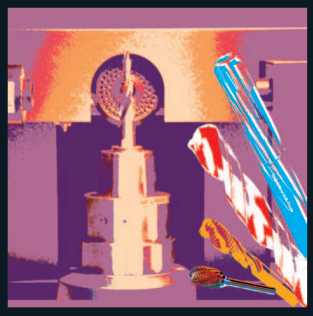
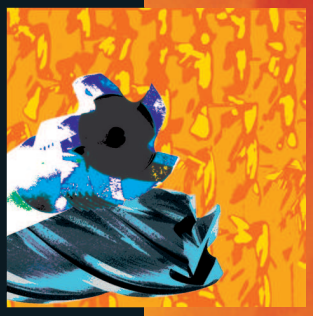
Tools you can trust

NACHREINER

spanabhebende Werkzeuge


KATALOG 102

WERKZEUGE / LEHREN



ALLGEMEINE HINWEISE:

Katalog 102 ist gültig ab 01.01.2010.

Sämtliche Peise sind unverbindliche Preisempfehlungen ohne Legierungszuschläge und ohne Mehrwertsteuer.

Mit dem Erscheinen dieses Preiskataloges 102 verlieren alle vorhergehenden Kataloge und Prospekte ihre Gültigkeit.

Druckfehler jeder Art, auch bei technischen Daten oder Preisen, berechtigen nicht zu Ansprüchen.

Baumaß- oder Preisänderungen infolge Weiterentwicklung oder Normenänderung behalten wir uns vor.

Alle Artikel ohne DIN-Angabe sind nach Werksnorm gefertigt.

GENERAL INFORMATIONS:

Catalogue 102 is valid from 2010/01/01.

All prices are not-binding price recommendation without alloy surcharge and without VAT.

When publiciting this catalogue 102, all previous catalogues and leaflets are no more valid.

Printing mistakes whatever kind also at technical dates or prices do not entitle to any claims.

Changes at dimension or prices due to further developments or changes in standards are subject to be changed.

All articles without DIN-statement are manufactured according maker standard.







Deshalb Nachreiner

Im Jahr 1981 gründeten Siegfried und Marianne Nachreiner das Unternehmen NACHREINER – SPANABHEBENDE WERKZEUGE. Seit der Gründung sind Schnelligkeit, Qualität, Flexibilität sowie umfangreiche Lagerhaltung die Philosophie des Familienunternehmens. 2002 erfolgte die Umfirmierung in eine GmbH und die Zertifizierung nach DIN EN ISO 9001.

Ziel ist es, die Kunden mit immer besser optimierten Präzisionswerkzeugen und größerem Lager bestens und umfassend bedienen zu können.

Da die heutigen Standardwerkzeuge oft nur unzureichend den benötigten Anforderungen entsprechen, wurde das Unternehmen um eine Produktion mit Büro- und Schulungsgebäude für VHM-Werkzeuge erweitert. Hierdurch ist es uns gelungen den immer größeren Bearbeitungsanforderungen gerecht zu werden. Mit diesen speziellen Produkten sind wir weltweit Problemlöser für unsere Kunden.

Der Slogan „Tools you can trust“ („Werkzeuge, denen Sie vertrauen können“) unterstreicht die hohen Ansprüche, die das Unternehmen an seine Produkte stellt. Auch in der Zukunft wollen wir den Anforderungen des Marktes immer einen Schritt voraus sein.



NACHREINER
spanabhebende Werkzeuge

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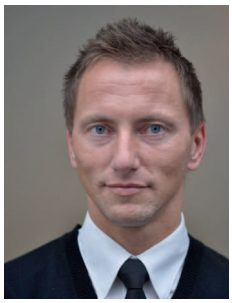

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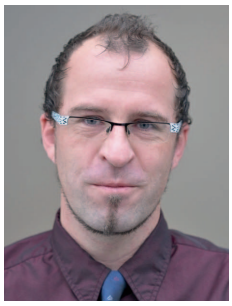

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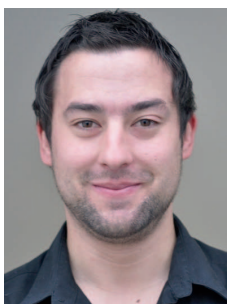

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Bohren HSS & HSSE *Drilling HSS & HSSE*	
Bohren VHM *Drilling VHM (Solid carbide)*	
Reiben/Senken HSS & HSSE *Reaming/Counter sinking HSS & HSSE*	
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Lehren *Gauges*	
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Zertifikat

QUALITÄTSMANAGEMENTSYSTEM – DIN EN ISO 9001: 2008

Hiermit wird bestätigt, dass die

Nachreiner GmbH
Finkenstraße 3/1
72336 Balingen
Deutschland

NACHREINER
spanabhebende Werkzeuge

Inhaber des Zertifikates Nr. **FS 529153/7322D**

ein Qualitätsmanagementsystem gemäß **DIN EN ISO 9001:2008** *für den folgenden Geltungsbereich anwendet:*

Entwicklung, Herstellung und Vertrieb von spanabhebenden Präzisionswerkzeugen und Prüflehren.

Für und im Namen von BSI:

Geschäftsführung, BSI Management Systems (Deutschland)

Ursprünglich zertifiziert: **08.08.2005** Letzte Ausgabe: **11.08.2009** Ablaufdatum: **07.08.2011**

TGA TRÄGERGEMEINSCHAFT FÜR AKKREDITIERUNG
GERMAN ASSOCIATION FOR ACCREDITATION GMBH

QMS/EMS-TGA-ZM-08-92

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Die British Standards Institution ist eingetragen in die Royal Charter.
BSI Management Systems und Umweltgutachter Deutschland GmbH, Dörnigheimer Straße 2a, 63452 Hanau, Deutschland.

BSI Management Systems

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
GEWINDEBOHRERAUSBOHRER DRILLS TO REMOVE JAMMED TAPS													
	VHM			E.1619.1	6	✔	✔	✔	✔		✔		
	VHM			SET.1619.1	6	✔	✔	✔	✔		✔		
HANDGEWINDEBOHRER HAND TAPS													
	HSS-E	Form A 1 START		E.1652.0-1	7		✔			✔			
	HSS-E	Form D 2 WORK		E.1652.0-2	7		✔			✔			
	HSS-E	Form C F FINISH	TOL. 6 HX	E.1652.0-F	7		✔			✔			
SET 1+2+F	HSS-E	Set 1-2-F	TOL. 6 HX	E.1652.0-S	7		✔			✔			
	HSSE/PM	Form A 1 START		E.1605.1-1	8	✔							
	HSSE/PM	Form D 2 WORK		E.1605.1-2	8	✔							
	HSSE/PM	Form C F FINISH	TOL. 6 HX	E.1605.1-F	8	✔							
SET 1+2+F	HSSE/PM	Set 1-2-F	TOL. 6 HX	E.1605.1-S	8	✔							
GEWINDEBOHRER/FORMER "M" TAPS/FORMING TAPS "M"													
	HSS-E		TOL. 6 HX	E.1615.1	9	✔					✔		
	HSS			SET.1606.0	9	✔	✔	✔	✔				
	HSS			SET.1607.0	10	✔	✔	✔	✔				
	HSS			SET.1608.0	10	✔	✔	✔	✔				
	HSS			SET.1609.0	10	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1601.0	11	✔							
	HSS-E		TOL. 6 H	E.1601.1	11	✔							
	HSSE/PM		TOL. 6 G	E.1602.1	11	✔							
	HSSE/PM		TOL. 6 H	E.1641.1	12	✔							
	HSSE/PM		TOL. 6 H	E.1610.1	12	✔					✔		

