	145	180	215	
	niedrig legierter Stahl (<5%) Alloyed steel	geglüht annealed	P2.1	180	590	100Cr6	160	180	200
		vergütet quenched	P2.2	280	960	14NiCr10	160	180	200
		vergütet quenched	P2.3	350	1250	34CrMo4	160	180	200
		vergütet quenched	P2.4	430	1450	55Cr3	160	180	200
	hochlegierter Stahl (>5%) high alloyed steel	geglüht annealed	P3.1	200	680	X10CrAl18			
		gehärtet hardened	P3.2	350	1200	X210Cr2			
	Stahlguss Cast steel	unlegiert unalloyed	P4.1	180	590	GE200			
		legiert alloyed	P4.2	220	750	GX40CrSi28			
	Sinterstahl Sintered steel	weich soft	P5.1	220	570	Sint-D39			
	<b>M</b>  Rostfreier Stahl Stainless steel	martensitisch ferritisch martensitic ferritic	M1.1	200	680	X16Cr13	70	95	120
austenitisch austenitic ferritic		M1.2	300	1000	X6CrNiMo- Ti17-12-2	70	95	120	
austenitisch ferritisch austenitic		M1.3	230	780	X2CrNiMo- N17-13-3	70	95	120	



Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e/D_c$			
						100%	50%	20%	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25	200	235	270
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40	200	235	270
	Kugel- graphitguss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40	200	235	270
		perlisch perlitic	K2.1	260	700	GGG-60	200	235	270
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45			
		perlisch perlitic	K3.2	260	700	GTS-55-04			
	Ausferri- tisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI	vergütet quenched	K4.1	260	800				
vergütet quenched		K4.2	350	1050					
vergütet quenched		K4.3	450	1400					
<b>N</b>	Al- Legierungen Al-alloys	nicht vergütbar not heat treatable	N1.1	30		AlMg1	300	600	900
		vergütbar heat treatable	N1.2	100	340	AlMgSi1	300	600	900
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6			
		6-10% Si	N2.2	100	320	AlSi7Mg			
		10-15 % Si	N2.3	130	450	AlSi12			
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu			
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb			
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40			
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3			
	Graphit Graphite		N4.1						

**DAM31, DAM32, DAM62, DAHM25,  
DAHM37, DAHM82, DAHM84**



**N**

TA45 a <sub>e</sub> /D <sub>c</sub>			SD6A a <sub>e</sub> /D <sub>c</sub>			SC6A a <sub>e</sub> /D <sub>c</sub>			IG6B a <sub>e</sub> /D <sub>c</sub>								
100%	50%	20%	100%	50%	20%	100%	50%	20%	100%	50%	20%						
125	135	145	200	235	270	200	235	270	145	155	165						
125	135	145	200	235	270	200	235	270	145	155	165						
125	135	145	200	235	270	200	235	270	145	155	165						
125	135	145	200	235	270	200	235	270	145	155	165						
450	775	1100															
450	775	1100															
450	775	1100															
450	775	1100															
450	775	1100															
450	775	1100															
450	775	1100															
450	775	1100															

Werkstoff Material		Material- gruppe Material group	Härte (HB) Hardness Brinell	Zugfestigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	SA4B $a_e/D_c$		
						100%	50%	20%
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			
		gehärtet hardened	S1.2	275	930			
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		
		gehärtet hardened	S2.2	350	1200	Inconel 713		
	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240			
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200			
Titanlegierung $\beta$ Titanium alloy $\beta$		S3.3	410	1400				
<b>H</b>	Gehärtete Stähle Hardened steels	50-55 HRC	H1.1					
		55-60 HRC	H1.2					
		60-63 HRC	H1.3					
		> 63HRC	H1.4					
<b>O</b>	Thermoplaste Thermoplastics		O1.1					
	Duroplaste Duro plaste		O1.2					
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	O1.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CFK	O1.4					





