

ph HORN ph



**FRÄSSYSTEME**

MILLING SYSTEMS

2023/2024

HORN ph





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

## Erleben Sie HORN

Außergewöhnliche Ergebnisse sind immer die Verbindung aus dem optimalen Zerspanprozess und dem perfekten Werkzeug. Dafür kombiniert HORN Spitzentechnologie, Leistung und Zuverlässigkeit. Von der Einzelteil- bis zur Serienfertigung, bei Standard- oder Sonderanwendungen: Unsere Werkzeuge bieten Ihnen schnelle, wirtschaftliche und qualitativ hochwertige Lösungen. Bei der Wahl der individuellen Schnittparameter unterstützen Sie unsere Tabellen mit praxiserprobten Erfahrungswerten im jeweiligen Katalog. Nutzen Sie darüber hinaus das Fachwissen unserer Innen- und Außendienstmitarbeiter.

Nachhaltigkeit ist ein zentraler Bestandteil unserer Unternehmensphilosophie. Daher stehen bei uns Qualitätssicherung, Umweltschutz, Energieeffizienz und Sicherheit hinsichtlich unserer Produkte und unserer Produktion seit jeher im Fokus. Als leistungsfähiger und zuverlässiger Werkzeugpartner tragen wir dafür Sorge, dass Sie gemeinsam mit uns in eine innovative und wirtschaftliche Zukunft gehen.



Lothar Horn  
Geschäftsführer  
Paul Horn GmbH



Markus Horn  
Geschäftsführer  
Paul Horn GmbH



Matthias Rommel  
Geschäftsführer  
Paul Horn GmbH

## Explore HORN

Exceptional 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.



Lothar Horn  
CEO  
Paul Horn GmbH



Markus Horn  
CEO  
Paul Horn GmbH



Matthias Rommel  
CEO  
Paul Horn GmbH

<b>A</b>	<b>System DC Nut- und Gewindefräser Vollhartmetall</b> System DC Solid Carbide Groove and Thread Milling Cutter		<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</b>	<b>F</b>
<b>G</b>	<b>Gewindefräsen</b> Thread Milling	<b>M275/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 Tauchfräsen / Hochvorschubfräsen</b> System DA / DAH Plunge Milling / 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

<b>HIS</b>	↔	<b>HWS</b>
<b>HMS</b>	↔	<b>HWS</b>

### Beispiel Schneidplatte

Example insert

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

### Beispiel Klemmhalter

Example toolholder

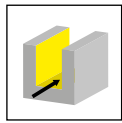
Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M306.0707.03A</b>	7,5	100	A	<b>306060R • 306060L</b>

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

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# Übersicht Anwendungen

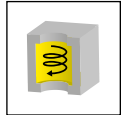
## Overview Application



Nutfräsen  
Groove milling



Vollradiusnut fräsen  
Full radius groove milling



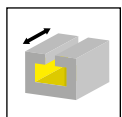
Zirkularnut  
Circular groove



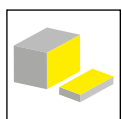
Innennut fräsen  
Internal groove milling



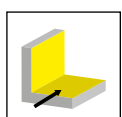
Seegerringnut  
Circlip groove



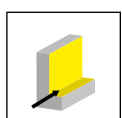
T-Nuten DIN650  
T-Slots DIN650



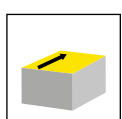
Trennfräsen  
Slot milling



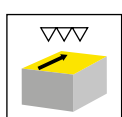
Eckfräsen  
Corner milling



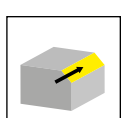
Besäumen  
Trimming



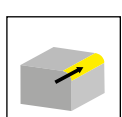
Planfräsen  
Face milling



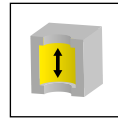
Schlichtfräsen  
Finishing



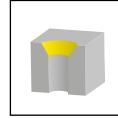
Fasen  
Chamfering



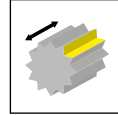
Radius fräsen  
Radius milling



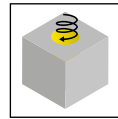
Bohrung fräsen  
Bore milling



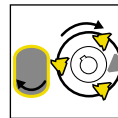
Fase fräsen  
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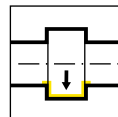
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Gear milling



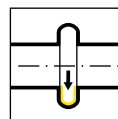
Zirkulareintauchen  
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Mehrkantschlagen  
Polygon milling



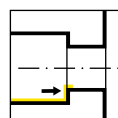
Einstechen innen  
Internal grooving



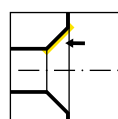
Einstechen innen Vollradius  
Internal grooving full radius



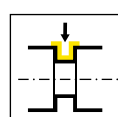
Ausdrehen und Fasen innen  
Internal boring and grooving chamfer



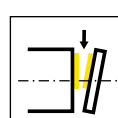
Rückwärtsdrehen innen  
Internal back turning



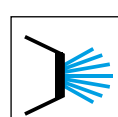
Fasen innen  
Internal chamfering



Einstechen außen  
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Abstechen  
Parting off

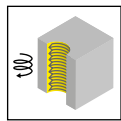


Innenkühlung  
Internal coolant

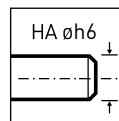


# Übersicht Anwendungen

## Overview Application



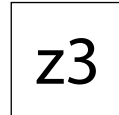
Gewinde fräsen innen  
Thread milling internal



Schaftform  
Shank form



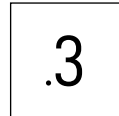
Gewinde Teilprofil  
Partial profile thread



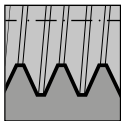
Zähnezahlen  
Numbers of teeth



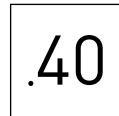
Gewinde Vollprofil  
Full profile thread



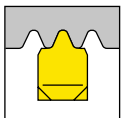
Geometrie .3  
Geometry



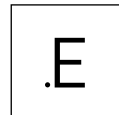
Gewinde innen  
Internal thread



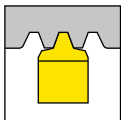
Geometrie .40  
Geometry



Gewinde Whitworth  
Whitworth thread



Geometrie .E  
Geometry



Trapezgewinde  
Trapezoidal thread



Geometrie .FY  
Geometry



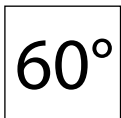
Whitworth-Rohrgewinde  
Whitworth pipe thread



National pipe thread



Anstellwinkel 45°  
Approach angle 45°



Gewinde metrisch  
Metric ISO thread  
Anstellwinkel 60° (Kapitel Tangentialfräsen)  
Approach angle 60° (Chapter Tangential Milling)



Unified-Gewinde  
Unified thread



## DC



### **Vollhartmetall-Schaftfräser System DC**

- Gewindefräsen Teilprofil
- Gewindefräsen Vollprofil
- Nutfräsen
- Fasfräsen

### **Solid Carbide End Mills System DC**

- Thread milling partial profile
- Thread milling full profile
- Groove milling
- Chamfer milling

Gewindefräser  
Thread Milling Cutter  
DCG



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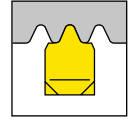
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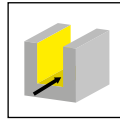


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Nutfräser  
Groove milling cutter  
DCR/DCN/DCX

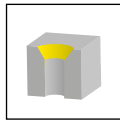


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Fasfräser  
Chamfer Milling Cutter  
DCF



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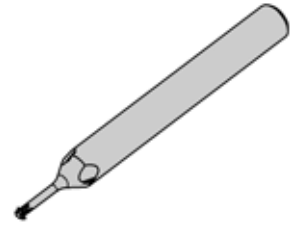
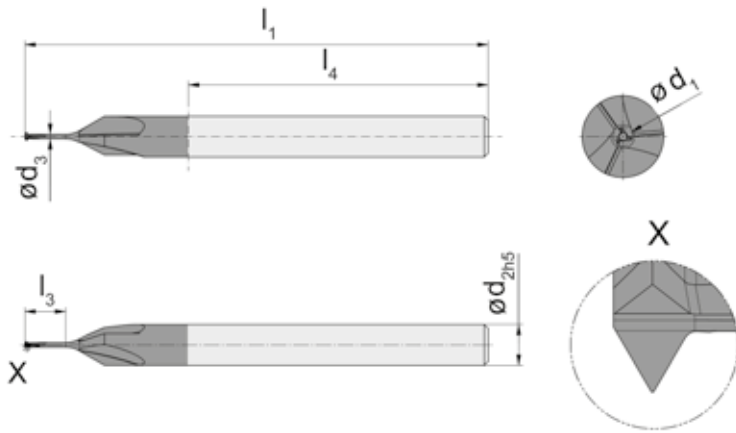
Schnittdaten  
Cutting data

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**z3**

**60°**

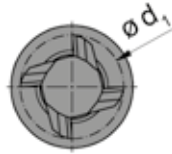
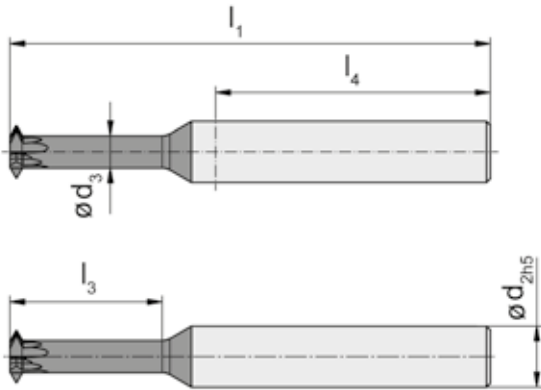
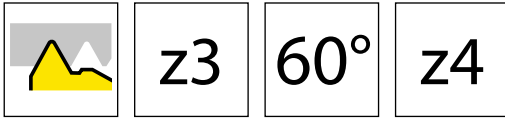


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	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
<b>DCG.3.M1.025.2.1.03</b>	M1	0,75	3	0,25	0,7	3	0,33	34	3	22	▲
<b>DCG.3.M11.025.2.1.03</b>	M1,1	0,8	3	0,25	0,75	3	0,4	34	2,75	22	Δ
<b>DCG.3.M12.025.2.1.03</b>	M1,2	0,9	3	0,25	0,8	3	0,43	34	3	22	▲
<b>DCG.3.M14.030.2.1.03</b>	M1,4	1,1	3	0,3	1	3	0,43	34	4	22	▲
<b>DCG.3.M16.035.2.1.03</b>	M1,6	1,2	3	0,35	1,1	3	0,53	34	4	22	▲
<b>DCG.3.M2.040.2.1.03</b>	M2	1,7	3	0,4	1,5	3	0,93	34	6	22	▲
<b>DCG.3.M22.045.2.1.03</b>	M2,2	1,9	3	0,45	1,7	3	1,13	34	6	22	▲
<b>DCG.3.M25.045.2.1.03</b>	M2,5	2,2	3	0,45	2	3	1,3	34	8	22	▲
											P ●
											M ○
											K ●
											N -
											S -
											H -



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

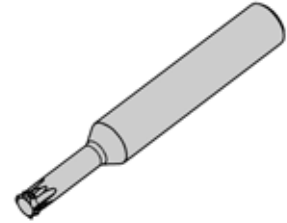
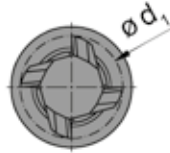
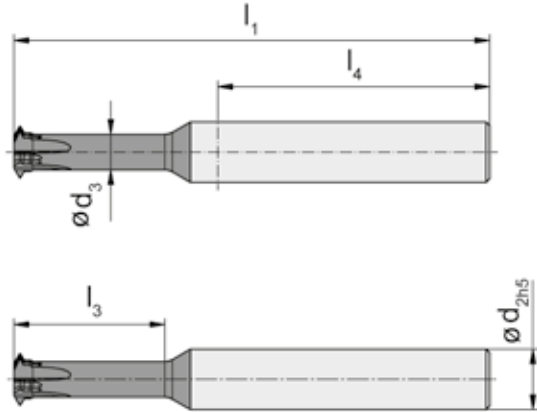
Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	Z	P	P <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	AN25
DCG.3.M3.025.2.1.04	M3	2,4	3	0,25	0,35	2	4	1,45	39	8	22	▲
DCG.3.M3.035.2.1.04	M3	2,4	3	0,25	0,35	2	4	1,35	39	8	22	▲
DCG.3.M3.050.2.1.04	M3	2,4	3	0,5	0,5	2	4	1,2	39	8	22	▲
DCG.3.M35.050.2.1.04	M3,5	2,7	3	0,5	0,6	2,3	4	1,35	39	8	22	▲
DCG.3.M4.070.3.1.06	M4	3,3	3	0,7	0,75	2,8	6	1,7	50	10	36	▲
DCG.3.M5.050.3.1.06	M5	4,2	3	0,5	0,75	3,6	6	2,5	50	10	36	▲
DCG.3.M5.080.3.1.06	M5	4,2	3	0,8	1	3,6	6	2,2	50	10	36	▲
DCG.4.M6.100.3.1.06	M6	5	4	1	1,25	4,3	6	2,4	63	10	40	▲
DCG.4.M6.100.5.1.06	M6	5	4	1	1,25	4,3	6	2,4	63	16	40	▲
DCG.4.M8.075.5.1.08	M8-M10	6,5	4	0,75	1	5,5	8	3,85	63	16	40	▲
DCG.4.M8.075.6.1.08	M8-M10	6,5	4	0,75	1	5,5	8	3,85	63	20	36	▲
DCG.4.M8.075.7.1.08	M8-M10	6,5	4	0,75	1	5,5	8	3,85	77	25	40	▲
DCG.4.M8.125.6.1.08	M8-M10	6,5	4	1,25	1,5	5,5	8	3,4	63	20	36	▲
DCG.4.M8.125.8.1.08	M8-M10	6,5	4	1,25	1,5	5,5	8	3,4	77	30	40	▲
DCG.4.M10.150.6.1.08	M10-M12	8	4	1,5	1,75	6,8	8	4,1	63	20	36	▲
DCG.4.M10.150.8.1.08	M10-M12	8	4	1,5	1,75	6,8	8	4,1	77	30	40	▲

P	●
M	o
K	-
N	-
S	-
H	-



**z3**

**z4**



HM-Sorten  
Carbide grades

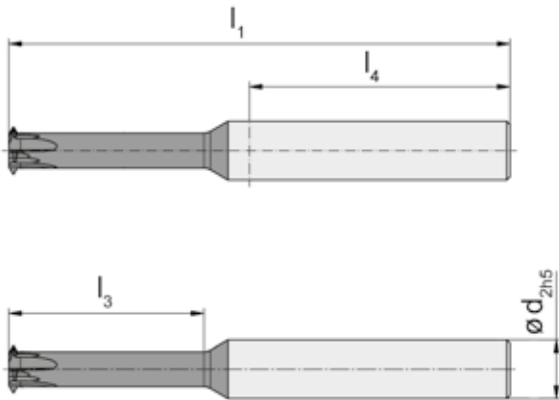
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	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>	AN25
<b>DCG.3.M3.035.2.2.04</b>	M3	2,4	3	0,35	2	4	1,4	39	8	22	▲
<b>DCG.3.M3.050.2.2.04</b>	M3	2,4	3	0,5	2	4	1,25	39	8	22	▲
<b>DCG.3.M4.070.3.2.06</b>	M4	3,3	3	0,7	2,8	6	1,9	50	10	36	▲
<b>DCG.3.M5.050.3.2.06</b>	M5	4,2	3	0,5	3,6	6	2,85	50	10	36	▲
<b>DCG.4.M6.075.5.2.06</b>	M6	5	4	0,75	4,2	6	3,1	63	16	40	▲
<b>DCG.4.M6.100.5.2.06</b>	M6	5	4	1	4,2	6	2,8	63	16	40	▲
<b>DCG.4.M8.125.5.2.08</b>	M8	6,5	4	1,25	5,5	8	3,7	63	16	40	▲
<b>DCG.4.M10.100.6.2.08</b>	M10	8	4	1	6,8	8	5,4	63	20	36	▲
<b>DCG.4.M10.100.7.2.08</b>	M10	8	4	1	6,8	8	5,4	77	25	40	▲
<b>DCG.4.M10.150.6.2.08</b>	M10	8	4	1,5	6,8	8	4,7	63	20	36	▲
<b>DCG.4.M12.100.6.2.10</b>	M12	10	4	1	8	10	6,3	63	20	36	▲
<b>DCG.4.M12.125.8.2.10</b>	M12	10	4	1,25	8	10	6,1	77	30	40	▲
<b>DCG.4.M12.175.6.2.10</b>	M12	10	4	1,75	8	10	5,5	63	20	36	▲
<b>DCG.4.M12.175.8.2.10</b>	M12	10	4	1,75	8	10	5,5	77	30	40	▲

P	●
M	o
K	-
N	-
S	-
H	-

UN z3 z4



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	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>	AN25
<b>DCG.3.60.540.2.04</b>	#5 - 40 UNC	2,4	3	0,635	2	4	1,1	39	8	22	▲
<b>DCG.3.60.632.2.04</b>	#6 - 32UNC #8 - 32UNC	2,6	3	0,794	2,2	4	-	39	8	22	▲
<b>DCG.4.60.1420.3.06</b>	1/4" - 20 UNC	4,9	4	1,27	3,5	6	-	63	10	40	▲
<b>DCG.4.60.1428.3.06</b>	1/4" - 28 UNF	5,3	4	0,907	3,5	6	-	63	10	40	▲
<b>DCG.4.60.51618.3.06</b>	5/16" - 18 UNC	6,4	4	1,411	4,2	6	-	63	10	40	▲
<b>DCG.4.60.3816.7.08</b>	3/8" - 16 UNC	7,8	4	1,588	5,5	8	-	77	25	40	▲
<b>DCG.4.60.71620.7.08</b>	7/16" - 20 UNF	9,1	4	1,27	7,2	8	-	77	30	40	▲
<b>DCG.4.60.1213.7.08</b>	1/2" - 13 UNC	10,5	4	1,953	7,9	8	-	77	30	40	▲
											P ●
											M o
											K -
											N -
											S -
											H -

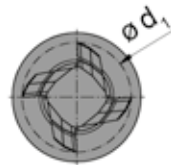
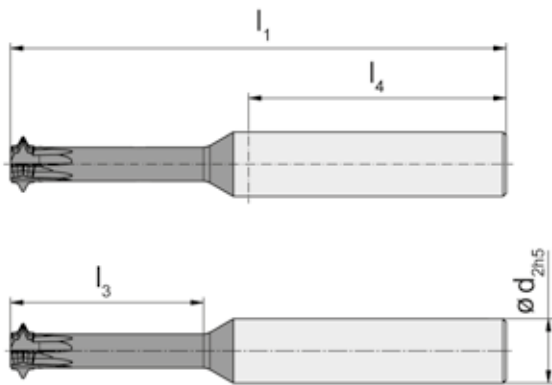
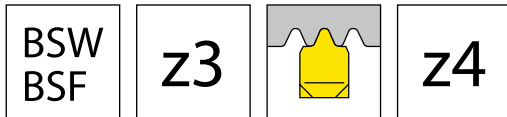


# Gewindefräser Thread Milling Cutter

## DCG



A



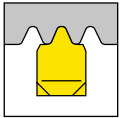
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

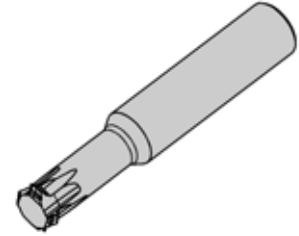
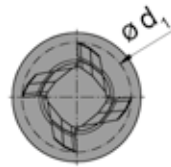
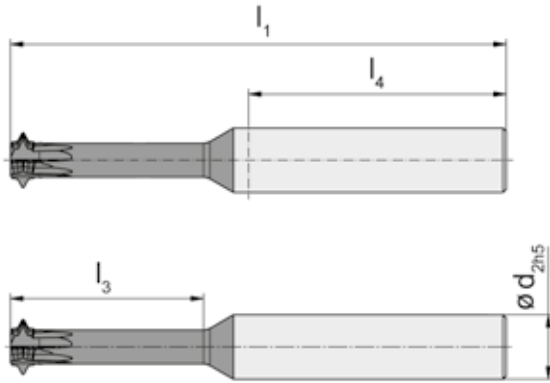
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	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>	AN25
DCG.3.55.1840.2.04	1/8" - 40 BSW	2,3	3	0,635	2	4	1	39	8	22	▲
DCG.3.55.53232.2.04	5/32" - 32 BSW	2,9	3	0,794	2,3	4	-	39	8	22	▲
DCG.3.55.31632.3.06	3/16" - 32 BSF	3,7	3	0,794	2,8	6	-	50	10	36	▲
DCG.3.55.73224.3.06	7/32" - 24 BSW	4,2	3	1,058	3,6	6	-	50	10	36	△
DCG.3.55.73228.3.06	7/32" - 28 BSF	4,3	3	0,907	3,6	6	-	50	10	36	▲
DCG.3.55.1420.5.06	1/4" - 20 BSW	4,7	3	1,27	4	6	-	63	16	40	▲
DCG.3.55.1426.5.06	1/4" - 26 BSF	5	3	0,977	4,2	6	-	63	16	40	▲
DCG.4.55.51618.5.06	5/16" - 18 BSW	6,1	4	1,411	5,2	6	-	63	16	40	▲
DCG.4.55.93226.5.06	9/32" - 26 BSF	5,8	4	0,977	5	6	-	63	16	40	△
DCG.4.55.3816.5.08	3/8" - 16 BSW	7,4	4	1,588	6,3	8	-	63	16	40	▲
DCG.4.55.3820.5.08	3/8" - 20 BSF	7,8	4	1,27	6,5	8	-	63	16	40	▲
DCG.4.55.71614.5.08	7/16" - 14 BSW	8,7	4	1,814	7,2	8	-	63	16	40	▲
DCG.4.55.71614.7.08	7/16" - 14 BSW	8,7	4	1,814	7,2	8	-	77	25	40	▲
DCG.4.55.71618.5.08	7/16" - 18 BSF	9,3	4	1,411	7,5	8	-	63	16	40	△
DCG.4.55.71618.7.08	7/16" - 18 BSF	9,3	4	1,411	7,5	8	-	77	25	40	△
DCG.4.55.1212.6.10	1/2" - 12 BSW	9,9	4	2,117	8,5	10	-	63	20	40	▲
DCG.4.55.1212.8.10	1/2" - 12 BSW	9,9	4	2,117	8,5	10	5,25	77	30	40	▲
DCG.4.55.1216.6.10	1/2" - 16 BSF	10,6	4	1,588	9,5	10	-	63	20	40	△

P	●
M	○
K	-
N	-
S	-
H	-



**z4**

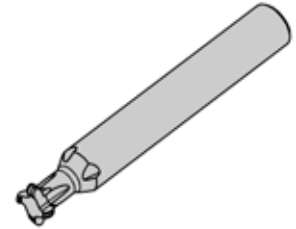
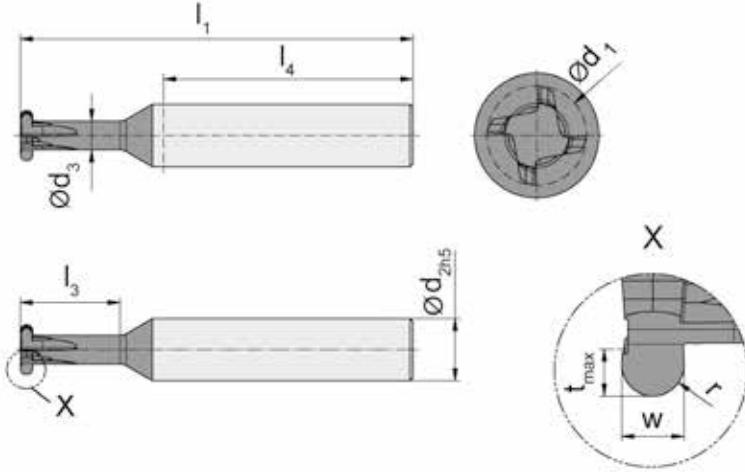
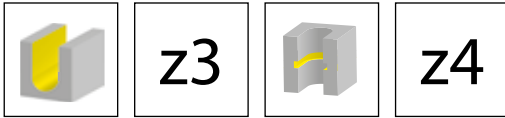


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Gewinde Thread	D <sub>min</sub>	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>	AN25
<b>DCG.4.55.G18.5.08</b>	G 1/8"	8,5	4	0,91	6,6	8	3,9	63	16	40	▲
<b>DCG.4.55.G14.6.10</b>	G 1/4"	11,4	4	1,34	9,5	10	7,1	63	20	40	▲
<b>DCG.4.55.G38.8.10</b>	G 3/8"	14,9	4	1,34	9,8	10	9,4	77	30	40	▲
											<b>P</b> ●
											<b>M</b> ○
											<b>K</b> -
											<b>N</b> -
											<b>S</b> -
											<b>H</b> -

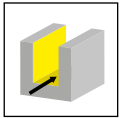


HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

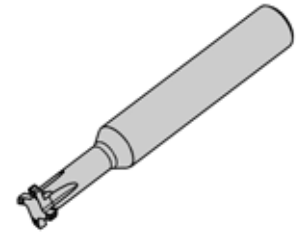
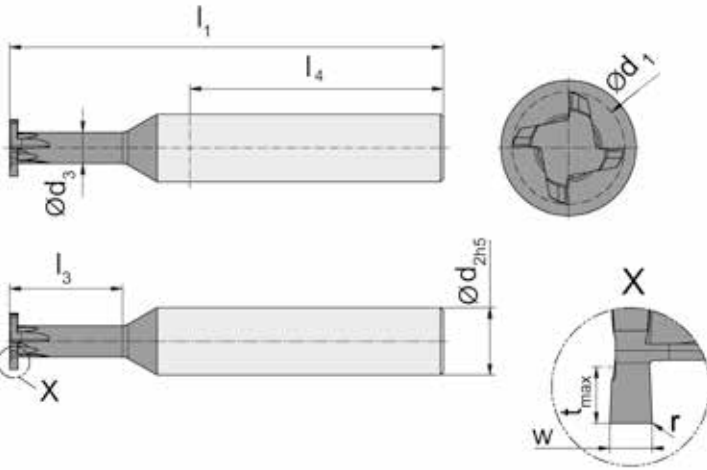
Δ 4 Wochen  
4 weeks

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>	AN25
<b>DCR.3.40.10.05.1.06</b>	3	1	0,5	0,5	4	6	2,75	50	4	36	▲
<b>DCR.3.60.10.05.1.06</b>	3	1	1	0,5	6	6	3,7	50	4	36	▲
<b>DCR.3.60.10.05.2.06</b>	3	1	1	0,5	6	6	3,7	63	6	40	▲
<b>DCR.3.60.15.75.2.06</b>	3	1,5	1	0,75	6	6	3,7	63	6	40	▲
<b>DCR.4.80.15.75.3.08</b>	4	1,5	1,5	0,75	8	8	4,6	63	8	40	▲
<b>DCR.4.80.15.75.5.08</b>	4	1,5	1,5	0,75	8	8	4,6	63	16	40	▲
<b>DCR.4.80.20.10.3.08</b>	4	2	1,5	1	8	8	4,6	63	8	40	▲
<b>DCR.4.80.20.10.5.08</b>	4	2	1,5	1	8	8	4,6	63	16	40	▲
<b>DCR.4.100.10.05.6.10</b>	4	1	2	0,5	10	10	5,5	77	20	55	▲
<b>DCR.4.100.15.75.6.10</b>	4	1,5	2	0,75	10	10	5,5	77	20	55	▲
<b>DCR.4.100.20.10.6.10</b>	4	2	2	1	10	10	5,5	77	20	55	▲
<b>DCR.4.100.25.12.6.10</b>	4	2,5	2	1,25	10	10	5,5	77	20	55	▲
<b>DCR.4.100.30.15.6.10</b>	4	3	2	1,5	10	10	5,5	77	20	55	▲
											P ●
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											K -
											N -
											S -
											H -



z3

z4



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>	AN25
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.3.40.10.00.1.06	3	1	0,5	-	4	6	2,8	50	4	36	▲
DCN.3.60.10.00.1.06	3	1	1	-	6	6	3,7	50	4	36	▲
DCN.3.60.10.00.2.06	3	1	1	-	6	6	3,7	63	6	40	▲
DCN.3.60.15.15.2.06	3	1,5	1	0,15	6	6	3,7	63	6	40	▲
DCN.4.80.15.15.3.08	4	1,5	1,5	0,15	8	8	4,6	63	8	40	▲
DCN.4.80.15.15.5.08	4	1,5	1,5	0,15	8	8	4,6	63	16	40	▲
DCN.4.80.20.15.3.08	4	2	1,5	0,15	8	8	4,6	63	8	40	▲
DCN.4.80.20.15.5.08	4	2	1,5	0,15	8	8	4,6	63	16	40	▲
DCN.4.100.10.00.6.10	4	1	2	-	10	10	5,5	77	20	50	▲
DCN.4.100.15.00.6.10	4	1,5	2	-	10	10	5,5	77	20	50	▲
DCN.4.100.20.15.6.10	4	2	2	0,15	10	10	5,5	77	20	50	▲
DCN.4.100.25.15.6.10	4	2,5	2	0,15	10	10	5,5	77	20	50	▲
DCN.4.100.30.15.6.10	4	3	2	0,15	10	10	5,5	77	20	50	▲

P	●
M	o
K	-
N	-
S	-
H	-

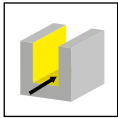
# Nutfräser

## Groove milling cutter

# DCX

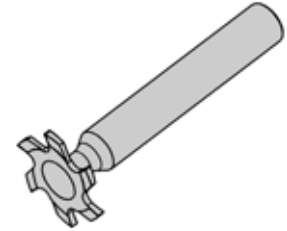
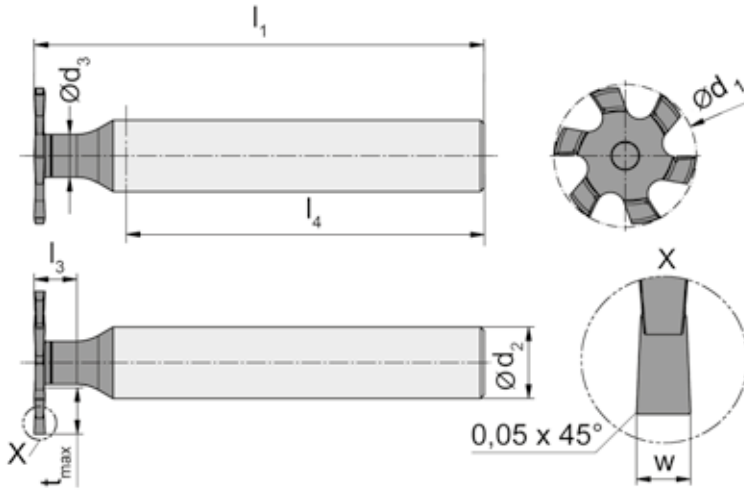


# A



z6

z8



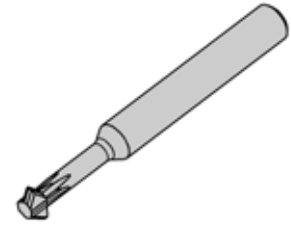
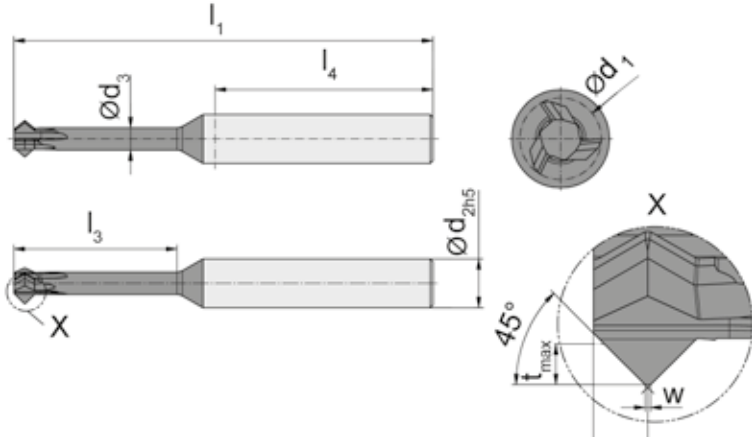
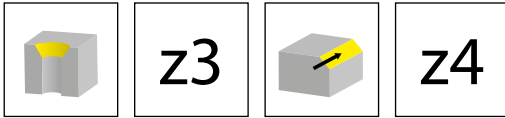
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 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>	AS/45
DCX.6.20.150.2.05.10	6	1,5	7	20	10	5	63	6	50	▲
DCX.6.20.200.2.05.10	6	2	7	20	10	5	63	6	50	▲
DCX.6.20.250.2.05.10	6	2,5	7	20	10	5	63	6	50	▲
DCX.6.25.150.2.06.10	6	1,5	9	25	10	6	63	6	51	▲
DCX.6.25.200.2.06.10	6	2	9	25	10	6	63	6	51	▲
DCX.6.25.250.2.06.10	6	2,5	9	25	10	6	63	6	51	▲
DCX.6.30.150.4.07.12	6	1,5	11	30	12	7	80	9	65	▲
DCX.6.30.200.4.07.12	6	2	11	30	12	7	80	9	65	▲
DCX.6.30.250.4.07.12	6	2,5	11	30	12	7	80	9	65	▲
DCX.6.30.300.4.07.12	6	3	11	30	12	7	80	9	65	▲
DCX.6.35.150.4.08.12	6	1,5	13	35	12	8	80	11	64	▲
DCX.6.35.200.4.08.12	6	2	13	35	12	8	80	11	64	▲
DCX.6.35.250.4.08.12	6	2,5	13	35	12	8	80	11	64	▲
DCX.6.35.300.4.08.12	6	3	13	35	12	8	80	11	64	▲
DCX.8.40.150.4.09.12	8	1,5	15	40	12	9	80	11	65	▲
DCX.8.40.200.4.09.12	8	2	15	40	12	9	80	11	65	▲
DCX.8.40.250.4.09.12	8	2,5	15	40	12	9	80	11	65	▲
DCX.8.40.300.4.09.12	8	3	15	40	12	9	80	11	65	▲

P	●
M	●
K	●
N	○
S	●
H	-



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

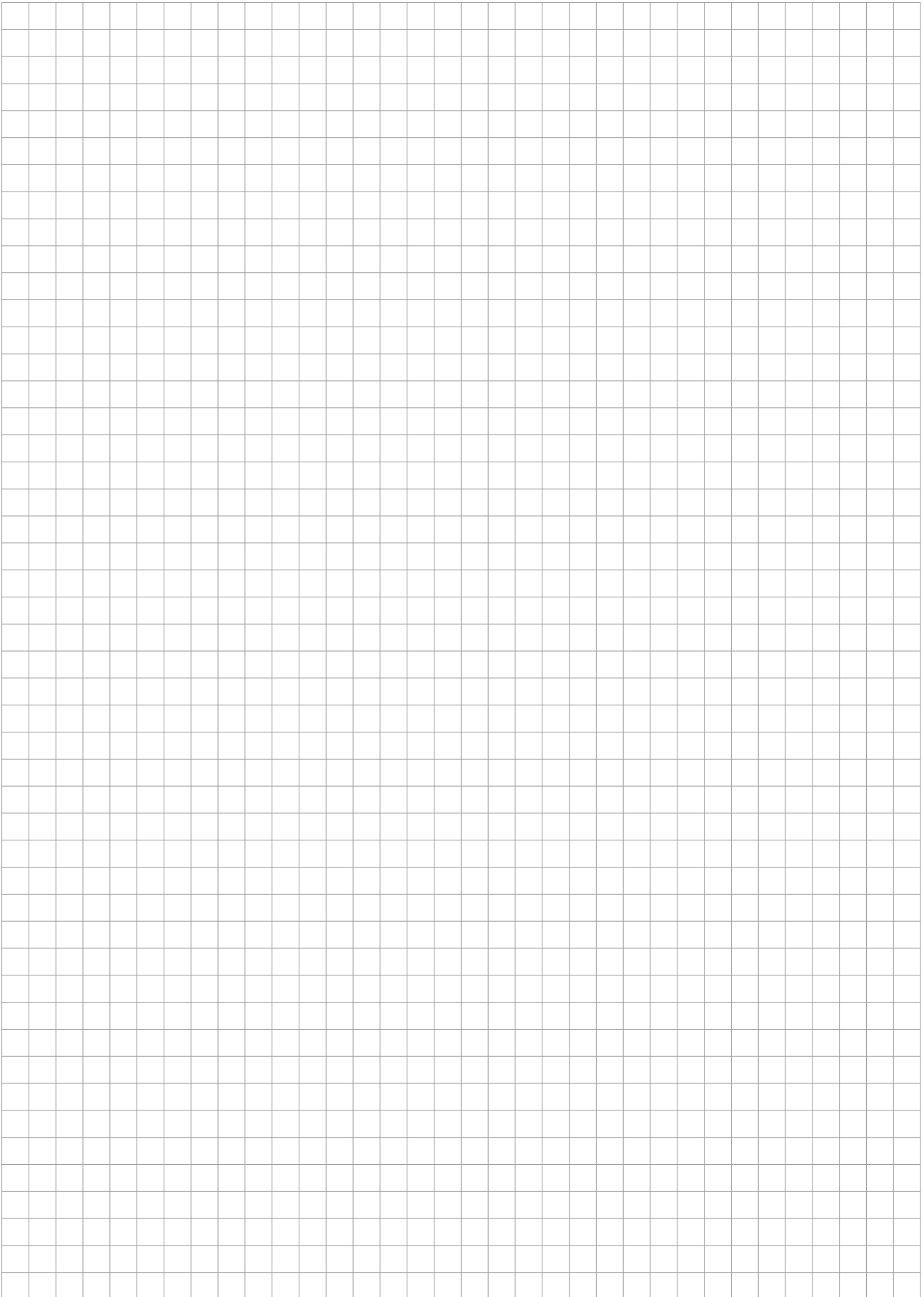
Bestellnummer Part number	Z	w	Fase Chamfer	t <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	AN25
DCF.3.20.4545.1.04	3	0,2	45°	0,3	2	4	1,25	39	4	22	▲
DCF.3.30.4545.2.04	3	0,2	45°	0,3	3	4	2,1	39	6	22	▲
DCF.3.40.4545.3.06	3	0,2	45°	0,75	4	6	2,2	50	8	36	▲
DCF.3.50.4545.3.06	3	0,2	45°	1	5	6	2,7	50	10	36	▲
DCF.3.60.4545.5.06	3	0,2	45°	1,25	6	6	3,15	63	16	40	▲
DCF.3.60.4545.6.06	3	0,2	45°	1,25	6	6	3,15	63	20	40	▲
DCF.3.75.4545.6.08	3	0,2	45°	1,5	7,5	8	4,1	63	20	40	▲
DCF.3.75.4545.8.08	3	0,2	45°	1,5	7,5	8	4,1	77	30	40	▲
DCF.4.75.4545.8.08	4	0,2	45°	1,5	7,5	8	4,1	77	30	40	▲
											P ●
											M o
											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		
						ES1_ AN2_ AS4_	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
<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	-	-			

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		
						ES1_ AN2_ AS4_ 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
		perlitisches 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
		perlitisches 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



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		
					ES1_ AN2_ AS4_	fz	
<b>S</b>  Titan	Titanlegierung α Titanium alloy α	S3.1	120	240		120-80	0,02 - 0,04
	Titanlegierung α-β Titanium alloy α-β	S3.2	360	1200		120-80	0,02 - 0,04
	Titanlegierung β Titanium alloy β	S3.3	410	1400		120-80	0,02 - 0,04
<b>O</b>	Thermoplaste Thermoplastics	01.1					
	Duroplaste Duro plaste	01.2					
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK 01.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CKF 01.4					





System/System	Seite/Page
<b>M304</b>	<b>28</b>
<b>M306</b>	<b>36</b>
<b>M308</b>	<b>66</b>
<b>M311</b>	<b>88</b>
<b>M116</b>	<b>110</b>
<b>M313</b>	<b>116</b>
<b>M328</b>	<b>150</b>
<b>M332</b>	<b>176</b>
<b>M335</b>	<b>200</b>
<b>M620</b>	<b>204</b>

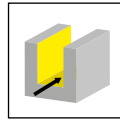
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



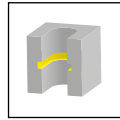
B

Fräferschaft  
Milling shank  
M304/M304.ST

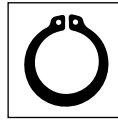


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Schneidplatte  
Insert  
304



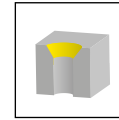
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# M304



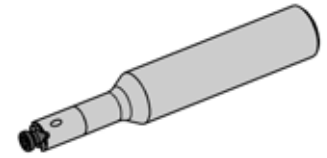
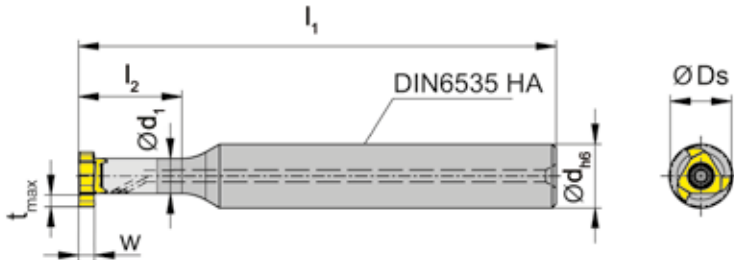
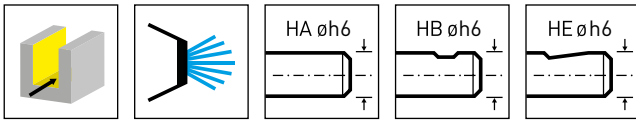
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\emptyset$  7,7 mm

**Milling shank with  
exchangeable insert**

from bore  $\emptyset$  7,7 mm

**B**



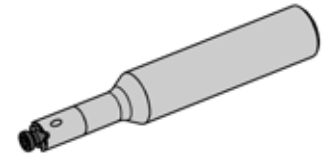
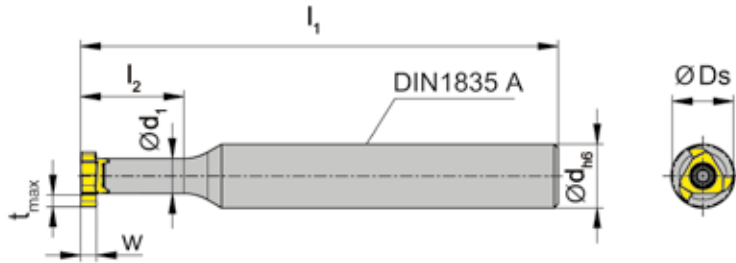
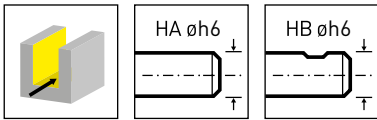
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<b>M304.0008.02A</b>	8	64	17	4,4	A	304044R
<b>M304.0008.03A</b>	8	68	21	4,4	A	304044R
<b>M304.0008.01B</b>	8	60	13	4,4	B	304044R
<b>M304.0008.02B</b>	8	64	17	4,4	B	304044R
<b>M304.0008.03B</b>	8	68	21	4,4	B	304044R
<b>M304.0008.01E</b>	8	60	13	4,4	E	304044R
<b>M304.0008.02E</b>	8	64	17	4,4	E	304044R
<b>M304.0008.03E</b>	8	68	21	4,4	E	304044R

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
M304...	<b>1.8.4T6EP</b>	<b>T6PL</b>



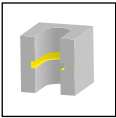
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<b>M304.ST08.01B</b>	8	60	13	4,4	B	304044R

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

**Ersatzteile**  
Spare Parts

<b>Fräuserschaft</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

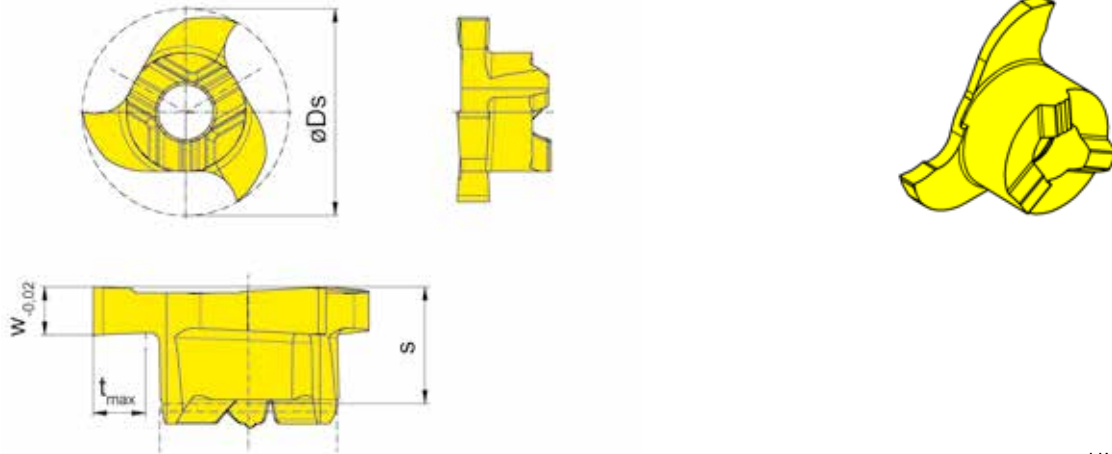


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	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	▲		Δ
304.0030.20	7,7	0,3	2,6	-	1,3	3	304044R	▲		Δ
304.0040.20	7,7	0,4	2,6	-	1,3	3	304044R	▲		Δ
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	▲		Δ
304.0070.20	7,7	0,7	2,6	-	1,3	3	304044R	▲		Δ
304.0100.20	7,7	1	2,6	-	1,3	3	304044R		▲	▲
304.0150.20	7,7	1,5	2,9	0,1	1,3	3	304044R		▲	▲
304.0200.20	7,7	2	2,9	0,2	1,3	3	304044R		▲	▲
P		●	●	-						
M		●	○	●						
K		○	○	-						
N		-	-	-						
S		-	-	●						
H		-	-	-						



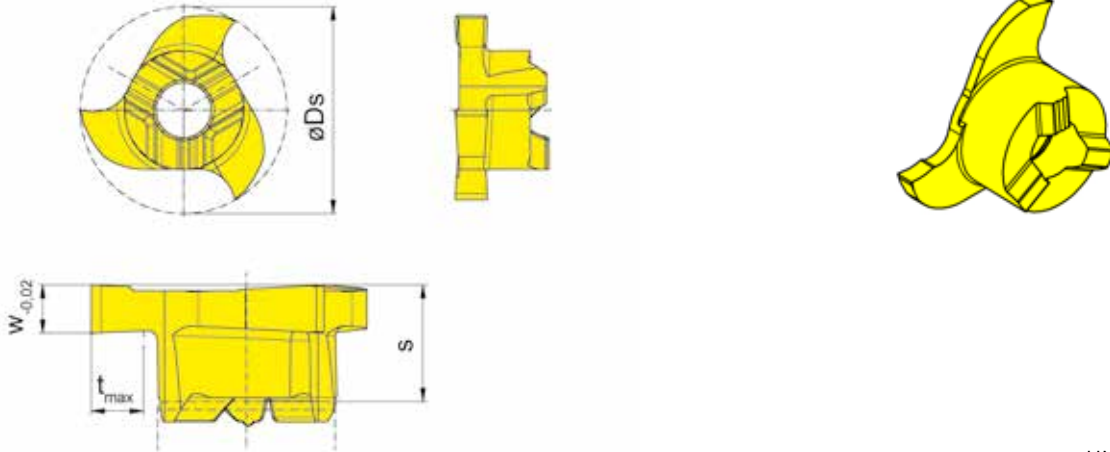


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B

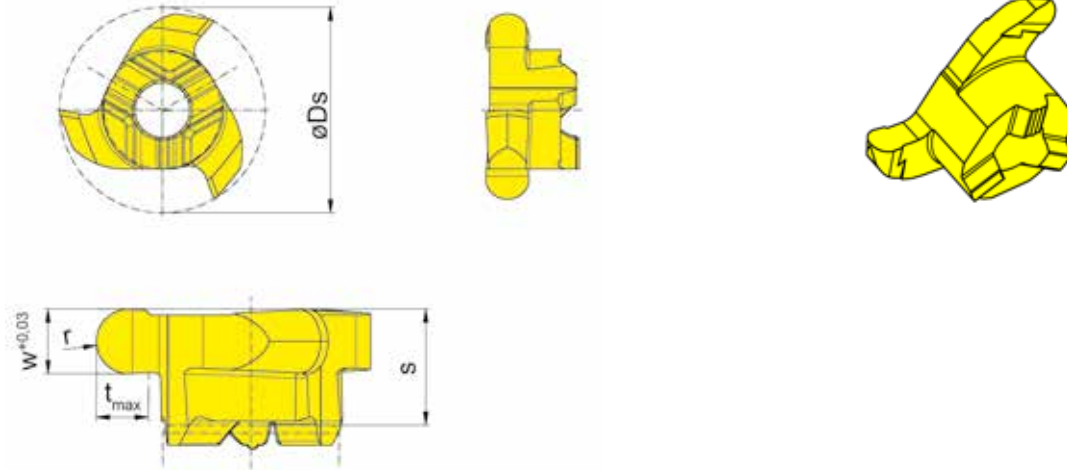
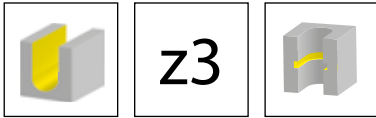


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

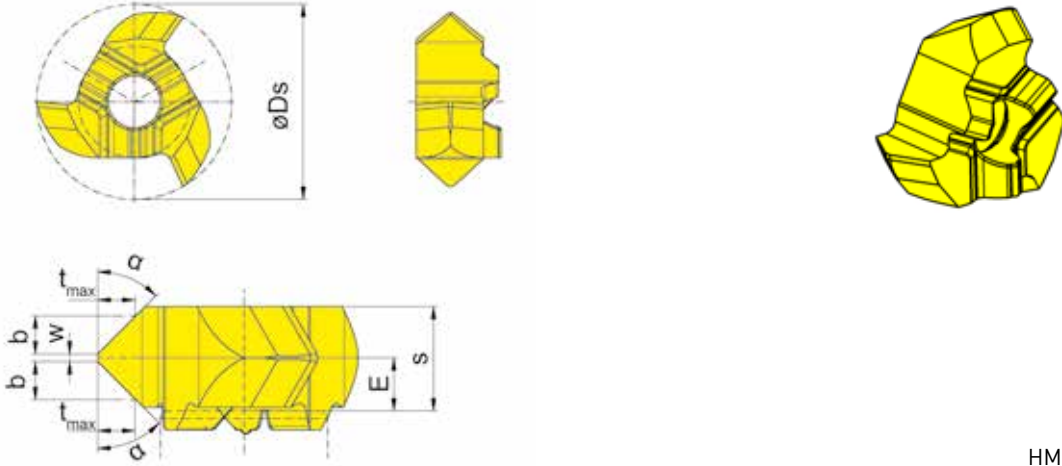


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	E	s	w	$\alpha$	b	$t_{max}$	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	-	-

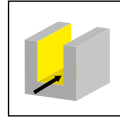
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



B

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

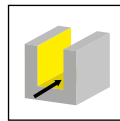


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Grundaufnahme  
Basic Holder  
WFB

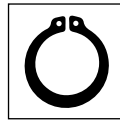
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Einschraubfräser  
Screw-in cutter  
M306.M

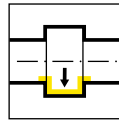


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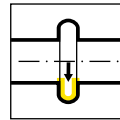
Schneidplatte  
Insert  
108/306/606



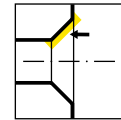
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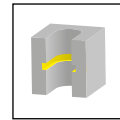
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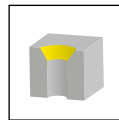
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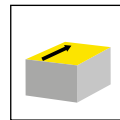
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# M306



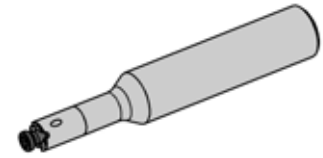
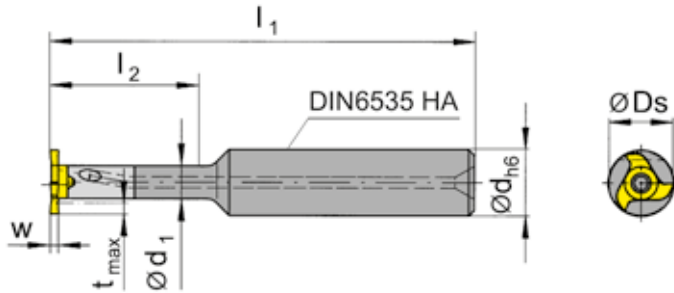
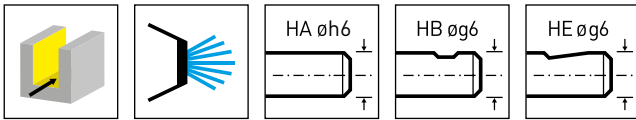
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  10 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  10 mm

**B**



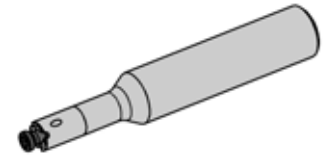
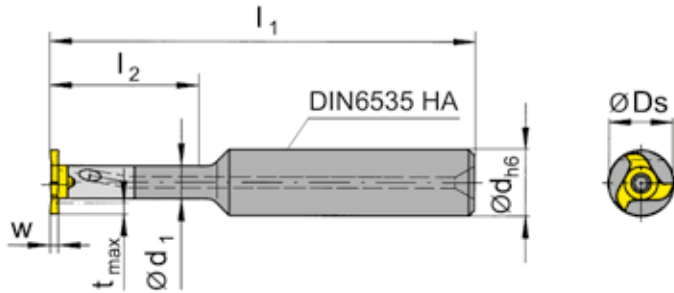
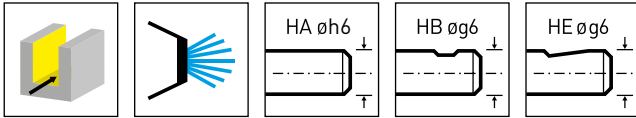
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<b>M306.0012.02A</b>	12	90	30	6	A	306060R • 306060L
<b>M306.0012.03A</b>	12	100	42	6	A	306060R • 306060L
<b>M306.0012.01B</b>	12	80	21	6	B	306060R • 306060L
<b>M306.0012.02B</b>	12	90	30	6	B	306060R • 306060L
<b>M306.0012.03B</b>	12	100	42	6	B	306060R • 306060L
<b>M306.0012.01E</b>	12	80	21	6	E	306060R • 306060L
<b>M306.0012.02E</b>	12	90	30	6	E	306060R • 306060L
<b>M306.0012.03E</b>	12	100	42	6	E	306060R • 306060L

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
M306...	<b>2.6.5T8EP</b>	<b>T8PL</b>



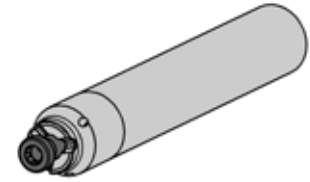
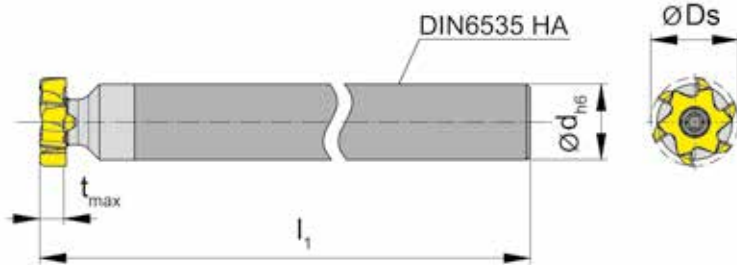
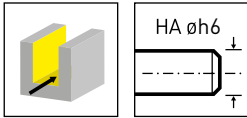
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M306.0712.02A	12	90	30	7,3	A	306060R • 306060L
M306.0716.01A	16	100	25	7,3	A	306060R • 306060L
M306.0716.02A	16	110	35	7,3	A	306060R • 306060L
M306.0712.02B	12	90	30	7,3	B	306060R • 306060L
M306.0716.01B	16	100	25	7,3	B	306060R • 306060L
M306.0712.02E	12	90	30	7,3	E	306060R • 306060L
M306.0716.01E	16	100	25	7,3	E	306060R • 306060L

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

Ersatzteile  
Spare Parts

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

**B**



Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M306.0707.03A</b>	7,5	100	A	306060R • 306060L
<b>M306.1010.03A</b>	10	120	A	306060R • 306060L

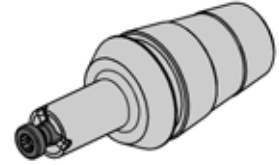
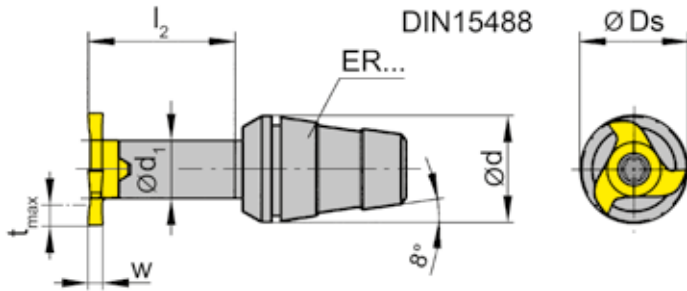
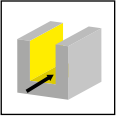
t<sub>max</sub> und Ds siehe SP  
t<sub>max</sub> and Ds see inserts

**Ersatzteile**

Spare Parts

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

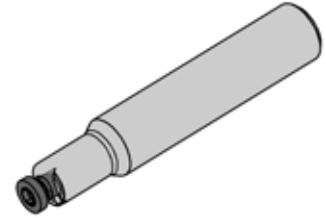
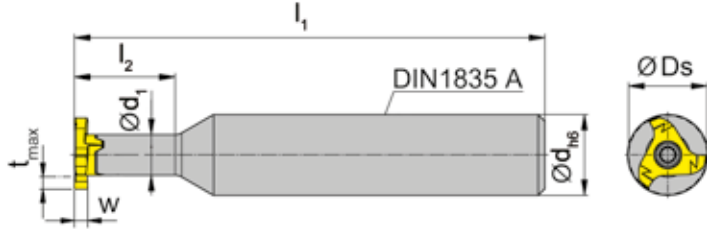
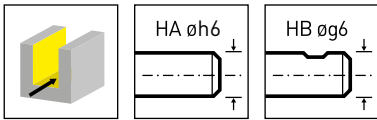
# Frälerschaft

Milling shank

# M306.ST



**B**



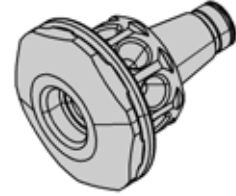
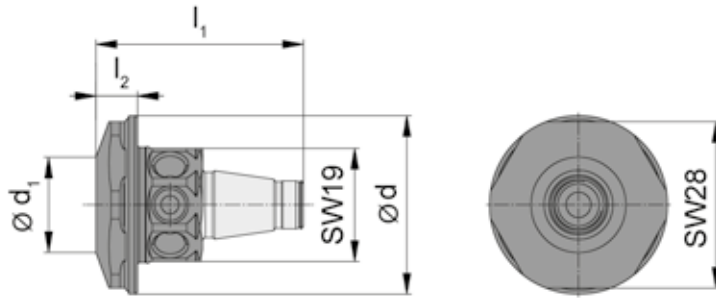
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M306.ST10.01A</b>	10	60	15	6	A	306060R • 306060L
<b>M306.ST12.01A</b>	12	70	15	6	A	306060R • 306060L
<b>M306.ST10.01B</b>	10	60	15	6	B	306060R • 306060L
<b>M306.ST12.01B</b>	12	70	15	6	B	306060R • 306060L

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

## Ersatzteile

Spare Parts

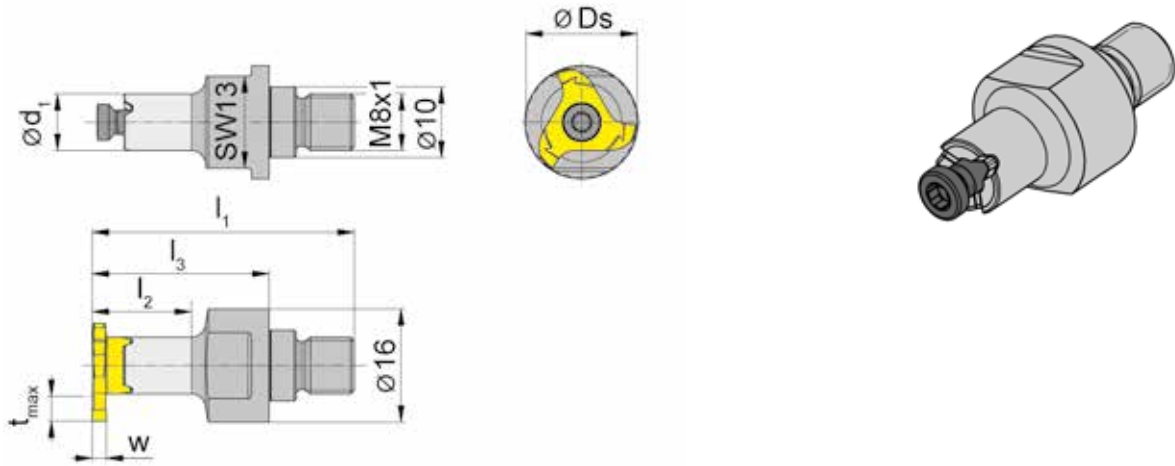
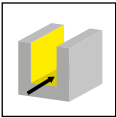
Frälerschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M306...	<b>2.6.5T8EP</b>	<b>T8PL</b>



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**

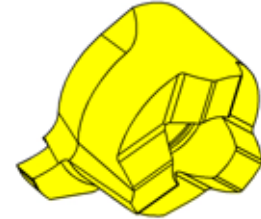
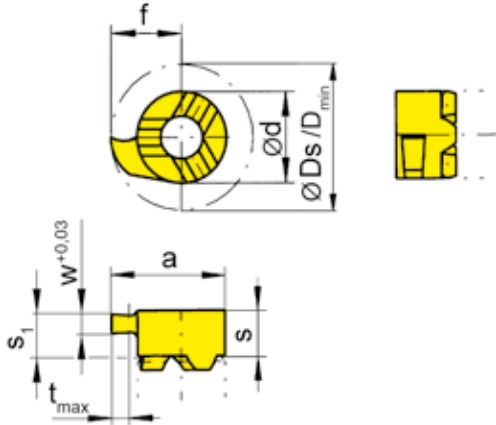
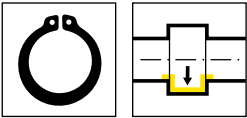


Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW
<b>M306.M081.01</b>	37	11	25	6	13

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>



R = rechts wie gezeichnet  
R = right hand version shown

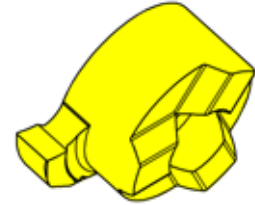
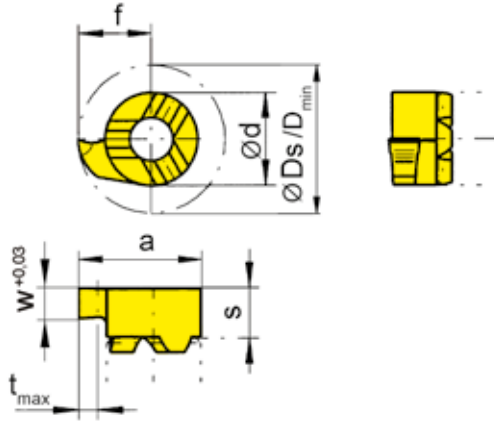
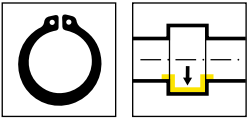
L = links spiegelbildlich  
L = left hand version

▲ 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>R108.0070.00</b>	0,74	0,7	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060R	▲	▲	▲	
<b>R108.0080.00</b>	0,84	0,8	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060R	▲	▲	▲	
<b>R108.0090.00</b>	0,94	0,9	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060R	▲	▲	▲	
<b>L108.0070.00</b>	0,74	0,7	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060L	Δ	▲	▲	
<b>L108.0080.00</b>	0,84	0,8	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060L	Δ	Δ	▲	
<b>L108.0090.00</b>	0,94	0,9	4,8	9,6	6	3,6	3,2	7,8	1	8	1	306060L	Δ	▲	▲	
<b>Zapfenausführung</b> not face cutting, limited depth of cut													<b>P</b>	●	●	●
													<b>M</b>	○	●	●
													<b>K</b>	○	●	●
													<b>N</b>	-	●	●
													<b>S</b>	-	●	●
													<b>H</b>	-	-	-

B



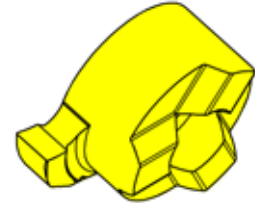
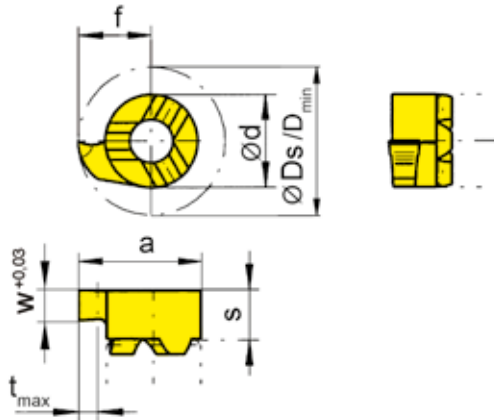
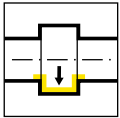
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	s	f	Ds	a	d	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TN35
R108.0110.00	1,19	1,1	3,2	4,8	9,6	7,8	6	1	8	1	306060R	▲	▲	▲	▲
R108.0130.00	1,39	1,3	3,2	4,8	9,6	7,8	6	1	8	1	306060R	▲	▲	▲	▲
R108.0160.00	1,69	1,6	3,2	4,8	9,6	7,8	6	1	8	1	306060R	▲	Δ	▲	▲
L108.0110.00	1,19	1,1	3,2	4,8	9,6	7,8	6	1	8	1	306060L	▲	Δ	▲	▲
L108.0130.00	1,39	1,3	3,2	4,8	9,6	7,8	6	1	8	1	306060L			Δ	▲
L108.0160.00	1,69	1,6	3,2	4,8	9,6	7,8	6	1	8	1	306060L			▲	Δ
												P	o	•	•
												M	-	o	•
												K	-	o	•
												N	-	-	•
												S	-	-	•
												H	-	-	-



R = rechts wie gezeichnet  
R = right hand version shown

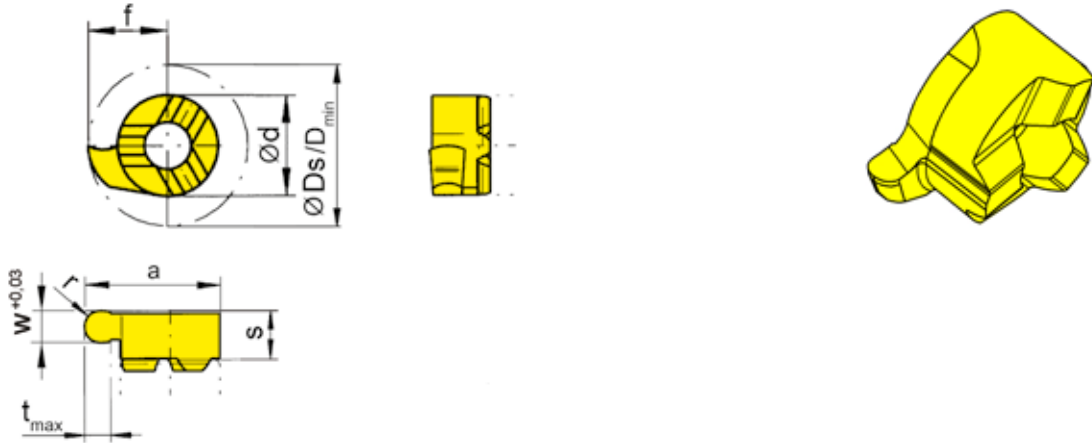
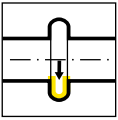
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 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>R108.0150.00</b>	1,5	3,2	4,8	9,6	7,8	6	1	8	1	306060R	▲	▲	▲	▲
<b>R108.0200.00</b>	2	3,2	4,8	9,6	7,8	6	1	8	1	306060R	▲	▲	▲	▲
<b>L108.0150.00</b>	1,5	3,2	4,8	9,6	7,8	6	1	8	1	306060L	▲		Δ	▲
<b>L108.0200.00</b>	2	3,2	4,8	9,6	7,8	6	1	8	1	306060L	▲		▲	▲
<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

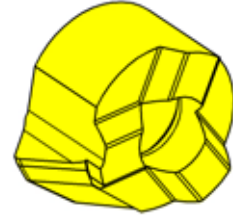
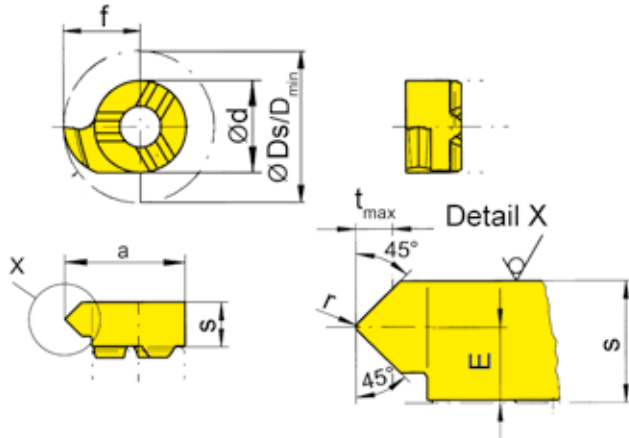
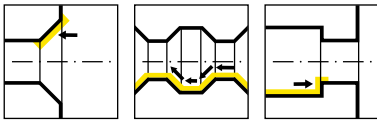
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	w	s	f	Ds	r	d	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TI25	TN35
<b>R108.0004.08</b>	0,8	3,2	4,8	9,6	0,4	6	8	1	306060R	▲	▲	▲		▲
<b>R108.0006.12</b>	1,2	3,2	4,8	9,6	0,6	6	8	1	306060R	▲	▲	▲		▲
<b>R108.0009.18</b>	1,8	3,2	4,8	9,6	0,9	6	8	1	306060R	▲	▲	▲	▲	▲
<b>L108.0004.08</b>	0,8	3,2	4,8	9,6	0,4	6	8	1	306060L	△	▲	▲		▲
<b>L108.0006.12</b>	1,2	3,2	4,8	9,6	0,6	6	8	1	306060L	▲	▲	▲		▲
<b>L108.0009.18</b>	1,8	3,2	4,8	9,6	0,9	6	8	1	306060L	△		▲	△	▲
<b>P</b>	o	•	•	•	•	•								
<b>M</b>	-	o	•	•	•	•								
<b>K</b>	-	o	•	•	•	•								
<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	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	306060R	▲	▲	▲	▲
<b>L108.4545.02</b>	1,8	4,65	9,3	0,2	6	3,6	7,65	7,8	45°	1,4	1	306060L	▲	Δ	Δ	▲
<b>P</b>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>M</b>	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>K</b>	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>N</b>	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>S</b>	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>H</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B

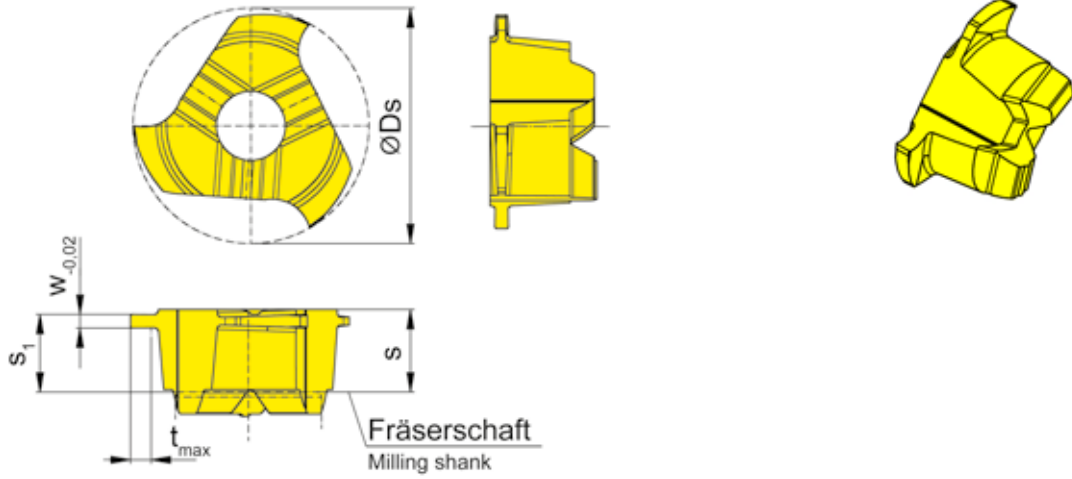


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	Nw	w	s	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	▲
306.0070.10.00	9,7	0,7	0,77	3,4	3,2	1,15	3	306060R	▲

Zapfenausführung  
not face cutting,  
limited depth of cut

P	●
M	●
K	●
N	●
S	●
H	-

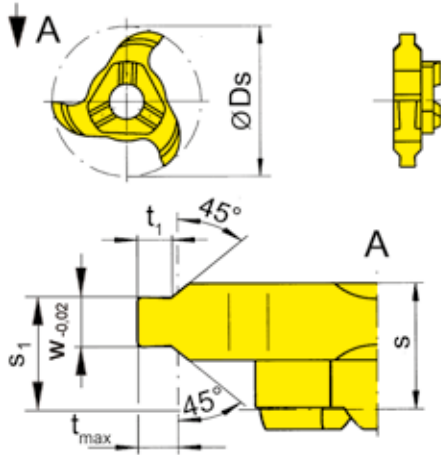
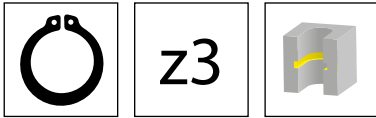


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B



z3

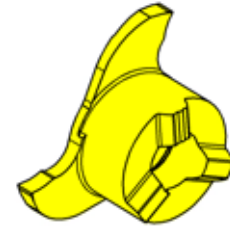
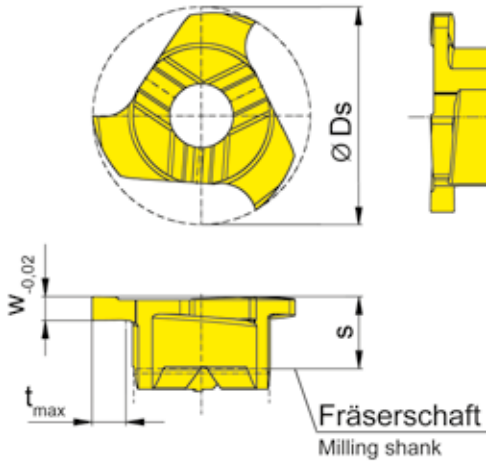
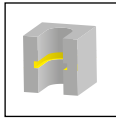


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	AS45	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	- -

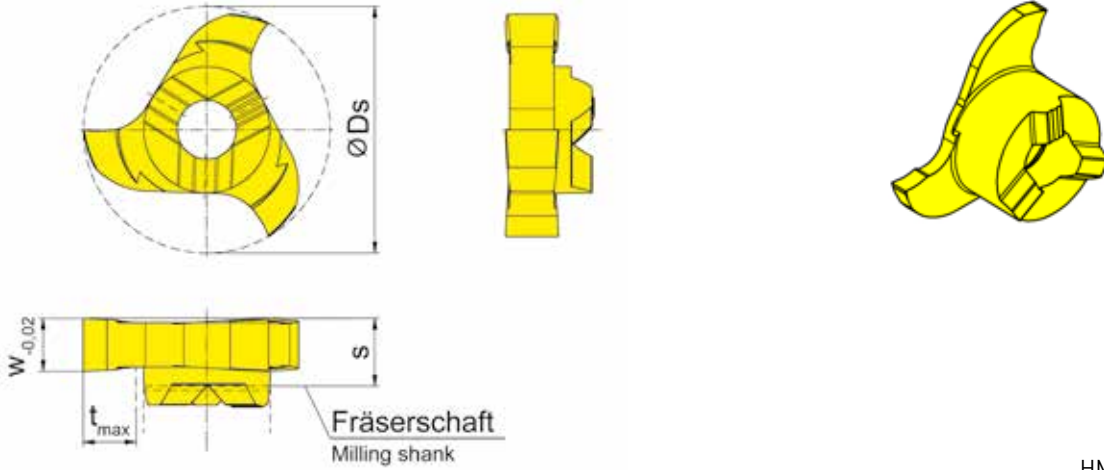
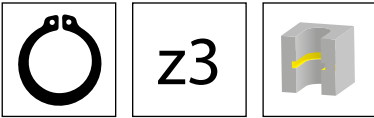


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	MG12	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	Δ	▲
306.0160.00	11,7	1,6	1,71	3,2	2,5	3	306060R	Δ	Δ	▲
								P	o	•
								M	-	•
								K	-	•
								N	-	•
								S	-	•
								H	-	-

B

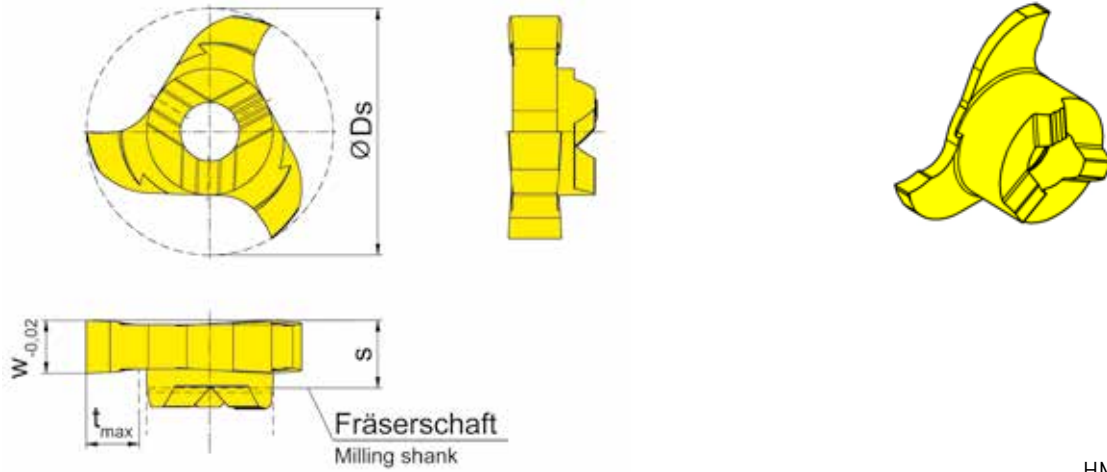
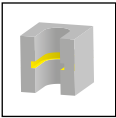


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	Nw	w	s	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	▲
								P ●
								M ●
								K ●
								N ●
								S ●
								H -



z3

B

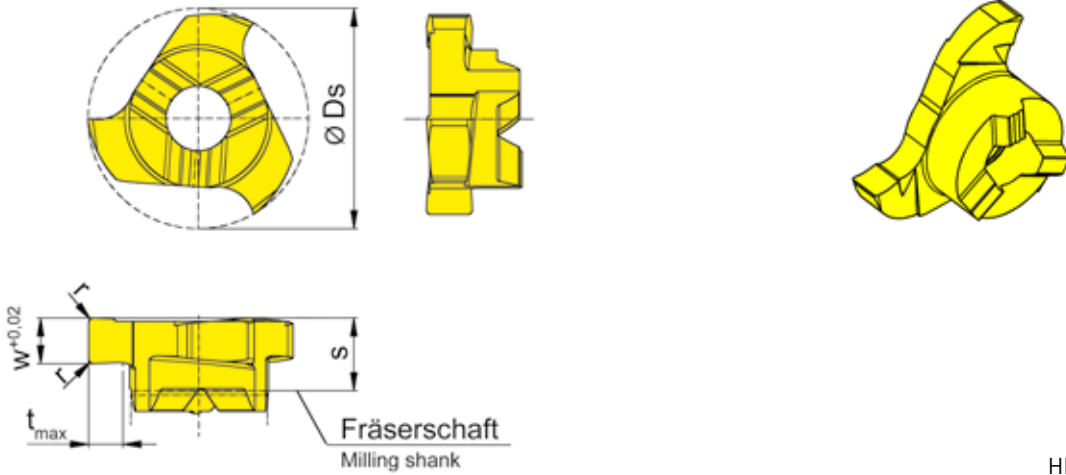


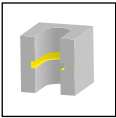
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B



z3

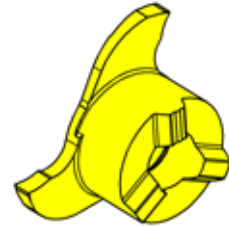
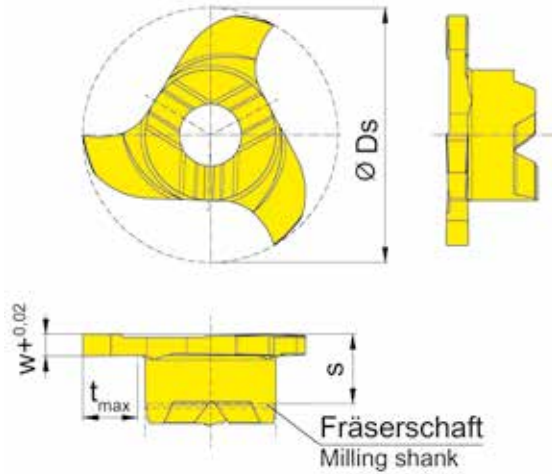


Abbildung = rechtsschneidend  
Picture = right hand cutting version

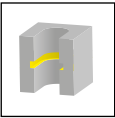
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades				
								MG12	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	o	•	•	•
								M	-	•	•	•
								K	-	•	•	•
								N	-	o	•	•
								S	-	•	•	•
								H	-	-	-	-





z3

.40

B

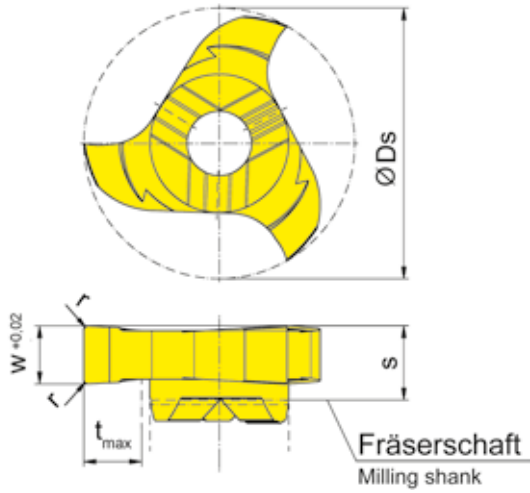


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	Tl25
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 -

B

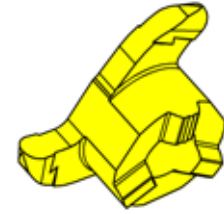
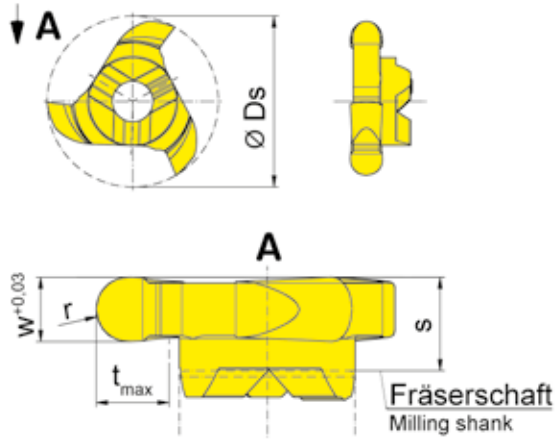
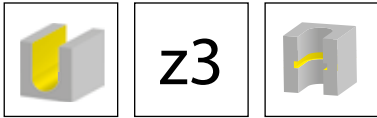


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	MG12	AN25	AS45	RC45	TF45	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	Δ		▲		Δ	▲	▲
306.0015.30	11,7	3	4,2	1,5	2,5	3	306060R			▲				
<b>P</b>	<b>o</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>
<b>M</b>	-	<b>o</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>
<b>K</b>	-	-	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>
<b>N</b>	-	-	<b>o</b>	-	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>
<b>S</b>	-	-	<b>•</b>	-	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>	<b>•</b>
<b>H</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-

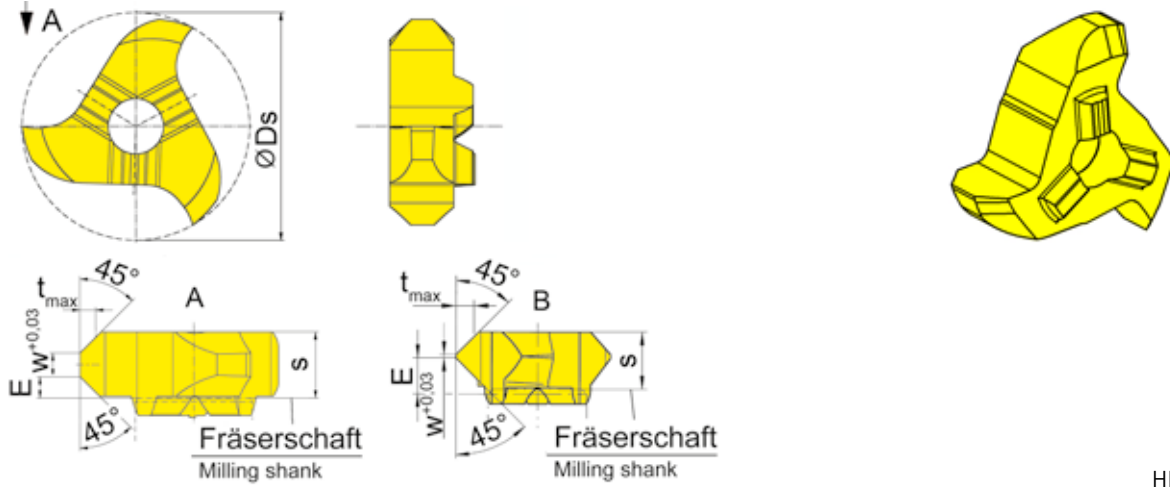
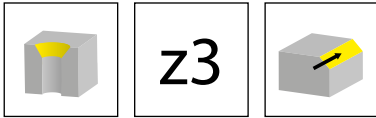


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	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	-	-	-

B



z6

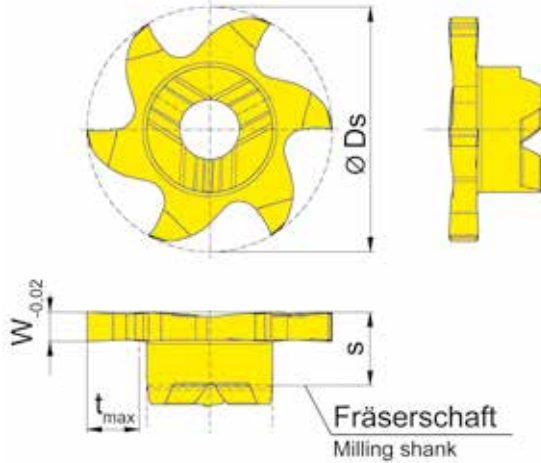
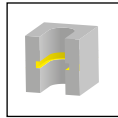
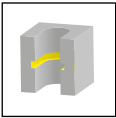


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades	
								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	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	o ●
								S	● ●
								H	- -



z6

B

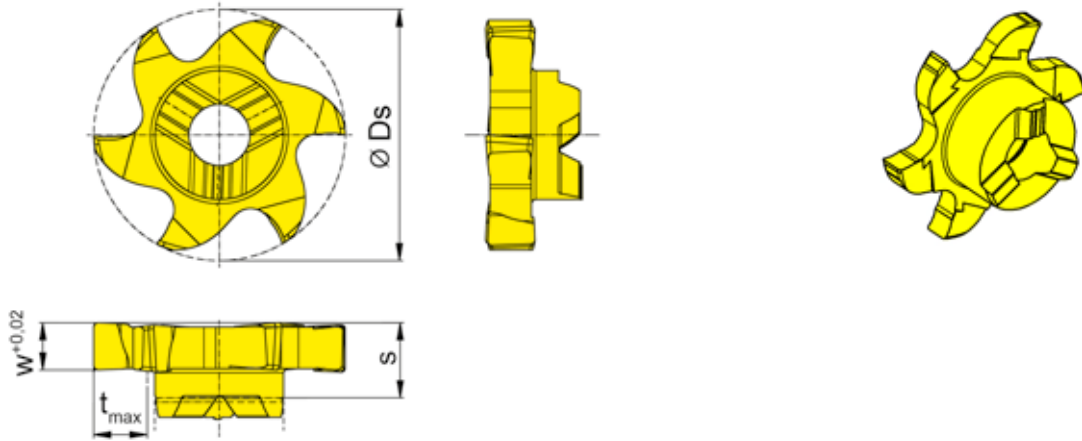


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades			
							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	-	-	-	-						

B

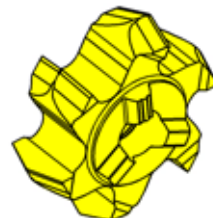
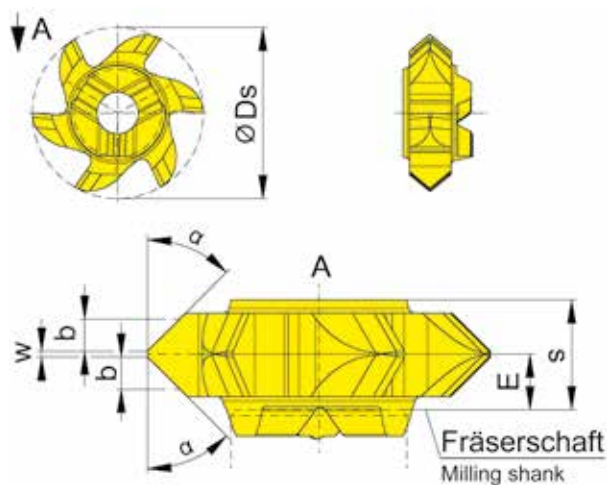
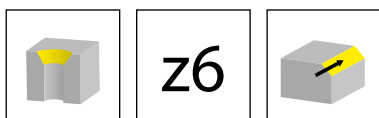


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	a	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 -

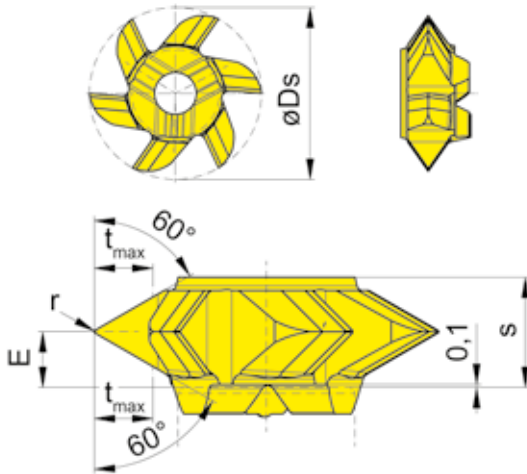
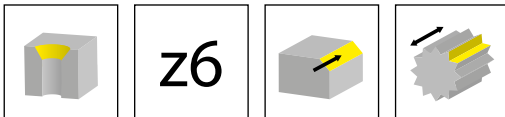


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	t <sub>max</sub>	Z	HIS	AS45
606.6060.05	11,7	1,9	3,75	2	6	306060R	▲
							P ●
							M ●
							K ●
							N ○
							S ●
							H -

B

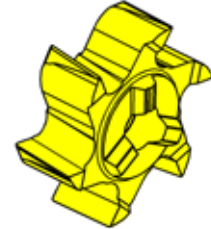
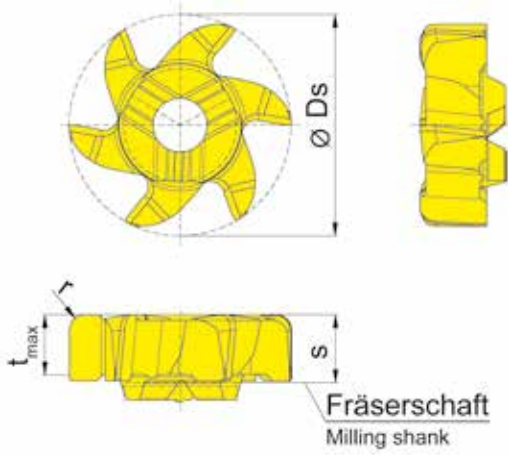
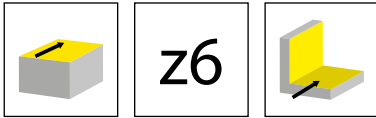


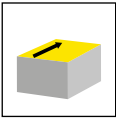
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	HM-Sorten Carbide grades	
							AS45	TI25
606.PLT6.08	11,7	6	0,8	3,2	3,6	306060R	▲	▲
							P ● ●	
							M ● ●	
							K ● ●	
							N ○ ●	
							S ● ●	
							H - -	





z6

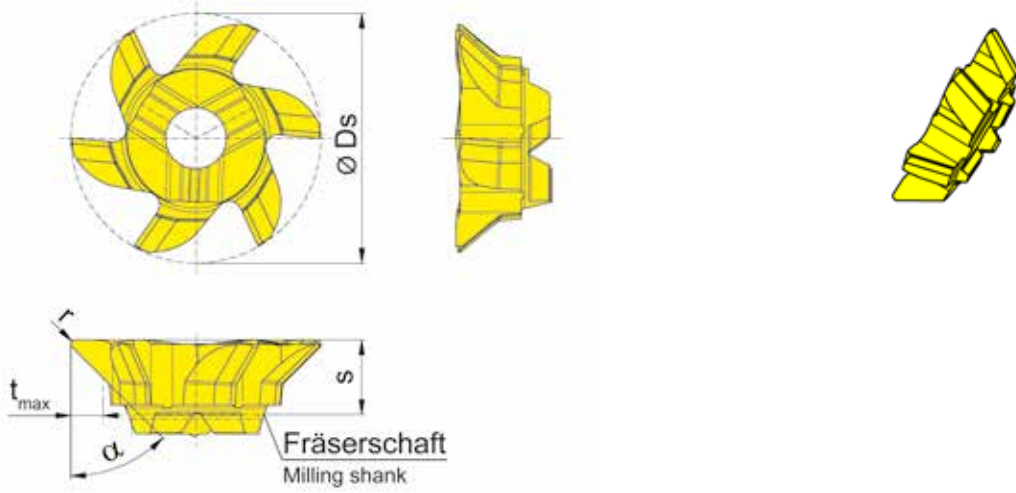
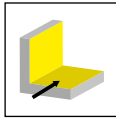


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	Z	r	$\alpha$	$t_{max}$	s	HIS	AS45
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 -

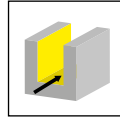
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



B

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

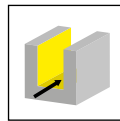


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Grundaufnahme  
Basic Holder  
WFB

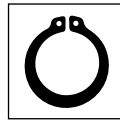
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Einschraubfräser  
Screw-in cutter  
M308.M

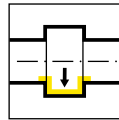


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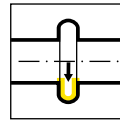
Schneidplatte  
Insert  
111/308/608



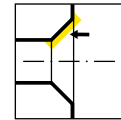
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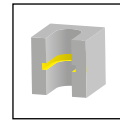
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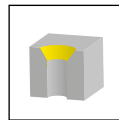
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85, 87

# M308



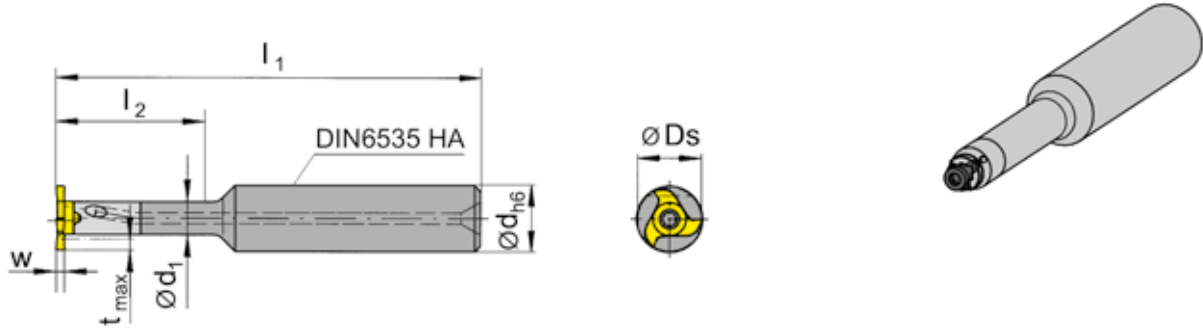
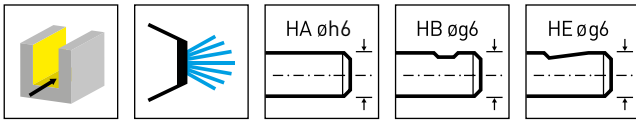
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  13,7 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  13,7 mm

**B**



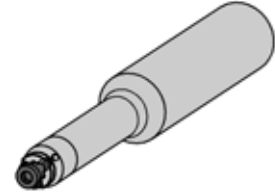
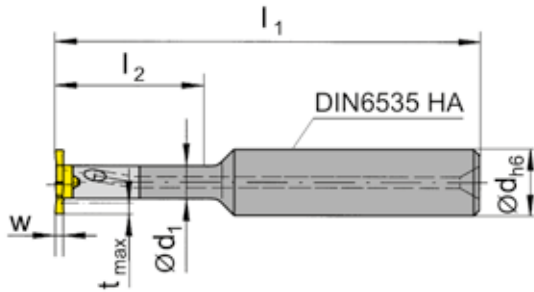
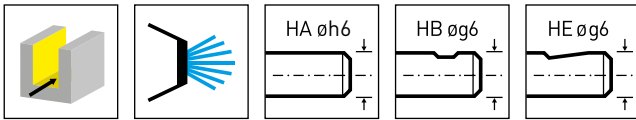
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M308.0012.01A</b>	12	95	29	8	A	308080R • 308080L
<b>M308.0012.02A</b>	12	110	42	8	A	308080R • 308080L
<b>M308.0012.03A</b>	12	120	56	8	A	308080R • 308080L
<b>M308.0012.07A</b>	12	160	-	8	A	308080R • 308080L
<b>M308.0012.01B</b>	12	95	29	8	B	308080R • 308080L
<b>M308.0012.02B</b>	12	110	42	8	B	308080R • 308080L
<b>M308.0012.03B</b>	12	120	56	8	B	308080R • 308080L
<b>M308.0012.01E</b>	12	95	29	8	E	308080R • 308080L
<b>M308.0012.02E</b>	12	110	42	8	E	308080R • 308080L
<b>M308.0012.03E</b>	12	120	56	8	E	308080R • 308080L

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

**Ersatzteile**

Spare Parts

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



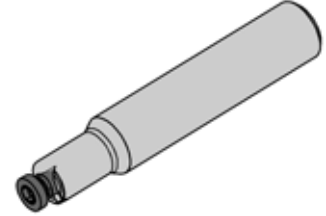
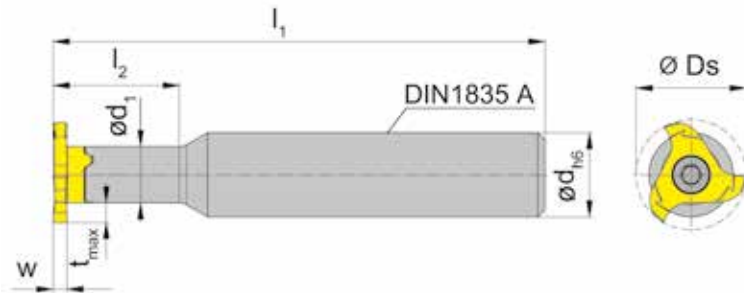
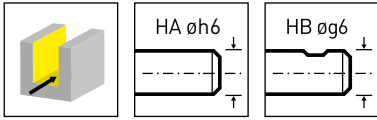
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M308.1012.02A</b>	12	110	42	9,5	A	308080R • 308080L
<b>M308.1016.01A</b>	16	110	33	9,5	A	308080R • 308080L
<b>M308.1016.02A</b>	16	110	45	9,5	A	308080R • 308080L
<b>M308.1016.03A</b>	16	130	64	9,5	A	308080R • 308080L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

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
M308...	<b>3.5.12T10EP</b>	<b>T10PL</b>