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSSE/PM		TOL. 6 H	E.1624.0	12		✔			✔			
	HSS-E		TOL. 6 H	E.1640.0	12		✔			✔			
	HSS-E		TOL. 6 H	E.1617.1	12	✔							
	HSS-E		TOL. 6 H	E.1717.0	13			✔					
	HSS-E		TOL. 6 HX	E.1621.1	13			✔					
	HSS-E		TOL. 6 H	E.1669.0	13	✔							
	HSS-E		TOL. 6 H	E.1614.0	14	✔	✔	✔	✔				
	HSSE/PM		TOL. 6 HX	E.1688.1	15	✔					✔		
	HSS-E		TOL. 6 H	E.1622.0	15			✔					
	HSSE/PM		TOL. 6 HX	E.1639.1	16				✔				✔
	HSS-E		TOL. 6 HX	E.1646.1	16				✔				
	HSS-E		TOL. 6 H	E.1612.1	17	✔							
	HSS-E		TOL. 6 H	E.1613.1	17	✔							
	HSS-E		TOL. 6 H	E.1678.0	18	✔							
	HSS-E		TOL. 6 H	E.1668.0	18	✔							
	HSS-E		TOL. 6 H	E.1668.1	18	✔							
	HSS-E		TOL. 6 G	E.1604.1	19	✔							
	HSS-E		TOL. 6 G	E.1720.0	19	✔							
	HSS-E		TOL. 6 H	E.1625.0	19	✔	✔	✔	✔				
	HSS-E			E.1626.1	19	✔							
	HSSE/PM		TOL. 6 H	E.1677.0	20	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1677.1	20	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1627.0	20	✔	✔	✔	✔				

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	HSSE/PM		TOL. 6 H	E.1603.1	21	✔	✔	✔	✔				
	HSSE/PM		TOL. 6 HX	E.1645.1	21	✔			✔		✔		
	HSS-E		TOL. 6 H	E.1642.0	21	✔							
	HSSE/PM		TOL. 6 HX	E.1628.1	22					✔			
	HSSE/PM		TOL. 6 H	E.1616.1	22	✔	✔	✔	✔				✔
	HSSE/PM		TOL. 6 H	E.1643.1	22	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1644.1	22			✔					
	HSS-E		TOL. 6 HX	E.1629.1	22			✔					
	VHM		TOL. 6 H	E.1680.1	23				✔				
	VHM		TOL. 6 H	E.1681.1	23			✔					
	VHM		TOL. 6 H	E.1634.1	23						✔		✔
	HSSE/PM	OIL NUT	TOL. 6 HX	E.1631.1	24	✔	✔	✔		✔			
	HSSE/PM	OIL NUT	TOL. 6 HX	E.1653.1	24	✔	✔	✔		✔			
	HSSE/PM	OIL NUT	TOL. 6 HX	E.1636.1	24	✔	✔	✔		✔			
	HSSE/PM	OIL NUT	TOL. 6 HX	E.1637.1	24	✔	✔	✔		✔			
	HSSE/PM		TOL. 6 H	E.1611.0	25	✔		✔					
GEWINDEBOHRER/FORMER "MF" *TAPS/FORMING TAPS "MF"*													
	PM		TOL. 6 HX	E.1638.1	25	✔					✔		
	HSS-E		TOL. 6 H	E.1647.1	26	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1648.0	26	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1649.1	27	✔	✔	✔	✔				
	HSS-E		TOL. 6 H	E.1651.0	27		✔						
	HSSE/PM	OIL NUT	TOL. 6 HX	E.1655.1	28	✔	✔	✔					

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

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	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
GEWINDEBOHRER "G" TAPS "G"													
	HSSE/PM		TOL. 6HX	E.1657.1	28	✔					✔		
	HSS-E			E.1654.1	29	✔	✔	✔	✔				
	HSS-E			E.1659.1	29				✔				
	HSS-E			E.1661.0	29			✔					
	HSS-E			E.1656.1	29		✔						
	HSSE/PM	OIL NUT		E.1663.1	30	✔	✔	✔		✔			
GEWINDEBOHRER "UNC" TAPS "UNC"													
	HSS-E		TOL. 2B	E.1662.0	30	✔	✔	✔	✔				
	HSS-E		TOL. 2B	E.1718.0	30	✔	✔	✔	✔				
	HSS-E		TOL. 2B	E.1664.0	30		✔						
GEWINDEBOHRER "UNF" TAPS "UNF"													
	HSS-E		TOL. 2B	E.1658.0	31	✔	✔	✔	✔				
	HSS-E		TOL. 2B	E.1719.0	31	✔	✔	✔	✔				
	HSS-E		TOL. 2B	E.1660.0	31		✔						
GEWINDEBOHRER "BSW" TAPS "BSW"													
	HSS-E			E.1665.0	31	✔	✔	✔	✔				
GEWINDEBOHRER "BSF" TAPS "BSF"													
	HSS-E			E.1684.0	32	✔	✔	✔	✔				
GEWINDEBOHRER "NPT" TAPS "NPT"													
	HSS-E			E.1685.0	32	✔	✔	✔	✔				
GEWINDEBOHRER "PG" TAPS "PG"													
	HSS-E			E.1687.0	33	✔	✔	✔	✔				

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	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
GEWINDEBOHRER "EG" TAPS "EG"													
	HSS-E			E.1630.0	33	✔	✔	✔	✔				
GEWINDEBOHRER "TR" TAPS "TR"													
	HSS		TOL. 7 H	E.1632.0	34	✔							
	HSS		TOL. 7 H	E.1633.0	34	✔							
GEWINDEFRÄSER THREAD MILLING CUTTERS													
	VHM	„M"		E.1666.0	35	✔		✔	✔				
	VHM	„M"		E.1689.0	35		✔			✔			
	VHM	„M"		E.1667.1	36	✔		✔	✔				
	VHM	„M"		E.1711.1	36	✔	✔	✔	✔				✔
	VHM	„MF"		E.1690.1	37	✔	✔	✔	✔				
	VHM	„G"		E.1691.1	37	✔	✔	✔	✔				
SCHNEIDEISEN DIES													
	HSS	„M"	TOL. 6g	E.1618.0	38	✔		✔	✔				
	HSS	„M"	TOL. 6e	E.1692.0	38	✔		✔	✔				
	HSS-E	„M"	TOL. 6g	E.1693.0	38		✔			✔			
	HSS	„MF"	TOL. 6g	E.1694.0	39	✔		✔	✔				
	HSS	„MF"	TOL. 6e	E.1695.0	39	✔		✔	✔				
	HSS-E	„MF"	TOL. 6g	E.1696.0	39		✔			✔			
	HSS	„G"		E.1697.0	40	✔		✔	✔				
	HSS	„G"		E.1698.0	40	✔		✔	✔				
	HSS-E	„G"		E.1699.0	40		✔			✔			
	HSS			E.1712.0	40	✔		✔	✔				

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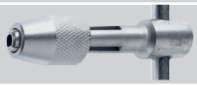
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION	ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS „UNC"	E.1701.0	41	✔		✔	✔				
	HSS-E „UNC"	E.1703.0	41		✔			✔			
	HSS „UNF"	E.1704.0	41	✔		✔	✔				
	HSS „UNF"	E.1705.0	41	✔		✔	✔				
	HSS-E „UNF"	E.1706.0	41		✔			✔			
	HSS Tr	E.1707.0	42	✔		✔	✔				
	HSS Tr	E.1708.0	42	✔		✔	✔				
ZUBEHÖR *ACCESSORIES*											
		E.1709.0	43								
		E.1710.0	43								
		E.1713.0	44								
		E.1714.0	44								
		E.1715.0	44								
		E.1716.0	45								
FUTTER / EINSÄTZE *CHUCKS*											
		E.1620.0	45								
		E.1672.0	46								
		E.1673.0	46								
		E.1674.0	47								
		E.1675.0	48								

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E.1619.1

6.2

VHM | HRC | „M" | ≤65 HRC | Blue Cut



SET.1619.1

6.2



- Solid carbide drills to remove jammed taps
- Wiertła z węglika spiekanego do usuwania złamanych gwintowników
- Punte MD per rimuovere maschi inceppati
- Broca de metal duro para remover machos rotos

Artikel-Nr. *Article-No.*					E.1619.1 € Stück *piece*
Ø	d1	l2	l1	d2	
M 3	2,5	10	38	3,0	24,00
M 4	3,3	14	46	4,0	28,00
M 5	4,2	19	50	5,0	32,00
M 6	5,0	23	50	6,0	36,00
M 8	6,8	23	60	7,0	39,00
M 10	8,5	25	80	9,0	50,00
M 12	10,2	35	80	11,0	73,00
		Satz *Set*			SET.1619.1
M 3 - M 12		je 1 Stück pro Abmessung *1 piece per size*			280,00

Bedienungsanleitung für VHM-Gewindebohrerausbohrer:

Der abgebrochene Gewindebohrer darf nicht über das Werkstück herausstehen (muß im Bohrloch stecken!)