Beschichtungs- verfahren Coating process	Sortenbezeichnung Grade designation		Anwendung Application	P										M									
	HORN	Norm		05	10	15	20	25	30	35	40	45	50	05	10	15	20	25	30	35	40	45	50
PVD	AS46	HC - P 20-40	○	[05-15] [15-20] [20-30] [30-40] [40-50]										[05-25] [25-30] [30-40] [40-50]									
		HC - M 30-50	○	[05-50]										[05-25] [25-30] [30-40] [40-50]									
		HC - K 20	●	[05-50]										[05-50]									
		HC - N 05	○	[05-50]										[05-50]									
	AS4B	HC - P 20-50	●	[05-15] [15-20] [20-30] [30-40] [40-50]										[05-25] [25-30] [30-40] [40-50]									
		HC - M 30-50	●	[05-50]										[05-25] [25-30] [30-40] [40-50]									
		HC - K 30-40	●	[05-50]										[05-50]									
		HC - S 40	○	[05-50]										[05-50]									
	SA4B	HC - P 10-40	●	[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]										[05-15] [15-20] [20-30] [30-40] [40-50]									
		HC - M 20-30	●	[05-50]										[05-15] [15-20] [20-30] [30-40] [40-50]									
		HC - K 30	●	[05-50]										[05-50]									
		HC - N 10	○	[05-50]										[05-50]									
	TA45	HC - S 30-40	○	[05-50]										[05-50]									
		HC - P 40	○	[05-35] [35-40] [40-50]										[05-50]									
		HC - M 40	●	[05-50]										[05-35] [35-40] [40-50]									
		HC - K 40	○	[05-50]										[05-50]									
	IG6B	HC - N 20	●	[05-50]										[05-50]									
		HC - P 05-30	●	[05-30] [30-40] [40-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - M 10-30	○	[05-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - K 05-20	○	[05-50]										[05-50]									
	IG35	HC - S 30	●	[05-50]										[05-50]									
		HC - P 20-40	●	[05-15] [15-20] [20-30] [30-40] [40-50]										[05-15] [15-20] [20-30] [30-40] [40-50]									
		HC - M 20-40	●	[05-50]										[05-15] [15-20] [20-30] [30-40] [40-50]									
		HC - K 30	○	[05-50]										[05-50]									
NE2B	HC - S 30	●	[05-50]										[05-50]										
	HC - N 05-10	●	[05-50]										[05-50]										
RC4G	HC - P 05-30	●	[05-30] [30-40] [40-50]										[05-15] [15-20] [20-30] [30-40] [40-50]										
	HC - M 20-30	●	[05-50]										[05-15] [15-20] [20-30] [30-40] [40-50]										
	HC - K 10-40	●	[05-50]										[05-50]										
AS45	HC - P 30-50	●	[05-25] [25-30] [30-40] [40-50]										[05-25] [25-30] [30-40] [40-50]										
	HC - M 30-50	●	[05-50]										[05-25] [25-30] [30-40] [40-50]										
	HC - K 20-40	○	[05-50]										[05-50]										
	HC - S 40	○	[05-50]										[05-50]										
CVD	SD6A	HC - P 10-30	○	[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - M 05-30	○	[05-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - K 30	●	[05-50]										[05-50]									
		HC - S 20-30	●	[05-50]										[05-50]									
	SC6A	HC - P 10-30	○	[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - M 05-30	○	[05-50]										[05-10] [10-15] [15-20] [20-30] [30-40] [40-50]									
		HC - K 30	●	[05-50]										[05-50]									
unbeschichtet uncoated	K10	HC - S 20-30	●	[05-50]										[05-50]									
		HW - N 15-30	●	[05-50]										[05-50]									
				[05-50]										[05-50]									
CVD-D	HD05	N - 10	●	[05-50]										[05-50]									
	HD08	N - 05	●	[05-50]										[05-50]									
PKD	PD70	PD - N 10	●	[05-50]										[05-50]									
	PD75	PD - N 05	●	[05-50]										[05-50]									

● Hauptanwendung  
Main application

○ Nebenanwendung  
Secondary application





**D 041 VL**  
0,4-1 Nm

**Drehmoment-Schraubendreher mit Skala**  
- mit variabler Einstellmöglichkeit  
- numerische Drehmoment-Anzeige in Fensterskala

Drehmoment stufenlos einstellbar mit Einstellwerkzeug Torque-Setter (enthalten).  
**Griff:** Ergonomischer Mehrkomponentengriff, extrem handlich durch leichte und kompakte Bauweise. Klicksignal beim Erreichen des eingestellten Drehmomentwertes.