**B**



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

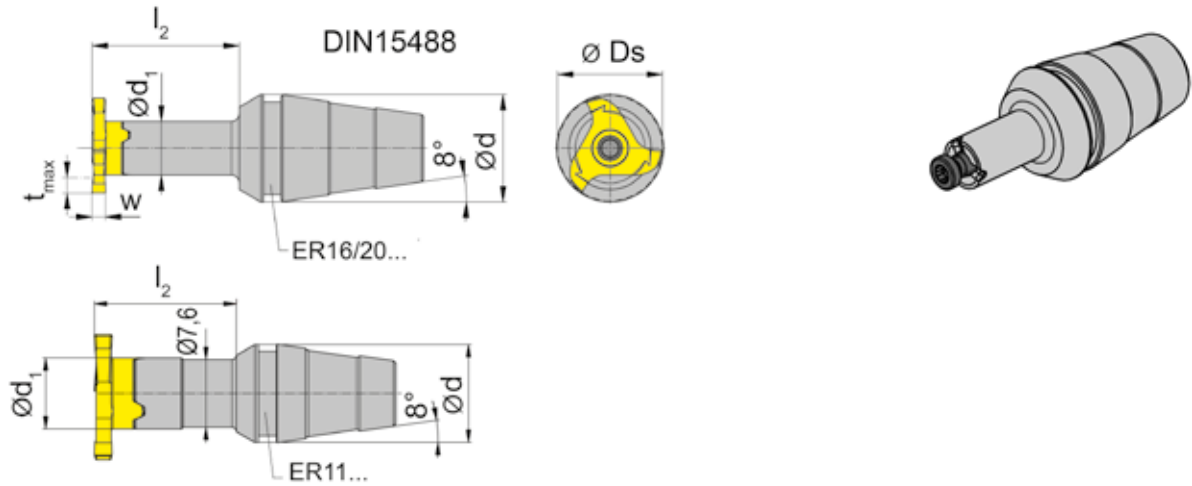
w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte

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

**Ersatzteile**

Spare Parts

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

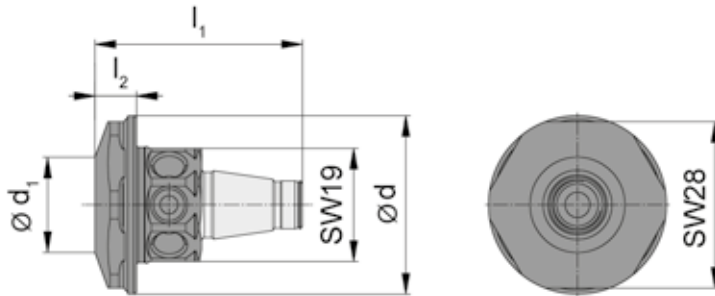
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

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

**Ersatzteile**  
Spare Parts

<b>Frälerschaft</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>

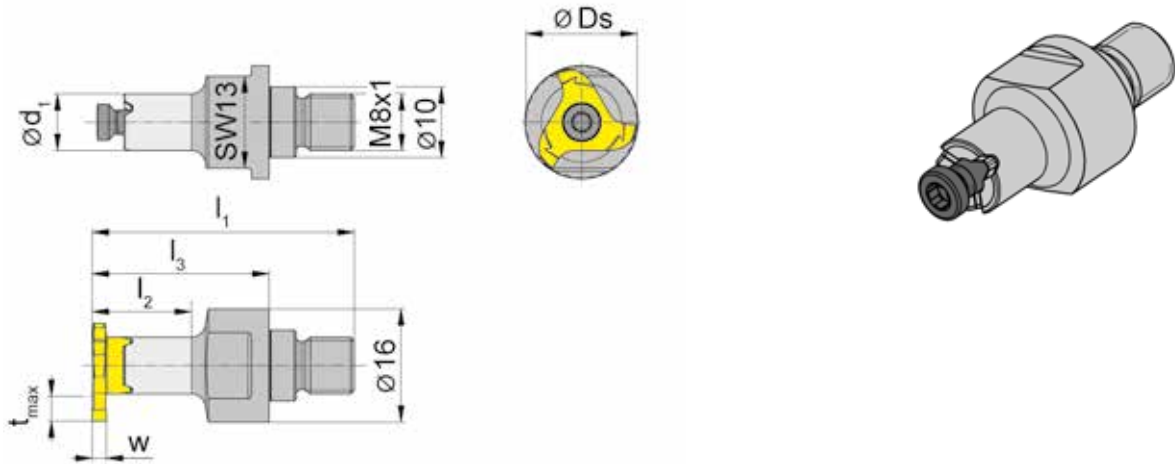
**B**



Bestellnummer Part number	$l_1$	$l_2$	$d_1$	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>M308.M081.01</b>	37	14	25	8	13	308080R • 308080L	8201

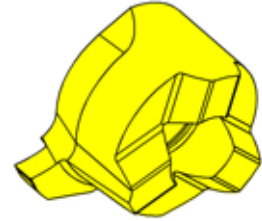
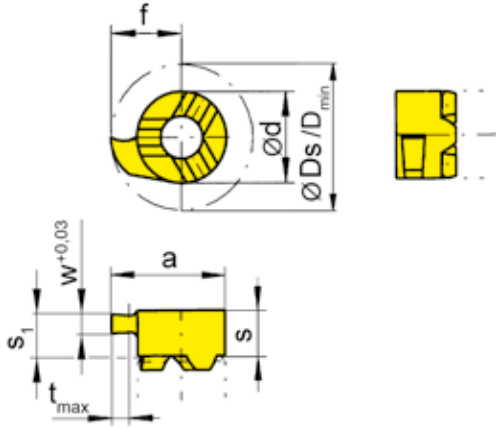
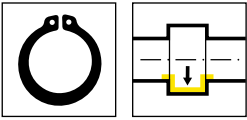
w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

**Ersatzteile**

Spare Parts

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

B



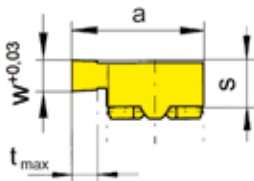
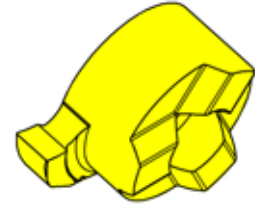
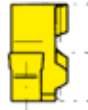
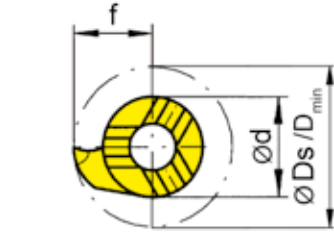
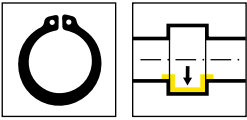
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	f	Ds	d	s	s <sub>1</sub>	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	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	308080R		▲	▲	▲	
<b>R111.0080.00</b>	0,84	0,8	6,7	13,4	8	4,15	3,95	10,7	1,3	11	1	308080R		▲	▲	▲	
<b>R111.0090.00</b>	0,94	0,9	6,7	13,4	8	4,15	3,95	10,7	1,5	11	1	308080R	▲	▲	▲	▲	
<b>L111.0070.00</b>	0,74	0,7	6,7	13,4	8	4,15	3,95	10,7	1,2	11	1	308080L			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	308080L			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	308080L	▲		▲	▲	
Zapfenausführung not face cutting, limited depth of cut													<b>P</b>	o	•	•	•
													<b>M</b>	-	o	•	•
													<b>K</b>	-	o	•	•
													<b>N</b>	-	-	•	•
													<b>S</b>	-	-	•	•
													<b>H</b>	-	-	-	-



R = rechts wie gezeichnet  
R = right hand version shown

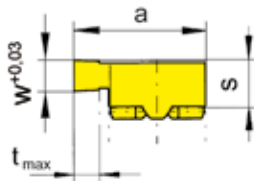
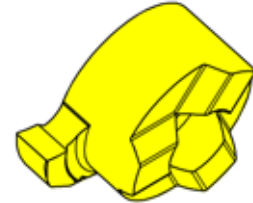
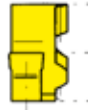
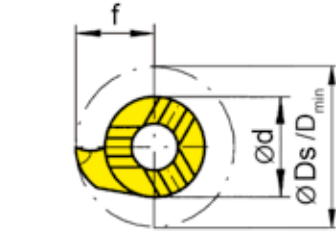
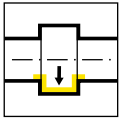
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	Nw	s	f	Ds	d	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	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	308080R	▲	▲	▲	▲
<b>R111.0130.00</b>	1,39	1,3	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>R111.0160.00</b>	1,69	1,6	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>L111.0110.00</b>	1,19	1,1	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	▲	▲	▲	▲
<b>L111.0130.00</b>	1,39	1,3	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	Δ	Δ	▲	▲
<b>L111.0160.00</b>	1,69	1,6	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	Δ	▲	▲	▲
<b>P</b>	o	•	•	•											
<b>M</b>	-	o	•	•											
<b>K</b>	-	o	•	•											
<b>N</b>	-	-	•	•											
<b>S</b>	-	-	•	•											
<b>H</b>	-	-	-	-											

**B**



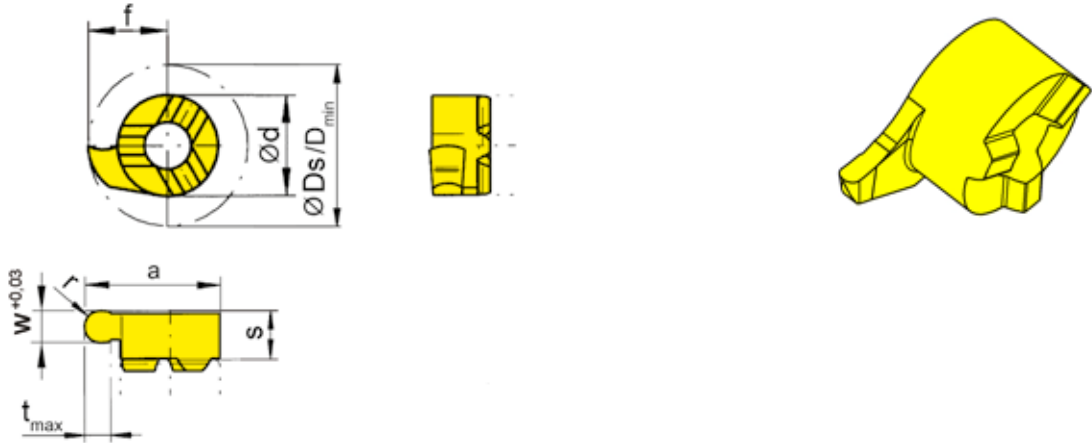
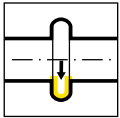
R = rechts wie gezeichnet  
R = right hand version shown

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	d	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TN35
<b>R111.0150.00</b>	1,5	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>R111.0200.00</b>	2	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>R111.0250.00</b>	2,5	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>R111.0300.00</b>	3	3,95	6,7	13,4	8	10,7	2,3	11	1	308080R	▲	▲	▲	▲
<b>L111.0150.00</b>	1,5	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	▲	▲	▲	▲
<b>L111.0200.00</b>	2	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	▲	▲	▲	▲
<b>L111.0250.00</b>	2,5	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	▲	▲	▲	▲
<b>L111.0300.00</b>	3	3,95	6,7	13,4	8	10,7	2,3	11	1	308080L	▲	▲	▲	▲
<b>P</b>	o	•	•	•										
<b>M</b>	-	o	•	•										
<b>K</b>	-	o	•	•										
<b>N</b>	-	-	•	•										
<b>S</b>	-	-	•	•										
<b>H</b>	-	-	-	-										



R = rechts wie gezeichnet  
R = right hand version shown

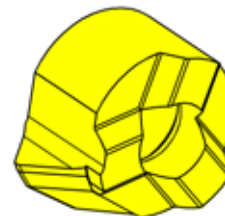
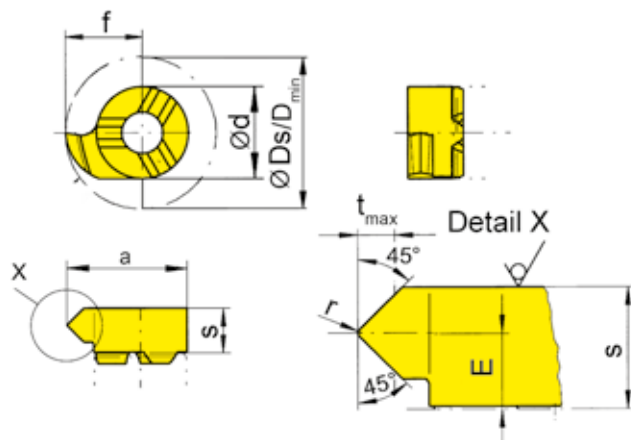
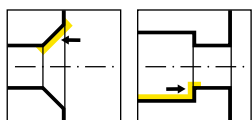
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	f	Ds	r	d	s	a	t <sub>max</sub>	D <sub>min</sub>	Z	HIS	MG12	EG55	TH35	TN35
R111.0004.08	0,8	6,7	13,4	0,4	8	3,95	10,7	2,3	11	1	308080R	▲	▲	▲	▲
R111.0006.12	1,2	6,7	13,4	0,6	8	3,95	10,7	2,3	11	1	308080R	▲	▲	▲	▲
R111.0009.18	1,8	6,7	13,4	0,9	8	3,95	10,7	2,3	11	1	308080R	▲	▲	▲	▲
R111.0010.20	2	6,7	13,4	1	8	3,95	10,7	2,3	11	1	308080R	▲	▲	▲	▲
R111.0015.30	3	6,7	13,4	1,5	8	3,95	10,7	2,3	11	1	308080R	▲	▲	▲	▲
L111.0004.08	0,8	6,7	13,4	0,4	8	3,95	10,7	2,3	11	1	308080L	▲	▲	▲	▲
L111.0006.12	1,2	6,7	13,4	0,6	8	3,95	10,7	2,3	11	1	308080L	Δ	▲	▲	▲
L111.0009.18	1,8	6,7	13,4	0,9	8	3,95	10,7	2,3	11	1	308080L	Δ	▲	▲	▲
L111.0010.20	2	6,7	13,4	1	8	3,95	10,7	2,3	11	1	308080L	▲	▲	▲	▲
L111.0015.30	3	6,7	13,4	1,5	8	3,95	10,7	2,3	11	1	308080L	Δ	▲	▲	▲
												P	o	•	•
												M	-	o	•
												K	-	o	•
												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  
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	308080R	▲	▲
<b>L111.4545.02</b>	2,4	6,7	13,4	0,2	8	4,15	10,7	1,5	11	1	308080L	▲	▲
<b>P</b>	●	●											
<b>M</b>	○	●											
<b>K</b>	○	●											
<b>N</b>	-	●											
<b>S</b>	-	●											
<b>H</b>	-	-											

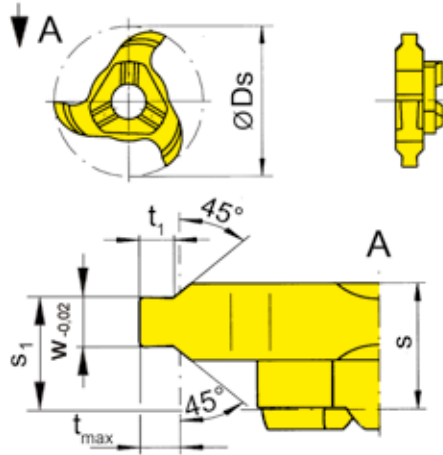


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B

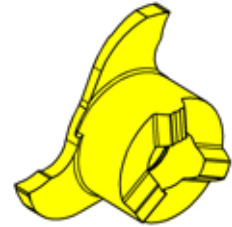
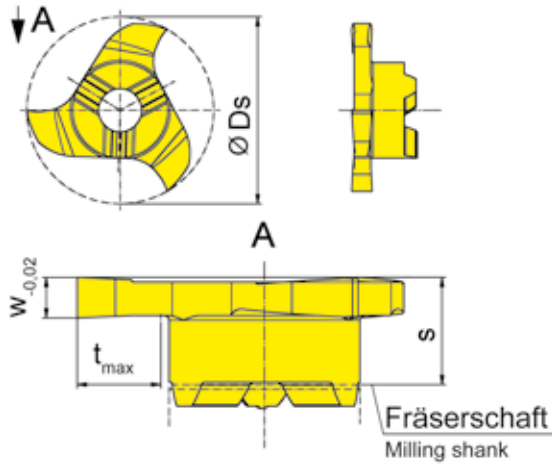


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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



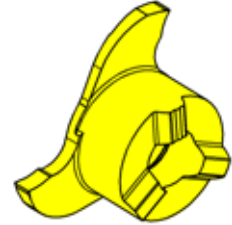
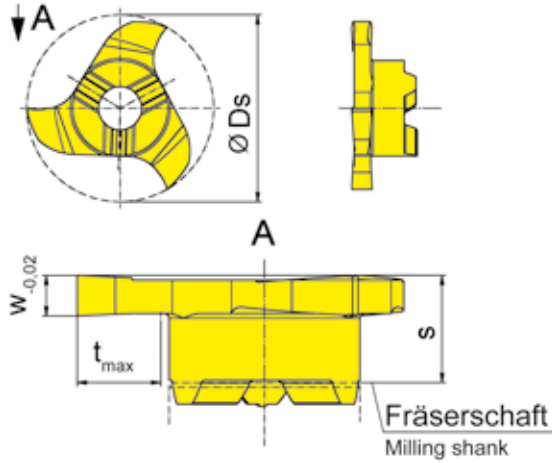
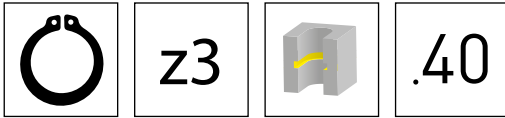
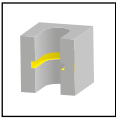


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B



z3

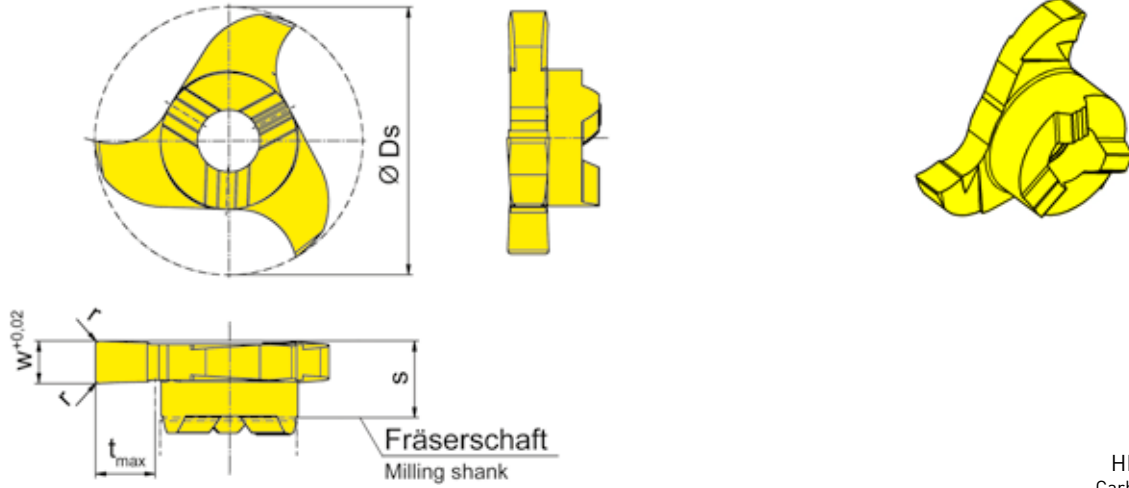


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

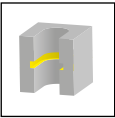
HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	MG12	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	▲	Δ	▲
308.0250.00	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	o	•	•	•
M	-	•	•	•
K	-	•	•	•
N	-	o	•	•
S	-	•	•	•
H	-	-	-	-



z3

.40

B

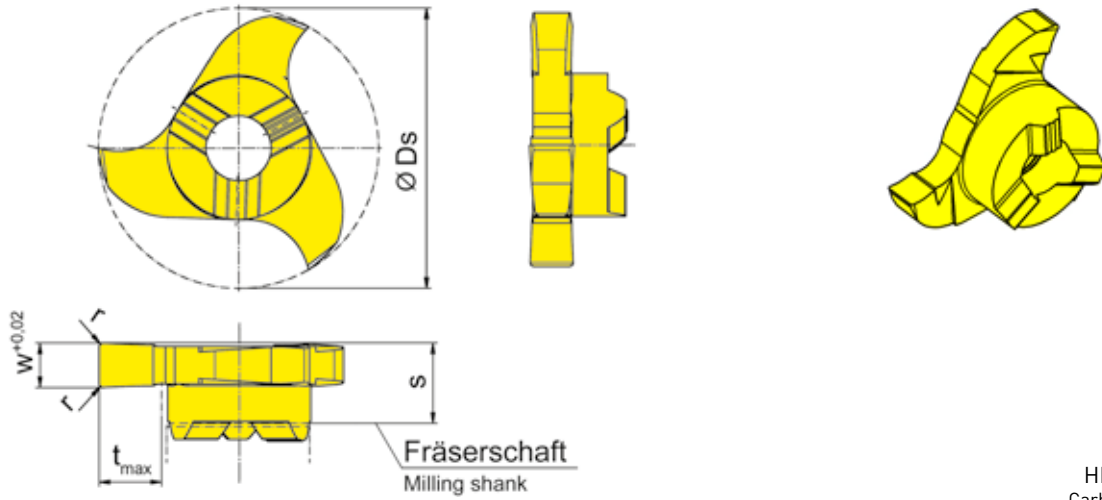


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	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	-

B



z3

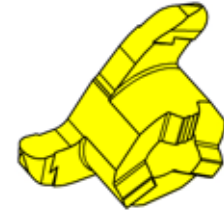
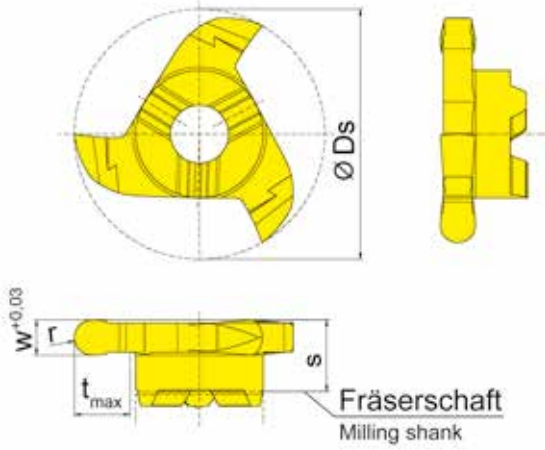
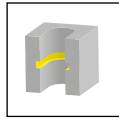


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	MG12	AN25	AS45	RC45	TF45	TI25	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	o	•	•	•	•	•	•	•	•	•	•	•	•	•
M	-	o	•	•	•	•	•	•	•	•	•	•	•	•
K	-	-	•	•	•	•	•	•	•	•	•	•	•	•
N	-	-	o	-	•	•	•	•	•	•	•	•	•	•
S	-	-	•	-	•	•	•	•	•	•	•	•	•	•
H	-	-	-	-	-	-	-	-	-	-	-	-	-	-

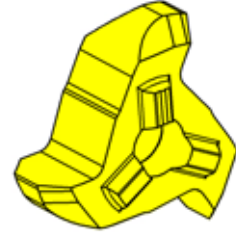
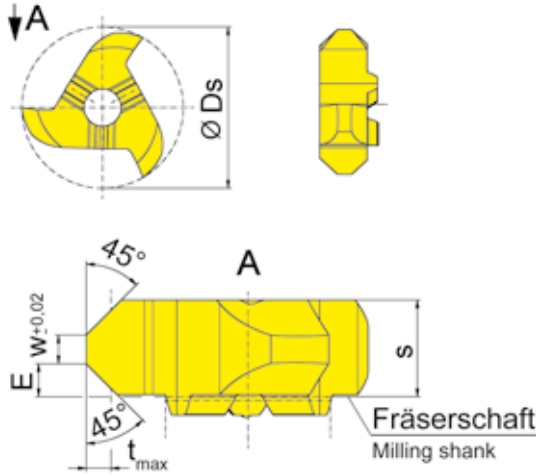


Abbildung = rechtsschneidend  
Picture = right hand cutting version

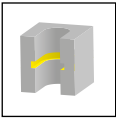
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	t <sub>max</sub>	Z	HIS		MG12	TF45	TI25	TN35
308.4545.00	15,7	1,6	4,7	1,4	1,2	3	308080R		Δ	Δ		▲
									P	o	•	•
									M	-	•	•
									K	-	•	•
									N	-	•	•
									S	-	•	•
									H	-	-	-

**B**



**z6**

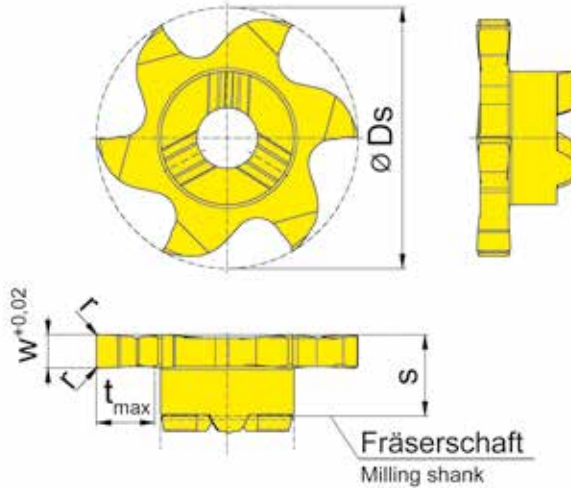


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	IG35	TI25	
608.0025.00	15,7	0,25	4,9	-	3,5	6	308080R		▲	Δ		
608.0030.00	15,7	0,3	4,9	-	3,5	6	308080R		▲	Δ		
608.0040.00	15,7	0,4	4,9	-	3,5	6	308080R		▲	Δ		
608.0050.00	15,7	0,5	4,9	-	3,5	6	308080R		▲	Δ		
608.0060.00	15,7	0,6	4,9	-	3,5	6	308080R		▲	Δ		
608.0070.00	15,7	0,7	4,9	-	3,5	6	308080R		▲	Δ		
608.0080.00	15,7	0,8	4,9	-	3,5	6	308080R		▲	Δ		
608.0090.00	15,7	0,9	4,9	-	3,5	6	308080R		▲	Δ		
608.0100.00	15,7	1	4,9	-	3,5	6	308080R		▲	Δ		
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	▲			▲	
								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.

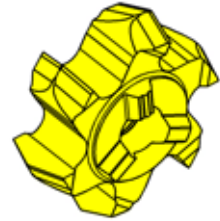
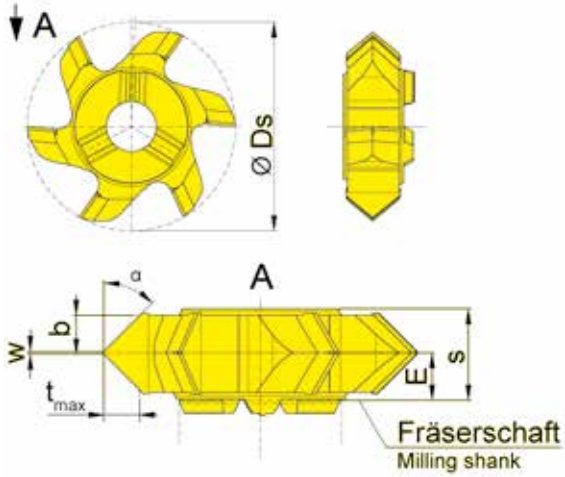
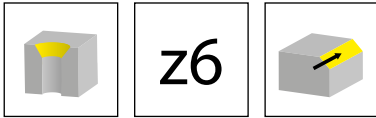


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	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 - -	

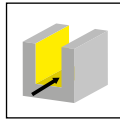
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



B

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

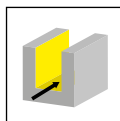


Seite/Page  
90-94

Grundaufnahme  
Basic Holder  
WFB

Seite/Page  
95

Einschraubfräser  
Screw-in cutter  
M311.M

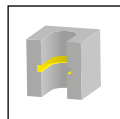


Seite/Page  
96

Schneidplatte  
Insert  
311/611/911



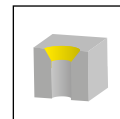
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97-99, 104



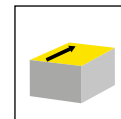
Seite/Page  
100-101, 105,  
108



Seite/Page  
102



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103, 107



Seite/Page  
106



# M311



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  18 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  18 mm

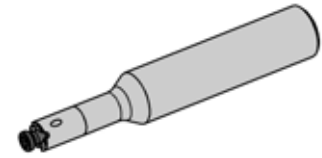
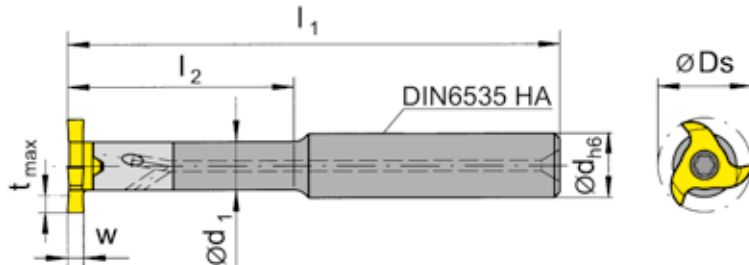
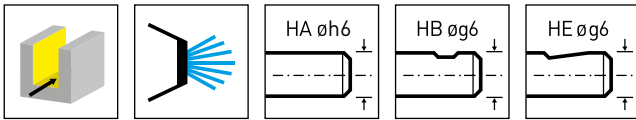
# Fräuserschaft

## Milling shank

# M311



B



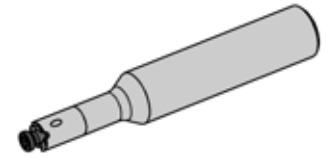
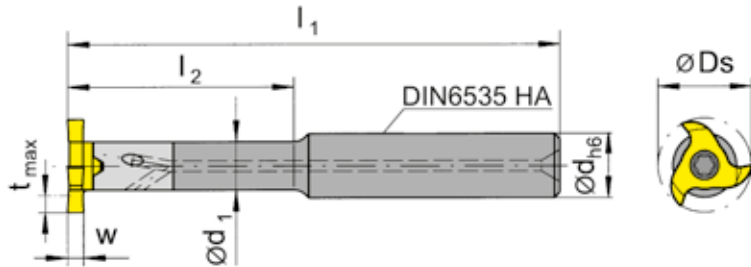
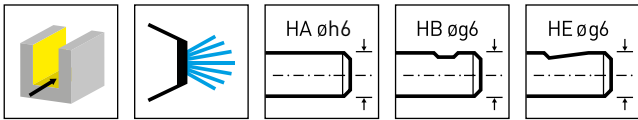
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M311.0012.01A	12	100	32	9	A	311090R
M311.0012.02A	12	100	45	9	A	311090R
M311.0012.03A	12	120	64	9	A	311090R
M311.0016.01A	16	100	32	9	A	311090R
M311.0016.02A	16	110	45	9	A	311090R
M311.0016.03A	16	130	64	9	A	311090R
M311.0012.01B	12	100	32	9	B	311090R
M311.0012.02B	12	100	45	9	B	311090R
M311.0012.03B	12	120	64	9	B	311090R
M311.0016.01B	16	100	32	9	B	311090R
M311.0016.02B	16	110	45	9	B	311090R
M311.0016.03B	16	130	64	9	B	311090R
M311.0012.01E	12	100	32	9	E	311090R
M311.0012.02E	12	100	45	9	E	311090R
M311.0012.03E	12	120	64	9	E	311090R
M311.0016.01E	16	100	32	9	E	311090R
M311.0016.02E	16	110	45	9	E	311090R
M311.0016.03E	16	130	64	9	E	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

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



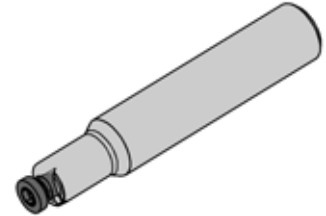
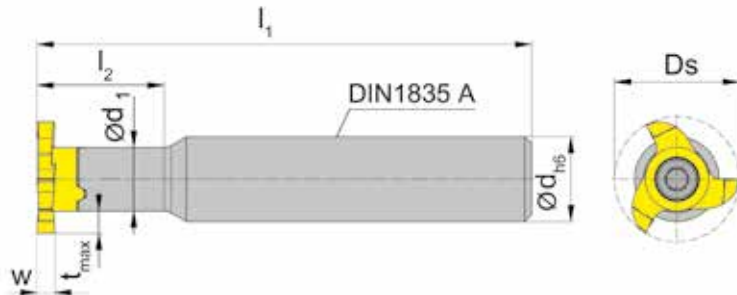
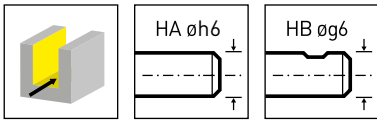
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
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<b>M311.1316.02A</b>	16	130	45	13	A	311090R
<b>M311.1316.03A</b>	16	145	64	13	A	311090R
<b>M311.1316.01B</b>	16	110	32	13	B	311090R
<b>M311.1316.02B</b>	16	130	45	13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

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
M311...	<b>4.14T15P</b>	<b>T15PQ</b>

**B**



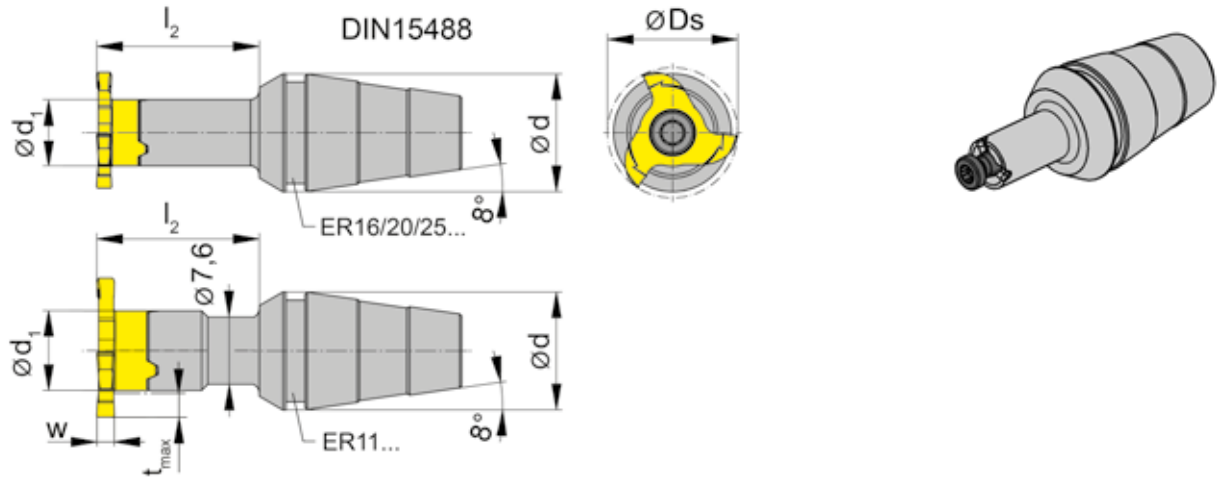
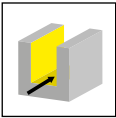
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<b>M311.ST10.01A</b>	10	60	18	9	A	311090R
<b>M311.ST12.01A</b>	12	70	18	9	A	311090R
<b>M311.ST13.01A</b>	13	70	26	9	A	311090R
<b>M311.ST16.01A</b>	16	80	26	9	A	311090R
<b>M311.ST10.01B</b>	10	60	18	9	B	311090R
<b>M311.ST12.01B</b>	12	70	18	9	B	311090R
<b>M311.ST16.01B</b>	16	80	26	9	B	311090R

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

**Ersatzteile**

Spare Parts

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



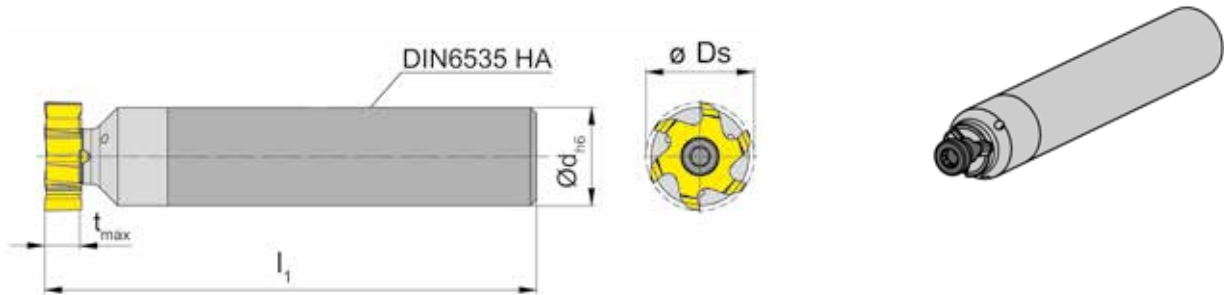
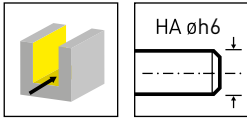
Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M311.ER11.02</b>	11	22	9	ER11.6499	311090R
<b>M311.ER25.02</b>	25	22	9	ER25.6499	311090R
<b>M311.ER16.02</b>	16	22	9	ER16.6499/ERM16.6499	311090R
<b>M311.ER20.02</b>	20	22	9	ER20.6499/ERM20.6499	311090R
<b>M311.ER20.14.01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

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

**Ersatzteile**  
Spare Parts

Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311.E...	<b>4.14T15P</b>	<b>T15PQ</b>
M311.ER25.14.01	<b>4.14T15P</b>	<b>T15PL</b>

**B**



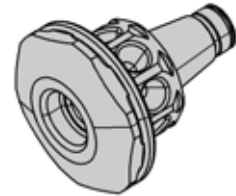
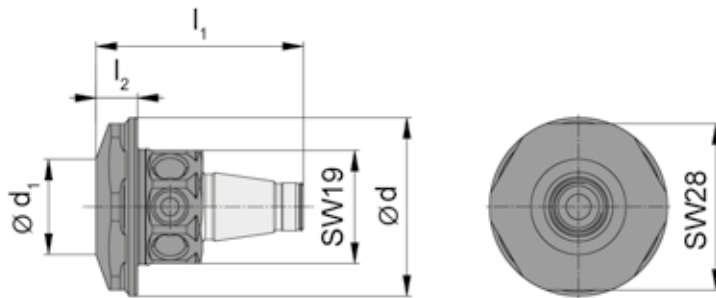
Bestellnummer Part number	d	$l_1$	Form	HWS
<b>M311.0012.D.00A</b>	12	80	A	311090R
<b>M311.0016.D.00A</b>	16	80	A	311090R

tmax und Ds siehe SP  
tmax and Ds see inserts

**Ersatzteile**

Spare Parts

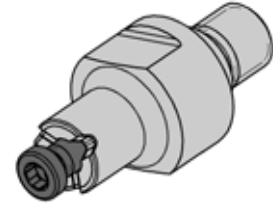
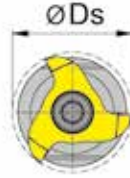
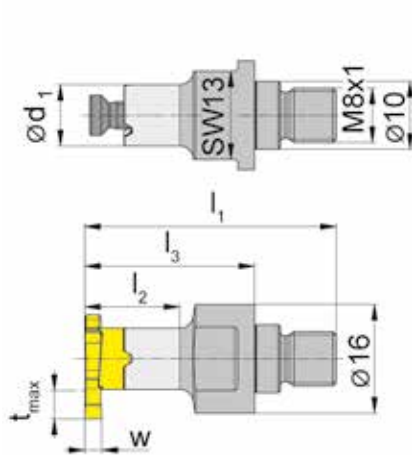
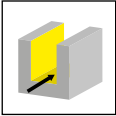
Fräserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M311...	<b>4.14T15P</b>	<b>T15PQ</b>



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
<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

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



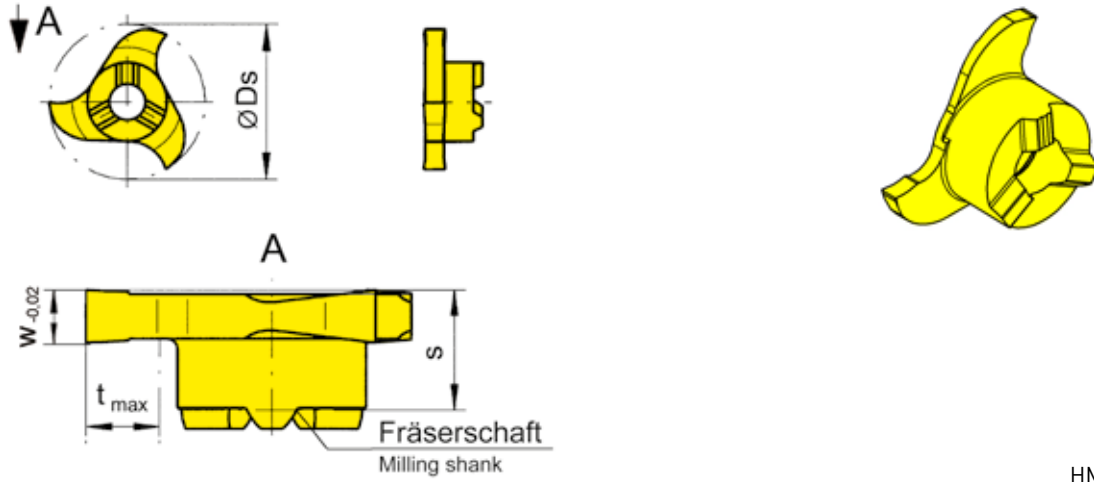
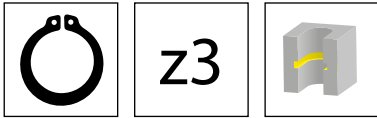


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B

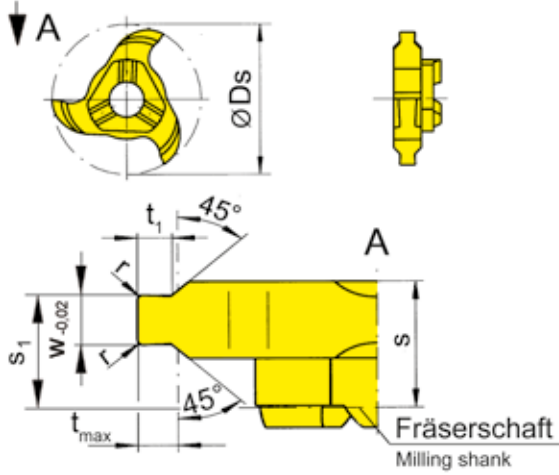


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	Nw	w	t <sub>1</sub>	s	s <sub>1</sub>	r	t <sub>max</sub>	Z	HIS	AS/45
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	▲
											P ●
											M ●
											K ●
											N ○
											S ●
											H -

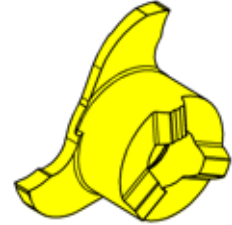
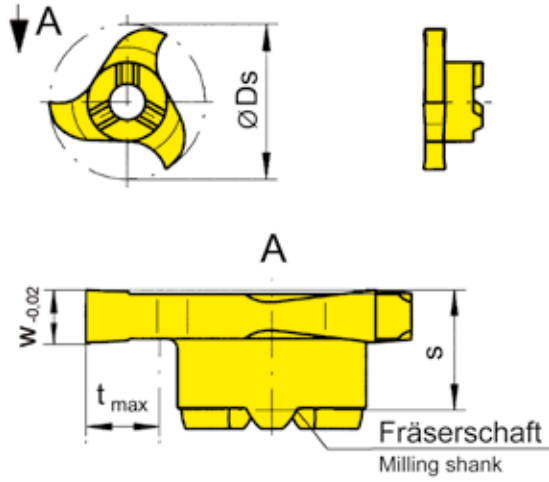
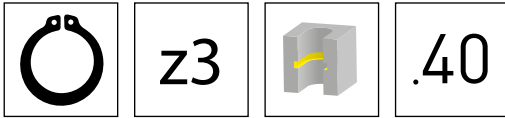


Abbildung = rechtsschneidend  
Picture = right hand cutting version

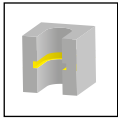
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	t <sub>max</sub>	Z	HIS	T/25
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
								P ●
								M ●
								K ●
								N ●
								S ●
								H -

B



z3

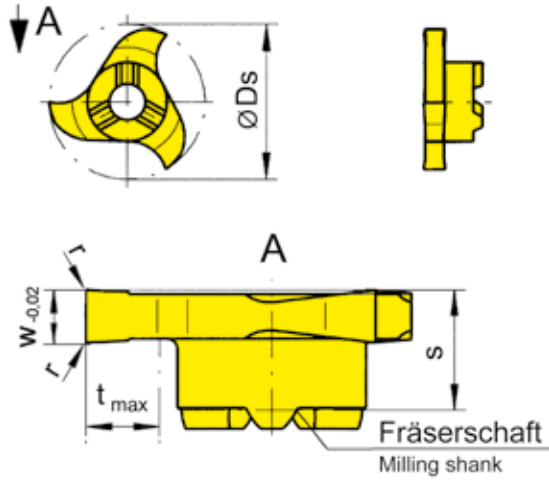


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades		
								MG12	AS45	TN35
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	Δ	▲	▲
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	o	●
								M	-	●
								K	-	●
								N	-	o
								S	-	●
								H	-	-

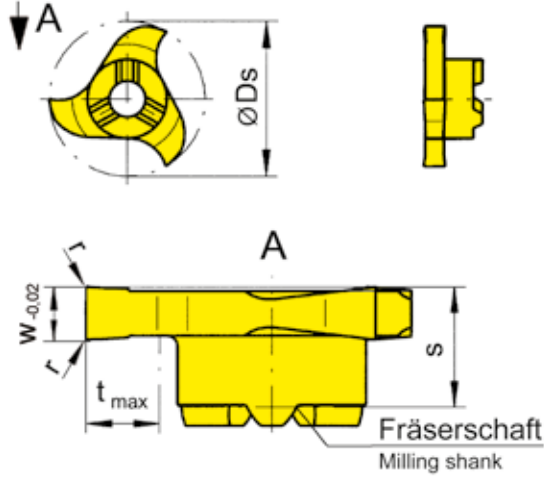
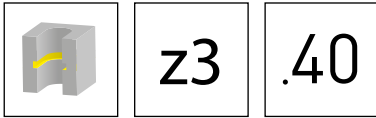


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	Tl25
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 -

B

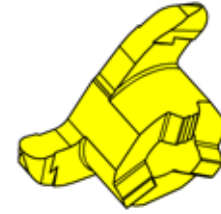
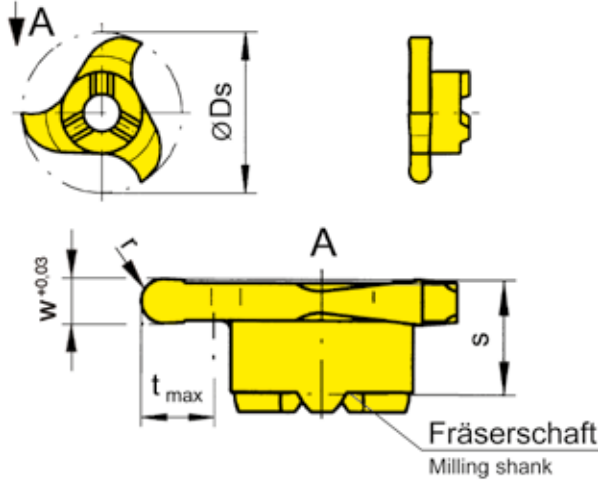
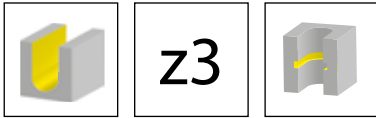


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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		AN25	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	-	-	-	-

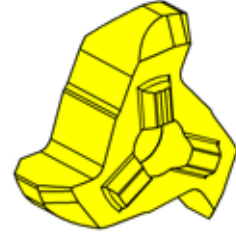
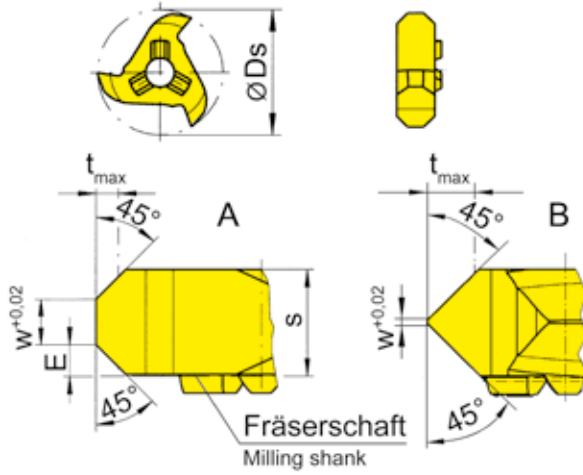
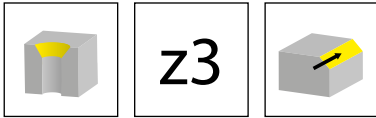


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	Ds	E	s	w	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	-	-

B

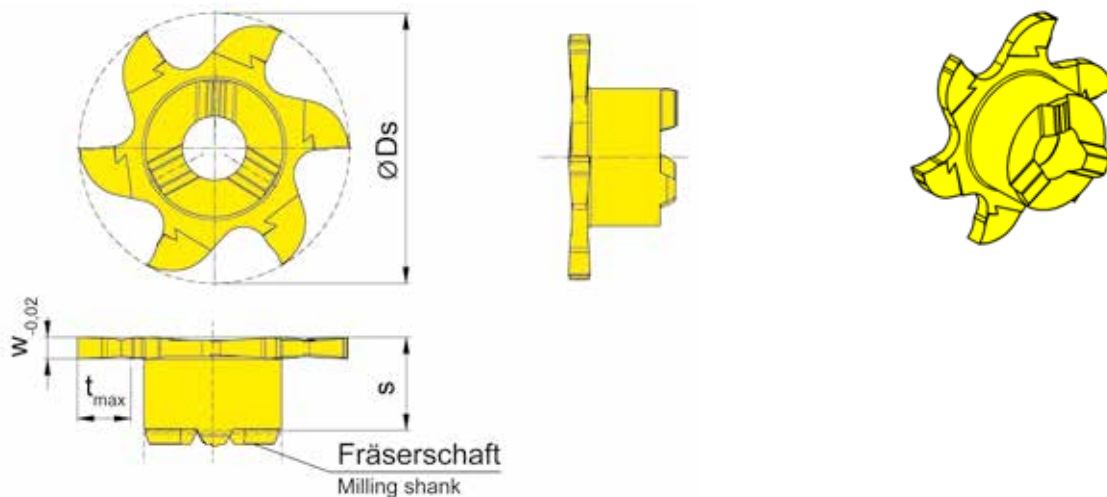
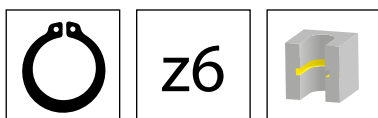


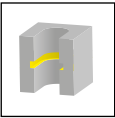
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	TI25
611.0110.00	17,7	1,1	1,21	6,1	3,5	6	311090L	▲	▲
611.0130.00	17,7	1,3	1,41	6,1	3,5	6	311090L	▲	▲
611.0160.00	17,7	1,6	1,71	6,1	3,5	6	311090L	▲	▲
								P ● ●	
								M ● ●	
								K ● ●	
								N ○ ●	
								S ● ●	
								H - -	





z6

B

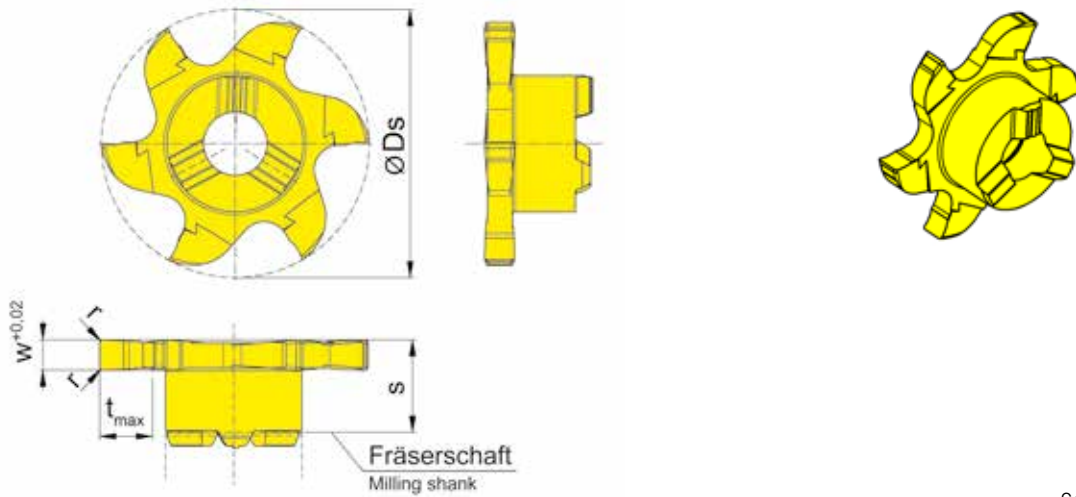


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS45	TI25
611.0150.00	17,7	1,5	6,1	-	3,5	6	311090L	▲	▲
611.0200.00	17,7	2	6,1	0,2	3,5	6	311090L	▲	▲
611.0250.00	17,7	2,5	6,1	0,2	3,5	6	311090L	▲	▲
611.0300.00	17,7	3	6,1	0,2	3,5	6	311090L	▲	▲
611.0400.00	17,7	4	6,1	0,2	3,5	6	311090L	▲	▲

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

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

B

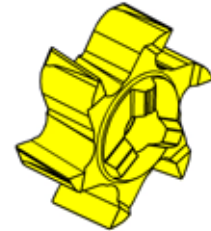
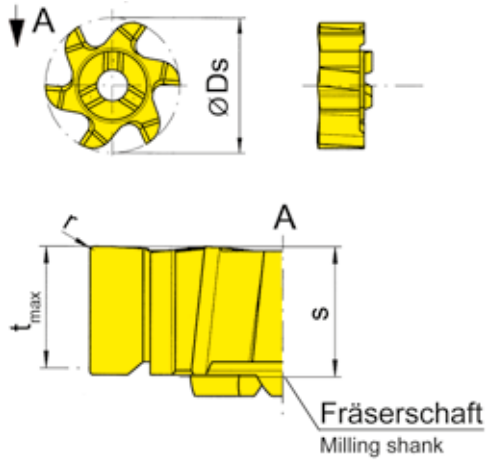
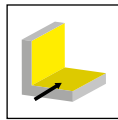
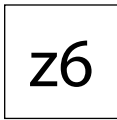
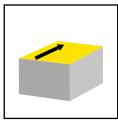


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
611.PL61.62	17,7	6	0,2	5,7	6,1	311090L	▲	▲	▲
							P ●	●	●
							M ●	●	●
							K ●	●	●
							N ○	●	●
							S ●	●	●
							H -	-	-

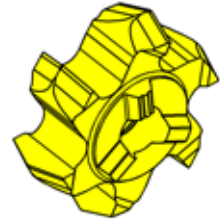
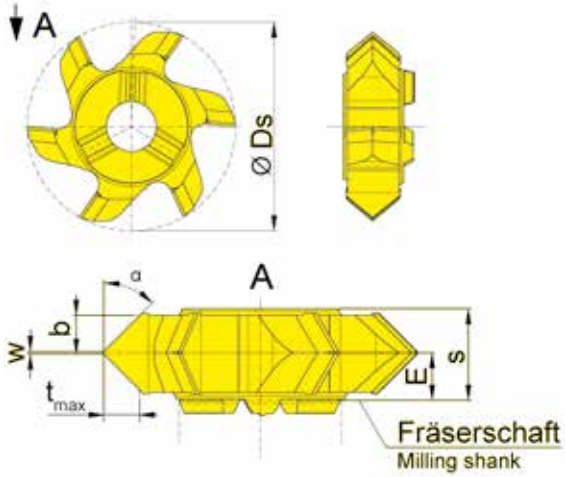
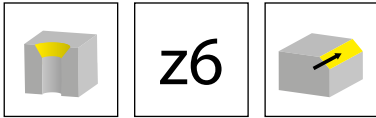


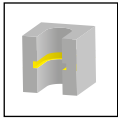
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	E	s	w	α	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	311090L	▲	▲	
611.2020.20	17,7	3,2	6,3	0,2	20°	2,8	1	6	311090L	▲	▲	
611.3030.20	17,7	3,2	6,3	0,2	30°	2,8	1,6	6	311090L	▲	▲	
611.4545.20	17,7	3,2	6,3	0,2	45°	2,3	2,3	6	311090L	▲		▲
P	●	●	●							●	●	●
M	●	●	●							●	●	●
K	●	●	●							●	●	●
N	○	●	●							○	●	●
S	●	●	●							●	●	●
H	-	-	-							-	-	-

B



z9

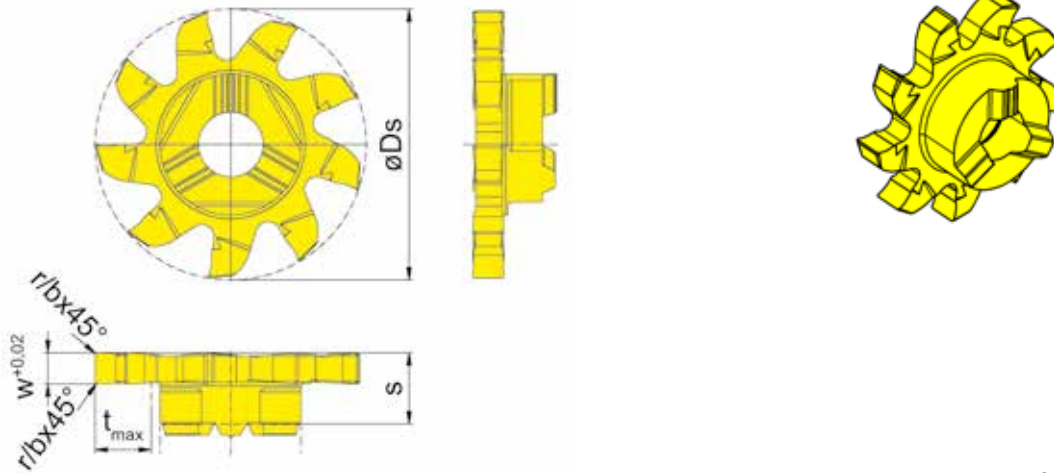
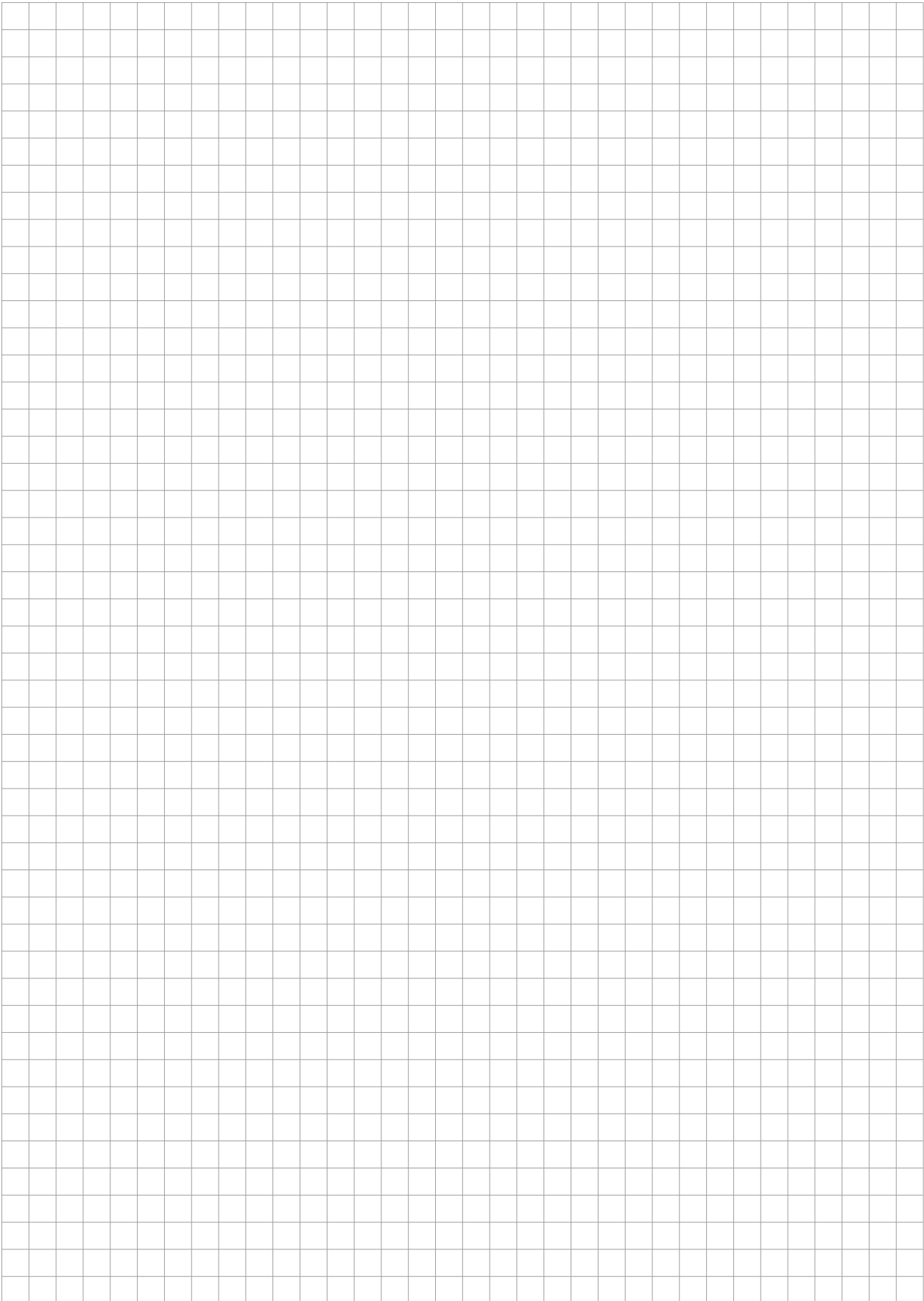


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
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 - -	

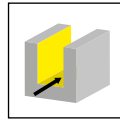


# Nutfräsen (zirkular)

## Groove Milling by circular interpolation

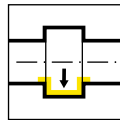
B

Frälerschaft  
Milling shank  
M116

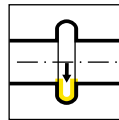


Seite/Page  
112

Schneidplatte  
Insert  
116



Seite/Page  
113-114



Seite/Page  
115

# M116



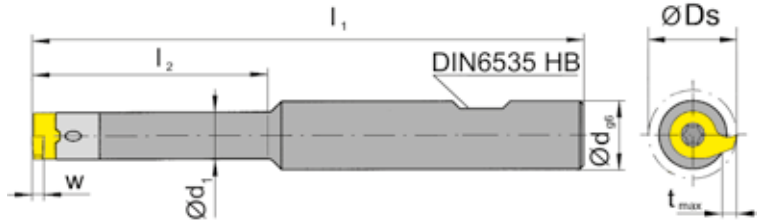
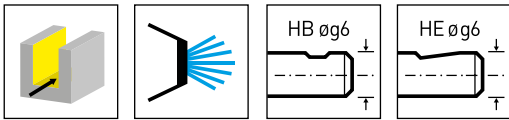
## Fräser mit wechselbarer Schneidplatte

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 <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M116.0012.01B</b>	12	130	40	11	B	116110R • 116110L
<b>M116.0012.02B</b>	12	130	56	11	B	116110R • 116110L
<b>M116.0016.01B</b>	16	130	40	11	B	116110R • 116110L
<b>M116.0016.02B</b>	16	130	56	11	B	116110R • 116110L
<b>M116.0016.03B</b>	16	150	80	11	B	116110R • 116110L
<b>M116.0016.01E</b>	16	130	40	11	E	116110R • 116110L
<b>M116.0016.03E</b>	16	150	80	11	E	116110R • 116110L

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

**Bearbeitungshinweis ab Ø 16 mm:**

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

**Note from Ø 16 mm:**

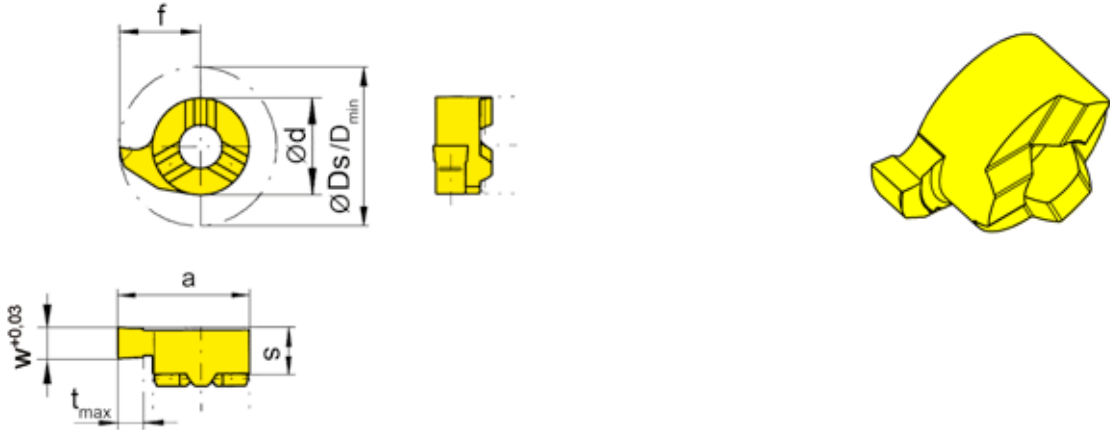
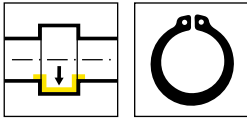
Only back face milling with oriented spindlestop offset of centerline.

**Ersatzteile**

Spare Parts

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





R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

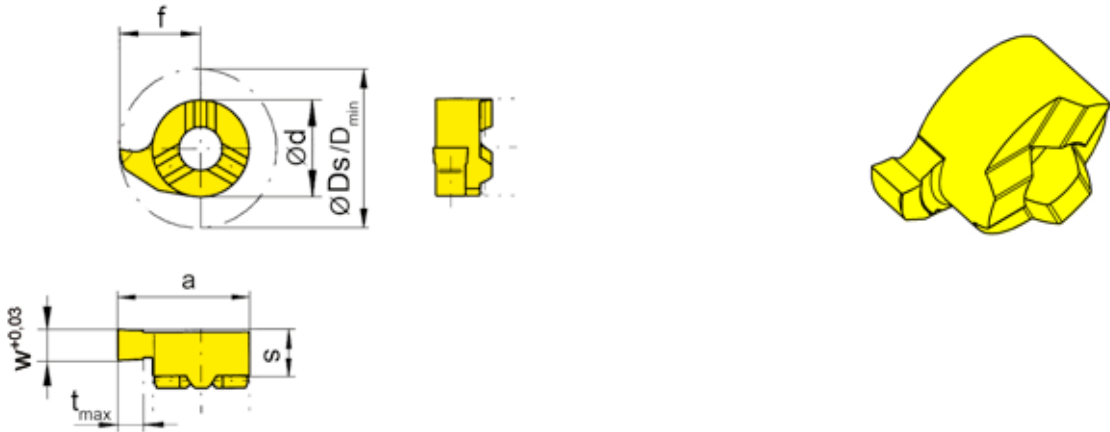
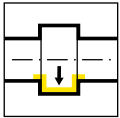
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

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

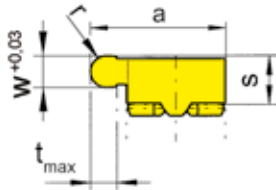
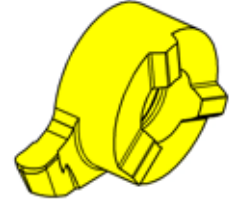
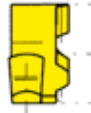
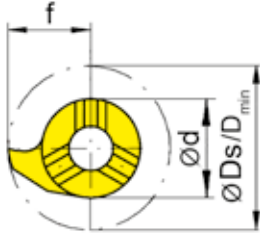
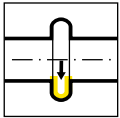
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	f	Ds	d	D <sub>min</sub>	HIS	HM-Sorten Carbide grades			
							MG12	EG55	TH35	TN35
R116.0200.00	2	10,2	20,4	11	16	116110R	▲	▲	▲	▲
R116.0250.00	2,5	10,2	20,4	11	16	116110R	▲	▲	▲	▲
R116.0300.00	3	10,2	20,4	11	16	116110R	▲	▲	▲	▲
R116.0350.00	3,5	10,2	20,4	11	16	116110R	▲	▲	▲	▲
R116.0400.00	4	10,2	20,4	11	16	116110R	▲	▲	▲	▲
L116.0200.00	2	10,2	20,4	11	16	116110L	▲	▲	▲	▲
L116.0250.00	2,5	10,2	20,4	11	16	116110L	▲	▲	▲	▲
L116.0300.00	3	10,2	20,4	11	16	116110L	▲	▲	▲	▲
L116.0350.00	3,5	10,2	20,4	11	16	116110L	▲	▲	▲	▲
L116.0400.00	4	10,2	20,4	11	16	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  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	f	Ds	r	d	D <sub>min</sub>	HIS	MG12	EG55	TH35	TN35
<b>R116.0009.18</b>	1,8	10,2	20,4	0,9	11	16	116110R	▲	▲	▲	▲
<b>R116.0011.22</b>	2,2	10,2	20,4	1,1	11	16	116110R	▲	▲	▲	▲
<b>R116.0015.30</b>	3	10,2	20,4	1,5	11	16	116110R	▲	▲	▲	▲
<b>R116.0020.40</b>	4	10,2	20,4	2	11	16	116110R	Δ	▲	▲	▲
<b>L116.0009.18</b>	1,8	10,2	20,4	0,9	11	16	116110L	Δ	▲	▲	▲
<b>L116.0011.22</b>	2,2	10,2	20,4	1,1	11	16	116110L	Δ	▲	▲	▲
<b>L116.0015.30</b>	3	10,2	20,4	1,5	11	16	116110L	Δ	▲	▲	▲
<b>L116.0020.40</b>	4	10,2	20,4	2	11	16	116110L	Δ	▲	▲	▲
								P	o	•	•
								M	-	o	•
								K	-	o	•
								N	-	-	•
								S	-	-	•
								H	-	-	-

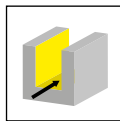
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation



B

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

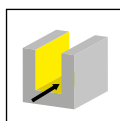


Seite/Page  
118-123

Grundaufnahme  
Basic Holder  
WFB

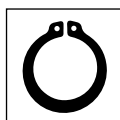
Seite/Page  
124

Einschraubfräser  
Screw-in cutter  
M313.M

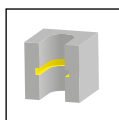


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125

Schneidplatte  
Insert  
313/L313/613/713  
913



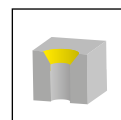
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126-130, 138-  
139



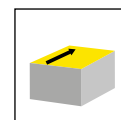
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140, 147, 149



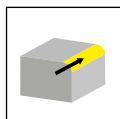
Seite/Page  
135



Seite/Page  
136, 145-146



Seite/Page  
141-143, 148



Seite/Page  
144

# M313



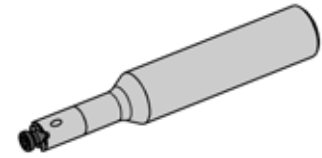
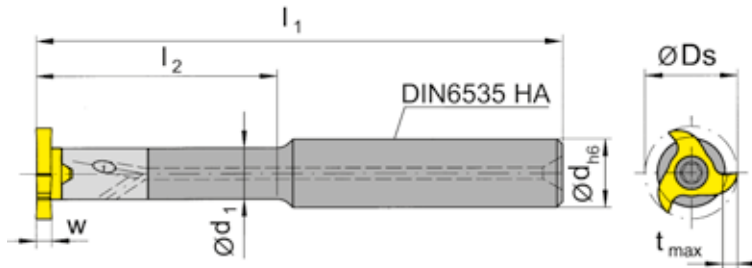
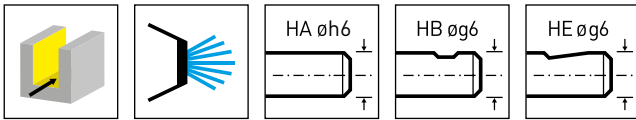
**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  22 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  22 mm

B



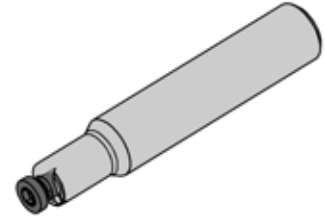
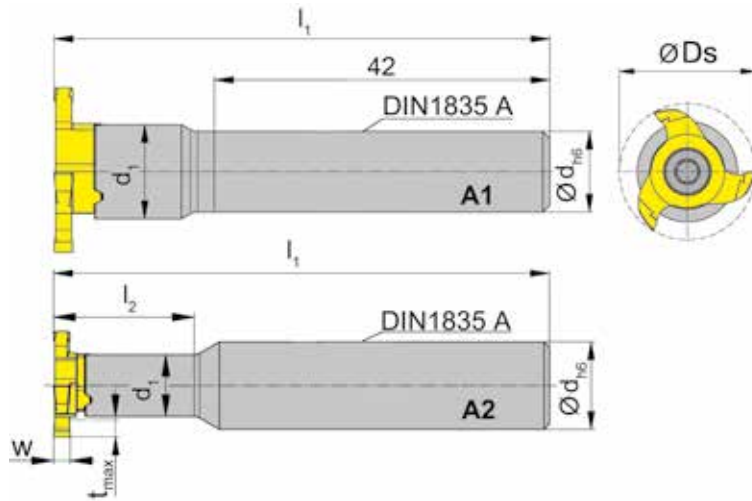
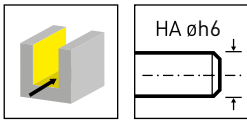
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
M313.0012.01A	12	100	-	-	A	313113R • 313113L
M313.0012.02A	12	130	-	-	A	313113R • 313113L
M313.0016.02A	16	130	60	12	A	313113R • 313113L
M313.0016.03A	16	160	85	12	A	313113R • 313113L
M313.0012.01B	12	100	-	-	B	313113R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

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
M313...	5.14T20P	T20PQ



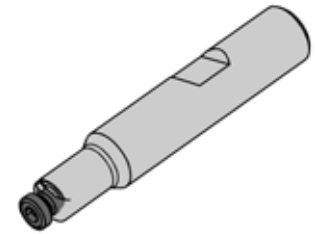
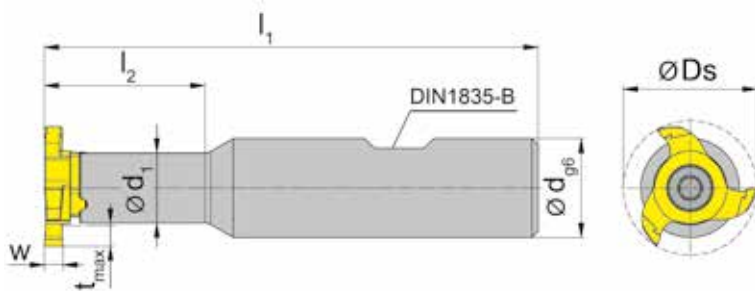
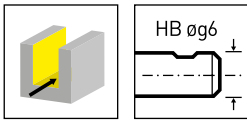
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.ST10.01A</b>	10	60	-	11,3	A1	313113R • 313113L
<b>M313.ST12.01A</b>	12	70	18	11,3	A2	313113R • 313113L
<b>M313.ST13.01A</b>	13	70	26	11,3	A2	313113R • 313113L
<b>M313.ST16.01A</b>	16	80	26	11,3	A2	313113R • 313113L

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

**Ersatzteile**  
Spare Parts

<b>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	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.ST12.01B</b>	12	70	18	11,3	B	313113R • 313113L
<b>M313.ST16.01B</b>	16	80	26	11,3	B	313113R • 313113L

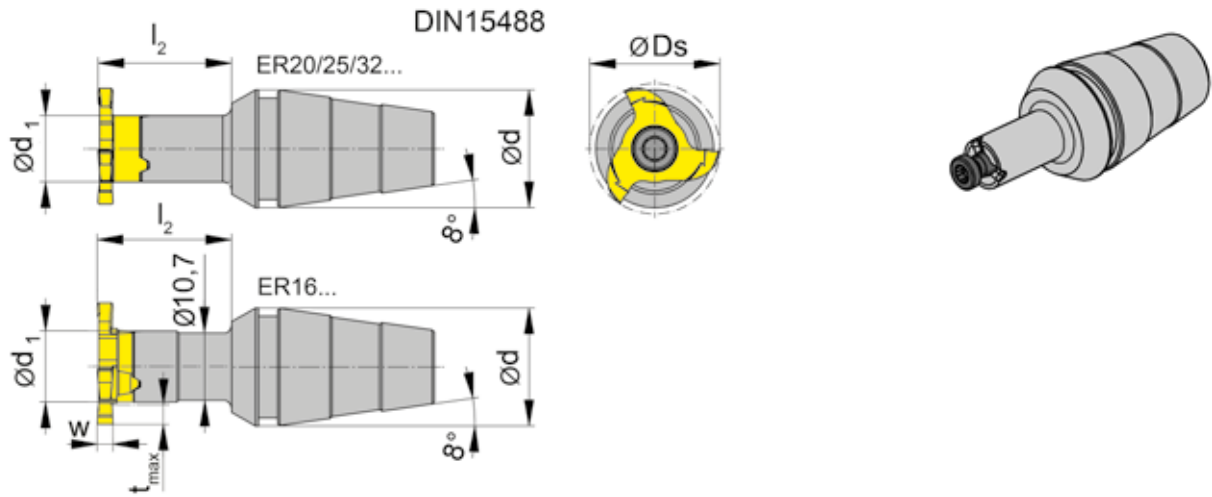
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

**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
<b>M313.ER16.01</b>	16	20	11,3	ER16.6499/ERM16.6499	313113R • 313113L
<b>M313.ER16.02</b>	16	30	11,3	ER16.6499/ERM16.6499	313113R • 313113L
<b>M313.ER20.01</b>	20	20	11,3	ER20.6499/ERM20.6499	313113R • 313113L
<b>M313.ER20.02</b>	20	30	11,3	ER20.6499/ERM20.6499	313113R • 313113L
<b>M313.ER25.02</b>	25	30	11,3	ER25.6499	313113R • 313113L
<b>M313.ER32.02</b>	32	30	11,3	ER32.6499	313113R • 313113L

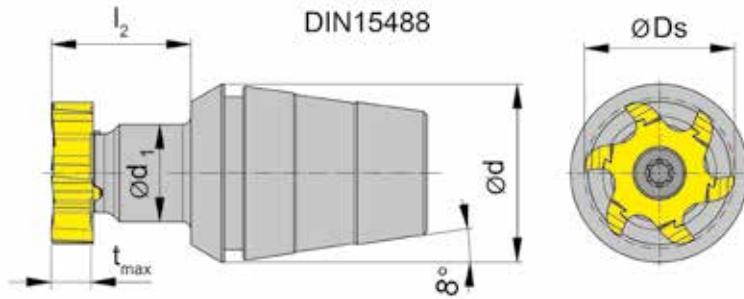
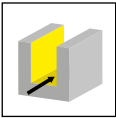
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

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...	<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>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

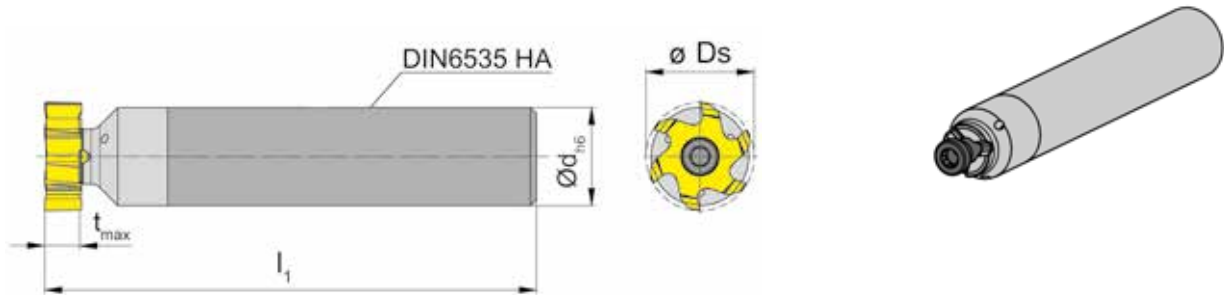
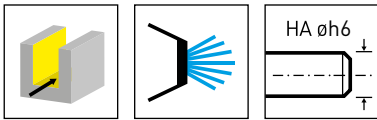
tmax und Ds siehe SP  
tmax and Ds see inserts

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

**Ersatzteile**

Spare Parts

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



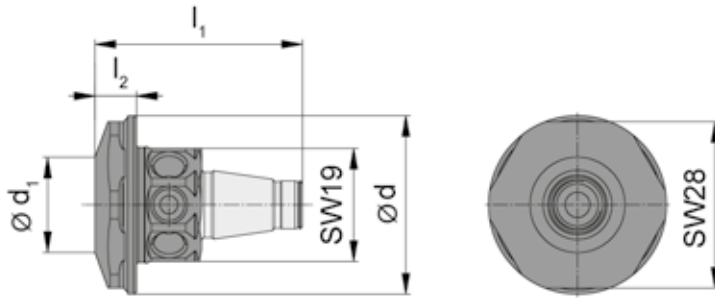
Bestellnummer Part number	d	l <sub>1</sub>	Form	HWS
<b>M313.0016.D.00A</b>	16	80	A	313113R • 313113L
<b>M313.0020.D.00A</b>	20	80	A	313113R • 313113L

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

**Ersatzteile**  
Spare Parts

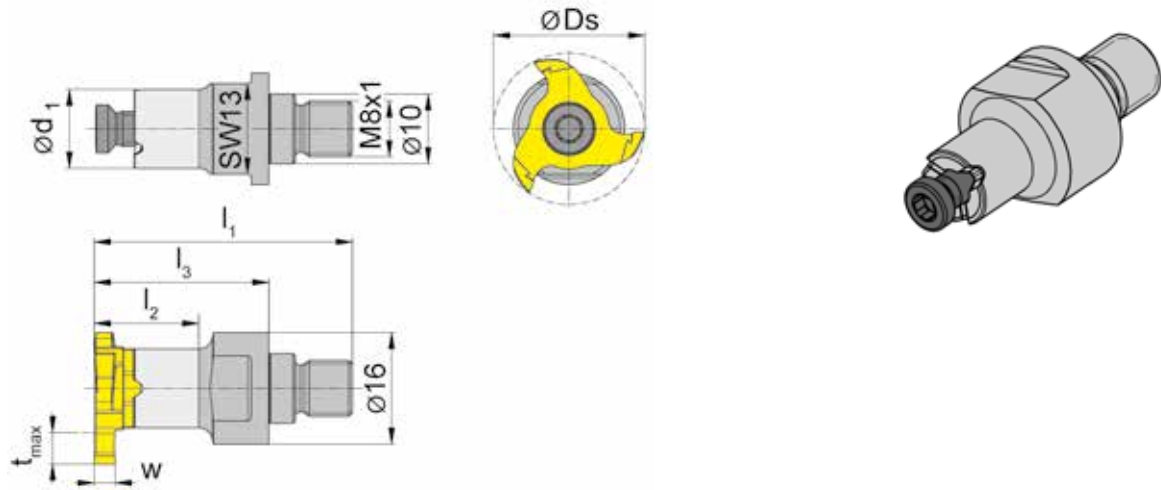
<b>Fräserschaft</b> Milling shank	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M313...	<b>5.14T20P</b>	<b>T20PQ</b>

**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

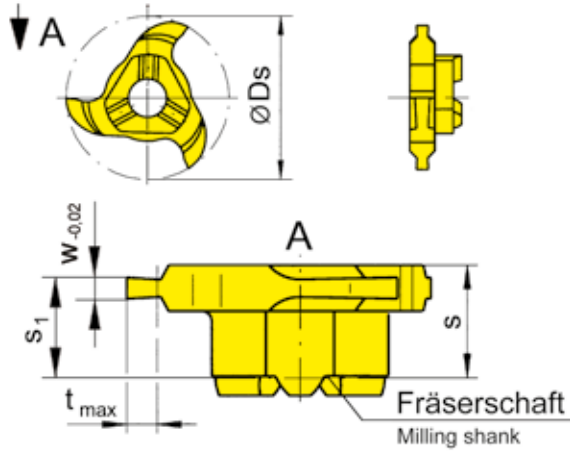
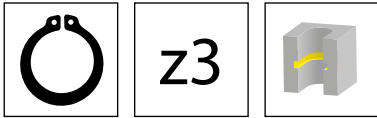


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	MG12	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	Δ	▲	▲
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		▲	▲
									P	o	•
									M	-	o
									K	-	o
									N	-	-
									S	-	-
									H	-	-

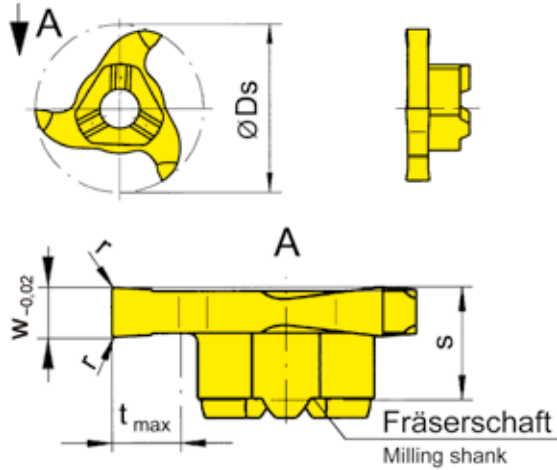
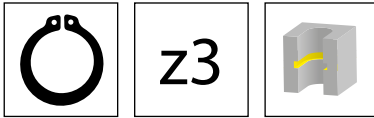


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	MG12	AS45	EG55	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	▲	▲	▲	▲

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 Fräaserschaftabmessung 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	o	•	•	•
M	-	•	o	•
K	-	•	o	•
N	-	o	-	•
S	-	•	-	•
H	-	-	-	-

B

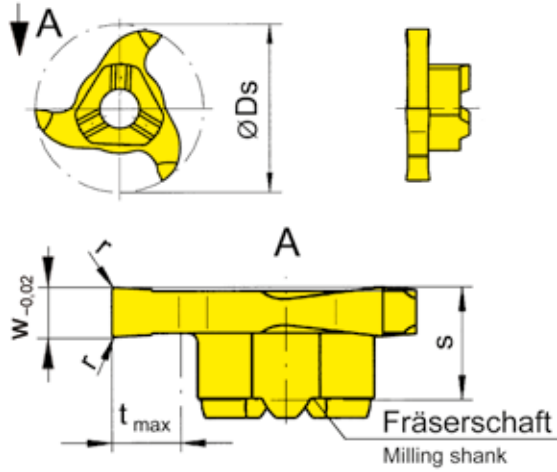
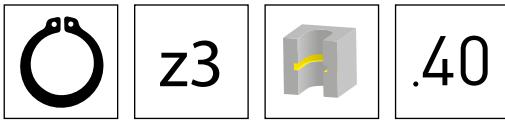


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	r	t <sub>max</sub>	Z	HIS	MG12	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	Δ	▲
313.0515.40	21,7	5,15	5,26	5,7	0,2	4,5	3	313113R	Δ	▲

**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	o	●
M	-	●
K	-	●
N	-	●
S	-	●
H	-	-



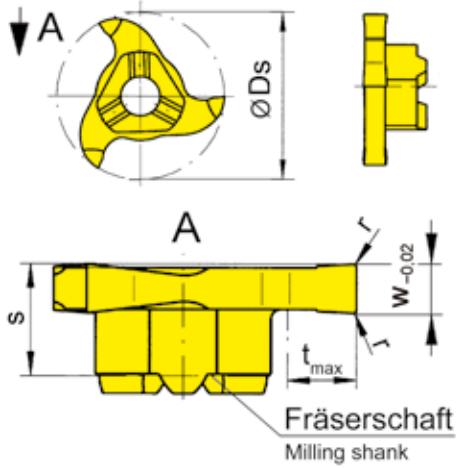


Abbildung = linksschneidend  
Picture = left hand cutting version

▲ 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	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	2,25	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	
<b>P</b>	●	●	●								
<b>M</b>	●	○	●								
<b>K</b>	●	○	●								
<b>N</b>	○	-	●								
<b>S</b>	●	-	●								
<b>H</b>	-	-	-								

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 L313.0415.00 und L313.0515.00**

nur in Verbindung mit Fräserschaftabmessung 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

B

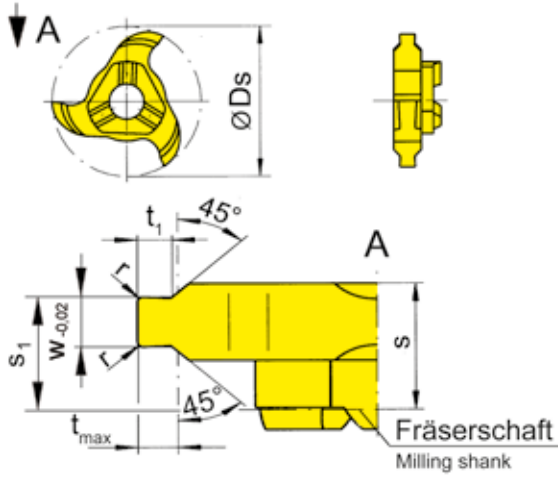
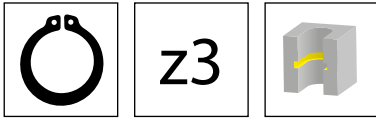


Abbildung = rechtsschneidend  
Picture = right hand cutting version

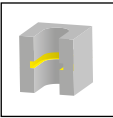
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	Nw	w	$t_1$	s	$s_1$	r	$t_{max}$	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		▲		▲

**Schneidplatten 313.4120.55 und 313.4125.55**  
nur in Verbindung mit Fräserschaftabmessung  $l_2 = \max. 42 \text{ mm}$   
Inserts 313.4120.55 and 313.4125.55  
only with toolholder dimension  $l_2 = \max. 42 \text{ mm}$

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



z3

B

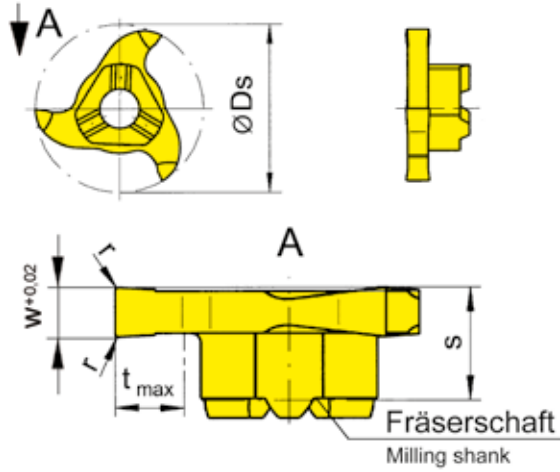


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

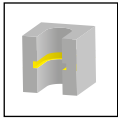
Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	MG12	AS45	EG55	TI25	TN35
313.0150.00	21,7	1,5	5,7	-	4,5	3	313113R	▲	▲	▲		▲
313.0150.01	21,7	1,5	5,7	0,1	4,5	3	313113R	▲	▲	▲		▲
313.0200.00	21,7	2	5,7	0,2	4,5	3	313113R	▲	▲	▲		▲
313.0250.00	21,7	2,5	5,7	0,2	4,5	3	313113R	△	▲	▲	▲	▲
313.0300.00	21,7	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	o	•	•	•	•
M	-	•	o	•	•
K	-	•	o	•	•
N	-	o	-	•	•
S	-	•	-	•	•
H	-	-	-	-	-

B



z3

.40

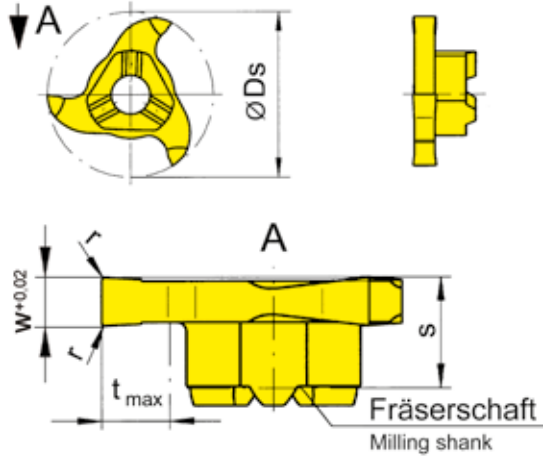
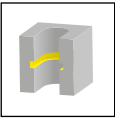


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
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

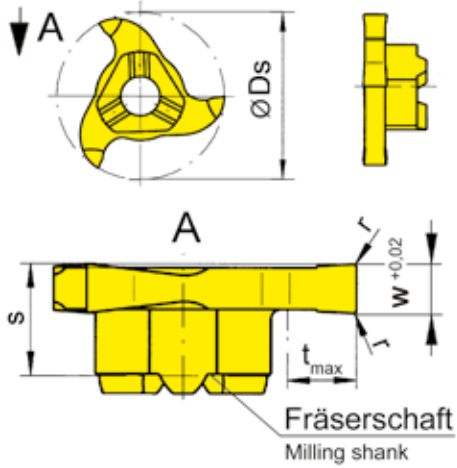


Abbildung = linksschneidend  
Picture = left hand cutting version

▲ ab Lager  
on stock

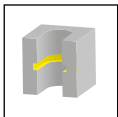
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	MG12	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	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	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	o	•	•	•
M	-	•	o	•
K	-	•	o	•
N	-	o	-	•
S	-	•	-	•
H	-	-	-	-

B



z3

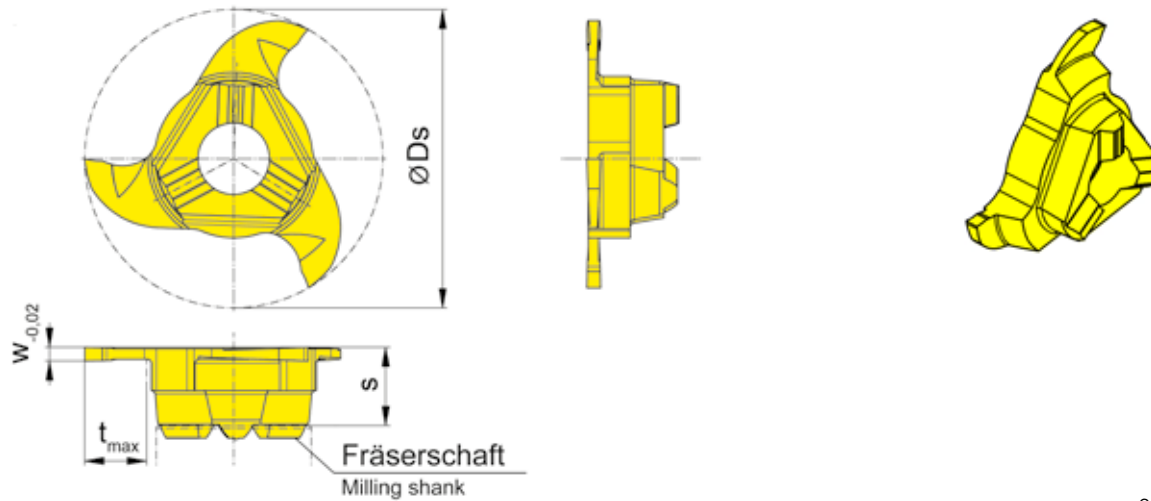


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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 -	-	-

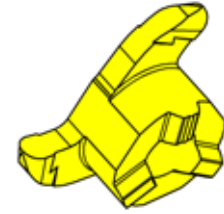
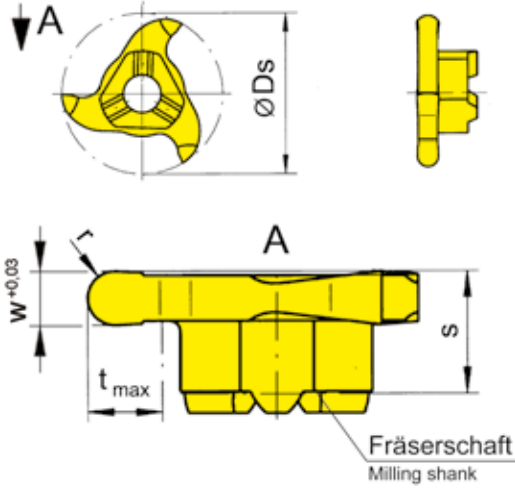
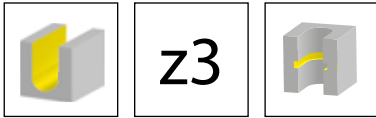


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	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

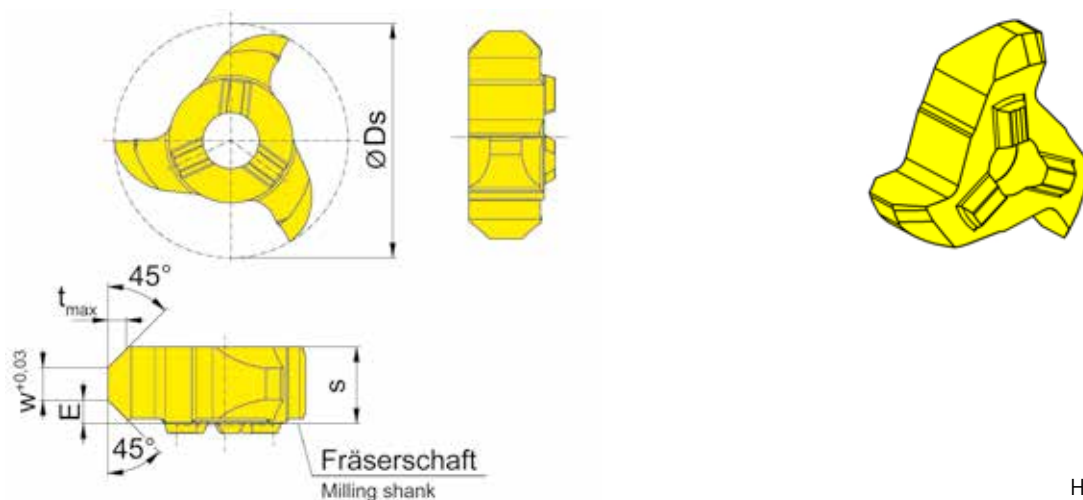
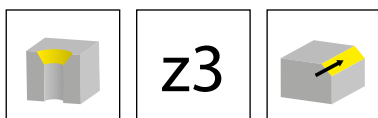


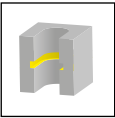
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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





z6

B

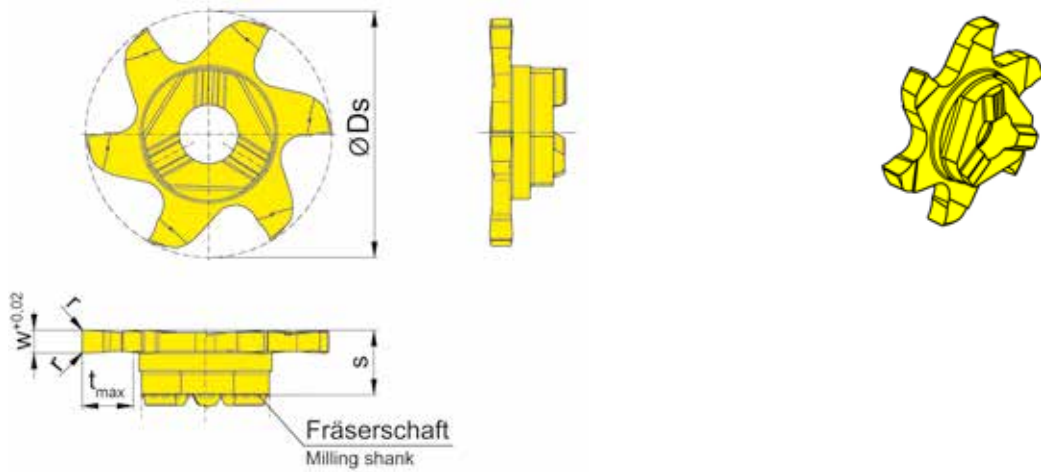


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	EG55	TI25	
613.0150.00	21,7	1,5	5,7	-	4,5	6	313113R	Δ	▲	▲	
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	▲	▲	▲	
ab Schneidbreite 2,5 mm Kreuzverzahnung from width of groove 2,5 mm tooling with cross-cut								P	●	●	●
<b>Schneidplatte 613.0400.00</b>								M	●	○	●
nur in Verbindung mit Fräaserschaftabmessung $l_2 = \text{max. } 42 \text{ mm}$ Insert 613.0400.00								K	●	○	●
only with toolholder dimension $l_2 = \text{max. } 42 \text{ mm}$								N	○	-	●
								S	●	-	●
								H	-	-	-

B



z6

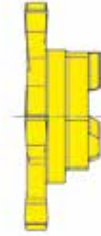
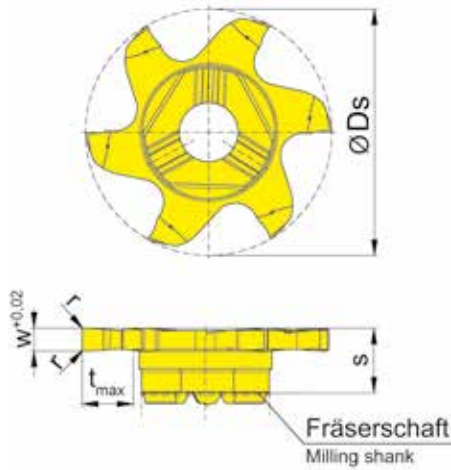
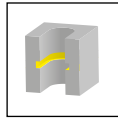


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	s	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	4,5	6	313113R	▲	▲
613.0315.00	21,7	3,15	3,26	5,7	4,5	6	313113R	▲	▲
613.0415.00	21,7	4,15	4,26	5,7	4,5	6	313113R	▲	▲
613.0515.00	21,7	5,15	5,26	5,7	4,5	6	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.