1. Zentrieren des Gewindebohrer-Ausbohrers durch mehrmaliges Antippen auf den abgebrochenen Gewindebohrer - auch auf schrägen Flächen
2. Ausbohrvorgang beginnen
3. Bei tieferen Gewinden evtl. 2-3 mal entspänen
4. Späne aus dem Bohrloch entfernen (z. B. Druckluft)
5. Eventuelle Restspäne mit einer Reisnadel herausnehmen
6. Mit dem neuen Gewindebohrer das Gewinde schneiden
7. Prüfung des Gewindes mit einem Gewindegrenzlehrdorn

Die Standzeit des Gewindebohrer-Ausbohrers beträgt ca. 3-5 Gewinde.

Gewindebohrer-Ausbohrer werden nicht nachgeschliffen.

Tisch- oder Ständerbohrmaschine:

Schmierung: trocken oder nass

Drehzahl: 1000 - 2000 U/min

Vorschub: Handvorschub

NC-Maschine:

Schmierung: nass

Drehzahl: 1400 - 2400 U/min

Vorschub: ca. 0,03-0,06 pro Umdrehung

Operating instruction for Carbide Drills to remove jammed Taps:

The broken tap should not rise above the workpiece (it must be inside the drill hole)

1. Centering of the carbide drill by a multiple approaching on the broken tap - also on sloping faces
2. Starting the drilling process
3. In case of deep threads the chips has to be removed twice or three times
4. Chips has to be removed out of the drill hole (for example by air pressure)
5. Any remaining chips should be taken out by a scriber point stray
6. Tapping the thread with a new tap
7. Checking the thread with a thread plug gauge

The tool life of the carbide drill to remove jammed taps is about 3 to 5 threads

Carbide drills to remove jammed taps will not be reground.

Bench type or Column boring machine:

Lubrication: dry or wet

Revolution: 1000 - 2000 Rev./min

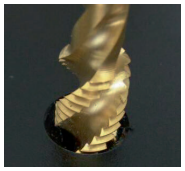
Feed: by hand

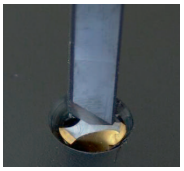
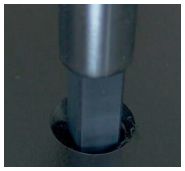
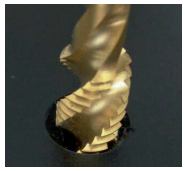
NC-machine:

Lubrication: wet

Revolution: 1400 - 2400 Rev./min

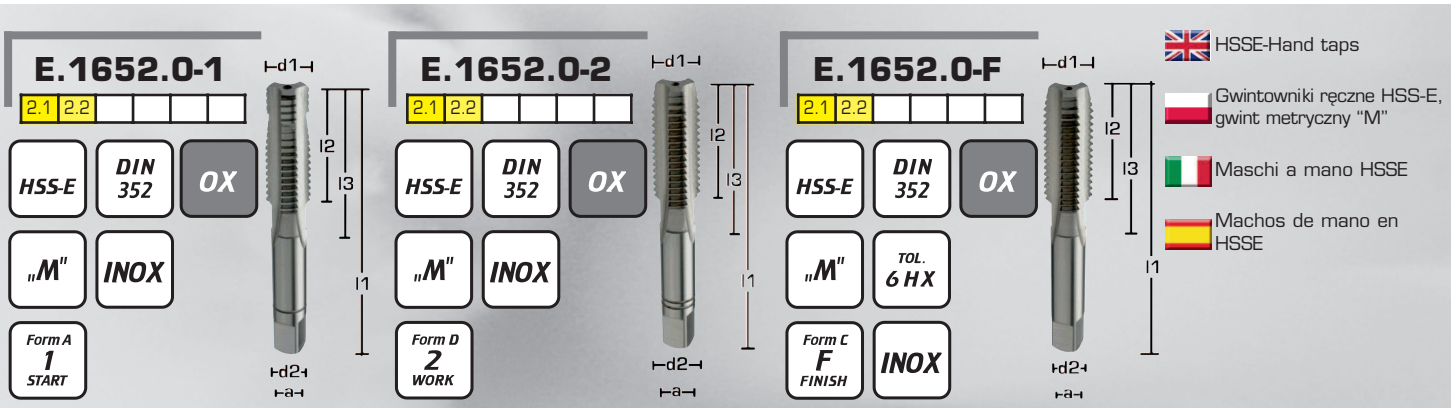
Feed: approx. 0,03-0,06 per revolution



HSSE-Handgewindebohrer

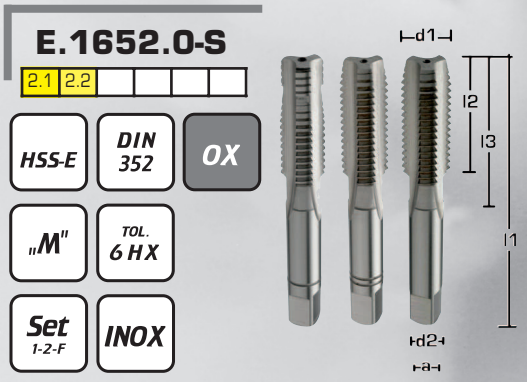
„M"



Artikel-Nr. *Article-No.*								E.1652.0-Nr.1 € Stück *piece*	E.1652.0-Nr. 2 € Stück *piece*	E.1652.0-F € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
M 3	0,50	40	10	18	3,5	2,7	2,5	**4,50**	**4,50**	**4,50**
M 4	0,70	45	12	22	4,5	3,4	3,3	**4,50**	**4,50**	**4,50**
M 5	0,80	50	14	25	6,0	4,9	4,2	**5,50**	**5,50**	**5,50**
M 6	1,00	56	16	28	6,0	4,9	5,0	**5,50**	**5,50**	**5,50**
M 8	1,25	63	20		6,0	4,9	6,8	**8,00**	**8,00**	**8,00**
M 10	1,50	70	22		7,0	5,5	8,5	**9,00**	**9,00**	**9,00**
M 12	1,75	75	24		9,0	7,0	10,2	**12,00**	**12,00**	**12,00**
M 14	2,00	80	26		11,0	9,0	12,0	**16,00**	**16,00**	**16,00**
M 16	2,00	80	27		12,0	9,0	14,0	**17,00**	**17,00**	**17,00**

HSSE-Handgewindebohrer im Satz

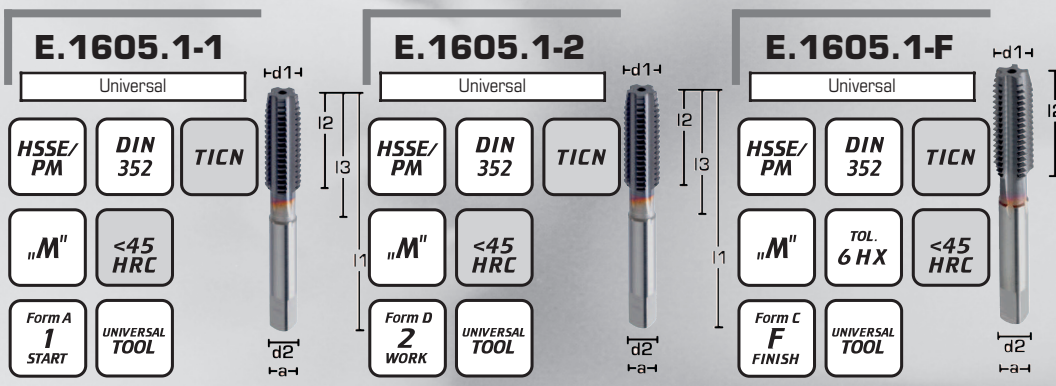
„M"