**Normen:** EN ISO 6798, BS EN 26789, ASME B107.14.M.

**Genauigkeit:**  $\pm 6\%$ , rückführbar auf nationale Normale



**D 15 VL**  
1-5 Nm

**Torque screw driver with scale**  
- variable torque setting  
- adjusted torque is shown on display

The Torque can be adjusted with a special torque setter (included).

**Handle:** Ergonomical form gives perfect handling abilities. Audible signal when set torque is reached.

**Standard:** EN ISO 6798, BS EN 26789, ASME B 107.14.M.  
**Precision:**  $\pm 6\%$



**D 28 VL**  
2-7 Nm

**Einstellwerkzeug für Drehmoment-Schraubendreher**

**Griff:** Celluloseacetat mit microfeiner Oberflächenstruktur

**Klinge:** Achtkantklinge, durchgehend gehärtet, verzinkt



**ED 28 VL**  
für / for  
D041VL / D15VL / D28VL

**Device for setting the required torque**

**Handle:** Celluloseacetat with micro structured surface

**Blade:** Octagonal (8 flats) blade, hardened galvanized



**D515QL**  
**5-14 Nm**

**Drehmoment-Schraubendreher mit Skala**  
- mit variabler Einstellmöglichkeit  
- numerische Drehmoment-Anzeige in Fensterskala

Drehmoment stufenlos einstellbar mit Einstellwerkzeug Torque-Setter (enthalten).

**Griff:** Ergonomischer Mehrkomponentengriff, extrem handlich durch leichte und kompakte Bauweise. Klicksignal beim Erreichen des eingestellten Drehmomentwertes.

**Normen:** EN ISO 6798, BS EN 26789, ASME B107.14.M.

**Genauigkeit:**  $\pm 6\%$ , rückführbar auf nationale Normale

**Torque screw driver with scale**  
- variable torque setting  
- adjusted torque is shown on display

The Torque can be adjusted with a special torque setter (included).

**Handle:** Ergonomical form gives perfect handling abilities. Audible signal when set torque is reached.

**Standard:** EN ISO 6798, BS EN 26789, ASME B 107.14.M.

**Precision:**  $\pm 6\%$



**ED515QL**  
für / for  
D515QL

**Einstellwerkzeug für Drehmoment-Schraubendreher**

**Griff:** Celluloseacetat mit microfeiner Oberflächenstruktur

**Klinge:** Achteckklinge, durchgehend gehärtet, verzinkt

**Device for setting the required torque.**

**Handle:** Celluloseacetat with micro structured surface

**Blade:** Octogonal (8 flats) blade, hardened galvanized



**DT6PK**  
**DT7PK**  
**DT8PK**  
**DT9PK**  
**DT10PK**  
**DT15PK**  
**DT20PK**  
**DT25PK**

für / for  
 D041VL / D15VL / D28VL



Plus

### Wechselklinge für TORX PLUS® Schrauben

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän Stahl, durchgehend gehärtet, mattverchromt Wiha Chrom Top-Klingenspitze garantiert höchste Maßhaltigkeit. Farbcodierung dunkelgrün

**Anwendung:** Kontrolliertes Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Wiha Drehmomentgriff.

#### Blade for TORX-Plus® screws

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated. Wiha Chrome Blade guarantees maximum precision. Colored code dark green

**Utilization:** Controlled screw setting with definite torque in combination with Wiha torque screw driver handle.



**DT6K**  
**DT8K**  
**DT15K**

für / for  
 D041VL / D15VL / D28VL



### Wechselklinge für Torx Schrauben

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän Stahl, durchgehend gehärtet, mattverchromt Wiha Chrom Top-Klingenspitze garantiert höchste Maßhaltigkeit. Farbcodierung dunkelgrün