P	●	●
M	●	○
K	●	○
N	○	-
S	●	-
H	-	-

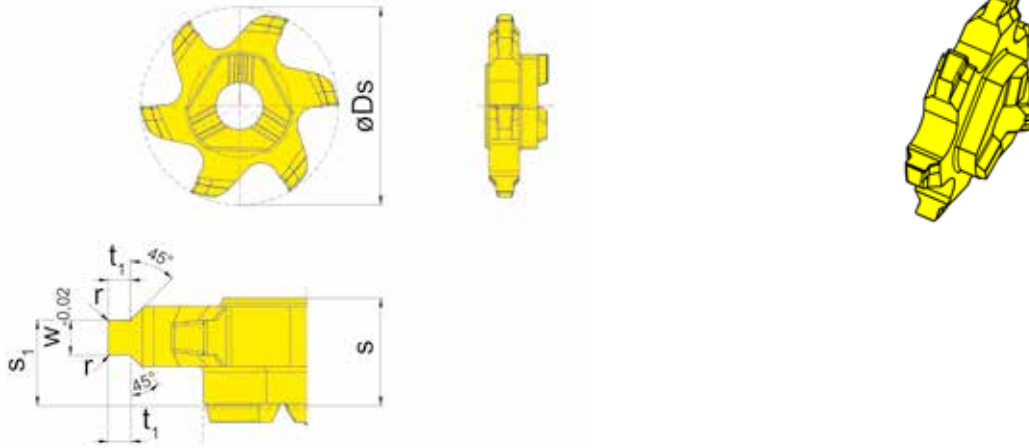
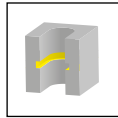
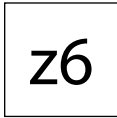


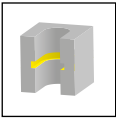
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Nw	w	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	▲
											P ● ●	
											M ● ○	
											K ● ○	
											N ○ -	
											S ● -	
											H - -	

B



z6

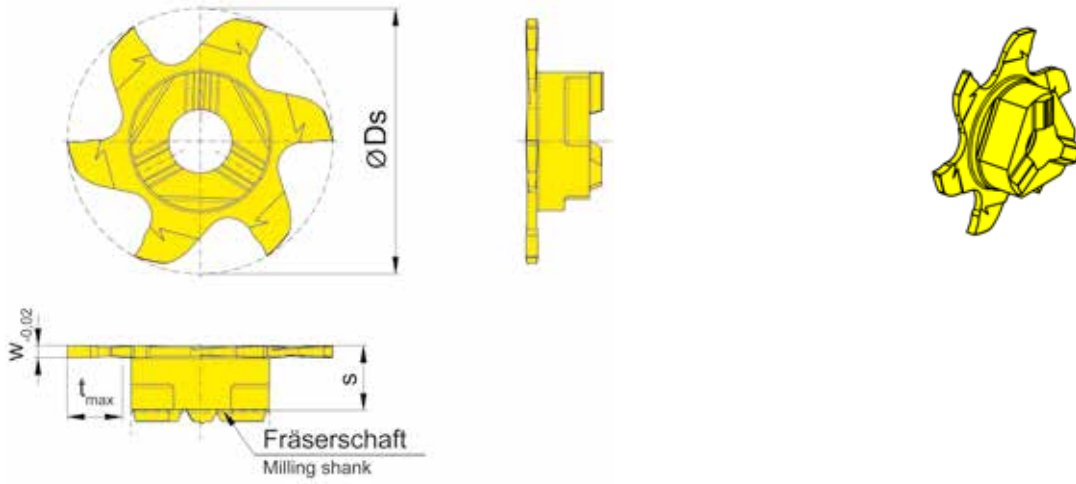


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	▲	▲
613.0100.1.00	21,7	1	5,7	4,5	6	313113R	▲	▲
							P ● ●	
							M ○ ●	
							K ○ ●	
							N - ●	
							S - ●	
							H - -	

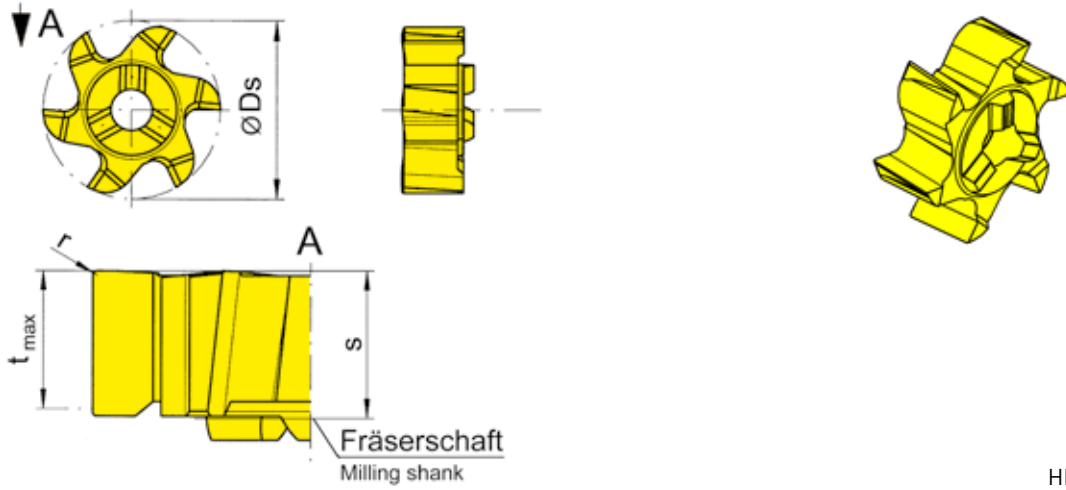
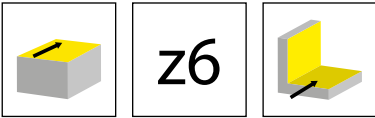


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	HM-Sorten Carbide grades			
							AS45	EG55	TF45	TI25
613.PL61.62	21,7	6	0,2	5,7	6,1	313113R	▲	▲	▲	▲
							P	●	●	●
							M	●	○	●
							K	●	○	●
							N	○	-	●
							S	●	-	●
							H	-	-	-

B

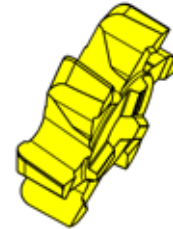
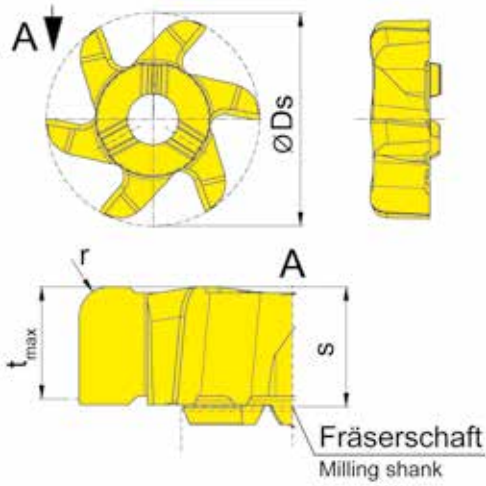
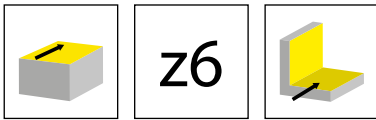


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

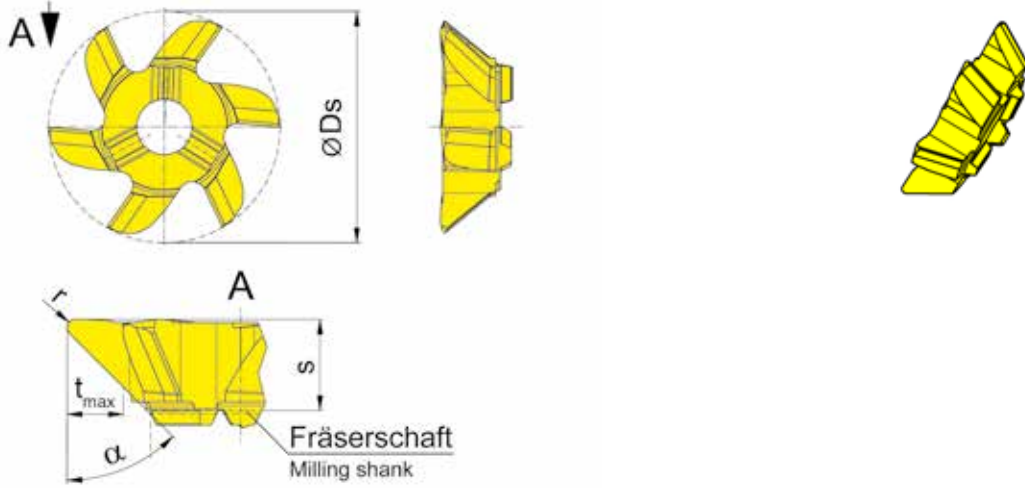
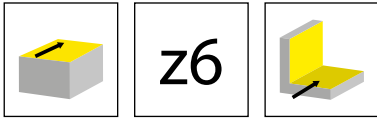


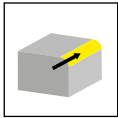
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	$\alpha$	$t_{max}$	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

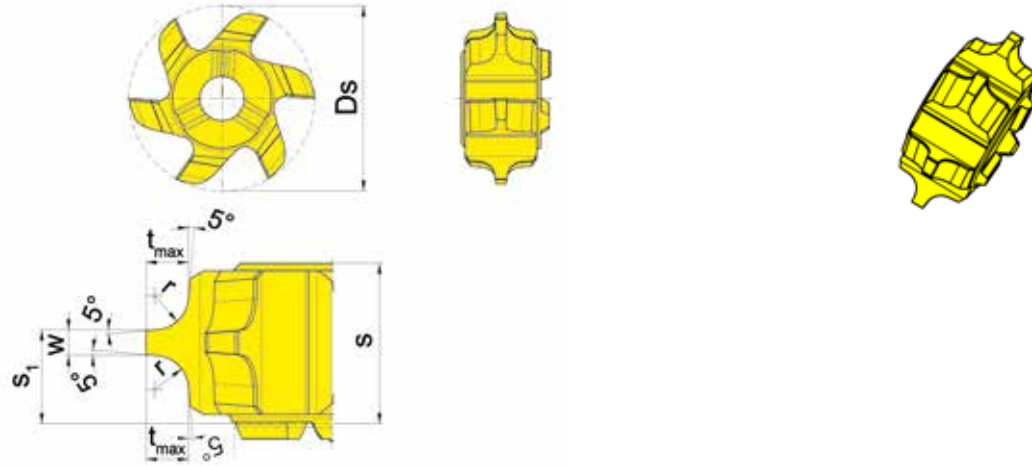


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	s <sub>1</sub>	r	Z	HIS	AS/45
613.R100.00	21,7	1,5	6,3	4	1	6	313113R	▲
613.R150.00	21,7	1,5	7,6	4,6	1,5	6	313113R	▲
613.R200.00	21,7	1,5	9,4	5,5	2	6	313113R	▲
613.R250.00	21,7	1,5	9,9	5,75	2,5	6	313113R	▲
613.R300.00	21,7	1,5	9,9	5,75	3	6	313113R	▲
								P ●
								M ●
								K ●
								N ○
								S ●
								H -



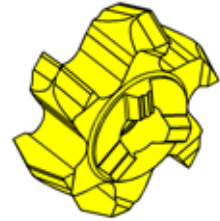
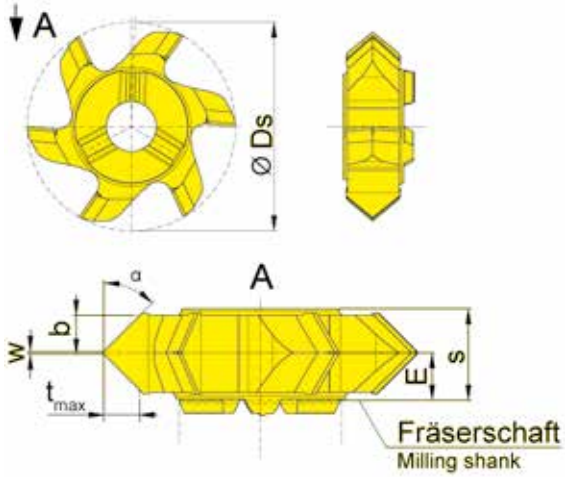
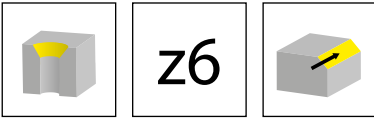


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$E$	$s$	$w$	$\alpha$	$b$	$t_{max}$	$Z$	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

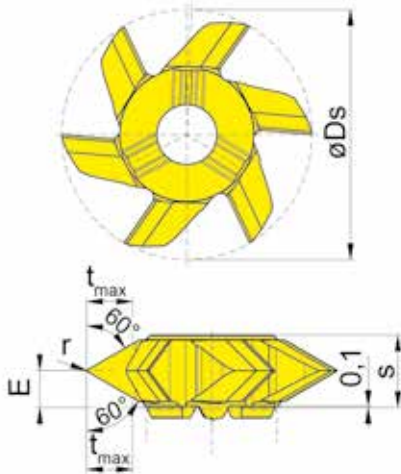
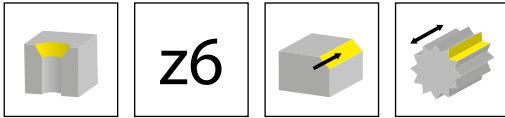
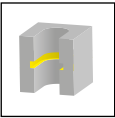


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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 -



z12

B

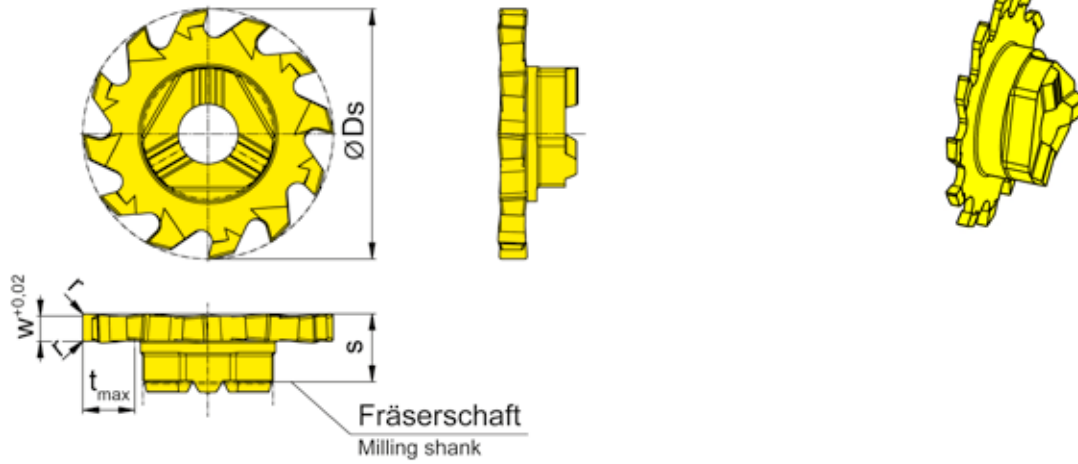


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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					
								AN25	AS45	EG35	EG55	IG35	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	△			▲		
713.0060.00	21,7	0,6	5,9	-	4,5	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			▲		△	
713.0100.00	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	-	-	-	-	-	-

B

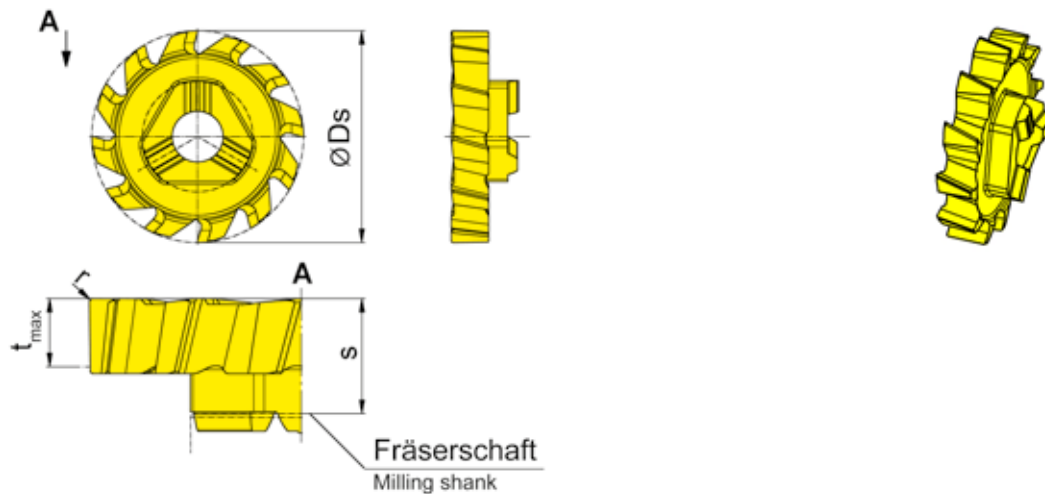
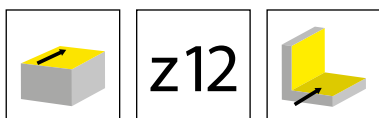


Abbildung = rechtsschneidend  
Picture = right hand cutting version

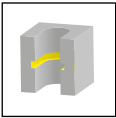
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	Z	r	$t_{max}$	s	HIS	EG55	TI25
713.PL35.15.02	21,7	12	0,2	3,5	5,9	313113R	▲	▲

Schrägverzahnung  
Helical teeth

P	●	●
M	○	●
K	○	●
N	-	●
S	-	●
H	-	-



z9

B

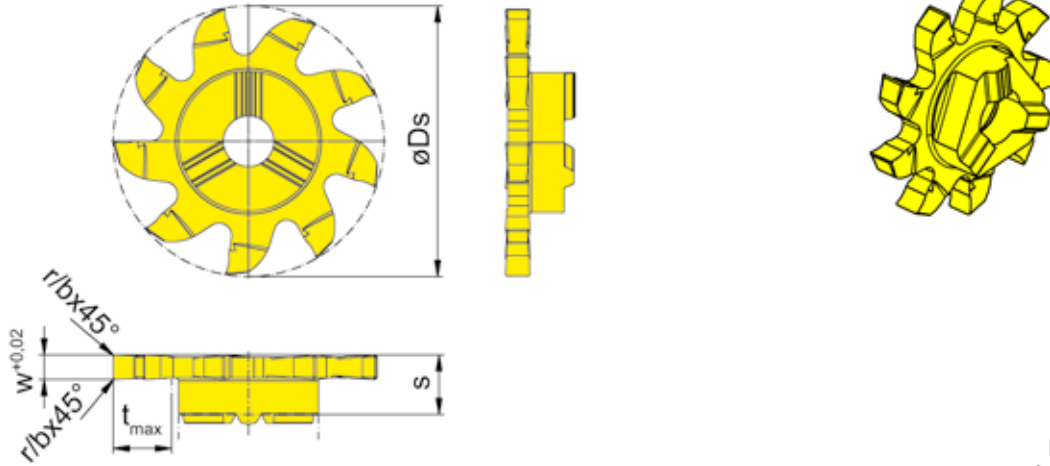


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

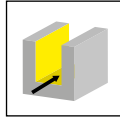
Bestellnummer Part number	Ds	w	s	b x 45°	r	t <sub>max</sub>	Z	HIS	EG55	IG65
913.0150.00	21,7	1,5	5,7	0,05	-	4,5	9	313113R	▲	Δ
913.0200.00	21,7	2	5,7	-	0,2	4,5	9	313113R	▲	Δ
913.0250.00	21,7	2,5	5,7	-	0,2	4,5	9	313113R	▲	Δ
913.0300.00	21,7	3	5,7	-	0,2	4,5	9	313113R	▲	Δ
									P ● ●	
									M ○ ●	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

# Nutfräsen (zirkular)

## Groove Milling by circular interpolation

B

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

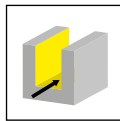


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152-157

Grundaufnahme  
Basic Holder  
WFB

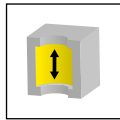
Seite/Page  
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Einschraubfräser  
Screw-in cutter  
M328.M

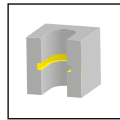


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159

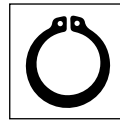
Schneidplatte  
Insert  
325/328/628/928



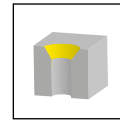
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170-172, 175



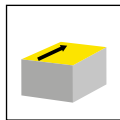
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166, 174



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167-168



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173

# M328



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  28 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  28 mm

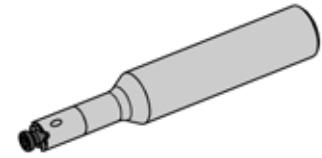
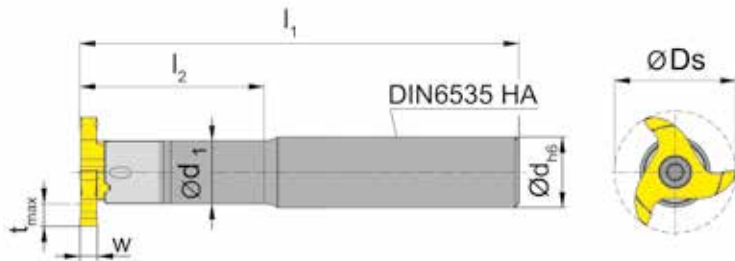
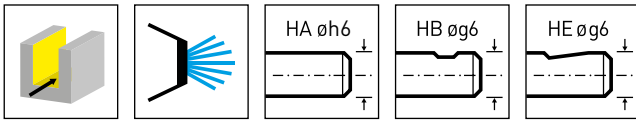
# Fräuserschaft

## 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	A	328143R
M328.0016.02A	16	130	60	14,3	A	328143R
M328.0016.03A	16	160	85	14,3	A	328143R
M328.0020.01A	20	100	42	14,3	A	328143R
M328.0020.02A	20	130	60	14,3	A	328143R
M328.0020.03A	20	160	85	14,3	A	328143R
M328.0016.01B	16	100	42	14,3	B	328143R
M328.0016.02B	16	130	60	14,3	B	328143R
M328.0016.03B	16	160	85	14,3	B	328143R
M328.0020.01B	20	100	42	14,3	B	328143R
M328.0020.02B	20	130	60	14,3	B	328143R
M328.0020.03B	20	160	85	14,3	B	328143R
M328.0016.01E	16	100	42	14,3	E	328143R
M328.0016.02E	16	130	60	14,3	E	328143R
M328.0016.03E	16	160	85	14,3	E	328143R
M328.0020.01E	20	100	42	14,3	E	328143R
M328.0020.02E	20	130	60	14,3	E	328143R
M328.0020.03E	20	160	85	14,3	E	328143R

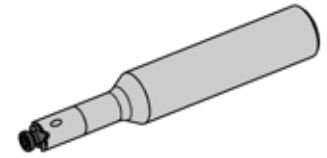
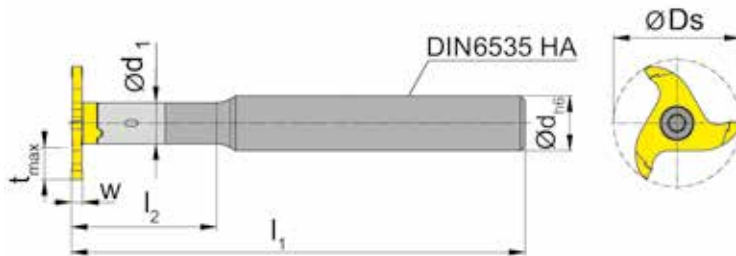
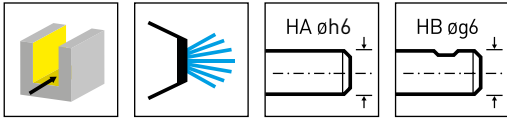
w, D<sub>s</sub>, t<sub>max</sub> siehe Schneidplatte  
w, D<sub>s</sub>, t<sub>max</sub> see inserts

### Ersatzteile

Spare Parts

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	A	328114R
<b>M328.0912.01A</b>	12	100	32	9	A	328114R
<b>M328.0912.01B</b>	12	100	32	9	B	328114R

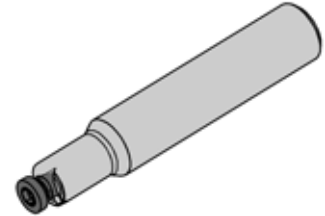
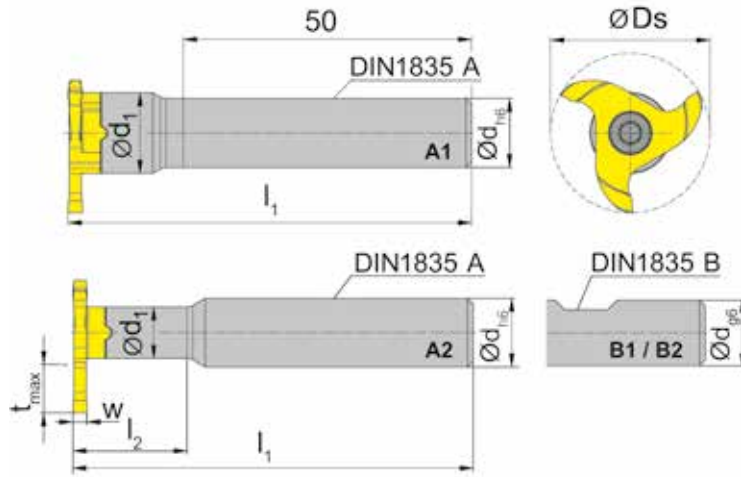
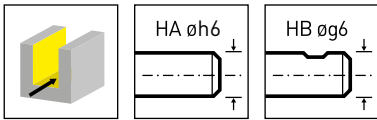
w,  $D_s$ ,  $t_{max}$  siehe Schneidplatte  
w,  $D_s$ ,  $t_{max}$  see inserts

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

**Ersatzteile**  
Spare Parts

<b>Frälerschaft</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**



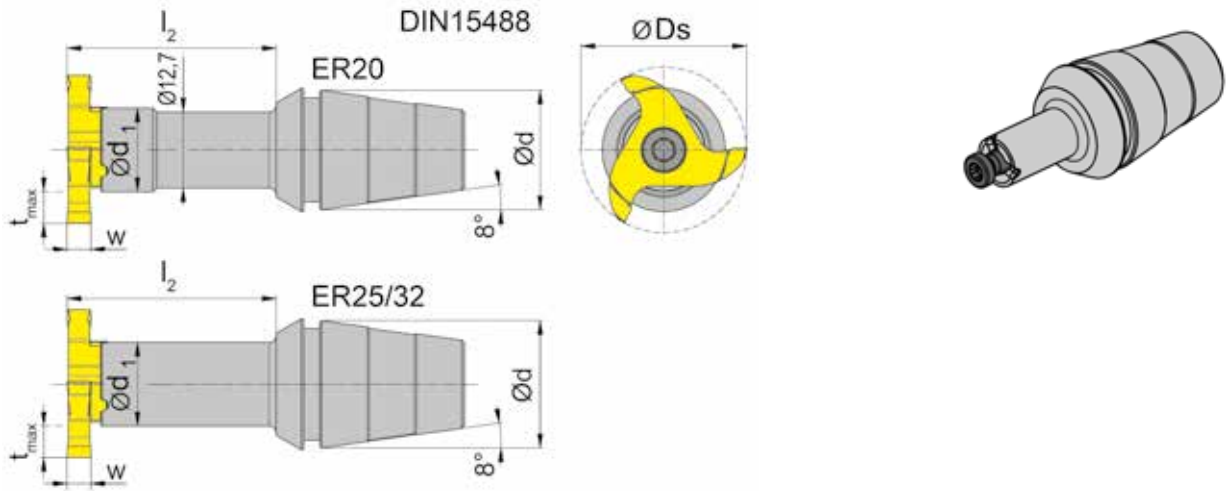
Bestellnummer Part number	d	$l_1$	$l_2$	$d_1$	Form	HWS
<b>M328.ST12.01A</b>	12	70	-	14	A1	328143R
<b>M328.ST13.01A</b>	13	70	-	14	A1	328143R
<b>M328.ST12.2.01A</b>	12	70	20	9	A2	328114R
<b>M328.ST16.01A</b>	16	90	36	14	A2	328143R
<b>M328.ST20.01A</b>	20	100	36	14	A2	328143R
<b>M328.ST12.01B</b>	12	70	-	14	B1	328143R
<b>M328.ST12.2.01B</b>	12	70	20	9	B2	328114R
<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

Fräuserschaft 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	328114R
<b>M328.ER25.02</b>	25	35	14	ER25.6499	328114R
<b>M328.ER32.02</b>	32	35	14	ER32.6499	328114R

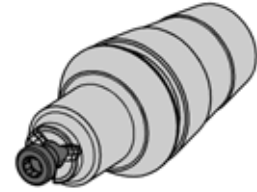
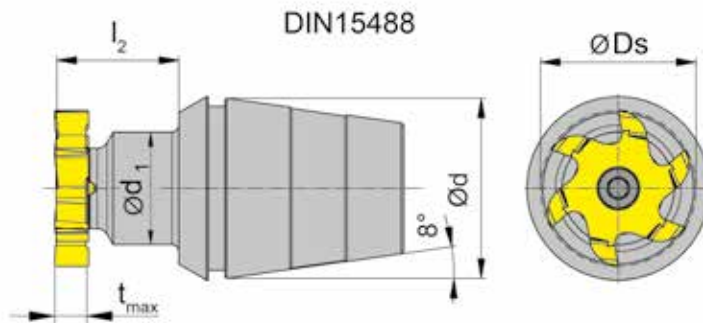
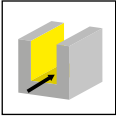
w, Ds, tmax siehe Schneidplatte  
w, Ds, tmax see inserts

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

**Ersatzteile**  
Spare Parts

<b>Frälerschaft</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	328114R
<b>M328.ER32.16.01</b>	32	21,7	20	ER32.6499	328114R

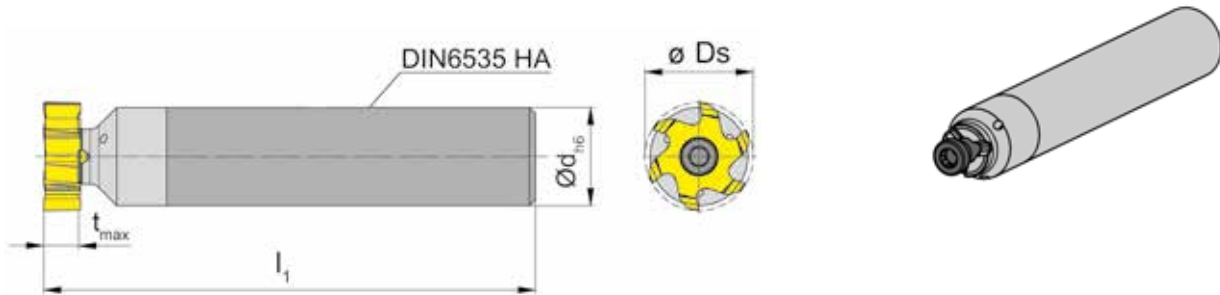
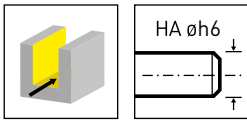
tmax und Ds siehe SP  
tmax and Ds see inserts

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

**Ersatzteile**

Spare Parts

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

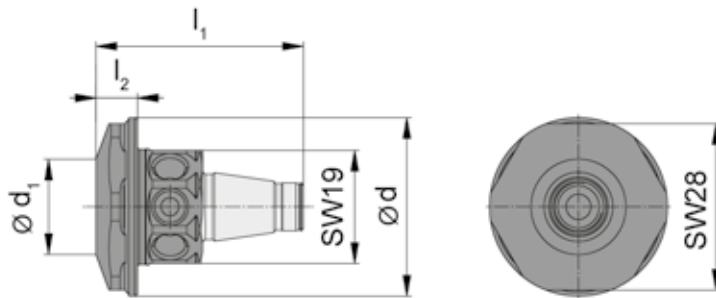


Bestellnummer Part number	d	$l_1$	Form	HWS
<b>M328.0016.D.00A</b>	16	80	A	328143R
<b>M328.0020.D.00A</b>	20	80	A	328143R

tmax und Ds siehe SP  
tmax and Ds see inserts

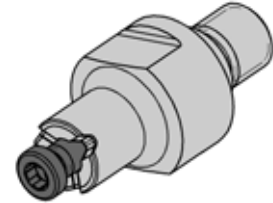
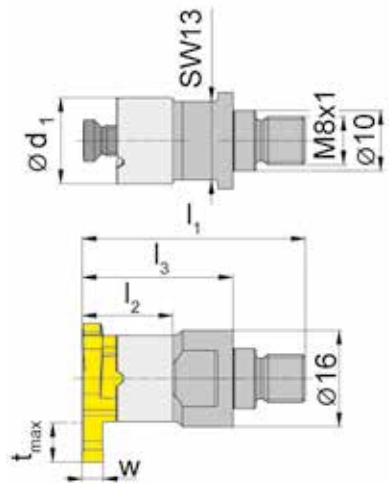
**Ersatzteile**  
Spare Parts

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

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

B

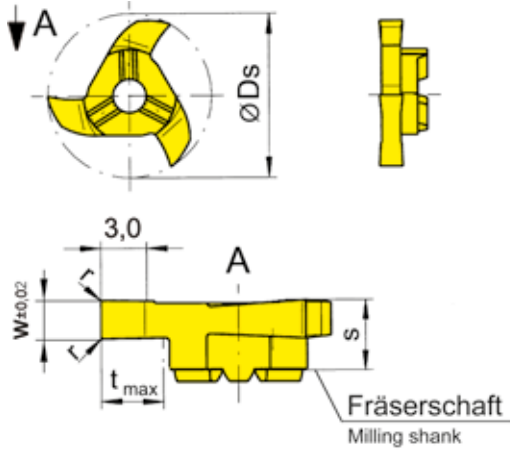
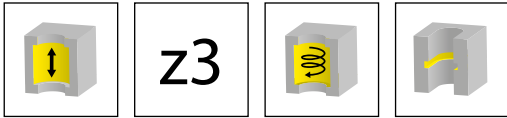


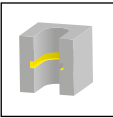
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	HM-Sorten Carbide grades	
								AS45	TN35
325.0350.52	24,8	3,5	5,7	0,2	5	3	328143R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -





**z3**

**B**

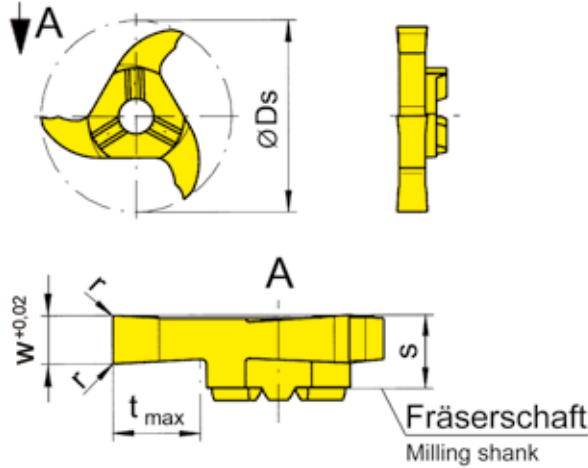


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
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 w = 2 - 6 mm Schraube 4.14T20P verwenden  
Für Schneidplatte w = 7 - 8 mm Schraube 5.17T20P verwenden  
Für Schneidplatte w = 10 mm Schraube 5.13T20P verwenden  
For Insert w = 2 - 6 mm use screw 4.14T20P  
For Insert w = 7 - 8 mm use screw 5.17T20P  
For Insert w = 10 mm use screw 5.13T20P

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

B

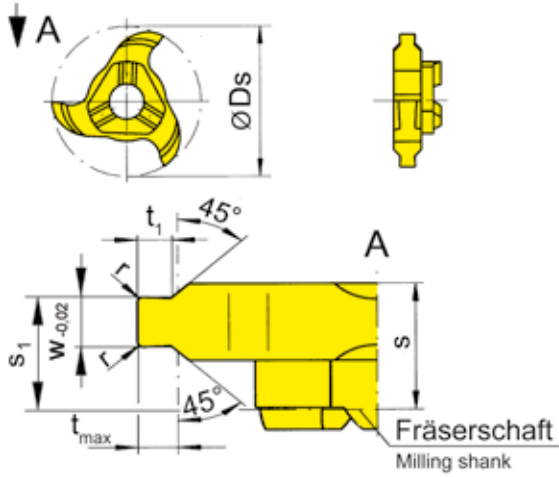


Abbildung = linksschneidend  
Picture = left hand cutting version

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

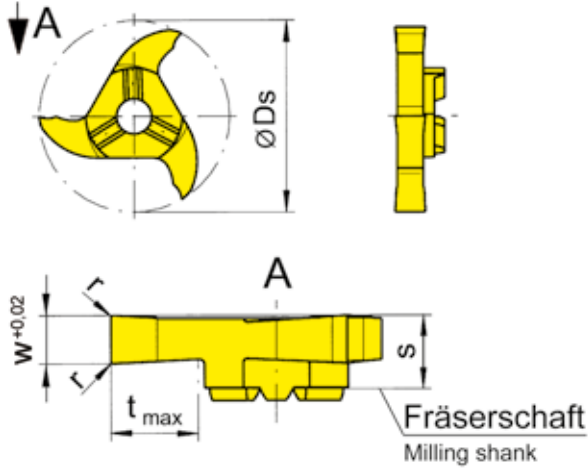
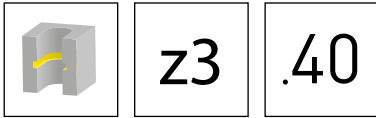


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

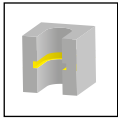
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$w$	$s$	$r$	$t_{max}$	Z	HIS	TI25
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

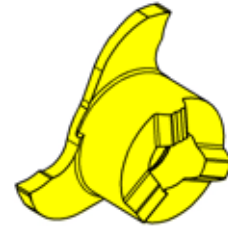
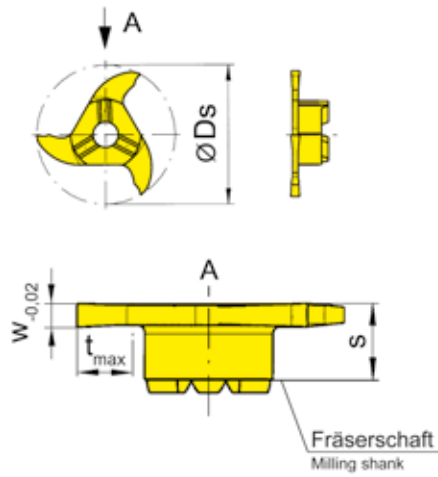
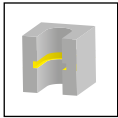


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	HM-Sorten Carbide grades	
							TI25	TN35
328.0082.1.00	27,7	0,82	5,7	5	3	328143R	▲	▲
							P	●
							M	●
							K	●
							N	●
							S	●
							H	-



z3

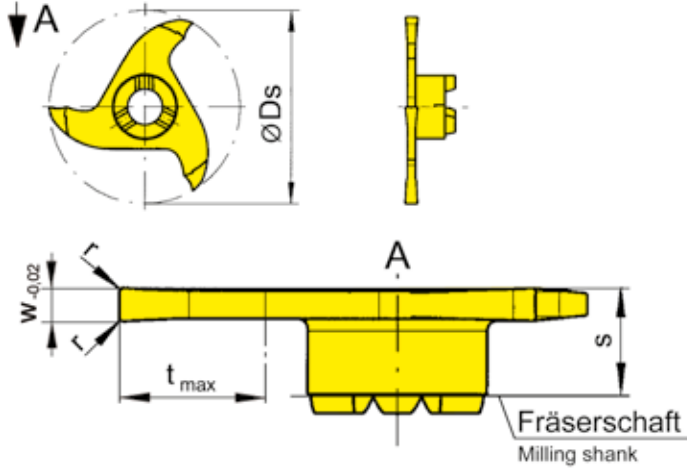


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	TI25	TN35
328.0110.2.00	28	1,1	5,7	0,2	9,3	3	328114R		▲	▲
328.0120.2.00	28	1,2	5,7	0,2	9,3	3	328114R		▲	▲
328.0132.2.00	28	1,32	5,7	0,15	9,3	3	328114R		▲	▲
328.0150.2.00	28	1,5	5,7	0,2	9,3	3	328114R	▲	▲	▲
328.0160.2.00	28	1,6	5,7	0,2	9,3	3	328114R	▲	▲	▲
328.0200.2.00	28	2	5,7	0,2	9,3	3	328114R	▲	▲	▲
328.0250.2.00	28	2,5	5,7	0,2	9,3	3	328114R	▲	▲	▲
P	●	●	●							
M	●	●	●							
K	●	●	●							
N	○	●	●							
S	●	●	●							
H	-	-	-							

B

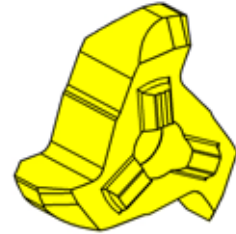
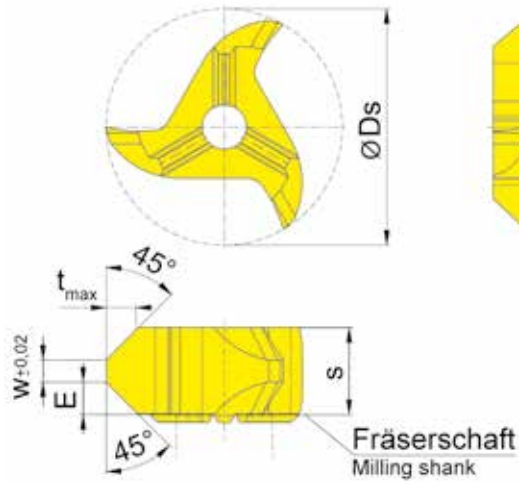


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	-

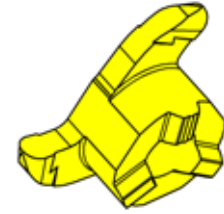
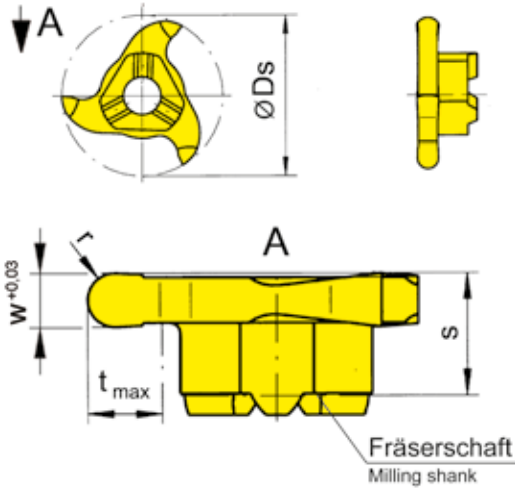
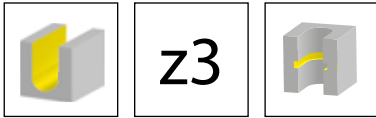


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

HM-Sorten  
Carbide grades

Bestellnummer Part number	$D_s$	$w$	$s$	$r$	$t_{max}$	$Z$	HIS	AS/45
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**

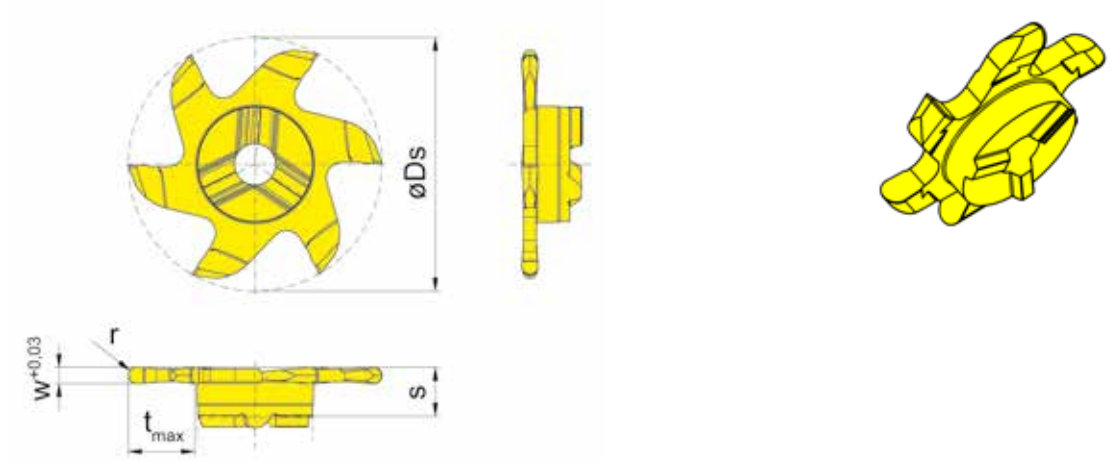
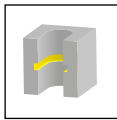


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	AS/45
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 -





z6

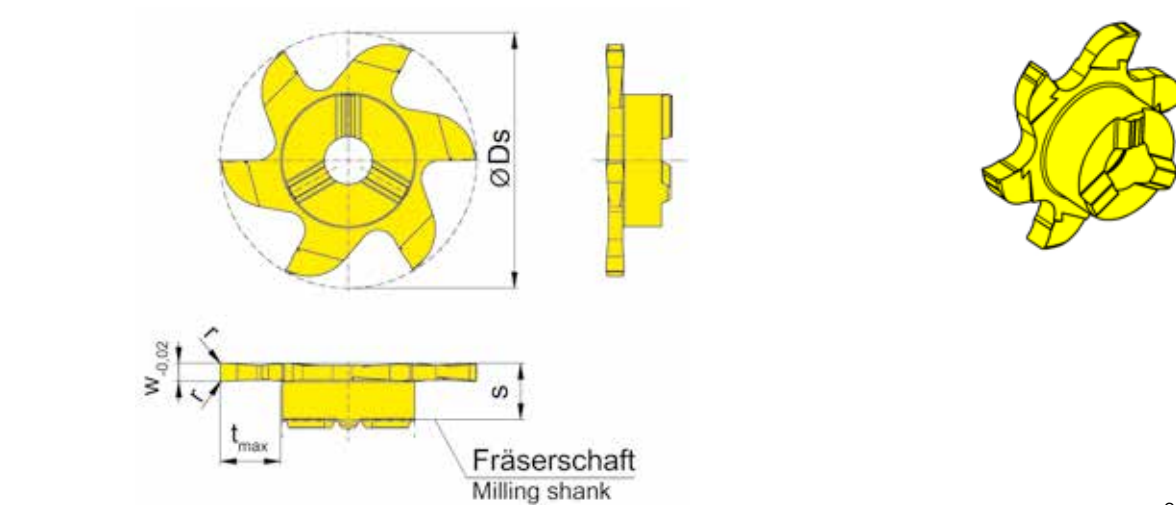
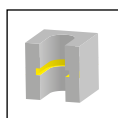


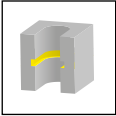
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

B



z6

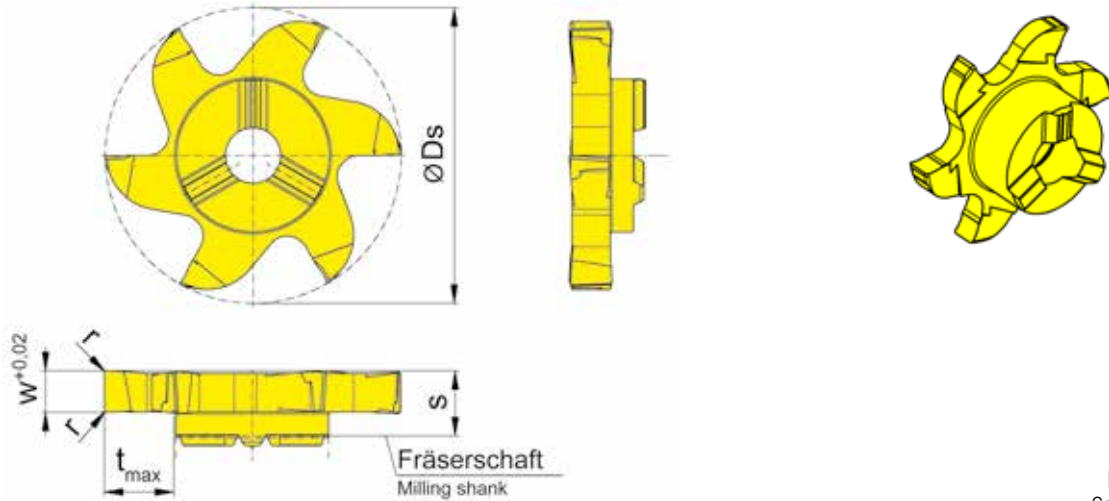


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	TH35	TI25
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	▲	▲	▲
								P ●	●	●
								M ●	●	●
								K ●	●	●
								N ○	●	●
								S ●	●	●
								H -	-	-

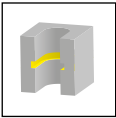
Bei Reduzierung der Frästiefe t<sub>max</sub> ist eine Schneidbreite w bis 0,5 mm auf Anfrage möglich.  
Inserts for widths of groove t<sub>max</sub> down to 0,5 mm can be delivered with reduced depth upon request.

**Schneidplatte 628.0400.00**

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

**Insert 628.0400.00**

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



z6

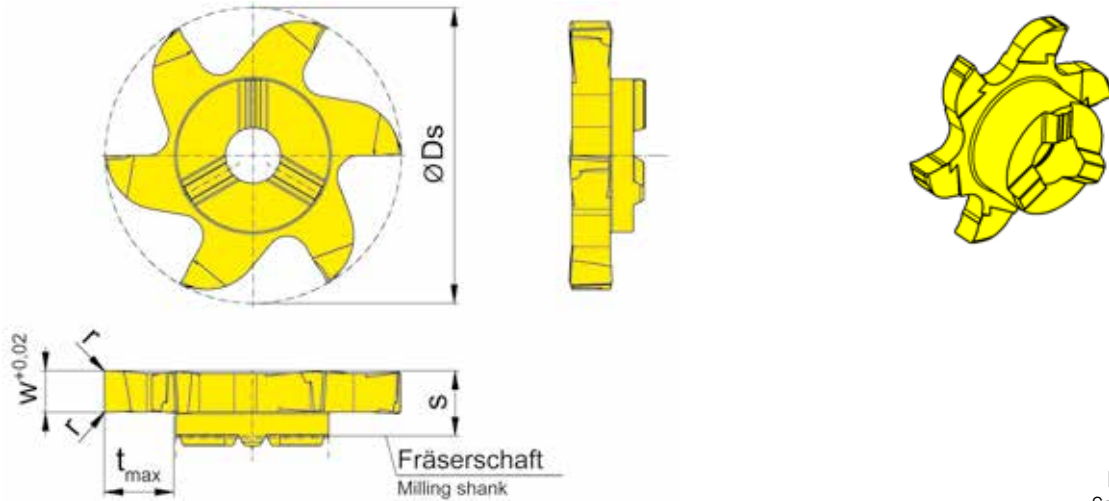


Abbildung = rechtsschneidend  
Picture = right hand cutting version

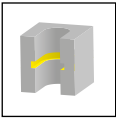
▲ ab Lager  
on stock

△ 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 ○
								S ●
								H -

B



z6

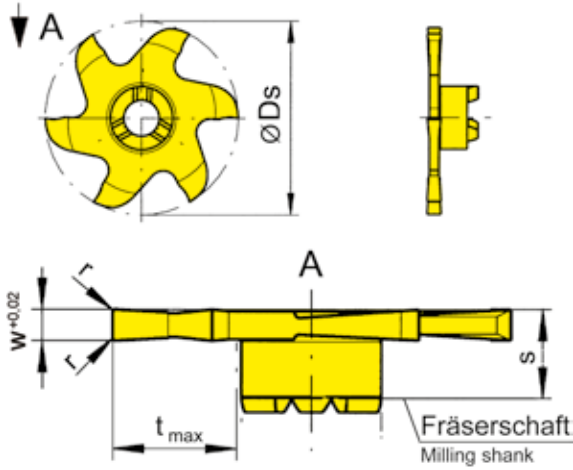
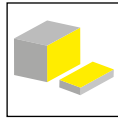


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$w$	$s$	$r$	$t_{max}$	$Z$	HIS	AS45	TI25
628.0100.2.00	28	1	6,1	-	9,3	6	328114R		▲
628.0120.2.00	28	1,2	6,1	-	9,3	6	328114R		▲
628.0150.2.00	28	1,5	6,1	-	9,3	6	328114R	▲	▲
628.0160.2.00	28	1,6	6,1	-	9,3	6	328114R	▲	▲
628.0200.2.00	28	2	6,1	0,2	9,3	6	328114R	▲	▲
628.0240.2.00	28	2,4	6,1	0,2	9,3	6	328114R	Δ	▲
628.0250.2.00	28	2,5	6,1	0,2	9,3	6	328143R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -

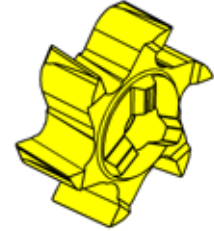
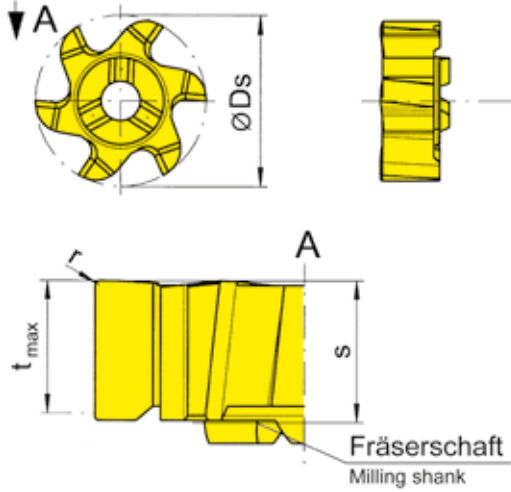
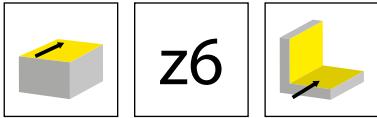


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	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 -	-	-

B

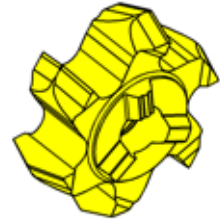
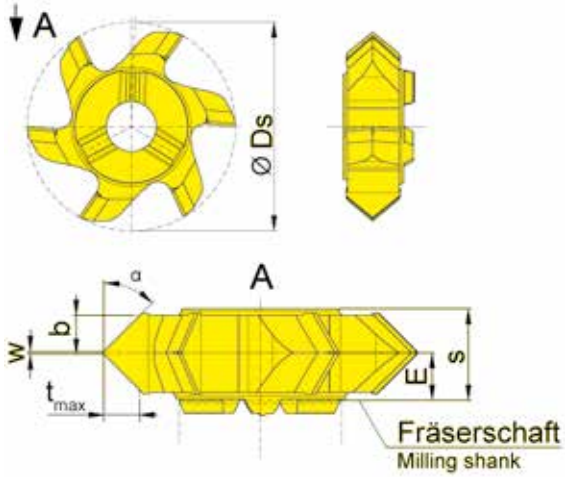
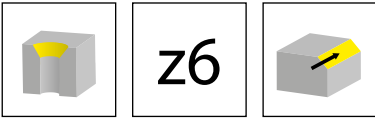


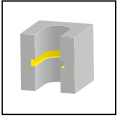
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$E$	$s$	$w$	$a$	$b$	$t_{max}$	$Z$	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	-



z9

B

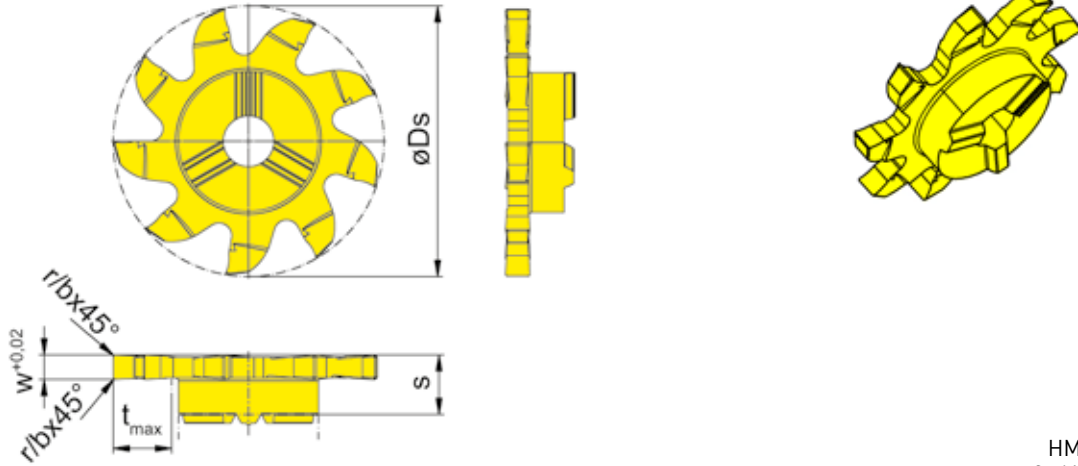


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

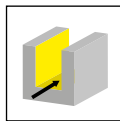
Bestellnummer Part number	Ds	w	s	b x 45°	r	t <sub>max</sub>	Z	HIS		EG55	IG65
928.0150.00	27,7	1,5	6,1	0,05	-	6,5	9	328143R	▲	Δ	
928.0200.00	27,7	2	6,1	-	0,2	6,5	9	328143R	▲	Δ	
928.0250.00	27,7	2,5	6,1	-	0,2	6,5	9	328143R	▲	Δ	
928.0300.00	27,7	3	6,1	-	0,2	6,5	9	328143R	▲	Δ	
									P	●	●
									M	○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

# Nutfräsen (zirkular)

## Groove Milling by circular interpolation

B

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

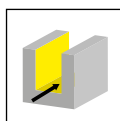


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Grundaufnahme  
Basic Holder  
WFB

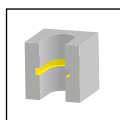
Seite/Page  
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Einschraubfräser  
Screw-in cutter  
M332.M

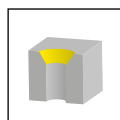


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Schneidplatte  
Insert  
332/632/636/932  
939



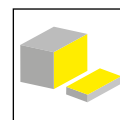
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190, 193-197



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187-188



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191-192, 198



# M332



**Fräser mit wechselbarer  
Schneidplatte**

ab Bohrung  $\varnothing$  32 mm

**Milling shank with  
exchangeable insert**

from bore  $\varnothing$  32 mm

**B**

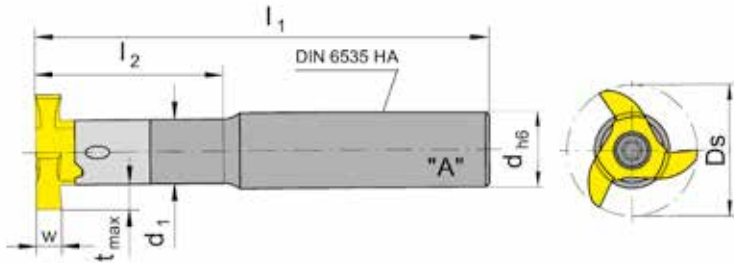
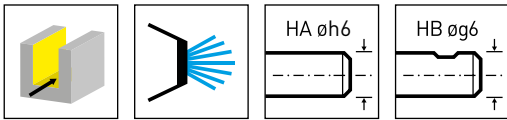


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M332.0016.01A</b>	16	100	42	14,3	A	332143R
<b>M332.0016.02A</b>	16	130	60	14,3	A	332143R
<b>M332.0016.03A</b>	16	160	85	14,3	A	332143R
<b>M332.0020.01A</b>	20	100	42	14,3	A	332143R
<b>M332.0020.02A</b>	20	130	60	14,3	A	332143R
<b>M332.0020.03A</b>	20	160	85	14,3	A	332143R
<b>M332.0016.01B</b>	16	100	42	14,3	B	332143R
<b>M332.0016.02B</b>	16	130	60	14,3	B	332143R
<b>M332.0016.03B</b>	16	160	85	14,3	B	332143R
<b>M332.0020.01B</b>	20	100	42	14,3	B	332143R
<b>M332.0020.02B</b>	20	130	60	14,3	B	332143R
<b>M332.0020.03B</b>	20	160	85	14,3	B	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...	<b>5.17T20P</b>	<b>T20PQ</b>

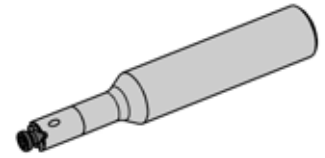
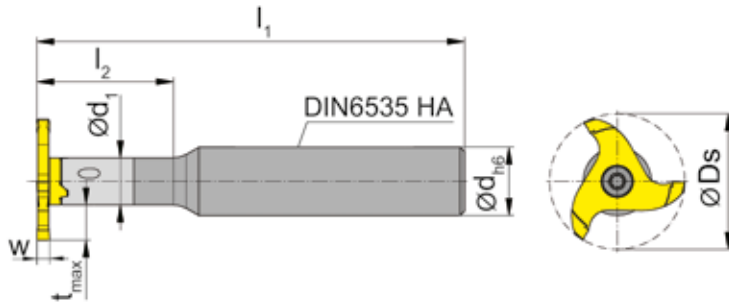
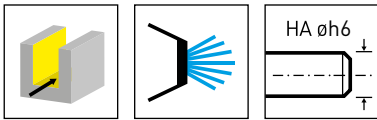


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M332.0012.2.01A</b>	12	100	32	11	A	332110R
<b>M332.0012.3.00A</b>	12	100	-	12	A	332110R
<b>M332.0016.2.02A</b>	16	130	68	11	A	332110R
<b>M332.0016.2.01A</b>	16	100	32	11	A	332110R

w, Ds, t<sub>max</sub> siehe Schneidplatte  
w, Ds, t<sub>max</sub> 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>

**B**

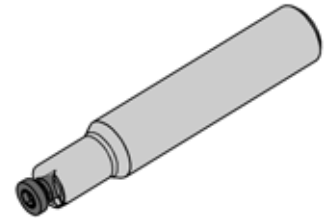
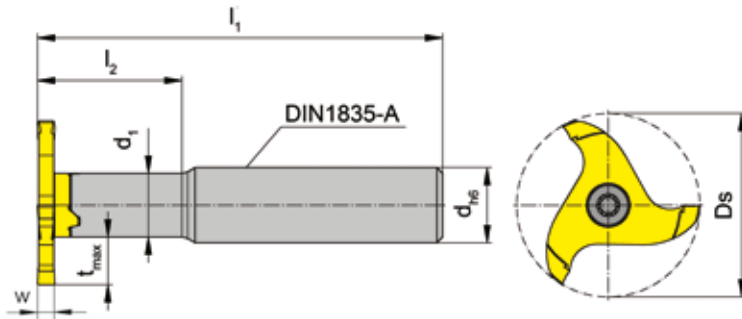
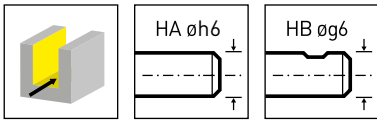


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	332110R
M332.ST12.2.01A	12	70	25	11	A	332110R
M332.ST13.2.01A	13	70	25	11	A	332110R
M332.ST16.01A	16	90	36	14,3	A	332143R
M332.ST20.01A	20	100	36	14,3	A	332143R
M332.ST12.2.01B	12	70	25	11	B	332110R
M332.ST16.01B	16	90	36	14,3	B	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...	<b>5.17T20P</b>	<b>T20PQ</b>

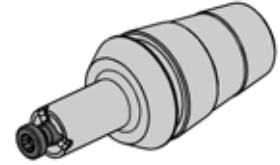
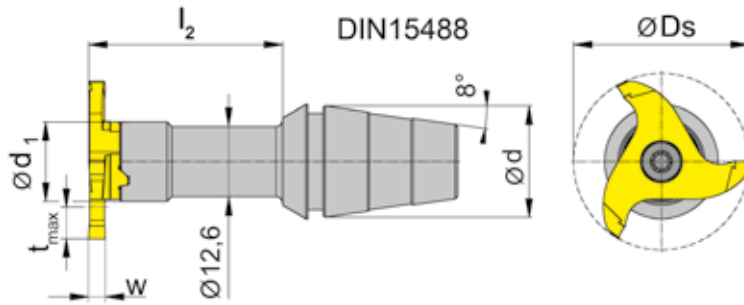
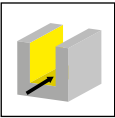


Abbildung = rechtsschneidend  
Picture = right hand cutting version

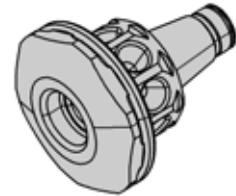
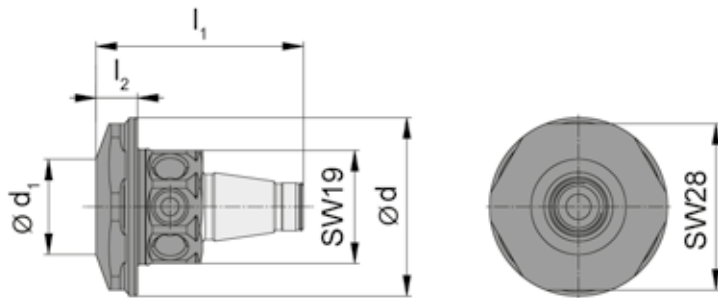
Bestellnummer Part number	d	l <sub>2</sub>	d <sub>1</sub>	Spannmutter Clamping nut	HWS
<b>M332.ER20.02</b>	20	35	14,3	ER20.6499/ERM20.6499	332143R

w, 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!

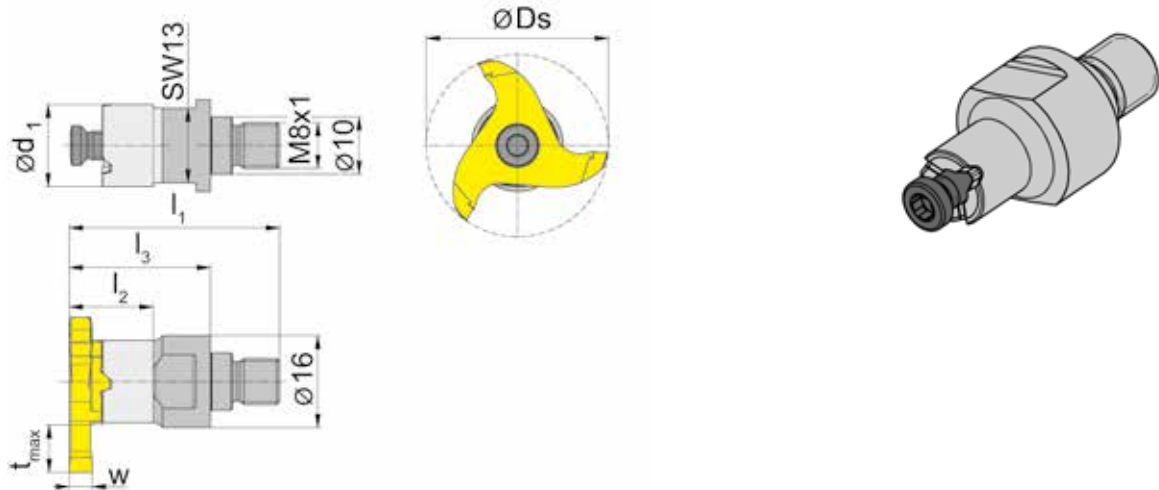
**Ersatzteile**  
Spare Parts

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



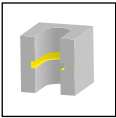
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	SW	HWS	HMS
<b>M332.M081.01</b>	37	15	25	14,3	13	332143R	8001

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
M332.M081.01	<b>5.17T20P</b>	<b>T20PQ</b>

B



z3

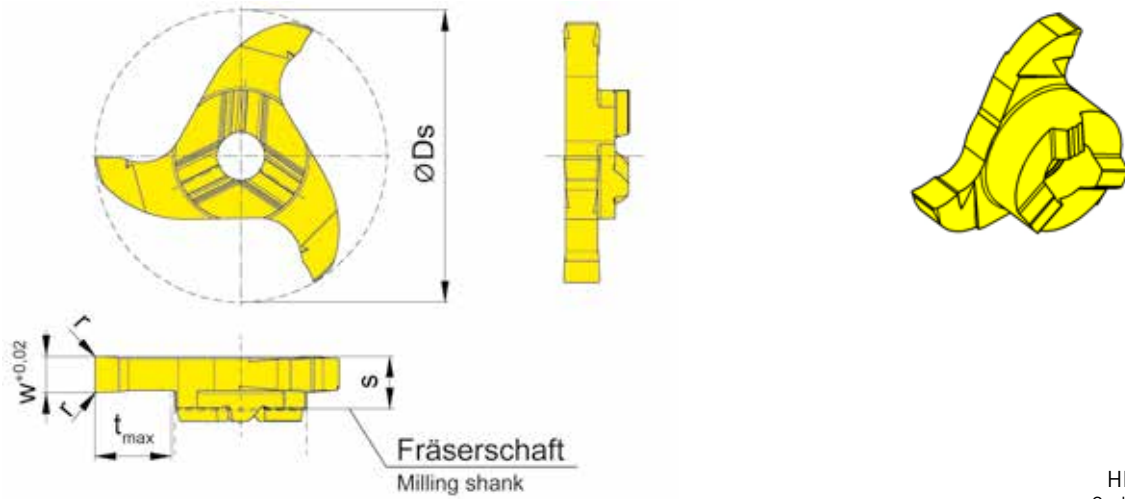


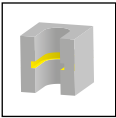
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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

B

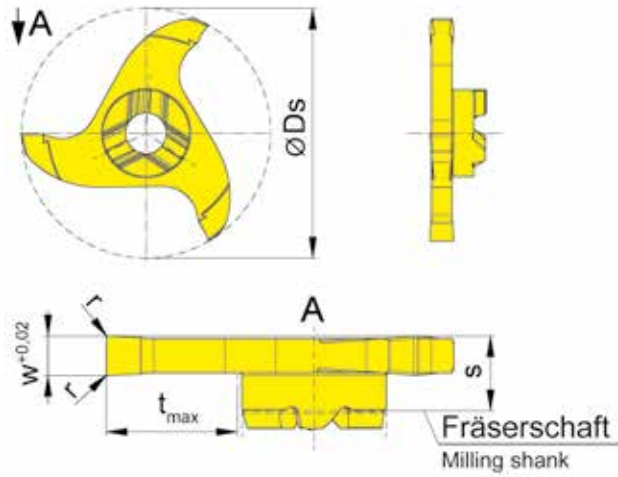


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
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

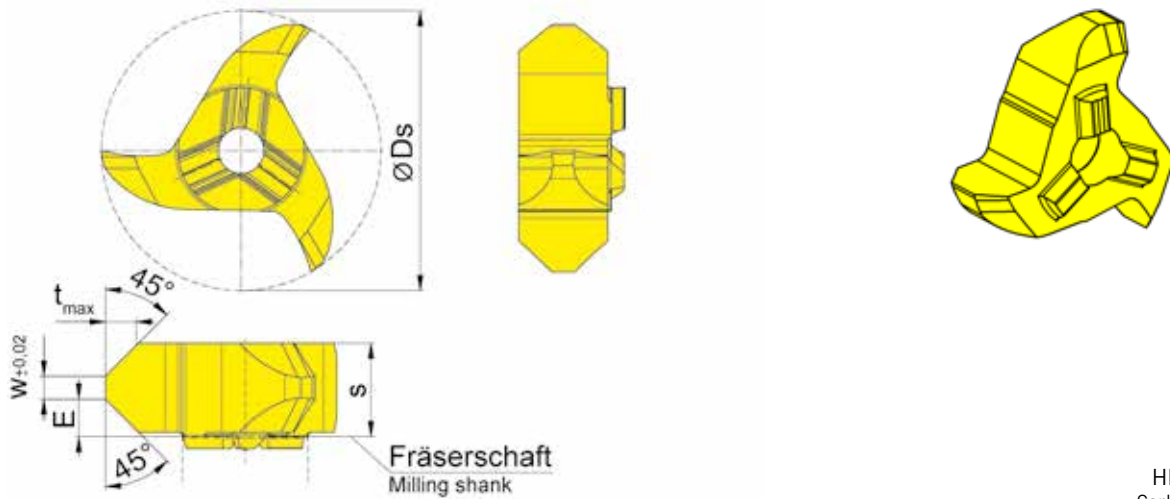
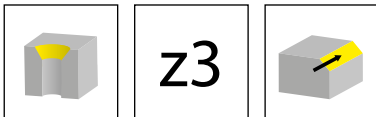


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

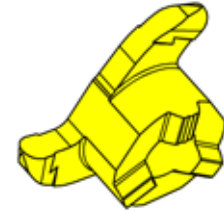
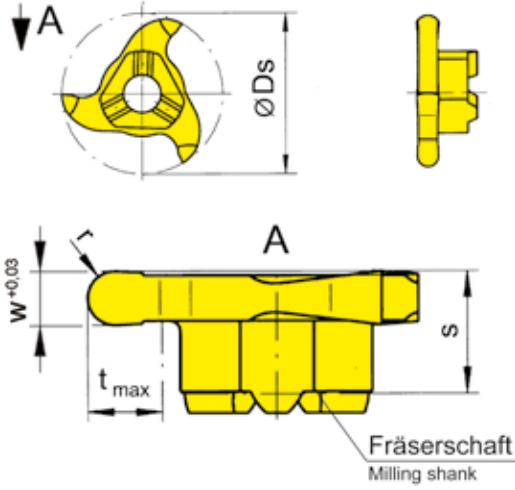
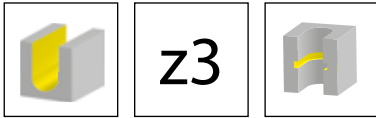


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
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

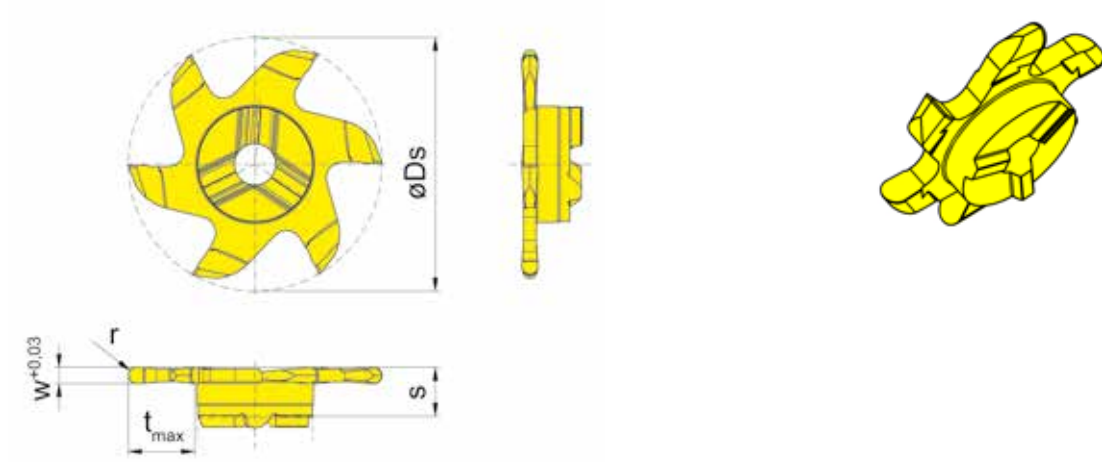
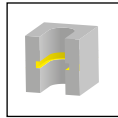
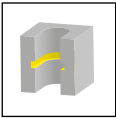


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	Ds	w	s	r	t <sub>max</sub>	Z	HIS	AS/45
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 o
								S ●
								H -



z6

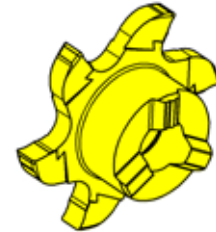
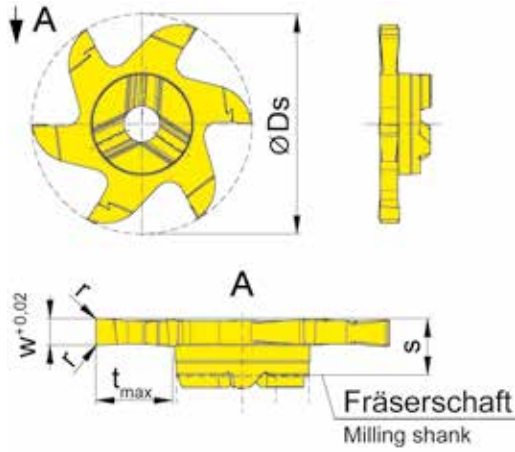


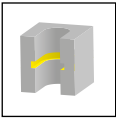
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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
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

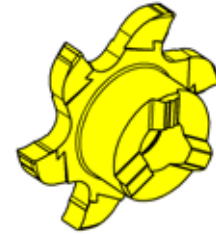
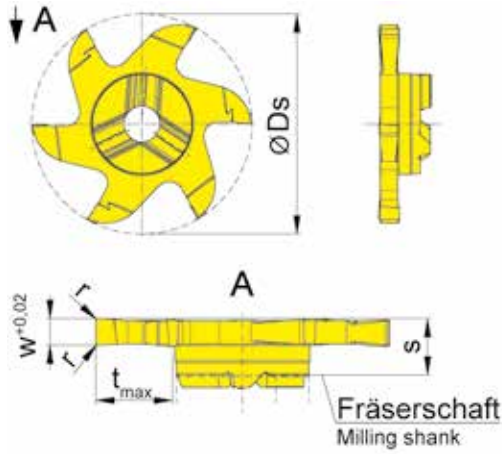
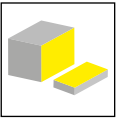


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	Δ	▲
632.0300.2.00	31,7	3	6,1	0,2	10	6	332110R	▲	▲
								P	● ●
								M	● ●
								K	● ●
								N	○ ●
								S	● ●
								H	- -



z6

B

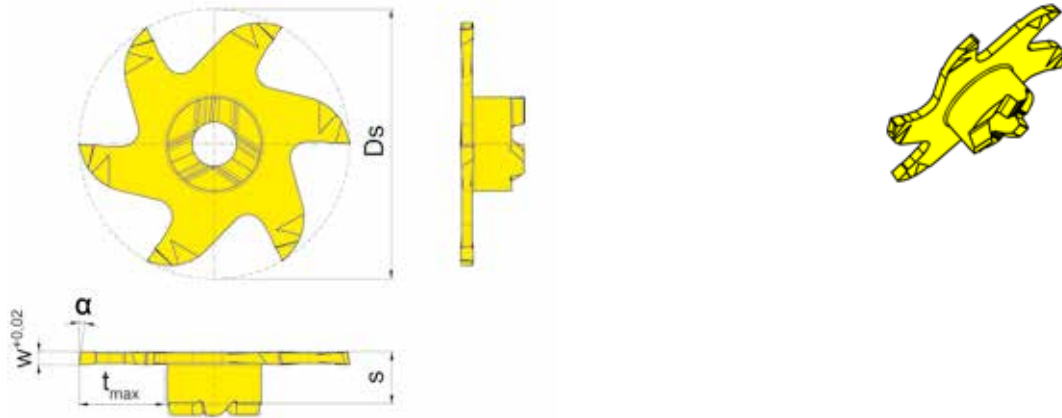


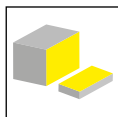
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	AN25	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**

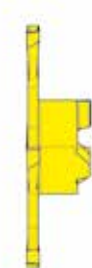
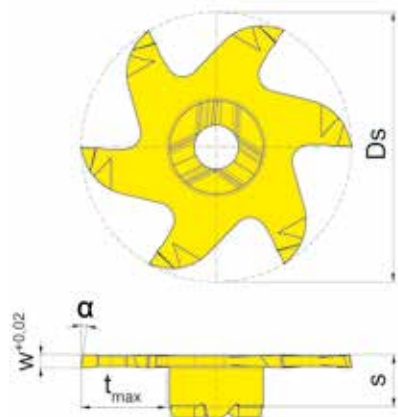


Abbildung = rechtsschneidend  
Picture = right hand cutting version

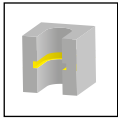
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	α	t <sub>max</sub>	Z	HIS	AN25	RC25
<b>636.L810.2.00</b>	35,7	1	6,1	8°	12	6	332110R	▲	▲
<b>636.L815.2.00</b>	35,7	1,5	6,1	8°	12	6	332110R	▲	▲
<b>636.L820.2.00</b>	35,7	2	6,1	8°	12	6	332110R	▲	▲
								P ● ●	
								M ○ ●	
								K - ●	
								N - -	
								S - -	
								H - -	

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





z6

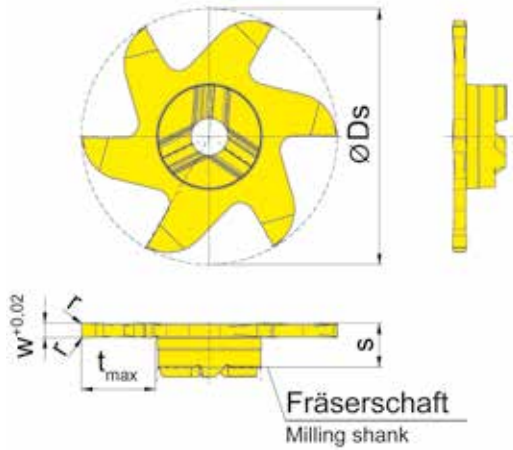
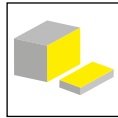


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

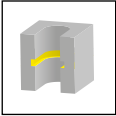
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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 Frälerschaft beachten!  
Please consider pocket seat  $\varnothing$  d1 of the milling shank!

P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

B



z6

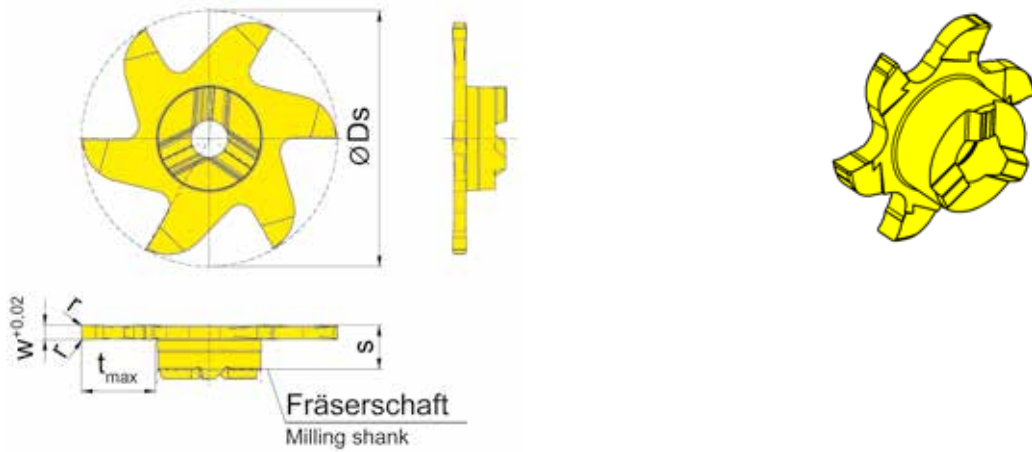


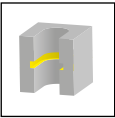
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	TA45	
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	Δ		
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 Fräuserschaft beachten! Please consider pocket seat $\varnothing$ d1 of the miling shank!								M	●	●
								K	●	●
								N	○	●
								S	●	●
								H	-	-



z9

B

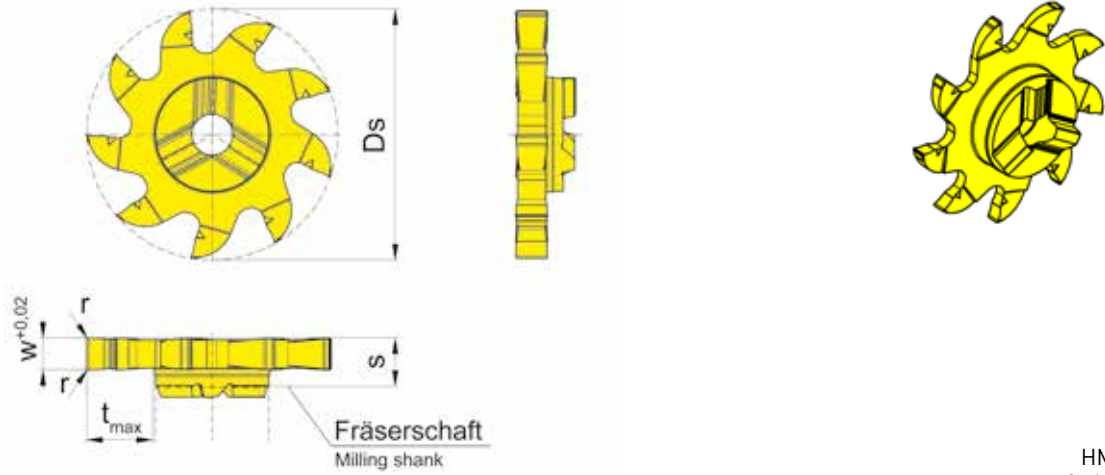


Abbildung = rechtsschneidend  
Picture = right hand cutting version

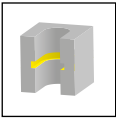
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 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

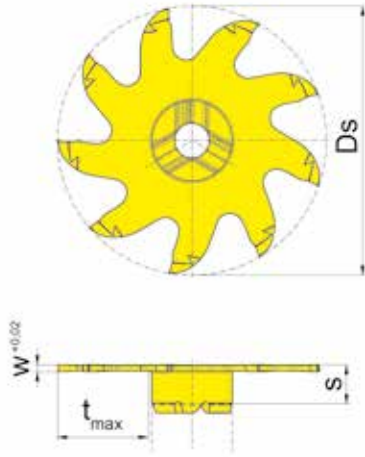
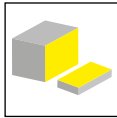
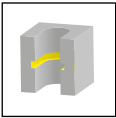


Abbildung = rechtsschneidend  
Picture = right hand cutting version

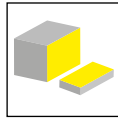
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	AN25	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 - -	



z9



B

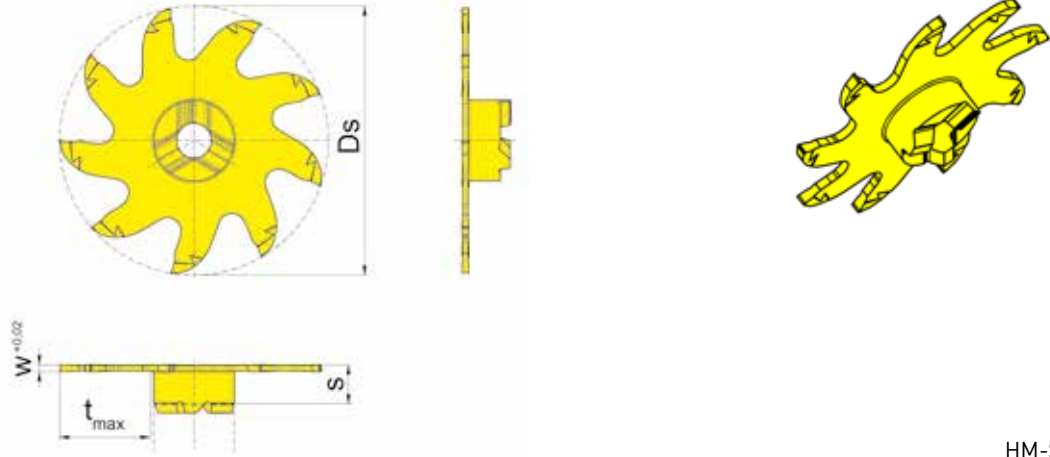


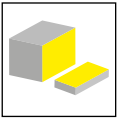
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	w	s	t <sub>max</sub>	Z	HIS	AN25	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

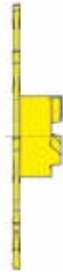
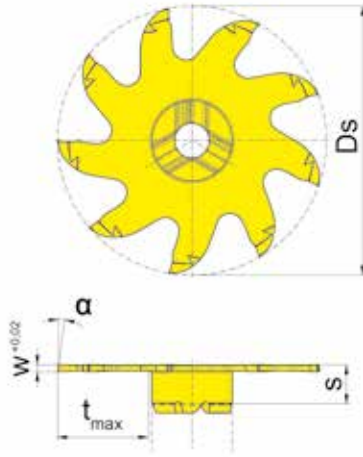
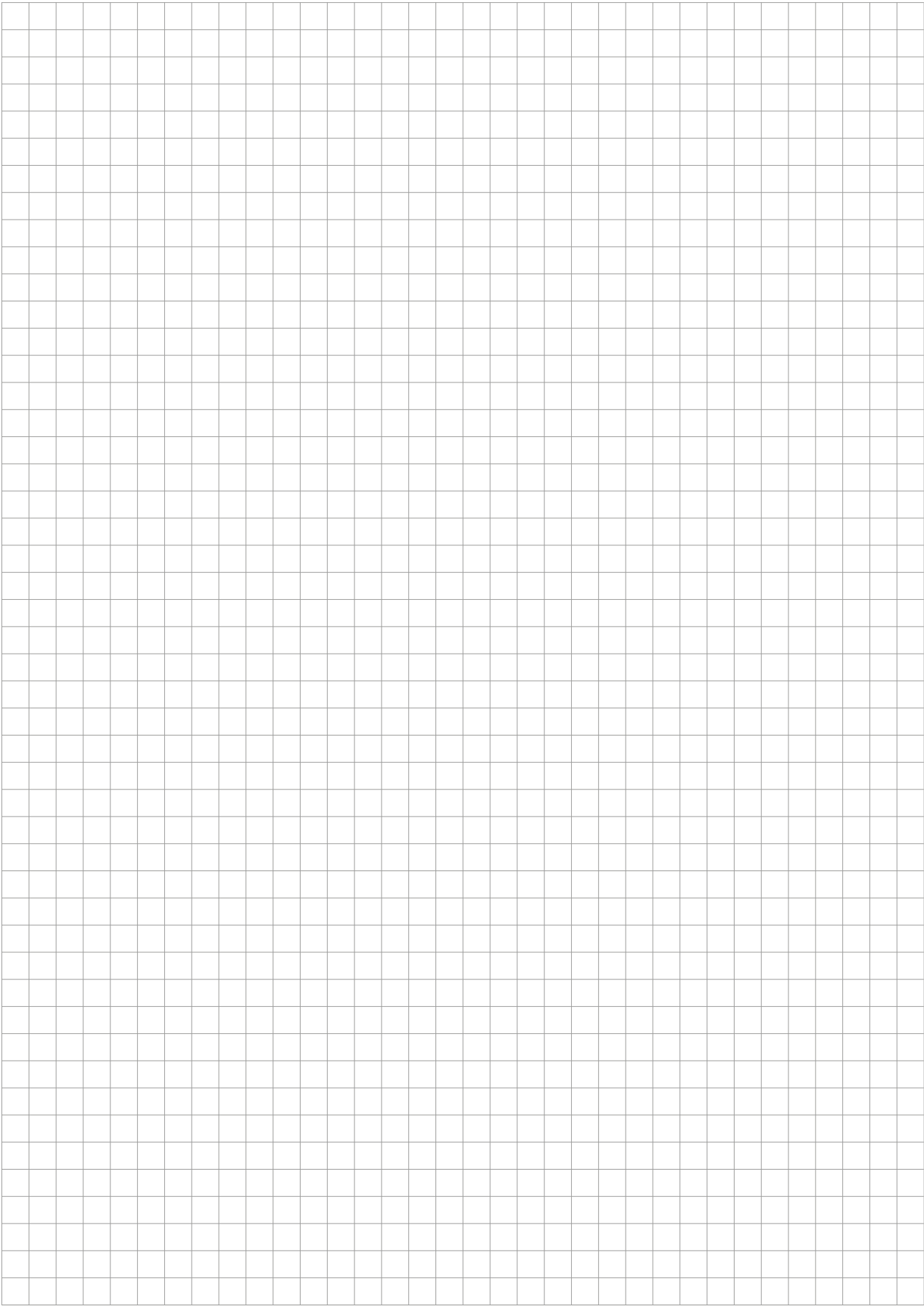


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	AN25	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	- -



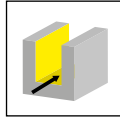
# Nutfräsen (zirkular)

## Groove Milling by circular interpolation

---

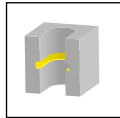
**B**

Frälerschaft  
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**

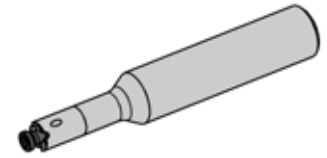
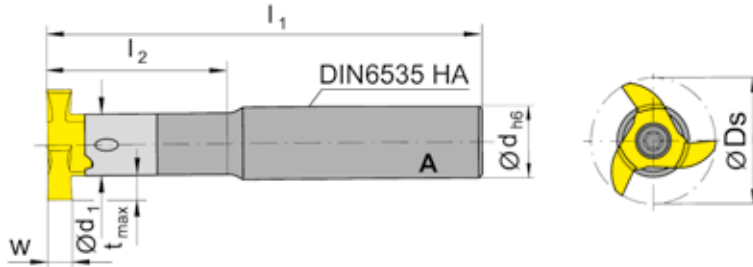
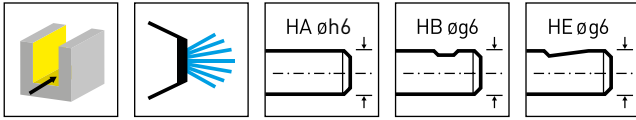


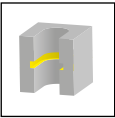
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	335175R
<b>M335.0020.02A</b>	20	130	60	17,5	A	335175R
<b>M335.0020.03A</b>	20	150	80	17,5	A	335175R
<b>M335.0020.01B</b>	20	100	40	17,5	B	335175R
<b>M335.0020.02B</b>	20	130	60	17,5	B	335175R
<b>M335.0020.02E</b>	20	130	60	17,5	E	335175R

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
M335...	<b>6.17T25P</b>	<b>T25PQ</b>



z3

B

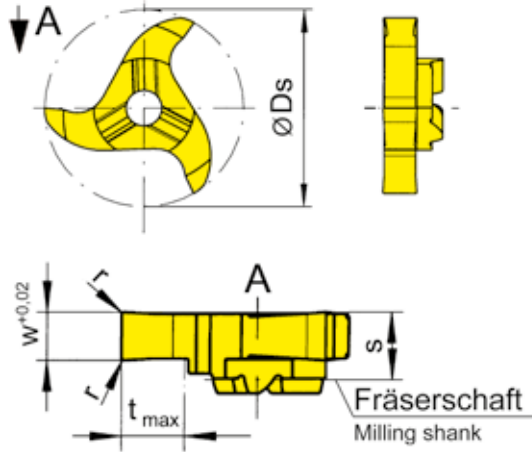


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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:**

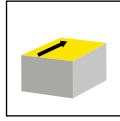
Schneidplatten mit 8,0 - 15,0 mm Breite nur als Formplatten, abhängig vom zu zerspanenden Werkstoff, lieferbar!