Artikel-Nr. *Article-No.*								E.1652.0-S € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
M 3	0,50	40	10	18	3,5	2,7	2,5	**12,00**
M 4	0,70	45	12	22	4,5	3,4	3,3	**12,00**
M 5	0,80	50	14	25	6,0	4,9	4,2	**14,00**
M 6	1,00	56	16	28	6,0	4,9	5,0	**14,00**
M 8	1,25	63	20		6,0	4,9	6,8	**24,00**
M 10	1,50	70	22		7,0	5,5	8,5	**27,00**
M 12	1,75	75	24		9,0	7,0	10,2	**33,00**
M 14	2,00	80	26		11,0	9,0	12,0	**44,00**
M 16	2,00	80	27		12,0	9,0	14,0	**50,00**

HSSE/PM-Handgewindebohrer

„M"



HSSE/PM-Hand taps
Gwintowniki ręczne HSS-E/PM, gwint metryczny "M"
Maschi a mano HSSE/PM
Machos de mano en HSSE/PM

Artikel-Nr. *Article-No.*								E.1605.1-Nr.1 € Stück *piece*	E.1605.1-Nr. 2 € Stück *piece*	E.1605.1-F € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
M 3	0,50	40	10	18	3,5	2,7	2,5	**9,50**	**9,50**	**9,50**
M 4	0,70	45	12	22	4,5	3,4	3,3	**9,50**	**9,50**	**9,50**
M 5	0,80	50	14	25	6,0	4,9	4,2	**11,00**	**11,00**	**11,00**
M 6	1,00	56	16	28	6,0	4,9	5,0	**12,00**	**12,00**	**12,00**
M 8	1,25	63	20		6,0	4,9	6,8	**13,50**	**13,50**	**13,50**
M 10	1,50	70	22		7,0	5,5	8,5	**18,00**	**18,00**	**18,00**
M 12	1,75	75	24		9,0	7,0	10,2	**22,00**	**22,00**	**22,00**

HSSE/PM-Handgewindebohrer im Satz

„M"



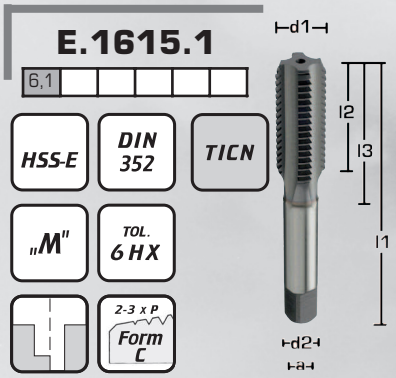
Set of HSSE/PM-Hand taps
Zestaw gwintowników ręcznych HSS-E/PM, gwint metryczny "M"
Serie maschi a mano HSSE/PM
Juegos de machos de mano en HSSE/PM

Artikel-Nr. *Article-No.*								E.1605.1-S € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
M 3	0,50	40	10	18	3,5	2,7	2,5	**28,00**
M 4	0,70	45	12	22	4,5	3,4	3,3	**28,00**
M 5	0,80	50	14	25	6,0	4,9	4,2	**30,00**
M 6	1,00	56	16	28	6,0	4,9	5,0	**34,00**
M 8	1,25	63	20		6,0	4,9	6,8	**38,00**
M 10	1,50	70	22		7,0	5,5	8,5	**50,00**
M 12	1,75	75	24		9,0	7,0	10,2	**61,00**

HSSE-Gewindebohrer zum Nachschneiden

„M"

E.1615.1



HSSE-Taps for retapping narrow threads

Gwintowniki HSS-E o zawężonej tolerancji, gwint metryczny "M"

Maschi HSSE per rigenerare la filettatura esistente

Machos en HSSE para repasar

Artikel-Nr. *Article-No.*								E.1615.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
M 3	0,50	40	10	18	3,5	2,7	2,5	**14,00**
M 4	0,70	45	12	22	4,5	3,4	3,3	**15,00**
M 5	0,80	50	14	25	6,0	4,9	4,2	**16,00**
M 6	1,00	56	16	28	6,0	4,9	5,0	**16,00**
M 8	1,25	63	20		6,0	4,9	6,8	**20,00**
M 10	1,50	70	22		7,0	5,5	8,5	**23,00**
M 12	1,75	75	24		9,0	7,0	10,2	**30,00**

HSS-Gewindebohrer im Satz

„M"

SET.1606.0

Universal



Gewindebohrer *taps*
M3, M4, M5, M6, M7, M8, M10, M12, M14, M16, M20

Schneideisen *screwing dies*
M3, M4, M5, M6, M7, M8, M10, M12, M14, M16, M20

Gewindeprofil-Lehre *screw pitch gauge*
0,4 ÷ 6 mm

Verstellbare Windeisen *tap wrenches*
Nr. 2: 2,5 ÷ 9 mm, Nr. 3: 4,9 ÷ 14 mm

Schneideisenhalter *die stocks*
Ø 25 x 9 mm, Ø 38 x 14 mm

Schraubenzieher *screwdriver*
4 x 90 mm

Set of HSS-Taps

Zestaw gwintowników HSS

Assortimento di maschi HSS

Juegos de machos de mano en HSS

€ 305,00

HSS-Gewindebohrer im Satz

„M"

SET.1607.0

Universal

Set of HSS-Taps
Zestaw gwintowników HSS
Assortimento di maschi HSS
Juegos de machos de mano en HSS

Gewindebohrer *taps*
M3, M4, M5, M6, M8, M10, M12, M14, M16, M18, M20, M22, M24, M8x1, M10x1, M12x1,25, M12x1,5, M14x1,25, M14x1,5, M16x1,5, M18x1,5, M20x1,5, M22x1,5, M24x1,5

Schneideisen *screwing dies*
M3, M4, M5, M6, M8, M10, M12, M14, M16, M18, M20, M22, M24, M8x1, M10x1, M12x1,25, M12x1,5, M14x1,25, M14x1,5, M16x1,5, M18x1,5, M20x1,5, M22x1,5, M24x1,5

Gewindeprofil-Lehre *screw pitch gauge*
0,4 ÷ 6 mm

Verstellbare Windeisen *tap wrenches*
Nr. 2: 2,5 ÷ 9 mm, Nr. 3: 4,9 ÷ 14 mm

Schneideisenhalter *die stocks*
Ø 25 x 9 mm, Ø 38 x 14 mm, Ø 45 x 18 mm, Ø 55 x 22 mm

Typ Windeisen *type wrench*
Nr. 1: M2 ÷ M5 mm

Schraubenzieher *screwdriver*
4 x 90 mm

Distanzring *distance ring*
38 x 2, 45 x 2, 55 x 3



€ **1070,00**

HSS-Gewindebohrer im Satz

„M"

SET.1608.0

Universal



Set of HSS-Taps
Zestaw gwintowników HSS
Assortimento di maschi HSS
Juegos de machos de mano en HSS

Gewindebohrer *taps*
M3, M4, M5, M6, M8, M10, M12

Schneideisen *screwing dies*
M3, M4, M5, M6, M8, M10, M12

Verstellbare Windeisen *tap wrenches*
Nr. 2: 2,5 ÷ 9 mm

Schneideisenhalter *die stocks*
Ø 25 x 9 mm, Ø 38 x 14 mm

€ **140,00**

HSS-Gewindebohrer im Satz

„M"