**Anwendung:** Kontrolliertes Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Wiha Drehmomentgriff.

#### Blade for Torx screws

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated. Wiha Chrome Blade guarantees maximum precision. Colored code dark green

**Utilization:** Controlled screw setting with definite torque in combination with Wiha torque screw driver handle.



**DT15PQ**  
**DT20PQ**  
**DT25PQ**  
**DT27PQ**  
**DT30PQ**

für / for  
D515QL



Plus

### Wechselklinge für TORX PLUS® Schrauben

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän-Stahl, durchgehend gehärtet, mattverchromt. Wiha Chrom Top-Klingenspitze garantiert höchste Maßhaltigkeit. Farbcodierung dunkelgrün

**Anwendung:** Kontrolliertes Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Wiha Drehmomentgriff.

### Blade for TORX-Plus® screws

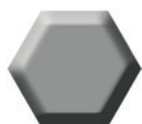
**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated. Wiha Chrome Blade guarantees maximum precision. Colored code dark green

**Utilization:** Controlled screw setting with definite torque in combination with Wiha torque screw driver handle.



**DSW15K**  
**DSW20K**  
**DSW25K**  
**DSW30K**  
**DSW40K**

für / for  
D041VL / D15VL / D28VL



### Wechselklinge für Innensechskant-Schrauben

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän-Stahl, durchgehend gehärtet, mattverchromt. Wiha Chrom Top-Klingenspitze garantiert höchste Maßhaltigkeit. Farbcodierung rot

**Anwendung:** Kontrolliertes Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Wiha Drehmomentgriff.

### Blade for allen screws

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated. Wiha Chrome Blade guarantees maximum precision. Colored code red

**Utilization:** Controlled screw setting with definite torque in combination with Wiha torque screw driver handle

**DSW50K**  
**DSW60K**

für / for  
D15QL



### Universal-Bithalter für C6,3 und E6,3 (1/4") Bits

#### D14ZBK

für / for  
D041VL / D15VL / D28VL

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän Stahl, durchgehend gehärtet, mattverchromt.

**Hülse:** Aus rostfreiem Stahl

**Anwendung:** Zum kontrollierten Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Drehmomentgriff.

### Universal Bitholder for C6,3 and E6,3 (1/4") Bits

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated.

**Collar:** Stainless steel

**Utilization:** For controlled screw setting with definite torque in combination with torque screw driver handle.



#### D14ZBQ

für / for  
D515QL

### Universal-Bithalter für C6,3 und E6,3 (1/4") Bits

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän Stahl, durchgehend gehärtet, mattverchromt.

**Hülse:** Aus rostfreiem Stahl

**Anwendung:** Zum kontrollierten Verschrauben bei vorgegebenem Drehmoment, in Kombination mit einem Drehmomentgriff.

### Universal Bitholder for C6,3 and E6,3 (1/4") Bits

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated.

**Collar:** Stainless steel

**Utilization:** For controlled screw setting with definite torque in combination with torque screw driver handle.





14ZQK

**Bithalter mit Quergriff für C6,3 und E6,3(1/4") Bits**

**Klinge:** Hochwertiger Chrom-Vanadium-Molybdän Stahl, durchgehend gehärtet, mattverchromt

**Hülse:** Aus rostfreiem Stahl

**Anwendung:** Zum kontrollierten Öffnen

**Universal Bitholder with T-handle for C6,3 and E6,3 (1/4") Bits**

**Blade:** High quality Chrome-Vanadium steel, through hardened, chrome plated.

**Collar:** Stainless steel

**Utilization:** For controlled opening



- T6PW
- T7PW
- T8PW
- T9PW
- T10PW
- T15PW
- T20PW
- T25PW
- T30PW



Plus

**Stiftschlüssel für TORX PLUS® Schrauben**

**Anwendung:** Für alle TORX PLUS® Schraubaufgaben

**Achtung:** TORX PLUS®-Schlüssel passen NICHT in Torx-Schrauben

**Wrench for TORX PLUS® Screws**

**Utilization:** For all kind of using TORX PLUS® Screws

**Attention:** TORX PLUS®-Wrench does NOT fit for Torx-Screws

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