**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.

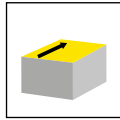
P	●	●
M	●	●
K	●	●
N	○	●
S	●	●
H	-	-

Frälerschaft  
Milling shank  
M620



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Schneidplatte  
Insert  
620



Seite/Page  
207-208

# M620



**Fräser mit wechselbarer  
Schneidplatte**

Schneidkreis Ø 21,7 mm

**Milling shank with  
exchangeable insert**

Cutting edge Ø 21,7 mm

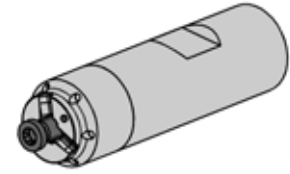
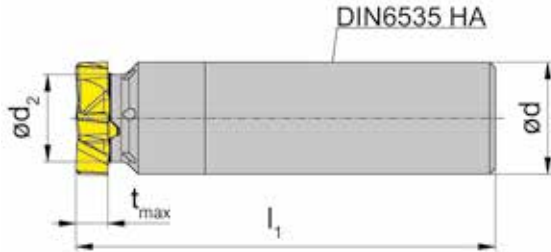
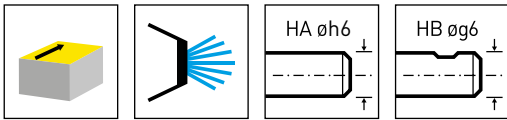
# Fräuserschaft

Milling shank

# M620



**B**



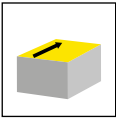
Bestellnummer Part number	Ds	d	l <sub>1</sub>	d <sub>2</sub>	Form	HWS
<b>M620.0020.D.00A</b>	21,7	20	75	15,6	A	620156R
<b>M620.0020.D.00B</b>	21,7	20	75	15,6	B	620156R
<b>M620.0020.D.04A</b>	21,7	20	130	15,6	A	620156R
<b>M620.0020.D.04B</b>	21,7	20	130	15,6	B	620156R

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

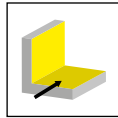
## Ersatzteile

Spare Parts

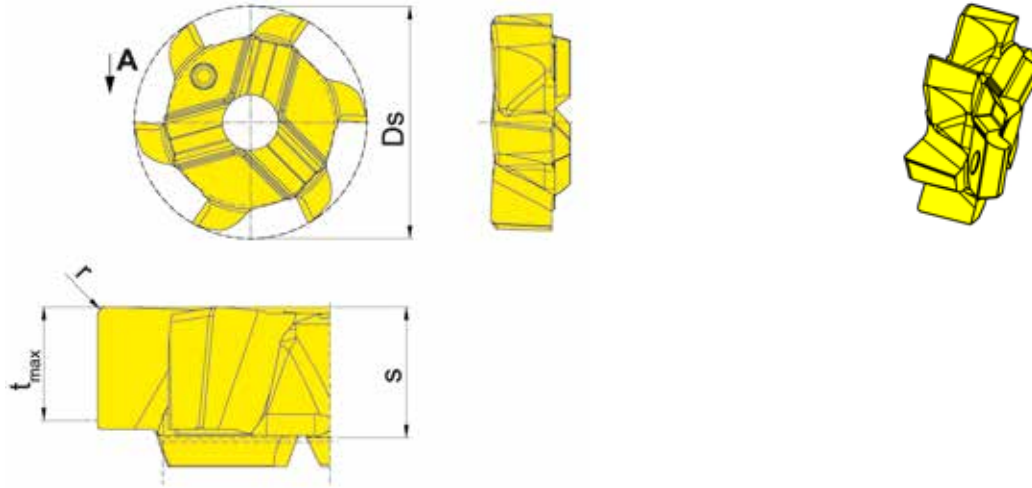
Fräuserschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M620...	<b>5.14T20P</b>	<b>T20PQ</b>



z6



B



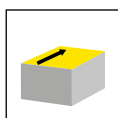
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

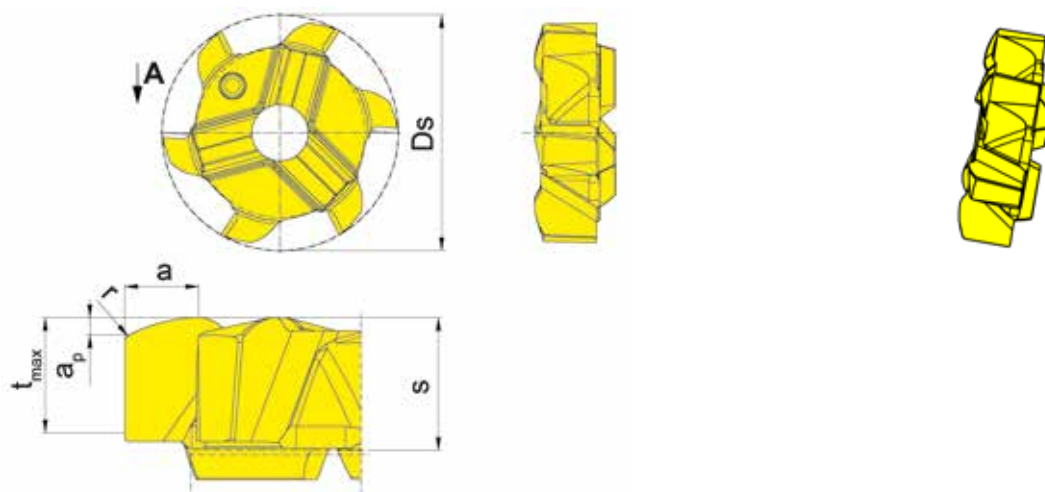
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Ds	Z	r	t <sub>max</sub>	s	HIS	AS/45
620.PL53.64	21,7	6	0,4	5,3	6,1	620156R	▲
							P ●
							M ●
							K ●
							N ○
							S ●
							H -

B



z6



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	D <sub>s</sub>	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> = Programmierradius theoretical corner radius r <sub>th</sub> = programming radius	max. Abweichung max. difference
1°	1,15 mm	0,43 mm



**M275**



**C**

**Nutfräser**

ab Schneidkreis  $\varnothing$  31 mm

**Groove milling cutter**

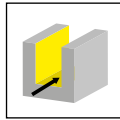
from cutting edge  $\varnothing$  31 mm

# Nutfräsen (zirkular)

## Groove Milling by circular interpolation

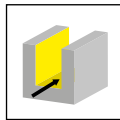
C

Schaftfräser  
End Mill  
M275



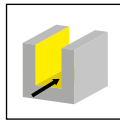
Seite/Page  
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Einschraubfräser  
Screw-in cutter  
M275



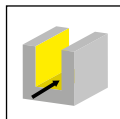
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Aufsteckfräser  
Arbour Mounted Cutter  
M275



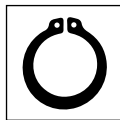
Seite/Page  
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Scheibenfräser  
Disc Milling Cutter  
M275

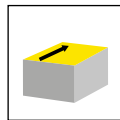


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Wendeschneidplatte  
Indexable insert  
S275/RS275



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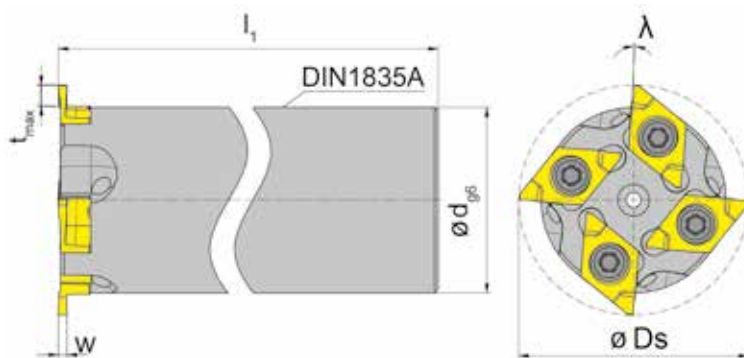
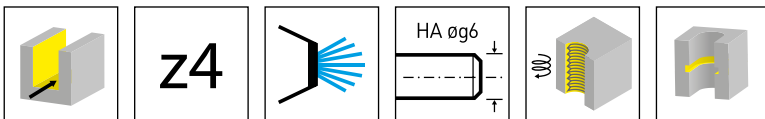


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

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>



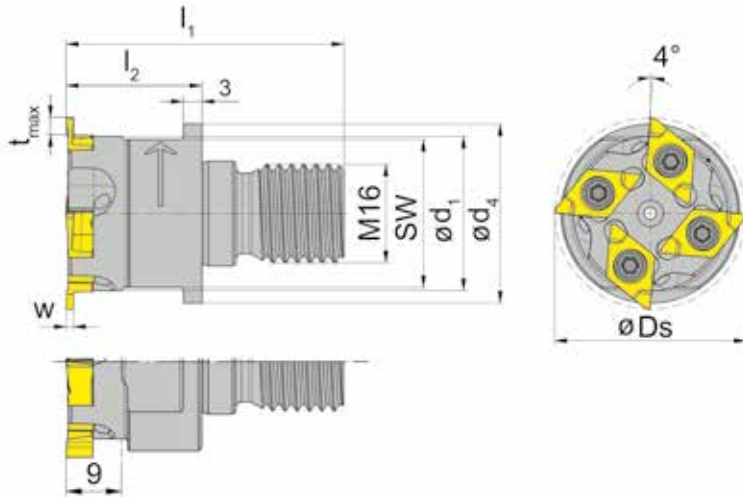
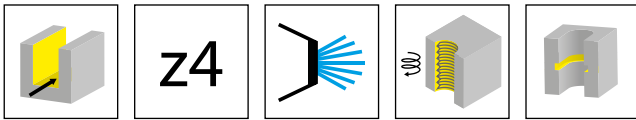


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
M275.036.M16.1.04	4	36	45	22	30	29	27	275041R

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

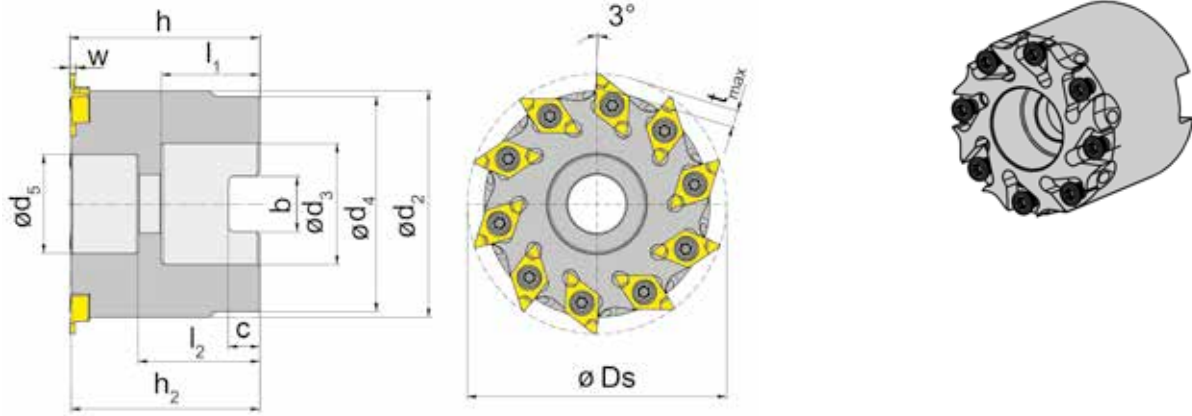
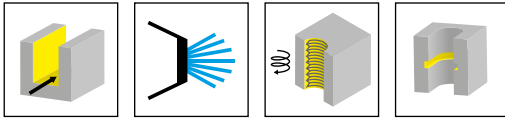


Abbildung = rechtsschneidend  
Picture = right hand cutting version

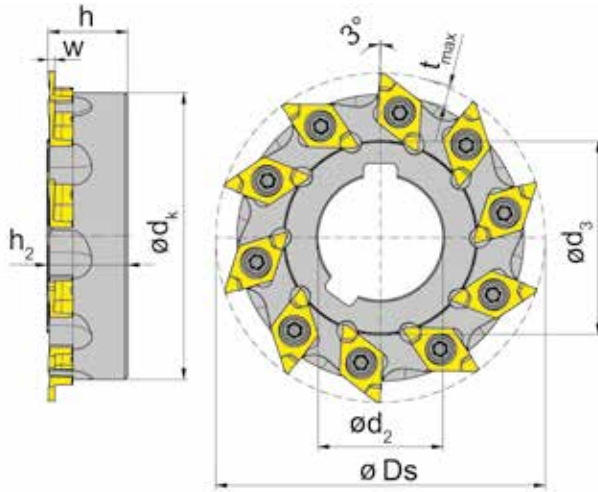
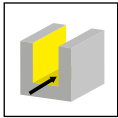
Bestellnummer Part number	Z	Ds	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>4</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	HWS
<b>M275.0038.A16.05</b>	5	38	32,7	33	13,5	32	16	18	22,7	8,4	5,6	32	275041R
<b>M275.0048.A22.08</b>	8	48	36,7	37	18,5	40,5	22	20	24,7	10,4	6,3	40,5	275041R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

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

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



R = rechtsschneidend, wie gezeichnet  
R = right hand cutting version shown

L = linksschneidend  
L = left hand cutting version

Bestellnummer Part number	Z	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>k</sub>	h <sub>2</sub>	h	HWS
RM275.0058.S22.10	10	58	22	34	50,5	14,2	14	275041R
RM275.0098.S32.16	16	98	32	48	90,5	20,2	20	275041R
LM275.0058.S22.10	10	58	22	34	50,5	14,2	14	275041L
LM275.0078.S27.14	14	78	27	43	70,5	16,2	16	275041L
LM275.0098.S32.16	16	98	32	48	90,5	20,2	20	275041L

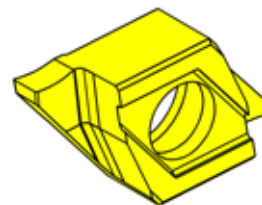
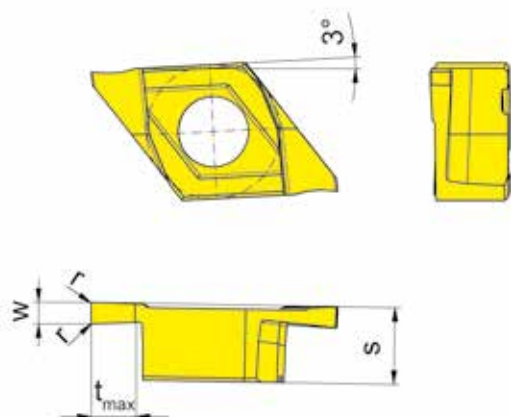
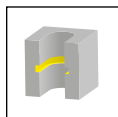
w und tmax siehe WSP  
w and tmax see inserts

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
R/LM275.0...	3.5.10T10P	T10PL



R = rechts wie gezeichnet  
R = right hand version shown

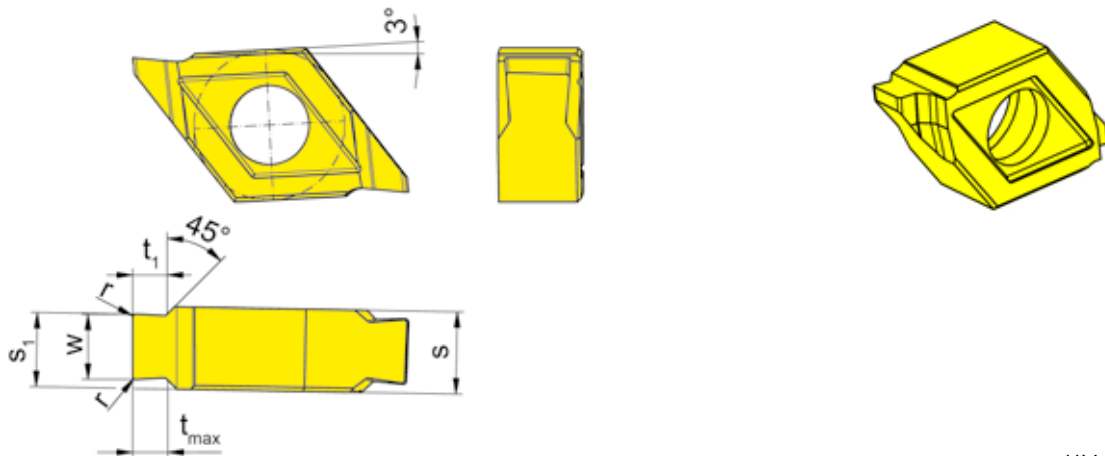
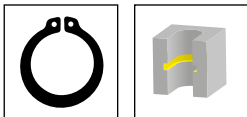
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	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	▲
RS275.0160.00	1,6	1,7	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
LS275.0160.00	1,6	1,7	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
						P ●	
						M ●	
						K ●	
						N ○	
						S ●	
						H -	





R = rechts wie gezeichnet  
R = right hand version shown

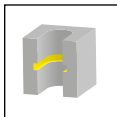
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

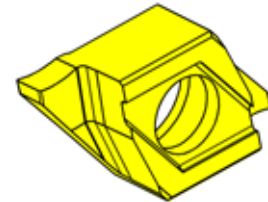
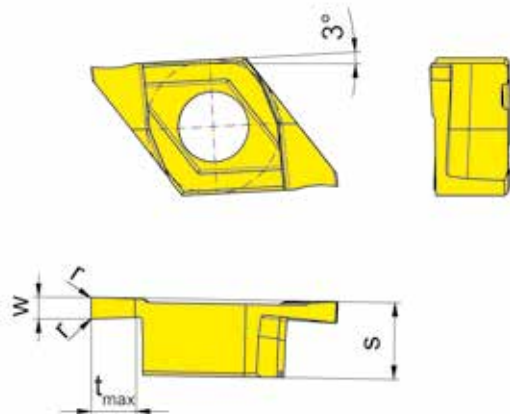
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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	▲
LS275.3118.41	3,15	3,25	1,7	4,1	3,7	0,15	1,75	275041L	Δ
									P ●
									M ●
									K ●
									N ○
									S ●
									H -





.40



R = rechts wie gezeichnet  
R = right hand version shown

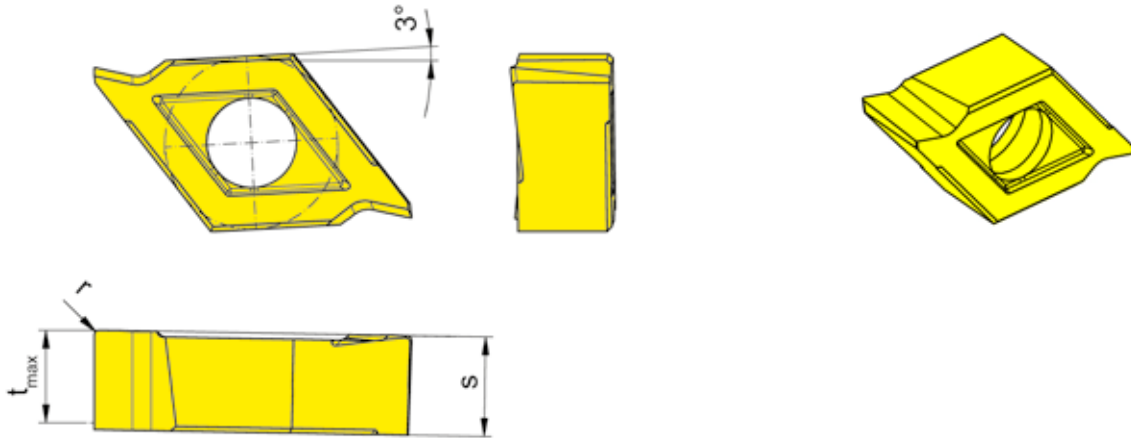
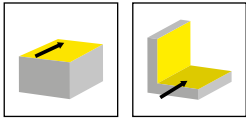
L = links spiegelbildlich  
L = left hand version

▲ 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
RS275.0110.40	1,1	1,2	4,3	0,1	2,5	275043R	Δ
RS275.0130.40	1,3	1,4	4,3	0,1	2,5	275043R	▲
RS275.0185.40	1,85	1,95	4,3	0,15	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
LS275.0110.40	1,1	1,2	4,3	0,1	2,5	275043L	Δ
LS275.0130.40	1,3	1,4	4,3	0,1	2,5	275043L	Δ
LS275.0160.40	1,6	1,7	4,3	0,1	2,5	275043L	Δ
LS275.0185.40	1,85	1,95	4,3	0,15	2,5	275043L	Δ
LS275.0215.40	2,15	2,25	4,3	0,15	2,5	275043L	Δ
LS275.0265.40	2,65	2,75	4,3	0,15	2,5	275043L	Δ
LS275.0315.40	3,15	3,25	4,3	0,15	2,5	275043L	Δ
P	●						
M	●						
K	●						
N	●						
S	●						
H	-						

C



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
RS275.PL40.62	0,15	4	4,3	275043R		▲
RS275.PL43.52	0,2	4	4,3	275043R	▲	
					P ● ●	
					M ● ●	
					K ● ●	
					N ○ ●	
					S ● ●	
					H - -	

## M380/M381



D

**Fräuserschaft**  
**Aufsteckfräser**  
**Monoblockfräser**  
**Scheibenfräser**

ab Bohrung  $\varnothing$  45 mm

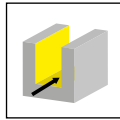
**Milling Shank**  
**Arbor Mounted Cutter**  
**Mono Milling Cutter**  
**Disc Milling Cutter**

from bore  $\varnothing$  45 mm

# Nutfräsen (zirkular)

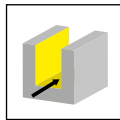
## Groove Milling by circular interpolation

Schaftfräser  
End Mill  
380



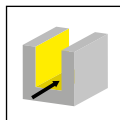
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Aufsteckfräser  
Arbour Mounted Cutter  
380/380...IK

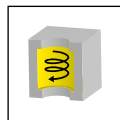


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Monoblockfräser  
Mono Milling Cutter  
HSK380/ABS..380

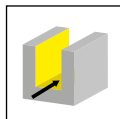


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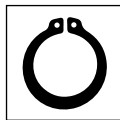
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Scheibenfräser  
Disc Milling Cutter  
381



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Wendeschneidplatte  
Indexable insert  
314



Seite/Page  
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D

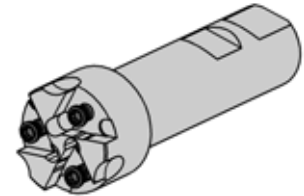
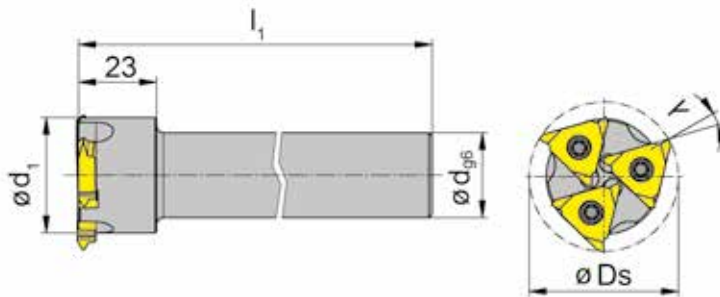
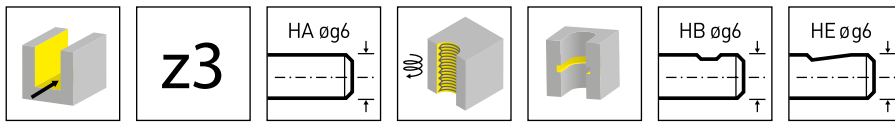


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	d <sub>1</sub>	λ	Form	HWS
<b>380.0044.03A</b>	3	44	25	125	34	14°	A	314027R • 314041R • 314052R
<b>380.0044.03B</b>	3	44	25	125	34	14°	B	314027R • 314041R • 314052R
<b>380.0044.03E</b>	3	44	25	125	34	14°	E	314027R • 314041R • 314052R

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

### Ersatzteile

Spare Parts

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

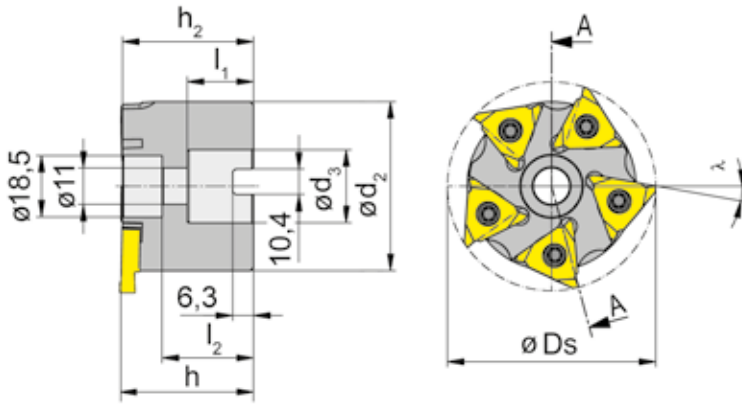
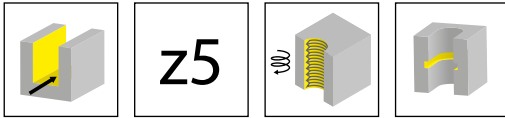


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>380.0063.05</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

**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>

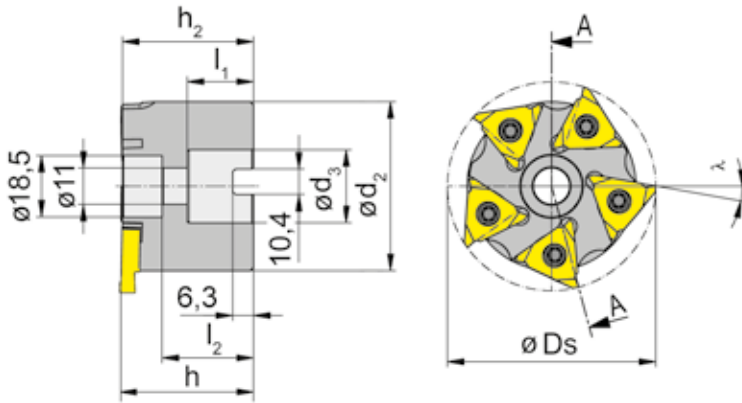
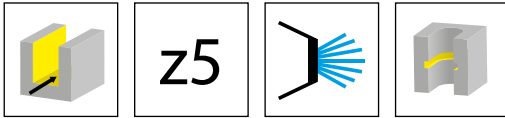


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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 arbor is not combined with milling cutter - separate 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>



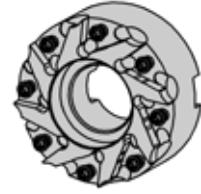
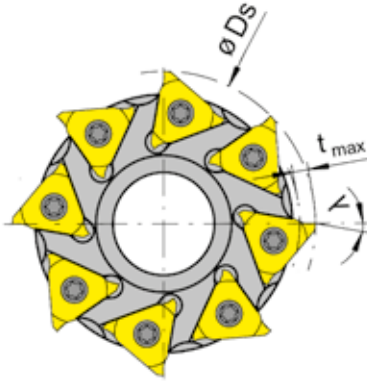
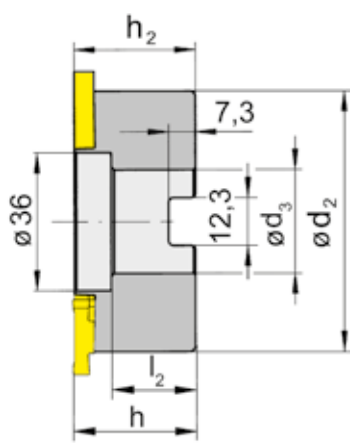
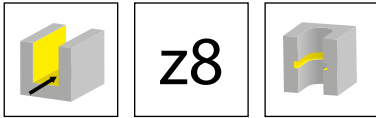


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>



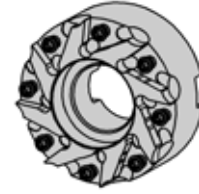
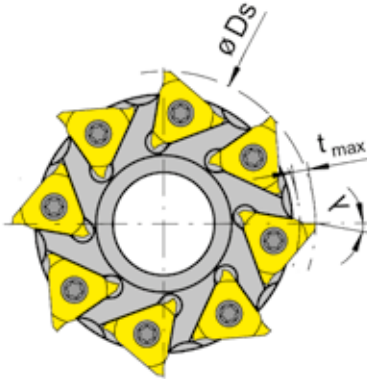
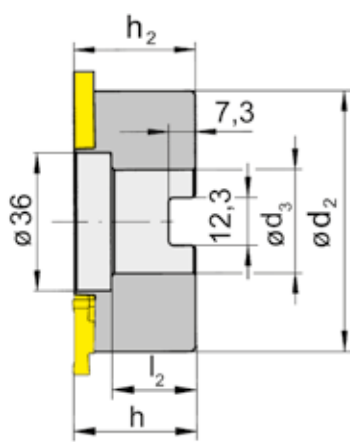
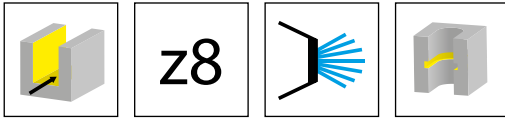


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>



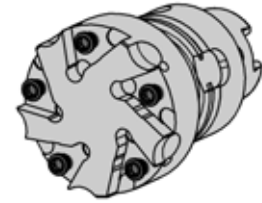
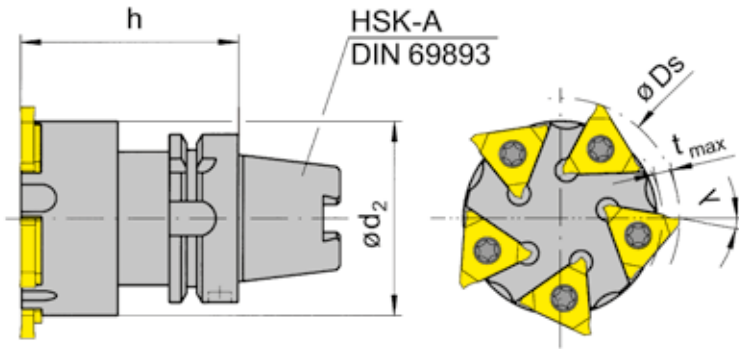
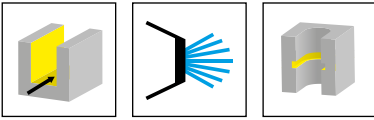


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	$D_s$	Z	$t_{max}$	h	$d_2$	$\lambda$	HWS
<b>HSK32-380.0044.03</b>	44	3	3	55	34	14°	314027R • 314041R • 314052R
<b>HSK40-380.0050.04</b>	50	4	4	55	40	14°	314027R • 314041R • 314052R
<b>HSK40-380.0063.05</b>	63	5	5	55	51	10°	314027R • 314041R • 314052R
<b>HSK50-380.0063.05</b>	63	5	5	65	51	10°	314027R • 314041R • 314052R
<b>HSK50-380.0080.08</b>	80	8	8	65	68	10°	314027R • 314041R • 314052R
<b>HSK63-380.0080.08</b>	80	8	8	70	68	10°	314027R • 314041R • 314052R

**Ersatzteile**

Spare Parts

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

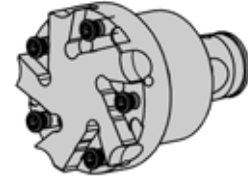
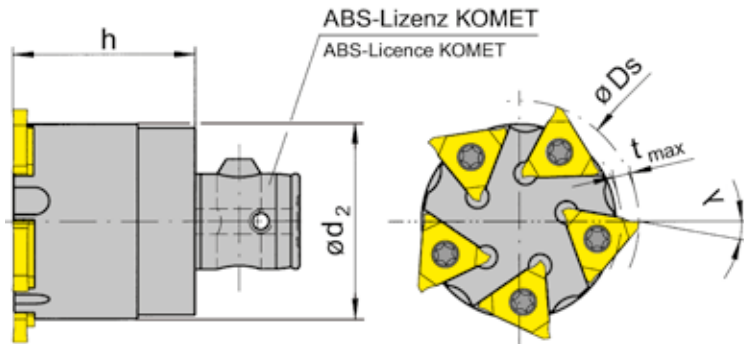
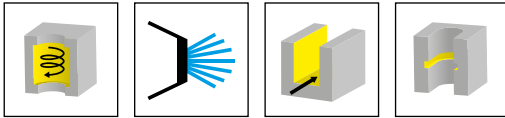


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Ds	Z	λ	HWS
<b>ABS32.380.0044.03</b>	44	3	14°	314027R • 314041R • 314052R
<b>ABS40-380.0050.04</b>	50	4	14°	314027R • 314041R • 314052R
<b>ABS50.380.0063.05</b>	63	5	10°	314027R • 314041R • 314052R
<b>ABS50.380.0080.08</b>	80	8	10°	314027R • 314041R • 314052R
<b>ABS63.380.0080.08</b>	80	8	10°	314027R • 314041R • 314052R

**Ersatzteile**

Spare Parts

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



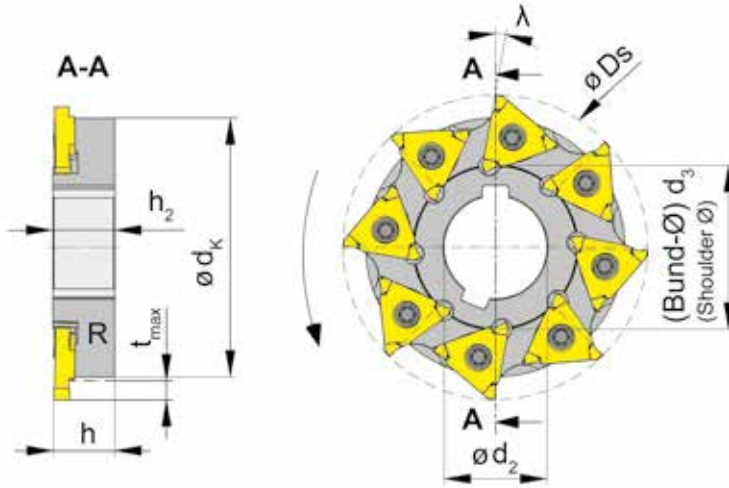
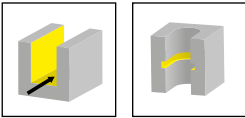


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

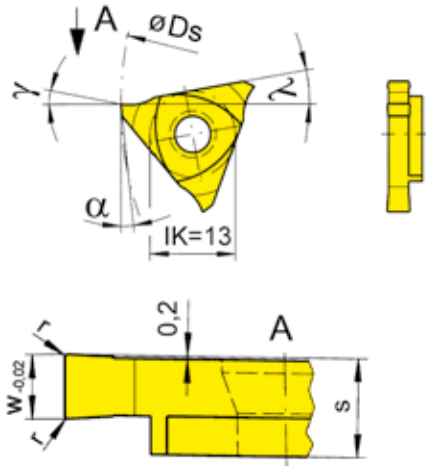
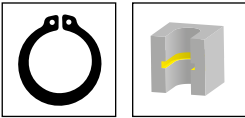
Bohrung (d<sub>2</sub>) mit Längsnut nach DIN 138  
Bore (d<sub>2</sub>) with longitudinal keyway to DIN 138

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>



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

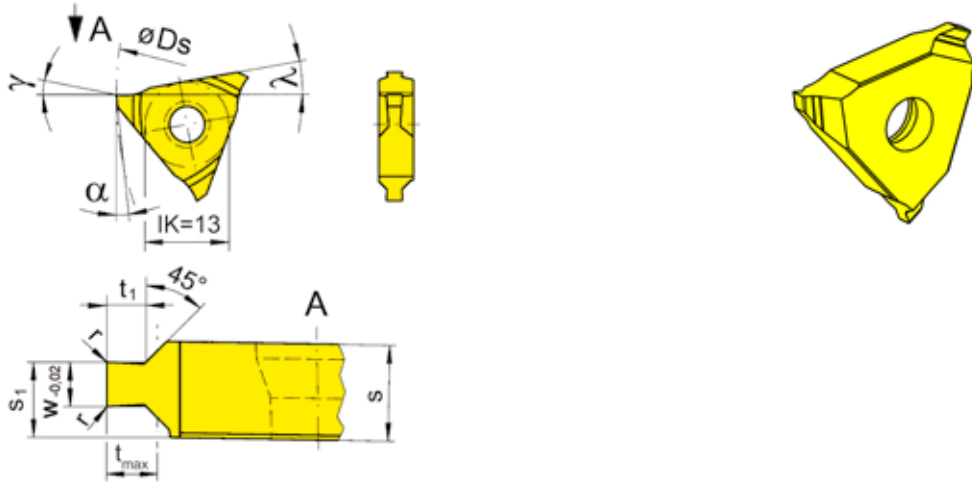
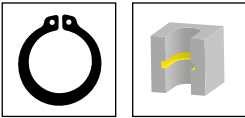
HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	r	s	HIS	MG12	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	△	▲		▲

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

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

P	o	•	•	•
M	-	•	•	•
K	-	•	•	•
N	-	o	•	•
S	-	•	•	•
H	-	-	-	-



D

R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

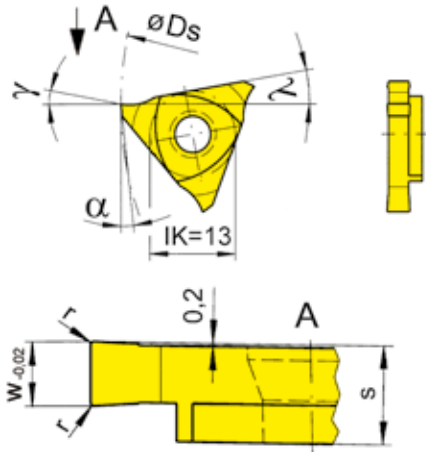
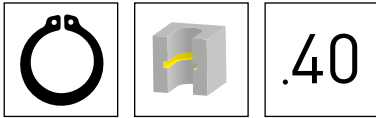
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	r	$s_1$	s	$t_{max}$	$t_1$	HIS	AS45	TN35
R314.1105.54	1,1	1,21	0,1	4,52	5,45	0,5	0,49	314041R		
R314.1307.54	1,3	1,41	0,1	4,62	5,45	0,75	0,67	314041R	Δ	Δ
R314.1308.54	1,3	1,41	0,1	4,62	5,45	0,85	0,83	314041R		
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	▲	▲
L314.1105.54	1,1	1,21	0,1	4,52	5,45	0,5	0,49	314041L		Δ
L314.1307.54	1,3	1,41	0,1	4,62	5,45	0,75	0,67	314041L		Δ
L314.1308.54	1,3	1,41	0,1	4,62	5,45	0,85	0,83	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

Geometrie in Abhängigkeit des Einlegewinkel  $\lambda$   
Geometrie 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  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Nw	w	r	s	HIS	MG12	TI25	TN35
R314.0130.40	1,3	1,41	0,1	5,4	314027R	△	△	△
R314.0160.40	1,6	1,71	0,1	5,4	314027R	△	△	△
R314.0185.40	1,85	1,96	0,15	5,4	314027R	△	△	△
R314.0215.40	2,15	2,26	0,15	5,4	314027R	△	△	△
R314.0265.40	2,65	2,76	0,15	5,4	314027R	△	△	▲
R314.0315.40	3,15	3,26	0,15	5,4	314027R	△	△	▲
R314.0415.40	4,15	4,26	0,15	5,4	314041R	△	△	▲
R314.0515.40	5,15	5,26	0,15	5,4	314052R	△	▲	▲
L314.0130.40	1,3	1,41	0,1	5,4	314027L	△	△	△
L314.0160.40	1,6	1,71	0,1	5,4	314027L	△	△	△
L314.0185.40	1,85	1,96	0,15	5,4	314027L	△	△	△
L314.0215.40	2,15	2,26	0,15	5,4	314027L	△	△	△
L314.0265.40	2,65	2,76	0,15	5,4	314027L	△	△	△
L314.0315.40	3,15	3,26	0,15	5,4	314027L	△	△	△
L314.0415.40	4,15	4,26	0,15	5,4	314041L	△	△	△
L314.0515.40	5,15	5,26	0,15	5,4	314052L	△	△	△

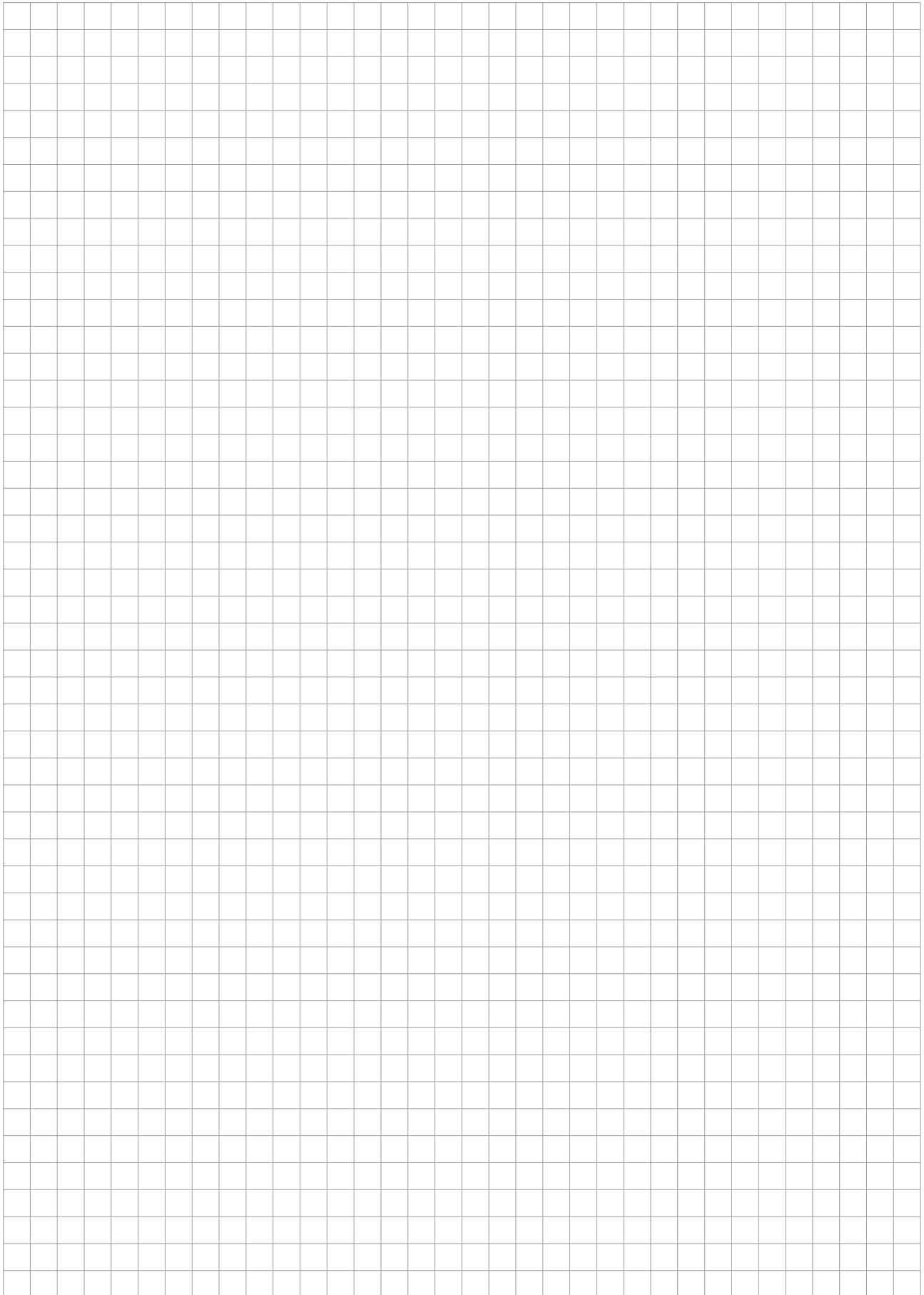
Geometrie in Abhängigkeit des Einlegewinkel  $\lambda$   
Geometrie depending on angle of seating  $\lambda$

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

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

D

D





**M101**



**E**

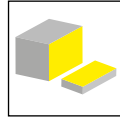
**Nutfräser**

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

**Groove milling cutter**

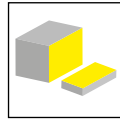
from cutting edge  $\varnothing$  63 mm  
Width of groove 1,2 - 4,6 mm

Nutfräser  
Groove milling cutter  
M101



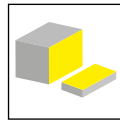
Seite/Page  
235

Scheibenfräser  
Disc Milling Cutter  
M101



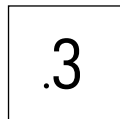
Seite/Page  
236-237

Aufsteckfräser  
Arbour Mounted Cutter  
M101

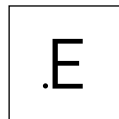


Seite/Page  
238-239

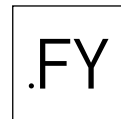
Schneidplatte  
Insert  
S101



Seite/Page  
240, 243



Seite/Page  
241-242



Seite/Page  
244

Technische Hinweise  
Technical Instructions

Seite/Page  
245

E

# Nutfräser

## Groove milling cutter

# M101

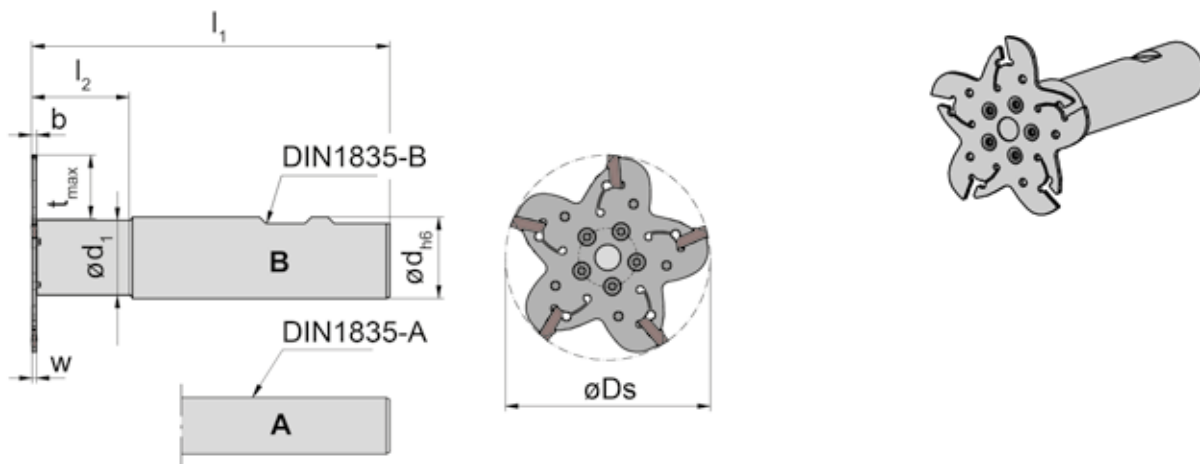
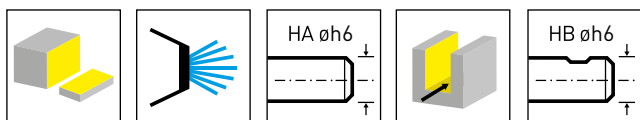


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	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	110	30	23	0,95	19,5	A	1,2-1,2	7500	10112
M101.063.D16.23.2.14A	5	63	110	30	23	1,15	19,5	A	1,4-1,4	7500	10140
M101.063.D16.23.2.16A	5	63	110	30	23	1,3	19,5	A	1,6-1,8	7500	10116
M101.063.D16.23.2.20A	5	63	110,35	30,4	23	1,6	19,5	A	2,0-2,3	7500	10120
M101.063.D20.23.2.12B	5	63	110	30	23	0,95	19,5	B	1,2-1,2	7500	10112
M101.063.D20.23.2.14B	5	63	110	30	23	1,15	19,5	B	1,4-1,4	7500	10140
M101.063.D20.23.2.16B	5	63	110	30	23	1,6	19,5	B	1,6-1,8	7500	10116
M101.063.D20.23.2.20B	5	63	110,35	30,4	23	1,6	19,5	B	2,0-2,3	7500	10120
M101.063.D25.23.2.12B	5	63	110	30	23	0,95	19,5	B	1,2-1,2	7500	10112
M101.063.D25.23.2.16B	5	63	110	30	23	1,3	19,5	B	1,6-1,8	7500	10116
M101.063.D25.23.2.20B	5	63	110	30	23	1,6	19,5	B	2,0-2,3	7500	10120

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

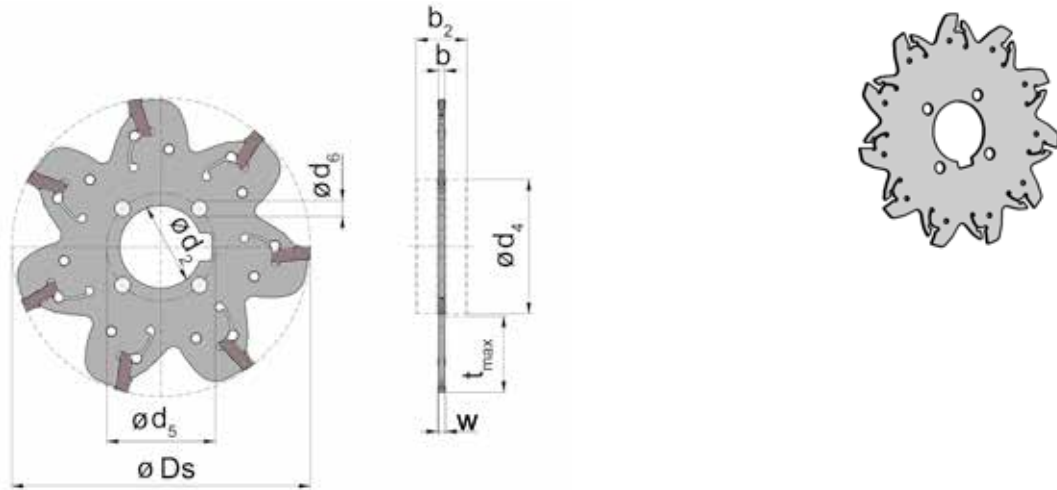
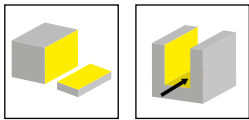


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
<b>M101.0080.22.12</b>	7	80	20	0,95	22	13	36	4,25	29	1,2-1,2	6000	10112
<b>M101.0080.22.14</b>	7	80	20	1,15	22	13,1	36	4,25	29	1,4-1,4	6000	10140
<b>M101.0080.22.16</b>	7	80	20	1,3	22	13,3	36	4,25	29	1,6-1,8	6000	10116
<b>M101.0100.22.16</b>	9	100	30	1,3	22	13,3	36	4,25	29	1,6-1,8	5000	10116
<b>M101.0125.32.16</b>	11	125	33	1,3	32	21,3	55	6,25	45	1,6-1,8	4000	10116
<b>M101.0080.22.20</b>	7	80	20	1,6	22	13,6	36	4,25	29	2,0-2,3	6000	10120
<b>M101.0100.22.20</b>	9	100	30	1,6	22	13,6	36	4,25	29	2,0-2,3	5000	10120
<b>M101.0125.32.20</b>	11	125	33	1,6	32	21,6	55	6,25	45	2,0-2,3	4000	10120

Der Schlüssel **P101.01** und die **Mitnehmerringsätze** gehören nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.01 and the driving collar sets are 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>

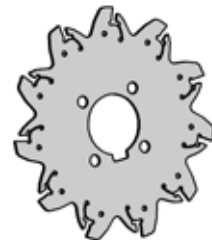
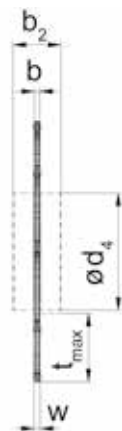
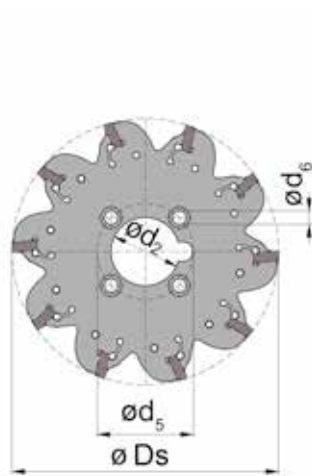
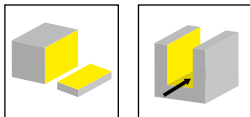


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Der Schlüssel **P101.02** und die **Mitnehmerringsätze** gehören nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.02 and the driving collar sets are 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>

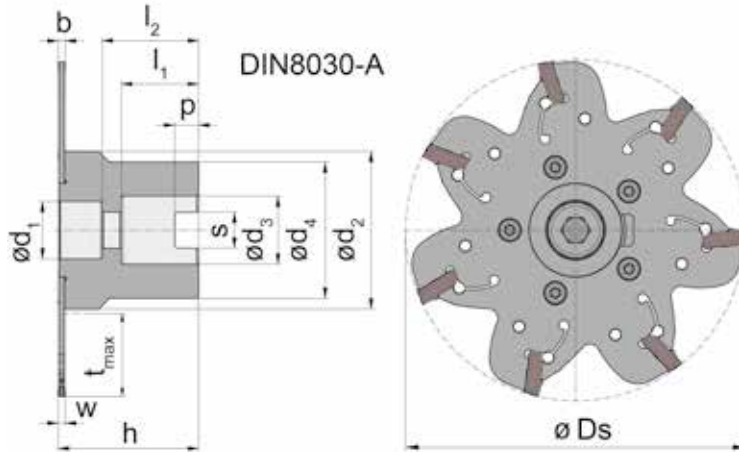
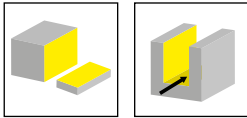


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	t <sub>max</sub>	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	10140
<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

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>

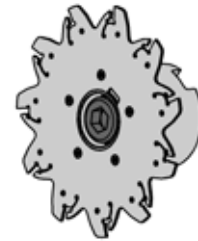
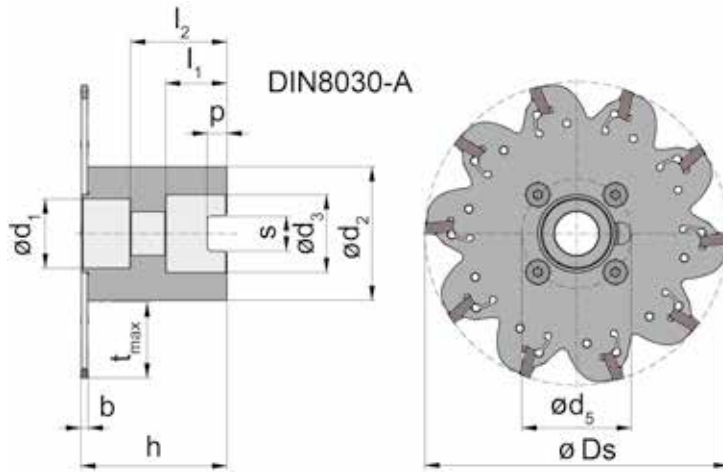
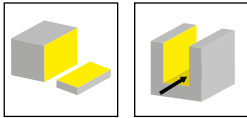


Abbildung = rechtsschneidend  
Picture = right hand cutting version

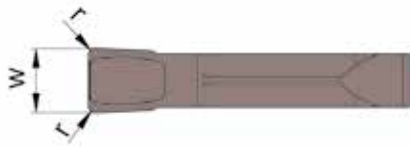
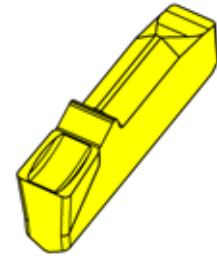
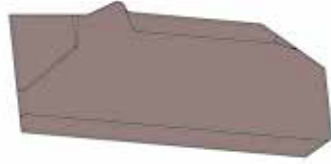
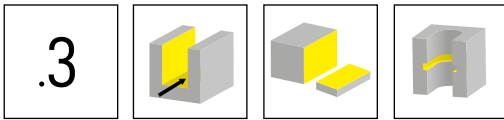
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	b	d <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	s	P	d <sub>2</sub>	d <sub>3</sub>	n <sub>max</sub>	Schneidbreite Width of groove	HWS
<b>M101.0080.A22.30</b>	6	80	19	37	2,4	18,5	20	24,7	10,4	6,3	22	22	5000	2,8-3,4	10130
<b>M101.0100.A22.30</b>	8	100	29	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

Der Schlüssel P101.02 gehört nicht zum Lieferumfang des Fräasers. Bitte separat bestellen!  
Wrench P101.02 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>030.3543.T8P</b>	<b>M101.0080.28.30</b>	<b>T15PQ</b>
M101.0100.A22...	<b>030.3543.T8P</b>		<b>T15PQ</b>
M101.0125.A32...	<b>030.3543.T8P</b>		<b>T20PQ</b>
M101....	<b>030.3543.T8P</b>		
M101.0080.A22.40		<b>M101.0080.28.40</b>	<b>T15PQ</b>



E

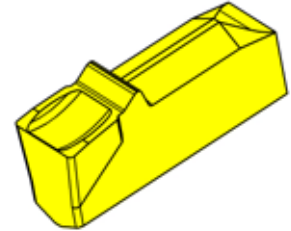
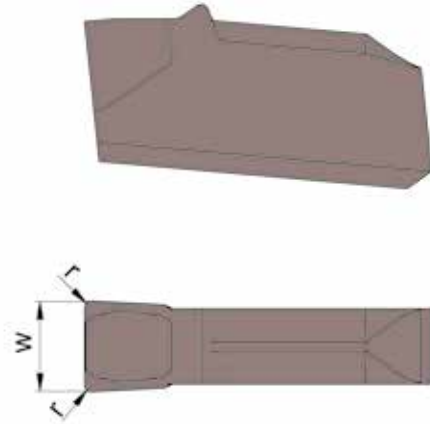
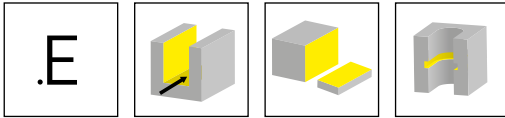
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	HIS	AS45	IG35
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S101.0140.315	1,4	0,15	10140	▲	▲
S101.0160.315	1,6	0,15	10116	▲	▲
S101.0200.320	2	0,2	10120	▲	▲
S101.0250.320	2,5	0,2	10125	Δ	Δ
				P ● -	
				M ● ●	
				K ● -	
				N ○ -	
				S ● ●	
				H - -	



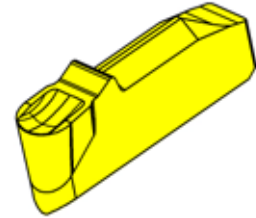
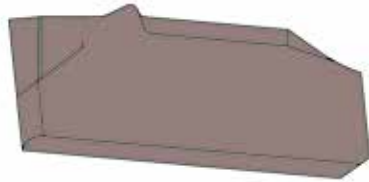
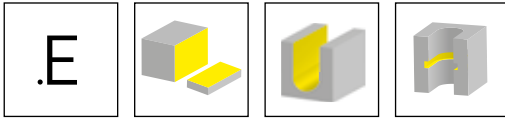


HM-Sorten  
Carbide grades

▲ 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

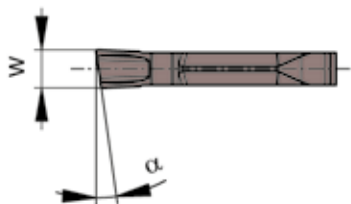
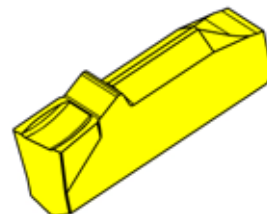
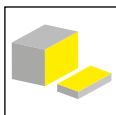
HM-Sorten  
Carbide grades

▲ 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 -

.3



R = rechts wie gezeichnet  
R = right hand version shown

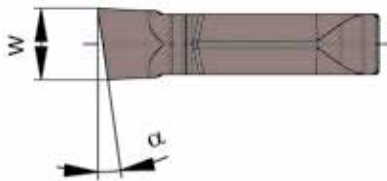
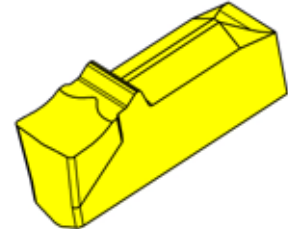
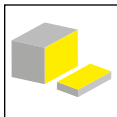
L = links spiegelbildlich  
L = left hand version

▲ 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°	10125	▲		▲
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°	10125	▲		▲
P	●	●	-			
M	●	○	●			
K	●	○	-			
N	○	-	-			
S	●	-	●			
H	-	-	-			

E



E

R = rechts wie gezeichnet  
R = right hand version shown

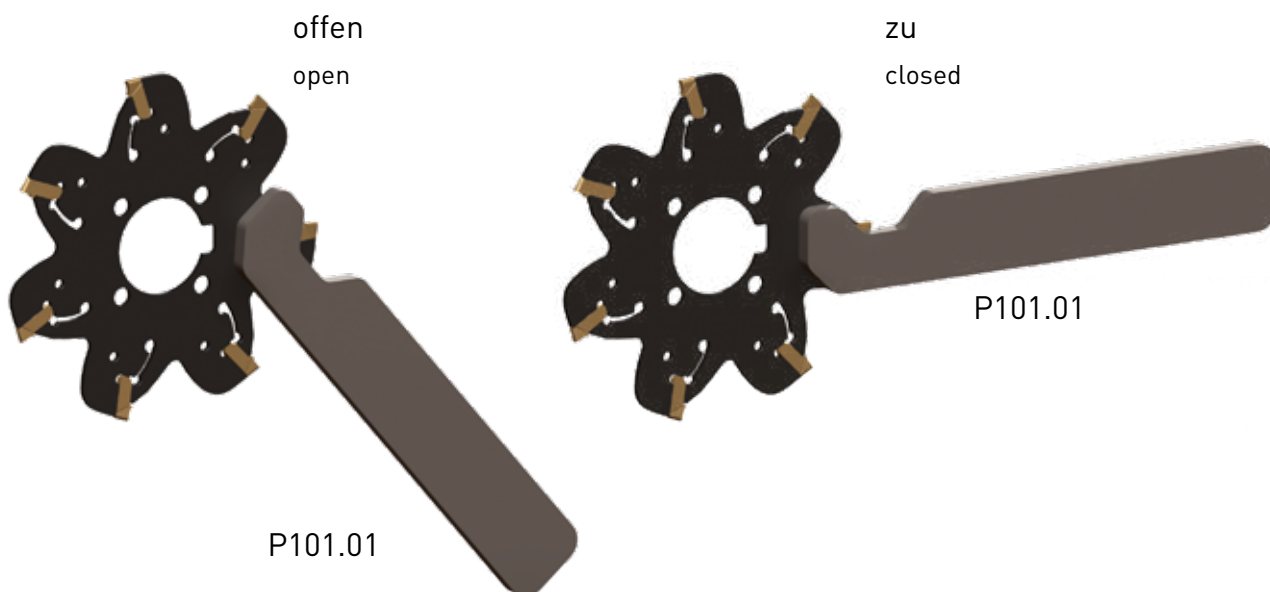
L = links spiegelbildlich  
L = left hand version

▲ 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

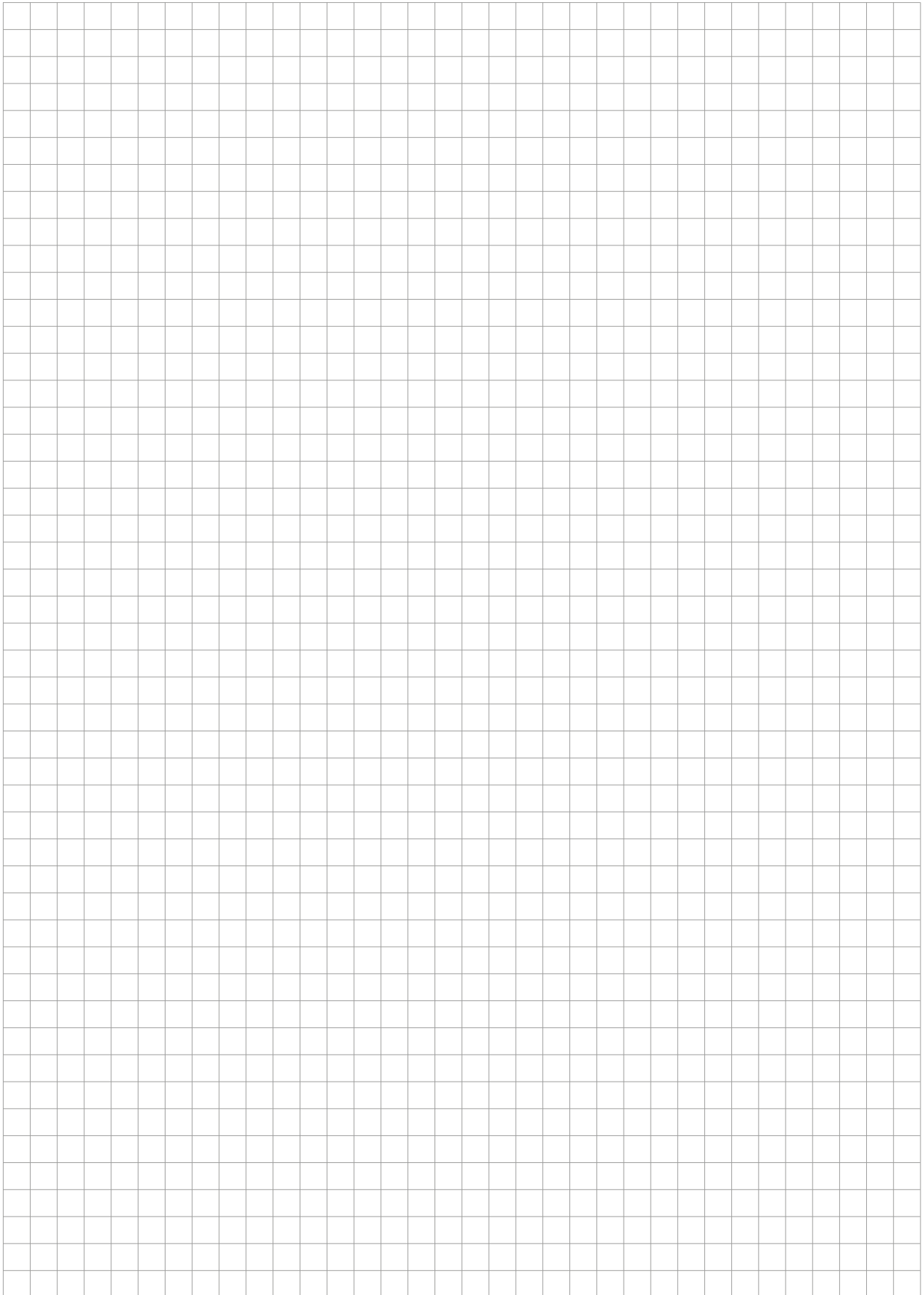
Use only conventional milling to avoid chip jamming.  
 After changing inserts, reduce the feed rate by 50% until an initial depth of cut of 0.5 - 1 mm is reached

**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

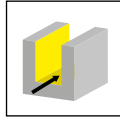
**382/383**

**248**

**M310**

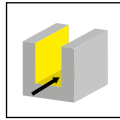
**262**

Scheibenfräser  
Disc Milling Cutter  
382



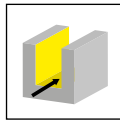
Seite/Page  
250-253

Aufsteckfräser  
Arbor Mounted Cutter  
383



Seite/Page  
254-256

Wendeschneidplatte  
Indexable insert  
314



Seite/Page  
257



Seite/Page  
258-260

F



**382/383**



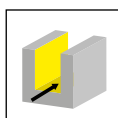
**F**

**Scheibenfräser**  
**Aufsteckfräser**

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

**Disc Milling Cutter**  
**Arbor Mounted Cutter**

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



**Z8**

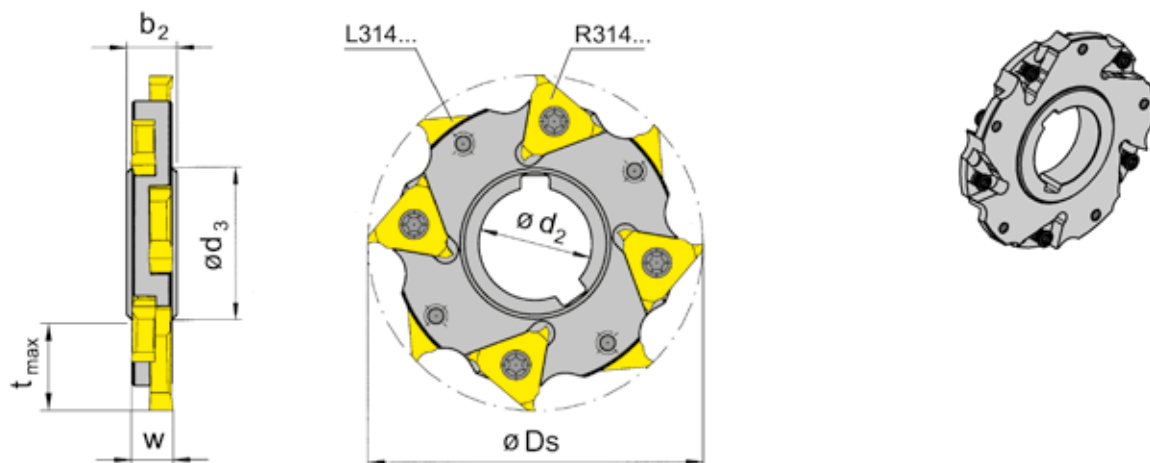


Abbildung = rechtsschneidend  
Picture = right hand cutting version

**F**

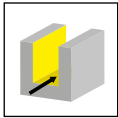
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>382.0080.27.06</b>	8	80	21	27	10	36	6	4x R314....	4x L314...	314027R • 314027L
<b>382.0080.27.08</b>	8	80	21	27	12	36	8	4x R314....	4x L314...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

Bohrung (d<sub>2</sub>) mit Längsnut nach DIN 138  
Bore (d<sub>2</sub>) 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	<b>5F.06T15P</b>	<b>T15PQ</b>
382.0080.27.08	<b>5F.08T20P</b>	<b>T20PQ</b>
382.0080.27.10	<b>5.10T20P</b>	<b>T20PQ</b>



**z10**

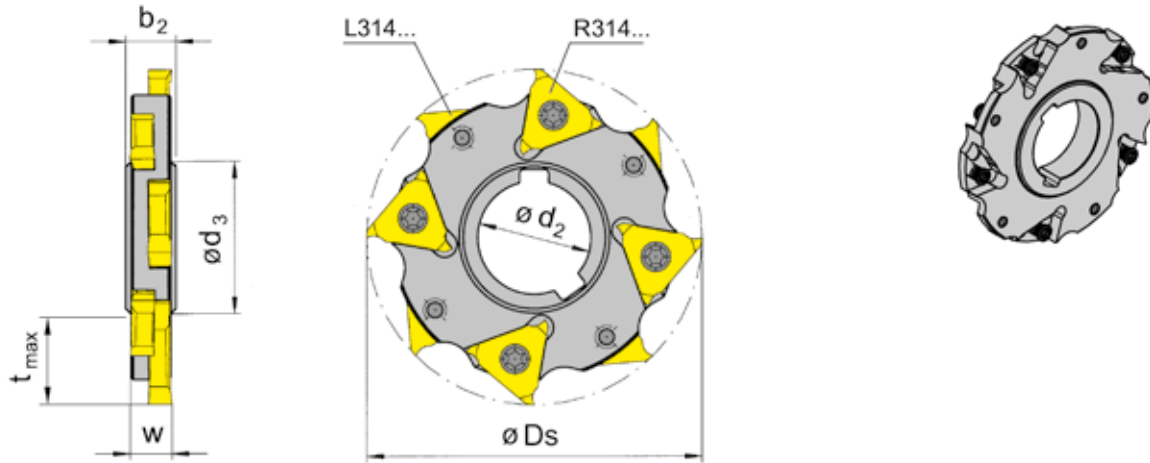


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>	10	100	25,5	32	10	47	6	5x R314...	5x L314...	314027R • 314027L
<b>382.0100.32.08</b>	10	100	25,5	32	12	47	8	5x R314...	5x L314...	314041R • 314041L
<b>382.0100.32.10</b>	10	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>



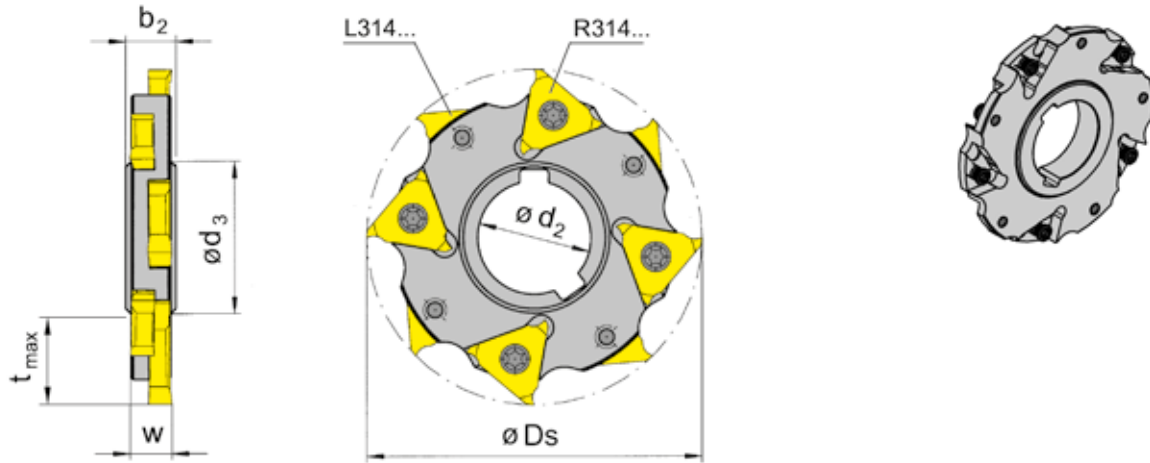
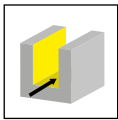


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

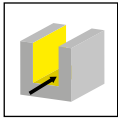
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
382.0125.40.06	12	125	32,5	40	10	58	6	6x R314...	6x L314...	314027R • 314027L
382.0125.40.08	12	125	32,5	40	12	58	8	6x R314...	6x L314...	314041R • 314041L
382.0125.40.10	12	125	32,5	40	14	58	10	6x R314...	6x L314...	314052R • 314052L
382.0160.40.06	16	160	50	40	10	58	6	8x R314...	8x L314...	314027R • 314027L
382.0160.40.08	16	160	50	40	12	58	8	8x R314...	8x L314...	314041R • 314041L
382.0160.40.10	16	160	50	40	14	58	10	8x R314...	8x L314...	314052R • 314052L
382.0160.40.12	15	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



**z18**

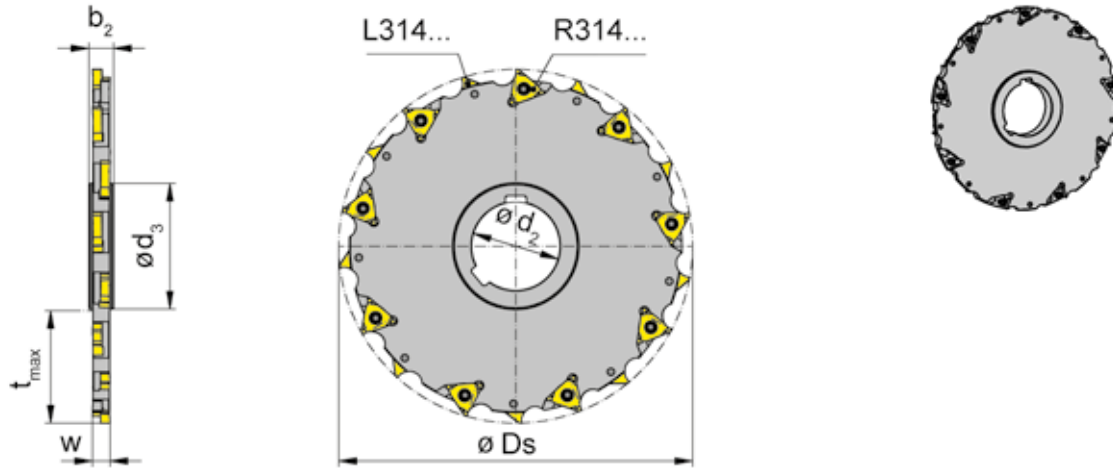


Abbildung = rechtsschneidend  
Picture = right hand cutting version

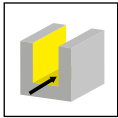
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>382.0200.50.06</b>	18	200	63,5	50	10	71	6	9x R314...	9x L314...	314027R • 314027L
<b>382.0200.50.08</b>	18	200	63,5	50	12	71	8	9x R314...	9x L314...	314041R • 314041L
<b>382.0200.50.10</b>	18	200	63,5	50	14	71	10	9x R314...	9x L314...	314052R • 314052L
<b>382.0200.50.12</b>	18	200	63,5	50	14	71	12	2x6 R314...	6x L314...	314052R • 314052L
<b>382.0200.50.14</b>	18	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	<b>5F.06T15P</b>	<b>T15PQ</b>
382.0200.50.08	<b>5F.08T20P</b>	<b>T20PQ</b>
382.0200.50....	<b>5.10T20P</b>	<b>T20PQ</b>





**z10**

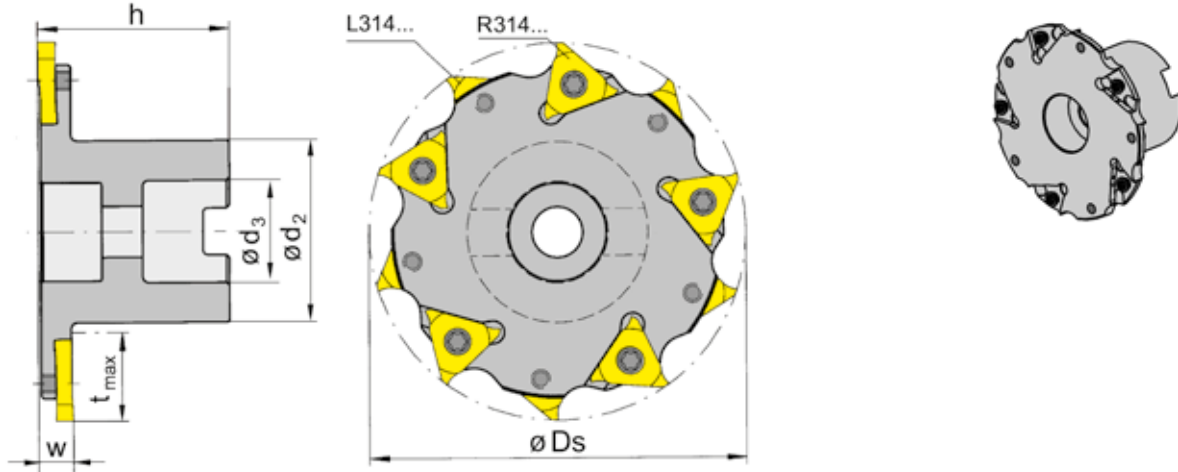


Abbildung = rechtsschneidend  
Picture = right hand cutting version

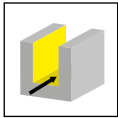
**F**

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>	10	100	25	50	48	27	6	5x R314...	5x L314...	314027R • 314027L
<b>383.0100.27.08</b>	10	100	25	50	48	27	8	5x R314...	5x L314...	314041R • 314041L
<b>383.0100.27.10</b>	10	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 Arbor 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>



**z12**

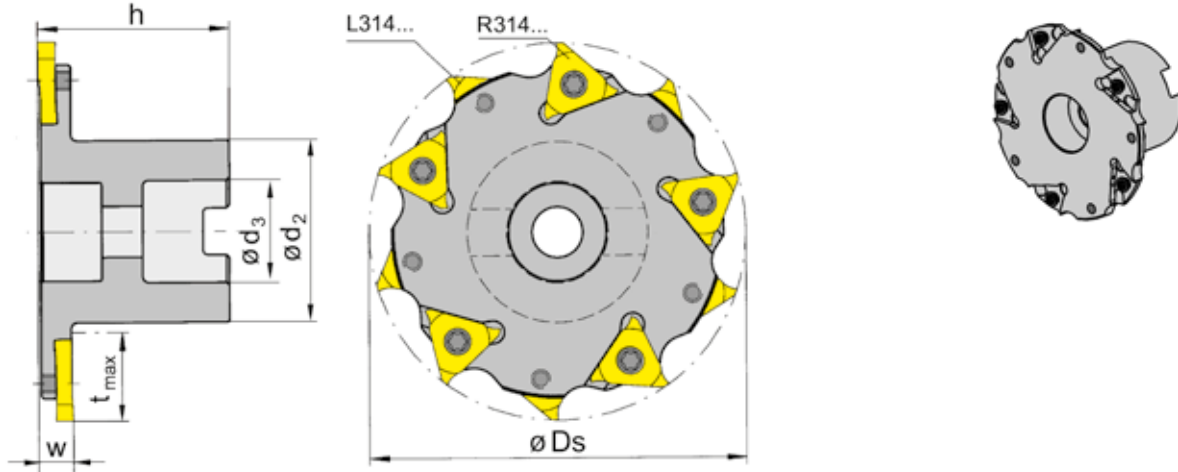


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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 Arbor 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>



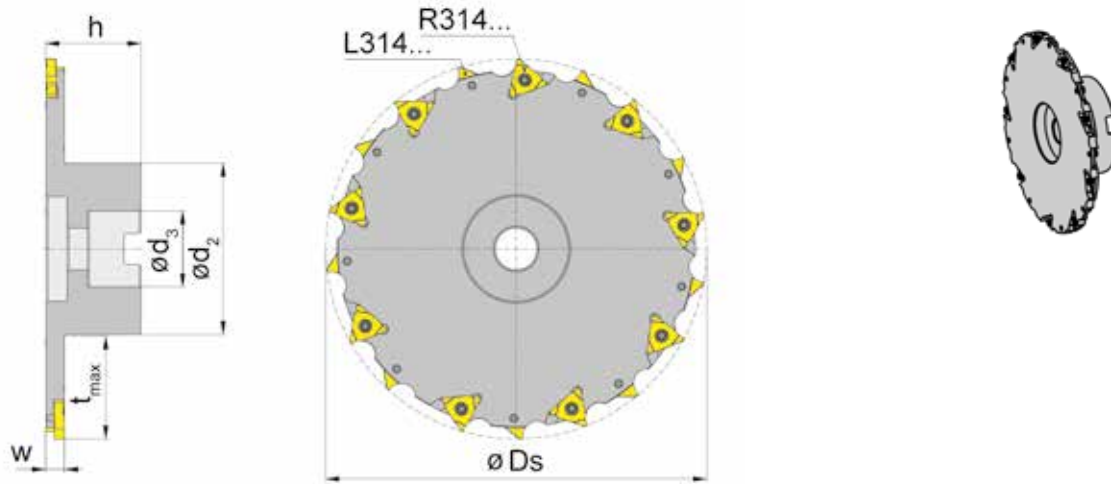
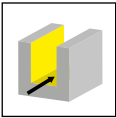


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	16	160	44	60	70	40	6	8x R314...	8x L314...	314027R • 314027L
383.0160.40.08	16	160	44	60	70	40	8	8x R314...	8x L314...	314041R • 314041L
383.0200.40.06	18	200	54	50	90	40	6	9x R314...	9x L314...	314027R • 314027L
383.0200.40.08	18	200	54	50	90	40	8	9x R314...	9x L314...	314041R • 314041L
383.0200.40.10	18	200	54	50	90	40	10	9x R314...	9x L314...	314052R • 314052L
383.0200.40.12	18	200	54	50	90	40	12	2x6 R314...	6x L314...	314052R • 314052L

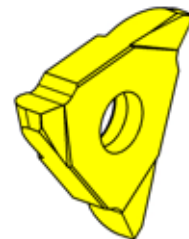
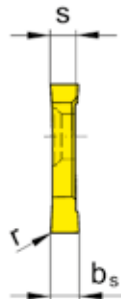
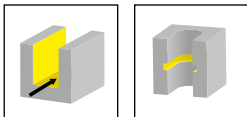
Bohrung (d3) mit Quernut nach DIN 138  
Bore (d3) with cross keyway to DIN 138

## Ersatzteile

Spare Parts

Aufsteckfräser Arbor Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
383.0160..06	5F.06T15P	T15PQ
383.0160..08	5F.08T20P	T20PQ
383.0200...	5.10T20P	T20PQ





R = rechts wie gezeichnet  
R = right hand version shown

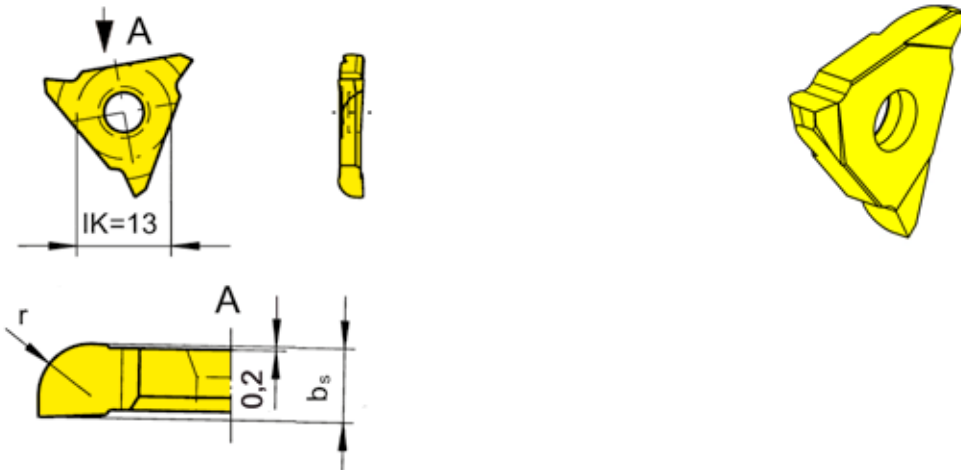
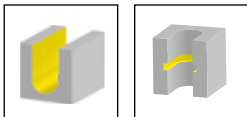
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	b <sub>s</sub>	r	s	HIS	AS45	TI25	TN35
<b>R314.6032.00</b>	6	3,2	0,2	2,7	314052R	▲	▲	▲
<b>R314.8043.00</b>	8	4,3	0,2	4,1	314052R	▲	▲	▲
<b>R314.0054.00</b>	14	5,4	0,2	5,2	314052R	▲	▲	▲
<b>L314.6032.00</b>	6	3,2	0,2	2,7	314052L	▲	▲	▲
<b>L314.8043.00</b>	8	4,3	0,2	4,1	314052L	▲	▲	▲
<b>L314.0054.00</b>	14	5,4	0,2	5,2	314052L	▲	▲	▲
<b>N314.0056.00</b>	-	5,6	0,2	5,2	314052N	▲	▲	▲
<b>Hinweis:</b>						<b>P</b>	●	●
Standard-WSP <b>N314.0056.00</b> für Verwendung in Sonderbauförmern.						<b>M</b>	●	●
<b>Note:</b>						<b>K</b>	●	●
Standard insert N314.0056.00 for use with special cutters.						<b>N</b>	o	●
						<b>S</b>	●	●
						<b>H</b>	-	-





R = rechts wie gezeichnet  
R = right hand version shown

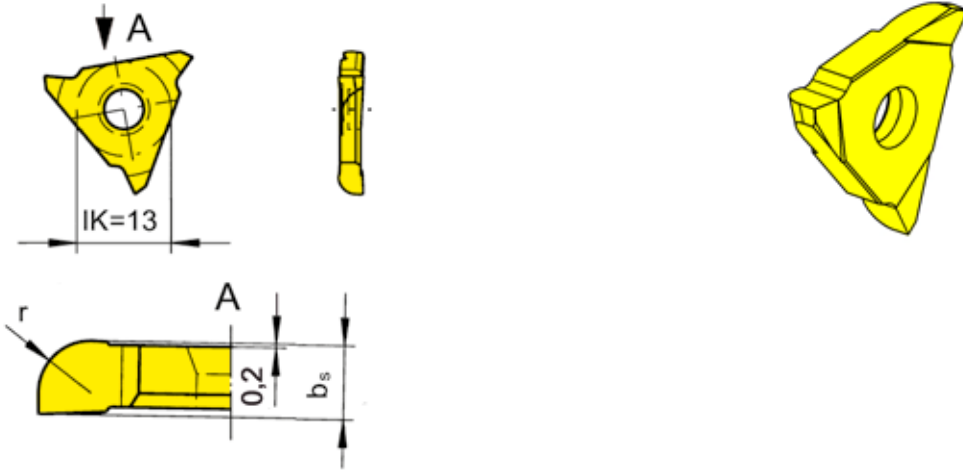
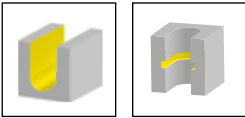
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

F

Bestellnummer Part number	w	b <sub>s</sub>	r	HIS	AS45	TI25
R314.0320.20	6	3,2	2	314027R	▲	▲
R314.0430.20	8	4,3	2	314041R	▲	▲
R314.0430.25	8	4,3	2,5	314041R	▲	▲
R314.0540.20	10	5,43	2	314052R	▲	▲
R314.0540.25	10	5,44	2,5	314052R	▲	▲
R314.0540.40	10	5,47	4	314052R	▲	▲
L314.0320.20	6	3,2	2	314027L	▲	▲
L314.0430.20	8	4,3	2	314041L	▲	▲
L314.0430.25	8	4,3	2,5	314041L	▲	▲
L314.0540.20	10	5,43	2	314052L	▲	▲
L314.0540.25	10	5,44	2,5	314052L	▲	▲
L314.0540.40	10	5,47	4	314052L	▲	▲
					P ● ●	
					M ● ●	
					K ● ●	
					N ○ ●	
					S ● ●	
					H - -	



R = rechts wie gezeichnet  
R = right hand version shown

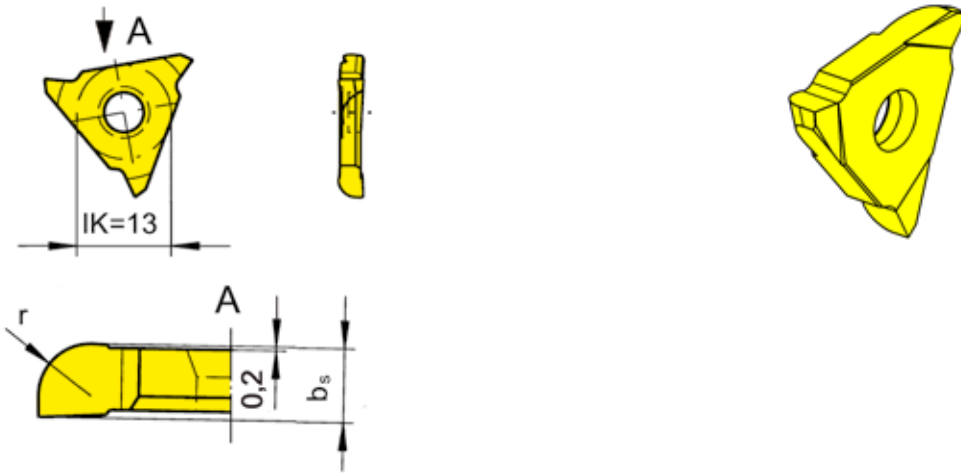
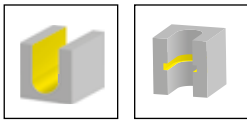
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	b <sub>s</sub>	r	HIS	AS45	TI25
R314.0320.04	6	3,2	0,4	314027R	Δ	
R314.0320.05	6	3,2	0,5	314027R	▲	
R314.0320.10	6	3,2	1	314027R	Δ	
R314.0320.15	6	3,2	1,5	314027R	▲	
R314.0320.16	6	3,2	1,6	314027R	Δ	
R314.0320.20	6	3,2	2	314027R	▲	▲
R314.0430.04	8	4,3	0,4	314041R	Δ	
R314.0430.05	8	4,3	0,5	314041R	Δ	
R314.0430.10	8	4,3	1	314041R	▲	
R314.0430.15	8	4,3	1,5	314041R	▲	
R314.0430.16	8	4,3	1,6	314041R	Δ	
R314.0430.20	8	4,3	2	314041R	▲	▲
R314.0430.25	8	4,3	2,5	314041R	▲	▲
L314.0320.04	6	3,2	0,4	314027L	Δ	
L314.0320.05	6	3,2	0,5	314027L	▲	
L314.0320.10	6	3,2	1	314027L	Δ	
L314.0320.15	6	3,2	1,5	314027L	▲	
L314.0320.16	6	3,2	1,6	314027L	Δ	
L314.0320.20	6	3,2	2	314027L	▲	▲
L314.0430.04	8	4,3	0,4	314041L	Δ	
L314.0430.05	8	4,3	0,5	314041L	Δ	
L314.0430.10	8	4,3	1	314041L	▲	
L314.0430.15	8	4,3	1,5	314041L	▲	
L314.0430.16	8	4,3	1,6	314041L	Δ	
L314.0430.20	8	4,3	2	314041L	▲	▲
L314.0430.25	8	4,3	2,5	314041L	▲	▲
P	•	•				
M	•	•				
K	•	•				
N	o	•				
S	•	•				
H	-	-				





R = rechts wie gezeichnet  
R = right hand version shown

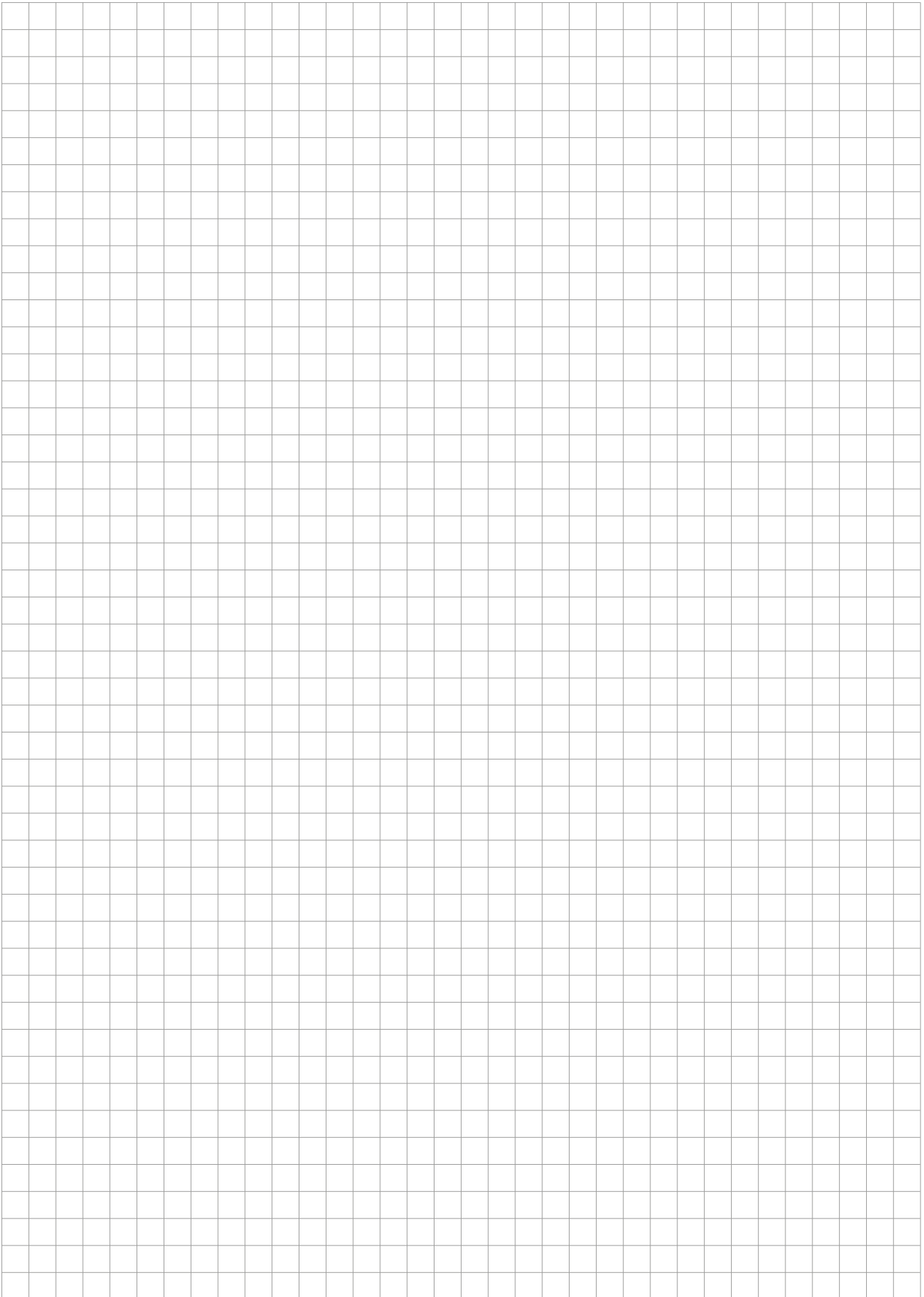
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

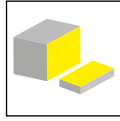
F

Bestellnummer Part number	w	b <sub>s</sub>	r	HIS	AS45	TI25
R314.0540.04	10	5,43	0,4	314052R	Δ	
R314.0540.05	10	5,43	0,5	314052R	Δ	
R314.0540.10	10	5,43	1	314052R	Δ	
R314.0540.15	10	5,43	1,5	314052R	Δ	
R314.0540.16	10	5,43	1,6	314052R	Δ	
R314.0540.20	10	5,43	2	314052R	▲	▲
L314.0540.04	10	5,43	0,4	314052L	Δ	
L314.0540.05	10	5,43	0,5	314052L	Δ	
L314.0540.10	10	5,43	1	314052L	Δ	
L314.0540.15	10	5,43	1,5	314052L	Δ	
L314.0540.16	10	5,43	1,6	314052L	Δ	
L314.0540.20	10	5,43	2	314052L	▲	▲
					P ● ●	
					M ● ●	
					K ● ●	
					N ○ ●	
					S ● ●	
					H - -	



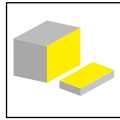
F

Scheibenfräser  
Disc Milling Cutter  
M310



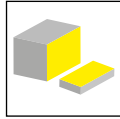
Seite/Page  
264

Einschraubfräser  
Screw-in cutter  
M310



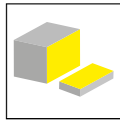
Seite/Page  
265-266

Aufsteckfräser  
Arbor Mounted Cutter  
M310



Seite/Page  
267-270

Wendeschneidplatte  
Indexable insert  
S310



Seite/Page  
271-273

F

# M310



F

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

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

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

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

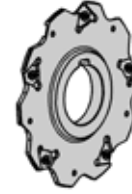
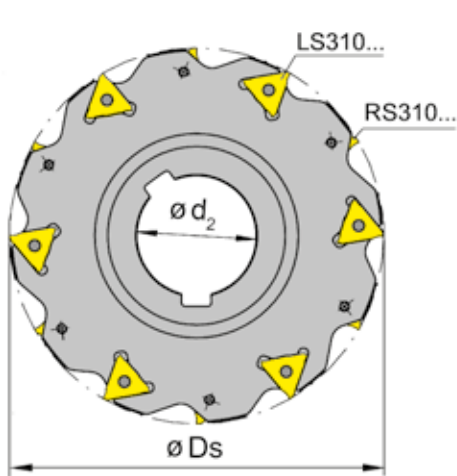
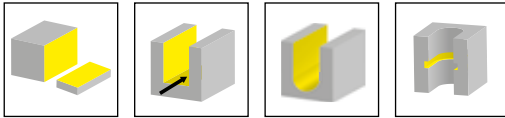


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	8	80	18	27	8	40	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.27.04	8	80	18	27	8	40	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.27.05	8	80	18	27	8	40	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.0100.32.03	10	100	25	32	8	46	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
M310.0100.32.04	10	100	25	32	8	46	4	5x RS310.4023...	5x LS310.4023...	310023R • 310023L
M310.0100.32.05	10	100	25	32	8	46	5	5x RS310.5028...	5x LS310.5028...	310028R • 310028L
M310.0125.40.03	12	125	32	40	10	54	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.0125.40.04	12	125	32	40	10	54	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.0125.40.05	12	125	32	40	10	54	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.0160.40.03	16	160	50	40	10	54	3	8x RS310.3017...	8x LS310.3017...	310017R • 310017L
M310.0160.40.04	16	160	50	40	10	54	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
M310.0160.40.05	16	160	50	40	10	54	5	8x RS310.5028...	8x LS310.5028...	310028R • 310028L
M310.0200.40.04	20	200	70	40	10	54	4	10x RS310.4023...	10x LS310.4023...	310023R • 310023L
M310.0200.40.05	20	200	70	40	10	54	5	10x RS310.5028...	10x LS310.5028...	310028R • 310028L

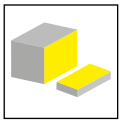
Bohrung (d2) mit Längsnut nach DIN 138  
Bore (d2) with longitudinal keyway to DIN 138

### 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





z6

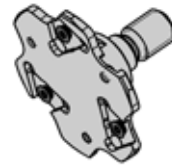
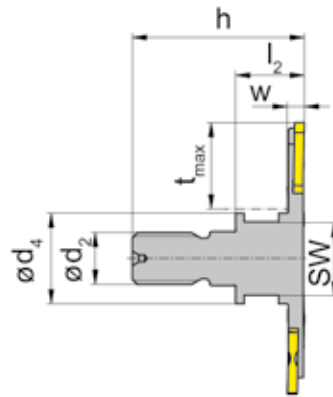
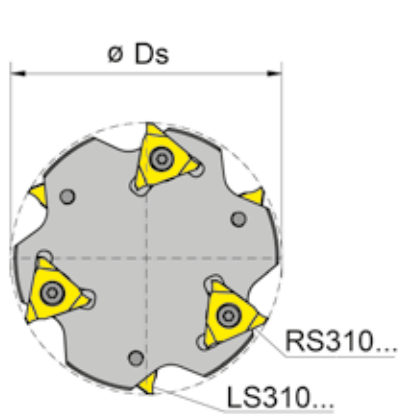


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>	6	50	33	13	M10	18	15	3	15	3x RS310.3017...	3x LS310.3017...	310017R • 310017L	10001
<b>M310.0050.M10.04</b>	6	50	34	14	M10	18	15	4	15	3x RS310.4023...	3x LS310.4023...	310023R • 310023L	10001
<b>M310.0050.M10.05</b>	6	50	35	15	M10	18	15	5	15	3x RS310.5028...	3x LS310.5028...	310028R • 310028L	10001
<b>M310.0063.M12.03</b>	6	63	39	15	M12	21	17	3	20	3x RS310.3017...	3x LS310.3017...	310017R • 310017L	12001
<b>M310.0063.M12.04</b>	6	63	40	16	M12	21	17	4	20	3x RS310.4023...	3x LS310.4023...	310023R • 310023L	12001
<b>M310.0063.M12.05</b>	6	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>

F

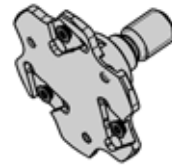
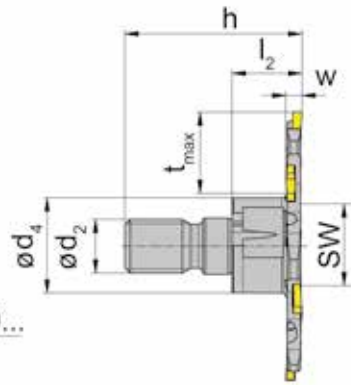
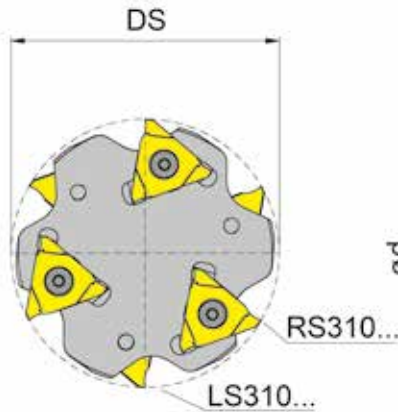
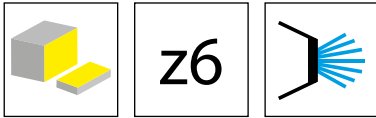


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	6	50	33	13	M10	18	15	3	15	3xRS310.3017..	3xLS310.3017..	310017R • 310017L	10001
M310.0050.M10.04.IK	6	50	34	14	M10	18	15	4	15	3xRS310.4023..	3xLS310.4023..	310023R • 310023L	10001
M310.0050.M10.05.IK	6	50	35	15	M10	18	15	5	15	3xRS310.5028..	3xLS310.5028..	310028R • 310028L	10001
M310.0063.M12.03.IK	6	63	39	15	M12	21	17	3	20	3xRS310.3017..	3xLS310.3017..	310017R • 310017L	12001
M310.0063.M12.04.IK	6	63	40	16	M12	21	17	4	20	3xRS310.4023..	3xLS310.4023..	310023R • 310023L	12001
M310.0063.M12.05.IK	6	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

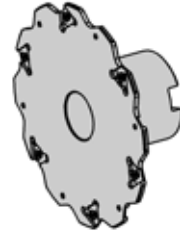
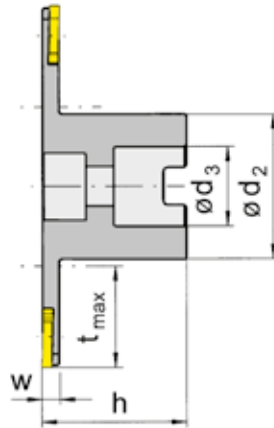
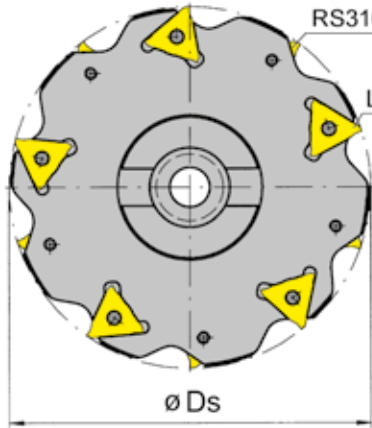


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
<b>M310.0080.22.03</b>	8	80	23	40	33	22	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
<b>M310.1100.27.03</b>	10	100	25	50	48	27	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
<b>M310.1125.27.03</b>	12	125	35,7	50	48	27	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
<b>M310.1125.32.03</b>	12	125	32,5	50	58	32	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
<b>M310.1125.40.03</b>	12	125	26,5	50	70	40	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
<b>M310.1160.40.03</b>	16	160	44	50	70	40	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L

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

**Ersatzteile**  
Spare Parts

<b>Aufsteckfräser</b> Arbor Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M310...	<b>030.0324.T7P</b>	<b>T7PL</b>