SET.1609.0

Universal



Set of HSS-Taps
Zestaw gwintowników HSS
Assortimento di maschi HSS
Juegos de machos de mano en HSS

Gewindebohrer *taps*
M3, M4, M5, M6, M8, M10, M12

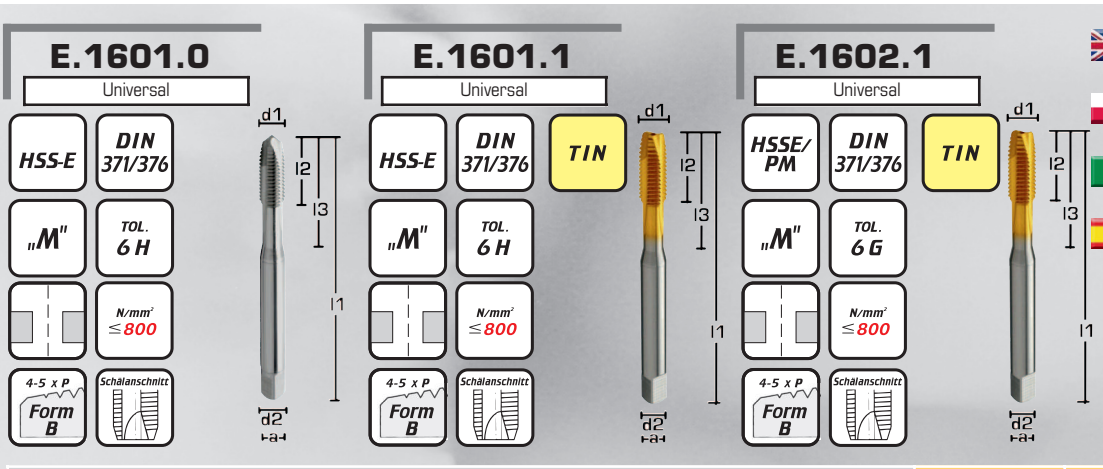
Schneideisen *screwing dies*
M3, M4, M5, M6, M8, M10, M12

Verstellbare Windeisen *tap wrenches*
Nr. 1,5: 2,5 ÷ 8 mm

Schneideisenhalter *die stocks*
Ø 25 x 9 mm

Schraubenzieher *screwdriver*
4 x 9 mm

€ **140,00**



HSSE/PM-Machine taps for through holes

Gwintowniki maszynowe HSS-E/PM do otworów przelot., gwint metryczny "M"

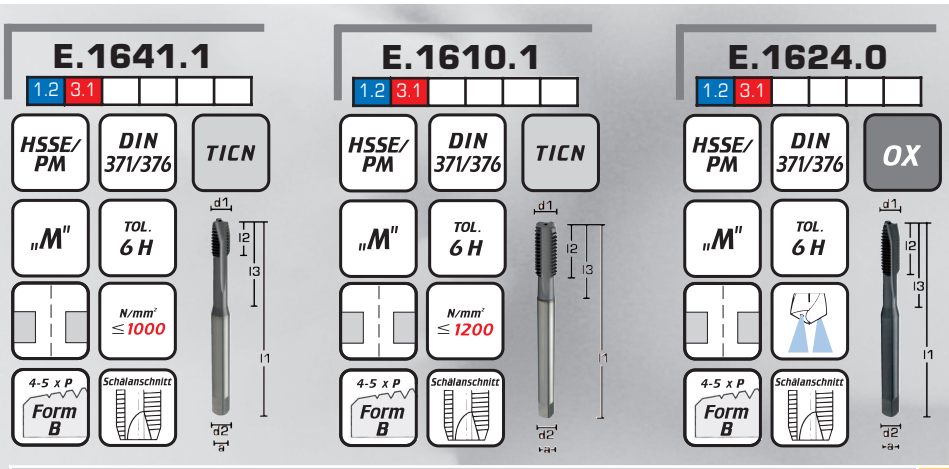
Maschi a macchina fori passanti HSSE/PM

Machos de máquina en HSSE/PM para agujeros pasantes

Artikel-Nr. *Article-No.*								E.1601.0 € Stück *piece*	E.1601.1 € Stück *piece*	E.1602.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 1,0	0,25	32	5		2,5	2,1	0,75	**62,00**		
M 1,4	0,30	40	7		2,5	2,1	1,10	**26,00**	**29,00**	
M 1,7	0,35	40	8	11	2,5	2,1	1,30	**16,00**	**15,00**	
M 2,0	0,40	45	8	12	2,8	2,1	1,60	**14,00**	**16,00**	
M 2,5	0,45	50	9	14	2,8	2,1	2,05	**14,00**	**16,00**	
M 3,0	0,50	56	10	18	2,8	2,7	2,50	**8,00**	**9,00**	**10,80**
M 3,5	0,60	56	12	20	3,5	3,0	2,90	**12,00**	**14,00**	**16,80**
M 4,0	0,70	63	12	21	4,0	3,4	3,30	**8,00**	**9,00**	**10,80**
M 5,0	0,80	70	14	25	4,0	4,9	4,20	**8,00**	**9,50**	**11,30**
M 6,0	1,00	80	18	30	6,0	4,9	5,00	**9,00**	**10,50**	**12,50**
M 7,0	1,00	80	10	30	7,0	5,5	6,00	**14,00**	**17,00**	**23,00**
M 8,0	1,25	90	20	35	7,0	6,2	6,80	**12,00**	**14,80**	**17,50**
M 9,0	1,25	90	13	35	9,0	7,0	7,80	**18,00**	**22,00**	**27,00**
M 10,0	1,50	100	20	39	9,0	8,0	8,50	**13,00**	**18,50**	**22,50**
DIN 376										
M 12,0	1,75	110	29		9,0	7,0	10,20	**18,00**	**24,00**	**29,00**
M 14,0	2,00	110	30		11,0	9,0	12,00	**23,00**	**29,50**	**34,00**
M 16,0	2,00	110	32		12,0	9,0	14,00	**25,00**	**34,00**	**37,00**
M 18,0	2,50	125	34		14,0	11,0	15,50	**35,00**	**47,00**	**54,00**
M 20,0	2,50	140	34		16,0	12,0	17,50	**37,00**	**52,00**	**58,00**
M 22,0	2,50	140	34		18,0	14,5	19,50	**46,00**	**65,00**	**71,00**
M 24,0	3,00	160	38		18,0	14,5	21,00	**50,00**	**75,00**	**56,00**
M 27,0	3,00	160	38		20,0	16,0	24,00	**67,00**	**88,00**	
M 30,0	3,50	180	45		22,0	18,0	26,50	**78,00**	**108,00**	
M 33,0	3,50	180	50		25,0	20,0	29,50	**114,00**	**146,00**	
M 36,0	4,00	200	56		28,0	22,0	32,00	**156,00**	**198,00**	

HSSE/PM-MGB für Durchgangsgewinde und Stahlbearbeitung

„M"



HSSE/PM-Machine taps for through holes

Gwintowniki maszynowe HSS-E/PM do otworów przelot., gwint metryczny "M"