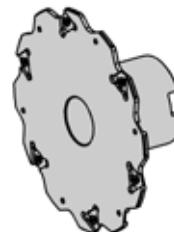
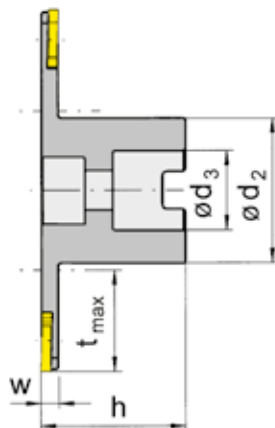
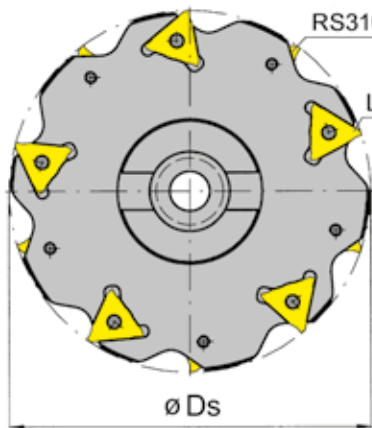


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
M310.0080.22.04	8	80	23	40	33	22	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.22.05	8	80	23	40	33	22	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.1100.27.04	10	100	25	50	48	27	4	5x RS310.4023...	5x LS310.4023...	310023R • 310023L
M310.1100.27.05	10	100	25	50	48	27	5	5x RS310.5028...	5x LS310.5028...	310028R • 310028L
M310.1125.27.04	12	125	37,5	50	48	27	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.32.04	12	125	32	50	56	32	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.40.04	12	125	26,5	50	70	40	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.27.05	12	125	37,5	50	48	27	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1125.32.05	12	125	32,5	50	56	32	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1125.40.05	12	125	26,5	50	70	40	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1160.40.04	16	160	44	50	70	40	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
M310.1160.40.05	16	160	44	50	70	40	5	8x RS310.5028...	8x LS310.5028...	310028R • 310028L
M310.1200.40.04	20	200	64	50	70	40	4	10x RS310.4023...	10x LS310.4023...	310023R • 310023L
M310.1200.40.05	20	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 Arbor Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M310...04	030.3535.T8P	T8PL
M310...05	030.3543.T8P	T8PL

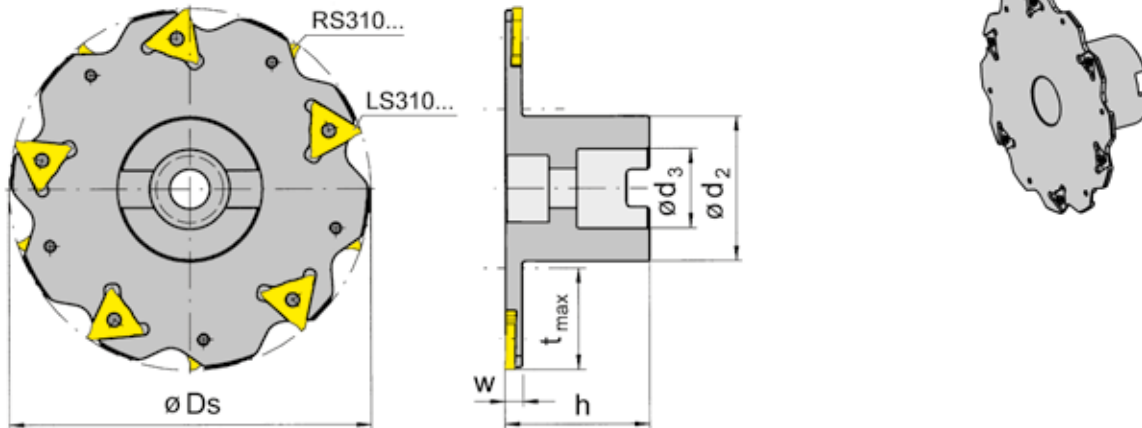
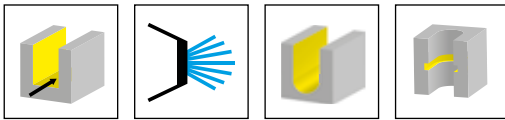


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
M310.0063.16.03.IK	6	63	17,5	35	26	16	3	3x RS310.3017...	3x LS310.3017...	310017R • 310017L
M310.0063.16.04.IK	6	63	17,5	35	26	16	4	3x RS310.4023...	3x LS310.4023...	310023R • 310023L
M310.0063.16.05.IK	6	63	17,5	35	26	16	5	3x RS310.5028...	3x LS310.5028...	310028R • 310028L
M310.0080.16.03.IK	8	80	25	40	28	16	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.16.04.IK	8	80	25	40	28	16	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.16.05.IK	8	80	25	40	28	16	5	4x RS310.5028...	4x LS310.5028...	310028R • 310028L
M310.0080.22.03.IK	8	80	23	40	33	22	3	4x RS310.3017...	4x LS310.3017...	310017R • 310017L
M310.0080.22.04.IK	8	80	23	40	33	22	4	4x RS310.4023...	4x LS310.4023...	310023R • 310023L
M310.0080.22.05.IK	8	80	23	40	33	22	5	4x RS310.5028...	4x RS310.5028...	310028R • 310028L
M310.1100.27.03.IK	10	100	25	50	48	27	3	5x RS310.3017...	5x LS310.3017...	310017R • 310017L
M310.1100.27.04.IK	10	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 Arbor 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



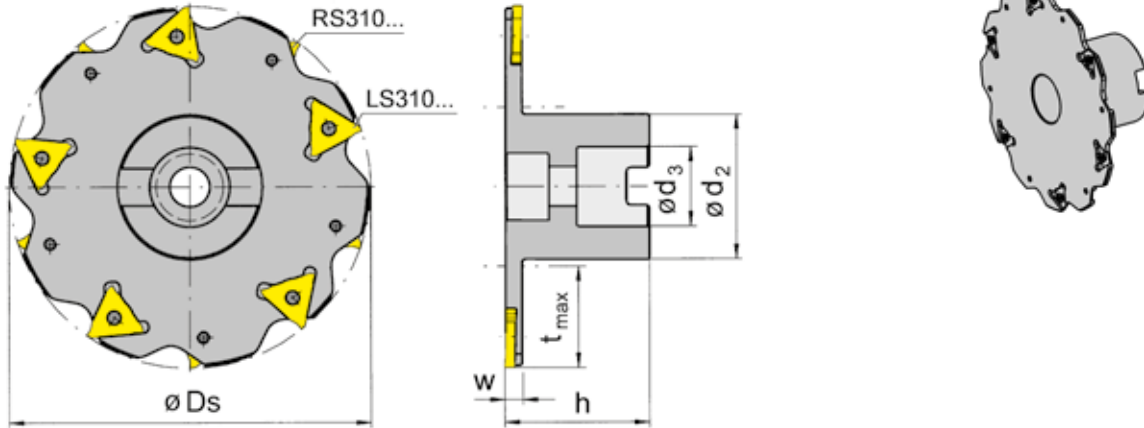
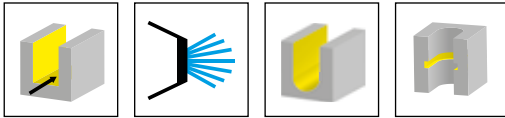


Abbildung = rechtsschneidend  
Picture = right hand cutting version

F

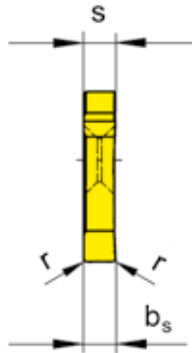
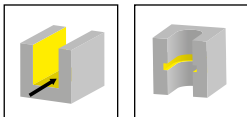
Bestellnummer Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	d <sub>3</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
M310.1125.27.03.IK	12	125	37,5	50	48	27	3	6x RS310.3017...	6x LS310.3017...	310017R • 310017L
M310.1125.27.04.IK	12	125	37,5	50	48	27	4	6x RS310.4023...	6x LS310.4023...	310023R • 310023L
M310.1125.27.05.IK	12	125	37,5	50	48	27	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1125.32.03.IK	12	125	32	50	56	32	3	6x LS310.3017...	6x LS310.3017...	310017R • 310017L
M310.1125.32.04.IK	12	125	32	50	56	32	4	6x LS310.4023...	6x RS310.4023...	310023R • 310023L
M310.1125.32.05.IK	12	125	32	50	56	32	5	6x LS310.5028...	6x RS310.5028...	310028R • 310028L
M310.1125.40.05.IK	12	125	26,5	50	70	40	5	6x RS310.5028...	6x LS310.5028...	310028R • 310028L
M310.1160.40.03.IK	16	160	44	50	70	40	3	8x RS310.3017...	8x LS310.3017...	310017R • 310017L
M310.1160.40.04.IK	16	160	44	50	70	40	4	8x RS310.4023...	8x LS310.4023...	310023R • 310023L
M310.1160.40.05.IK	16	160	44	50	70	40	5	8x LS310.5028...	3x RS310.5028...	310028R • 310028L
M310.1200.40.04.IK	20	200	64	50	70	40	4	10x LS310.4023...	10x RS310.4023...	310023R • 310023L
M310.1200.40.05.IK	20	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 Arbor 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



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

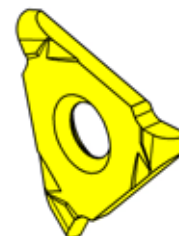
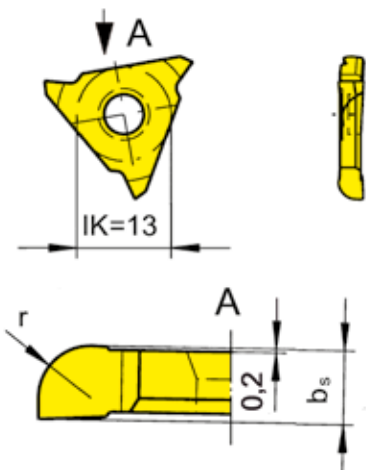
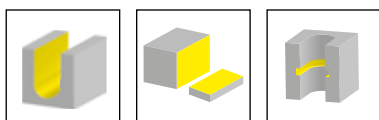
HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	b <sub>s</sub>	s	HIS	AS45	DD25	IG35	TF45	TN35
<b>RS310.3017.00</b>	3	0,15	1,7	1,6	310017R	▲	▲	▲		
<b>RS310.3118.00</b>	3,175	0,15	1,8	1,6	310018R	▲				
<b>RS310.4023.00</b>	4	0,2	2,3	2,2	310023R	▲	▲	▲	▲	▲
<b>RS310.5028.00</b>	5	0,2	2,8	2,7	310028R	▲	▲	▲	▲	▲
<b>LS310.3017.00</b>	3	0,15	1,7	1,6	310017L	▲	▲	▲		
<b>LS310.3118.00</b>	3,175	0,15	1,8	1,6	310018L	▲				
<b>LS310.4023.00</b>	4	0,2	2,3	2,2	310023L	▲	▲	▲	▲	▲
<b>LS310.5028.00</b>	5	0,2	2,8	2,7	310028L	▲	▲	▲	▲	▲
<b>P</b>	●	-	-	●	●					
<b>M</b>	●	-	●	●	●					
<b>K</b>	●	-	●	●	●					
<b>N</b>	○	●	-	●	●					
<b>S</b>	●	○	●	●	●					
<b>H</b>	-	-	-	-	-					



# Wendeschnidplatte

## Indexable insert



HM-Sorten  
Carbide grades  
▲ 4 Wochen  
on stock  
4 weeks

R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

F

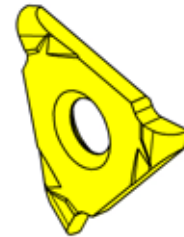
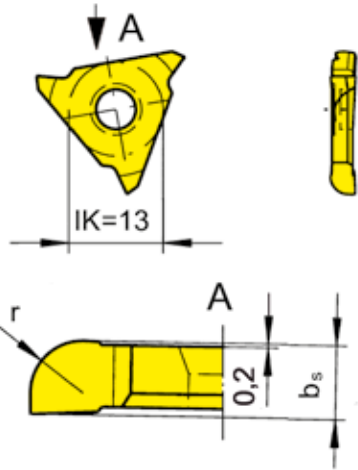
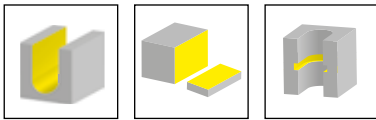
Bestellnummer Part number	w	r	b <sub>s</sub>	s	HIS	AS45
RS310.3017.04	3	0,4	1,7	1,57	310017R	Δ
RS310.3017.05	3	0,5	1,7	1,57	310017R	Δ
RS310.3017.10	3	1	1,7	1,57	310017R	▲
RS310.3017.15	3	1,5	1,7	1,57	310017R	Δ
RS310.4023.04	4	0,4	2,3	2,17	310023R	Δ
RS310.4023.05	4	0,5	2,3	2,17	310023R	Δ
RS310.4023.10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

P	●
M	●
K	●
N	○
S	●
H	-



# Wendeschnidplatte

## Indexable insert



R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

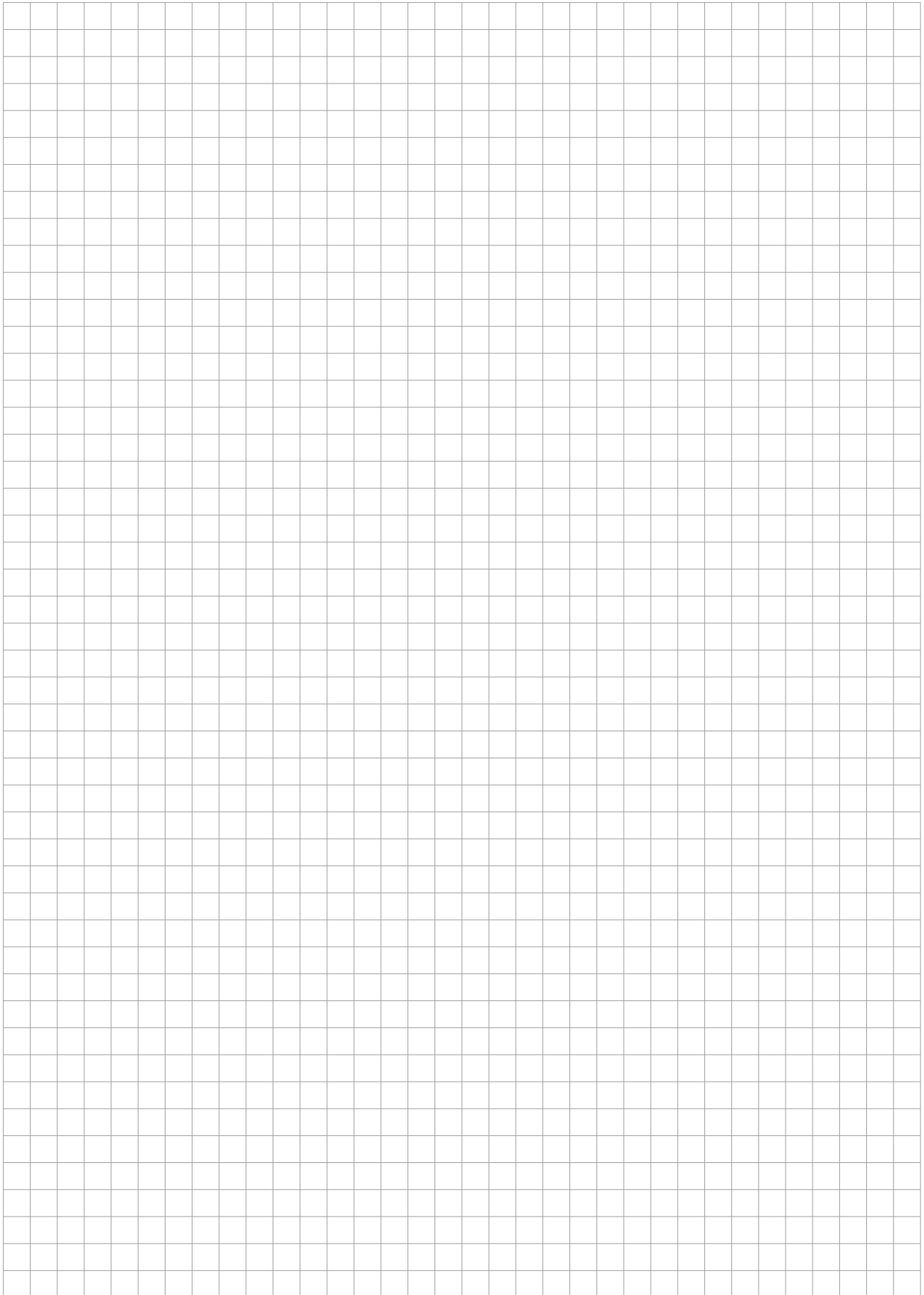
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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



F





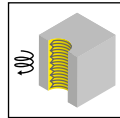
**G**

System/System	Seite/Page
<b>M304</b>	<b>276</b>
<b>M306</b>	<b>284</b>
<b>M308</b>	<b>296</b>
<b>M311</b>	<b>306</b>
<b>M313</b>	<b>316</b>
<b>M328</b>	<b>326</b>
<b>M332</b>	<b>336</b>
<b>M275</b>	<b>342</b>
<b>380</b>	<b>348</b>

Übersicht  
Overview

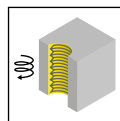
Seite/Page  
278

Klemmhalter  
Toolholder  
M304



Seite/Page  
279

Schneidplatte  
Insert  
304



Seite/Page  
280-282

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)**

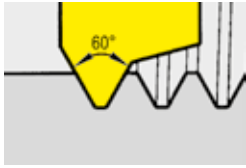
ab Schneidkreis  $\varnothing$  7,7 mm

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

from Cutting edge  $\varnothing$  7,7 mm

### Teilprofil, metrisch Typ 304

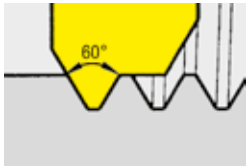
Partial profile, metric type 304



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, metrisch Typ 304

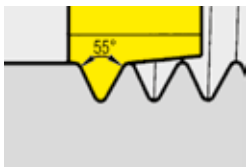
Full profile, metric type 304



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

### Vollprofil, Whitworth Typ 304

Full profile, Whitworth type 304



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

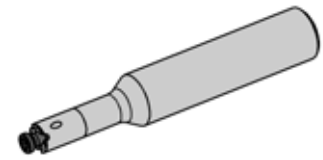
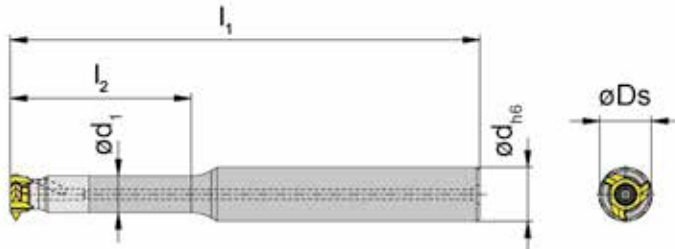
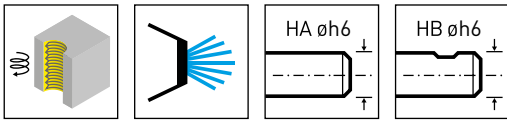


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M304.0508.02A</b>	8	63	20	5,4	A	304044R
<b>M304.0508.03A</b>	8	70	27	5,4	A	304044R
<b>M304.0508.02B</b>	8	63	20	5,4	B	304044R
<b>M304.0508.03B</b>	8	70	27	5,4	B	304044R

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Klemmhalter Toolholder	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M304...	<b>1.8.4T6EP</b>	<b>T6PL</b>



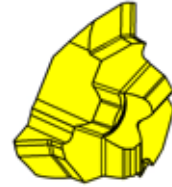
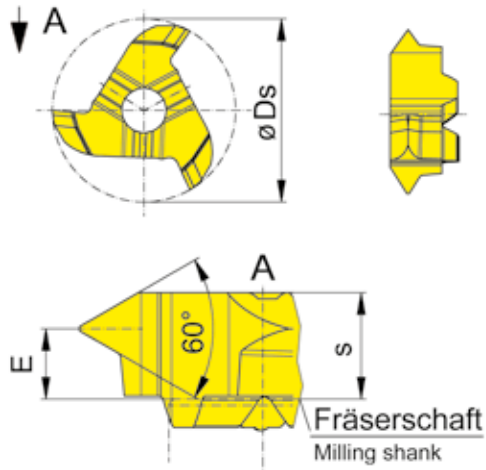
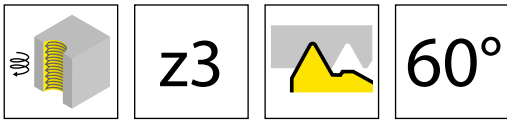


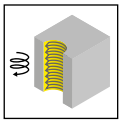
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	Z	HIS	AS45
304.0515.01	0,5	1,5	1,9	2,75	7,7	3	304044R	▲
	P ●							
	M ●							
	K ●							
	N ○							
	S ●							
	H -							

G





z3



60°

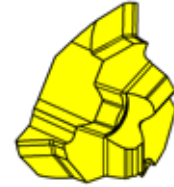
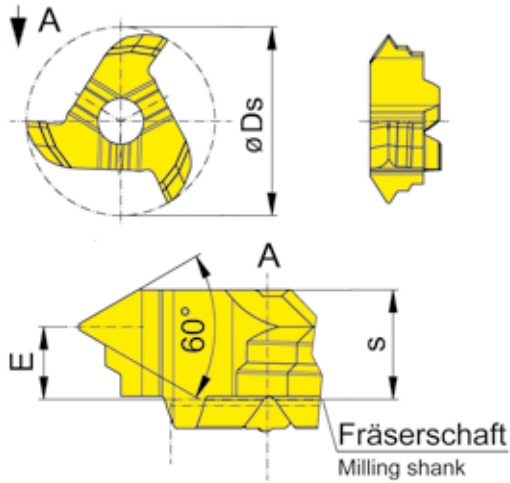


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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



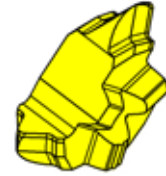
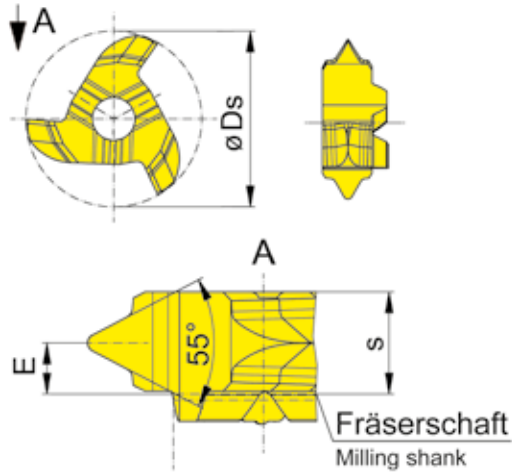
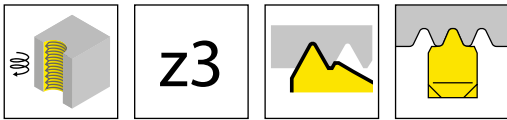


Abbildung = rechtsschneidend  
Picture = right hand cutting version

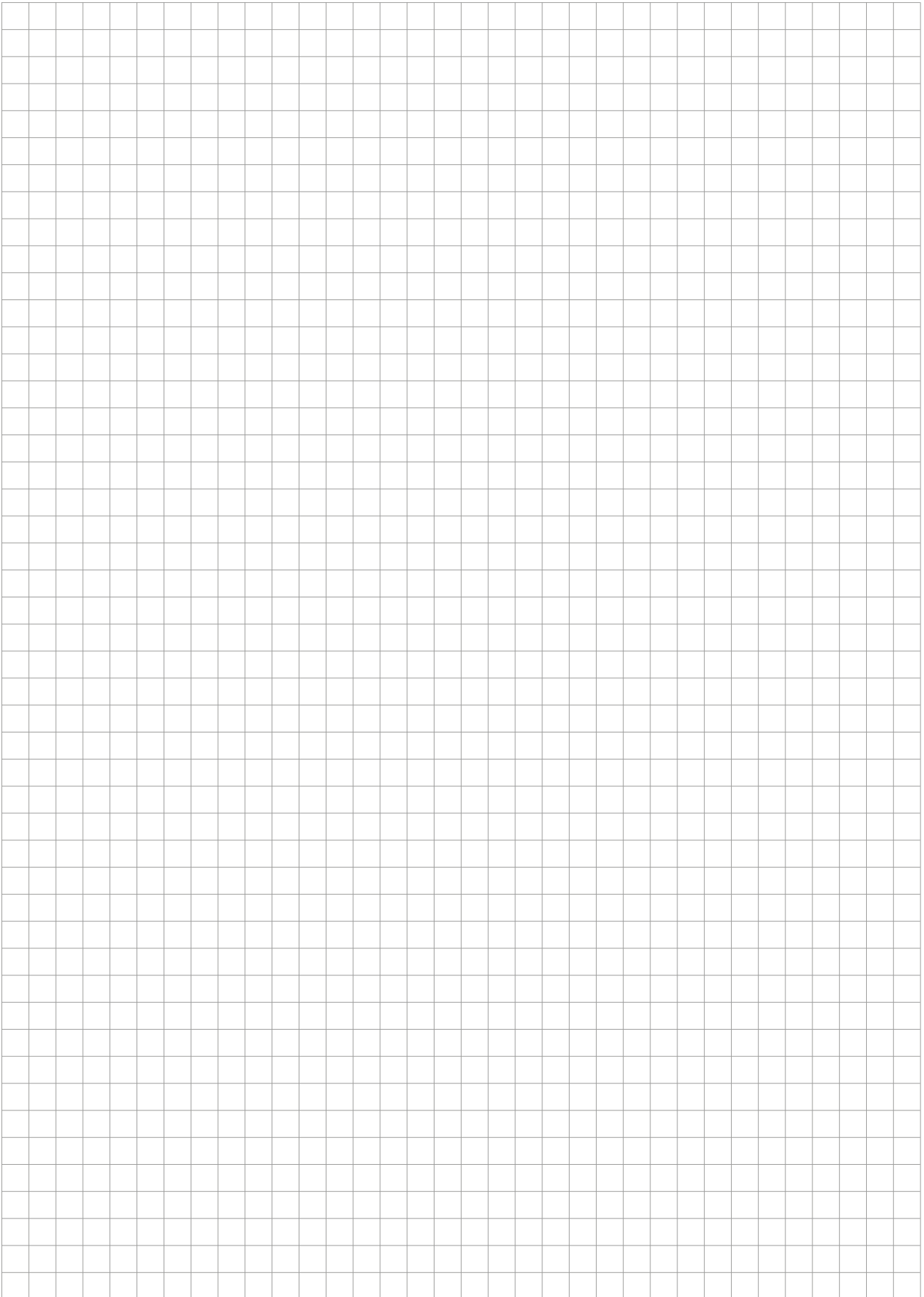
▲ ab Lager  
on stock

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 -

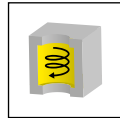
G



Übersicht  
Overview

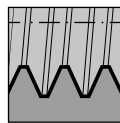
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M306

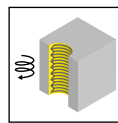


Seite/Page  
287

Schneidplatte  
Insert  
108/306/606



Seite/Page  
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289-294

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**

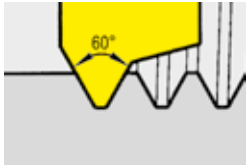
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  9,6 mm

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

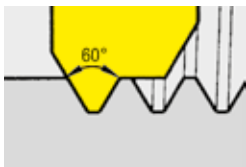
from Cutting edge  $\varnothing$  9,6 mm

## Teilprofil, metrisch Typ 108, 306, 606 Partial 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
Nenndurchmesser / 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		

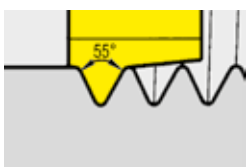
## Vollprofil, metrisch Typ 306, 606 Full profile, metric type 306



Steigung/ Pitch P	1,5	2,0
Nenndurchmesser 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
Nenndurchmesser Nominal diameter	
Typ / type <b>606</b> / Ds 11,7	
606.0815.02	≥ 22

## Vollprofil, Whitworth Typ 306, 606 Full profile, 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> ''	

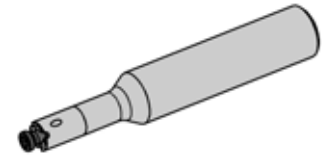
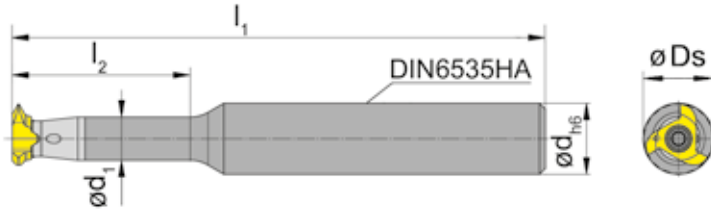
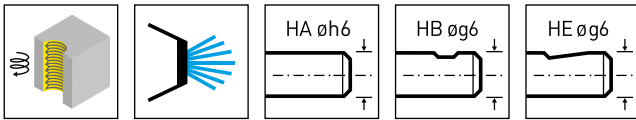


Abbildung = rechtsschneidend  
Picture = right hand cutting version

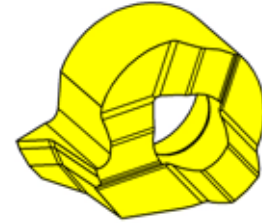
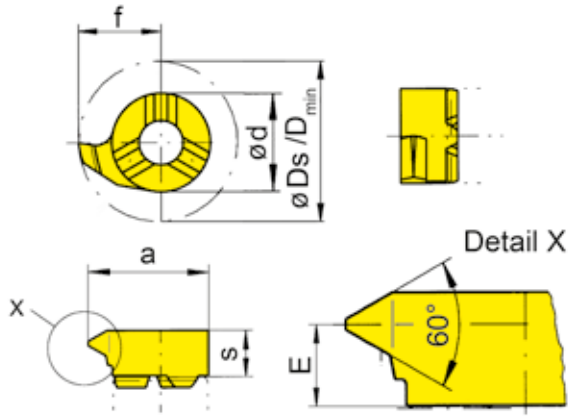
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M306.0712.02A</b>	12	90	30	7,3	A	306060R • 306060L
<b>M306.0716.01A</b>	16	100	25	7,3	A	306060R • 306060L
<b>M306.0716.02A</b>	16	110	35	7,3	A	306060R • 306060L
<b>M306.0712.02B</b>	12	90	30	7,3	B	306060R • 306060L
<b>M306.0716.01B</b>	16	100	25	7,3	B	306060R • 306060L
<b>M306.0716.02B</b>	16	110	35	7,3	B	306060R • 306060L
<b>M306.0712.02E</b>	12	90	30	7,3	E	306060R • 306060L
<b>M306.0716.01E</b>	16	100	25	7,3	E	306060R • 306060L
<b>M306.0716.02E</b>	16	110	35	7,3	E	306060R • 306060L

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

<b>Klemmhalter</b> Toolholder	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> 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	MG12	EG55	TH35	TI25	TN35
<b>R108.0205.01</b>	0,5	0,75	2,8	4,8	7,8	6	3,6	8	9,6	306060R	▲	▲	▲		▲
<b>R108.0815.01</b>	1,5	1,75	2,6	4,8	7,8	6	3,6	8	9,6	306060R	▲	▲	▲		▲
<b>R108.0510.01</b>	1	1,25	2,8	4,8	7,8	6	3,6	8	9,6	306060R	▲	▲	▲	▲	▲
<b>L108.0205.01</b>	0,5	0,75	2,8	4,8	7,8	6	3,6	8	9,6	306060L	Δ	▲	▲		▲
<b>L108.0815.01</b>	1,5	1,75	2,6	4,8	7,8	6	3,6	8	9,6	306060L	Δ	▲	▲		▲
<b>L108.0510.01</b>	1	1,25	2,8	4,8	7,8	6	3,6	8	9,6	306060L	Δ	▲	▲	▲	▲
<b>P</b>	o	•	•	•	•	•	•	•	•						
<b>M</b>	-	o	•	•	•	•	•	•	•						
<b>K</b>	-	o	•	•	•	•	•	•	•						
<b>N</b>	-	-	•	•	•	•	•	•	•						
<b>S</b>	-	-	•	•	•	•	•	•	•						
<b>H</b>	-	-	-	-	-	-	-	-	-						

G



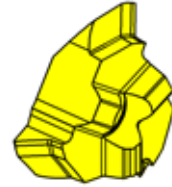
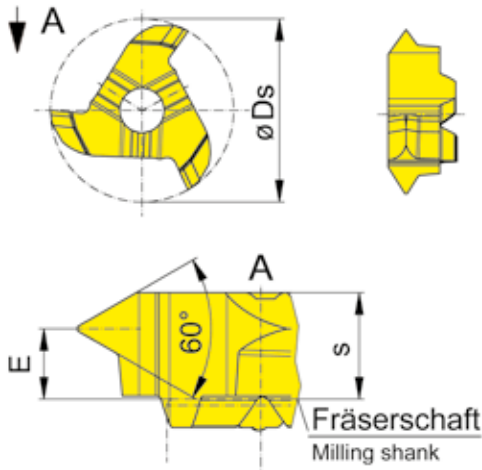
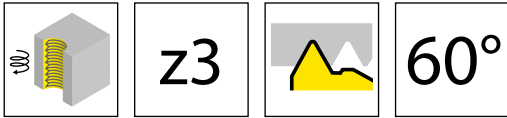


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	Z	HIS	AS45	TA45	TF45	TI25	TN35
306.0515.01	0,5	1,5	2,3	3,4	10	3	306060R	▲	▲			△
306.1020.01	2	2	2,2	3,4	10	3	306060R	▲			▲	
306.0720.01	1	2	1,95	3,4	11,7	3	306060R	▲		▲	▲	▲
306.0815.01	1,5	1,5	2,25	3,4	11,7	3	306060R	▲		△	▲	▲
306.2530.01	2,5	3	1,7	3,4	11,7	3	306060R	▲		▲	▲	▲
P	●	●	●	●	●	●		●	●	●	●	●
M	●	●	●	●	●	●		●	●	●	●	●
K	●	●	●	●	●	●		●	●	●	●	●
N	○	●	●	●	●	●		○	●	●	●	●
S	●	●	●	●	●	●		●	●	●	●	●
H	-	-	-	-	-	-		-	-	-	-	-



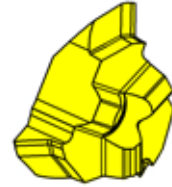
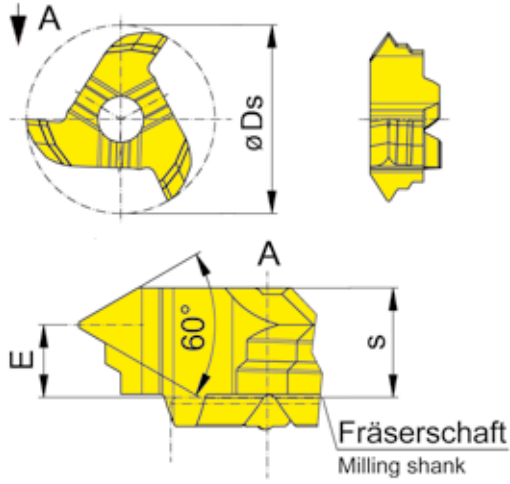
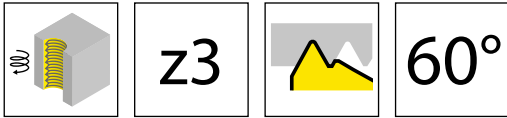


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	AS45	TA45
306.1020.02	2	2,2	3,4	10	306060R	▲	▲
306.0510.02	1	2,5	3,4	11,7	306060R	▲	▲
306.0815.02	1,5	2,25	3,4	11,7	306060R	▲	▲
						P ● ●	
						M ● ●	
						K ● ●	
						N ○ ●	
						S ● ●	
						H - -	

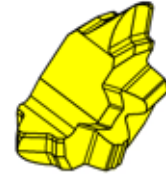
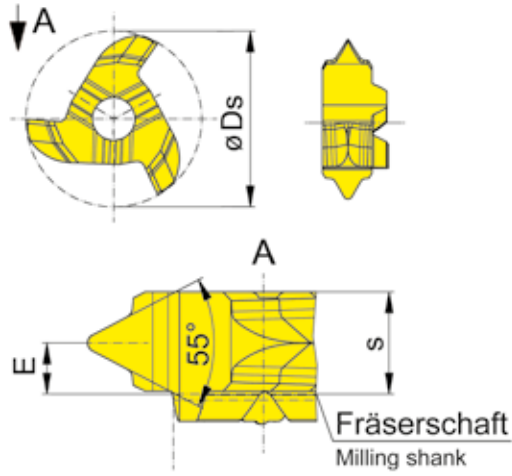
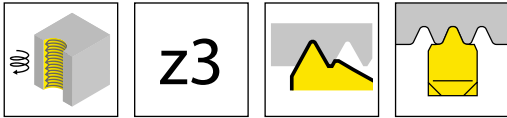


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TA45	TF45	TI25	TN35
306.5519.10.02	19	2,2	3,4	9,7	306060R	▲	▲			
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	▲	▲			
P	●	●	●	●	●	●	●	●	●	●
M	●	●	●	●	●	●	●	●	●	●
K	●	●	●	●	●	●	●	●	●	●
N	○	●	●	●	●	●	●	●	●	●
S	●	●	●	●	●	●	●	●	●	●
H	-	-	-	-	-	-	-	-	-	-



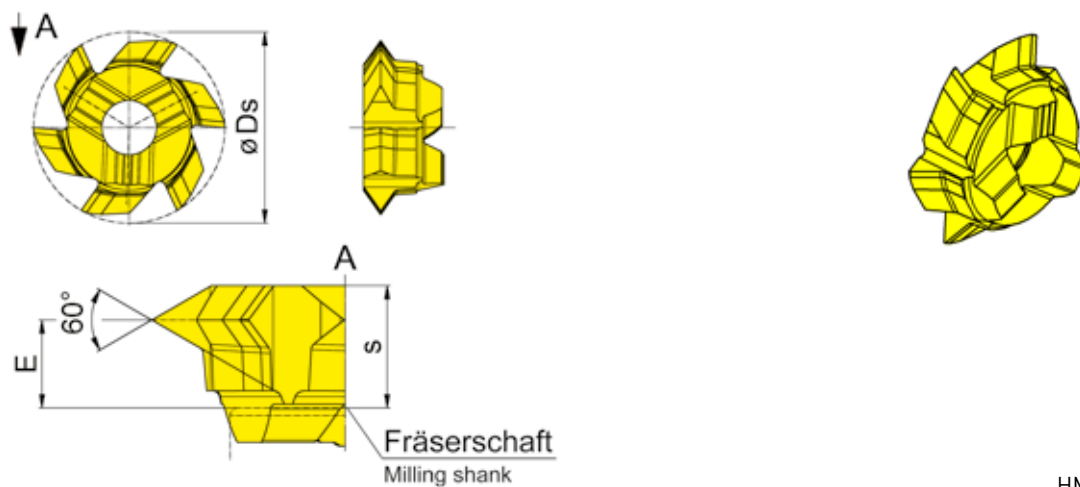
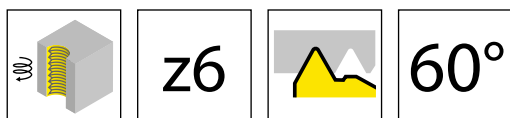


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	TA45
606.0515.01	0,5	1,5	2,3	3,15	10	6	306060R	▲	▲
606.0720.01	1	2	1,95	3,15	11,7	6	306060R	▲	▲
	P	●	●						
	M	●	●						
	K	●	●						
	N	○	●						
	S	●	●						
	H	-	-						

G

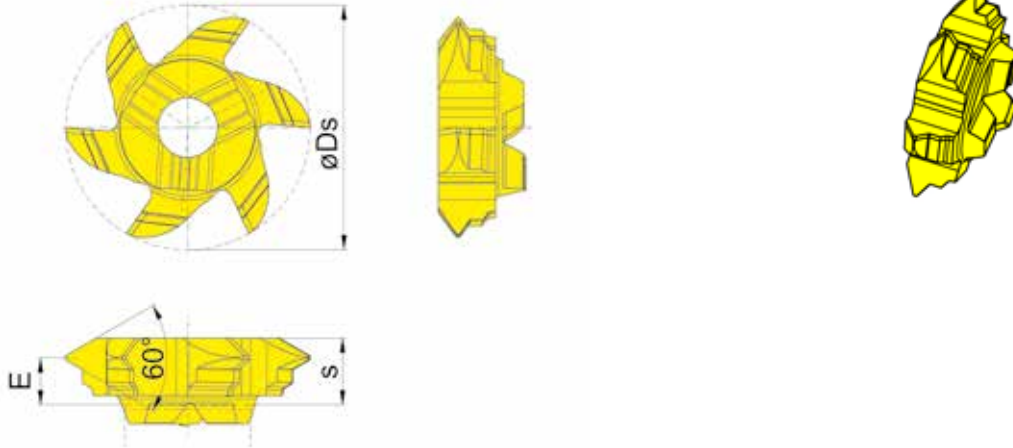
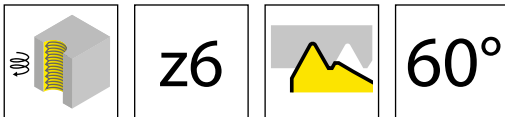


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	Z	HIS	AS45	TA45
606.0510.02	1	2,5	3,2	11,7	6	306060R	▲	▲
606.0815.02	1,5	2,25	3,2	11,7	6	306060R	▲	▲
	P	●	●					
	M	●	●					
	K	●	●					
	N	○	○					
	S	●	●					
	H	-	-					



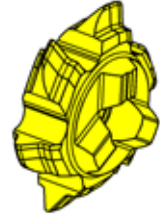
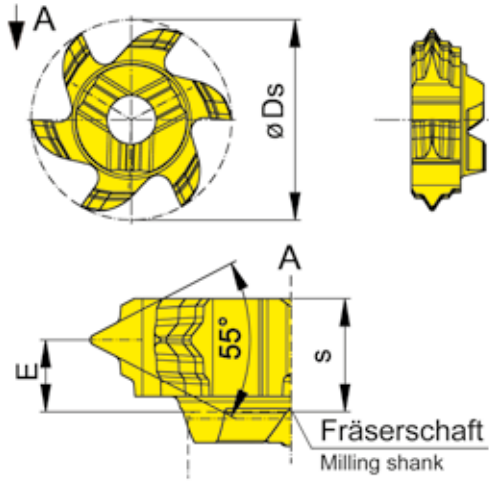
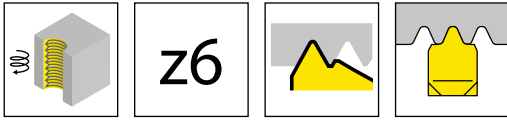


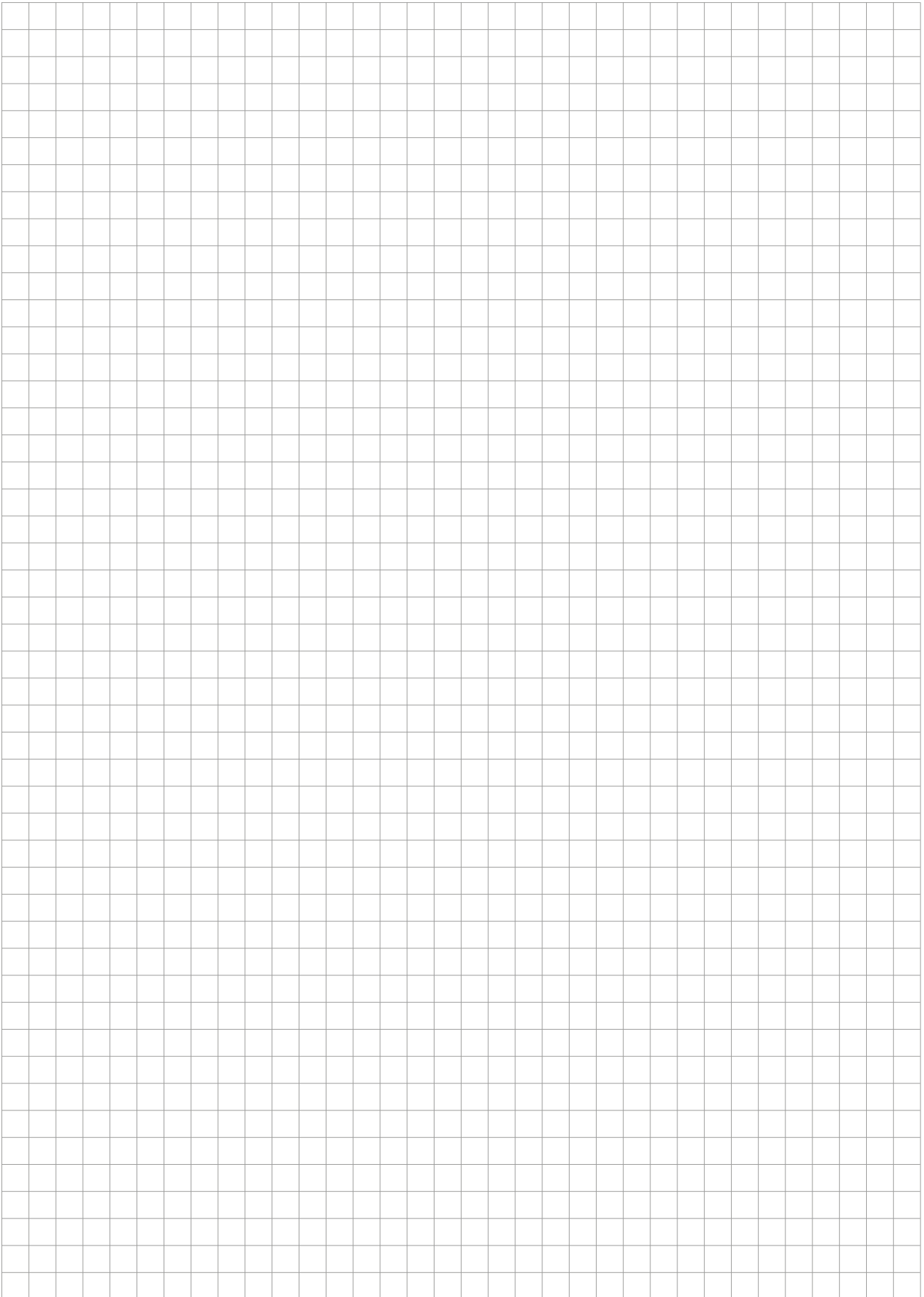
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	HM-Sorten Carbide grades		
						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	▲	▲	Δ
606.5519.02	19	2,1	3,3	11,7	306060R	▲	▲	Δ
						P	●	●
						M	●	●
						K	●	●
						N	○	●
						S	●	●
						H	-	-

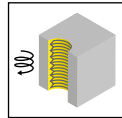
G



Übersicht  
Overview

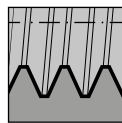
Seite/Page  
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Frälerschaft  
Milling shank  
M308

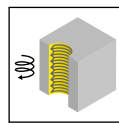


Seite/Page  
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Schneidplatte  
Insert  
111/308/608



Seite/Page  
300-301



Seite/Page  
302-305

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**

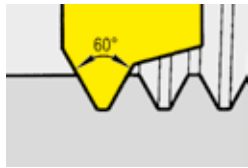
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  13,4 mm

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

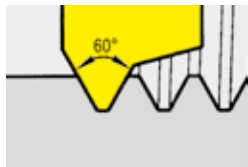
from cutting edge  $\varnothing$  13,4 mm

## Teilprofil, metrisch Typ 111, 308 Partial profile, metric type 111, 308



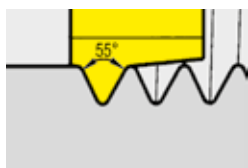
Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Nenn Durchmesser / Nominal diameter									
Typ / type <b>111</b> / Ds 13,4									
R/L111.0205.01	≥ 18	≥ 16							
R/L111.0510.01			≥ 18	≥ 18					
R/L111.0815.01					≥ 20	≥ 20			
R/L111.1020.01							≥ 22		
R/L111.1325.01								≥ 24	
Typ / type 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, metrisch Typ 608 Partial profile, metric type 608



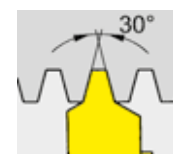
Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0
Nenn Durchmesser / Nominal diameter									
Typ / type <b>608</b> / Ds 13,2									
608.1325.01								≥ 18	
Typ / type <b>608</b> / Ds 15,7									
608.0720.01			≥ 20	≥ 20	≥ 20	≥ 20	≥ 20		
608.2530.01								≥ 24	≥ 24

## Vollprofil, Whitworth Typ 111, 608 Full profile, Whitworth type 111, 608



Gg/'' / tpi	19	14
Nenn Durchmesser 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		G½''/G¾''

## Trapezgewinde, metrisch Typ 608 Trapezoidal thread, metric type 608



608.1525.01	Tr24x2,5
608.1730.01	Tr24x3
608.2240.01	Tr24x4

# Frärschaft

## Milling shank

# M308

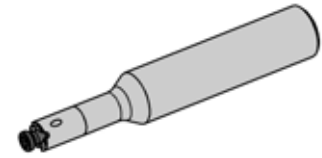
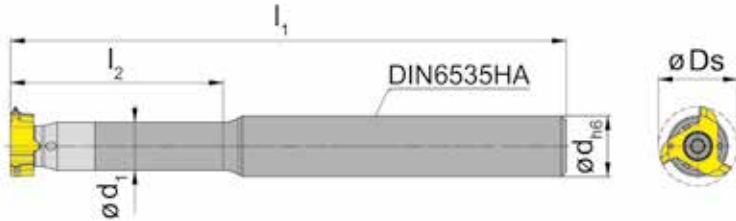
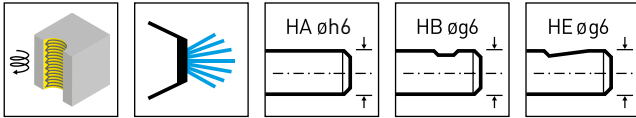


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

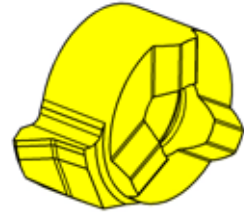
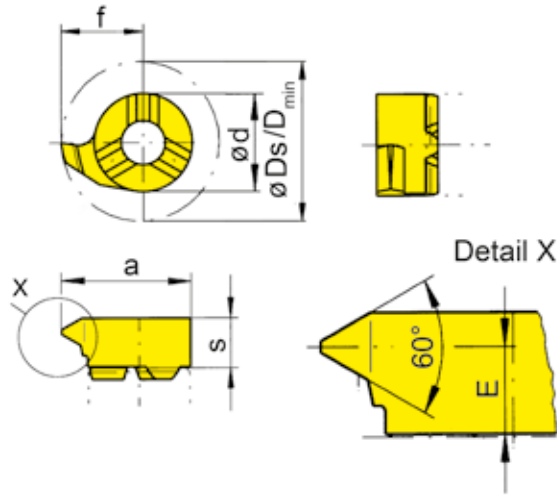
Ds siehe Schneidplatten  
Ds see inserts

### Ersatzteile

#### Spare Parts

Frärschaft Milling shank	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M308...	3.5.12T10EP	T10PL





R = rechts wie gezeichnet  
R = right hand version shown

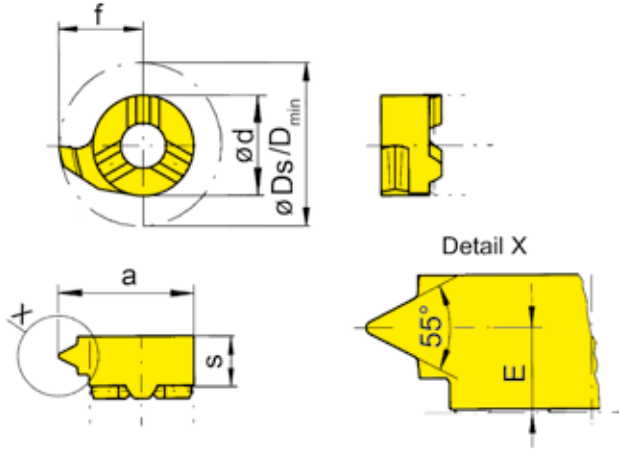
L = links spiegelbildlich  
L = left hand version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	f	a	d	Ds	Z	D <sub>min</sub>	HIS	EG55	TH35	TN35
R111.0205.01	0,5	0,75	3,5	4,15	6,7	10,7	8	13,4	1	11	308080R	▲	▲	▲
R111.0510.01	1	1,25	3,3	4,15	6,7	10,7	8	13,4	1	11	308080R	▲	▲	▲
R111.0815.01	1,5	1,75	3,3	4,15	6,7	10,7	8	13,4	1	11	308080R	▲	▲	▲
R111.1020.01	2	2	3	4,15	6,7	10,7	8	13,4	1	11	308080R	▲	▲	▲
L111.0205.01	0,5	0,75	3,5	4,15	6,7	10,7	8	13,4	1	11	308080L	△	△	▲
L111.0510.01	1	1,25	3,3	4,15	6,7	10,7	8	13,4	1	11	308080L	▲	△	▲
L111.0815.01	1,5	1,75	3,3	4,15	6,7	10,7	8	13,4	1	11	308080L	▲	△	▲
L111.1020.01	2	2	3	4,15	6,7	10,7	8	13,4	1	11	308080L	△	△	▲
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	308080R	▲		▲
<b>R111.5519.02</b>	19	2,9	4,15	6,7	10,7	8	13,4	11	308080R	▲	Δ	▲
<b>L111.5514.02</b>	14	2,5	4,15	6,7	10,7	8	13,4	11	308080L	Δ		▲
<b>L111.5519.02</b>	19	2,9	4,15	6,7	10,7	8	13,4	11	308080L		Δ	▲
<b>P</b>		●	●	●								
<b>M</b>		○	●	●								
<b>K</b>		○	●	●								
<b>N</b>		-	●	●								
<b>S</b>		-	●	●								
<b>H</b>		-	-	-								



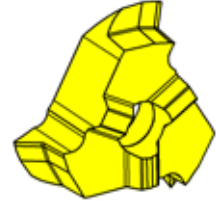
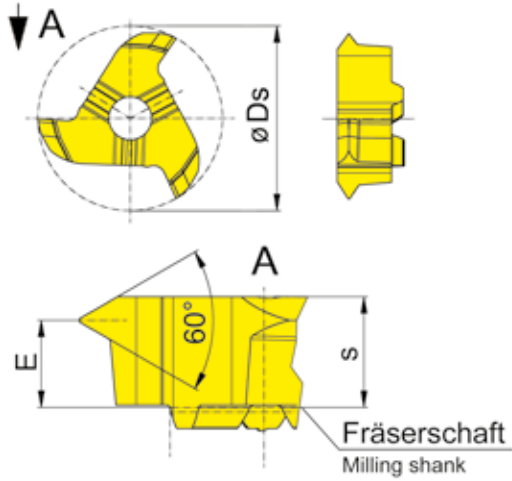
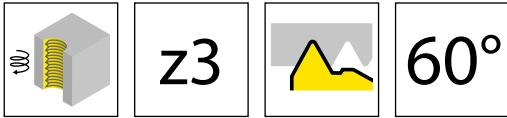


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	D <sub>s</sub>	Z	HIS	AS45	TA45	TF45	TI25	TN35
308.1325.01	2,5	2,5	3,3	4,7	13,2	3	308080R	▲	▲			
308.0720.01	1	2	3,3	4,7	15,7	3	308080R	▲			Δ	▲
308.0815.01	1,5	1,5	3,7	4,7	15,7	3	308080R	▲				▲
308.2530.01	2,5	3	2,7	4,7	15,7	3	308080R	▲		Δ	Δ	▲

**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	-	-	-	-	-

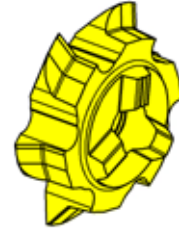
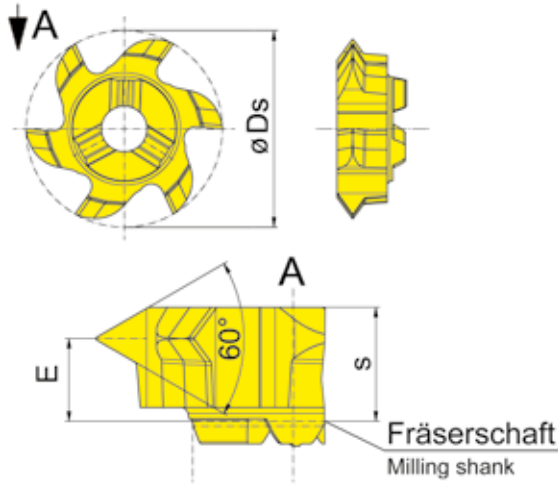
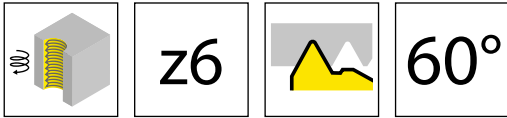


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	TA45	TI25	
608.0720.01	1	2	3,3	4,55	15,7	6	308080R	▲		▲	
608.1325.01	2,5	2,5	3,3	4,55	13,2	6	308080R	▲	▲		
608.2530.01	2,5	3	2,9	4,55	15,7	6	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	-	-	-



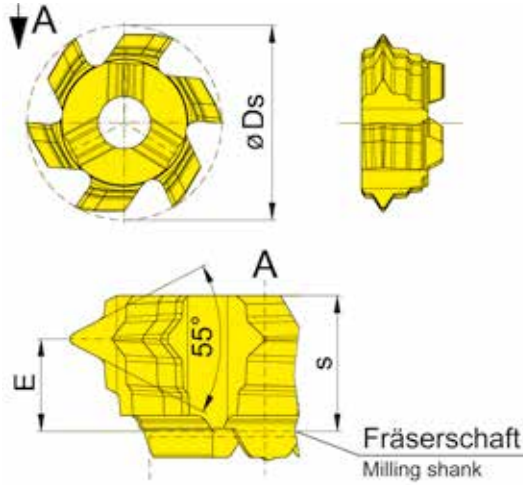
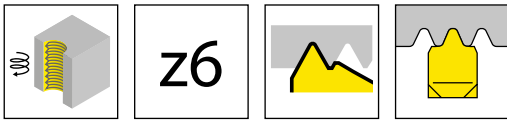


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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



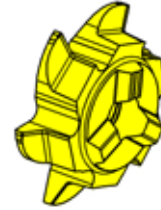
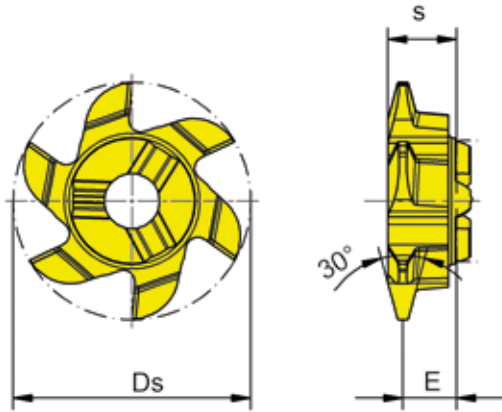
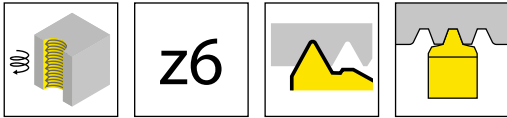


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

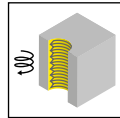
Bestellnummer Part number	P	s	E	Ds	Z	HIS	EG55
608.1525.01	2,5	4,55	3,56	15,7	6	308080R	▲
608.1730.01	3	4,55	3,4	15,7	6	308080R	▲
608.2240.01	4	4,55	3,16	15,7	6	308080R	▲
	P	●					
	M	o					
	K	o					
	N	-					
	S	-					
	H	-					



Übersicht  
Overview

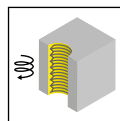
Seite/Page  
308

Frälerschaft  
Milling shank  
M311



Seite/Page  
309

Schneidplatte  
Insert  
311/611



Seite/Page  
310-314

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**

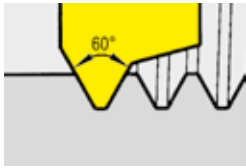
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  17,7 mm

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

from cutting edge  $\varnothing$  17,7 mm

## Teilprofil, metrisch Typ 311, 611 Partial profile, metric type 311, 611



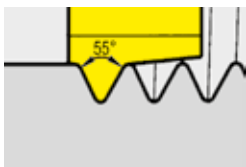
Steigung/Pitch P	0,5	0,75	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5
Nenndurchmesser / Nominal diameter										
Typ / type <b>311</b> / Ds 17,7										
311.0515.01	≥ 20	≥ 20	≥ 20	≥ 20	≥ 22					
311.0510.01			≥ 22							
311.0720.01			≥ 22	≥ 22	≥ 22	≥ 22	≥ 22			
311.0815.01					≥ 24					
311.1020.01						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

## Vollprofil, metrisch Typ 311, 611 Full profile, metric type 311, 611



Steigung/Pitch P	1,5	1,75	2,0	2,5	3,0	3,5
Nenndurchmesser / Nominal diameter						
Typ / type <b>311, 611</b> / Ds 17,7						
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
Typ / type <b>611</b> / Ds 17,7						
611.0815	≥ 23					

## Vollprofil, Whitworth Typ 311 Full profile, Whitworth type 311



Gg/'' / tpi	14	11
Gewinde / Thread		
Typ / type <b>311</b> / Ds 17,7		
311.5514.02	G $\frac{3}{4}$ ''	
311.5511.02		G1''

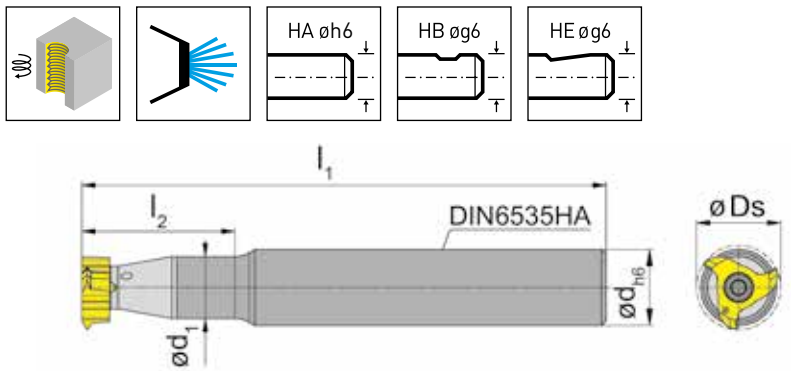


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	311090R
<b>M311.1316.01A</b>	16	110	32	13	A	311090R
<b>M311.1316.02A</b>	16	130	45	13	A	311090R
<b>M311.1316.03A</b>	16	145	64	13	A	311090R
<b>M311.1316.01B</b>	16	110	32	13	B	311090R
<b>M311.1316.02B</b>	16	130	45	13	B	311090R
<b>M311.1316.03B</b>	16	145	64	13	B	311090R
<b>M311.1316.01E</b>	16	110	32	13	E	311090R
<b>M311.1316.02E</b>	16	130	45	13	E	311090R
<b>M311.1316.03E</b>	16	145	64	13	E	311090R

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

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



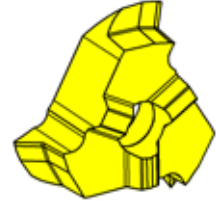
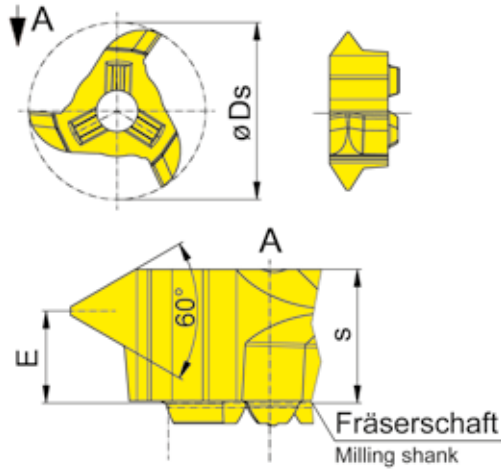
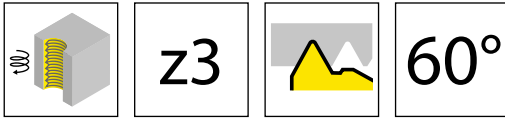


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

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

G

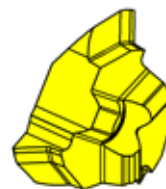
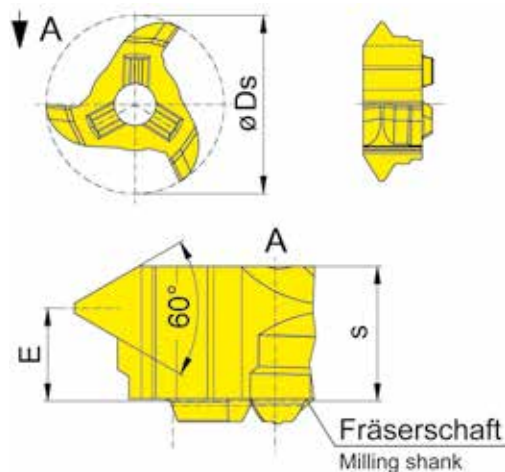
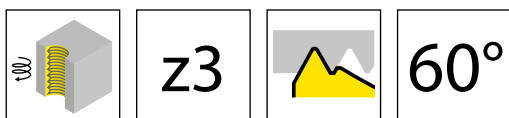


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	HIS	AS45	TN35
311.0815.02	1,5	4,8	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	▲	Δ
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 - -	



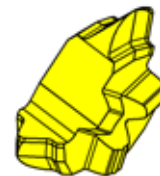
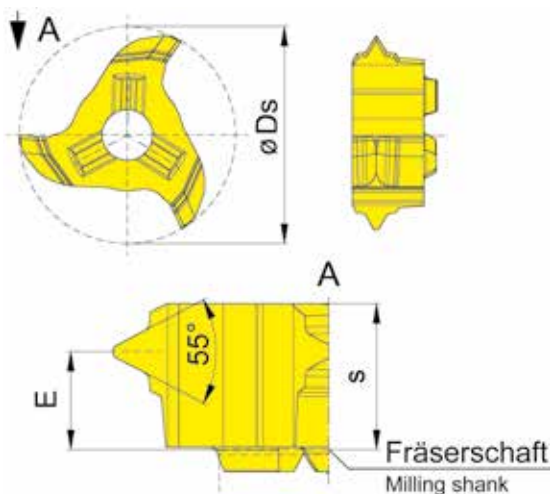
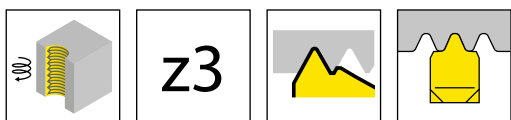


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	AS45	TA45	TI25	TN35
311.5511.02	11	4	5,95	17,7	311090R	▲	Δ	Δ	▲
311.5514.02	14	4,35	5,95	17,7	311090R	▲	Δ	▲	▲
						P	●	●	●
						M	●	●	●
						K	●	●	●
						N	○	●	●
						S	●	●	●
						H	-	-	-

G



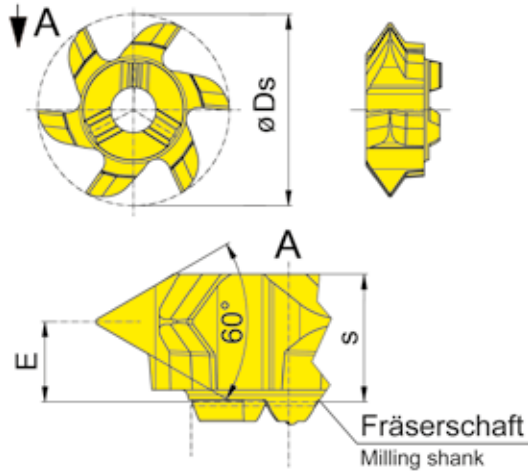
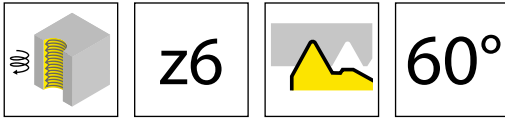


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	TA45	TI25
611.0515.01	0,5	1,5	4,8	5,75	17,7	6	311090R	▲	▲	▲
611.0720.01	1	2	4,6	5,75	17,7	6	311090R	▲	▲	▲
611.2535.01	2,5	3,5	3,7	5,75	17,7	6	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 -	-	-



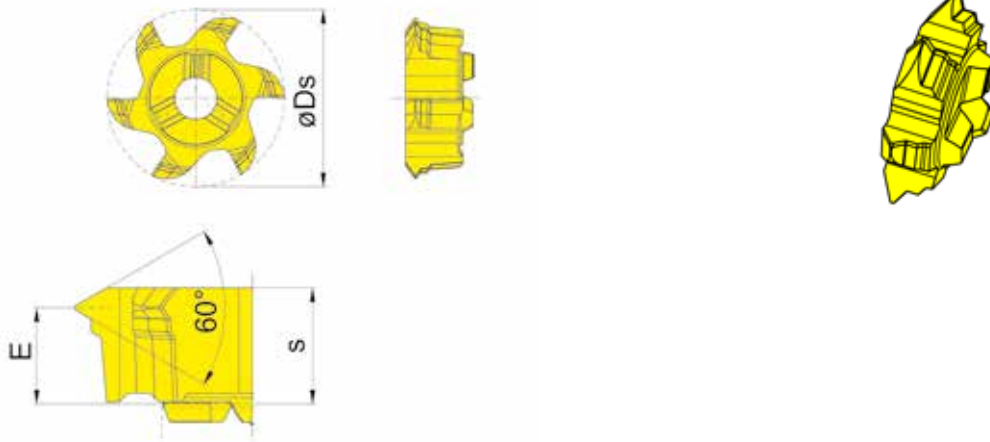
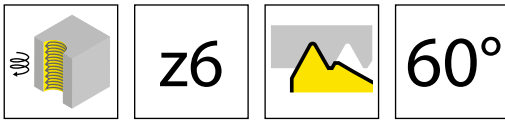
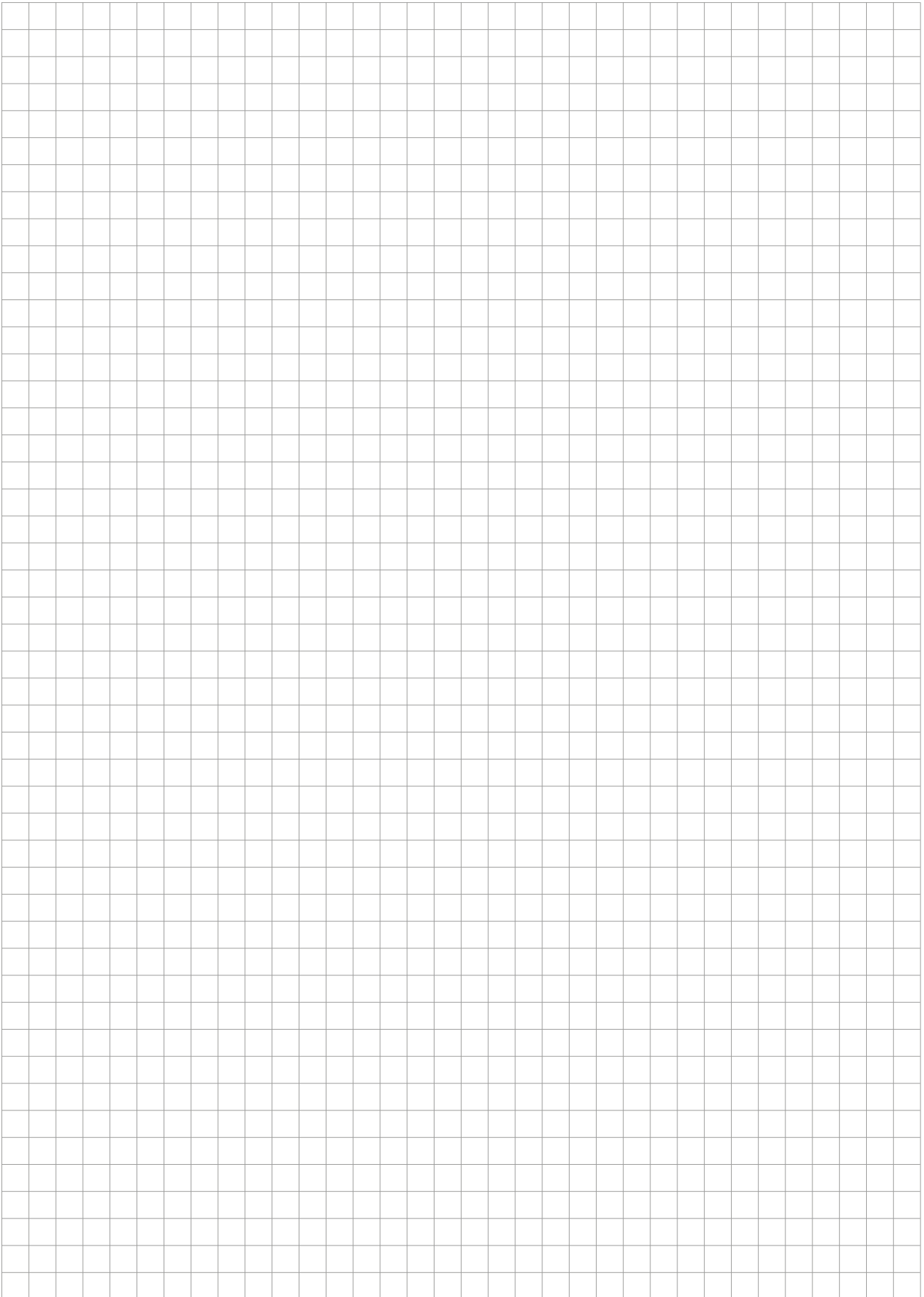


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Bestellnummer Part number	P	E	s	Ds	Z	HIS	AS45
611.0815.02	1,5	4,8	5,95	17,7	6	311090R	▲
	P ●						
	M ●						
	K ●						
	N ○						
	S ●						
	H -						

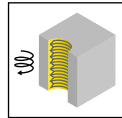
G



Übersicht  
Overview

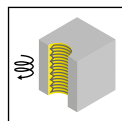
Seite/Page  
318

Frälerschaft  
Milling shank  
M313



Seite/Page  
319-320

Schneidplatte  
Insert  
313/613



Seite/Page  
321-325

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**

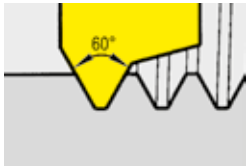
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  21,7 mm

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

from cutting edge  $\varnothing$  21,7 mm

## Teilprofil, metrisch Typ 313, 613 Partial profile, metric type 313, 613



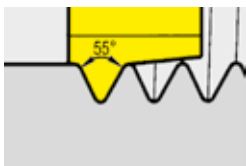
Steigung/Pitch P	1,0	1,25	1,5	1,75	2,0	2,5	3,0	3,5	4,0	4,5
Nenn Durchmesser / Nominal diameter										
Typ / type <b>313</b> / Ds 21,7										
313.0720.01	≥ 27	≥ 26	≥ 26	≥ 26	≥ 26					
313.0815.01			≥ 30							
313.1020.01					≥ 32					
313.1630.01							≥ 36			
313.1835.01								≥ 36		
313.2140.01									≥ 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, metrisch Typ 313 Full profile, metric type 313



Steigung/Pitch P	1,5	2,0	3,0	3,5	4,0	4,5
Nenn Durchmesser / 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, Whitworth Typ 313, 613 Full profile, Whitworth type 313, 613



Gg"/tpi	11	8	6
Nenn Durchmesser 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"		

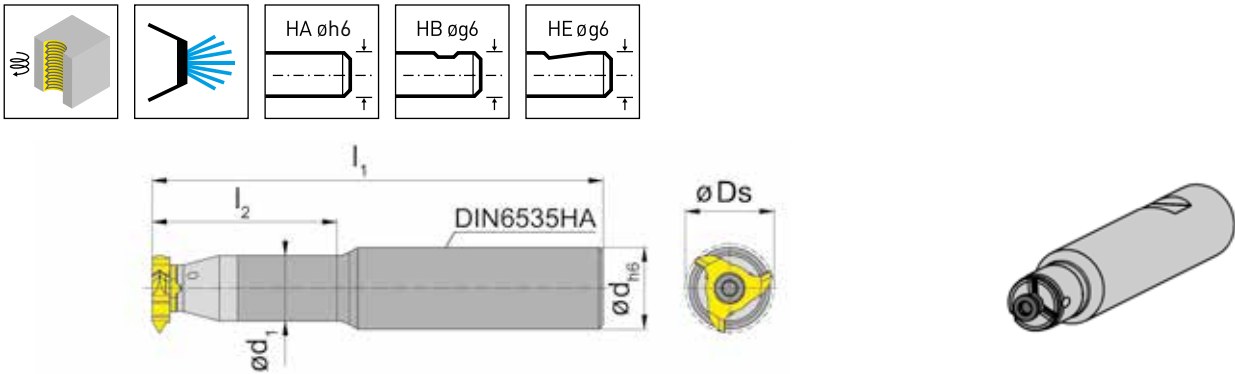


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	313113R • 313113L
<b>M313.1620.02A</b>	20	130	65	16	A	313113R • 313113L
<b>M313.1620.03A</b>	20	160	85	16	A	313113R • 313113L
<b>M313.1620.01B</b>	20	110	45	16	B	313113R • 313113L
<b>M313.1620.02B</b>	20	130	65	16	B	313113R • 313113L
<b>M313.1620.03B</b>	20	160	85	16	B	313113R • 313113L
<b>M313.1620.01E</b>	20	110	45	16	E	313113R • 313113L
<b>M313.1620.02E</b>	20	130	65	16	E	313113R • 313113L
<b>M313.1620.03E</b>	20	160	85	16	E	313113R • 313113L

Ds siehe Schneidplatten  
Ds 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>



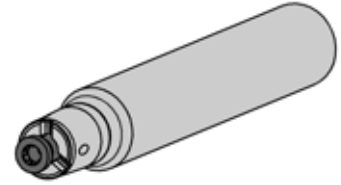
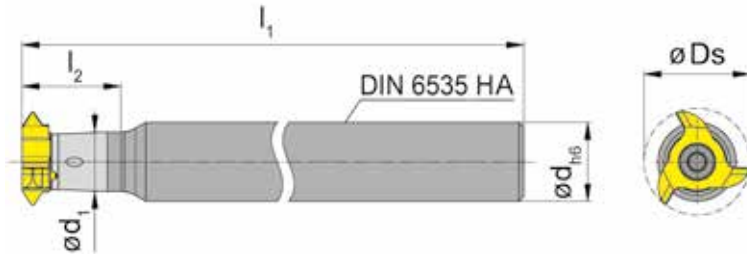
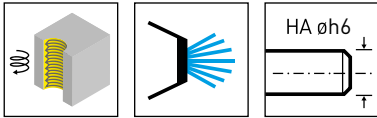


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	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
M313.0016.07A	<b>5.14T20P</b>	<b>T20PQ</b>



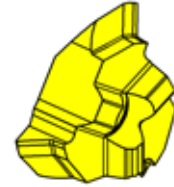
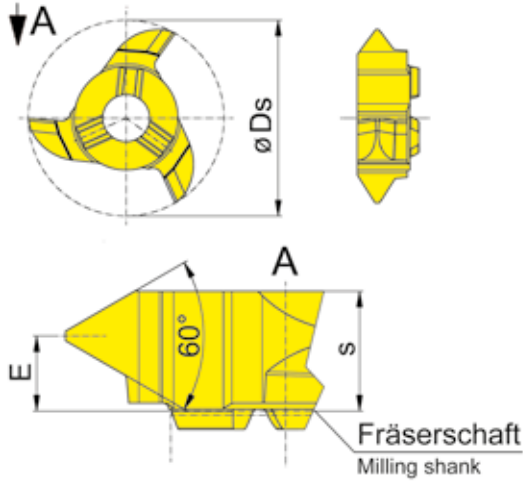
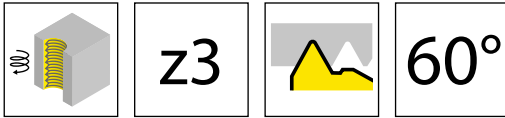


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	EG55	TF45	TN35	
313.0720.01	1	2	4,6	5,9	21,7	3	313113R	▲	▲		▲	
313.0815.01	1,5	1,5	4,8	5,9	21,7	3	313113R	▲	▲		▲	
313.1020.01	2	2	4,6	5,9	21,7	3	313113R	▲	▲		▲	
313.1630.01	3	3	4,3	5,9	21,7	3	313113R	▲	▲		▲	
313.1835.01	3,5	3,5	4,1	5,9	21,7	3	313113R	▲	▲		△	
313.2140.01	4	4	3,9	5,9	21,7	3	313113R	▲	▲	△	▲	
313.2445.01	4,5	4,5	3,7	5,9	21,7	3	313113R	▲	▲		▲	
313.2545.01	2,5	4,5	3,7	5,9	21,7	3	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	-	-	-	-



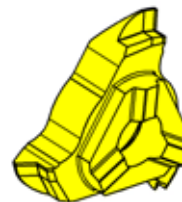
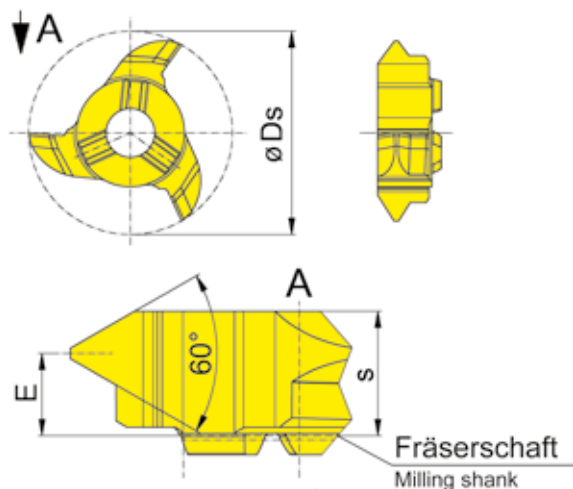
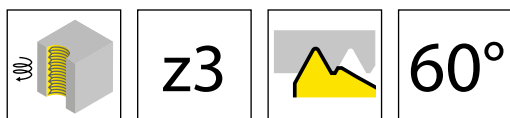


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

Bestellnummer Part number	P	E	s	Ds	Z	HIS	AS45	EG55	TN35
313.0815.02	1,5	4,8	5,9	21,7	3	313113R	▲	▲	▲
313.1020.02	2	4,6	5,9	21,7	3	313113R	▲	▲	▲
313.1630.02	3	4,3	5,9	21,7	3	313113R	▲	▲	▲
313.1835.02	3,5	4,1	5,9	21,7	3	313113R	▲	▲	▲
313.2140.02	4	3,9	5,9	21,7	3	313113R	▲	▲	▲
313.2445.02	4,5	3,8	5,9	21,7	3	313113R	▲	▲	▲
							P ●	●	●
							M ●	○	●
							K ●	○	●
							N ○	-	●
							S ●	-	●
							H -	-	-

G

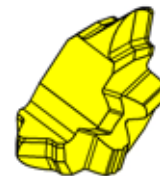
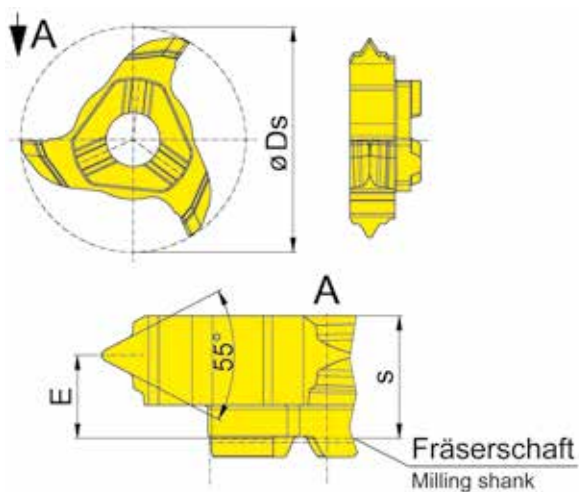
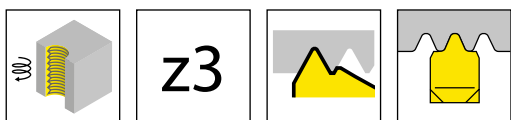


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	TPI	E	s	Ds	HIS	HM-Sorten Carbide grades		
						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	-	-



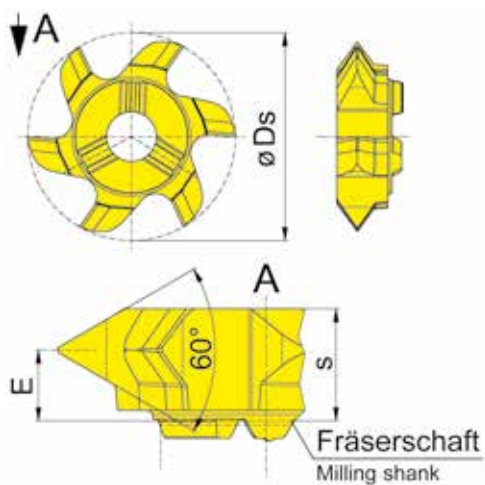
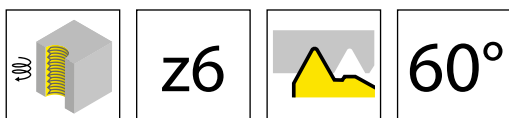


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
△ 4 Wochen  
4 weeks

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

G

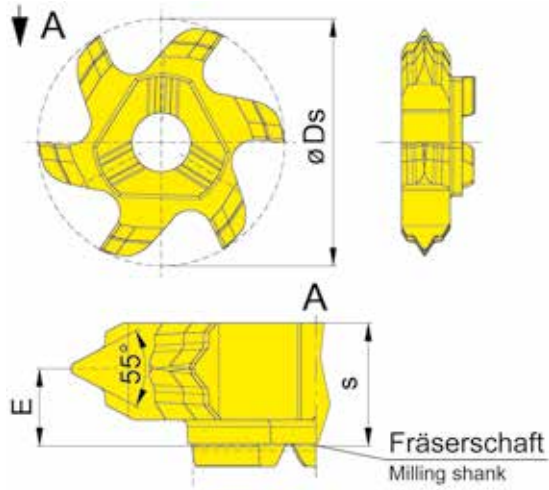
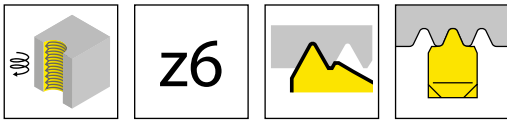


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 4 Wochen  
4 weeks

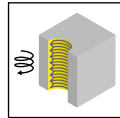
Bestellnummer Part number	TPI	E	s	Ds	HIS	HM-Sorten Carbide grades			
						AS45	EG55	TA45	TI25
613.5511.02	11	3,4	5,4	21,7	313113R	▲	▲	▲	▲
						P	●	●	●
						M	●	○	●
						K	●	○	●
						N	○	-	●
						S	●	-	●
						H	-	-	-



Übersicht  
Overview

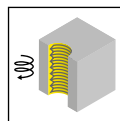
Seite/Page  
328

Frälerschaft  
Milling shank  
M328/SM328



Seite/Page  
329-330

Schneidplatte  
Insert  
328/628



Seite/Page  
331-334

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)**

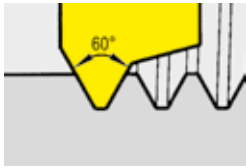
ab Schneidkreis  $\varnothing$  27,7 mm

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

from cutting edge  $\varnothing$  27,7 mm

### Teilprofil, metrisch Typ 328, 628

#### Partial profile, metric type 328, 628



Steigung/Pitch P	1,0	1,25	1,5	1,75	2,0	2,5
------------------	-----	------	-----	------	-----	-----

Nenn Durchmesser / 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

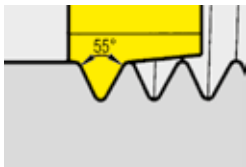
Steigung/Pitch P	3,0	3,5	4,0	4,5	5,0	5,5	6,0
------------------	-----	-----	-----	-----	-----	-----	-----

Nenn Durchmesser / 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, Whitworth Typ 328, 628

#### Full profile, 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''



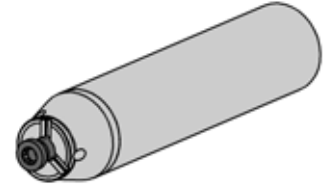
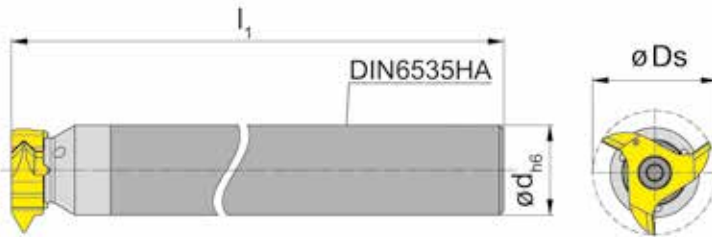
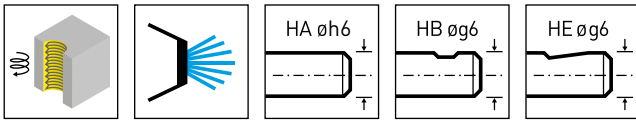


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

Frälerschaft 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>



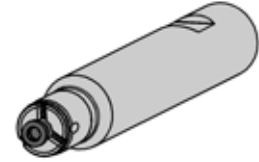
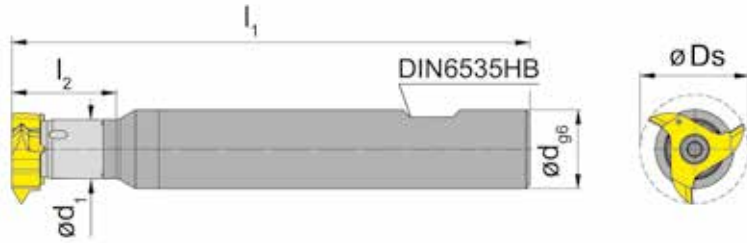
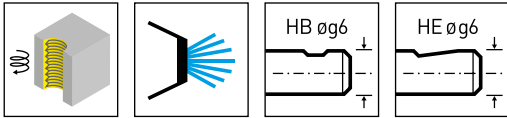


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	B	328143R
<b>SM328.0020.06B</b>	20	145	-	20	B	328143R
<b>SM328.0020.07B</b>	20	160	25	15	B	328143R
<b>SM328.0020.08B</b>	20	200	-	20	B	328143R
<b>SM328.0020.05E</b>	20	130	25	15	E	328143R
<b>SM328.0020.06E</b>	20	145	-	20	E	328143R
<b>SM328.0020.07E</b>	20	160	25	15	E	328143R
<b>SM328.0020.08E</b>	20	200	-	20	E	328143R

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

Ds siehe Schneidplatten  
Ds see inserts

**Ersatzteile**  
Spare Parts

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



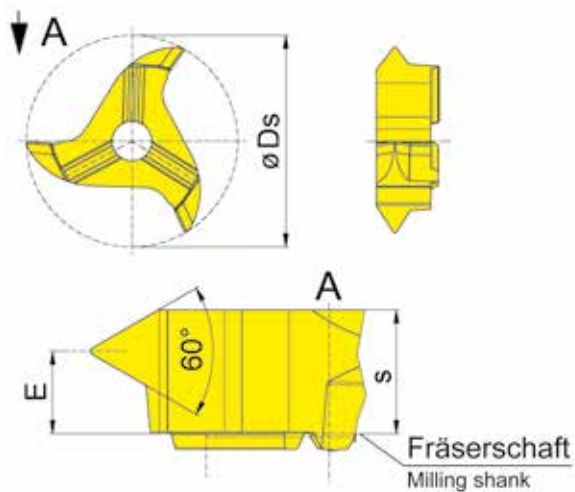
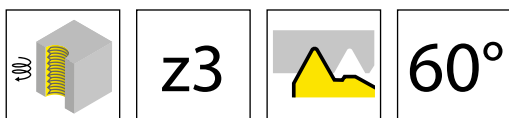


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	TI25	TN35
328.0720.01	1	2	4,6	5,95	27,7	3	328114R	▲		▲
328.1525.01	1,5	2,5	4,3	5,95	27,7	3	328114R	▲		▲
328.3050.01	3	5	4,8	7,2	27,7	3	328114R	▲	▲	▲
328.5060.01	5	6	4,4	7,2	27,7	3	328114R	▲		▲
P	●	●	●	●	●	●		●	●	●
M	●	●	●	●	●	●		●	●	●
K	●	●	●	●	●	●		●	●	●
N	○	○	○	○	○	○		○	○	○
S	●	●	●	●	●	●		●	●	●
H	-	-	-	-	-	-		-	-	-



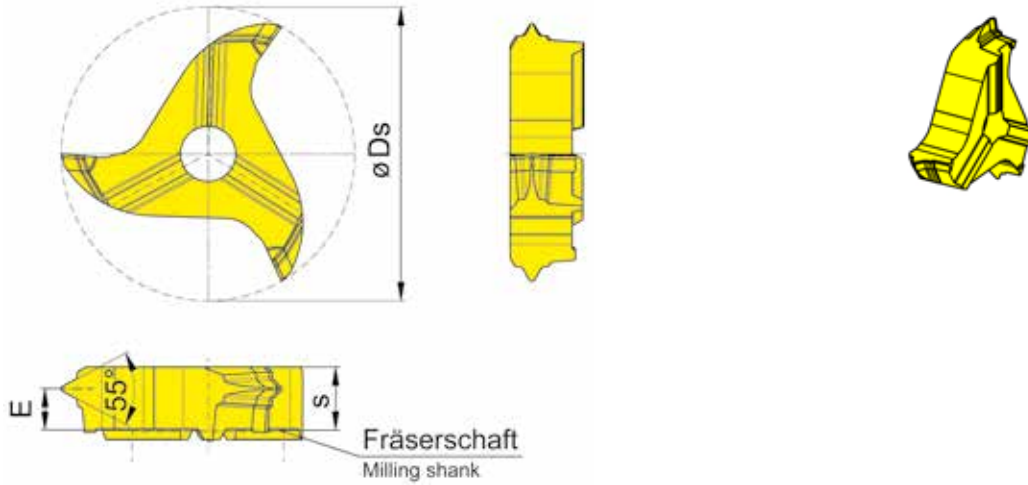
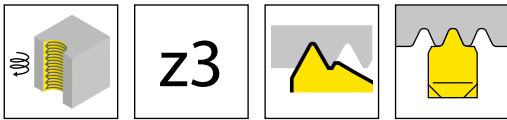


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	328114R	▲
						P ●
						M ●
						K ●
						N ○
						S ●
						H -

G

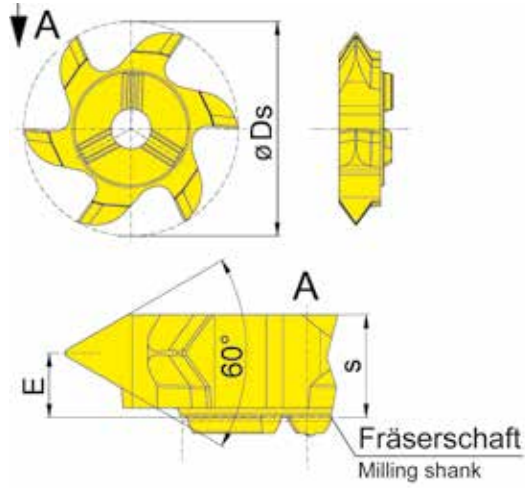
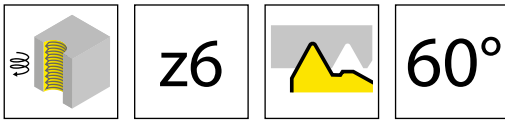


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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>	Z	HIS	AS45	TI25
628.1525.01	1,5	2,5	4,8	6	27,7	6	328114R	▲	▲
628.3050.01	3	5	3,7	5,75	27,7	6	328114R	▲	▲
628.5060.01	5	6	3,2	5,75	27,7	6	328114R	▲	▲
	P	●	●						
	M	●	●						
	K	●	●						
	N	○	●						
	S	●	●						
	H	-	-						



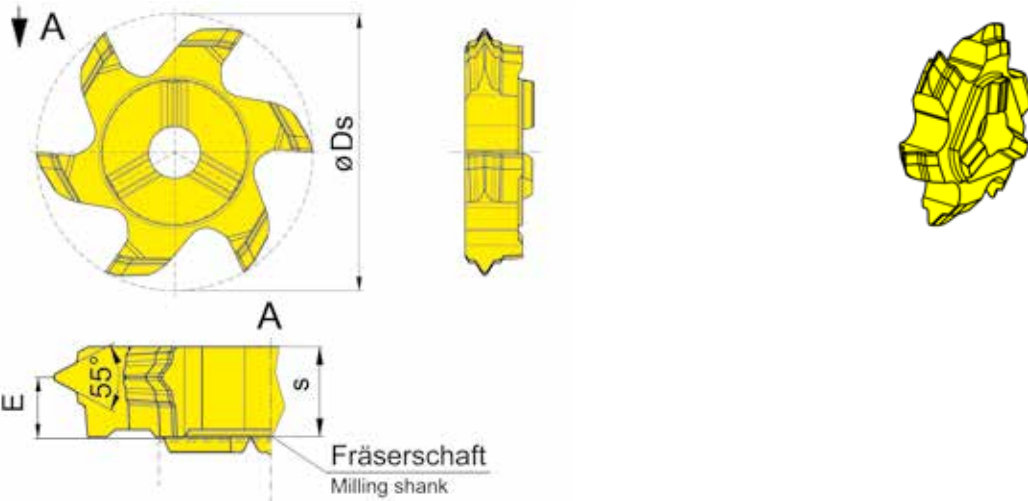
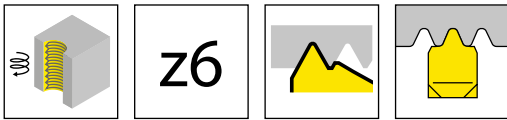


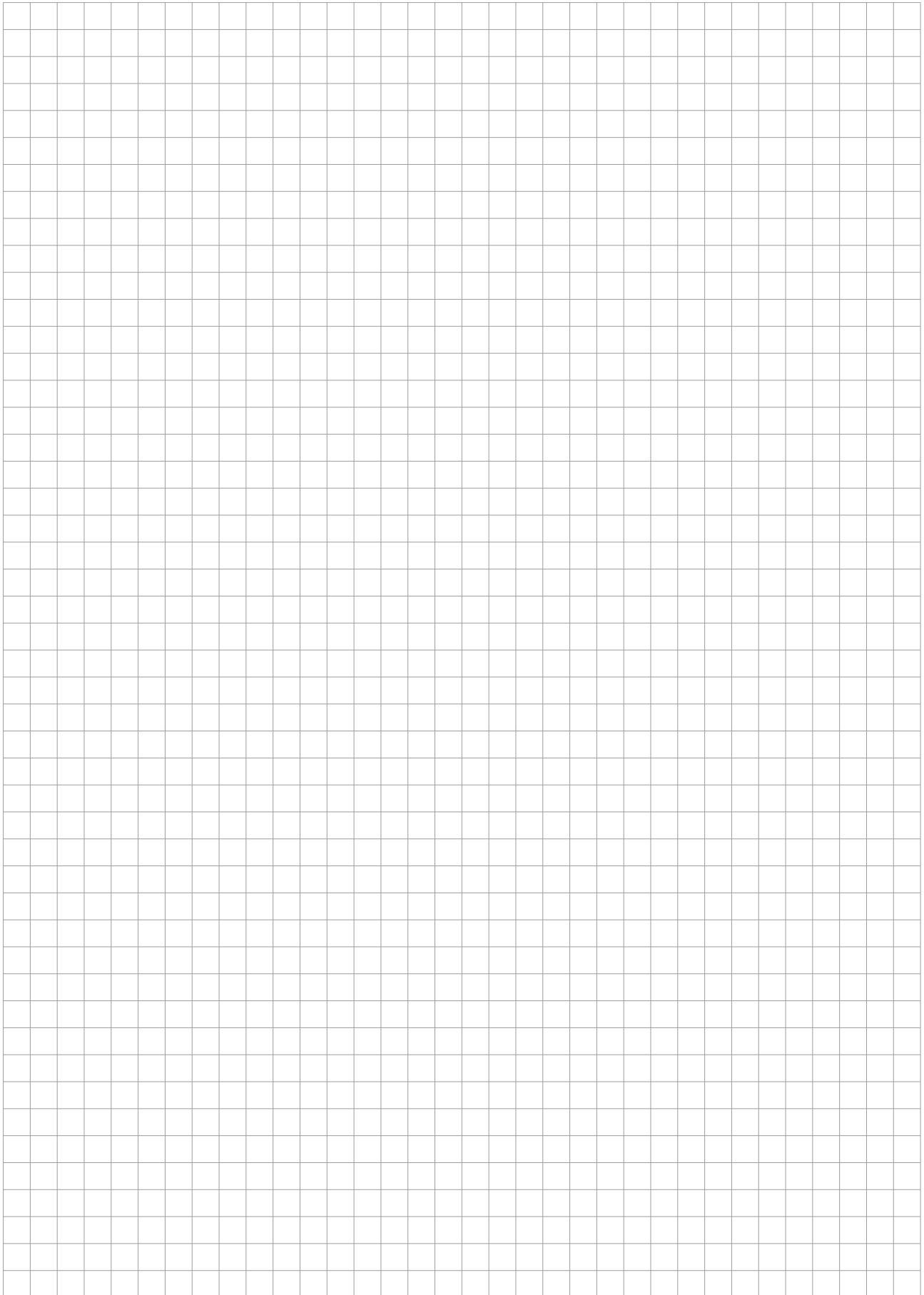
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ 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	328114R	▲
						P ●
						M ●
						K ●
						N ○
						S ●
						H -