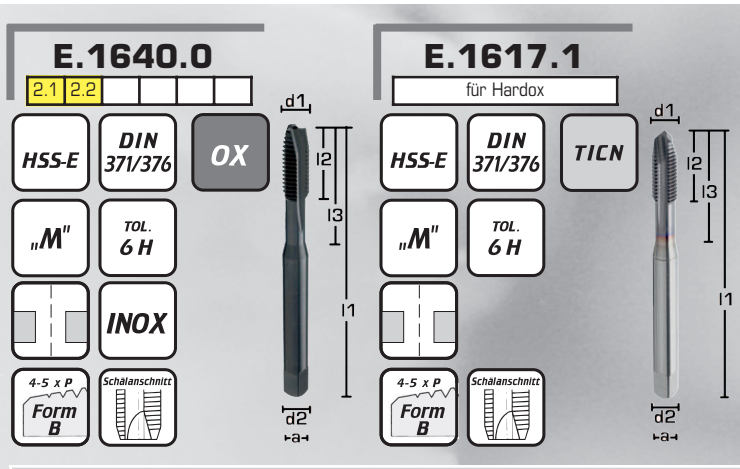
Maschi a macchina fori passanti HSSE/PM

Machos de máquina en HSSE/PM para agujeros pasantes

Artikel-Nr. *Article-No.*								E.1641.1 € Stück *piece*	E.1610.1 € Stück *piece*	E.1624.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 3,0	0,50	56	10	18	2,8	2,7	2,50	**12,00**	**10,50**	
M 4,0	0,70	63	12	21	4,0	3,4	3,30	**12,00**	**10,50**	
M 5,0	0,80	70	14	25	4,0	4,9	4,20	**13,00**	**12,00**	
M 6,0	1,00	80	18	30	6,0	4,9	5,00	**13,00**	**13,50**	**36,00**
M 8,0	1,25	90	20	35	7,0	6,2	6,80	**18,00**	**17,00**	**39,00**
M 10,0	1,50	100	20	39	9,0	8,0	8,50	**23,00**	**21,00**	**42,00**
DIN 376										
M 12,0	1,75	110	29		9,0	7,0	10,20	**30,00**	**27,00**	**52,00**
M 16,0	2,00	110	32		12,0	9,0	14,00	**38,00**	**38,00**	
M 20,0	2,50	140	34		16,0	12,0	17,50		**57,00**	

HSSE/PM-MGB für Durchgangsgewinde

„M"



HSSE-Machine taps for through holes

Gwintowniki maszynowe HSS-E do otworów przelot., gwint metryczny "M"

Maschi a macchina fori passanti HSSE

Machos de máquina en HSSE/PM para agujeros pasantes

Artikel-Nr. *Article-No.*								E.1640.0 € Stück *piece*	E.1617.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 1,0	0,25	40	5,5		2,5	2,1	0,75	**92,00**	**92,00**
M 1,4	0,30	40	7,0		2,5	2,1	1,10	**76,00**	**76,00**
M 1,7	0,35	40	8,0		2,5	2,1	1,30	**87,00**	**87,00**
M 2,0	0,40	45	8,0		2,8	2,1	1,60	**14,00**	**43,00**
M 2,5	0,45	50	9,0		2,8	2,1	2,05	**14,00**	**45,00**
M 3,0	0,50	56	10,0	18	2,8	2,7	2,50	**7,50**	**16,00**
M 4,0	0,70	63	12,0	21	4,0	3,4	3,30	**7,50**	**16,00**
M 5,0	0,80	70	14,0	25	4,0	4,9	4,20	**8,00**	**18,00**
M 6,0	1,00	80	18,0	30	6,0	4,9	5,00	**8,00**	**18,00**
M 8,0	1,25	90	20,0	35	7,0	6,2	6,80	**10,50**	**20,00**
M 10,0	1,50	100	20,0	39	9,0	8,0	8,50	**12,50**	**22,00**
DIN 376									
M 12,0	1,75	110	29,0		9,0	7,0	10,20	**16,50**	**24,00**
M 16,0	2,00	110	32,0		12,0	9,0	14,00	**23,00**	**35,00**
M 20,0	2,50	140	34,0		16,0	12,0	17,50	**35,00**	**49,00**
M 24,0	3,00	160	38,0		18,0	14,5	21,00	**50,00**	**68,00**

HSSE-MGB für Durchgangsgewinde

„M"

E.1717.0

4.1 | 4.4 | 4.7

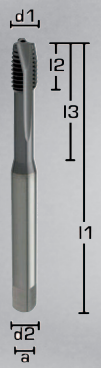
HSS-E | DIN 371/376 | „M" | TOL. 6 H | Kupfer/ Alu lang | 4-5 x P Form B | Schälanschnitt



E.1621.1

4.3 | 4.6 | 4.8

HSS-E | DIN 371/376 | TICN | „M" | TOL. 6 HX | Kupfer/ Alu kurz | 4-5 x P Form B | Schälanschnitt



HSSE-Machine taps for through holes

Gwintowniki maszynowe HSS-E do otworów przelot., gwint metryczny "M"

Maschi a macchina fori passanti HSSE

Machos de máquina en HSSE para agujeros pasantes

Artikel-Nr. *Article-No.*									E.1717.0 € Stück *piece*	E.1621.1 € Stück *piece*
d1	Aufmaß *oversize*	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371										
M 3,0	+0,10	0,50	56	10	18	2,8	2,7	2,50	**10,00**	**11,00**
M 4,0	+0,10	0,70	63	12	21	4,0	3,4	3,30	**10,00**	**11,00**
M 5,0	+0,10	0,80	70	14	25	4,0	4,9	4,20	**11,00**	**13,00**
M 6,0	+0,10	1,00	80	18	30	6,0	4,9	5,00	**11,00**	**13,00**
M 8,0	+0,10	1,25	90	20	35	7,0	6,2	6,80	**14,00**	**17,00**
M 10,0	+0,10	1,50	100	20	39	9,0	8,0	8,50	**16,00**	**22,00**
DIN 376										
M 12,0	+0,10	1,75	110	29		9,0	7,0	10,20	**21,00**	**28,00**
M 14,0	+0,10	2,00	110	30		11,0	9,0	12,00		**33,00**
M 16,0	+0,10	2,00	110	32		12,0	9,0	14,00		**39,00**

HSSE-MGB lang für Durchgangsgewinde

„M"

E.1669.0

Universal

HSS-E | DIN 371/376 | UNIVERSAL TOOL | „M" | TOL. 6 H | N/mm² ≤800 | 4-5 x P Form B | Schälanschnitt



HSSE-Machine taps for through holes, long

Gwintowniki maszynowe HSS-E długie do otw. przelot., gwint metryczny "M"

Maschi a macchina fori passanti HSSE, lunghi

Machos de máquina en HSSE para agujeros pasantes, serie larga

Artikel-Nr. *Article-No.*								E.1669.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 3,0	0,50	100	10	18	3,5	2,7	2,5	**14,00**
M 4,0	0,70	125	12	20	4,5	3,0	3,3	**14,00**
M 5,0	0,80	140	14	25	6,0	4,9	4,2	**15,00**
M 6,0	1,00	160	18	30	6,0	4,9	5,0	**16,00**
DIN 376								
M 8,0	1,25	90	13		6,0	4,9	6,8	**19,00**
M 10,0	1,50	100	15		7,0	5,5	8,5	**22,00**
M 12,0	1,75	220	29		9,0	7,0	10,2	**27,00**
M 16,0	2,00	220	32		12,0	9,0	14,0	**40,00**

E.1614.0

Universal

HSS-E | DIN 371/376 | „M" | TOL. 6 H | UNIVERSAL TOOL | 2-3 x P Form C



HSSE/PM-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otworów przelot., gwint metryczny "M"

Maschi a macchina fori passanti e ciechi HSSE/PM

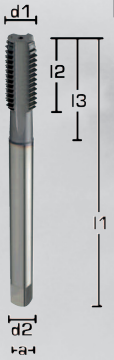
Machos de máquina en HSSE/PM para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*							E.1614.0 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
DIN 371							
M 1,0	0,25	40	5,5	2,5	2,1	0,75	**53,00**
M 1,2	0,25	40	5,5	2,5	2,1	0,95	**53,00**
M 1,4	0,30	40	7,0	2,5	2,1	1,10	**44,00**
M 1,6	0,35	40	8,0	2,5	2,1	1,25	**42,00**
M 1,7	0,35	40	8,0	2,5	2,1	1,30	**46,00**
M 1,8	0,35	40	8,0	2,5	2,1	1,45	**44,00**
M 2,0	0,40	45	8,0	2,8	2,1	1,60	**36,00**
M 2,5	0,45	50	9,0	2,8	2,1	2,05	**35,00**
M 3,0	0,50	56	10,0	3,5	2,7	2,50	**7,00**
M 3,5	0,60	56	12,0	4,0	3,0	2,90	**8,50**
M 4,0	0,70	63	12,0	4,5	3,4	3,30	**7,00**
M 5,0	0,80	70	14,0	6,0	4,9	4,20	**7,00**
M 6,0	1,00	80	18,0	6,0	4,9	5,00	**7,00**
M 8,0	1,25	90	20,0	8,0	6,2	6,80	**9,00**
M 10,0	1,50	100	20,0	10,0	8,0	8,50	**10,20**
DIN 376							
M 12,0	1,75	110	29,0	9,0	7,0	10,20	**13,00**
M 14,0	2,00	110	30,0	11,0	9,0	12,00	**17,00**
M 16,0	2,00	110	32,0	12,0	9,0	14,00	**18,00**
M 18,0	2,50	125	34,0	14,0	11,0	15,50	**24,00**
M 20,0	2,50	140	34,0	16,0	12,0	17,50	**26,00**
M 22,0	2,50	140	34,0	18,0	14,5	19,50	**34,00**
M 24,0	3,00	160	38,0	18,0	14,5	21,00	**32,00**
M 27,0	3,00	160	38,0	20,0	16,0	24,00	**41,00**
M 30,0	3,50	180	45,0	22,0	18,0	26,50	**48,00**
M 33,0	3,50	180	50,0	25,0	20,0	29,50	**63,00**
M 36,0	4,00	200	56,0	28,0	22,0	32,00	**75,00**
M 39,0	4,00	200	60,0	32,0	24,0	35,00	**95,00**
M 42,0	4,50	200	60,0	32,0	24,0	37,50	**106,00**
M 45,0	4,50	220	65,0	36,0	29,0	40,50	**120,00**
M 48,0	5,00	250	70,0	36,0	29,0	43,00	**138,00**
M 52,0	5,00	250	70,0	40,0	32,0	47,00	**150,00**

E.1688.1

1.3 6.1

HSSE/PM | DIN 371/376 | TICN | „M" | TOL. 6 HX | <45 HRC | N/mm² ≤1400 | 2-3 x P Form C | STAHL



E.1622.0

4.5

HSS-E | DIN 371/376 | „M" | TOL. 6 H | MESSING | 4-5 x P Form E



HSSE/PM-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E/PM do otworów przelot.i nieprzelot., gwint metryczny "M"

Maschi a macchina fori passanti e ciechi HSSE/PM

Machos de máquina en HSSE/PM para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1688.1 € Stück *piece*	E.1622.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 3,0	0,50	56	10	18	3,5	2,7	2,50	**13,00**	**7,50**
M 3,5	0,60	56	12	20	4,0	3,0	2,90		**9,00**
M 4,0	0,70	63	12	21	4,5	3,4	3,30	**13,00**	**8,00**
M 4,5	0,75	70	14	25	6,0	4,9	3,80		**12,00**
M 5,0	0,80	70	14	25	6,0	4,9	4,20	**13,00**	**8,00**
M 6,0	1,00	80	18	30	6,0	4,9	5,00	**15,00**	**8,00**
M 8,0	1,25	90	20	35	8,0	6,2	6,80	**19,00**	**10,00**
M 10,0	1,50	100	20	39	10,0	8,0	8,50	**24,00**	**12,00**
DIN 376									
M 12,0	1,75	110	29		9,0	7,0	10,20	**32,00**	
M 16,0	2,00	110	32		12,0	9,0	14,00	**42,00**	



HSSE/PM-MGB für Durchgangs- und Sacklochgewinde

„M"

E.1639.1

3.1 3.2 3.3 3.4

HSSE/PM | DIN 371/376 | TICN | „M" | TOL. 6 HX | GG | 2-3 x P Form C



HSSE/PM-Machine taps for through blind holes

Gwintowniki masz. HSS-E/PM do otw. przelot. i nieprzelot., gwint metryczny "M"

Maschi a macchina fori passanti e ciechi HSSE/PM

Machos de máquina en HSSE/PM para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1639.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 5,0	0,80	70	14	25	4,0	4,9	4,20	**17,00**
M 6,0	1,00	80	18	30	6,0	4,9	5,00	**18,00**
DIN 376								
M 8,0	1,25	90	22		6,0	4,9	6,80	**20,00**
M 10,0	1,50	100	24		7,0	5,5	8,50	**23,00**
M 12,0	1,75	110	29		9,0	7,0	10,20	**30,00**

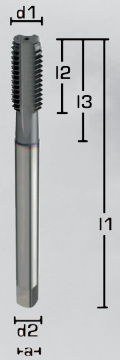
HSSE/PM-MGB für Durchgangs- und Sacklochgewinde

„M"

E.1646.1

3.1 3.2 3.3 3.4

HSS-E | DIN 371/376 | TICN | „M" | TOL. 6 HX | GG | 2-3 x P Form C



HSSE/PM-Machine taps for through and blind holes

Gwintowniki masz. HSS-E/PM do otw. przelot. nieprzelot., gwint metryczny "M"

Maschi a macchina fori passanti e ciechi HSSE/PM

Machos de máquina en HSSE/PM para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1646.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 3,0	0,50	56	10	18	2,8	2,7	2,50	**9,00**
M 3,5	0,60	56	12	20	4,0	3,0	2,90	**13,00**
M 4,0	0,70	63	12	21	4,0	3,4	3,30	**9,00**
M 5,0	0,80	70	14	25	4,0	4,9	4,20	**10,00**
M 6,0	1,00	80	18	30	6,0	4,9	5,00	**11,00**
M 8,0	1,25	90	20	35	7,0	6,2	6,80	**15,00**
M 10,0	1,50	100	20	39	9,0	8,0	8,50	**18,00**
DIN 376								
M 12,0	1,75	110	29		9,0	7,0	10,20	**24,00**
M 16,0	2,00	110	32		12,0	9,0	14,00	**32,00**

HSSE-EMUGE-Hochleistungs-MGB Speed-A

„M"

E.1612.1

Universal

HSS-E | DIN 371/376 | TICN

„M" | TOL. 6 H | 4-5 x P Form B

N/mm² ≤1000 | Schälanschnitt



HSSE-Heavy duty machine taps Emuge Speed-A

Gwintowniki maszynowe HSS-E do obróbki wysokowydajnej, typ Speed A, gwint metryczny "M"

Maschi a macchina ad alte prestazioni (Speed A) Emuge per lavorazioni pesanti

Machos de máquina Emuge de alto rendimiento en HSSE, tipo Speed A

Artikel-Nr. *Article-No.*								E.1612.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 2,5	0,45	50	9	14	2,8	2,30	2,05	**36,00**
M 3,0	0,50	56	10	18	3,5	2,80	2,50	**29,80**
M 4,0	0,70	63	12	21	4,5	3,70	3,30	**28,90**
M 5,0	0,80	70	14	25	6,0	4,65	4,20	**31,00**
M 6,0	1,00	80	18	30	6,0	5,55	5,00	**39,20**
M 8,0	1,25	90	20	35	8,0	7,40	6,80	**44,00**
M 10,0	1,50	100	20	39	10,0	9,30	8,50	**60,00**
DIN 376								
M 12,0	1,75	110	29		9,0	7,0	10,20	**68,80**
M 16,0	2,00	110	32		12,0	9,0	14,00	**97,00**

HSSE-EMUGE-Hochleistungs-MGB Speed-B

„M"

E.1613.1

Universal

HSS-E | DIN 371/376 | TICN

„M" | TOL. 6 H | 2-3 x P Form C

N/mm² ≤1000 | 35°



HSSE-Heavy duty machine taps Emuge Speed-B

Gwintowniki maszynowe HSS-E do obróbki wysokowydajnej, typ Speed B, gwint metryczny "M"