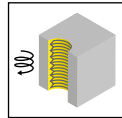
G



Übersicht  
Overview

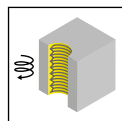
Seite/Page  
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Frälerschaft  
Milling shank  
M332



Seite/Page  
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Schneidplatte  
Insert  
632



Seite/Page  
340

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**

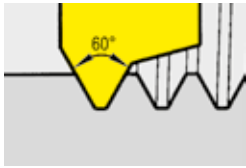
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  31,7 mm

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

from cutting edge  $\varnothing$  31,7 mm

Teilprofil, metrisch Typ 632  
 Partial profile, 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



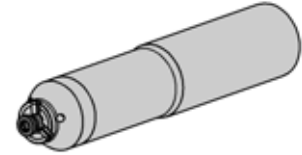
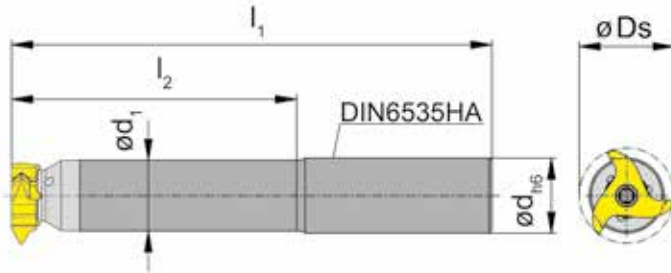


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	A	332143R
<b>M332.2325.07A</b>	25	180	115	23,5	A	332143R
<b>M332.2325.08A</b>	25	200	135	23,5	A	332143R
<b>M332.2325.09A</b>	25	250	185	23,5	A	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>

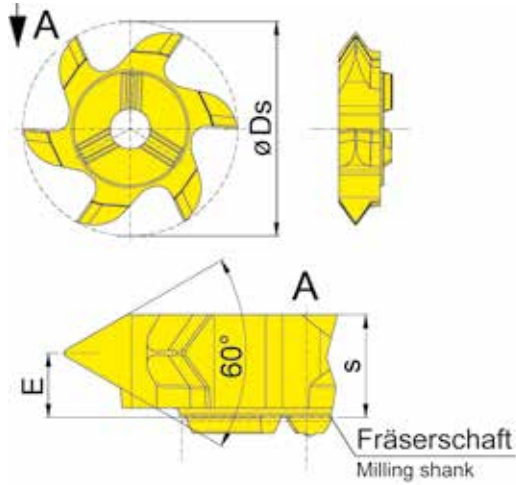
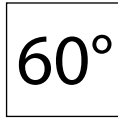
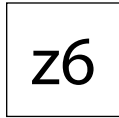
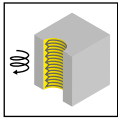


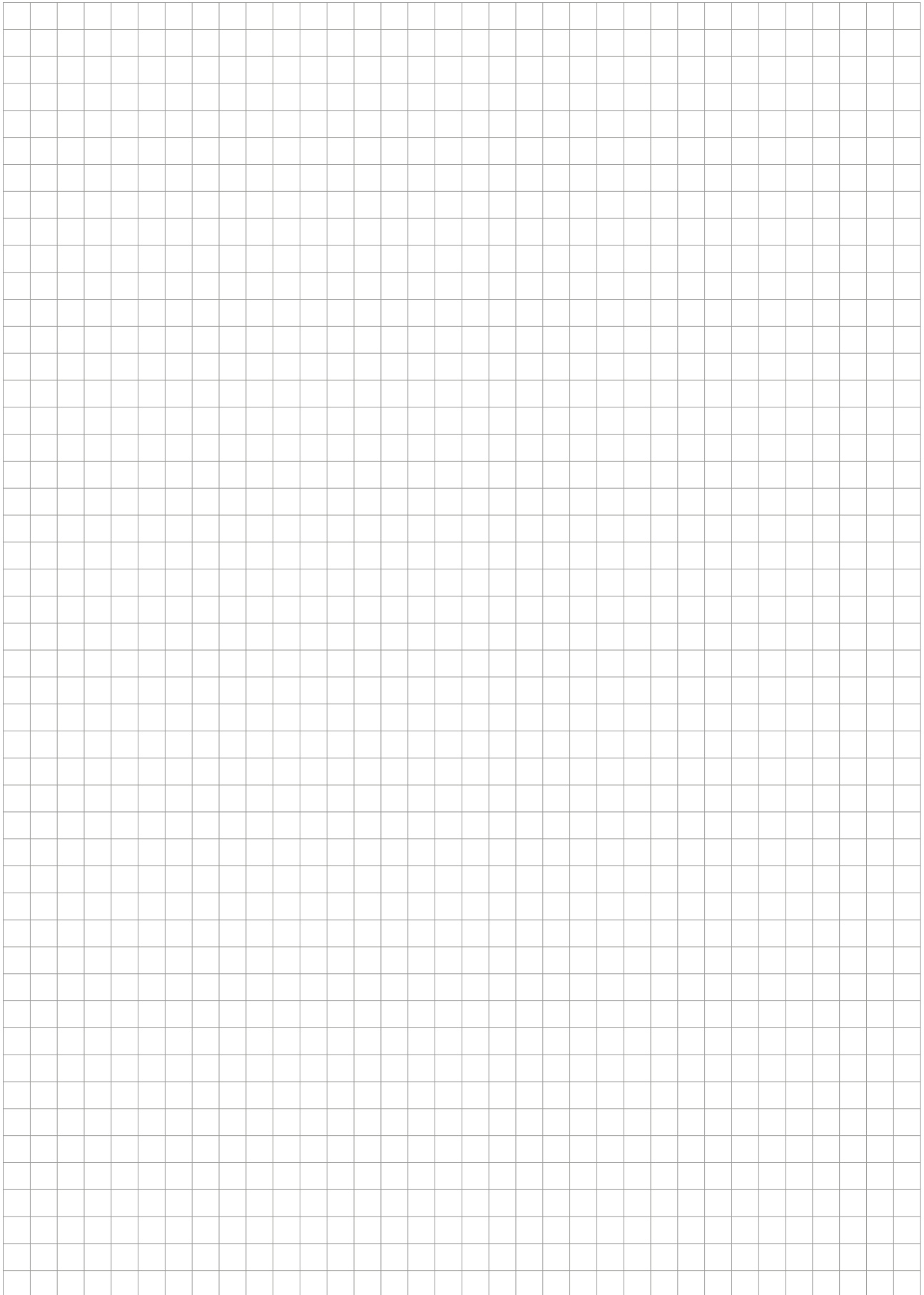
Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

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

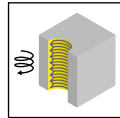
G



Übersicht  
Overview

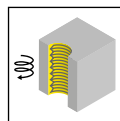
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Schaftfräser  
End Mill  
M275



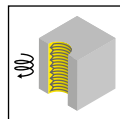
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Messerkopf  
Milling cutter  
M275



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Wendeschneidplatte  
Indexable insert  
RS275



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### 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**

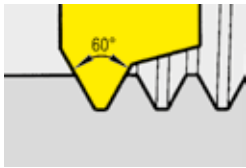
**Gewindefräser  
(zirkular)**

ab Schneidkreis  $\varnothing$  31 mm

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

from cutting edge  $\varnothing$  31 mm

### Teilprofil, metrisch Typ S275 Partial profile, metric type S275



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



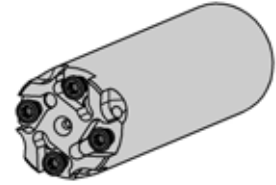
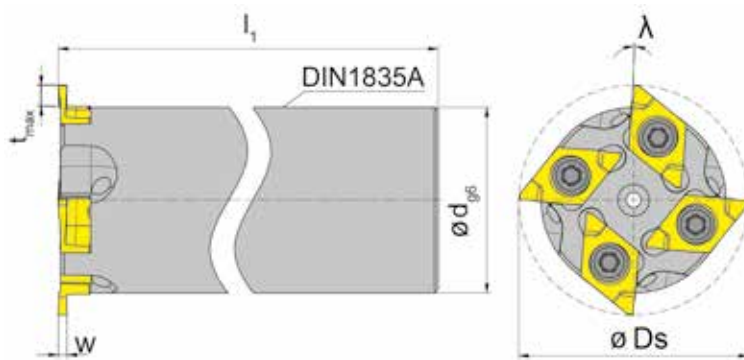
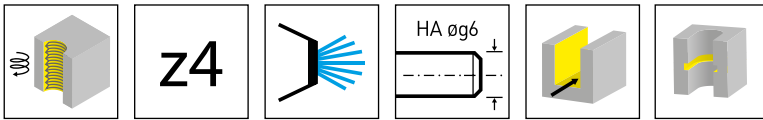


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	$l_1$	$\lambda$	HWS
M275.031.D25.3.04A	4	31	25	125	4°	275041R

G

**Ersatzteile**  
Spare Parts

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

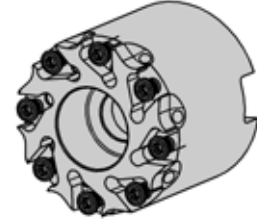
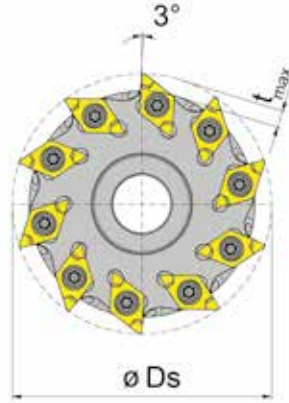
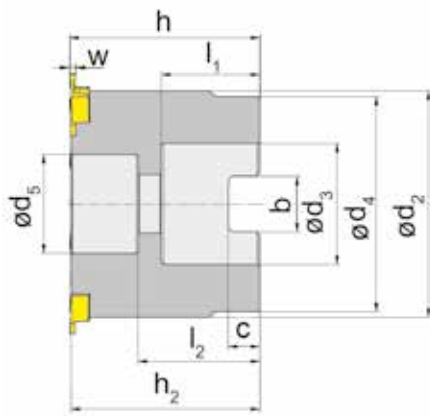
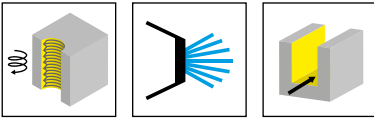


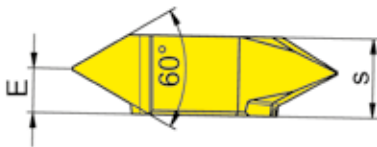
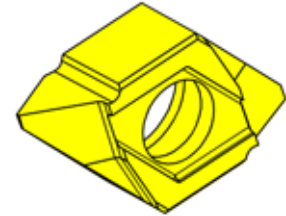
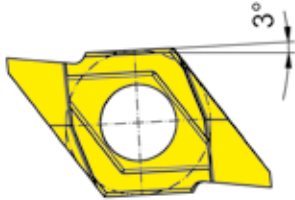
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
<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
<b>M275.0058.A27.10</b>	10	58	42,2	42,5	22	48	27	22	27,2	12,4	7	50	275041R
<b>M275.0078.A32.14</b>	14	78	49,7	50	33	58	32	25	36,7	14,4	8	70,5	275041R

**G**

**Ersatzteile**  
Spare Parts

<b>Messerkopf</b> Milling cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M275...	<b>3.5.10T10P</b>	<b>T10PL</b>



R = rechts wie gezeichnet  
R = right hand version shown

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

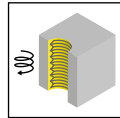
Bestellnummer Part number	P	P <sub>max</sub>	E	s	Z	HIS	TA45
RS275.1535.01	1,5	3,5	2,3	4,1	2	275041R	▲
	P ●	M ●	K ●	N ●	S ●	H -	



Übersicht  
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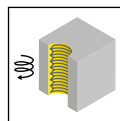
Seite/Page  
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Schaftfräser  
End Mill  
380



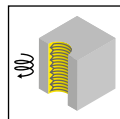
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Messerkopf  
Milling cutter  
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Wendeschneidplatte  
Indexable insert  
314



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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)**

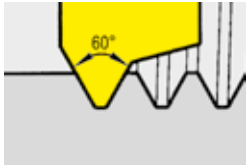
ab Schneidkreis  $\varnothing$  44 mm

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

from cutting edge  $\varnothing$  44 mm

### Teilprofil, metrisch Typ 314

#### Partial profile, 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



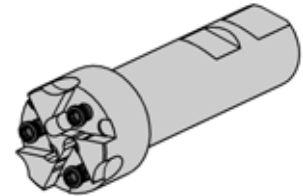
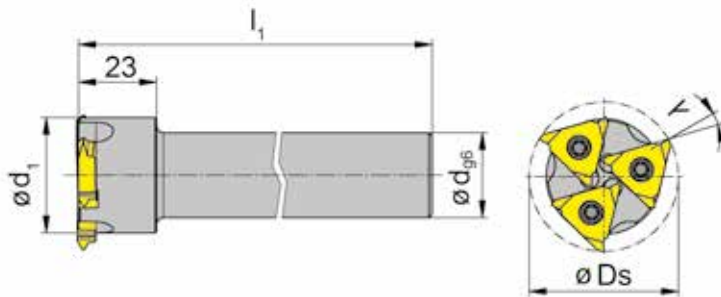
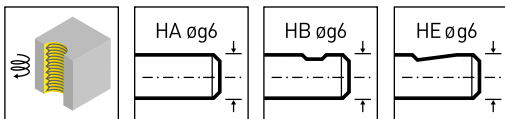


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	d <sub>1</sub>	λ	Form	HWS
380.0044.03A	3	44	25	125	34	14°	A	314027R • 314041R • 314052R
380.0044.03B	3	44	25	125	34	14°	B	314027R • 314041R • 314052R
380.0044.03E	3	44	25	125	34	14°	E	314027R • 314041R • 314052R

## Ersatzteile

Spare Parts

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



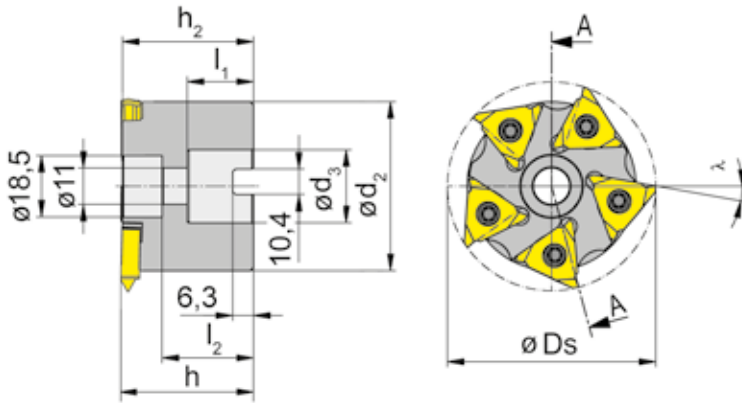
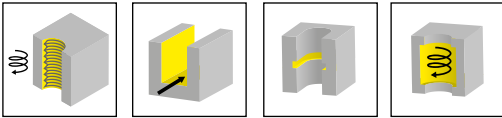


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>380.0063.05</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

**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>



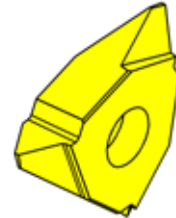
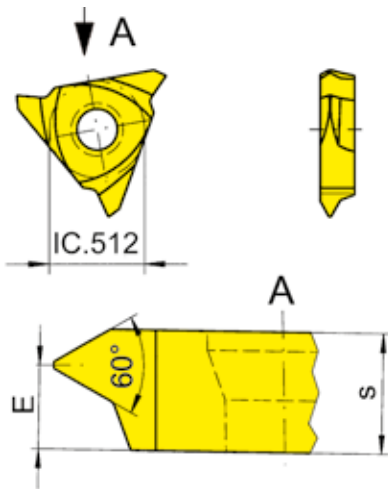


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	P	P <sub>max</sub>	E	s	Ds	Z	HIS	TN35
R314.1535.01	1,5	3,5	3,3	5,45	44	3	314052R	▲
R314.2140.01	4	4	3	5,45	44	3	314052R	▲
R314.4060.01	4	6	2,7	5,45	44	3	314052R	▲
R314.3260.01	6	6	2,7	5,45	63	3	314052R	▲

**Hinweis:**

R314.3260.01 ausschließlich für Messerkopf 380.0063.05

**Note:**

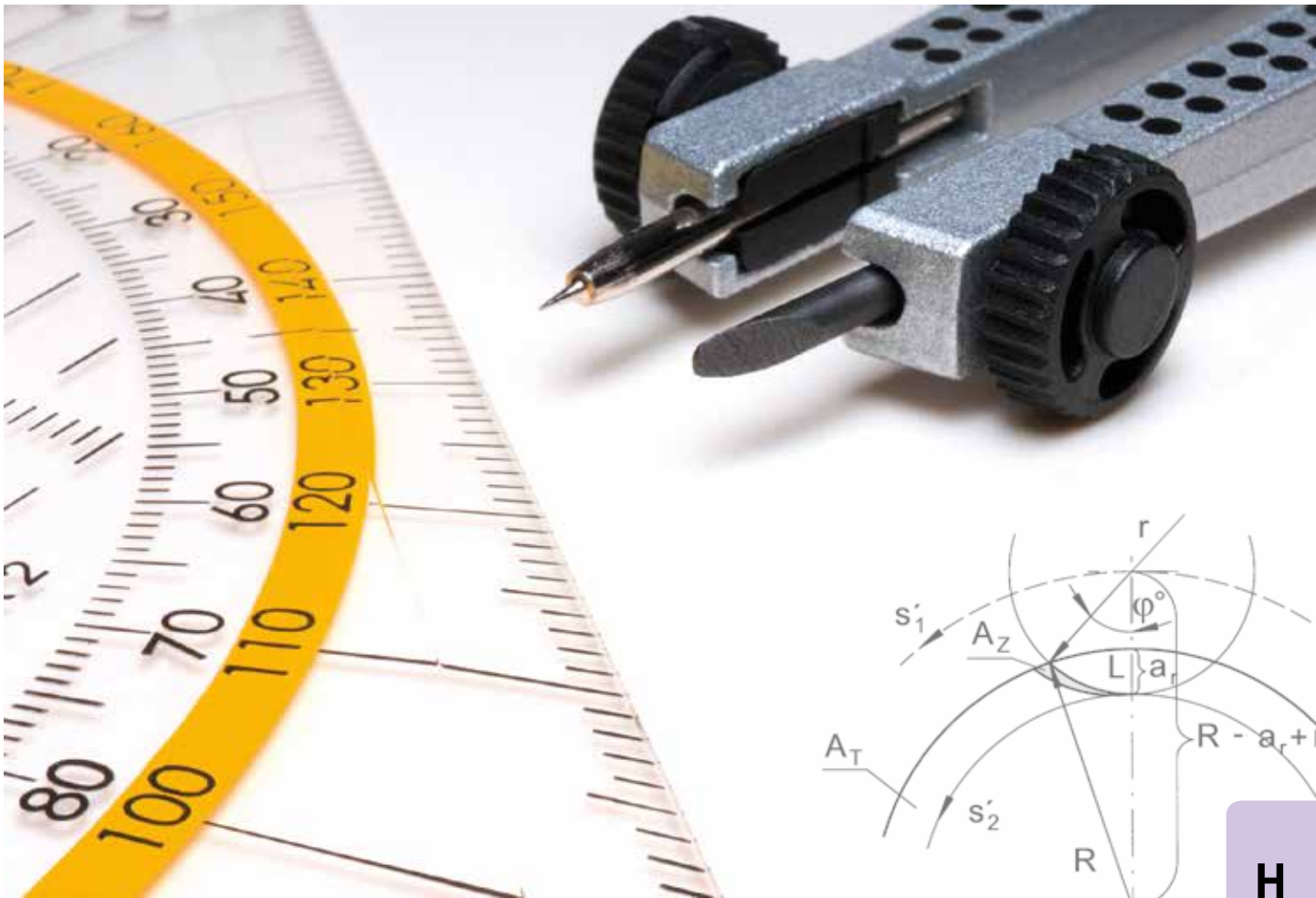
R314.3260.01 only for milling cutter 380.0063.05

P	●
M	●
K	●
N	●
S	●
H	-





G



H

Inhalt/Summary	Seite/Page
Ermittlung des Vorschubs Calculating the Feed Rate	356
Formelzeichen Symbols	357
Formeln Formulas	358 - 359
Schnittdaten Cutting Data	360 - 365

### 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

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

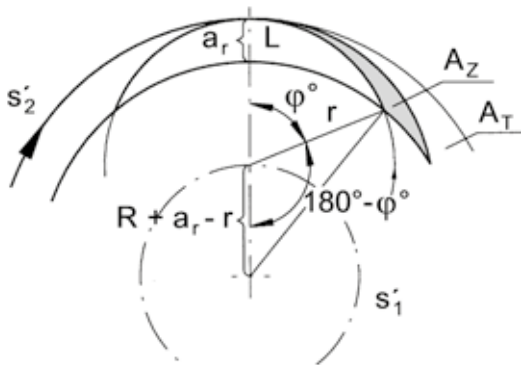
$$f_z = (h_m \times \pi \times d_e \times \phi_s) / (360^\circ \times a_e) \text{ [simplified } f_z = h_m \times \sqrt{d_e/a_e} \text{ with } a_e/d_e < 0,3]$$

### 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 Angle of action

### 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

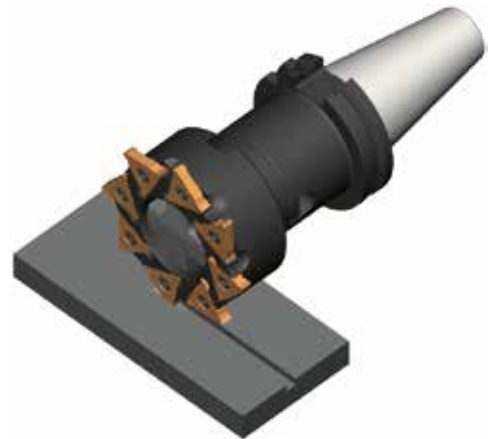
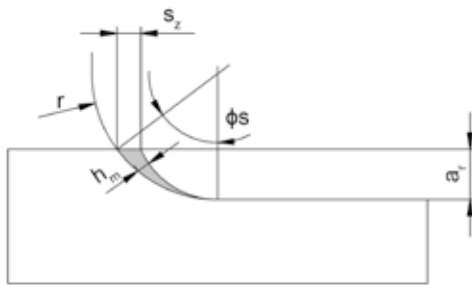
Gesamt-Zerspanzeit (für AT)  $t = \frac{A_T}{n \cdot z \cdot A_z}$  min  
Time for cut (for AT)

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

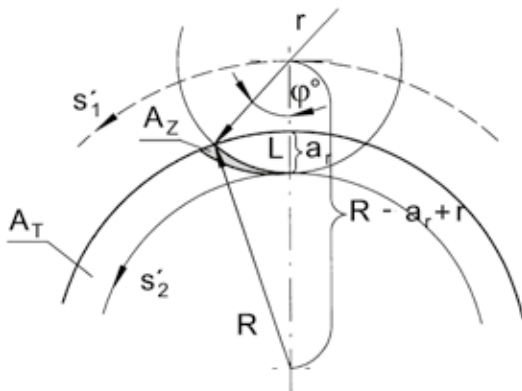
### Fräsen gerader Nuten - außen

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  $A_T = \pi [(R + a_r)^2 - R^2]$  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

# 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	gegüht 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	gegüht 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 ferritic			M1.2	300	1000	X6CrNiMo- Ti17-12-2		
austenitisch ferritisch austenitic			M1.3	230	780	X2CrNiMo- N17-13-3		
<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	-	-			

H





# 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	Tl2_ 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				
<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	

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# 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_ TF4_	AN2_ AN4_ 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			
						110-80			
						60-25			
						60-25			
						60-25			



# 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>S</b>	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>O</b>	Thermoplaste Thermoplastics		01.1			150 - 50		
	Duroplaste Duro plaste		01.2			150 - 50		
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	01.3			150 - 50		
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CKF	01.4			300 - 150		

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# Schnittdaten Nut- und Zirkularfäsen

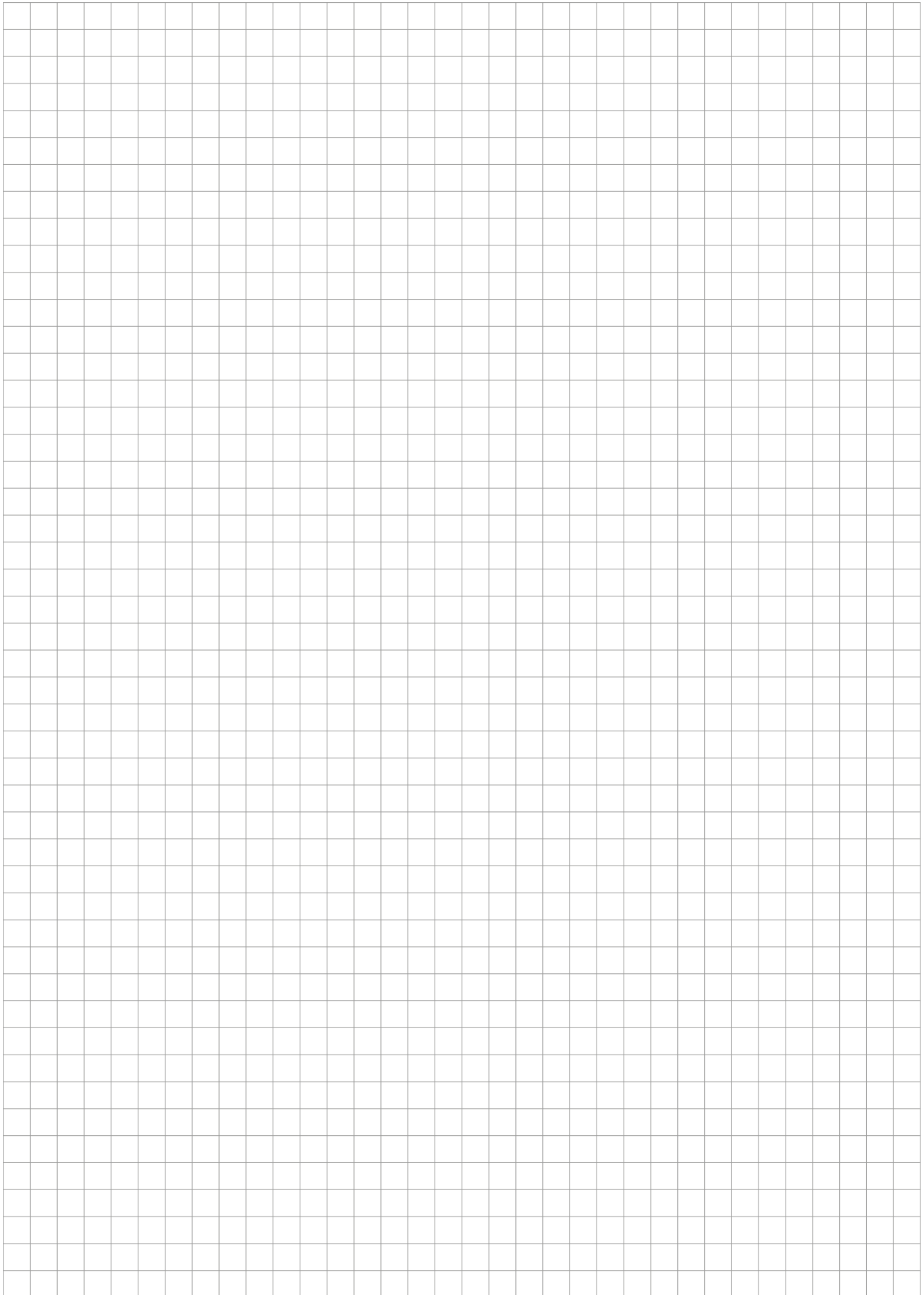
## Cutting Data Groove and Circular Milling



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

AS4_ TH3_ TA4_ TF4_	AN2_ AN4_ RC2_ RC4_	EG5_	IG3_	SG3_	DD2_				
				100-70					
				80-50					
				70-40					





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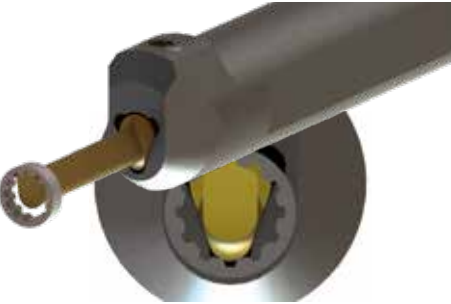


System	Seite/Page
<b>Verzahnungsfräsen</b> / Gear Milling	<b>371</b>
<b>Verzahnungsstoßen</b> / Gear Broaching	<b>383</b>
<b>Wälzschälen</b> / Gear Skiving	<b>387</b>
<b>Entgraten</b> / Deburring	<b>393</b>
<b>Abwälzstoßen</b> / Gear Shaping	<b>395</b>
<b>Schlagzahnfräsen</b> / Single-Point Gear Milling	<b>397</b>
<b>Kegelradfräsen</b> / Bevel Gear Milling	<b>399</b>
<b>5-Achs-Fräsen</b> / 5-Axis Milling of Gear Teeth	<b>403</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 broaching (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



## **VERZÄHNUNGSFRÄSEN**

Modulgrößen von 0,5 bis 4 mm

## **GEAR MILLING**

Module sizes from 0.5 up to 4 mm

# Bestellbeispiel

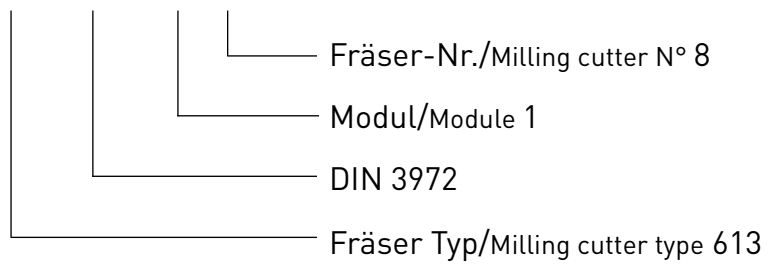
## Ordering Example

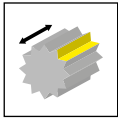


Fräser-Nr. Milling cutter N°	*z (Zähnezahl Stirnrad) *z (N° of teeth cylindrical gear)
1	12 - 13
2	14 - 16
3	17 - 20
4	21 - 25
5	26 - 34
6	35 - 54
7	55 - 134
8	≥ 135...Zahnstange/Tooth bar

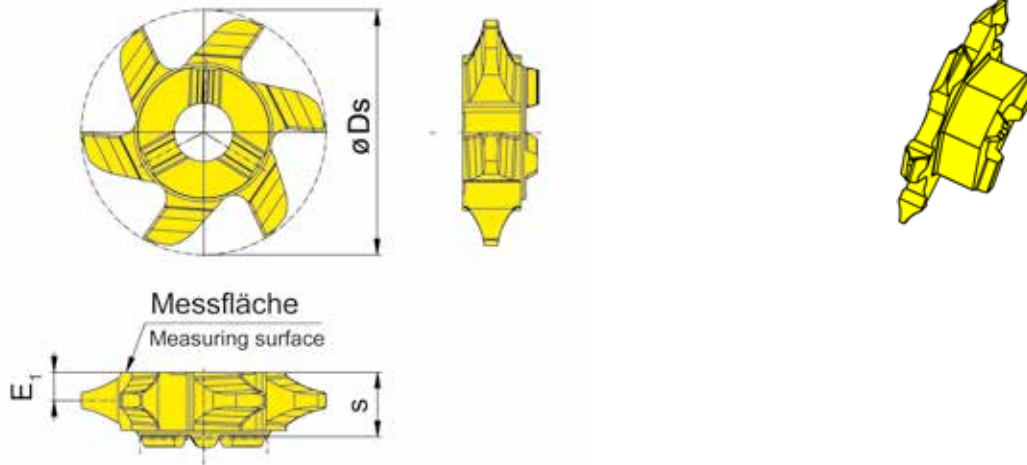


613.3972.100.8





z6



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

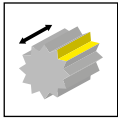
Δ 4 Wochen  
4 weeks

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

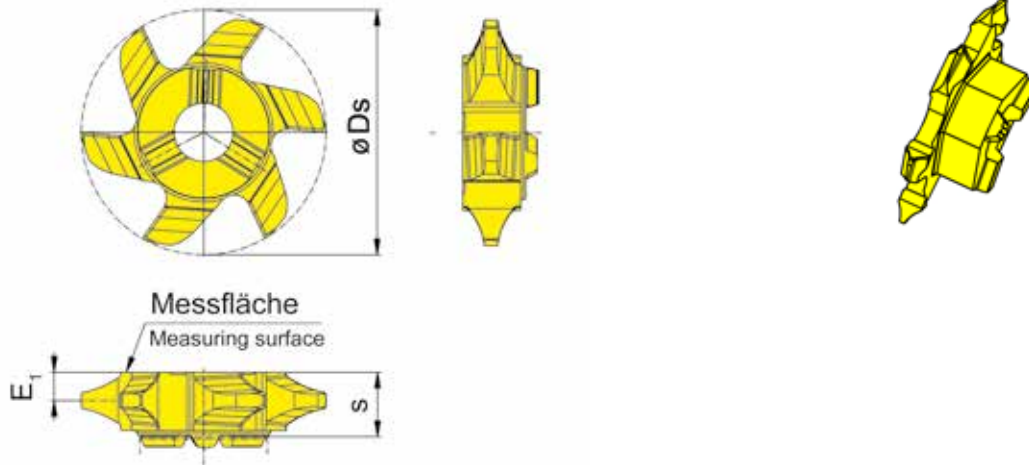
Eingriffswinkel 20°  
Pressure angle 20°

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



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

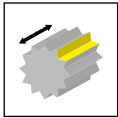
△ 4 Wochen  
4 weeks

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	△

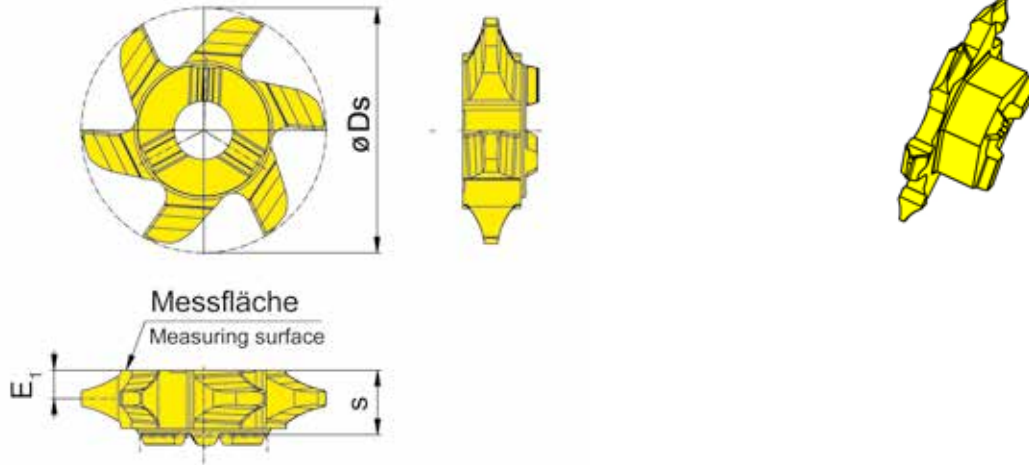
Eingriffswinkel 20°  
Pressure angle 20°

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	o
S	●
H	-



z6



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

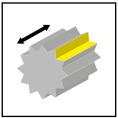
△ 4 Wochen  
4 weeks

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	△

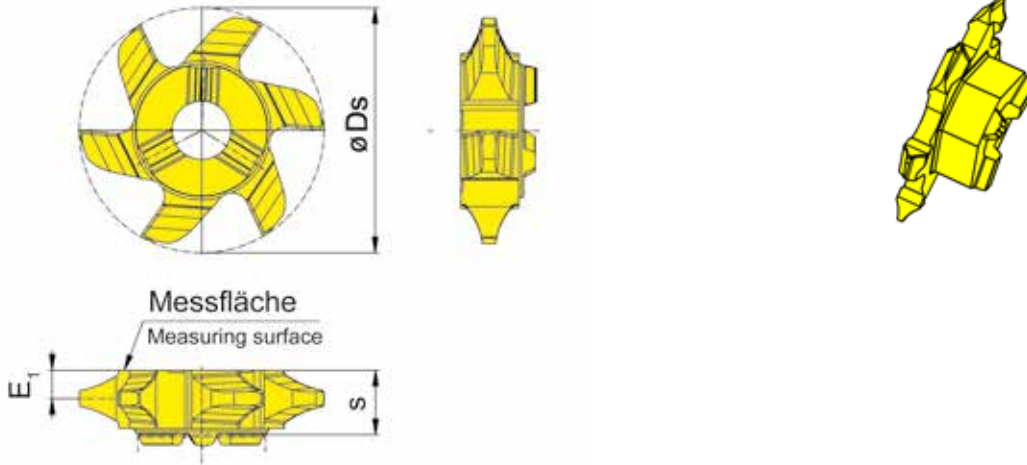
Eingriffswinkel 20°  
Pressure angle 20°

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



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	Δ
613.3972.150.2	1,5	14	16	2,5	5,7	3,2	21,7	313113R	Δ
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	Δ
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	Δ
613.3972.150.8	1,5	135	999	2,5	5,7	3,3	21,7	313113R	▲

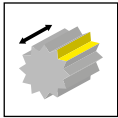
Eingriffswinkel 20°  
Pressure angle 20°

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

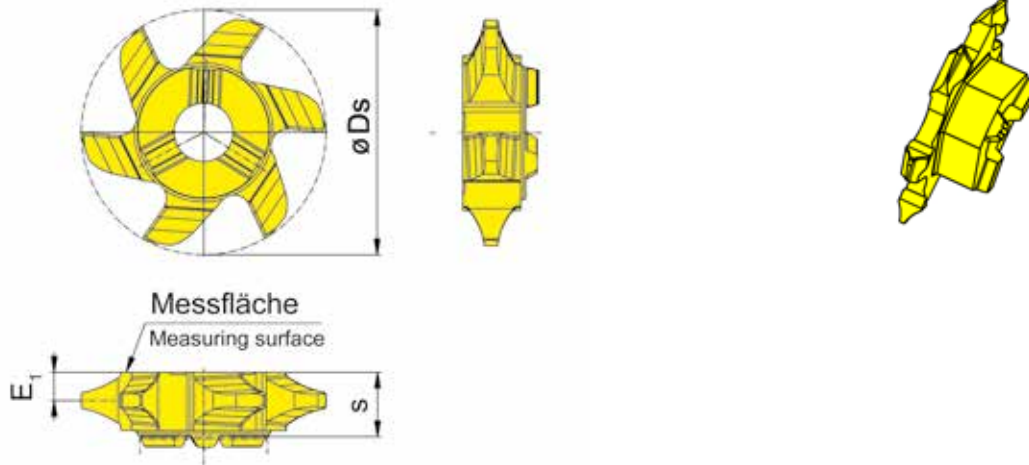
Gear milling cutter for cylindrical gears with involuted flanks according to DIN 867 Basic profile 1 according to DIN 3972 for finishing, addendum shift 0

P	●
M	●
K	●
N	o
S	●
H	-





z6



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

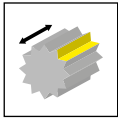
△ 4 Wochen  
4 weeks

Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	$D_s$	HIS	AS/45
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	△

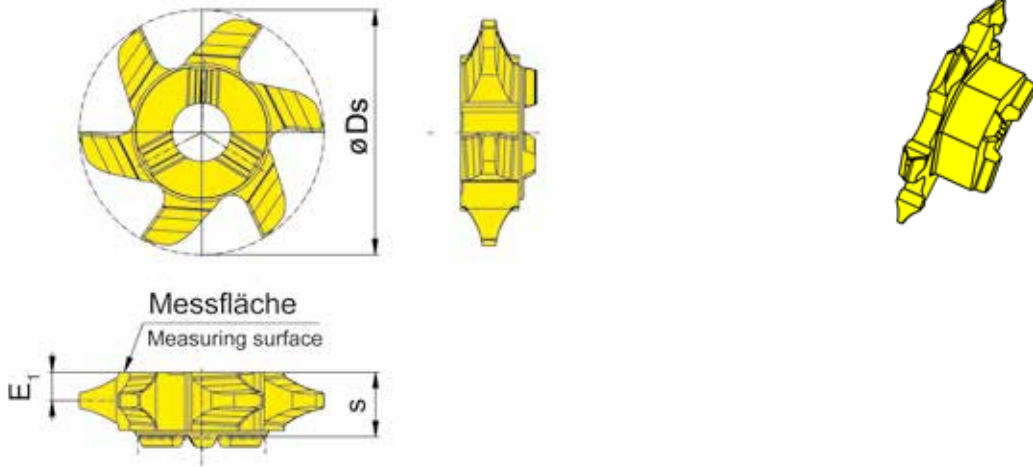
Eingriffswinkel 20°  
Pressure angle 20°

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	○
S	●
H	-



z6



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

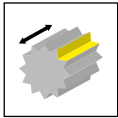
Bestellnummer Part number	Modul Module	$z_{min}$	$z_{max}$	$E_1$	s	$t_{max}$	$D_s$	HIS	AS45
632.3972.225.2	2,25	14	16	3,45	7,5	4,7	31,7	332143R	Δ
632.3972.225.3	2,25	17	20	3,45	7,5	4,8	31,7	332143R	Δ
632.3972.225.4	2,25	21	25	3,45	7,5	4,9	31,7	332143R	Δ
632.3972.225.5	2,25	26	34	3,45	7,5	4,9	31,7	332143R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

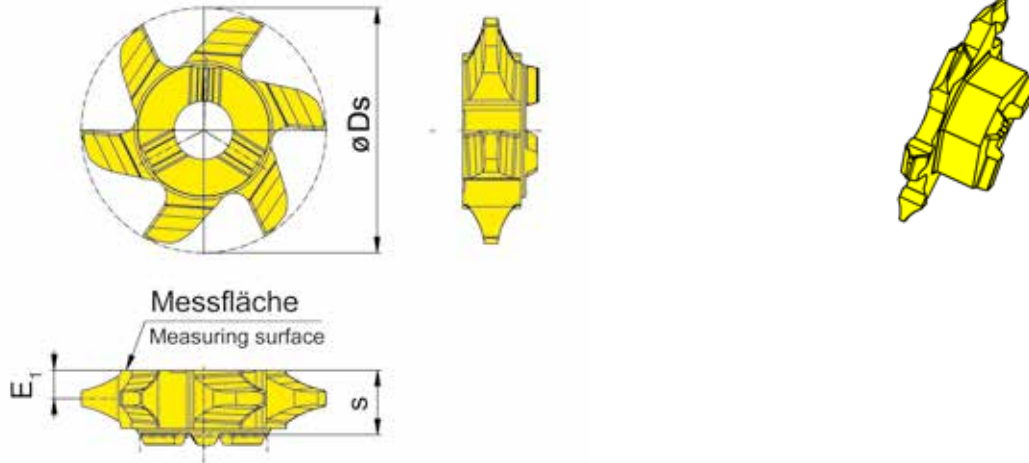
Zahnformfräser für Stirnräder mit Evolventenverzahnung nach DIN 867 Bezugsprofil 1 nach DIN 3972 für Fertigbearbeitung, Profilverchiebungsfaktor 0

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	-



z6



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

P	●
M	●
K	●
N	○
S	●
H	-

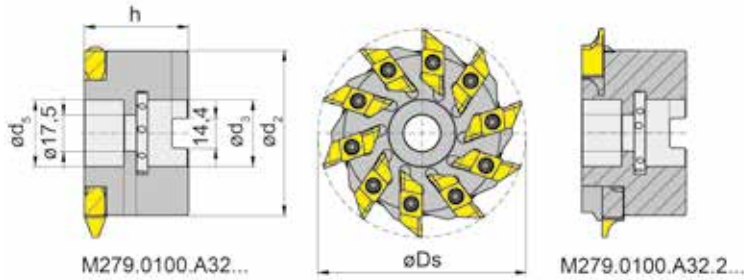
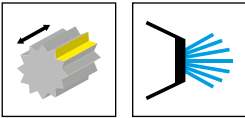
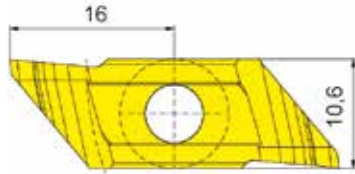
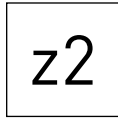
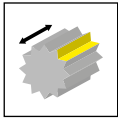


Abbildung = rechtsschneidend  
Picture = right hand cutting version

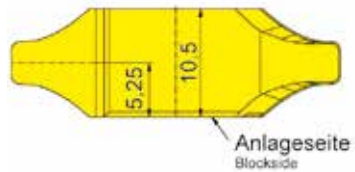
Bestellnummer Part number	Z	Ds	h	d <sub>5</sub>	d <sub>2</sub>	d <sub>3</sub>	HWS
<b>M279.0100.A32.10.10.IK</b>	10	100	50	17,5	79	32	279105N
<b>M279.0100.A32.2.10.05.IK</b>	10	100	50	17,5	79	32	279105R • 279105L

**Ersatzteile**  
Spare Parts

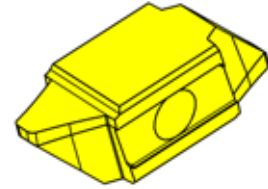
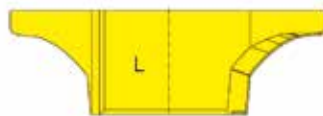
Aufsteckfräser Arbour Mounted Cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M279...	<b>030.0516.T20P</b>	<b>T20PQ</b>



„A“ = einreihig  
= single-row



„B“ = zweireihig  
= two-row



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

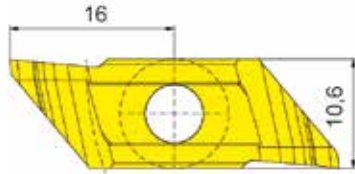
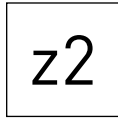
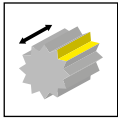
Δ 4 Wochen  
4 weeks

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, 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

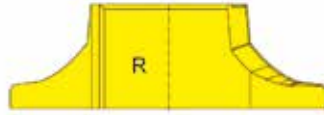
P	●
M	●
K	●
N	○
S	●
H	-



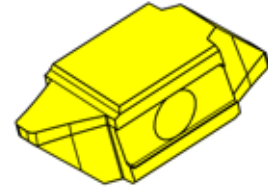
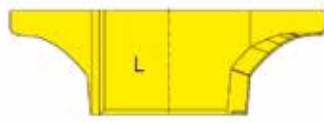
„A“ = einreihig  
= single-row



Anlageseite  
Blockside



„B“ = zweireihig  
= two-row



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

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
RS279.3972.375.1L	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	-



# **VERZÄHNUNGSSTOSSEN**

Bis Modul 5

## **GEAR BROACHING**

Up to module 5

**Beispiel: Supermini**

Example:





### Schneidplatte

Insert

**N105**

**N110**

**S117**

Typ Type	max. Modulgröße $m_n$ ma. 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 von Modul 0,2 mm bis Modul 8 mm

## **GEAR SKIVING**

Gear teeth from module 0.2 mm up to module 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)



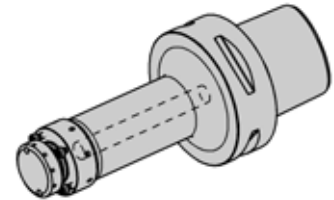
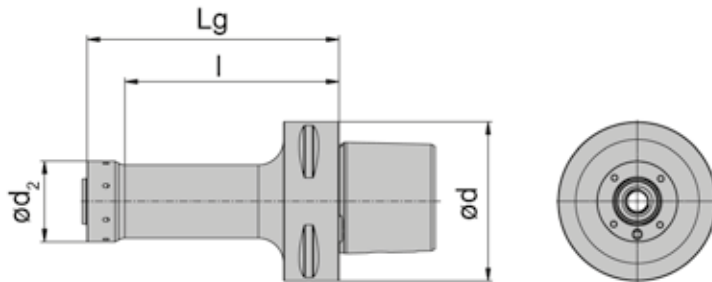
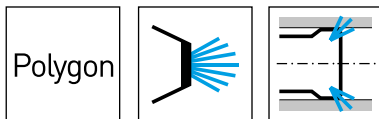
## Produktgruppe WSR:

- 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
<b>MDR.044.C6.060.W</b>	45	60	63	32	D	04
<b>MDR.044.C6.100.W</b>	85	100	63	32	D	04
<b>MDR.044.HSKT063.060.W</b>	45	60	63	32	D	04
<b>MDR.052.C6.060.W</b>	45	60	63	39	D	05
<b>MDR.052.C6.100.W</b>	85	100	63	39	D	05
<b>MDR.052.HSKT063.060.W</b>	45	60	63	39	D	05
<b>MDR.052.HSKT063.100.W</b>	85	100	63	56	D	05
<b>MDR.081.C6.060.W</b>	45	60	63	56	D	08
<b>MDR.081.C6.125.W</b>	102	125	63	56	D	08
<b>MDR.081.C8.060.W</b>	45	60	80	56	D	08
<b>MDR.081.C8.100.W</b>	77	100	80	56	D	08
<b>MDR.081.C8.125.W</b>	102	125	80	56	D	08
<b>MDR.081.HSKT063.060.W</b>	45	60	63	56	D	08
<b>MDR.081.HSKT063.100.W</b>	77	100	63	56	D	08
<b>MDR.081.HSKT063.125.W</b>	102	125	63	56	D	08

Die Schäfte sind für das Wälzschälssystem 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

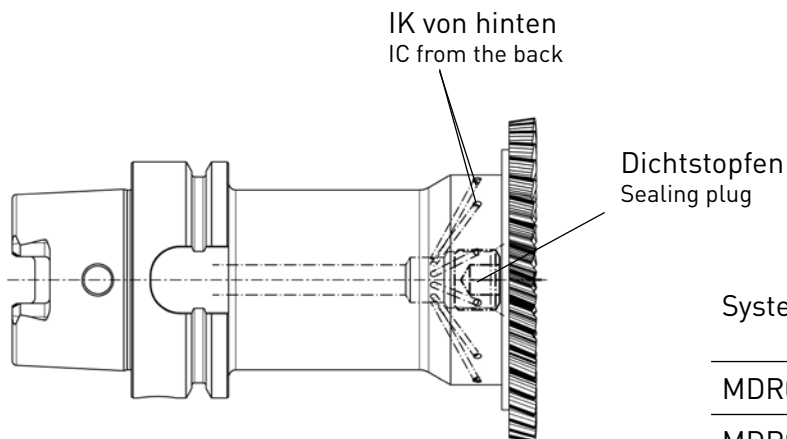
Wälzschälschaft Gear Skiving Holder	Schraube Screw	Torx-Schlüssel Torx Wrench
MDR....	<b>C009002</b>	<b>T8L</b>
MDR.081...	<b>C00 90 04</b>	<b>T15Q</b>

### Ausführung innere Kühlmittelzufuhr

Internal coolant supply design

Ausführung "D" - mit Dichtstopfen

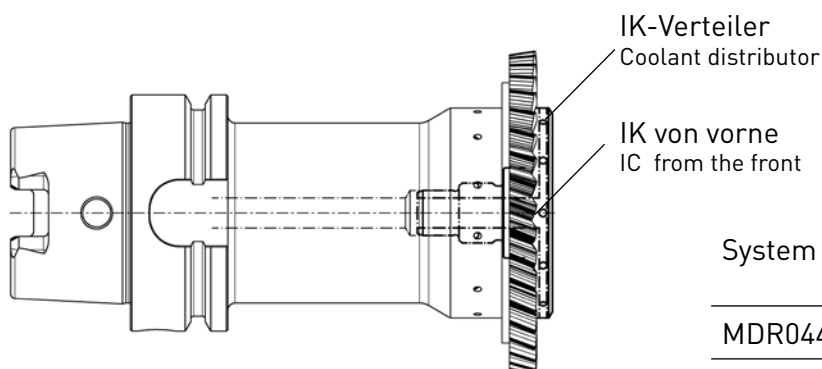
Version "D" - with Sealing plug



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 VERZÄHNUNGEN**

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

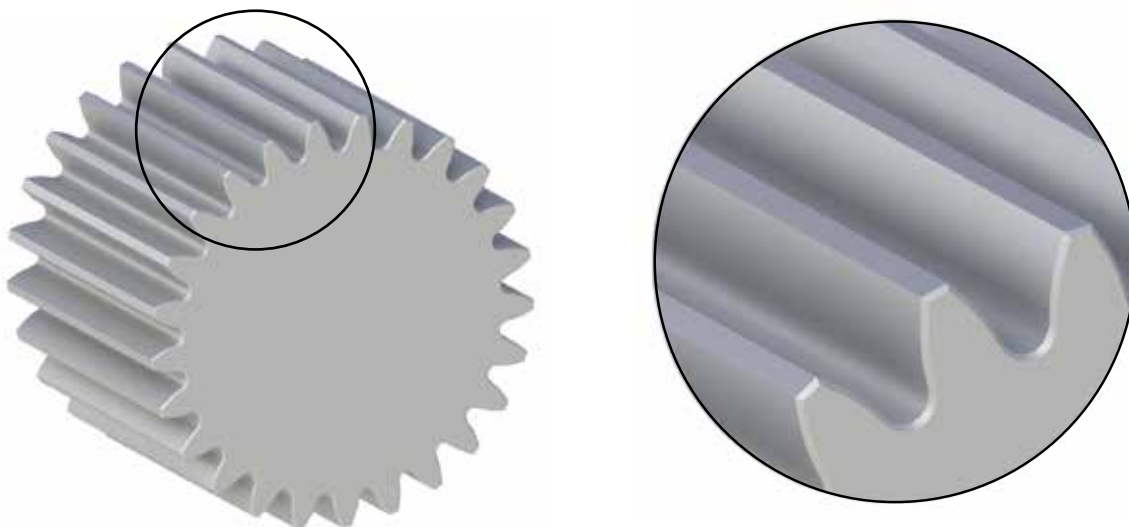
Number of teeth: 25

Module: 1.25

Cycle time: 8 s

Cutting speed: 200 m/min

f: 150 mm/min





## **ABWÄLZSTOSSEN**

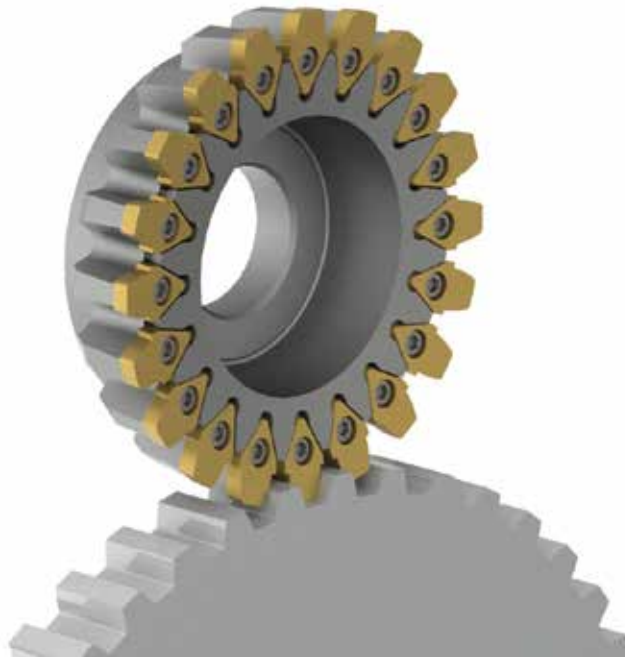
Für Außen- und Innenverzahnungen

## **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**

Von Modul 0,6 mm bis Modul 4 mm

## **BEVEL GEAR MILLING**

From module 0.6 mm up to module 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

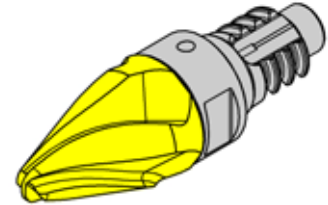
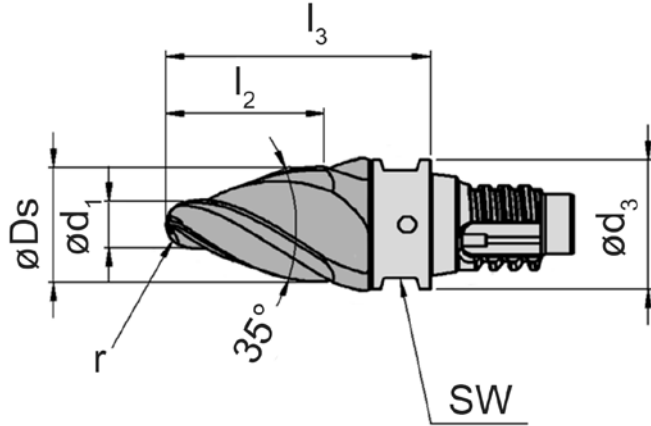
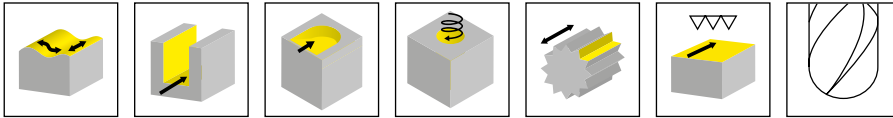






## **5-ACHS-FRÄSEN VON VERZÄHNUNGEN**

5-AXIS MILLING OF GEAR TEETH



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	System	SW	Z	D <sub>s</sub>	d	r	l <sub>3</sub>	d <sub>1</sub>	a <sub>p</sub>	HIS	AN2P
DGVZ.4.10.35.15.00	DG10	8	4	10	9,8	1,5	21	2,86	12,3	DG0101	▲
DGVZ.4.12.35.20.00	DG12	10	4	12	11,7	2	24	3,82	14,3	DG0121	▲
DGVZ.6.16.35.30.00	DG16	13	6	16	15,6	3	32	5,72	18,4	DG0161	▲
DGVZ.6.20.35.50.00	DG20	17	6	20	19,5	5	37	9,54	20,09	DG0201	▲

**Hinweis:**

Dieses Kapitel enthält lediglich die Schlichtwerkzeuge für Verzahnungen. Die Werkzeuge für die Schruppbearbeitung des Systems DAH finden Sie im Kapitel K, die Systeme DG und DS im Katalog VHM-FRÄSWERKZEUGE

**Note:**

This chapter contains only the finishing tools for gears. The tools for roughing System DAH can be found in chapter K, for systems DG and DS please see our catalogue SOLID CARBIDE MILLS

P	●
M	○
K	-
N	-
S	-
H	-

## 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



DAH.M.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
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### 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 $q_f$ (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 $q_{aPO}$ (mm) Tool tip radius		

### Prüfmaß Verzahnung / Measuring type

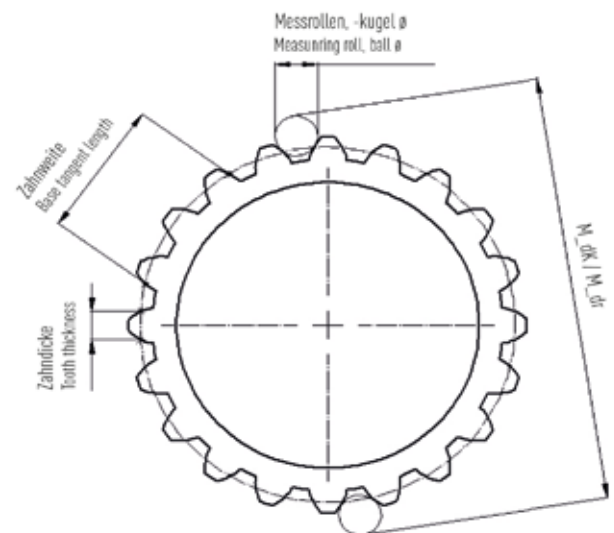
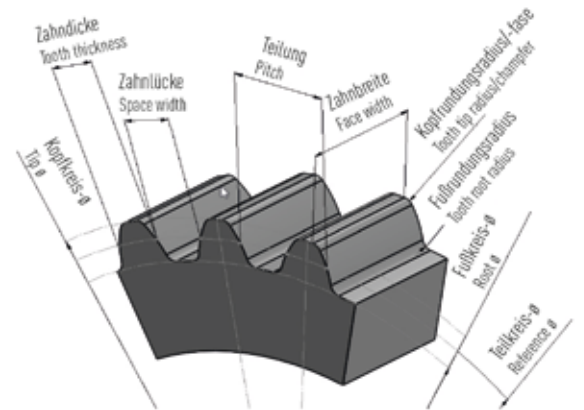
Bitte wählen! Please choose!		
2-Kugelmaß $M_{dK}$ (mm) Measurement between 2 balls	min	max
2-Rollenmaß $M_{dr}$ Measurement between 2 rolls	min	max
Zahnweite über ___ Zähne Base tangent length	min	max
Zahndicke Tooth thickness	min	max
Zahnlückenweite Gap width	min	max
Messkörper- $\emptyset$ (mm) Measuring 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)		

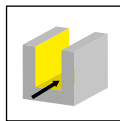
### Bemerkungen / Notes





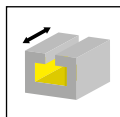
System/System	Seite/Page
<b>M311</b>	<b>410</b>
<b>M313</b>	<b>416</b>
<b>M328</b>	<b>420</b>
<b>M406/M409</b>	<b>426</b>

Frälerschaft  
Milling shank  
M311



Seite/Page  
412

Schneidplatte  
Insert  
311



Seite/Page  
413-414

# M311



**T-Nuten-Fräser mit  
wechselbarer  
Schneidplatte**

ab SchneidkreisØ 17 mm

**T-Slot Cutter  
with exchangeable  
inserts**

from cutting edge Ø 17 mm

**J**

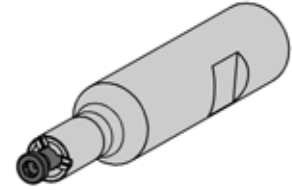
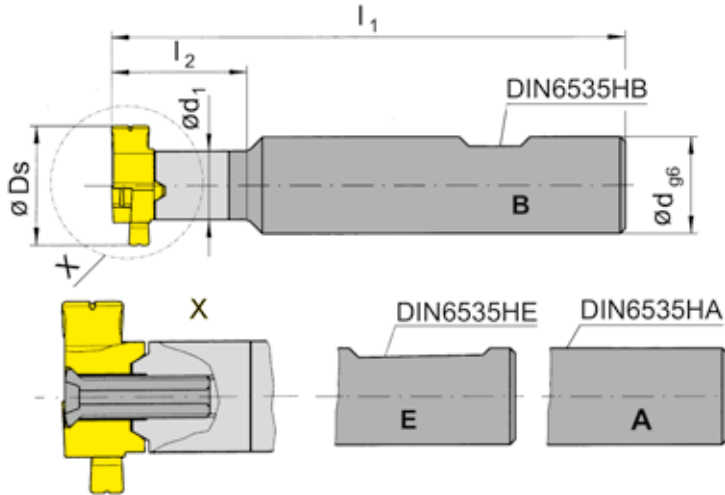
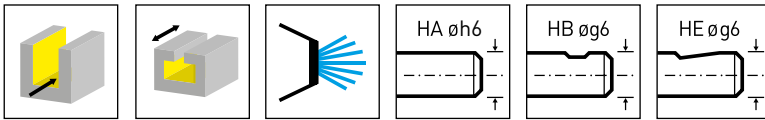


Abbildung = rechtsschneidend  
Picture = right hand cutting version

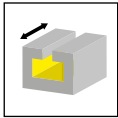
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M311.0016.00A</b>	16	90	25	9	A	311090R
<b>M311.0016.00B</b>	16	90	25	9	B	311090R
<b>M311.0016.00E</b>	16	90	25	9	E	311090R

Ds siehe Schneidplatten  
Ds see inserts

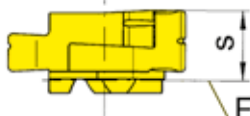
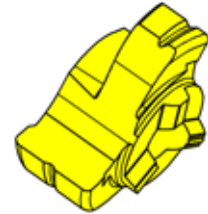
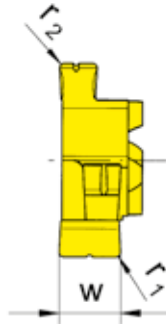
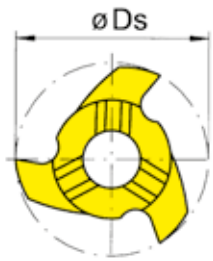


**Ersatzteile**  
Spare Parts

<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>



z3



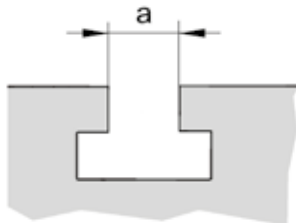
Fräaserschaft  
Milling shank

Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$s$	$w$	$r_1$	$r_2$	$a$	HIS	AS45	TI25
311.1016.00	17	7,7	7,2	0,5	0,8	10	311090R	▲	▲
								P ● ●	● ●
								M ● ●	● ●
								K ● ●	● ●
								N ○ ●	● ●
								S ● ●	● ●
								H - -	- -



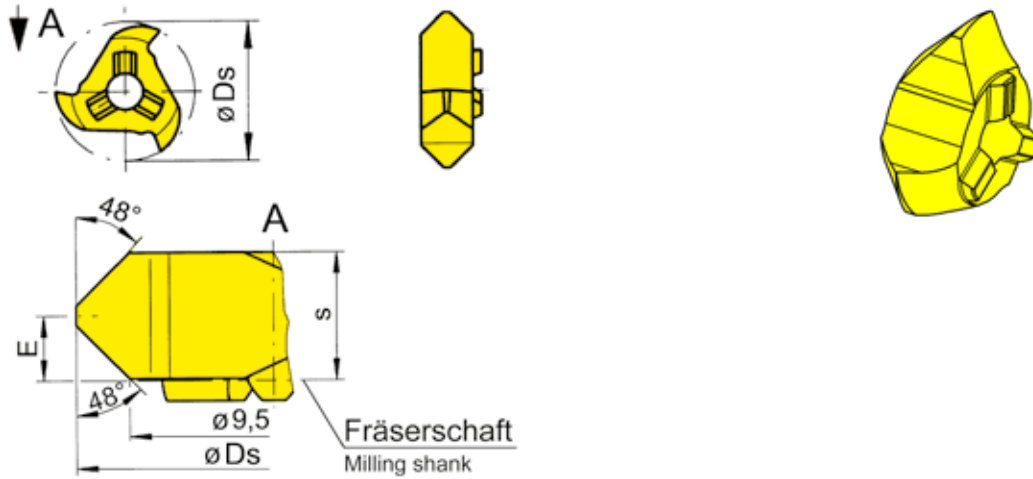
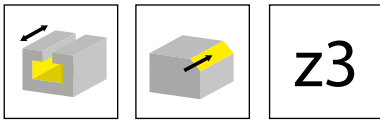
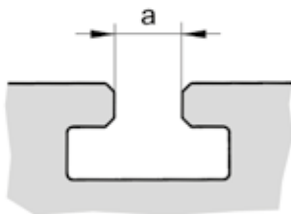


Abbildung = rechtsschneidend  
Picture = right hand cutting version

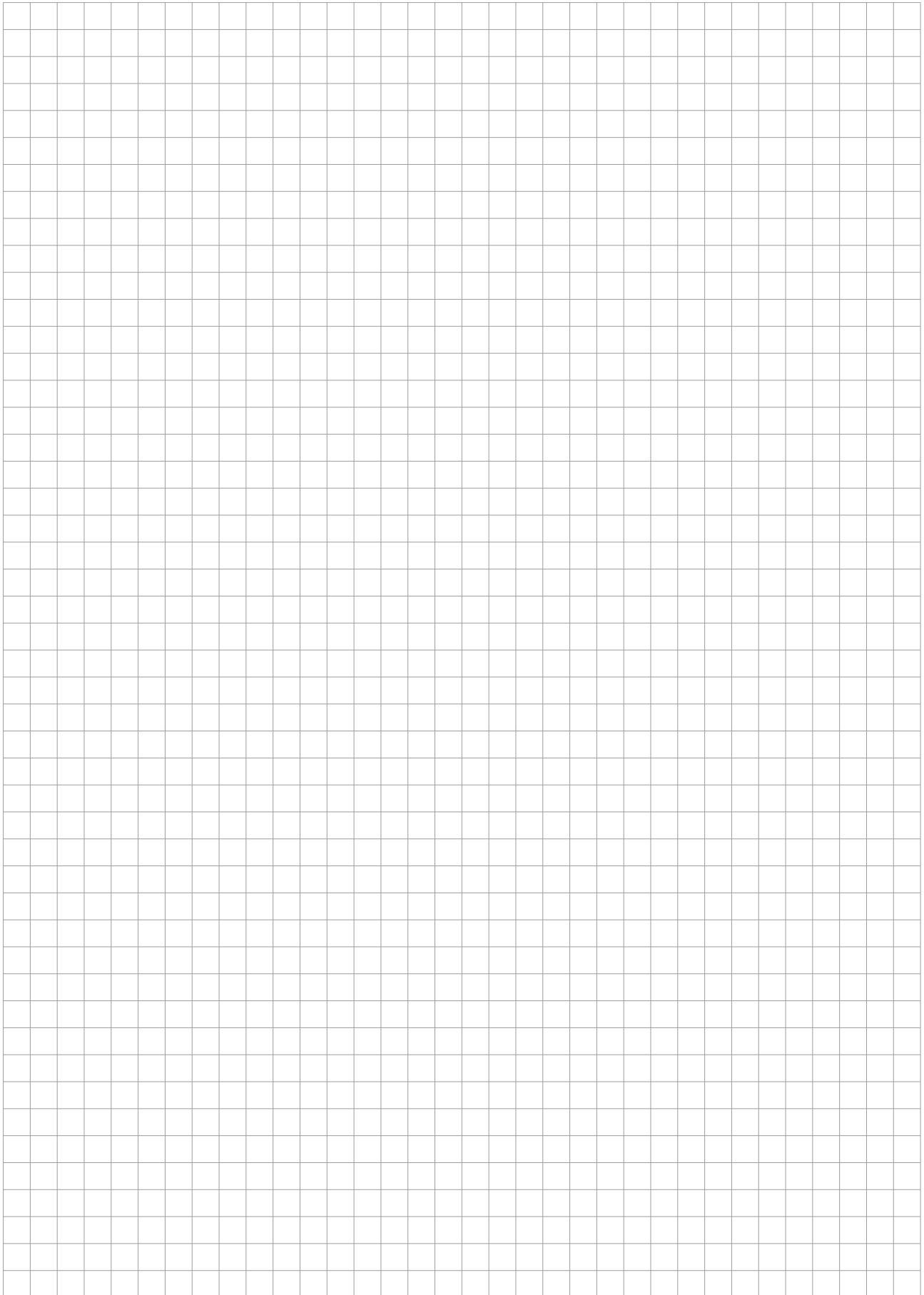
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

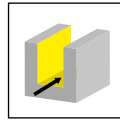
Bestellnummer Part number	Ds	E	s	a	HIS	TI25
311.4216.00	15,8	3	5,95	10	311090R	▲



P	●
M	●
K	●
N	●
S	●
H	-

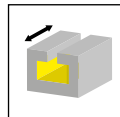


Frälerschaft  
Milling shank  
M313



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418

Schneidplatte  
Insert  
313



Seite/Page  
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# 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**

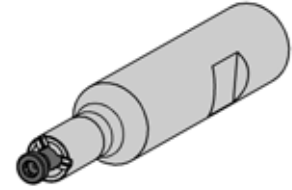
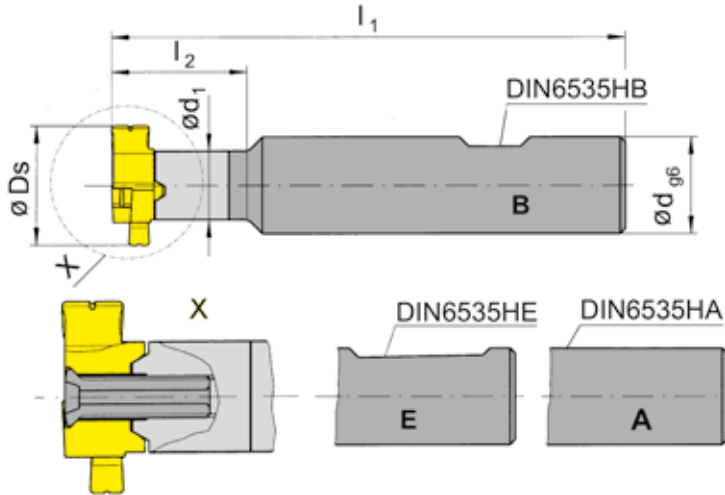
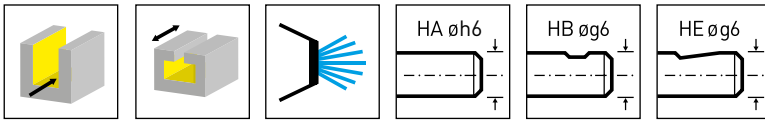


Abbildung = rechtsschneidend  
Picture = right hand cutting version

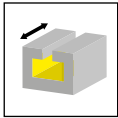
Bestellnummer Part number	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	Form	HWS
<b>M313.0016.00A</b>	16	93	30	11,5	A	313113R • 313113L
<b>M313.0016.00B</b>	16	93	30	11,5	B	313113R • 313113L
<b>M313.0016.00E</b>	16	93	30	11,5	E	313113R • 313113L

Ds siehe Schneidplatten  
Ds see inserts

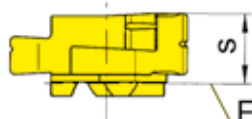
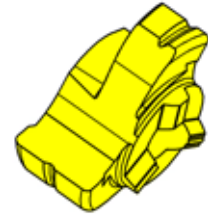
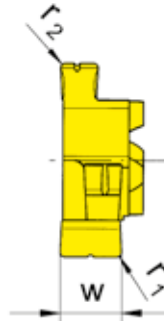
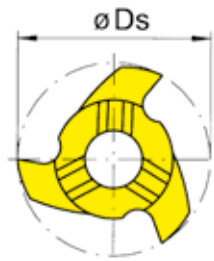


**Ersatzteile**  
Spare Parts

<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>



z3



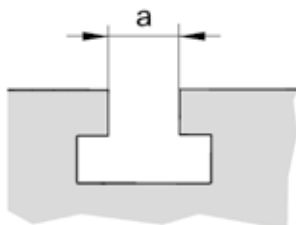
Fräuserschaft  
Milling shank

Abbildung = rechtsschneidend  
Picture = right hand cutting version

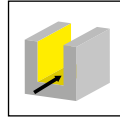
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$D_s$	$s$	$w$	$r_1$	$r_2$	$a$	HIS	AS45	TI25
313.1219.00	20	8,7	8,2	0,5	0,8	12	313113R	▲	▲
								P ● ●	● ●
								M ● ●	● ●
								K ● ●	● ●
								N ○ ●	● ●
								S ● ●	● ●
								H - -	- -

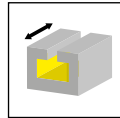


Fräserschaft  
Milling shank  
M328



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Schneidplatte  
Insert  
328



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Technische Hinweise  
Technical Instructions

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# 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**

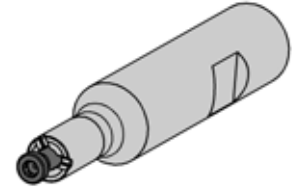
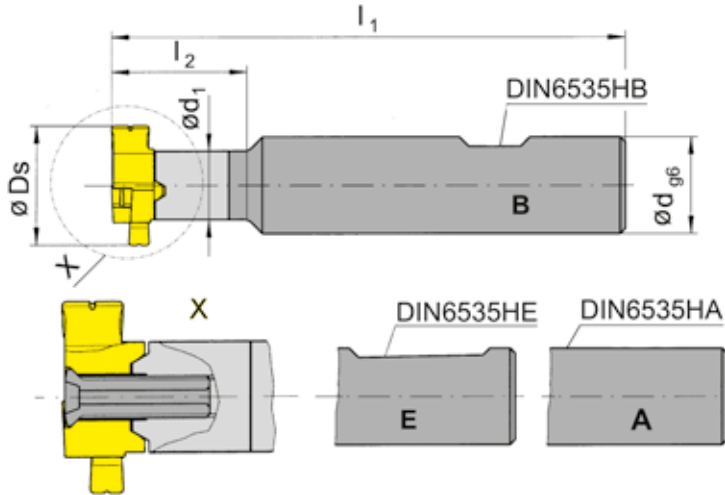
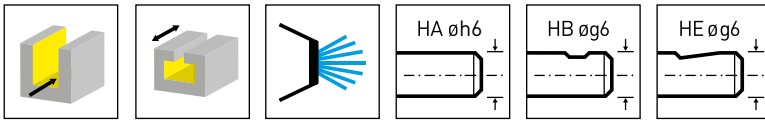


Abbildung = rechtsschneidend  
Picture = right hand cutting version

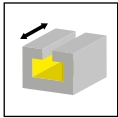
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<b>M328.0020.00A</b>	20	104	35	13,5	A	328143R
<b>M328.0020.00B</b>	20	104	35	13,5	B	328143R
<b>M328.0020.00E</b>	20	104	35	13,5	E	328143R

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>



z3

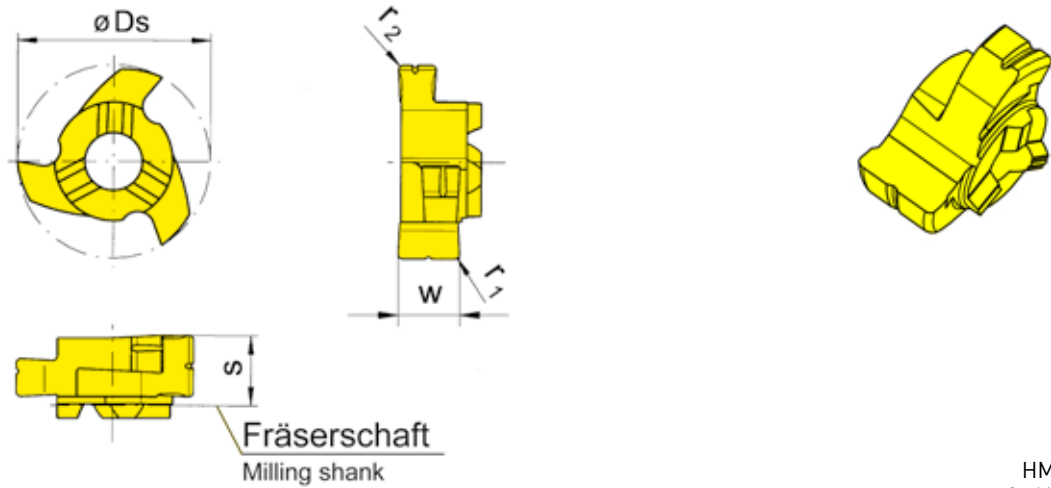
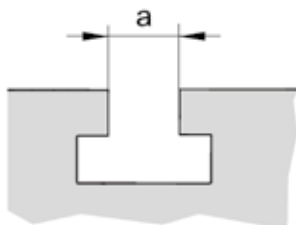


Abbildung = rechtsschneidend  
Picture = right hand cutting version

▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

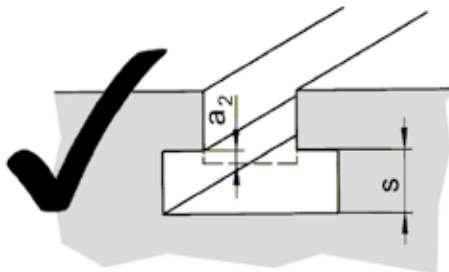
Bestellnummer Part number	$D_s$	$s$	$w$	$r_1$	$r_2$	$a$	HIS	AS45	TI25
328.1423.00	24	9,8	9,2	0,5	1	14	328143R	▲	▲
								P ● ●	● ●
								M ● ●	● ●
								K ● ●	● ●
								N ○ ●	● ●
								S ● ●	● ●
								H - -	- -



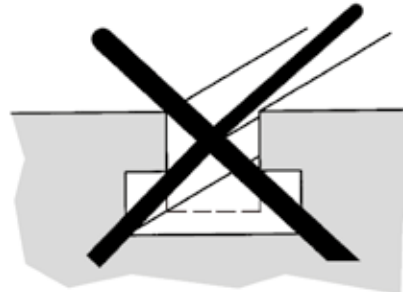
**Anwendungstechnologie**

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 / AS45	200 - 300	0,03 - 0,06	0,05 - 0,08
Legierter Stahl Alloyed steel	Tl25 / AS45	140 - 220	0,02 - 0,04	0,03 - 0,05
Grauguss Grey cast iron	Tl25 / AS45	100 - 160	0,03 - 0,06	0,05 - 0,10

**T-Nuten-Fasen**

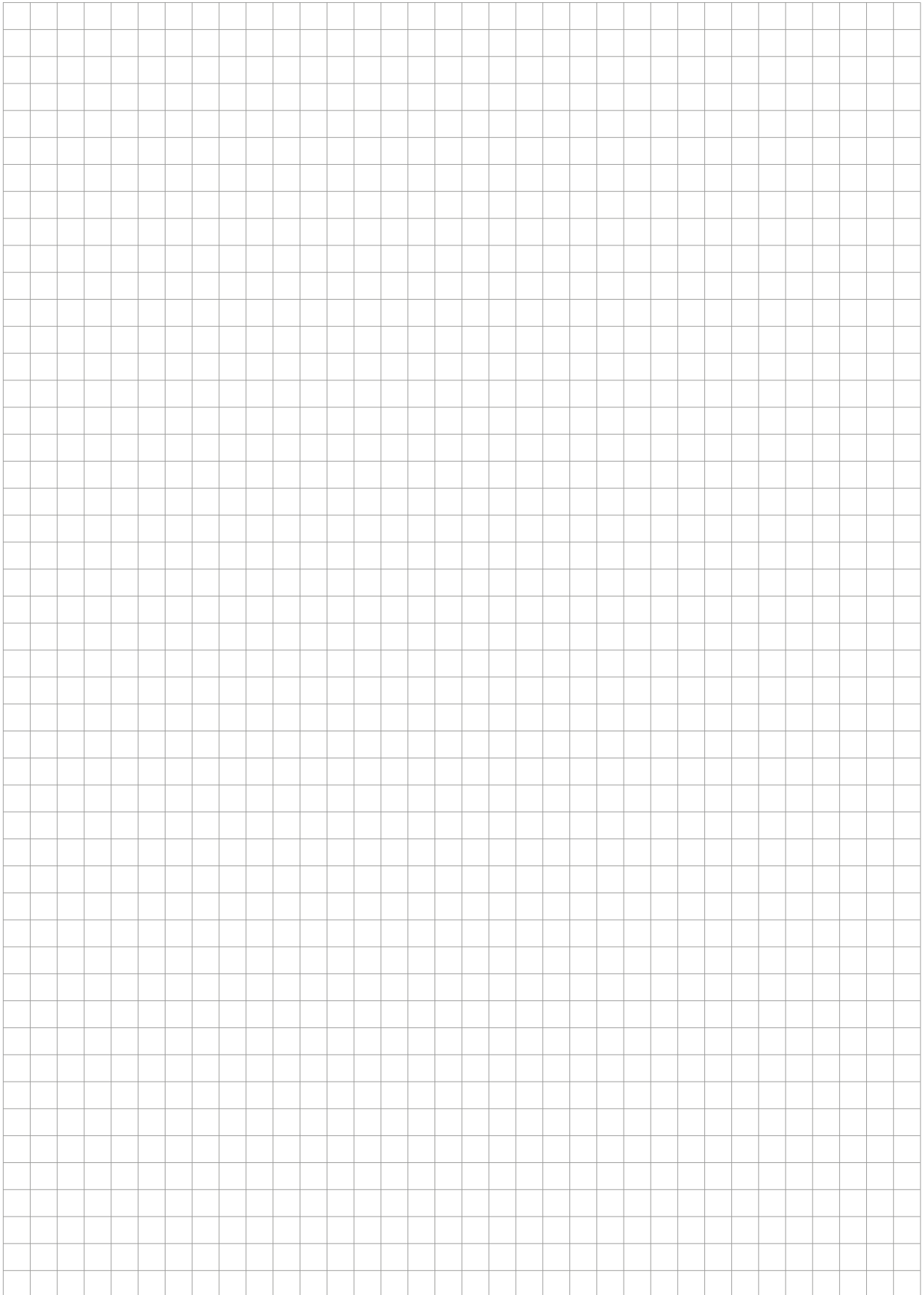
Chamfering of T-slots

bearbeitbare Werkstoffe Workpiece material	Schneidstoff Cutting material	$v_c$ (m/min)	$f_z$ (mm), Z=3
Kohlenstoffstahl Carbon steel	Tl25 / AS45	300 - 400	0,10 - 0,13
Legierter Stahl Alloyed steel	Tl25 / AS45	180 - 300	0,13 - 0,21
Grauguss Grey cast iron	Tl25 / AS45	140 - 240	0,16 - 0,27

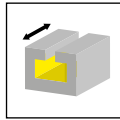
Diese Werte sind nur gültig mit dem zur Verfügung stehenden schwingungsdämpfenden Standard-Vollhartmetallschäften.

The cutting data is only valid for standard carbide toolholders (shanks) listed in this chapter.



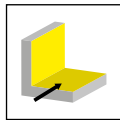


Schaftfräser  
End Mill  
M406/M409



Seite/Page  
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Wendeschnidplatte  
Indexable insert  
406/409



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Technische Hinweise  
Technical Instructions

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# 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

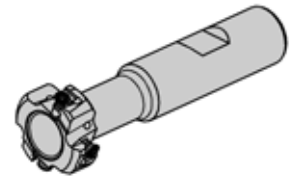
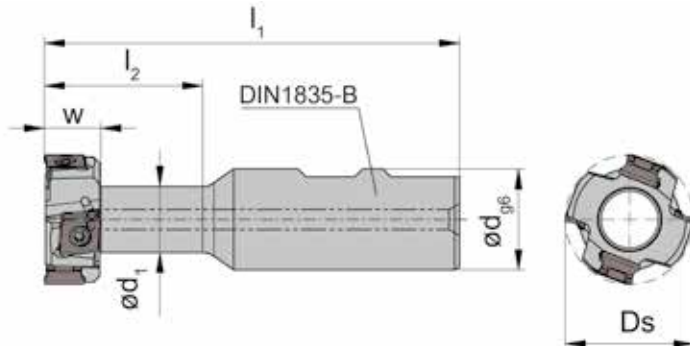
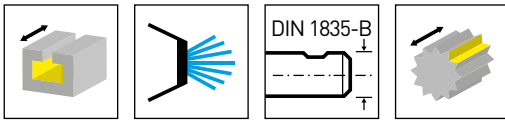


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

<b>Schaftfräser</b> End Mill	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M406.025.11.D16.1.02.B	<b>030.2608.T8P</b>	<b>T8PL</b>

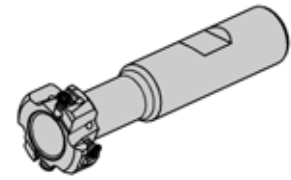
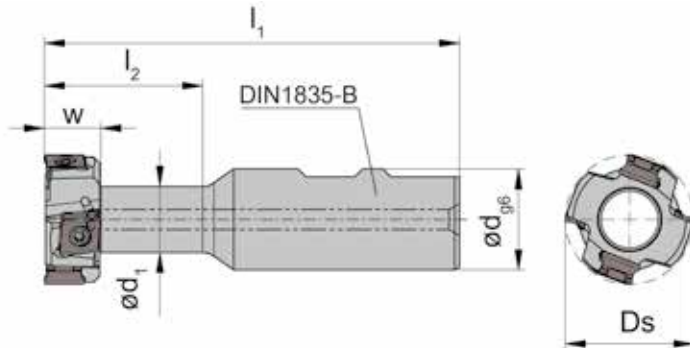
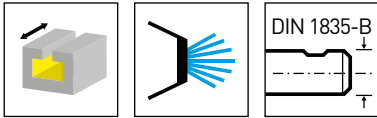


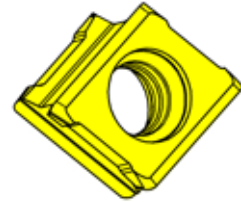
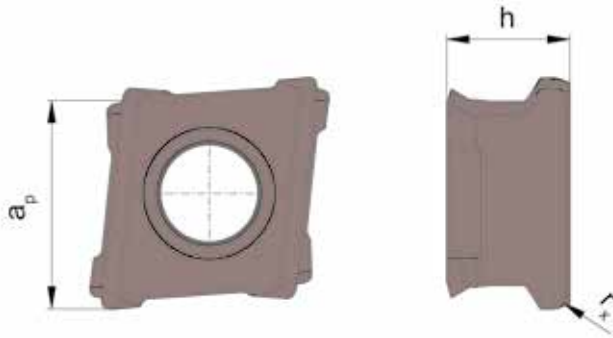
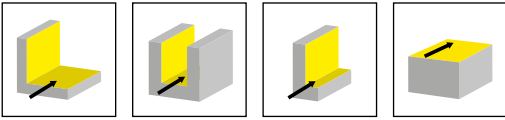
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	2xR409.093.U...	2xL409.093.U...	40900R • 40900L
<b>M409.040.18.D25.1.02.B</b>	4	2	40	25	109	48	20,4	18	20,9	13900	2xR409.093.U...	2xL409.093.U...	40900R • 40900L
<b>M409.050.22.D32.1.02.B</b>	6	2	50	32	125	59	26,4	22	26,9	12500	4xR409.093.U...	2xL409.093.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>



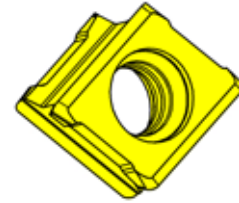
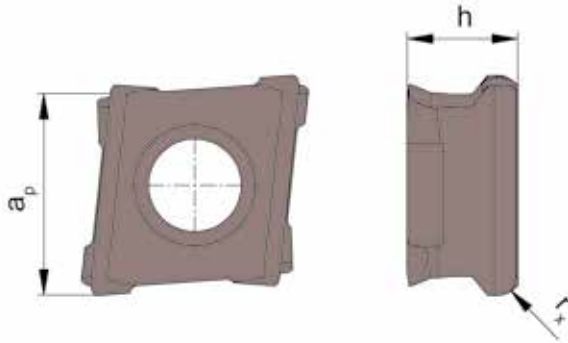
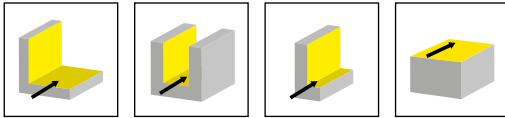
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 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	△	▲
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	△	▲
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



▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

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	- -

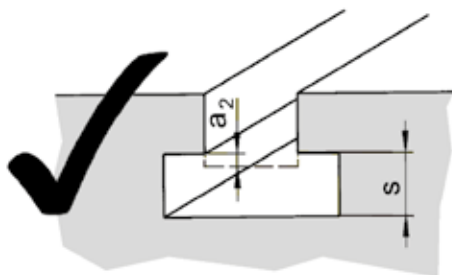
mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges



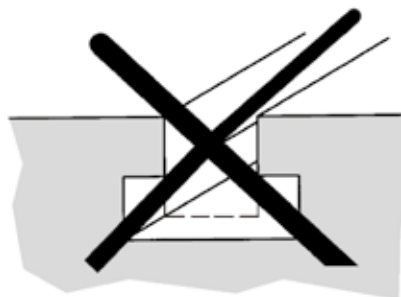
## Anwendungstechnologie

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	120 - 160	0,07 - 0,14
Grauguss Grey cast iron	AS4B	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	60 - 90	0,06 - 0,08
Grauguss Grey cast iron	AS4B	90 - 140	0,06 - 0,08





System/System

Seite/Page

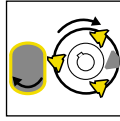
**M275**

**434**

**381**

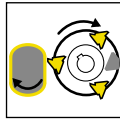
**440**

Schlagmesser  
Cutter  
M275



Seite/Page  
436-437

Wendeschneidplatte  
Indexable insert  
S275



Seite/Page  
438

# M275



## Schlagmesser

ab Schneidkreis  $\varnothing$  40 mm

## Cutter

from cutting edge  $\varnothing$  40 mm

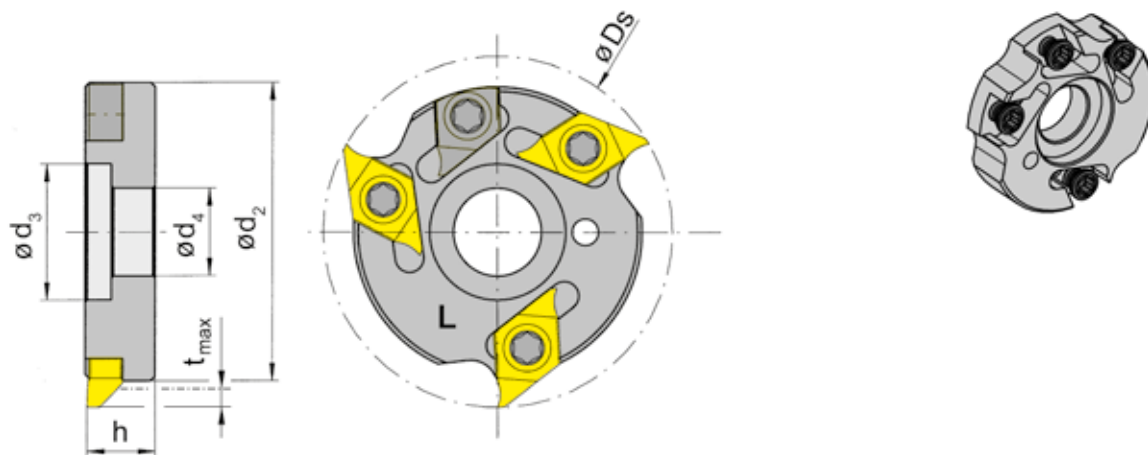
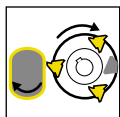


Abbildung = linksschneidend  
Picture = left hand cutting version

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
<b>RM275.D040.10.04</b>	40	33	7,9	3	10	15,5	EvoDECO 10	275041R
<b>LM275.D040.10.04</b>	40	33	7,9	3	10	15,5	EvoDECO 10	275041L

für Maschine: **Tornos**  
for machine: Tornos

K

## 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	<b>030.357P.0315</b>	<b>T10PL</b>	<b>LS275.AT41.HM</b>	
RM275.D040.10.04	<b>030.357P.0315</b>	<b>T10PL</b>		<b>RS275.AT41.HM</b>

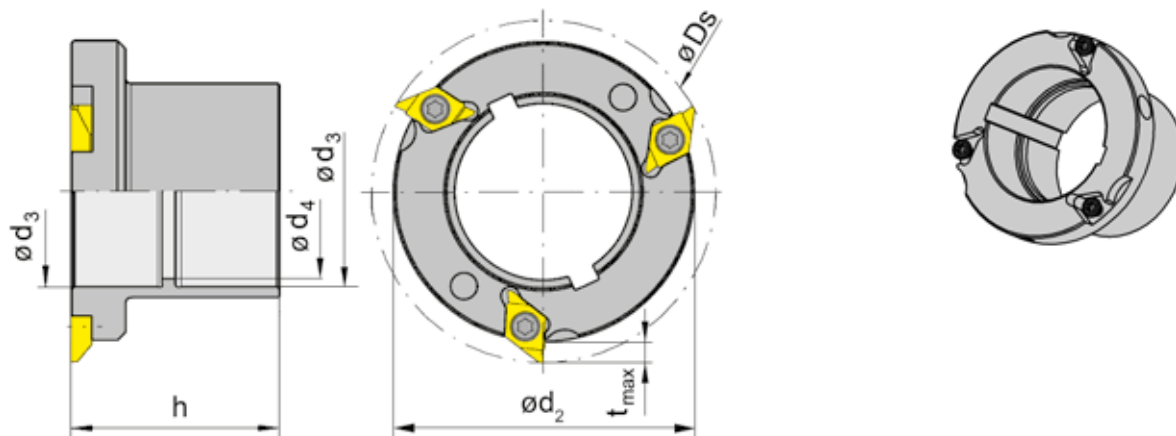
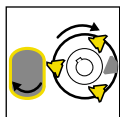


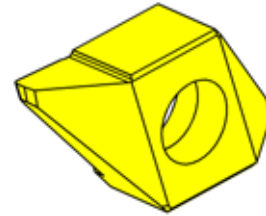
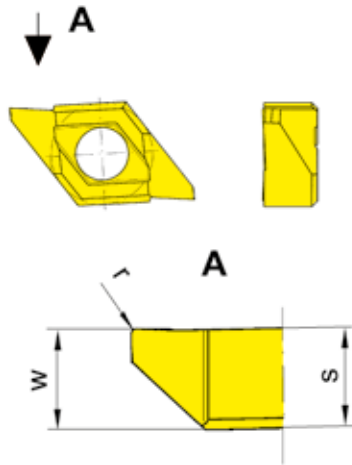
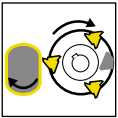
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$t_{max}$	$d_4$	$d_3$	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>



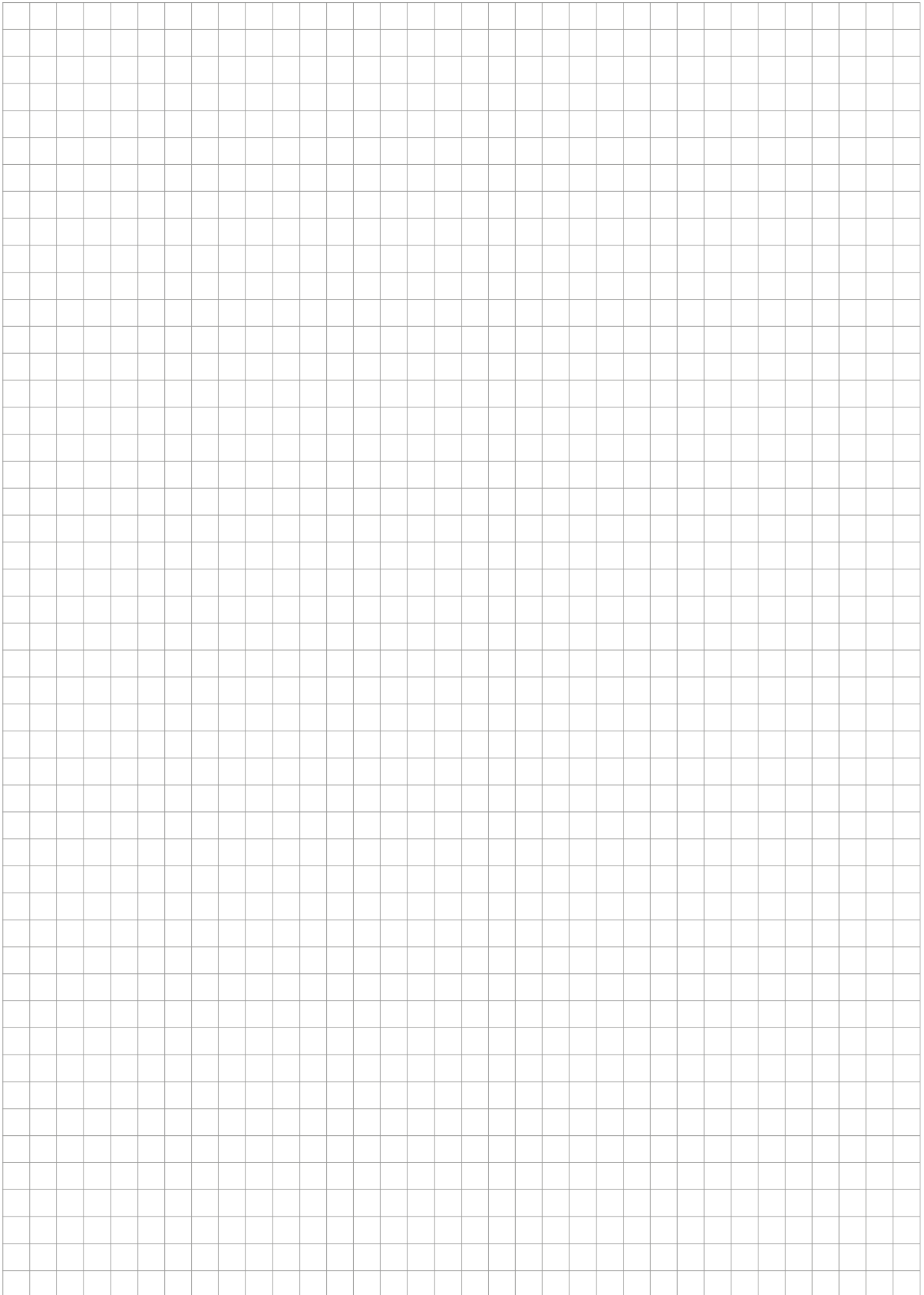
R = rechts wie gezeichnet  
R = right hand version shown

L = links spiegelbildlich  
L = left hand version

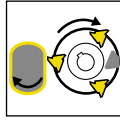
▲ ab Lager  
on stock

HM-Sorten  
Carbide grades  
Δ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	s	HIS	MG12	AS45	TI25
<b>RS275.MK13.M0</b>	1,3	0,2	3,9	275041R	Δ	▲	▲
<b>LS275.MK13.M0</b>	1,3	0,2	3,9	275041L	Δ	▲	▲
<b>P</b>	o	•	•				
<b>M</b>	-	•	•				
<b>K</b>	-	•	•				
<b>N</b>	-	o	•				
<b>S</b>	-	•	•				
<b>H</b>	-	-	-				

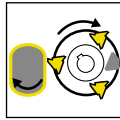


Schlagmesser  
Cutter  
381



Seite/Page  
442-454

Wendeschneidplatte  
Indexable insert  
N314/314



Seite/Page  
455-456

Technische Hinweise  
Technical Instructions

Seite/Page  
457-462

Übersicht  
Overview

Seite/Page  
463-464



**381**



**Schlagmesser**

ab Schneidkreis  $\varnothing$  60 mm

**Cutter**

from cutting edge  $\varnothing$  60 mm

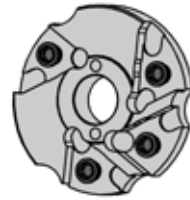
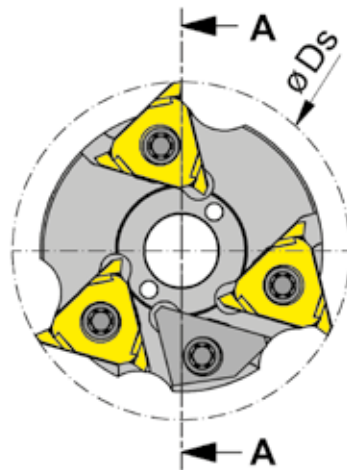
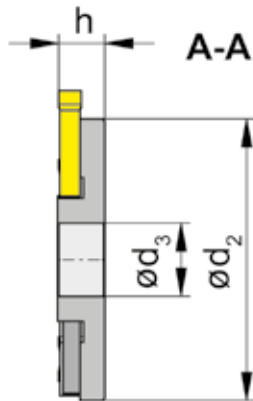
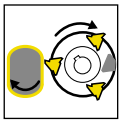


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$t_{max}$	$d_3$	Maschinentyp Machine type	HWS
<b>L381.A060.13.04</b>	60	50	8,2	4,5	13	Star SR-20J	314027N

für Maschine: **Star**  
for machine: Star

K

**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>

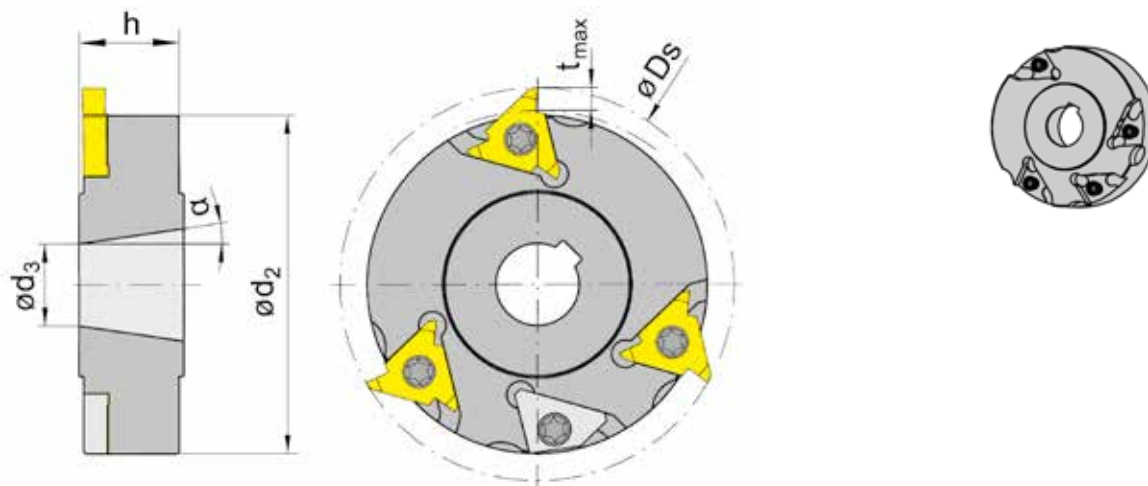
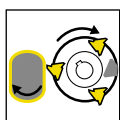


Abbildung = linksschneidend  
Picture = left hand cutting version

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>

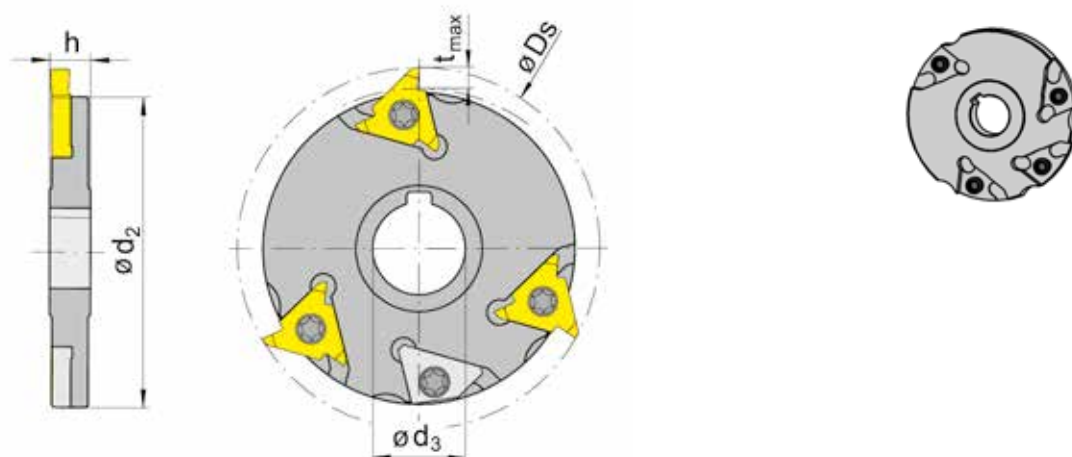
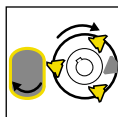


Abbildung = linksschneidend  
Picture = left hand cutting version

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>

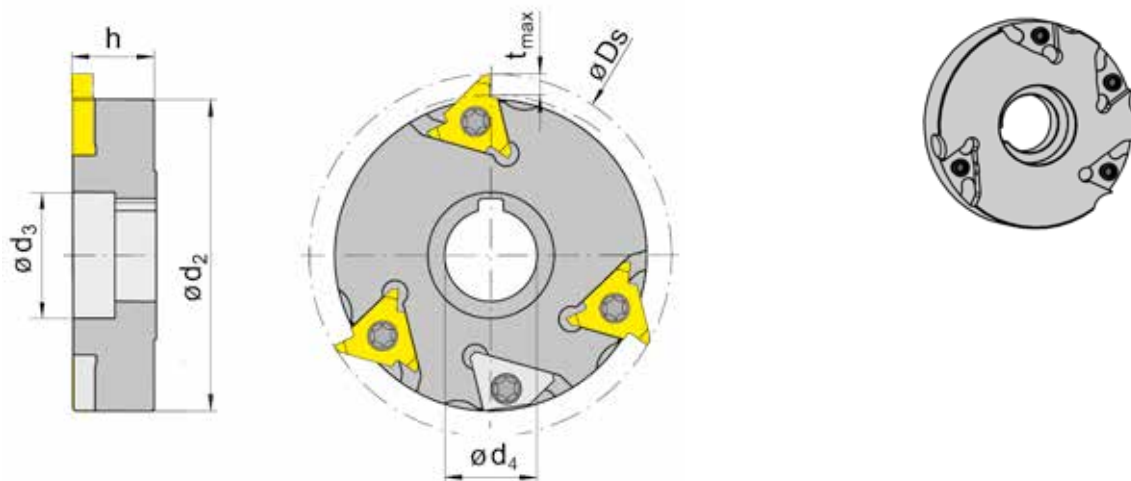
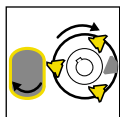


Abbildung = linksschneidend  
Picture = left hand cutting version

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>

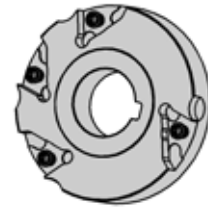
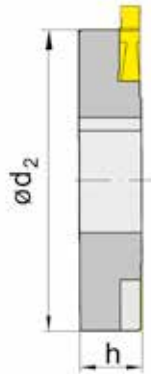
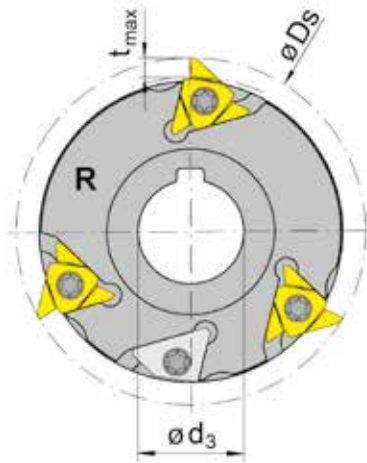
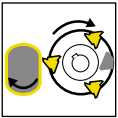


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

K

## 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>

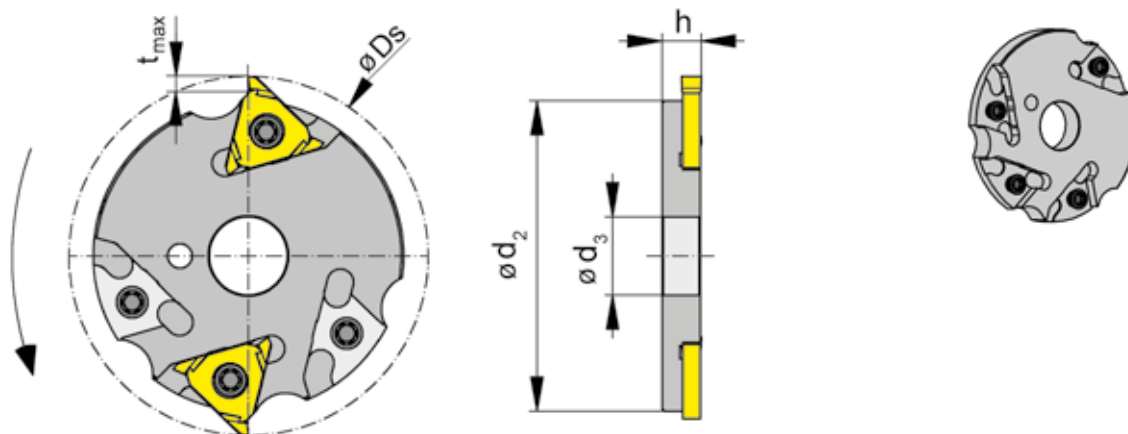
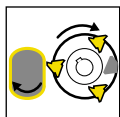


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>

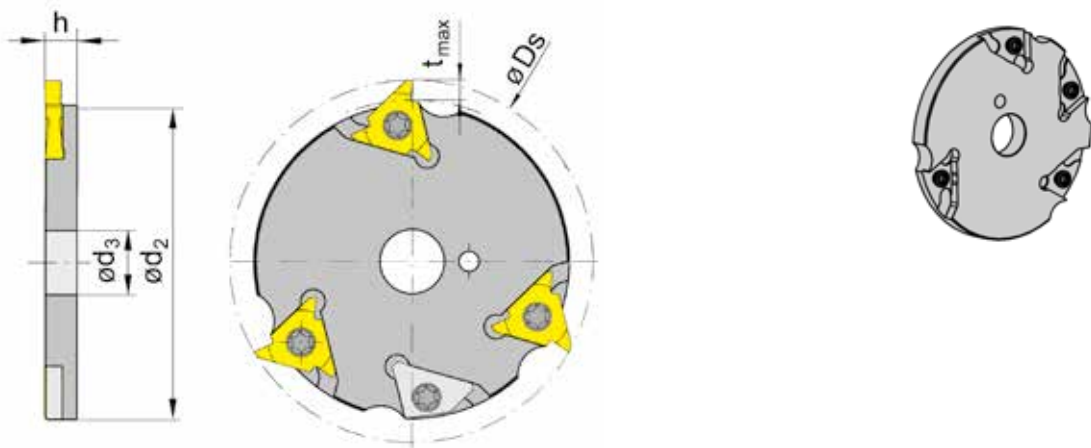
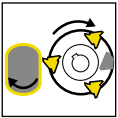


Abbildung = linksschneidend  
Picture = left hand cutting version

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>



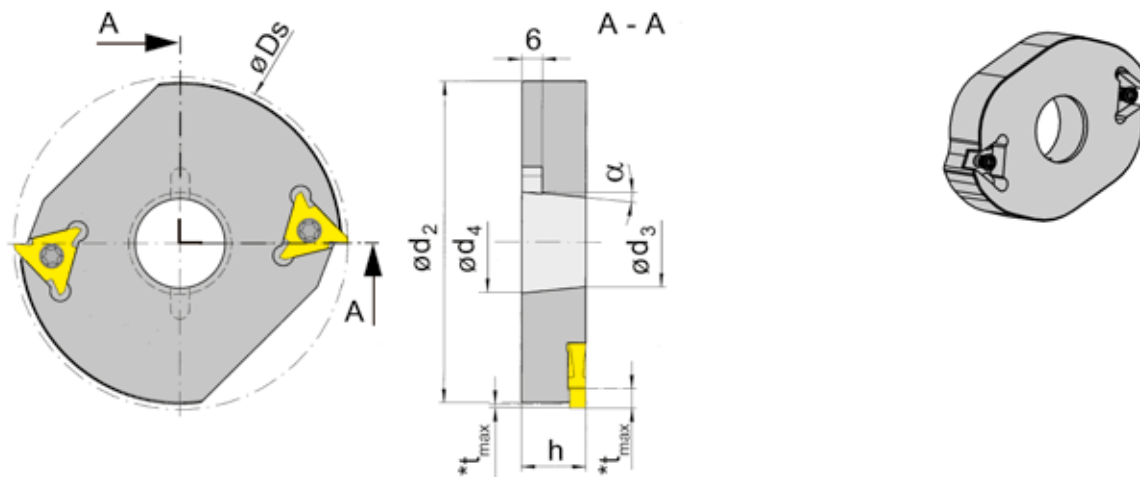
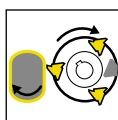


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	D <sub>s</sub>	d <sub>2</sub>	h	α	*t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.S078.30.02</b>	78	66	19	5,42°	5	26,3	SG18, SG20, AG18	314052L
<b>L381.S098.30.02</b>	98	94,6	19	5,42°	5	26,3	SG20/SF26,-S,-L/SE18/AF26,32	314052L
<b>L381.S118.30.02</b>	118	115	19	5,42°	5	26,3	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>

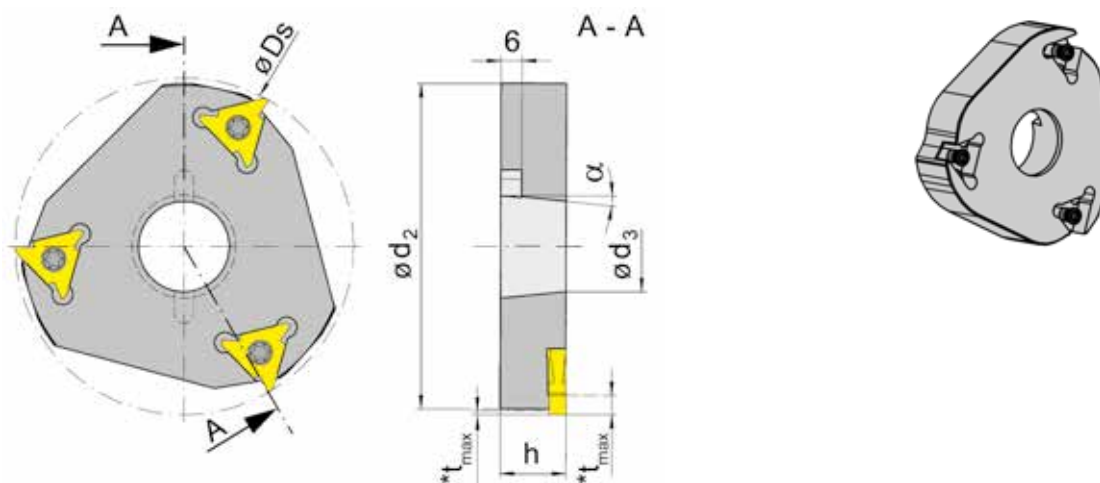
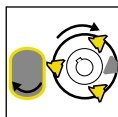


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$\alpha$	$*t_{max}$	$d_3$	Maschinentyp Machine type	HWS
<b>L381.S078.30.03</b>	78	77	19	5,42°	5	26,3	SG18, SG20, AG18	314052L
<b>L381.S098.30.03</b>	98	94,6	19	5,42°	5	26,3	SG20/SF26,-S,-L/SE18/AF26,32	314052L
<b>L381.S118.30.03</b>	118	115	19	5,42°	5	26,3	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...	<b>5.15T20P</b>	<b>T20PQ</b>

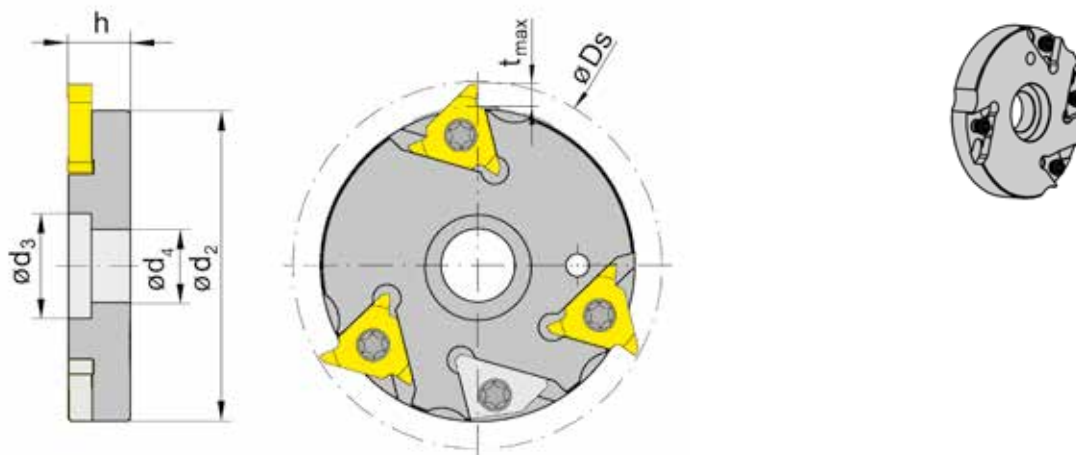
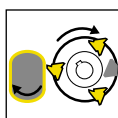


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	$D_s$	$d_2$	$h$	$t_{max}$	$d_4$	$d_3$	Maschinentyp Machine type	HWS
<b>L381.D080.16.04</b>	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	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

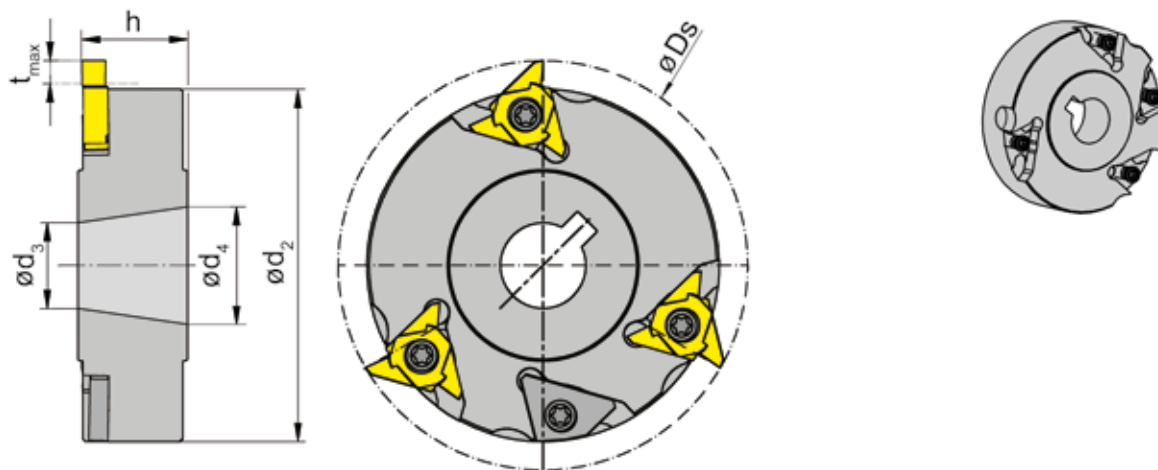
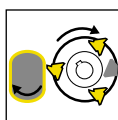


Abbildung = linksschneidend  
Picture = left hand cutting version

Bestellnummer Part number	D <sub>s</sub>	d <sub>2</sub>	h	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>

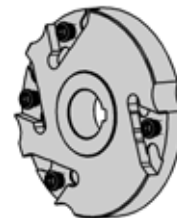
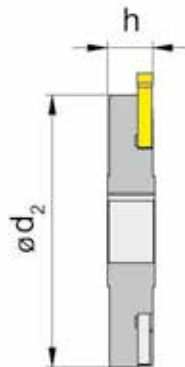
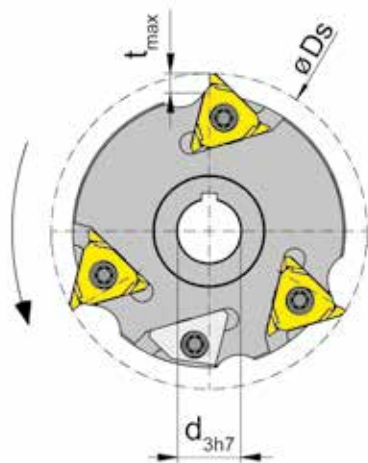
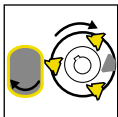


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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>



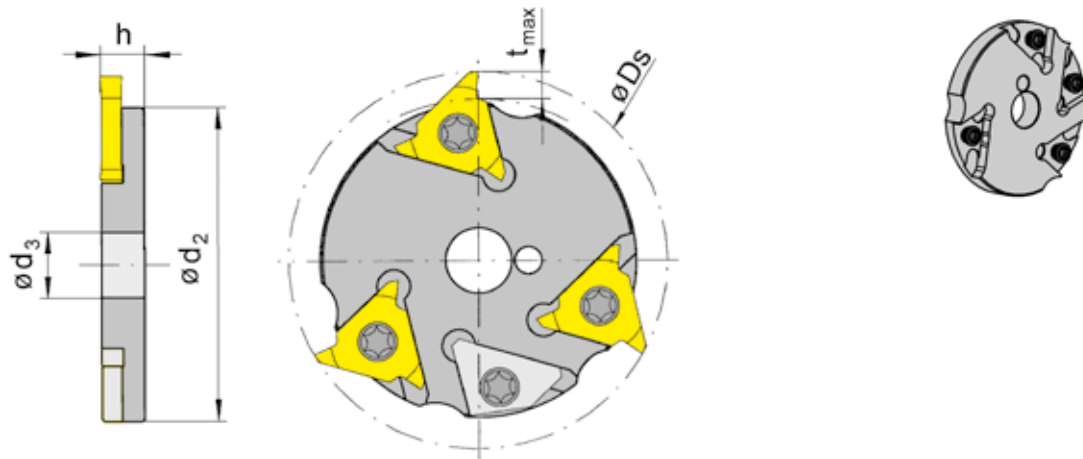
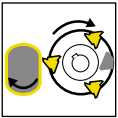


Abbildung = linksschneidend  
Picture = left hand cutting version

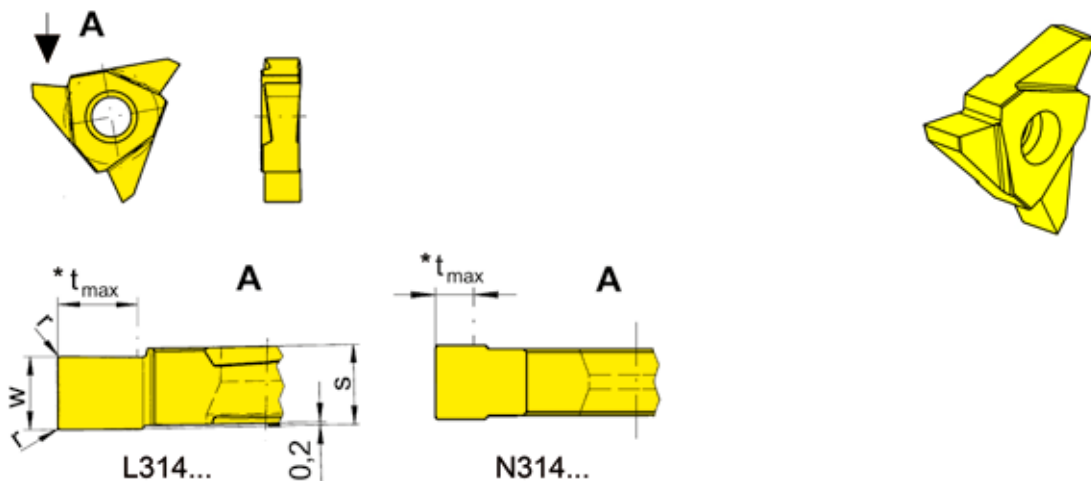
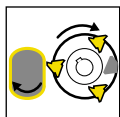
Bestellnummer Part number	Ds	d <sub>2</sub>	h	t <sub>max</sub>	d <sub>3</sub>	Maschinentyp Machine type	HWS
<b>L381.T069.12.04</b>	69	57,5	8	5	12	TNL12-7/TNL26/TNK36	314027N

für Maschine: **Traub**  
for machine: Traub

K

**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

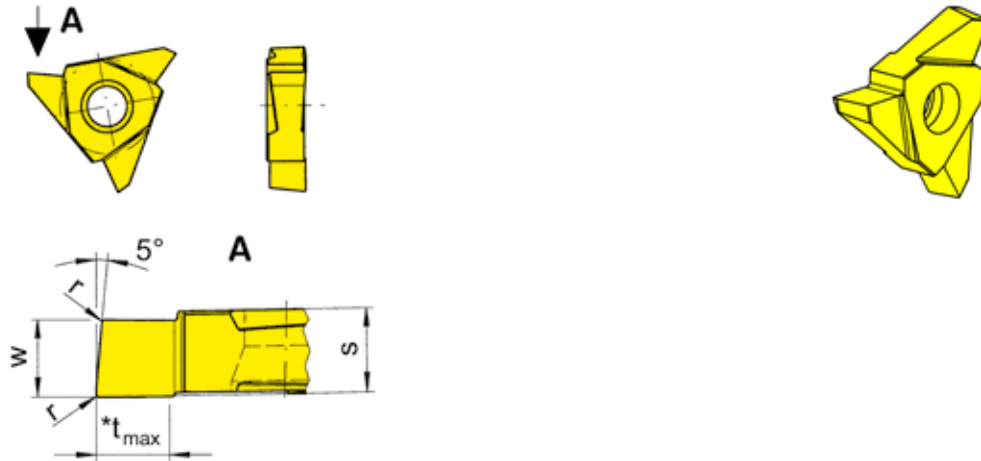
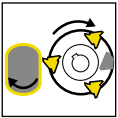
▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	w	r	s	t <sub>max</sub>	HIS	HM-Sorten Carbide grades			
						MG12	AS45	TI25	TN35
R314.MK50.20	5	0,15	5,2	5	314041R		▲	▲	
L314.MK50.20	5	0,15	5,2	5	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	TH35	TI25
R314.MK50.5.20	5	0,15	5,4	5	314041R	▲		▲
R314.MK50.20.L	5,4	0,6	5,4	5	314041R	▲	Δ	▲
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	o	•	•					
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.

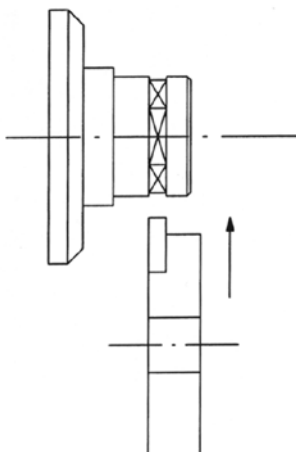
Demzufolge wird in den meisten Fällen das Übersetzungsverhältnis 2:1 angewendet. Schlagmesser mit  $Z = 2$  erzeugen 4 Flächen am Werkstück.

Zur Berechnung der Konvexität der erzeugten Flächen sind folgende Punkte notwendig:

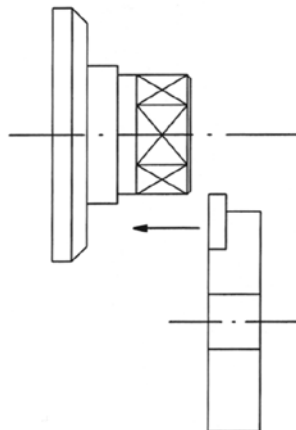
1. Schneidkreisdurchmesser des Schlagmessers
2. Zu erzeugende Schlüsselweite
3. Vorgedrehter Werkstückdurchmesser
4. Anzahl der Flächen
5. Übersetzungsverhältnis Werkstück:Werkzeug

Die Flächen können im Einstechverfahren sowie im Längsdrehverfahren erzeugt werden. Ebenfalls kann damit eine Fase kopiert werden (entgraten der Fläche).

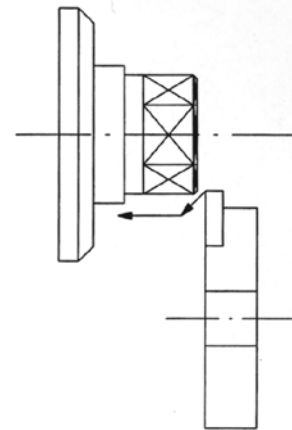
Einstechfräsverfahren



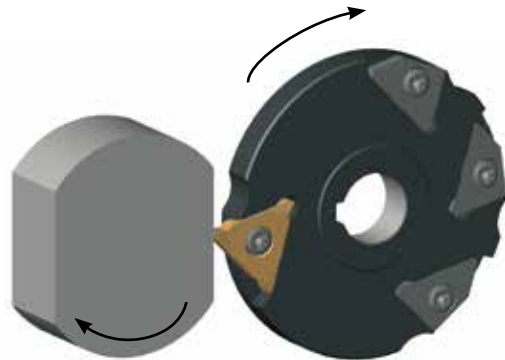
Längsfräsverfahren



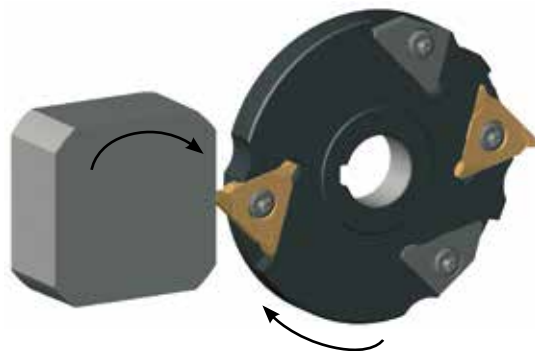
Kopieren und Längsfräsverfahren



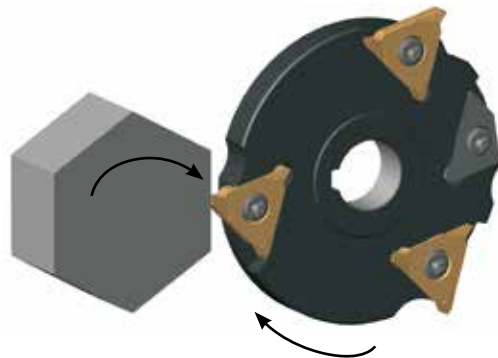
Zweikant mit 1 Schneide im Übersetzungsverhältnis von 2:1 zur Hauptspindel hergestellt.



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.

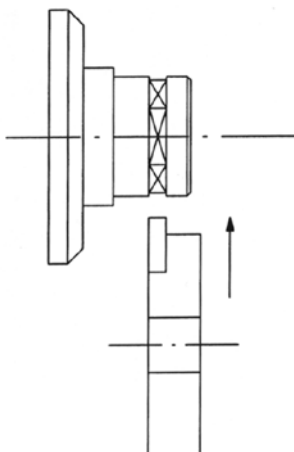
According to this, the number of flats at the component is twice the number of cutting inserts on the milling cutter.

To calculate the shape of the flats following parameter are necessary:

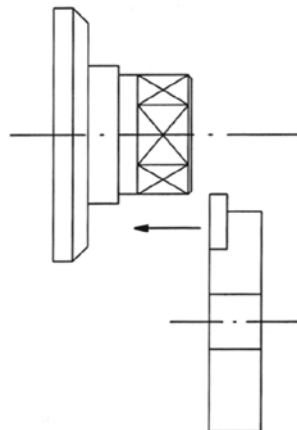
1. Cutting diameter of the polygon milling cutter
2. Across-flats dimension
3. Premachined diameter of the component
4. Number of flats
5. Revolution ratio of component and milling cutter

The flats can be produced by grooving or by turning. Chamfers can be produced by profiling (deburring).

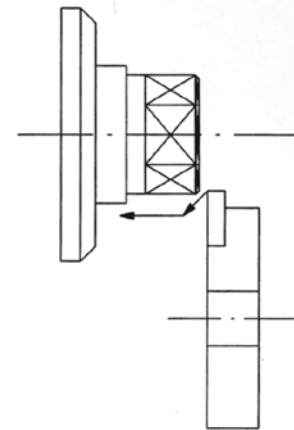
Groove milling



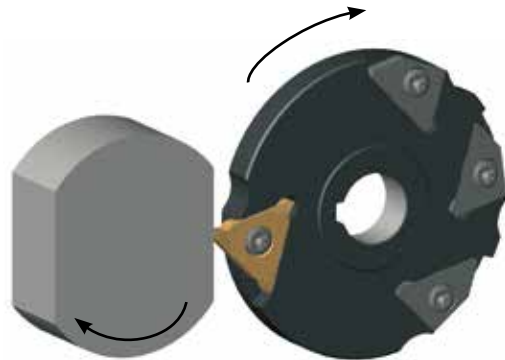
Side milling



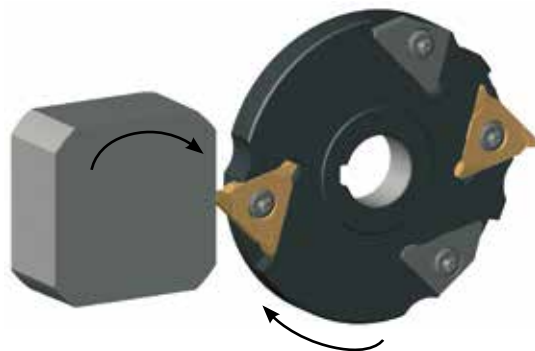
Copymilling and Side milling



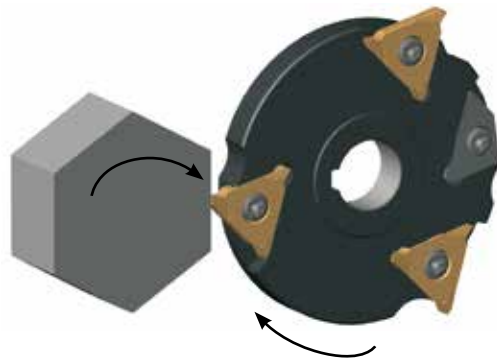
Two flats machined with 1 cutting edge. Revolution ratio 2:1 to the main spindle.



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

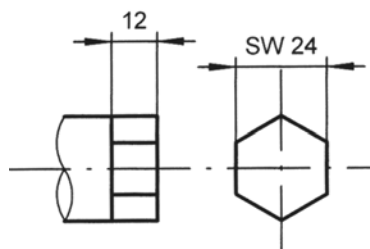
**Richtwerte**

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 mm/min

Werkstück:  
 n<sub>WS</sub> = 686,00 mm<sup>-1</sup>  
 v<sub>c WS</sub> = 59,75 mm/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

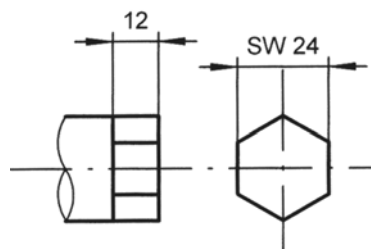
Material	Grades	$v_c$ m/min	Feed rate $f_z$ mm	
			Side milling	Groove milling
Al	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
Ms58	TI25, MG12	500 - 1000	0,10 - 0,20	0,05 - 0,10
9SMnPb28	TH35, TI25, AS45	200 - 500	0,08 - 0,15	0,04 - 0,08
16MnCr5/C45	TH35, TI25, AS45	150 - 250	0,05 - 0,10	0,03 - 0,05

**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>  
 $v_{cWZ} = 388,25$  mm/min

Workpiece:  
 $n_{WS} = 686,00$  mm<sup>-1</sup>  
 $v_{cWS} = 59,75$  mm/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

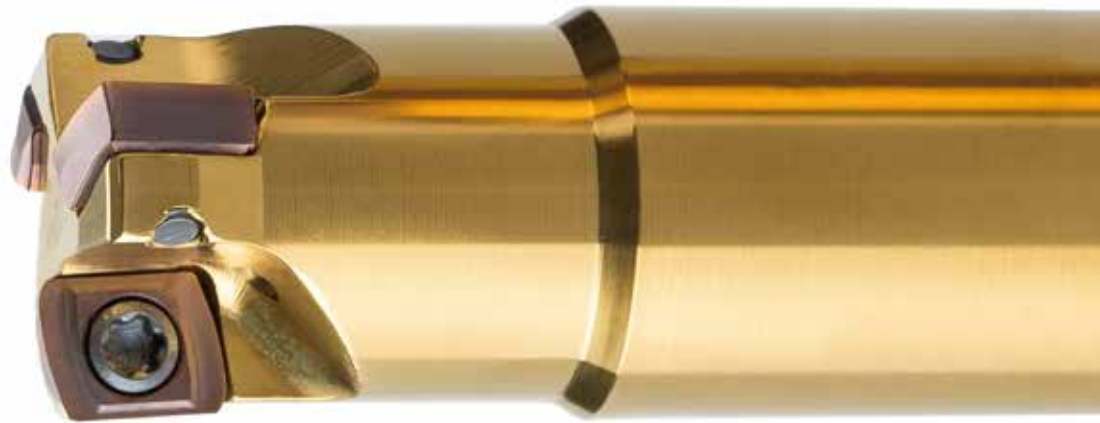


Hersteller Machine manufacturer	Maschine Machine	Schlagmesser Cutter	Wendeschneidplatten Indexable inserts	Z	n <sub>max</sub> Fräser n <sub>max</sub> Milling cutter
Alfred H. Schütte	SG18	L381.S078.30.03	L314.MK70.M0 TN35	3	20.000 min-1*
Alfred H. Schütte	SG18	L381.S078.30.02	L314.MK70.M0 TN35	2	20.000 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

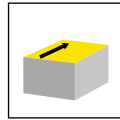
**DA**

**466**

**DAH**

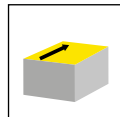
**492**

Schaftfräser  
End Mill  
DAM31/DAM32/DAM62



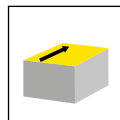
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468-472

Aufsteckfräser  
Arbour Mounted Cutter  
DAM32/DAM62

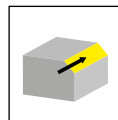


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Einschraubfräser  
Screw-in cutter  
DAM31/DAM32/DAM62

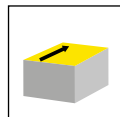


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Aufnahme  
Adaptor  
MD



Seite/Page  
478-479

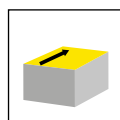
Reduzierstück  
Reducer  
MD

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Verlängerung  
Extension  
MD

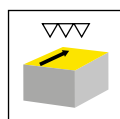
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Wendeschneidplatte  
Indexable insert  
DA31/DA32/DA62/  
SDA62



Seite/Page  
482-483, 486-487

Schneidplatte  
Insert  
DA32



Seite/Page  
484-485

# DA

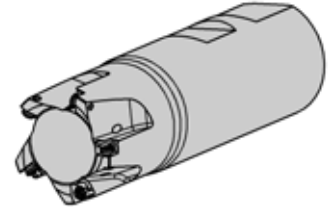
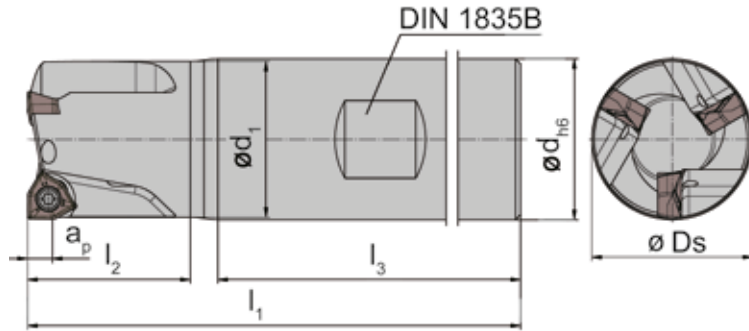
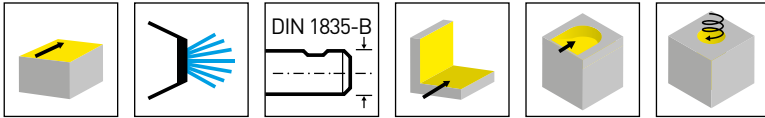


## System DA

- Fräterschäfte
- Aufsteckfräser
- Einschraubfräser
- Wendeschneidplatten

## System DA

- Milling shanks
- Arbor Mounted Cutter
- Screw-in Cutter
- Indexable Inserts



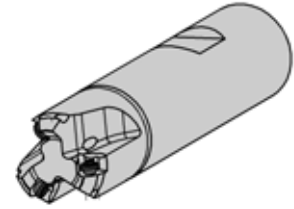
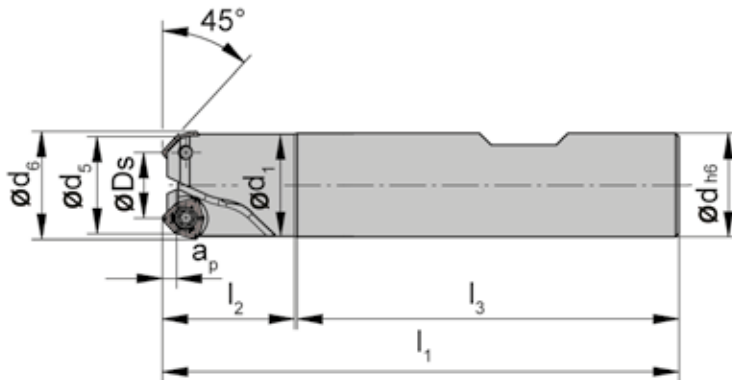
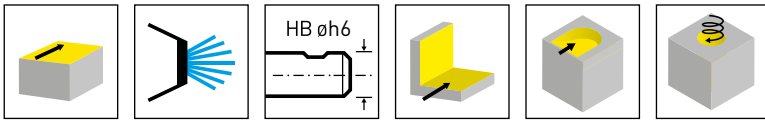
Bestellnummer Part number	Z	Ds	d	$l_1$	$l_2$	$d_1$	$l_3$	$a_p$	HWS
DAM31.016.D163.02B	2	16	16	79	17	15	54	3	DA3116
DAM31.020.D204.03B	3	20	20	86	21	19	59	3	DA3120
DAM31.025.D255.04B	4	25	25	97	27	24	64	3	DA3125
DAM31.032.D326.05B	5	32	32	106	32	31	68	3	DA3132
DAM32.020.D205.02B	2	20	20	87	22	19	19	4,8	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  $\varnothing$  25 mm 2 Spannflächen  
from  $\varnothing$  25 mm 2 clamping flats

### Ersatzteile

Spare Parts

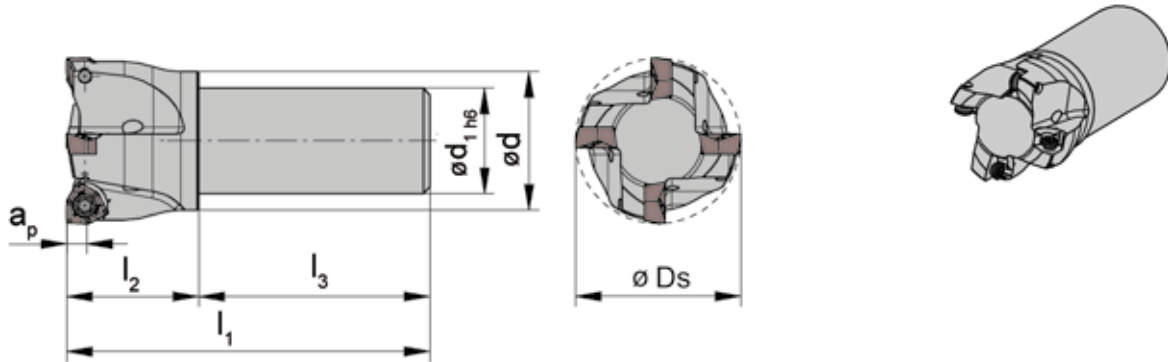
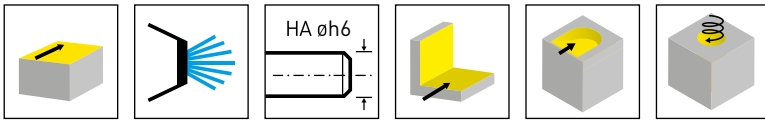
Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
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DAM31.020.D204.03B	030.2547.T8P	T8PL
DAM31.025.D255.04B	030.2553.T8P	T8PL
DAM31.032.D326.05B	030.2557.T8P	T8PL
DAM32.020.D205.02B	030.3562.T10P	T10PL
DAM32.025.D256.03B	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

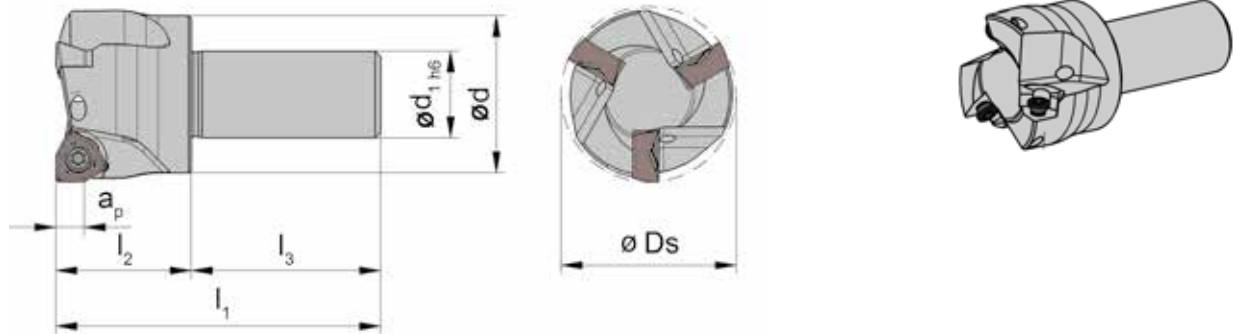
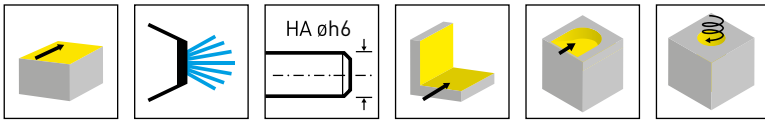


Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAM31.020.D160.03A	3	20	19	52	17	16	35	3	DA3120
DAM31.025.D161.04A	4	25	24	55	20	16	35	3	DA3125
DAM31.032.D162.05A	5	32	31	60	25	16	35	3	DA3132
DAM31.032.D202.05A	5	32	31	60	25	20	35	3	DA3132

**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

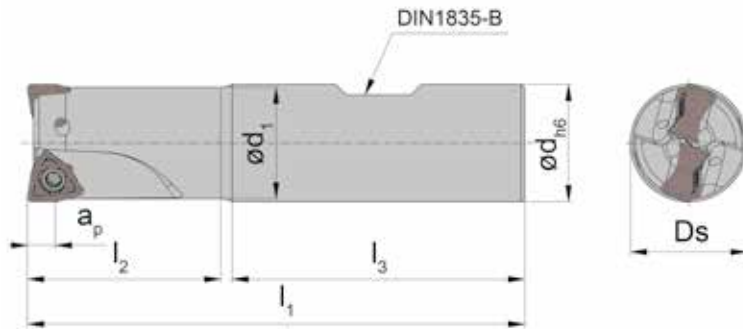
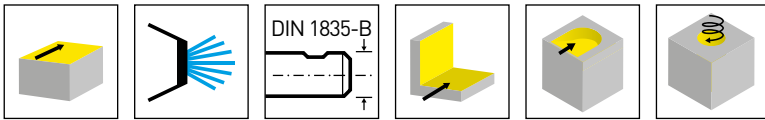


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	$D_s$	d	$l_1$	$l_2$	$d_1$	$l_3$	$a_p$	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

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## Ersatzteile

Spare Parts

Schaftfräser End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM62...	<b>030.3070.T10P</b>	<b>T10PL</b>



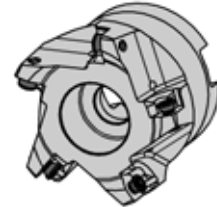
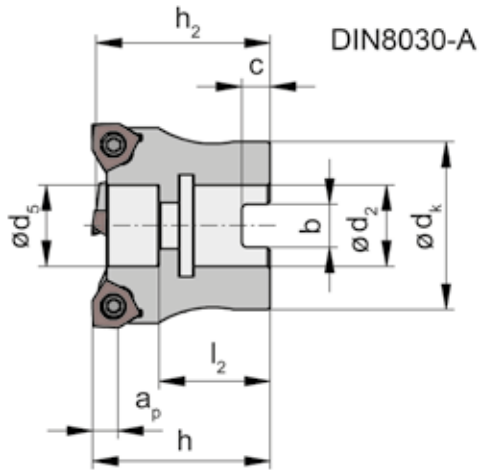
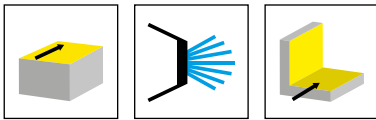


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>s</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>

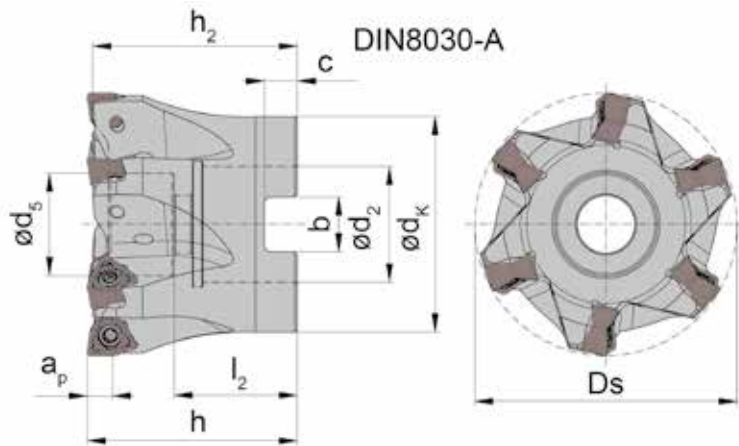


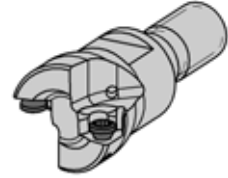
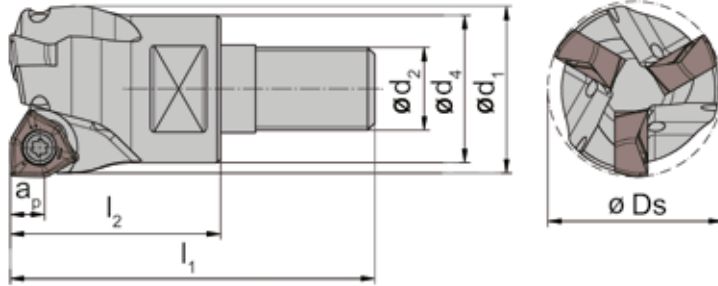
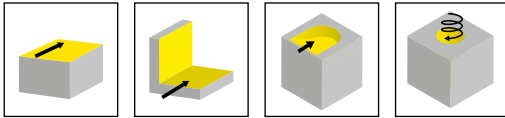
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	d <sub>k</sub>	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

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**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>

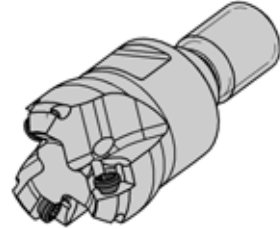
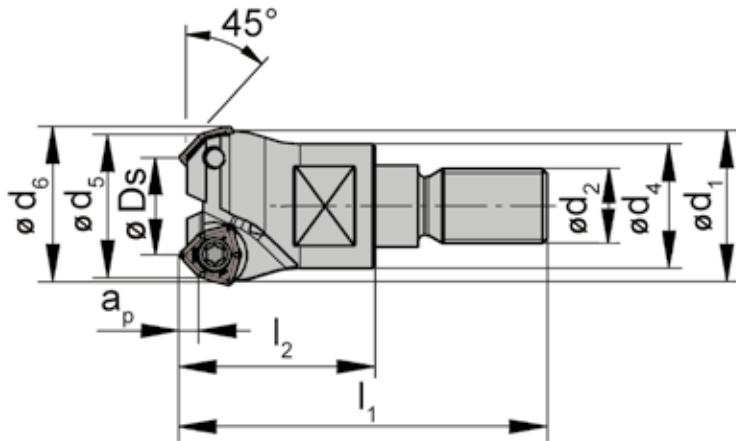
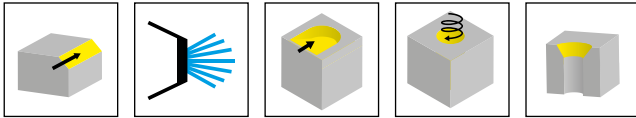


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DAM31.016.M083.02B	2	16	38	20	15	3	M8	13	10	DA3116	08001
DAM31.020.M104.03B	3	20	45	25	19	3	M10	18	15	DA3120	10001
DAM31.025.M125.04B	4	25	52	30	24	3	M12	21	17	DA3125	12001
DAM31.032.M166.05B	5	32	58	35	31	3	M16	29	24	DA3132	16001
DAM32.020.M104.02B	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>

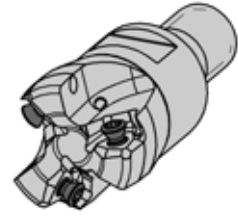
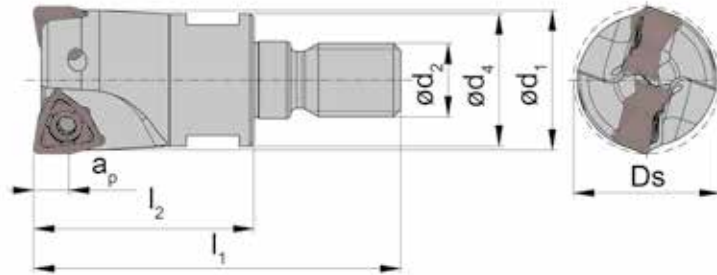
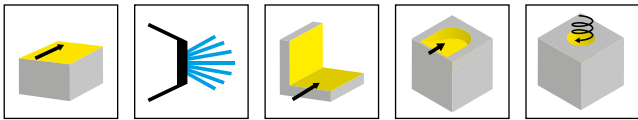
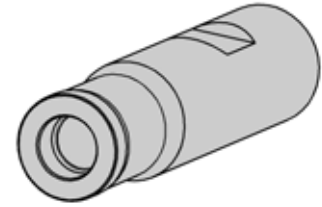
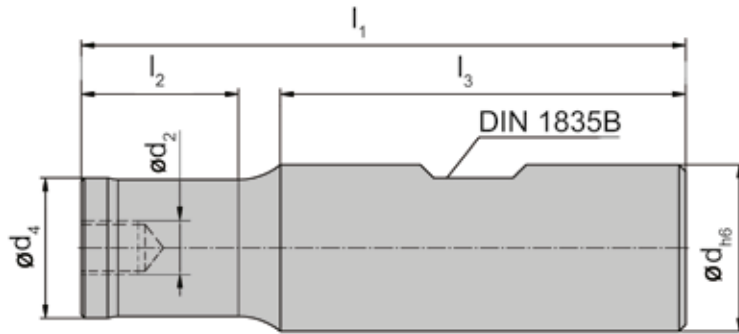
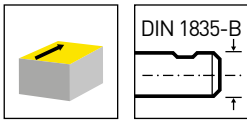


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	l <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
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

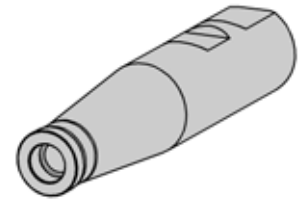
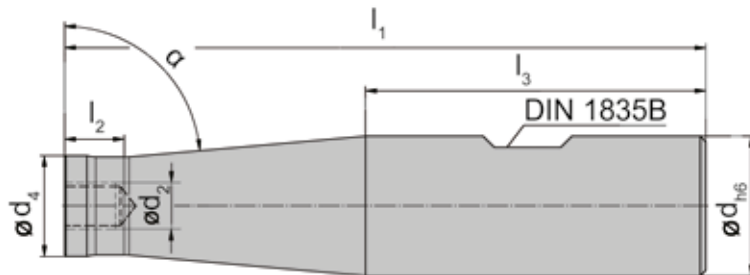
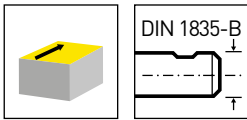
Ersatzteile  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAM62...	030.3070.T10P	T10PL



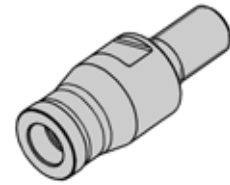
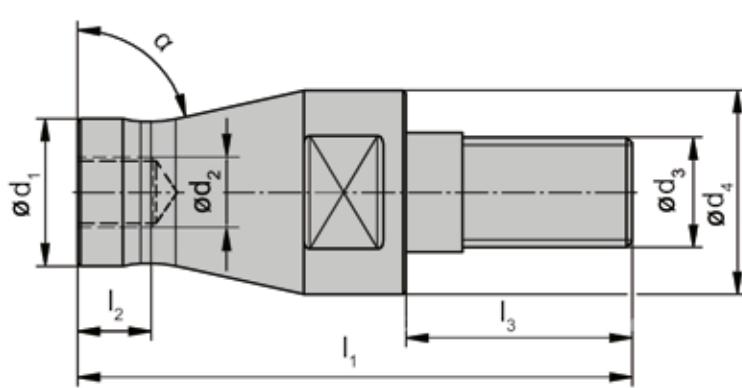
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	d	$d_4$	$d_2$
<b>MD13.02.00.D16B</b>	73	14	53	16	13	M8
<b>MD18.04.00.D20B</b>	80	20	55	20	18	M10
<b>MD21.06.00.D25B</b>	91	23	61	25	21	M12
<b>MD29.08.00.D32B</b>	100	29	65	32	29	M16

ab  $\varnothing$  25 mm 2 Spannflächen  
from  $\varnothing$  25 mm 2 clamping flats



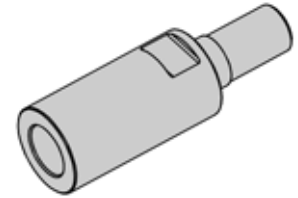
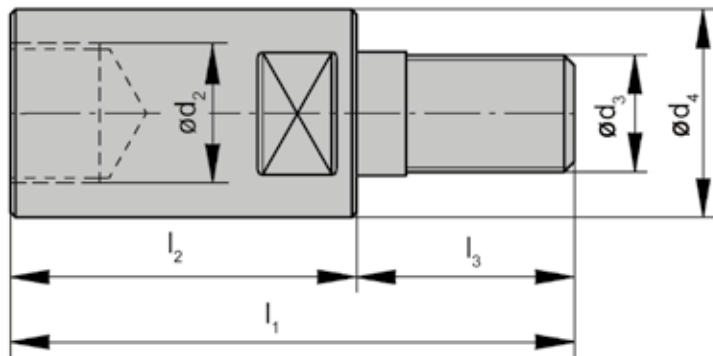
Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d$	$d_4$	$d_2$	$\alpha$
<b>MD13.02.85.D20B</b>	105	7	55	20	13	M8	85°
<b>MD18.04.85.D25B</b>	115	10	61	25	18	M10	85°
<b>MD21.06.85.D32B</b>	140	8	65	32	21	M12	85°
<b>MD29.08.85.D40B</b>	150	8	75	40	29	M16	85°

ab  $\varnothing$  25 mm 2 Spannflächen  
from  $\varnothing$  25 mm 2 clamping flats

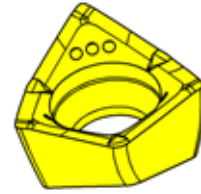
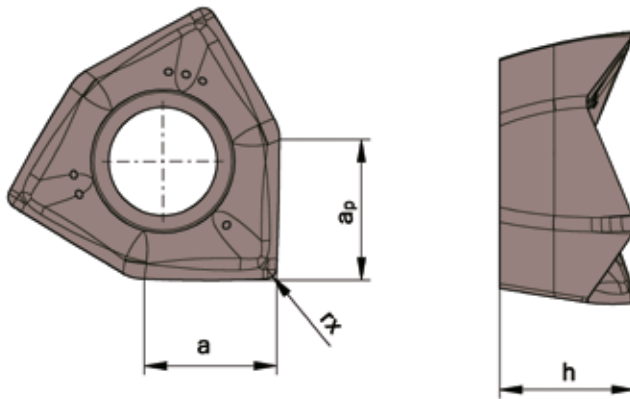
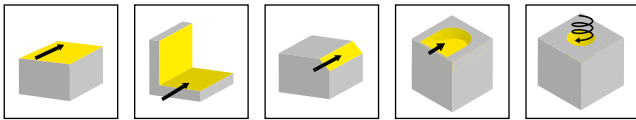


Bestellnummer Part number	$l_1$	$l_2$	$l_3$	$d_1$	$d_2$	$d_3$	$d_4$	SW	$\alpha$
MD18.02.77.M10	49	6	20	13	M8	M10	18	15	77,5°
MD21.04.77.M12	56	10	22	18	M10	M12	21	17	77,5°
MD29.06.77.M16	52	6	23	21	M12	M16	29	24	77,5°





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

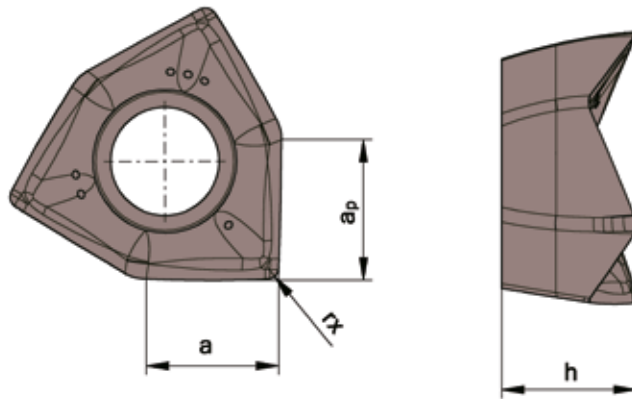
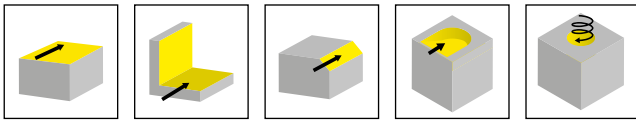
△ 4 Wochen  
4 weeks

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	-	-



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

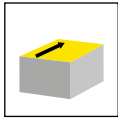
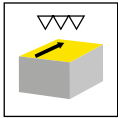
△ 4 Wochen  
4 weeks

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	▲	▲

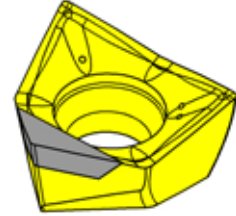
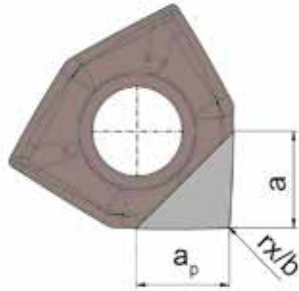
HM-Sorte TA45 bevorzugt für leichte Zerspanaufgaben, Aluminium und Schlichten.

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

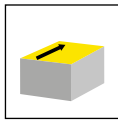
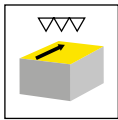


HM-Sorten  
Carbide grades

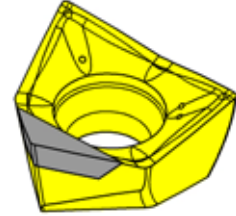
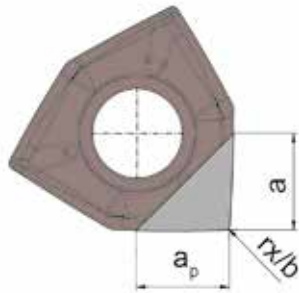
▲ ab Lager  
on stock

Δ 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	Δ
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	Δ
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

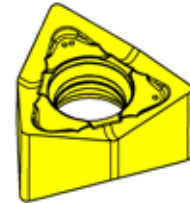
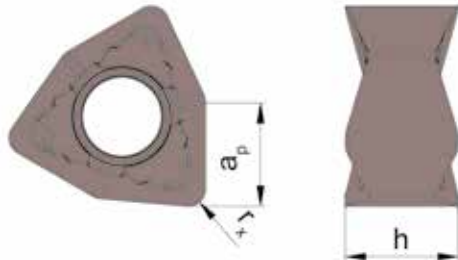
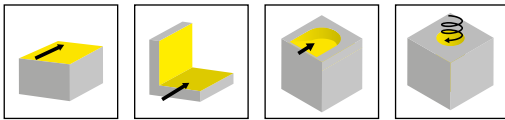


HM-Sorten  
Carbide grades

▲ 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 -

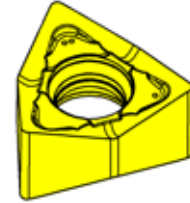
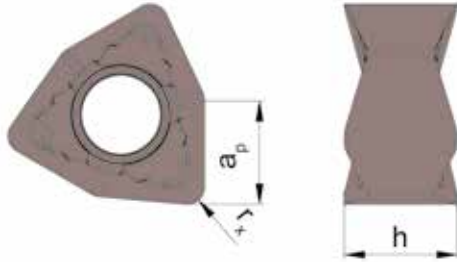
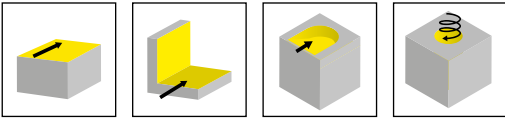


▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

△ 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

Δ 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 -

# Vorschubswerte DA31 / DA32

Feed Rate



ISO	Plattengröße DA31 Vorschub/Zahn $f_z$ (mm) Insert size DA31 Feed/tooth $f_z$ (mm)	Plattengröße DA32 Vorschub/Zahn $f_z$ (mm) Insert size DA32 Feed/tooth $f_z$ (mm)
<b>P</b>	0,03 - 0,15	0,04 - 0,25
<b>M</b>	0,03 - 0,12	0,03 - 0,17
<b>K</b>	0,03 - 0,15	0,04 - 0,25
<b>N</b>	0,03 - 0,40	0,04 - 0,50
<b>S</b>	0,03 - 0,08	0,03 - 0,15

**Beim 45°-Fräsen kann der Vorschub pro Zahn  $f_z$  um den Faktor 1,4 erhöht werden.**

When 45° Milling the feed per tooth  $f_z$  could be increased by factor 1,4.

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.



### 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

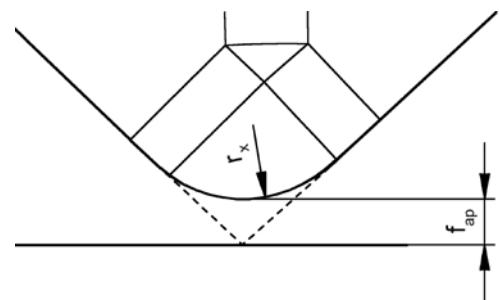
Ramp angle and plunging with a 45° milling cutter

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.

Eckenradius $r_x$ (mm) Corner radius $r_x$ (mm)	Korrekturfaktor $f_{ap}$ (mm) Correction factor $f_{ap}$ (mm)
0	0
0,2	0,078
0,4	0,17
0,8	0,33
1,0	0,41

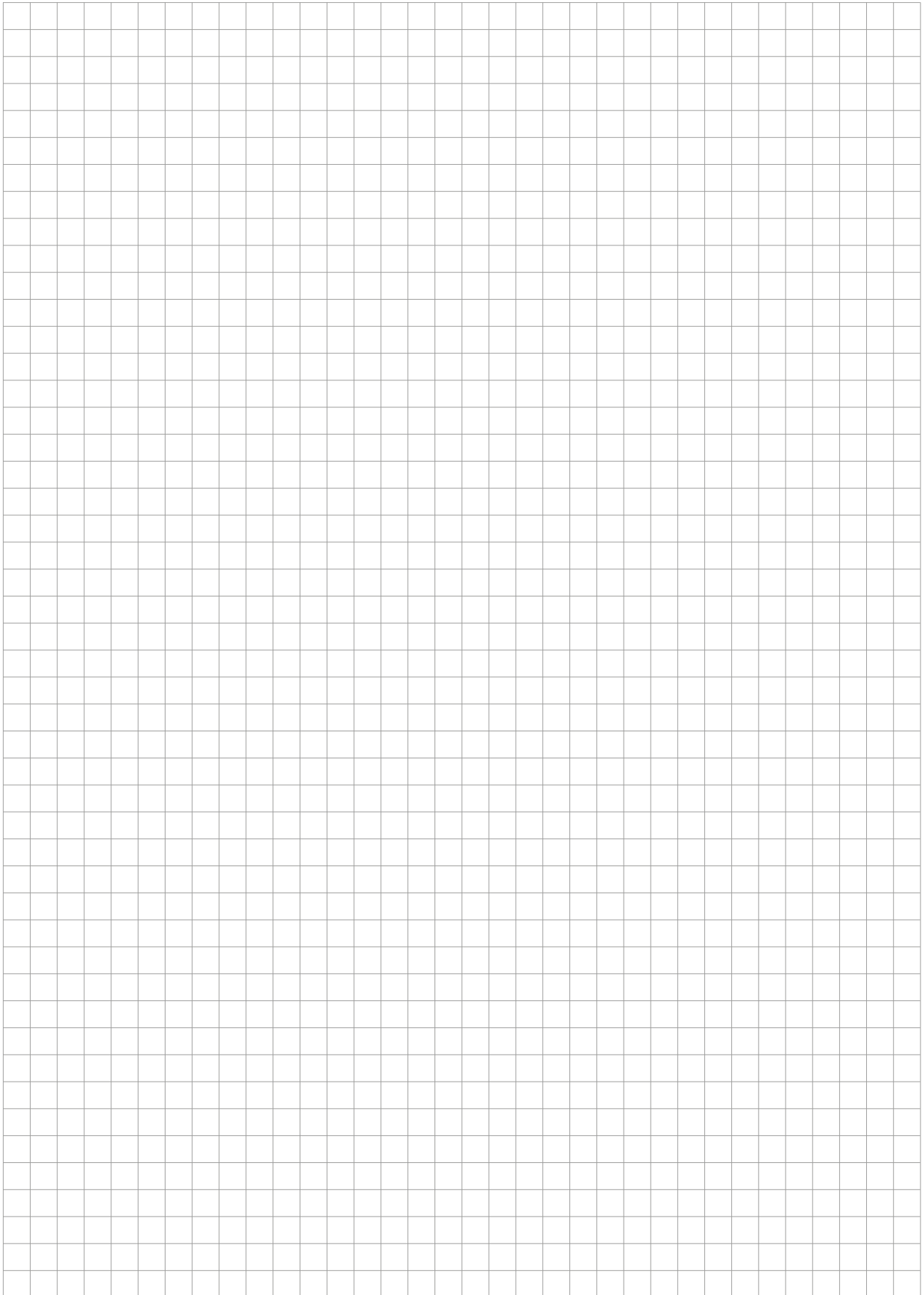


ISO	Vorschub/Zahn $f_z$ (mm) Feed/tooth $f_z$ (mm)
<b>P</b>	0,04 - 0,25
<b>M</b>	0,03 - 0,17
<b>K</b>	0,04 - 0,25
<b>N</b>	0,04 - 0,50
<b>S</b>	0,03 - 0,15

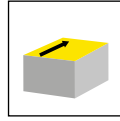
Schneidkreis-Ø Cutting edge Ø [mm]	Eintauchwinkel Diving angle [°]
20	2,4
25	1,75
32	1,25
40	0,95
50	0,7
63	0,55
80	0,4

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

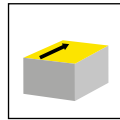


Schaftfräser  
End Mill  
DAH25/DAH37/  
DAH82



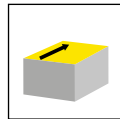
Seite/Page  
494-495, 500, 507

Einschraubfräser  
Screw-in cutter  
DAH25/DAH37/  
DAH82



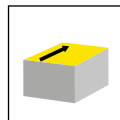
Seite/Page  
496, 501, 508

Wendeschneidplatte  
Indexable insert  
DAH25/DAH37/DAH82/  
DAH84



Seite/Page  
497, 503-504, 510, 512

Aufsteckfräser  
Arbour Mounted Cutter  
DAH37/DAH82/  
DAH84



Seite/Page  
502, 509, 511

# DAH

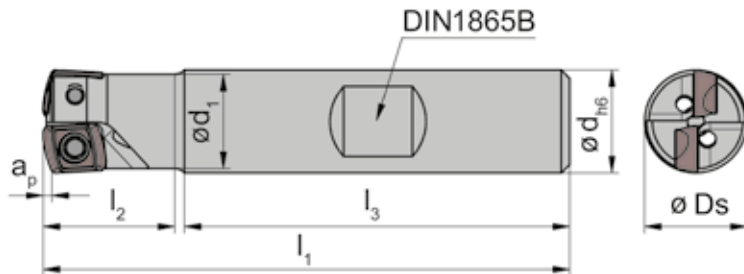
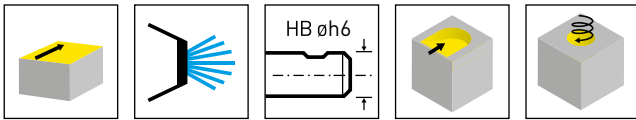


## **Hochvorschubfräsen System DAH**

- Schaftfräser
- Einschraubfräser
- Aufsteckfräser
- Wendeschneidplatten

## **High feed milling System DAH**

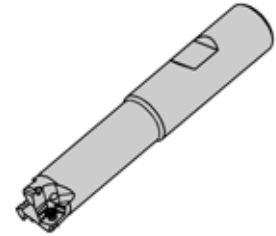
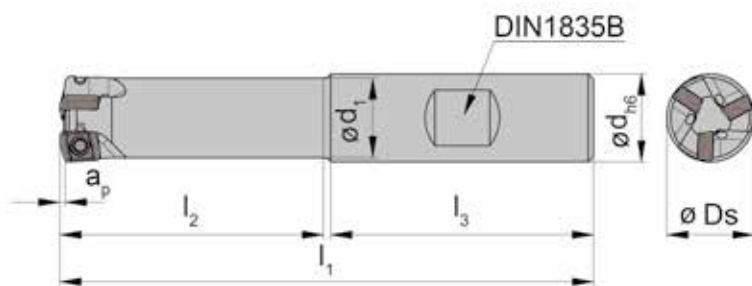
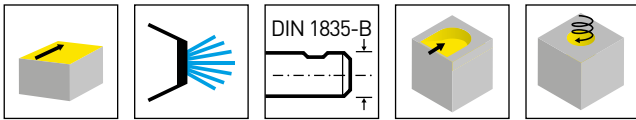
- End Mill
- Screw-in Cutter
- Arbour Mounted Cutter
- Indexable Inserts



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
DAH25.25.012.D122.02B	2	12	12	61,5	15	11	45	1	DAH25
DAH25.25.016.D163.03B	3	16	16	69,5	20	14,5	48	1	DAH25
DAH25.25.020.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
DAH25.25.012.D122.02B	030.2547.T8P	T8PL
DAH25.25....	030.2553.T8P	T8PL

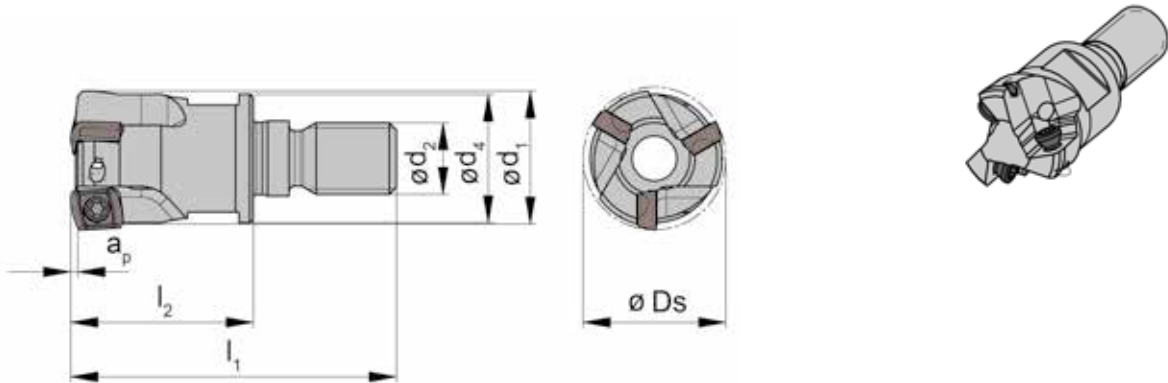
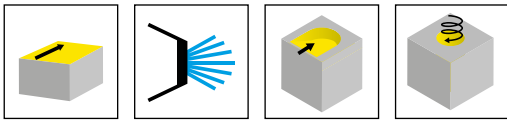


Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAH25.25.012.D124.02B	2	12	12	82,5	36	11,5	45	1	DAH25
DAH25.25.016.D165.02B	2	16	16	97,5	48	15,4	48	1	DAH25
DAH25.25.016.D165.03B	3	16	16	97,5	48	15,4	48	1	DAH25
DAH25.25.020.D206.03B	3	20	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

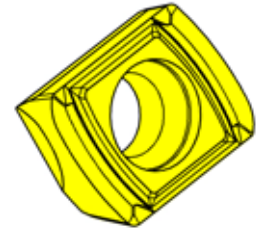
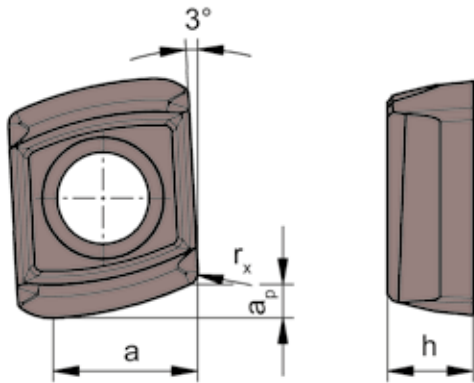
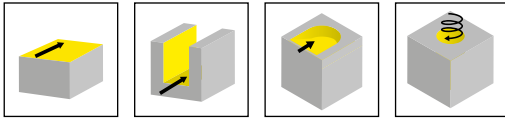


Bestellnummer Part number	Z	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	a <sub>p</sub>	d <sub>2</sub>	d <sub>4</sub>	HWS	HMS
DAH25.012.M062.02	2	12	26	13,5	11	1	M6	11,5	DAH25	6001
DAH25.016.M083.02	2	16	39	20,5	13	1	M8	15,4	DAH25	08001
DAH25.016.M083.03	3	16	39	20,5	13	1	M8	15,4	DAH25	08001
DAH25.020.M104.03	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

Δ 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 -

ISO	Vorschub/Zahn $f_z$ (mm) Feed/tooth $f_z$ (mm)
<b>P</b>	0,5 - 1,8
<b>M</b>	0,5 - 1,5
<b>K</b>	0,6 - 1,8
<b>N</b>	0,8 - 2,5
<b>S</b>	0,5 - 1,5

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

### Eintauchwinkel

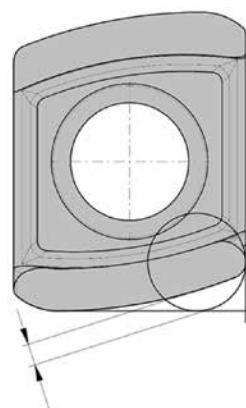
Diving angle

$\emptyset$ (mm)	Eintauchwinkel (°) Diving angle (°)
12	6,5
16	2,5
20	1,5
25	1,0

### Programmerradius und Abweichung

Programming radius and difference

$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
1,4	0,61



theoretischer Eckenradius  $r_{th}$   
= Programmerradius  
theoretical corner radius  $r_{th}$   
= programming radius

Z = Zähnezahl  
Number of teeth

$d_{\text{eff}}$  = effektiver Schneidkreis-Ø  
effective cutting edge Ø

n = Drehzahl  
Revolutions

$$n = \frac{v_c \cdot 1000}{d_{\text{eff}} \cdot \pi} \text{ [1/min]}$$

$v_c$  = Schnittgeschwindigkeit  
Cutting speed

$$v_c = \frac{d_{\text{eff}} \cdot \pi \cdot n}{1000} \text{ [m/min]}$$

$f_z$  = Vorschub/Zahn  
Feed/tooth

$$f_z = \frac{v_f}{Z \cdot n} \text{ [mm]}$$

$v_f$  = Vorschubgeschwindigkeit  
Feed rate

$$v_f = f_z \cdot Z \cdot n \text{ [mm/min]}$$

Q = Materialabtragungsrate  
Material removal rate

$$Q = \frac{a_e \cdot a_p \cdot v_f}{1000} \text{ [cm}^3\text{/min]}$$

Zur Ermittlung der Drehzahl und der Schnittgeschwindigkeit muss mit dem effektiven Durchmesser  $d_{\text{eff}}$  gerechnet werden.

Dieser berechnet sich in Abhängigkeit der Schnitttiefe  $a_p$ , dem Schneidkreisdurchmesser  $D_s$  und dem Korrekturwert  $K_D$  zu:

$$d_{\text{eff}} = K_D + (D_s - 12)$$

The effective cutting diameter  $d_{\text{eff}}$  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

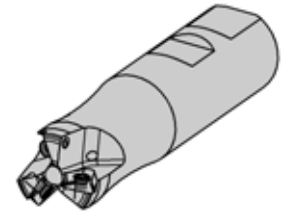
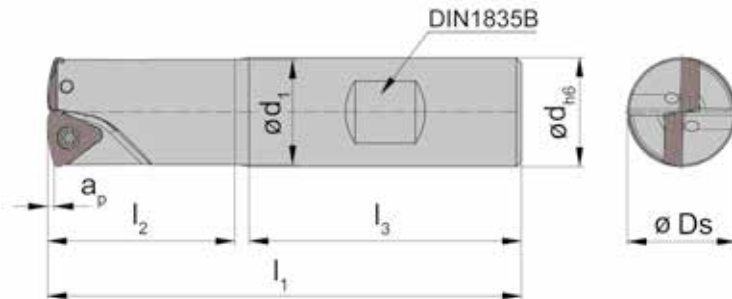
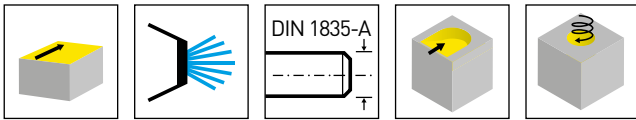
$D_s$  = cutter diameter

$K_D$  = from Correction value chart

$$d_{\text{eff}} = K_D + (D_s - 12)$$

### 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

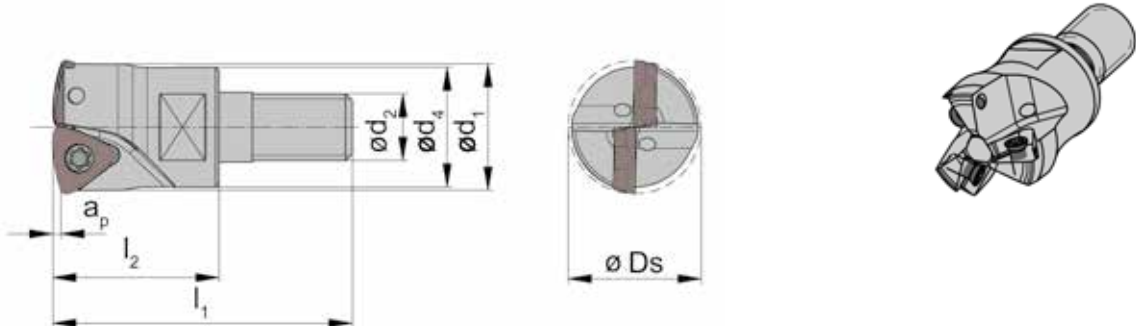
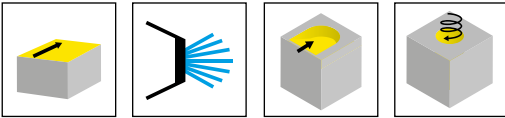


Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	HWS
DAH37.020.D204.02B	2	20	20	87	34	19	50	1,2	DAH37
DAH37.025.D255.03B	3	25	25	101	41	24	56	1,2	DAH37
DAH37.032.D326.04B	4	32	32	111	47	31	60	1,2	DAH37

L

**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

Ersatzteile  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH37...	030.3070.T10P	T10PL



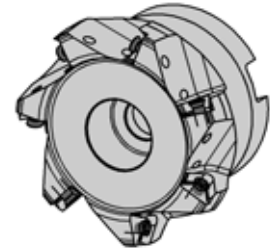
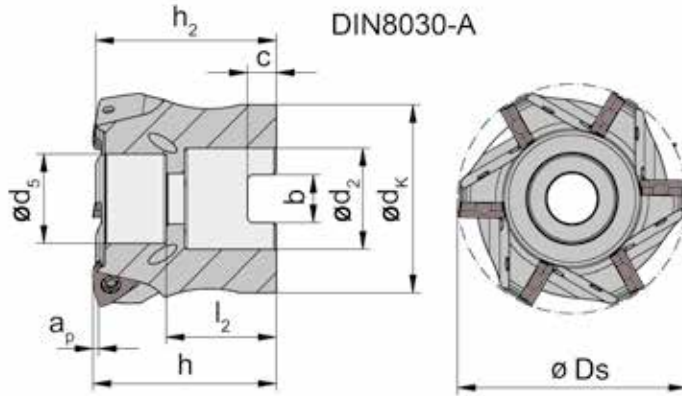
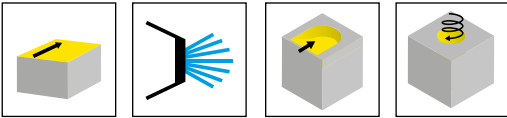


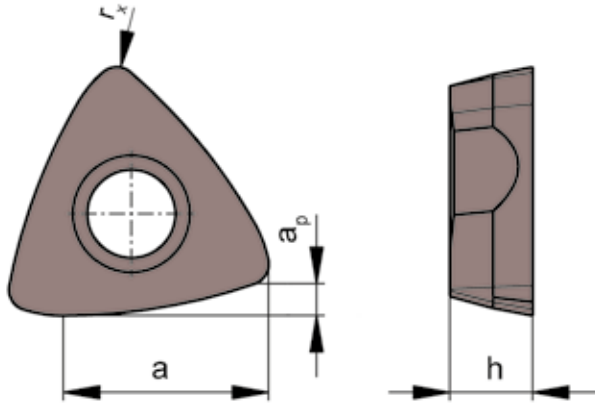
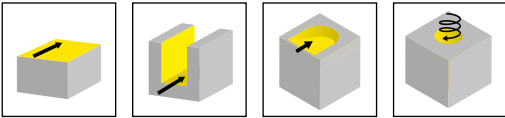
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

L

**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>



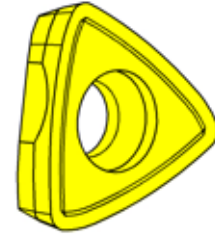
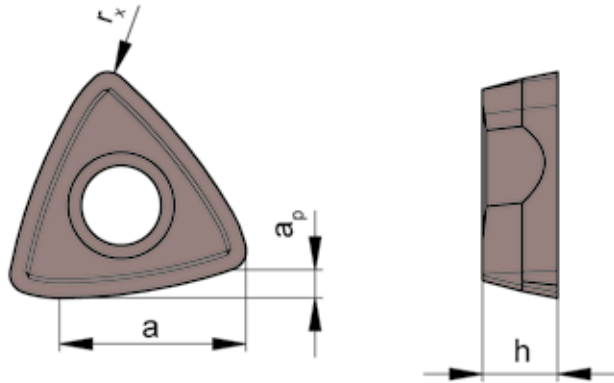
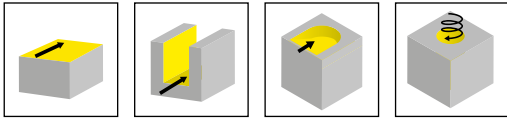
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

Δ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	a	h	$r_x$	HIS	SA4B	SC6A
<b>DAH.37.022.N.08</b>	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	▲
positive Geometrie positive geometry						P ●
						M ●
						K ●
						N ●
						S -
						H -



ISO	Vorschub/Zahn $f_z$ (mm) Feed/tooth $f_z$ (mm)
<b>P</b>	0,6 - 2,2
<b>M</b>	0,6 - 2,0
<b>K</b>	0,7 - 2,0
<b>N</b>	1,0 - 2,8
<b>S</b>	0,6 - 1,8

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

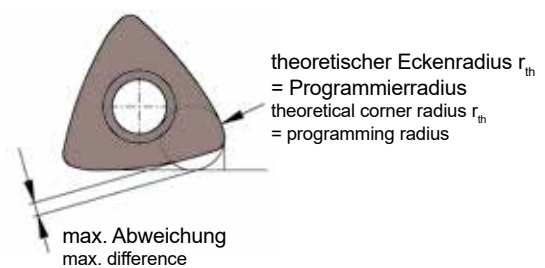
### Eintauchwinkel

Diving angle

$\emptyset$ (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

### Programmerradius und Abweichung

Programming radius and difference



$r_{th}$ (mm)	max. Abweichung (mm) max. difference (mm)
2	0,83

Z = Zähnezahl  
Number of teeth

$d_{\text{eff}}$  = effektiver Schneidkreis-Ø  
effective cutting edge Ø

n = Drehzahl  
Revolutions

$$n = \frac{v_c \cdot 1000}{d_{\text{eff}} \cdot \pi} \text{ [1/min]}$$

$v_c$  = Schnittgeschwindigkeit  
Cutting speed

$$v_c = \frac{d_{\text{eff}} \cdot \pi \cdot n}{1000} \text{ [m/min]}$$

$f_z$  = Vorschub/Zahn  
Feed/tooth

$$f_z = \frac{v_f}{Z \cdot n} \text{ [mm]}$$

$v_f$  = Vorschubgeschwindigkeit  
Feed rate

$$v_f = f_z \cdot Z \cdot n \text{ [mm/min]}$$

Q = Materialabtragungsrate  
Material removal rate

$$Q = \frac{a_e \cdot a_p \cdot v_f}{1000} \text{ [cm}^3\text{/min]}$$

Zur Ermittlung der Drehzahl und der Schnittgeschwindigkeit muss mit dem effektiven Durchmesser  $d_{\text{eff}}$  gerechnet werden.

Dieser berechnet sich in Abhängigkeit der Schnitttiefe  $a_p$ , dem Schneidkreisdurchmesser  $D_s$  und dem Korrekturwert  $K_D$  zu:

$$d_{\text{eff}} = K_D + (D_s - 20)$$

The effective cutting diameter  $d_{\text{eff}}$  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

$$d_{\text{eff}} = K_D + (D_s - 20)$$

### 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

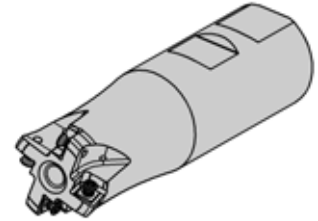
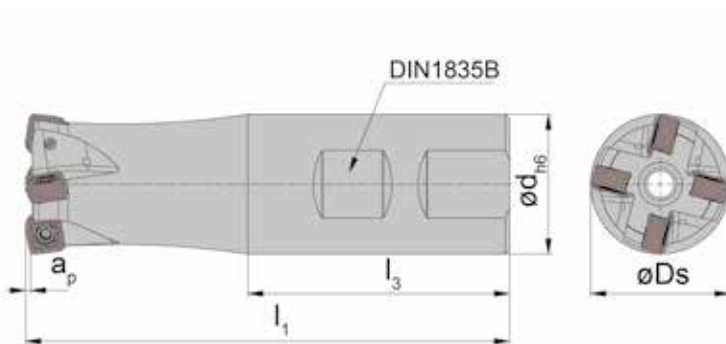
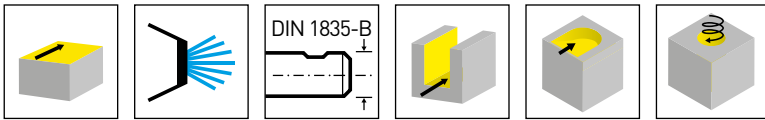


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	d	l <sub>1</sub>	l <sub>3</sub>	a <sub>p</sub>	n <sub>max</sub>	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

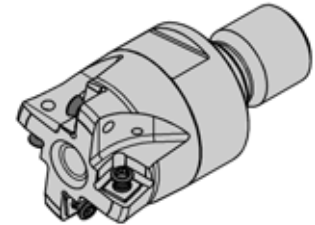
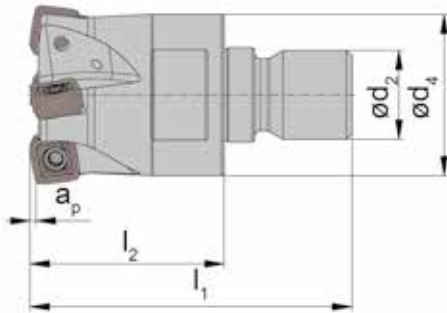
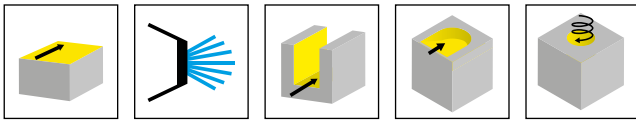


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

Ersatzteile  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
DAH82...	030.3070.T10P	T10PL

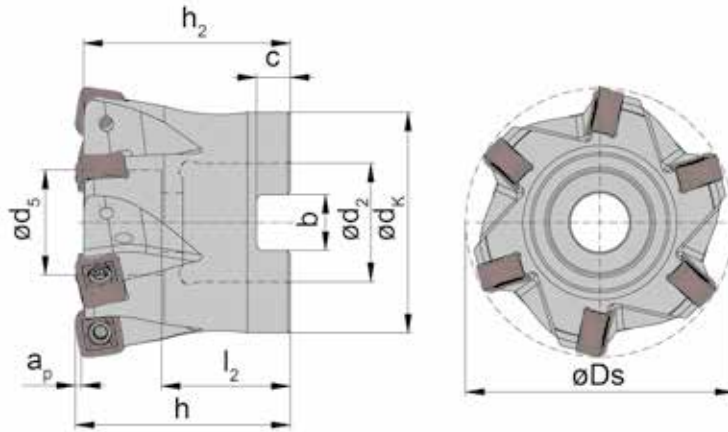
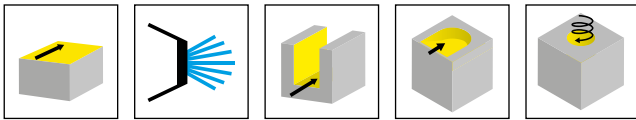


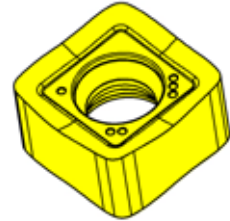
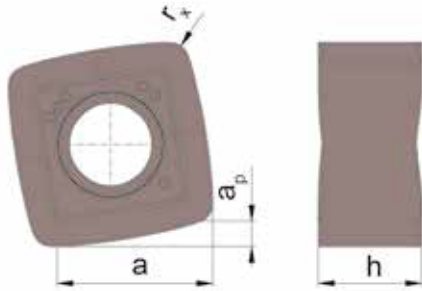
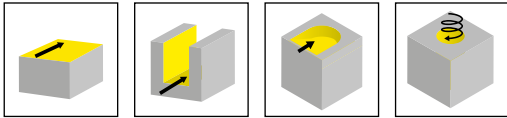
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

## Ersatzteile

Spare Parts

<b>Aufsteckfräser</b> Arbour Mounted Cutter	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
DAH82...	<b>030.3070.T10P</b>	<b>T10PL</b>



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 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 o	●	●
						K o	●	●
						N o	●	●
						S o	-	-
						H -	-	-

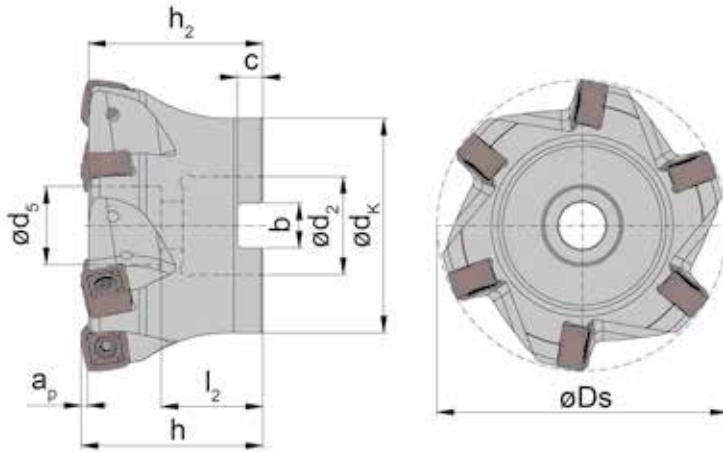
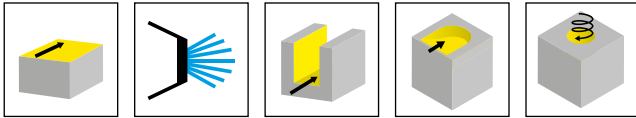


Abbildung = rechtsschneidend  
Picture = right hand cutting version

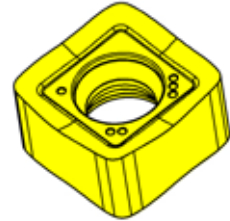
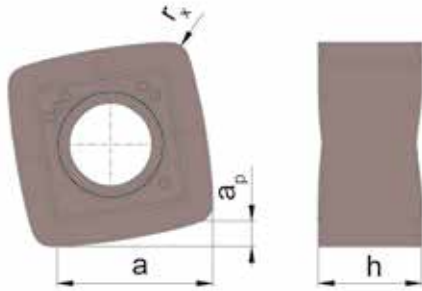
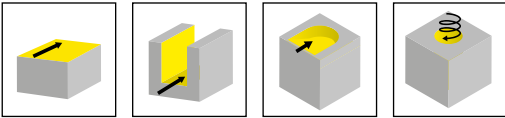
Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>s</sub>	d <sub>k</sub>	l <sub>2</sub>	b	C	d <sub>2</sub>	n <sub>max</sub>	HWS
<b>DAH84.050.A2240.04</b>	4	50	1,5	38	40	16,5	41	25	10,4	6,3	22	8000	DAH84
<b>DAH84.052.A2240.04</b>	4	52	1,5	38	40	16,5	41	25	10,4	6,3	22	7500	DAH84
<b>DAH84.063.A2240.05</b>	5	63	1,5	38	40	19,5	49	25	10,4	6,3	22	6500	DAH84
<b>DAH84.066.A2240.05</b>	5	66	1,5	38	40	19,5	49	25	10,4	6,3	22	6500	DAH84
<b>DAH84.080.A2750.06</b>	6	80	1,5	48	50	21,5	59	28	12,4	7	27	5500	DAH84
<b>DAH84.085.A2750.06</b>	6	85	1,5	48	50	21,5	59	28	12,4	7	27	5500	DAH84
<b>DAH84.100.A3250.07</b>	7	100	1,5	48	50	30	80	33	14,4	8	32	5000	DAH84
<b>DAH84.125.A4063.08</b>	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...	<b>030.0412.T15P</b>	<b>T15PQ</b>	
DAH84.125.A4063.08	<b>030.0412.T15P</b>	<b>T15PQ</b>	<b>20.30.6367</b>





HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 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 -	-	-



# Vorschubswerte DAH82 / DAH84

Feed Rate



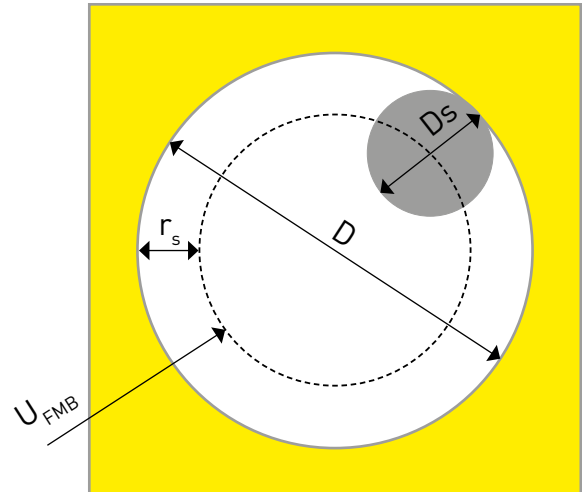
ISO	DAH82	DAH84
	Vorschub/Zahn $f_z$ (mm) Feed/tooth $f_z$ (mm)	Vorschub/Zahn $f_z$ (mm) Feed/tooth $f_z$ (mm)
<b>P</b>	0,6 - 2,2	0,8 - 2,2
<b>M</b>	0,6 - 2,0	0,6 - 2,2
<b>K</b>	0,7 - 2,0	0,7 - 2,2
<b>N</b>	1,0 - 2,8	1,5 - 3,0
<b>S</b>	0,6 - 1,8	0,7 - 2,0

**Schnittgeschwindigkeiten finden Sie im Kapitel N in diesem Katalog.**

Cutting speeds can be found in chapter N in this catalogue.

## Berechnung Fräsermittelpunktsbahn

- D = Bohrungsdurchmesser Werkstück
- D<sub>s</sub> = Schneidkreisdurchmesser
- r<sub>s</sub> = Schneidkreisradius
- U<sub>FMB</sub> = Umfang Fräsermittelpunktsbahn



$$U_{FMB} = \pi \times (\text{Bohrungsdurchmesser Werkstück} - \text{Schneidkreisdurchmesser})$$

$$\longrightarrow U_{FMB} = \pi \times (D - D_s)$$

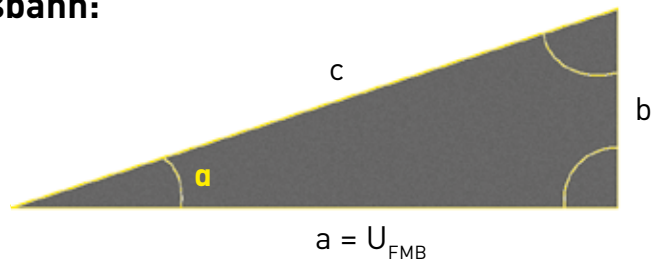
oder

$$U_{FMB} = \pi \times (\text{Bohrungsdurchmesser Werkstück} - (2 \times \text{Schneidkreisradius}))$$

$$\longrightarrow U_{FMB} = \pi \times (D - (2 \times r_s))$$

## Berechnung über Fräsermittelpunktsbahn: Basis ist das rechtwinklige Dreieck

- a = Rampenwinkel
- b = Schnitttiefe je Umdrehung (Steigung)
- a = Umfang Fräsermittelpunktsbahn



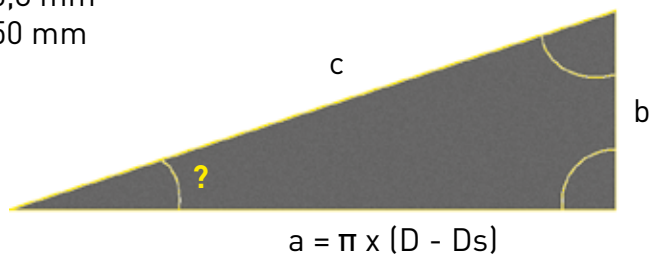
## Beispielbetrachtung fehlender Rampenwinkel = ?

- 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

$$D_{\min} = (D_s - a) \times 2$$

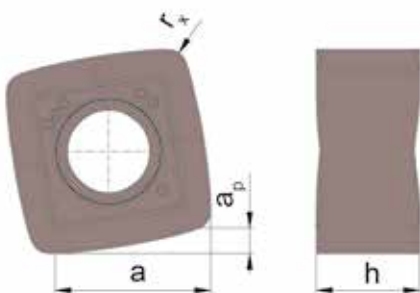
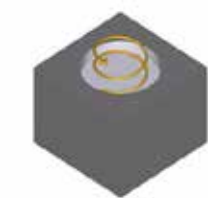
$$D_{\min} = (50 \text{ mm} - 6,8 \text{ mm}) \times 2$$

$$D_{\min} = 86,4 \text{ mm}$$



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

$$D_{\min} = (D_s - a) \times 2$$

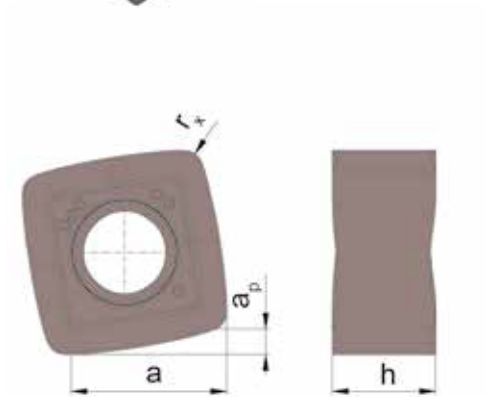
$$D_{\min} = (50 \text{ mm} - 9,8 \text{ mm}) \times 2$$

$$D_{\min} = 80,4 \text{ mm}$$



Bedeutet:

Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 80,4 mm mit ebenem Grund zu erreichen.



$$D_{\max} = (D_s - r_x) \times 2$$

$$D_{\max} = (50 \text{ mm} - 1,2 \text{ mm}) \times 2$$

$$D_{\max} = 97,6 \text{ mm}$$



Bedeutet:

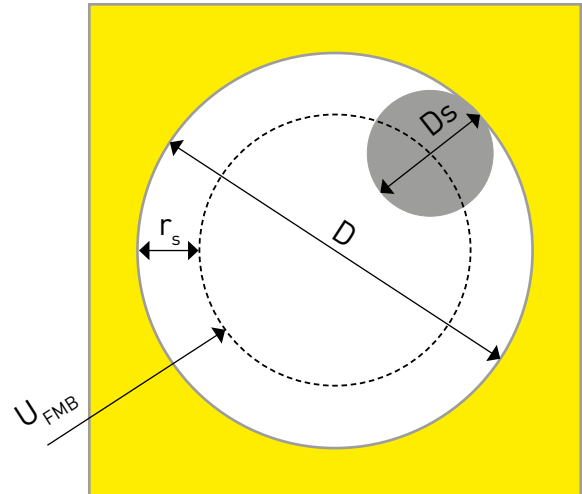
Mit dem Schneidkreisdurchmesser 50 mm ist ein Durchmesser von 97,6 mm **ohne** ebenem Grund zu erreichen. Es bleibt Restmaterial in der Mitte stehen.

$$r_x = 1,2 \text{ mm}$$

$$a = 9,8 \text{ mm}$$

## 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



$$U_{FMB} = \pi \times (\text{Bore diameter of workpiece} - \text{Cutting diameter})$$

$$\longrightarrow U_{FMB} = \pi \times (D - D_s)$$

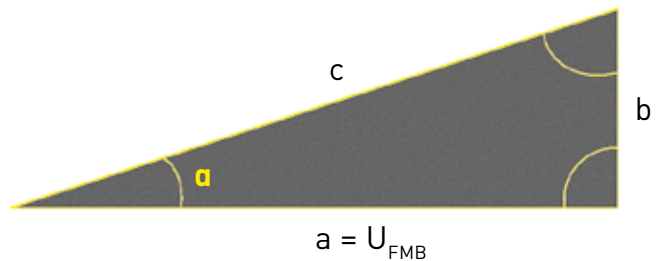
or

$$U_{FMB} = \pi \times (\text{Bore diameter of workpiece} - (2 \times \text{Cutting radius}))$$

$$\longrightarrow U_{FMB} = \pi \times (D - (2 \times r_s))$$

## Calculation using cutter centre path: The basis is the right-angled triangle

- $\alpha$  = Ramp angle
- b = Depth of cut per rotation (Pitch)
- a = Circumference of cutter centre path



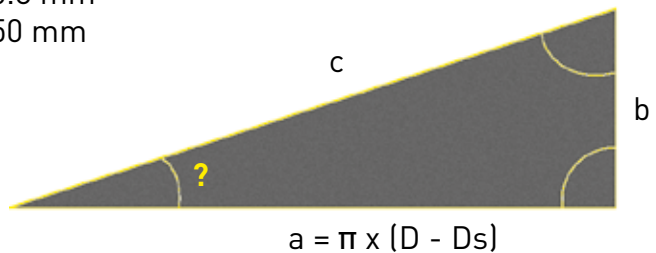
## Example of missing ramp angle = ?

- 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.

$$D_{\max} = (D_s - r_x) \times 2$$

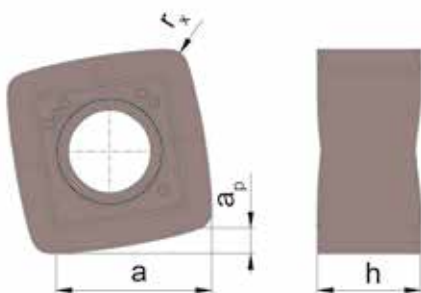
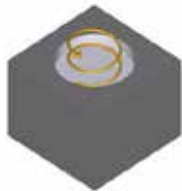
$$D_{\max} = (50 \text{ mm} - 0.8 \text{ mm}) \times 2$$

$$D_{\max} = 98.4 \text{ mm}$$



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.

$$D_{\max} = (Ds - r_x) \times 2$$

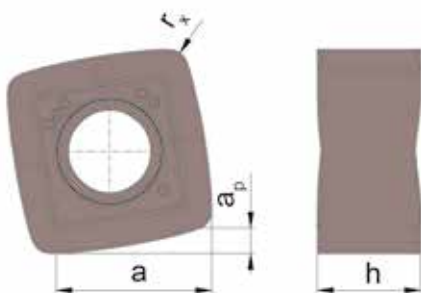
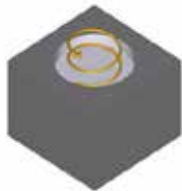
$$D_{\max} = (50 \text{ mm} - 1.2 \text{ mm}) \times 2$$

$$D_{\max} = 97.6 \text{ mm}$$



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**

**524**

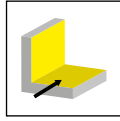
**M409**

**534**

**M610**

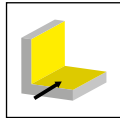
**558**

Schaftfräser  
End Mill  
M406



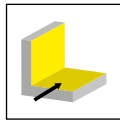
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526-528

Einschraubfräser  
Screw-in cutter  
M406



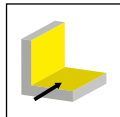
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Aufsteckfräser  
Arbour Mounted Cutter  
M406



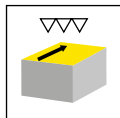
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Wendeschneidplatte  
Indexable insert  
406



Seite/Page  
531

Schneidplatte  
Insert  
406



Seite/Page  
532

# M406



## **Tangentialfräsen mit System 406**

- 90° Schafffräser
- 90° Einschraubfräser
- Aufsteckfräser

## **Tangential milling with system 406**

- 90° End Mill
- 90° Screw-in Cutter
- Disc Milling Cutter

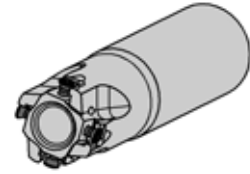
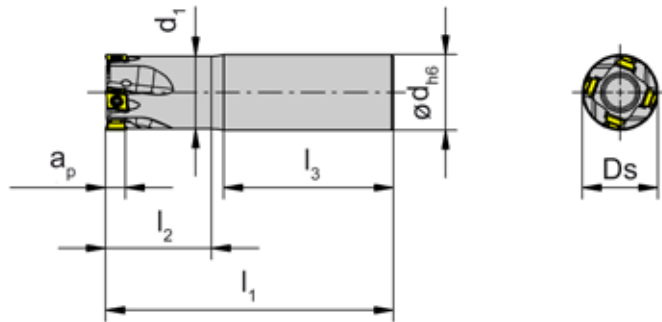
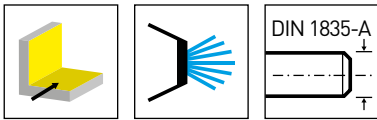


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

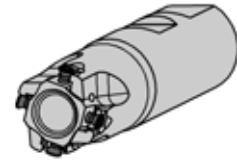
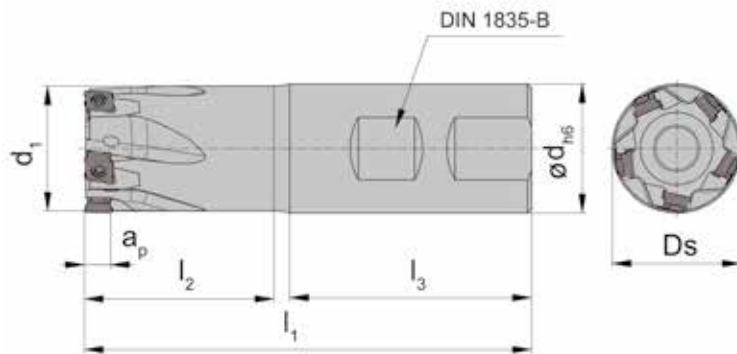


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

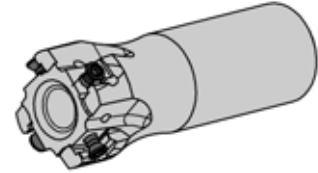
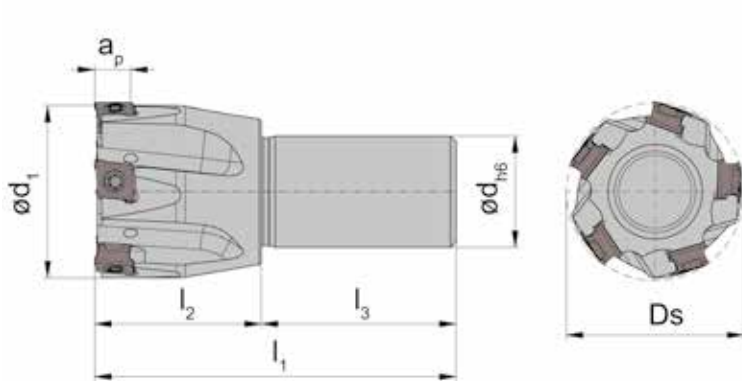
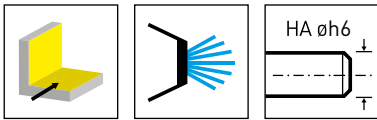


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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



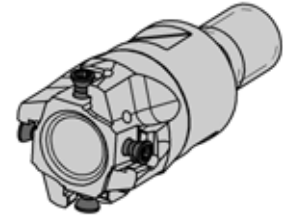
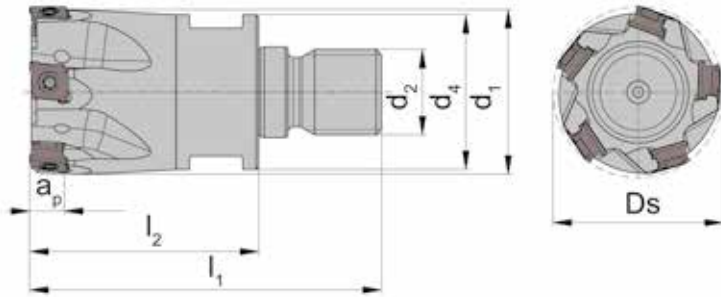
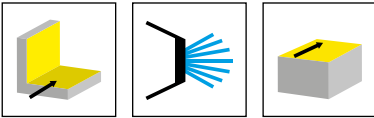


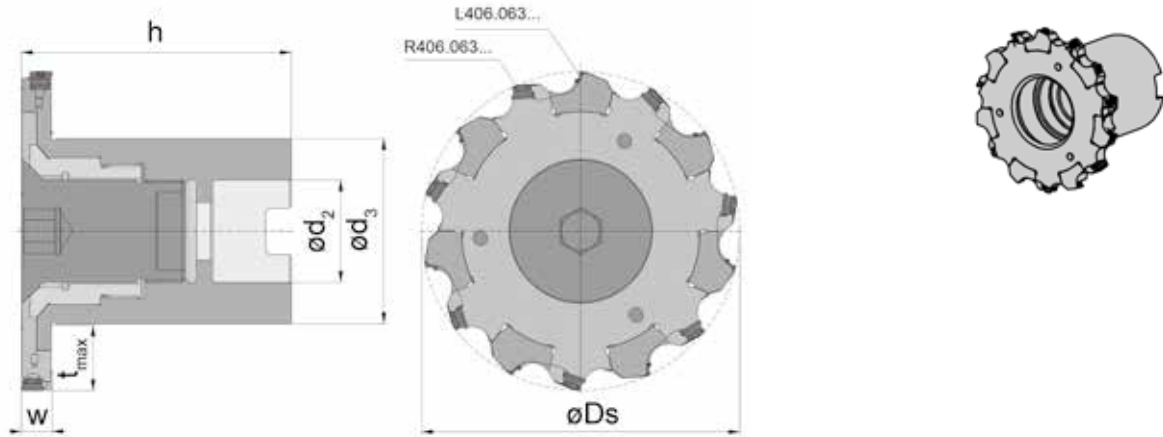
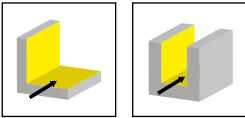
Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
M406.016.M08.3.02	2	16	41	23	15	6,3	M8	13	10	23700	40600R	08001
M406.020.M10.4.03	3	20	50	30	19	6,3	M10	18	15	21200	40600R	10001
M406.025.M12.5.04	4	25	57	35	24	6,3	M12	21	17	19000	40600R	12001
M406.032.M16.6.05	5	32	66	43	31	6,3	M16	29	24	16700	40600R	16001
M406.040.M16.6.06	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	030.2669.T8P	T8PL
M406...04 -...06	030.2608.T8P	T8PL

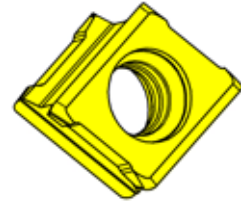
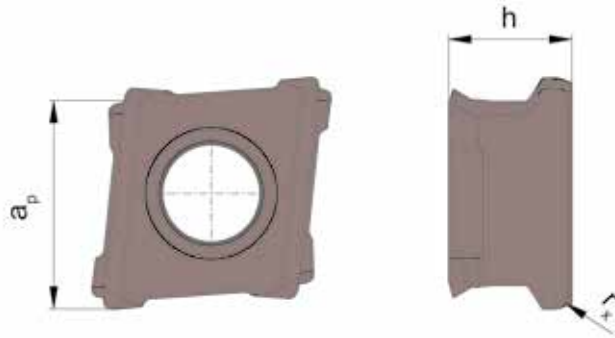
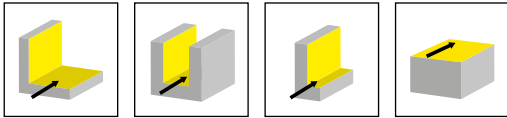


Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	t <sub>max</sub>	h <sub>min</sub>	h <sub>max</sub>	d <sub>3</sub>	d <sub>2</sub>	w <sub>min</sub>	w <sub>max</sub>	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M406.0100.A32.ES.96</b>	14	7	100	20	84,8	88,1	58	32	9,6	12,9	7x R406.063...	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

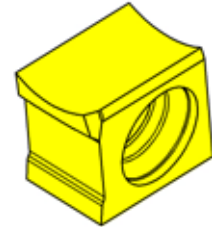
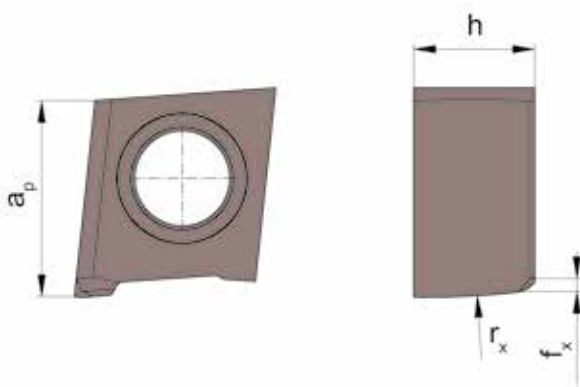
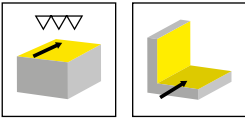
▲ ab Lager  
on stock

△ 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

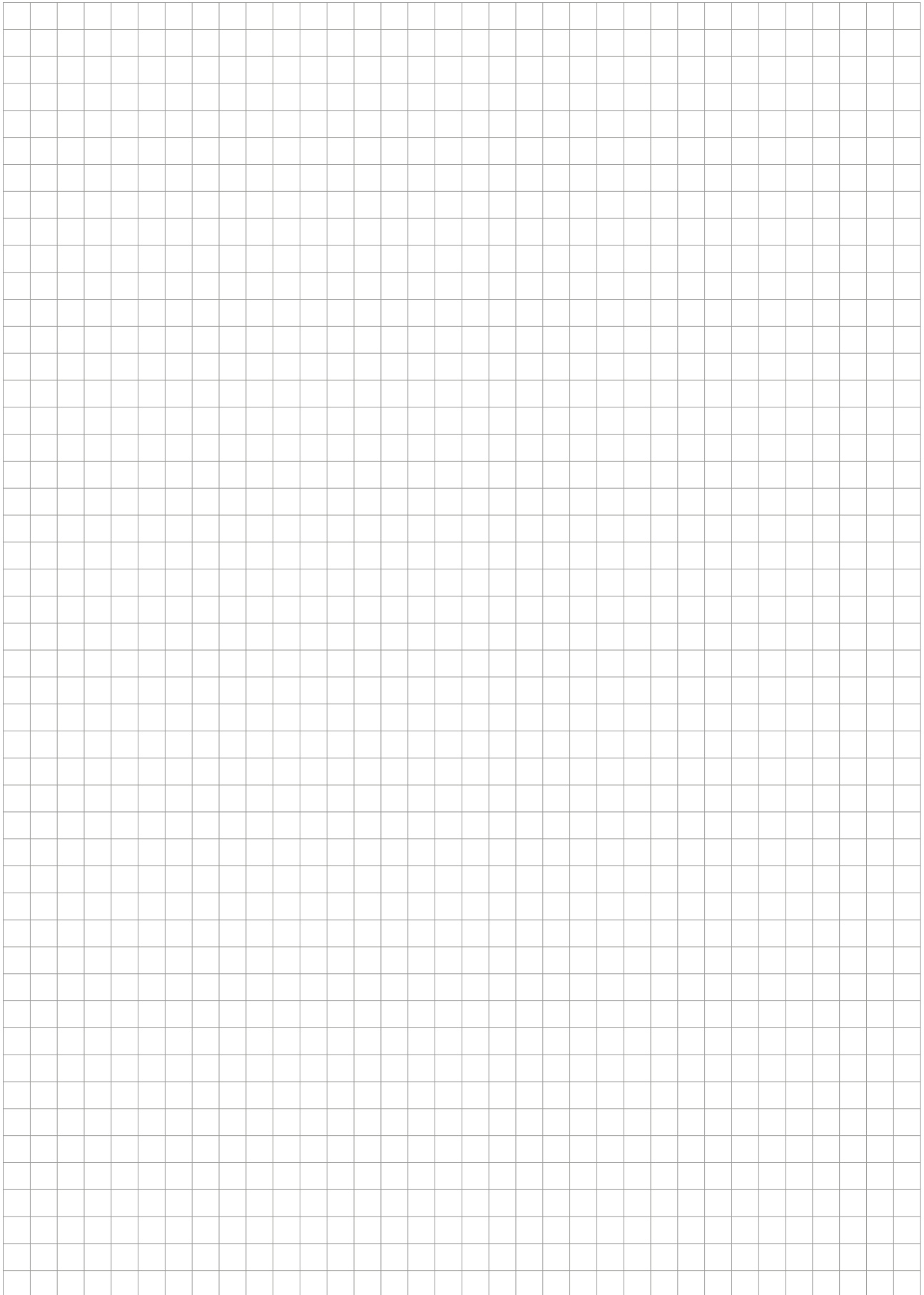


▲ ab Lager  
on stock

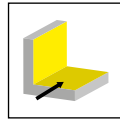
HM-Sorten  
Carbide grades

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	-

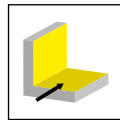


Schafffräser  
End Mill  
M409



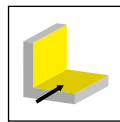
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Einschraubfräser  
Screw-in cutter  
M409



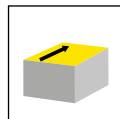
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Eckfräser  
Shoulder Mill  
M409



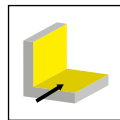
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Planfräser  
Face Mill  
M409



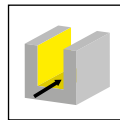
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542-545

Walzenstirnfräser  
Shell End Mill  
M409



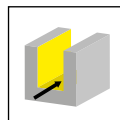
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Scheibenfräser  
Disc Milling Cutter  
M409



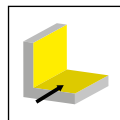
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Aufsteckfräser  
Arbour Mounted Cutter  
M409

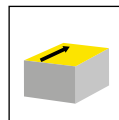


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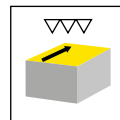
Wendeschneidplatte  
Indexable insert  
409



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Seite/Page  
551

Montageanleitung  
Mounting Instructions

Seite/Page  
552-557

# M409



## **Tangentialfräsen mit System 409**

- 90° Schafffräser
- 90° Einschraubfräser
- Eckfräser
- Planfräser
- Walzenstirnfräser
- Scheibenfräser

## **Tangential milling with system 409**

- 90° End Mill
- 90° Screw-in cutter
- Shoulder Mill
- Face Mill
- Shell End Mill
- Disc Milling Cutter

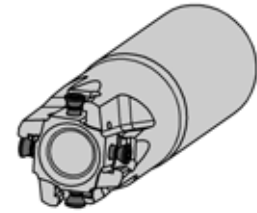
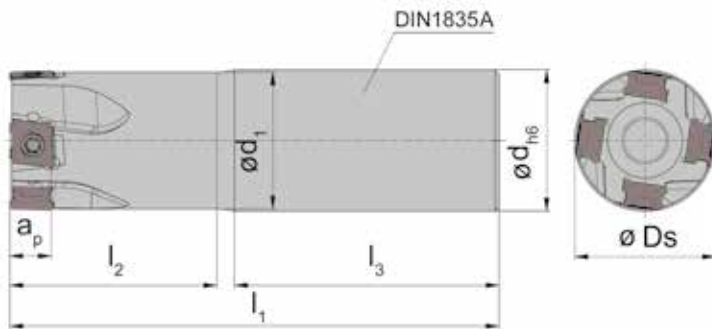
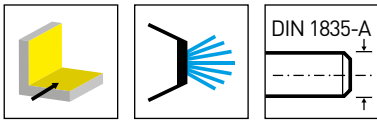


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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



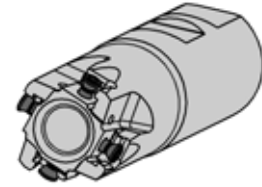
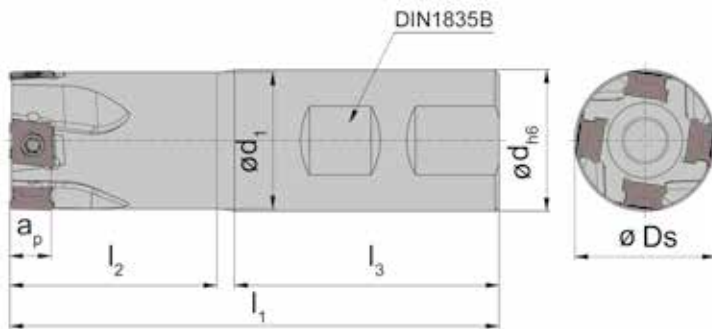
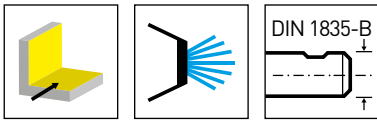


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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.D32.6.03B</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

enge Teilung  
narrow pitch

**Ersatzteile**  
Spare Parts

<b>Schaftfräser</b> End Mill	<b>Spannschraube</b> Clamping Screw	<b>TORX PLUS®-Schlüssel</b> TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

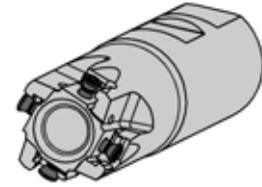
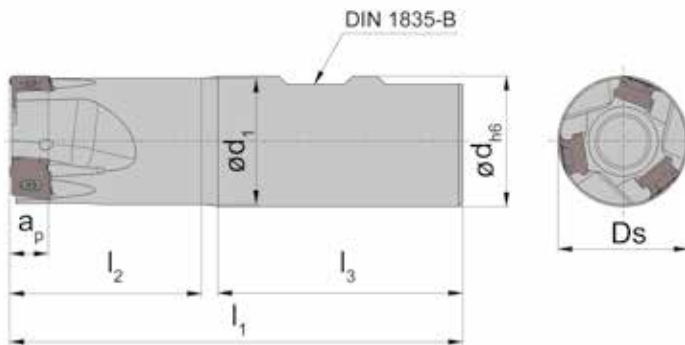
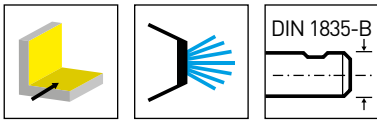


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	$D_s$	d	$l_1$	$l_2$	$d_1$	$l_3$	$a_p$	Form	$n_{max}$	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>

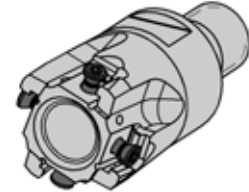
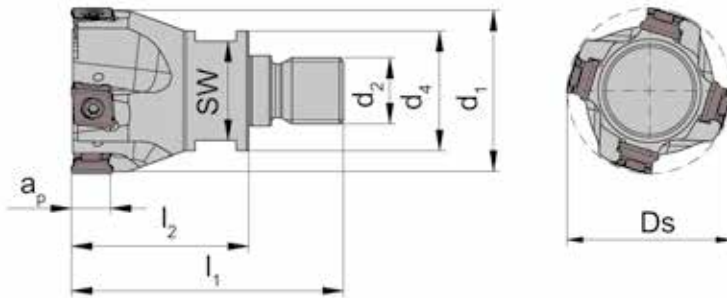


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
M409.032.M16.6.03	3	32	66	43	31	9,3	M16	29	24	15600	40900R	16001
M409.032.M16.6.04	4	32	66	43	31	9,3	M16	29	24	15600	40900R	16001
M409.040.M16.6.04	4	40	66	43	39	9,3	M16	29	24	13900	40900R	16001
M409.040.M16.6.05	5	40	66	43	39	9,3	M16	29	24	13900	40900R	16001

Ersatzteile  
Spare Parts

Einschraubfräser Screw-in cutter	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	030.3511.T10P	T10PL

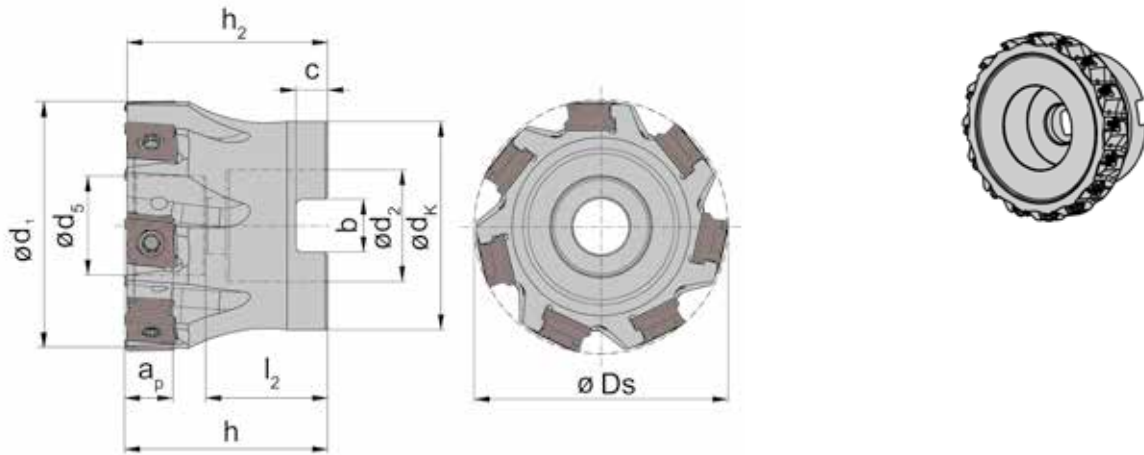
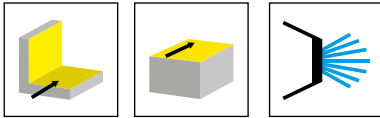


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Ds	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>M409.0040.A16.05</b>	5	40	9,3	34,5	35	16	39	16	22	8,4	5,6	33	13900	40900R
<b>M409.0050.A22.07</b>	7	50	9,3	39,5	40	19,5	49	22	24	10,4	6,3	41	12500	40900R
<b>M409.0063.A22.08</b>	8	63	9,3	39,5	40	19,5	62	22	25	10,4	6,3	49	11100	40900R
<b>M409.0063.A27.08</b>	8	63	9,3	39,5	40	23	62	27	27,5	12,4	7	49	11100	40900R
<b>M409.0080.A27.10</b>	10	80	9,3	49,5	50	21,5	79	27	28	12,4	7	59	9800	40900R
<b>M409.0100.A32.12</b>	12	100	9,3	49,5	50	30	99	32	33	14,4	8	80	8800	40900R
<b>M409.0125.A40.16</b>	16	125	9,3	62,5	63	56	124	40	35	16,4	9	89	7900	40900R
<b>M409.0160.A40.20</b>	20	160	9,3	62,5	63	90	159	40	29	16,4	9	110	6900	40900R
<b>M409.0200.A60.24</b>	24	200	9,3	62,5	63	135	199	60	42	25,7	14	130	6200	40900R
<b>M409.0250.A60.30</b>	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

## Ersatzteile

Spare Parts

Eckfräser Shoulder Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	<b>030.3511.T10P</b>	<b>T10PL</b>	
M409.0...A40..	<b>030.3511.T10P</b>	<b>T10PL</b>	<b>20.30.6367</b>
M409.0...A60..	<b>030.3511.T10P</b>	<b>T10PL</b>	<b>30.45.6367</b>

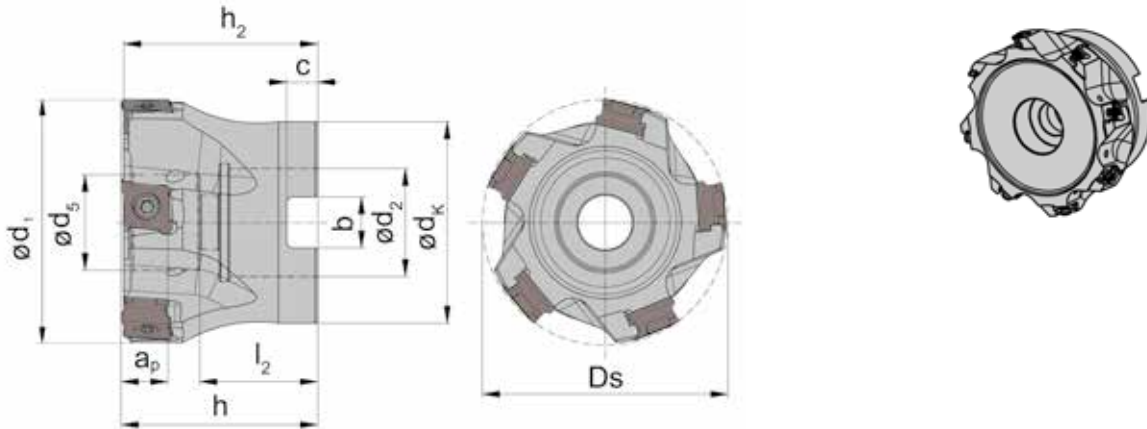
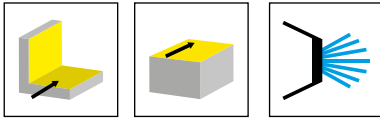


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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
<b>M409.0040.A16.04</b>	4	40	9,3	34,5	35	16	39	16	22	8,4	5,6	33	13900	40900R
<b>M409.0050.A22.05</b>	5	50	9,3	39,5	40	19,5	49	22	24	10,4	6,3	41	12500	40900R
<b>M409.0063.A22.06</b>	6	63	9,3	39,5	40	19,5	62	22	25	10,4	6,3	49	11100	40900R
<b>M409.0063.A27.06</b>	6	63	9,3	39,5	40	23	62	27	27,5	12,4	7	49	11100	40900R
<b>M409.0080.A27.07</b>	7	80	9,3	49,5	50	21,5	79	27	28	12,4	7	59	9800	40900R
<b>M409.0100.A32.08</b>	8	100	9,3	49,5	50	30	99	32	33	14,4	8	80	8800	40900R
<b>M409.0125.A40.10</b>	10	125	9,3	62,5	63	56	124	40	35	16,4	9	89	7900	40900R
<b>M409.0160.A40.14</b>	14	160	9,3	62,5	63	90	159	40	29	16,4	9	110	6900	40900R
<b>M409.0200.A60.16</b>	16	200	9,3	62,5	63	135	199	60	42	25,7	14	130	6200	40900R
<b>M409.0250.A60.20</b>	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

## Ersatzteile

Spare Parts

Eckfräser Shoulder Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench	Fräseranzugsschraube Tightening Bolt
M409....	<b>030.3511.T10P</b>	<b>T10PL</b>	
M409.0...A40..	<b>030.3511.T10P</b>	<b>T10PL</b>	<b>20.30.6367</b>
M409.0...A60..	<b>030.3511.T10P</b>	<b>T10PL</b>	<b>30.45.6367</b>

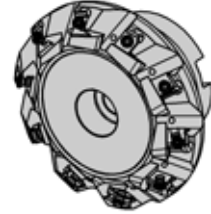
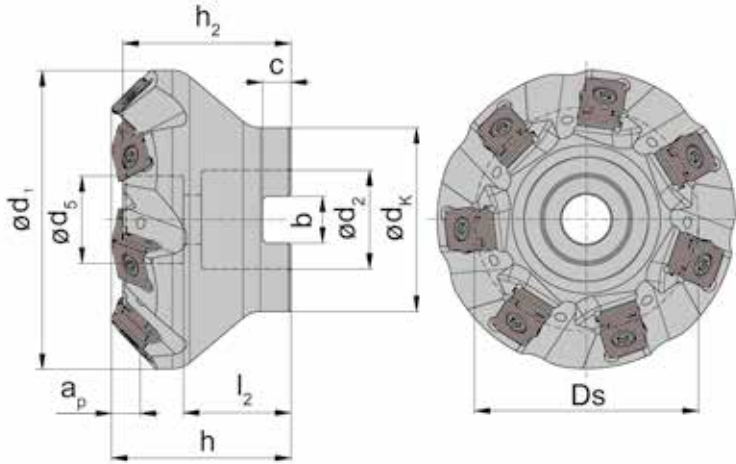


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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.A16.45.05	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 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

### 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

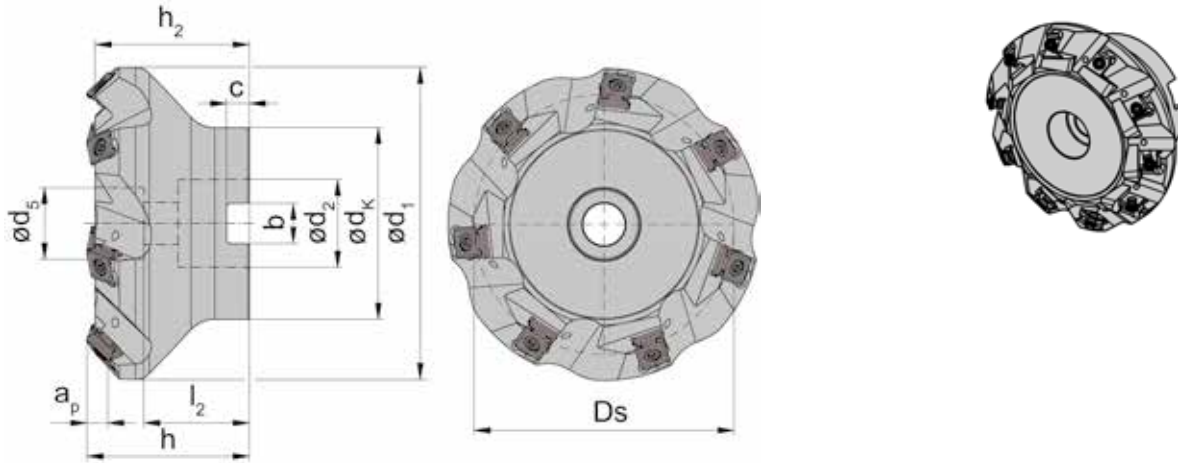


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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

### 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

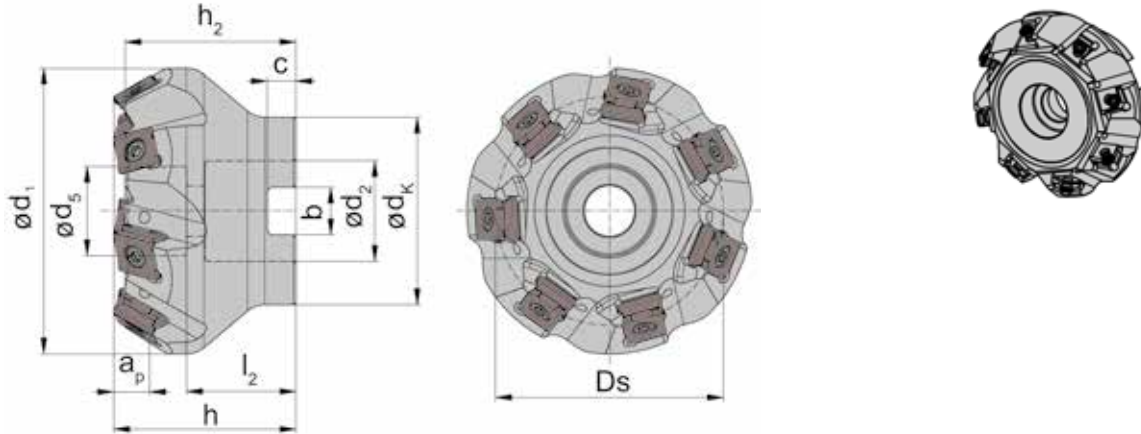
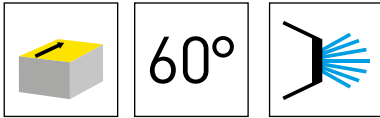


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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	d <sub>k</sub>	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

### 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
M409.02...	030.3511.T10P	T10PL	30.45.6367



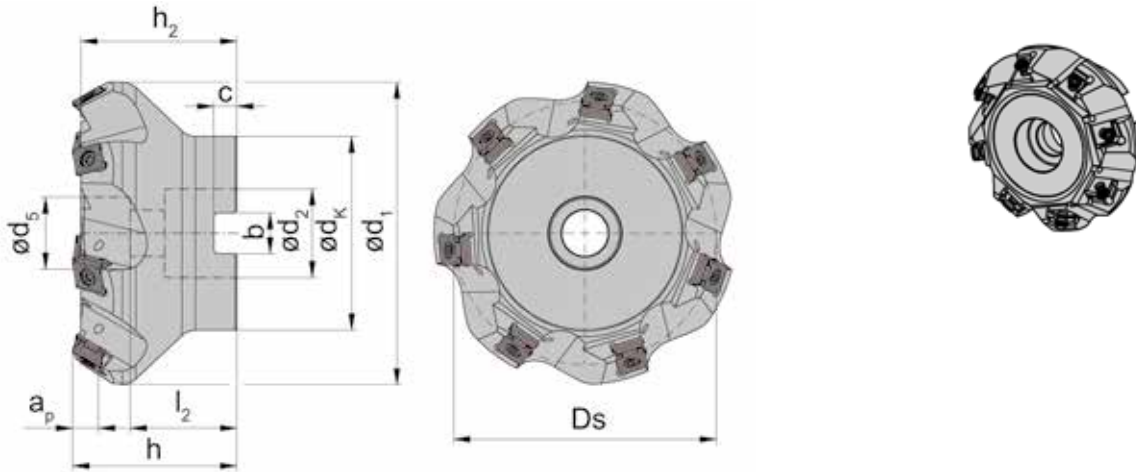
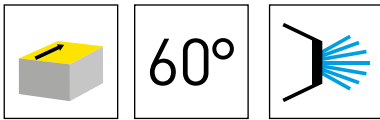


Abbildung = rechtsschneidend  
Picture = right hand cutting version

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 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

### 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

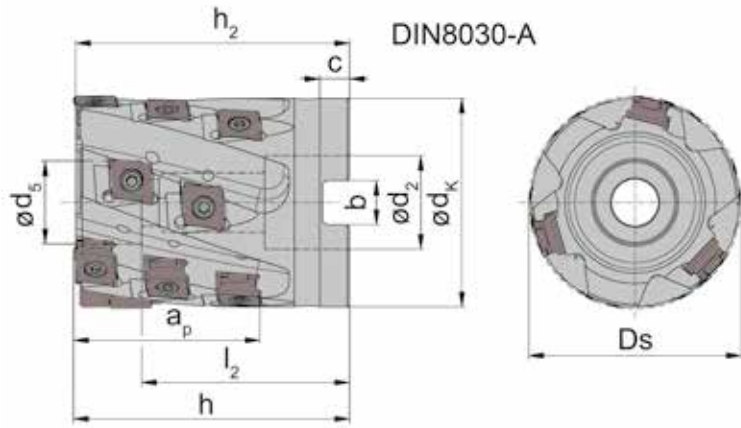
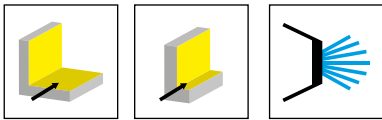


Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	a <sub>p</sub>	h <sub>2</sub>	h	d <sub>s</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

Walzenstirnfräser Shell End Mill	Spannschraube Clamping Screw	TORX PLUS®-Schlüssel TORX PLUS® Wrench
M409...	<b>030.3511.T10P</b>	<b>T10PL</b>

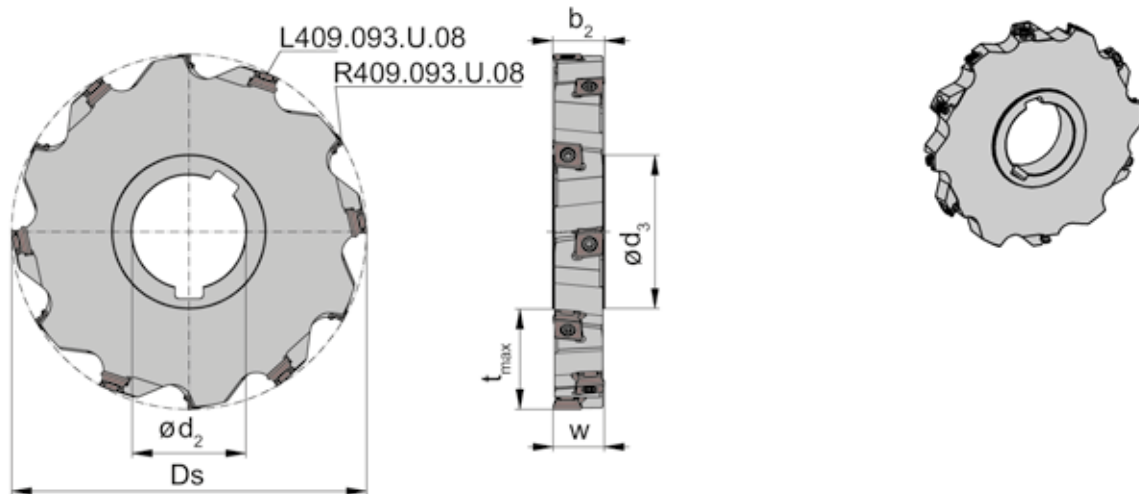
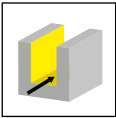


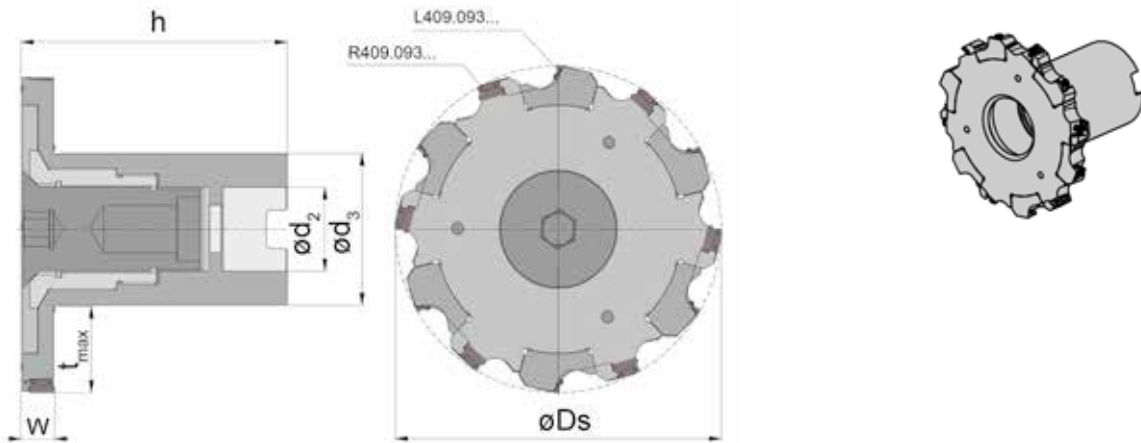
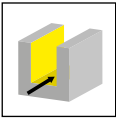
Abbildung = rechtsschneidend  
Picture = right hand cutting version

Bestellnummer Part number	Z	Z <sub>eff</sub>	D <sub>s</sub>	t <sub>max</sub>	d <sub>2</sub>	b <sub>2</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	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	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	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	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**

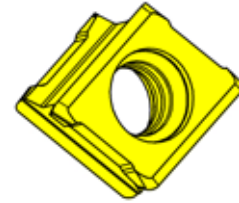
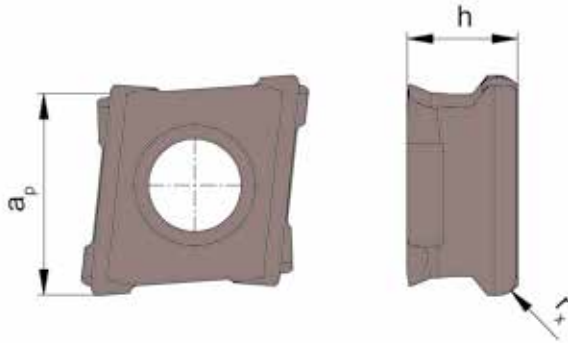
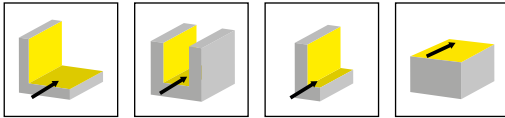
Spare Parts

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>

# Wendeschnidplatte

## Indexable insert

# 409



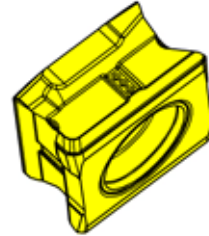
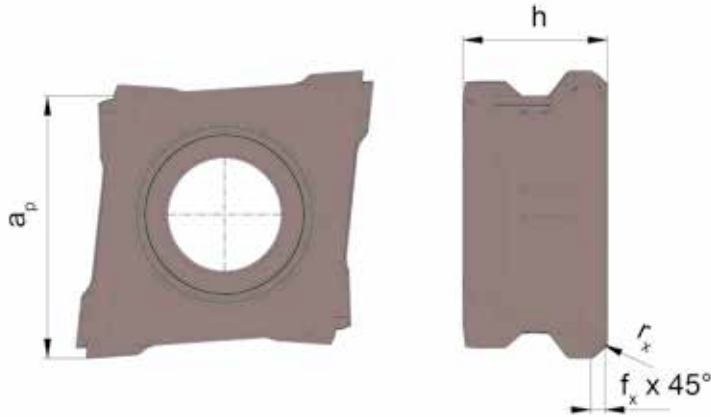
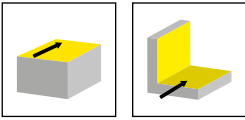
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	a <sub>p</sub>	h	r <sub>x</sub>	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		▲			▲	▲
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		▲			▲	▲
P	●	○	●	-	-					
M	○	○	●	●	-					
K	●	●	●	-	-					
N	●	○	○	-	●					
S	○	○	●	●	-					
H	-	-	-	-	-					

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges



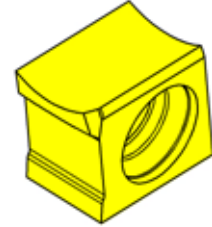
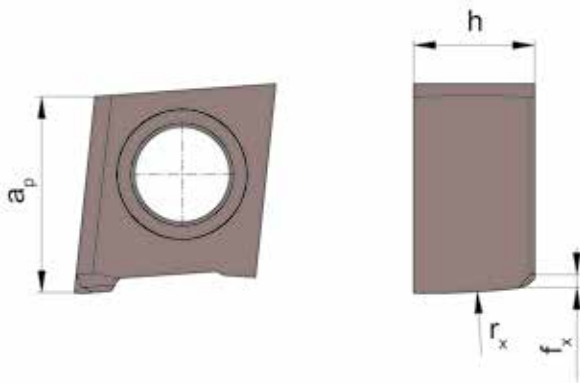
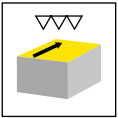
HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

Bestellnummer Part number	$a_p$	$h$	$r_x$	$f_x$	HIS	AS45	AS46
RS409.090.P.F05	9	5,2	0,6	0,5	40900R	▲	▲
LS409.090.P.F05	9	5,2	0,6	0,5	40900L	▲	▲
						P ● ○	○
						M ● ○	○
						K ● ●	○
						N ○ ○	○
						S ● ○	○
						H - -	-

mit 4 nutzbaren Schneidkanten  
with 4 usable cutting edges

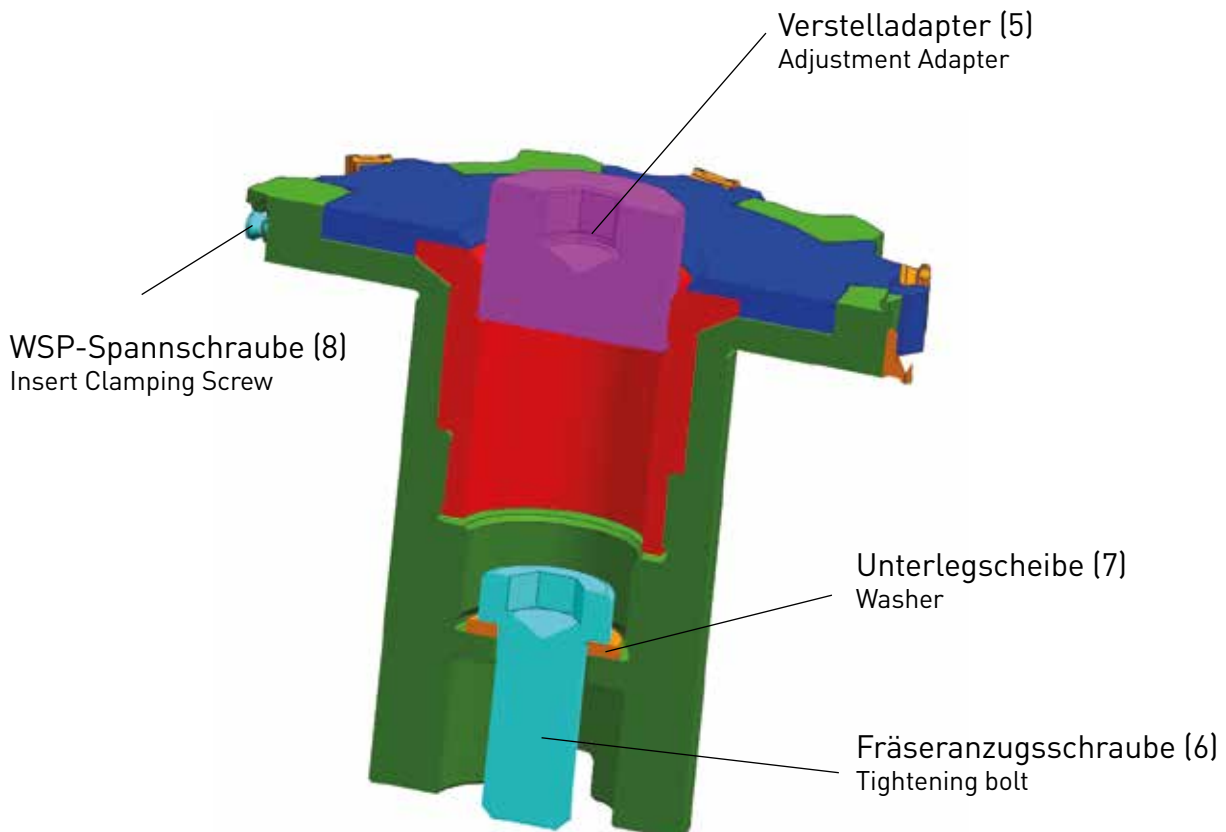
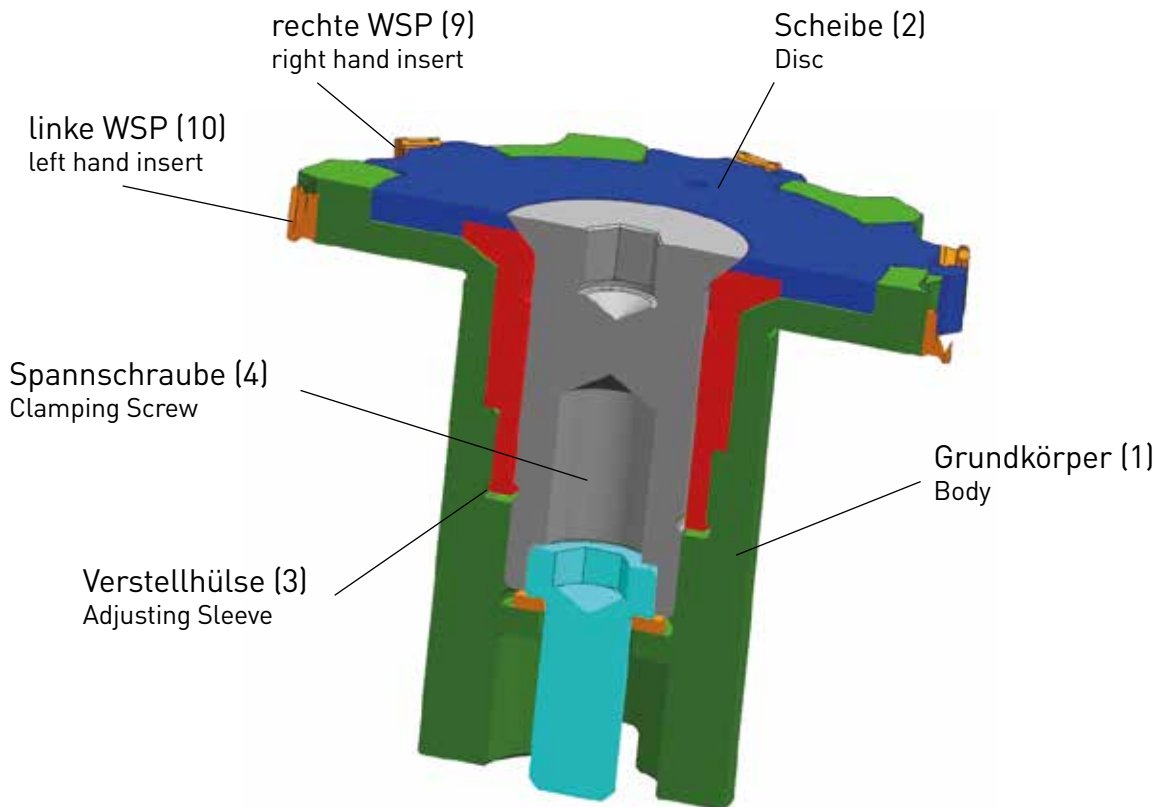


▲ ab Lager  
on stock

HM-Sorten  
Carbide grades

Δ 4 Wochen  
4 weeks

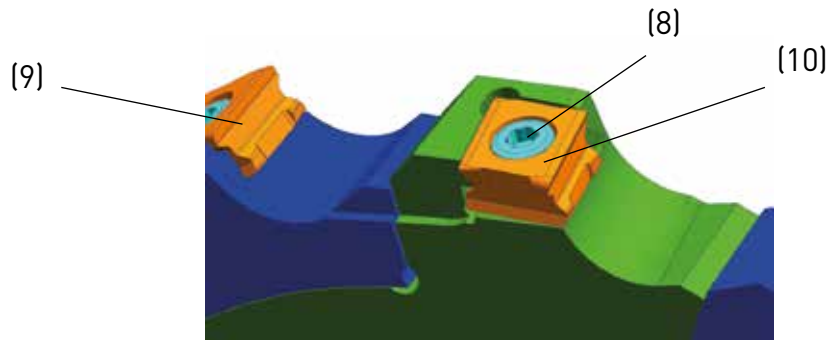
Bestellnummer Part number	$a_p$	$h$	$r_x$	$f_x$	HIS	AS46	AS4B
<b>R409.093.S.F4</b>	9,3	5,2	100	0,4	40900R	▲	▲
Breitschlichtschneide, präzisionsgeschliffen Wiper geometry, precision ground						P	o ●
1 nutzbare Schneidkante with 1 usable cutting edge						M	o ●
						K	● ●
						N	o o
						S	o ●
						H	- -



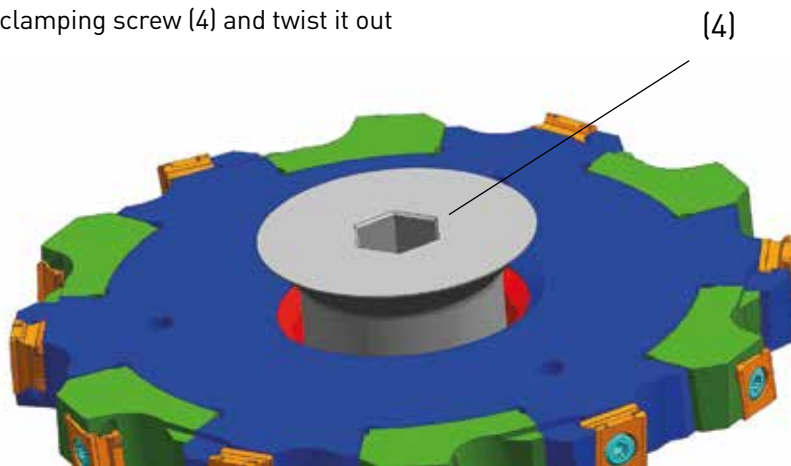


1. Montage der Wendeschneidplatten mittels WSP-Spannschraube (8);  
[rechte WSP (9) und linke WSP (10) Ausführung]

Mount the indexable insert using clamping screw (8);  
[right-hand insert (9) and left-hand insert (10) version]

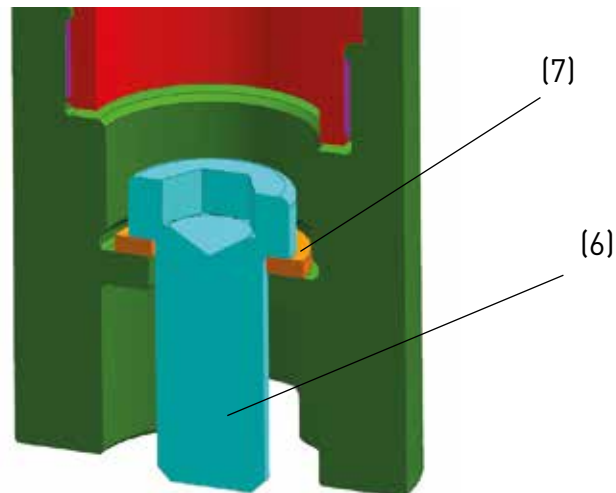


2. Spannschraube (4) lösen und heraus drehen  
Loosen the clamping screw (4) and twist it out



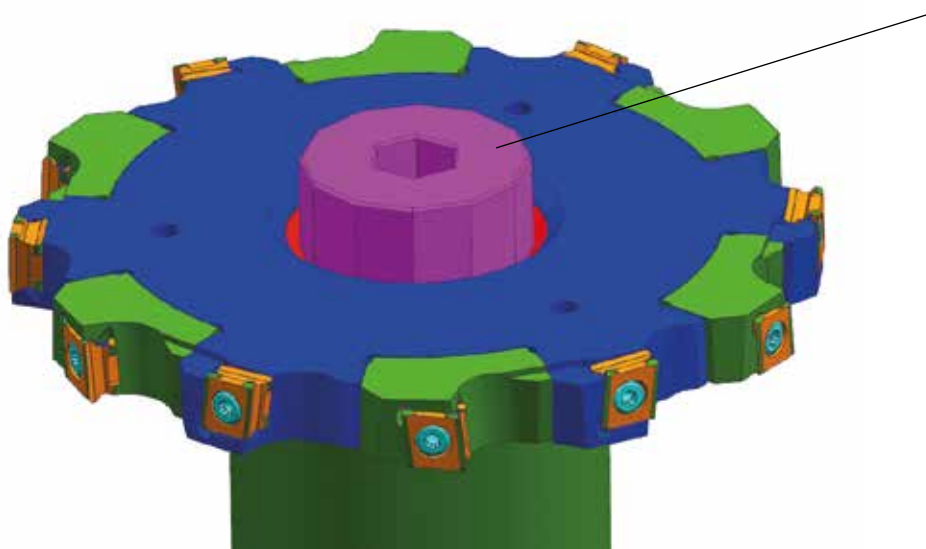
3. Fräs Werkzeug mit beigelegter Unterscheibe (7) und Fräseranzugschraube (6) auf die Werkzeugaufnahme (nicht abgebildet) montieren

Mount the milling tool with the enclosed washer (7) and cutter tightening bolt (6) on the toolholder (not shown)



4. Schneidbreite des Fräasers 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:

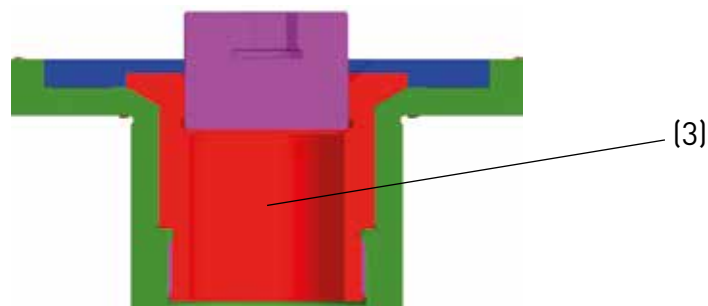
- Montiertes Werkzeug in die Adaption des Voreinstellgerätes einsetzen
- Sicher stellen, dass das Mindestmaß (System 409 → 12,9 mm; System 406 → 9,6 mm) des Werkzeugs eingestellt ist.

Anmerkung: Verstellhülse (3) ist auf Anschlag eingedreht

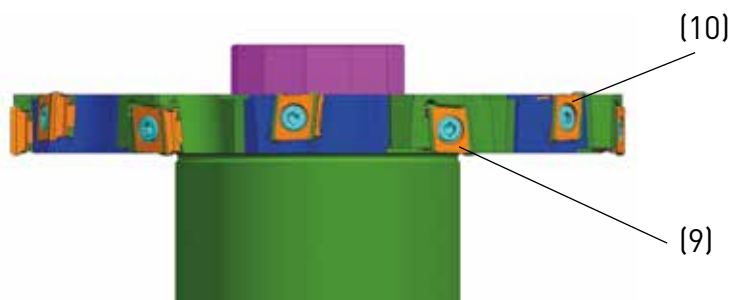
### Adjustment on a tool presetter:

- 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.

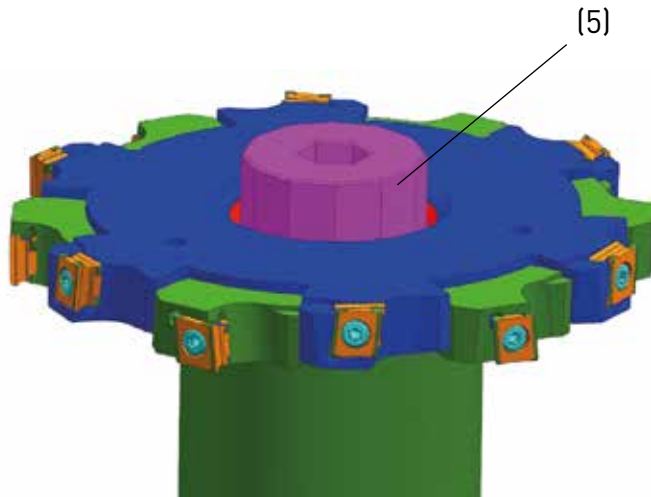
Note: Adjusting sleeve (3) is tightened fully



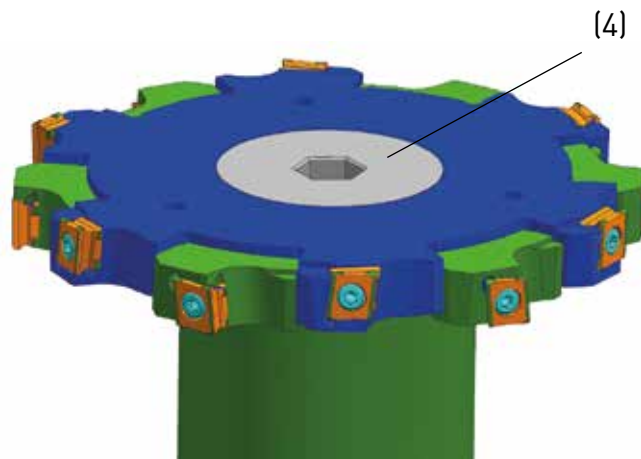
- Untere Schneidenreihe ausmessen [linke WSP's (9)]
  - Obere Schneidenreihe ausmessen [rechte WSP's (10)]
- Measure the lower cutting edge row [left hand inserts (9)]
  - Measure the upper cutting edge row [right hand inserts (10)]



- 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)



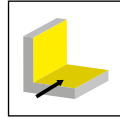
### Hinweis:

- 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:

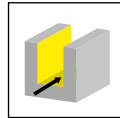
- 1) After the first groove has been machined, it must be measured or checked. If necessary, the cutting width of the milling tool must be corrected.
- 2) The individual parts must be kept clean during assembly and disassembly
- 3) We recommend lubricating or greasing the contact and thread surfaces of the adjustment mechanism.
- 4) Observe the maximum cutting width:  
System 409 → 18.8 mm; System 406 → 12.9 mm

Eckfräser  
Shoulder Mill  
M610



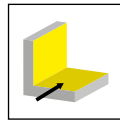
Seite/Page  
560

Aufsteckfräser  
Arbour Mounted Cutter  
M610



Seite/Page  
561

Wendeschneidplatte  
Indexable insert  
610



Seite/Page  
562

# M610

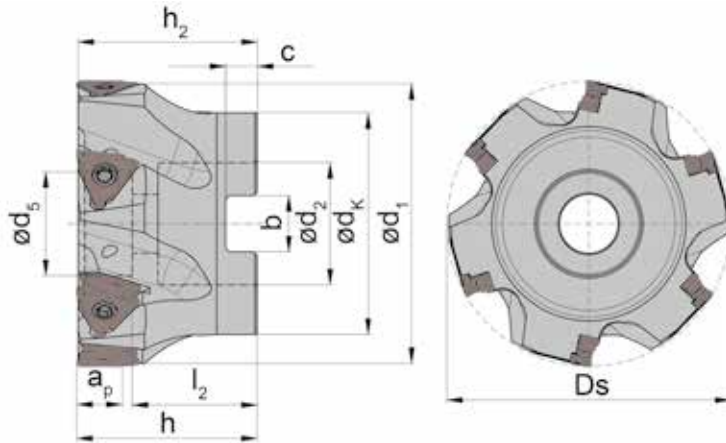
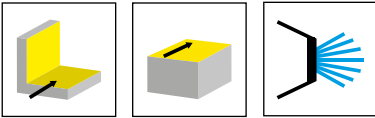


**Tangentialfräsen  
mit System 610**

Schneidkreis-Ø 100-125 mm

**Tangential milling  
with system 610**

cutting edge Ø 100-125 mm

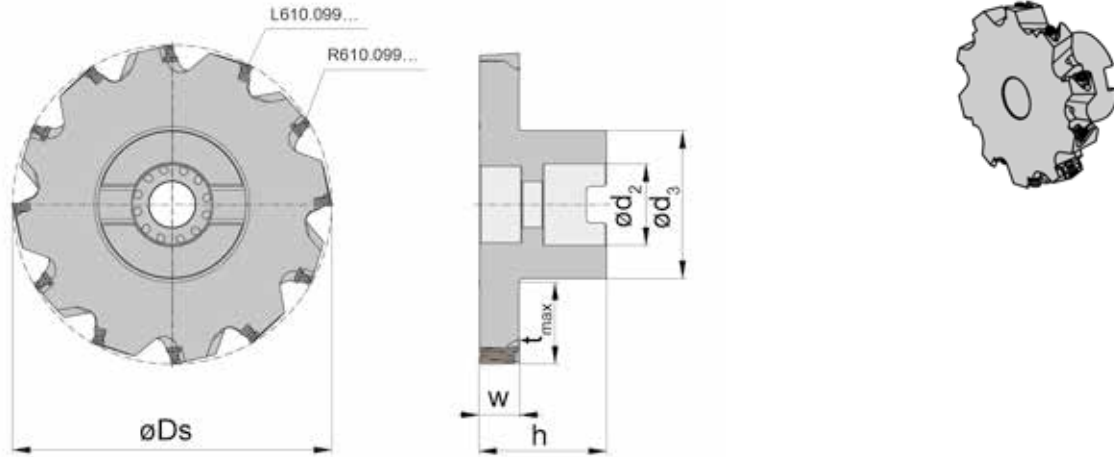
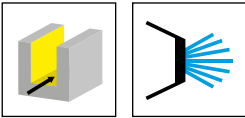


Bestellnummer Part number	Z	Ds	ap	h <sub>2</sub>	h	d <sub>5</sub>	d <sub>1</sub>	d <sub>2</sub>	l <sub>2</sub>	b	C	d <sub>k</sub>	n <sub>max</sub>	HWS
<b>M610.0050.A22.05</b>	5	50	9,9	39,7	40	19,5	49	22	24	10,4	6,3	41	10000	61000R
<b>M610.0063.A22.06</b>	6	63	9,9	39,7	40	19,5	62	22	25	10,4	6,3	49	9000	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>



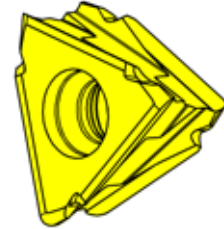
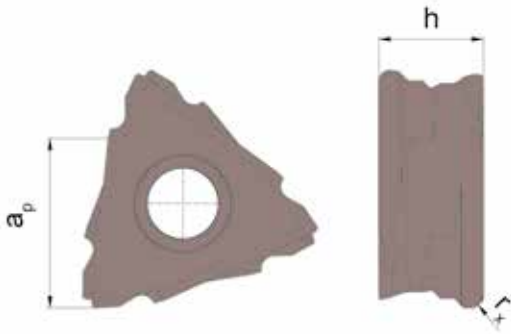
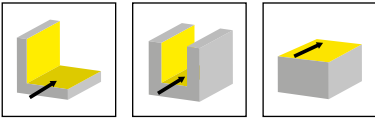


Bestellnummer Part number	Z	Z <sub>eff</sub>	Ds	t <sub>max</sub>	h	d <sub>3</sub>	d <sub>2</sub>	n <sub>max</sub>	w	rechte WSP right hand insert	linke WSP left hand insert	HWS
<b>M610.0125.A32.S.16</b>	12	6	125	32,5	50	58	32	6000	16	6x R610.099.U....	6x L610.099.U....	61000L

**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>



HM-Sorten  
Carbide grades

▲ ab Lager  
on stock

△ 4 Wochen  
4 weeks

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	-	-	-	-				

# Ermittlung des Vorschubs

## Calculating the Feed Rate



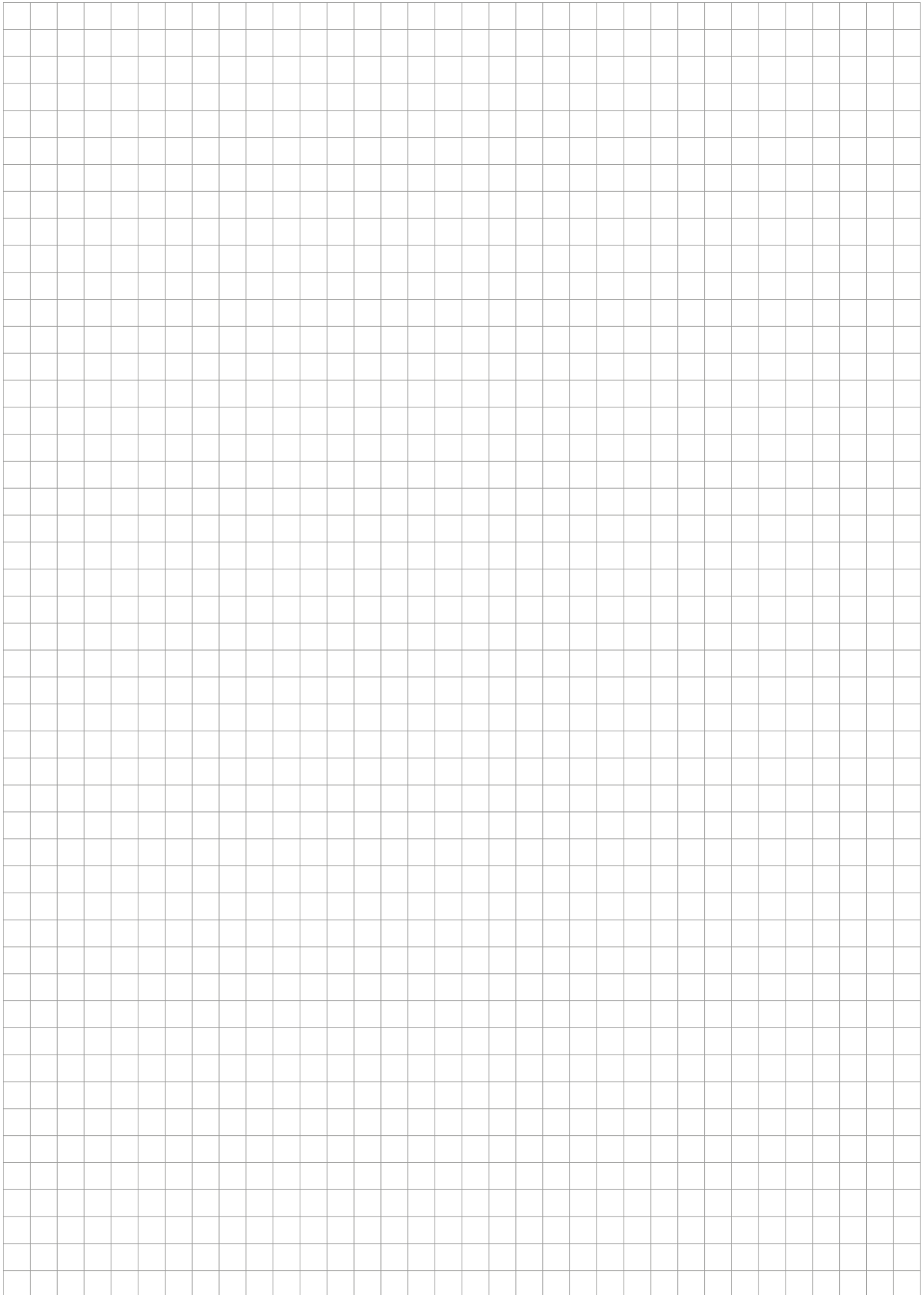
### Mittlere Spandicke $h_m$ zur Ermittlung des Vorschubs

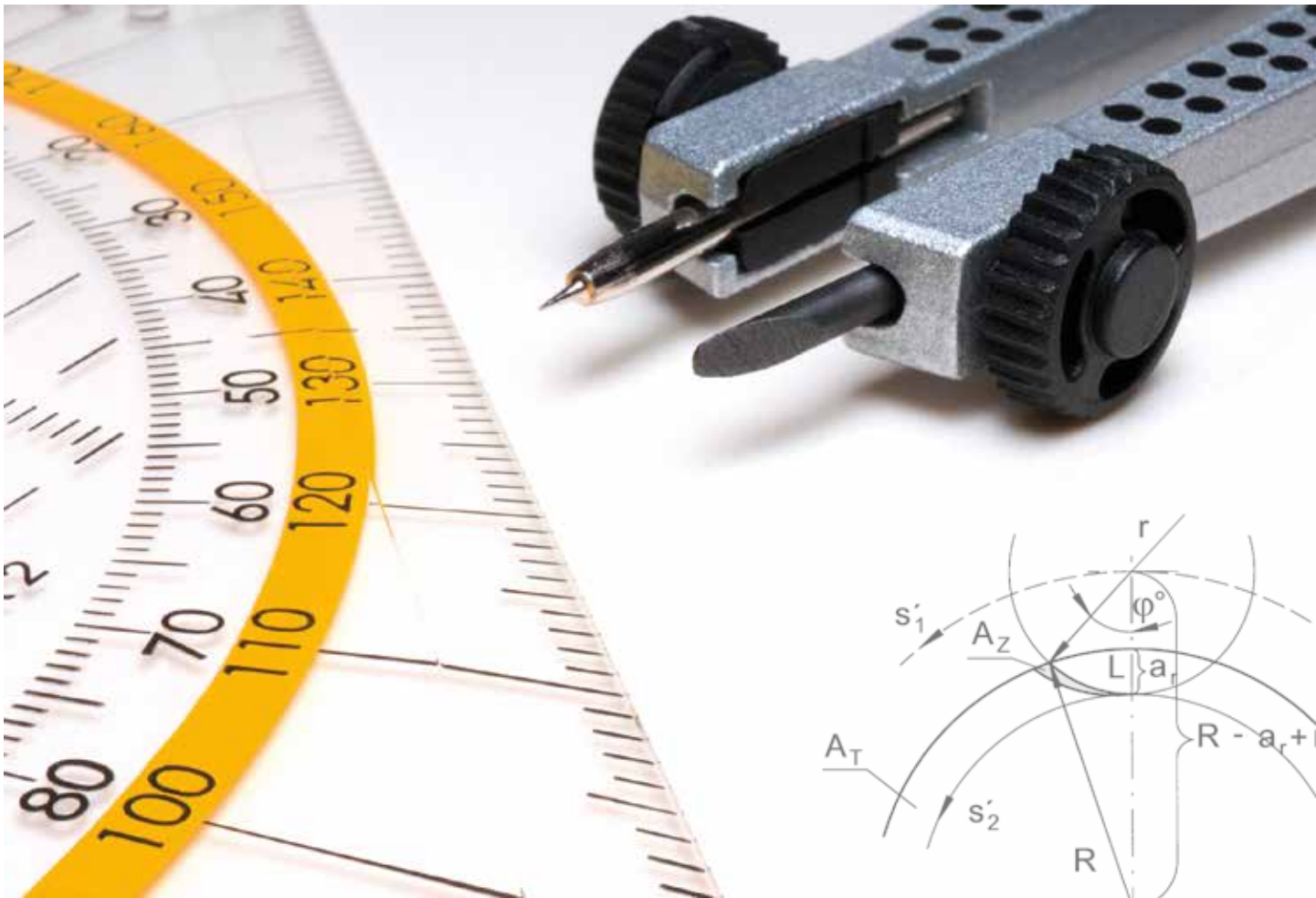
Medium chip thickness  $h_m$  for calculating the feed rate

ISO	406 / 409	610
	$h_m$ (mm)	$h_m$ (mm)
<b>P</b>	0,08 - 0,14	0,08 - 0,10
<b>M</b>	0,07- 0,09	0,04 - 0,06
<b>K</b>	0,12 - 0,16	0,09 - 0,11
<b>N</b>	0,1 - 0,12	0,06 - 0,08
<b>S</b>	0,06 - 0,09	0,04 - 0,06

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

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





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Anzugsmomente Torque Specification	566 - 568
Technische Hinweise Technical Instructions	569 - 570
Formelzeichen Cutting Data	571
Schnittdaten Cutting Data	572 - 577
Beschichtungsübersicht Coating Overview	578 - 579

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>6,50</b>	T20PQ	DT20PK / DT20PQ
381	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
382...06	5F.06T15P	<b>5,50</b>	T15PQ	DT15PK
382...08	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
382...10/12/14	5.10T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
383...06	5F.06T15P	<b>5,50</b>	T15PQ	DT15PK
383...08	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
383...10/12	5.10T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
ABS	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
ADR.01...	C009000	<b>0,75</b>	T6W	DT6K
ADR.02/03...	C009001	<b>1,50</b>	T8L	DT8K
ADR.04/05/06...	C009002	<b>1,50</b>	T8L	DT8K
B105/BKT105	6.075T15P	<b>5,00</b>	T15PQ	DT15PK
B110/BKT110	6.075T15P	<b>5,00</b>	T15PQ	DT15PK
BKT356	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
DAH	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
DAH.M.25.012...	030.2547.T8P	<b>1,30</b>	T8PL	DT8PK
DAH.M.25	030.2553.T8P	<b>1,30</b>	T8PL	DT8PK
DAH.M.37	030.3070.T10P	<b>3,40</b>	T10PL	DT10PK
DAH.M.62	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
DAM31...02B	030.2541.T8P	<b>1,10</b>	T8PL	DT8PK
DAM31...03A/B	030.2547.T8P	<b>1,10</b>	T8PL	DT8PK
DAM31...04A/B	030.2553.T8P	<b>1,10</b>	T8PL	DT8PK
DAM31...05A/B	030.2557.T8P	<b>1,10</b>	T8PL	DT8PK
DAM32...A...	030.3576.T10P	<b>3,50</b>	T10PL	DT10PK
DAM32...02A/B	030.3562.T10P	<b>3,50</b>	T10PL	DT10PK
DAM32.025.D...03A/B	030.3569.T10P	<b>3,50</b>	T10PL	DT10PK
DAM32.032.D...03A/B	030.3576.T10P	<b>3,50</b>	T10PL	DT10PK
DAM32.417...03B	030.3569.T10P	<b>3,50</b>	T10PL	DT10PK
DAM62	030.3070.T10P	<b>3,00</b>	T10PL	DT10PK
DRHD	6.075T15P	<b>5,00</b>	T15PQ	DT15PK
HSK	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
L381.A060...	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK

Typ Type	Schraube Screw	$M_d$ Nm	Schlüssel Clamping wrench	Klinge Blade
L381.D080...	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
L381.D086...	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
L381.G070...	5.10T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
L381.G080...	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
L381.G086/090/098	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
L381.N090...	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
L381.S...	5.15T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
L381.T...	5F.08T20P	<b>5,50</b>	T20PQ	DT20PK
L381.X090...	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M101	030.3543.T8P	<b>2,00</b>	T8PL	DT8PK
M101...A22...30/...40	030.0520.0912	<b>6,50</b>	T15PQ	DT15PK
M101...A32...30/...40	030.0620.0913	<b>8,00</b>	T20PQ	DT20PK / DT20PQ
M101...A40...30/...40	030.1030.0911	<b>15,00</b>	SW6,0 DIN911	
M116	5.13T20EP	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M117K...05	030.265P.0821	<b>1,20</b>	T8PL	DT8PK
M117K...07	030.265P.0819	<b>1,20</b>	T8PL	DT8PK
M117K...09	030.400P.0227	<b>4,30</b>	T15PQ	DT15PK
M117.MD10...	030.400P.0227	<b>4,30</b>	T15PQ	DT15PK
M117U...05	030.265P.0818	<b>1,20</b>	T8PL	DT8PK
M117U...07	2.6.5T8EP	<b>1,20</b>	T8PL	DT8PK
M117P...05	030.265P.0818	<b>1,20</b>	T8PL	DT8PK
M117P...07	2.6.5T8EP	<b>1,20</b>	T8PL	DT8PK
M271	030.2609.T8P	<b>1,20</b>	T8PL	DT8PK
M274	030.3513.T15P	<b>3,00</b>	T15PQ	DT15PK
M275	3.5.10T10P	<b>3,00</b>	T10PL	DT10PK
M275.D	030.357P.0315	<b>3,00</b>	T10PL	DT10PK
M275.T	3.5.10T10P	<b>3,00</b>	T10PL	DT10PK
M279	030.0516.T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M304	1.8.4T6EP	<b>0,90</b>	T6PL	DT6K
M306	2.6.5T8EP	<b>1,20</b>	T8PL	DT8PK
M308	3.5.12T10EP	<b>3,00</b>	T10PL	DT10PK
M310...03	030.0324.T7P	<b>1,20</b>	T7PL	DT7PK
M310...04	030.3535.T8P	<b>2,00</b>	T8PL	DT8PK
M310...05	030.3543.T8P	<b>2,00</b>	T8PL	DT8PK
M311	4.14T15P	<b>5,00</b>	T15PQ	DT15PK
M311.0016.00.B/E	4.16T15KP	<b>5,00</b>	T15PQ	DT15PK
M313	5.14T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M313.0016.00.A/B/E	5.13T20KP	<b>6,50</b>	T20PQ	DT20PK / DT20PQ

Typ Type	Schraube Screw	$M_d$ Nm	Schlüssel Clamping wrench	Klinge Blade
M328	5.14T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M328.0020.00.A/B/E	5.13T20KP	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M328.0020.D...	5.17T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M332	5.17T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
M335	6.17T25P	<b>12,00</b>	T25PQ	DT20PQ
M406...02/03	030.2669.T8P	<b>1,20</b>	T8PL	DT8PK
M406...04/05/06	030.2608.T8P	<b>1,20</b>	T8PL	DT8PK
M406.025.11.D16.1.02.B	030.2608.T8P	<b>1,20</b>	T8PL	DT8PK
M409	030.3511.T10P	<b>3,50</b>	T10PL	DT10PK
M610	030.3513.T15P	<b>3,50</b>	T15Q	DT15K
M620	5.14T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
MDR.01...	C009000	<b>0,75</b>	T6W	DT6K
MDR.02/03...	C009001	<b>1,50</b>	T8L	DT8K
MDR.04/05/06...	C009002	<b>1,50</b>	T8L	DT8K
MDR.08/09/10...	C009004	<b>3,50</b>	T15Q	DT15K
R381.T...	5F.08T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
R381.X073...	5F.08T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
R381.X090...	5.12T20P	<b>6,50</b>	T20PQ	DT20PK / DT20PQ
SM328	5.17T20P	<b>6,50</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:

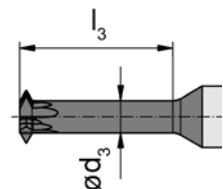
### Basic recommendations:

## 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.

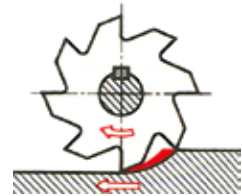
### Als Faustformel beim Gewindefräsen gilt:

Das Werkzeug darf nicht größer sein als 70% des Kerndurchmessers, ansonsten schneidet das Werkzeug 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.



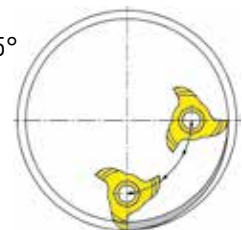
## Fräsrichtung

### 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 erregt 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

Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10	TA4_	
<b>P</b>	unlegierter Stahl Carbon steel	~ 0,2 % C	P1.1	125	430	CK15		180-140
		~ 0,4% C geglüht annealed	P1.2	190	610	19Mn6		180-140
		~ 0,4% C vergütet quenched	P1.3	210	640	36Mn5		180-140
		~ 0,6% C geglüht annealed	P1.4	190	610	C55		180-140
		~ 0,6% C vergütet quenched	P1.5	300	1000	CK60		180-140
		Automatenstahl Free cutting steel	P1.6	220	750	9SMn28		
	niedrig legierter Stahl (<5%) Alloyed steel	gegült 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	gegült 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		
<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	-	-			



Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material			
						K10	TA4_	
<b>K</b>	Grauguss Grey cast iron	niedrige Festigkeit low tensile strength	K1.1	180	250	GG-25		160-140
		hohe Festigkeit high tensile strength	K1.2	250	350	GG-40		160-140
	Kugelgraphit- guss Spheroidal graphite cast iron	ferritisch ferritic	K2.1	160	400	GGG-40		160-140
		perlitisch perlitic	K2.1	260	700	GGG-60		160-140
	Temperguss Malleable cast iron	ferritisch ferritic	K3.1	200	400	GTW-45		
		perlitisch perlitic	K3.2	260	700	GTS-55-04		
	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		1200-500
		vergütbar heat treatable	N1.2	100	340	AlMgSi1		1200-500
	Al-Guss- Legierung Al-cast-alloy	< 6% Si	N2.1	80	300	AlMgSi6	600-350	1200-500
		6-10% Si	N2.2	100	320	AlSi7Mg	600-350	1200-500
		10-15 % Si	N2.3	130	450	AlSi12		1200-500
	Kupfer- Legierungen Copper-alloys	Reinkupfer Pure copper	N3.1	100	340	Cu	230-180	1200-500
		Messing, Bronze Brass	N3.2	90	310	CuZn40Pb	230-180	1200-500
		Messing bleifrei Lead-free brass	N3.3	110	430	CuZn40	230-180	1200-500
		hochfest high strength	N3.4	300	1000	CuZn25Al5- Mn4Fe3	230-180	1200-500
	Graphit Graphite		N4.1					
<b>S</b>	Warmfeste Legierung (Fe) Heat resistant alloy	geglüht annealed	S1.1	200	670			30-25
		gehärtet hardened	S1.2	275	930			30-25
	Warmfeste Legierung (Ni, Co) Heat resistant alloy	geglüht annealed	S2.1	250	840	Inconel 600		30-25
		gehärtet hardened	S2.2	350	1200	Inconel 713		30-25

# Schnittdaten 406/409/DA/DAH/610

## Cutting Data



N

Schnittgeschwindigkeit vc (m/min) / Startwerte  
Cutting speed vc (m/min) / Start values

	AS4_	SA4_	SD6_	SC6_	IG3_ IG6_	NE2_	HD05	PD75		
	300-220	180-140	300-220	300-220	200-160					
	260-220	160-140	260-220	260-220	180-160					
	260-220	160-140	260-220	260-220	180-160					
	260-220	160-140	260-220	260-220	180-160					
	1000-350	1200-500					3000-500	3000-500		
	1000-350	1200-500					3000-500	3000-500		
	1000-350	1200-500				3000-500	3000-500	3000-500		
		1200-500				2000-500	3000-500	3000-500		
		1200-500				1500-350	3000-500	3000-500		
		1200-500				300-220	3000-500	3000-500		
		1200-500				230-180	3000-500	3000-500		
		1200-500				240-180	3000-500	3000-500		
		1000-500				250-160	3000-500	3000-500		
		70-30		80-30	80-30					
		70-30		80-30	80-30					
		70-30		80-30	80-30					
		70-30		80-30	80-30					

Werkstoff Material		Materialgruppe Material group	Härte (HB) Hardness Brinell	Zug- festigkeit $R_m$ [N/mm <sup>2</sup> ] Tensile Strength	Beispiel Werkstoff Example Material	K10	TA4_	
<b>S</b>	Titan	Titanlegierung $\alpha$ Titanium alloy $\alpha$	S3.1	120	240			30-25
		Titanlegierung $\alpha$ - $\beta$ Titanium alloy $\alpha$ - $\beta$	S3.2	360	1200			30-25
		Titanlegierung $\beta$ Titanium alloy $\beta$	S3.3	410	1400			30-25
<b>O</b>	Thermoplaste Thermoplastics		01.1			1500-500		
	Duroplaste Duro plaste		01.2			1500-500		
	Kunststoffe glasfaser- verstärkt Plastics glass fibre reinforced	GFK	01.3					
	Kunststoffe kohlefaser- verstärkt Plastics carbon fibre reinforced	CKF	01.4					



# Schnittdaten 406/409/DA/DAH/610

## Cutting Data



N

Schnittgeschwindigkeit vc (m/min) / Startwerte  
Cutting speed vc (m/min) / Start values

AS4_	SA4_	SD6_	SC6_	IG3_ IG6_	NE2_	HD05	PD75		
	70-30		80-30	80-30					
	70-30		80-30	80-30					
	70-30		80-30	80-30					
					500-1500				
					500-1500				

Schneidstoff Material group	Schichtaufbau Coating structure	Empfehlung Recommendation						Anwendung Application
AN2_ AN4_	AlCrSiN	P05	M05	K05	N05	S05	H05	Bei hohen Schnittgeschwindigkeiten geeignet für Trockenbearbeitung Nut- und Trennfräsen  For high cutting speeds, suitable for dry machining, groove and slot milling
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
AS4_ AS6_	TiAlN	P05	M05	K05	N05	S05	H05	Ideal für Schruppbearbeitungen, Allrounder auch geeignet für Trocken- bearbeitung Nut- und Trennfräsen  Ideal for roughing operations, All-rounder also suitable for dry machining, groove and slot milling
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
DD2_		P05	M05	K05	N05	S05	H05	Schruppen und Schlichten  Roughing and finishing
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
EG3_	AlTiN + TiN	P05	M05	K05	N05	S05	H05	Ideal für Schlichtbearbeitungen bei hohen Schnittgeschwindigkeiten  Ideal for finishing operations at high cutting speeds
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
EG5_	AlTiN + TiN	P05	M05	K05	N05	S05	H05	Ideal für Schruppbearbeitungen bei hohen Schnittgeschwindigkeiten Nut- und Trennfräsen  Ideal for roughing operations at high cutting speeds, groove and slot milling
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
IG3_	TiAlSiN	P05	M05	K05	N05	S05	H05	Ideal für Schlichtbearbeitungen bei hohen Schnittgeschwindigkeiten Nut- und Trennfräsen  Ideal for finishing operations at high cutting speeds, groove and slot milling
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
IG6_	TiAlSiN	P05	M05	K05	N05	S05	H05	Ideal für Schruppbearbeitungen bei hohen Schnittgeschwindigkeiten Nut- und Trennfräsen  Ideal for roughing operations at high cutting speeds, groove and slot milling
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
NE2_	ta-C	P05	M05	K05	N05	S05	H05	Schruppen und Schlichten  Roughing and finishing
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					

# Beschichtungsübersicht

## Coating Overview



Schneidstoff Material group	Schichtaufbau Coating structure	Empfehlung Recommendation						Anwendung Application
		P05	M05	K05	N05	S05	H05	
RC2_ RC4_	AlCrSiN	P10	M10	K10	N10	S10	H10	bei hohen Schnittgeschwindigkeiten geeignet für Trockenbearbeitung Nut- und Trennfräsen
		P20	M20	K20	N20	S20	H20	
		P30	M30	K30	N30	S30	H30	at high cutting speeds suitable for dry machining Groove and parting milling
		P40	M40	K40	N40			
		P50	M50					
SG3_	TiAlCrSiN	P05	M05	K05	N05	S05	H05	Schruppen und Schlichten
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	Roughing and finishing
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
TI2_	TiCn	P05	M05	K05	N05	S05	H05	Schruppen und Schlichten bei moderaten Schnittgeschwindigkeiten, Reduzierung von Aufbauschneiden
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	Roughing and finishing at moderate cutting speeds, reduction of built-up edges
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
TN3_	TiN	P05	M05	K05	N05	S05	H05	Schruppen und Schlichten bei moderaten Schnittgeschwindigkeiten Nut- und Trennfräsen
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	Roughing and finishing at moderate cutting speeds, groove and slot milling
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
SA4_ SA6_		P05	M05	K05	N05	S05	H05	Schruppen und Schlichten bei mittleren Schnittgeschwindigkeiten, ideal bei hohen Vorschüben
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	Roughing and finishing at medium cutting speeds, ideal for high feed rates
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					
SC6_	TiCN + Al2O3	P05	M05	K05	N05	S05	H05	Ideal für Schruppbearbeitungen bei hohen Schnittgeschwindigkeiten
		P10	M10	K10	N10	S10	H10	
		P20	M20	K20	N20	S20	H20	Ideal for roughing operations at high cutting speeds
		P30	M30	K30	N30	S30	H30	
		P40	M40	K40	N40			
		P50	M50					

ISO 513		P	M	K	N	S	H
+ Zähigkeit / Tenacity - Verschleißfestigkeit / Wear resistance +	05	05	05	05	05	05	05
	10	10	10	10	10	10	10
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	50	50					

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GERMANY, HEADQUARTERS

—

Hartmetall Werkzeugfabrik  
Paul Horn GmbH  
Horn-Straße 1  
72072 Tübingen

Tel +49 7071 7004-0

Fax +49 7071 72893

[info@de.horn-group.com](mailto:info@de.horn-group.com)

[horn-group.com](http://horn-group.com)