Maschi a macchina ad alte prestazioni (Speed B) Emuge per lavorazioni pesanti

Machos de máquina Emuge de alto rendimiento en HSSE, tipo Speed A

Artikel-Nr. *Article-No.*								E.1613.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 2,5	0,45	50	9	14	2,8	2,10	2,05	**37,40**
M 3,0	0,50	56	10	18	3,5	2,80	2,50	**31,90**
M 4,0	0,70	63	12	21	4,5	3,70	3,30	**29,90**
M 5,0	0,80	70	14	25	6,0	4,65	4,20	**32,60**
M 6,0	1,00	80	18	30	6,0	5,55	5,00	**41,50**
M 8,0	1,25	90	20	35	8,0	7,40	6,80	**44,50**
M 10,0	1,50	100	20	39	10,0	9,30	8,50	**63,00**
DIN 376								
M 12,0	1,75	110	29		9,0	7,0	10,20	**74,00**
M 16,0	2,00	110	32		12,0	9,0	14,00	**98,00**

E.1678.0

1.1

HSS-E | DIN 371/376 | OX | „M" | TOL. 6 H | N/mm² ≤500 | 2-3 x P Form C | 45°



E.1668.0

1.1

HSS-E | DIN 371/376 | „M" | TOL. 6 H | N/mm² ≤800 | 2-3 x P Form C | 40°



E.1668.1

1.1 4.1

HSS-E | DIN 371/376 | TIN | „M" | TOL. 6 H | N/mm² ≤800 | 2-3 x P Form C | 40°



- HSSE-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE
- Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1678.0 € Stück *piece*	E.1668.0 € Stück *piece*	E.1668.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 2,0	0,40	45	8	12	2,8	2,1	1,60		**14,00**	**16,00**
M 2,5	0,45	50	9	14	2,8	2,1	2,05		**14,00**	**16,00**
M 3,0	0,50	56	5	18	3,5	2,7	2,50	**9,00**	**8,00**	**10,00**
M 3,5	0,60	56	6	20	4,0	3,0	2,90	**11,00**	**10,00**	**12,00**
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**9,00**	**8,00**	**10,00**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**10,00**	**9,00**	**10,50**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**10,00**	**9,00**	**11,50**
M 7,0	1,00	80	18	30	7,0	5,5	6,00	**21,00**	**14,00**	**16,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**14,00**	**12,00**	**15,00**
M 9,0	1,25	90	13	35	9,0	7,0	7,80	**26,00**	**18,00**	**21,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**17,00**	**14,00**	**19,50**
DIN 376										
M 12,0	1,75	110	18		9,0	7,0	10,20	**21,00**	**18,00**	**24,50**
M 14,0	2,00	110	20		11,0	9,0	12,00	**26,00**	**23,50**	**30,00**
M 16,0	2,00	110	20		12,0	9,0	14,00	**28,00**	**25,60**	**34,00**
M 18,0	2,50	125	25		14,0	11,0	15,50		**38,00**	**46,00**
M 20,0	2,50	140	25		16,0	12,0	17,50		**38,00**	**45,00**
M 22,0	2,50	140	25		18,0	14,5	19,50		**52,00**	**62,00**
M 24,0	3,00	160	30		18,0	14,5	21,00		**53,00**	**68,00**
M 27,0	3,00	160	30		20,0	16,0	24,00		**71,00**	**97,00**
M 30,0	3,50	180	35		22,0	18,0	26,50		**83,00**	**114,00**
M 33,0	3,50	180	35		25,0	20,0	29,50		**122,00**	**160,00**
M 36,0	4,00	200	40		28,0	22,0	32,00		**166,00**	**215,00**
M 39,0	4,00	200	40		32,0	24,0	35,00		**175,00**	**241,00**
M 42,0	4,50	200	45		32,0	24,0	37,50		**198,00**	**265,00**

HSSE-MGB für Sacklochgewinde

„M"

E.1604.1

1.2

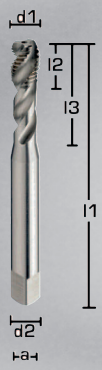
HSS-E | DIN 371/376 | TIN | „M" | TOL. 6G | N/mm² ≤1000 | 2-3 x P Form C | 40°



E.1720.0

1.1

HSS-E | DIN 371/376 | „M" | TOL. 6G | N/mm² ≤800 | 2-3 x P Form C | 40°



E.1625.0

Universal

HSS-E | DIN 371/376 | LH | „M" | TOL. 6H | UNIVERSAL TOOL | N/mm² ≤800 | 2-3 x P Form C | 40°



- HSSE-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE
- Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1604.1 € Stück *piece*	E.1720.0 € Stück *piece*	E.1625.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 3,0	0,50	56	5	18	3,5	2,7	2,50	**11,80**	**10,50**	**12,00**
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**11,80**	**10,50**	**12,00**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**12,80**	**11,80**	**13,00**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**14,00**	**12,00**	**14,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**18,00**	**16,00**	**18,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**23,00**	**20,80**	**21,00**
DIN 376										
M 12,0	1,75	110	18		9,0	7,0	10,20	**28,00**	**25,00**	**27,00**
M 16,0	2,00	110	20		12,0	9,0	14,00	**40,00**	**36,00**	**38,00**

HSSE-Aufmaß-MGB für Sacklochgewinde

„M"

E.1626.1

Universal

HSS-E | DIN 371/376 | TIN | „M" | UNIVERSAL TOOL | N/mm² ≤800 | 2-3 x P Form C | 40°



- HSSE-Machine taps for blind holes, oversize
- Gwintowniki maszynowe HSS-E o zawężonej tolerancji do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE
- Machos de máquina en HSSE para agujeros ciegos con sobremedida

Artikel-Nr. *Article-No.*									E.1626.1 € Stück *piece*
d1	Aufmaß *oversize*	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371									
M 3,0	+0,05	0,50	56	5	18	3,5	2,7	2,50	**16,00**
M 4,0	+0,05	0,70	63	7	21	4,5	3,4	3,30	**16,00**
M 5,0	+0,05	0,80	70	8	25	6,0	4,9	4,20	**18,00**
M 6,0	+0,05	1,00	80	10	30	6,0	4,9	5,00	**18,00**
M 8,0	+0,10	1,25	90	13	35	8,0	6,2	6,80	**22,00**
M 10,0	+0,10	1,50	100	15	39	10,0	8,0	8,50	**26,00**
DIN 376									
M 12,0	+0,10	1,75	110	18		9,0	7,0	10,20	**34,00**
M 14,0	+0,10	2,00	110	20		11,0	9,0	12,00	**42,00**
M 16,0	+0,10	2,00	110	20		12,0	9,0	14,00	**44,00**
M 18,0	+0,10	2,50	125	25		14,0	11,0	15,50	**60,00**
M 20,0	+0,10	2,50	140	25		16,0	12,0	17,50	**65,00**
M 24,0	+0,16	3,00	160	30		18,0	14,5	21,00	**80,00**

HSSE/PM-MGB für Sacklochgewinde

„M"

E.1677.0
Universal

HSSE/PM | DIN 371/376 | OX | „M" | TOL. 6 H | UNIVERSAL TOOL | N/mm² ≤800 | 4-5 x P Form E | 45°



E.1677.1
Universal

HSS-E | DIN 371/376 | TIN | „M" | TOL. 6 H | UNIVERSAL TOOL | N/mm² ≤800 | 4-5 x P Form E | 45°



- HSSE-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE/PM
- Machos de máquina en HSSE/PM para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1677.0 € Stück *piece*	E.1677.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 3,0	0,50	56	5	18	3,5	2,7	2,50	**11,50**	**12,50**
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**11,50**	**12,50**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**12,00**	**14,00**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**12,00**	**14,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**17,00**	**20,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**19,00**	**25,00**
DIN 376									
M 12,0	1,75	110	18		9,0	7,0	10,20	**26,00**	**32,00**
M 16,0	2,00	110	20		12,0	9,0	14,00	**36,00**	**44,00**

HSSE-MGB für Sacklochgewinde

„M"

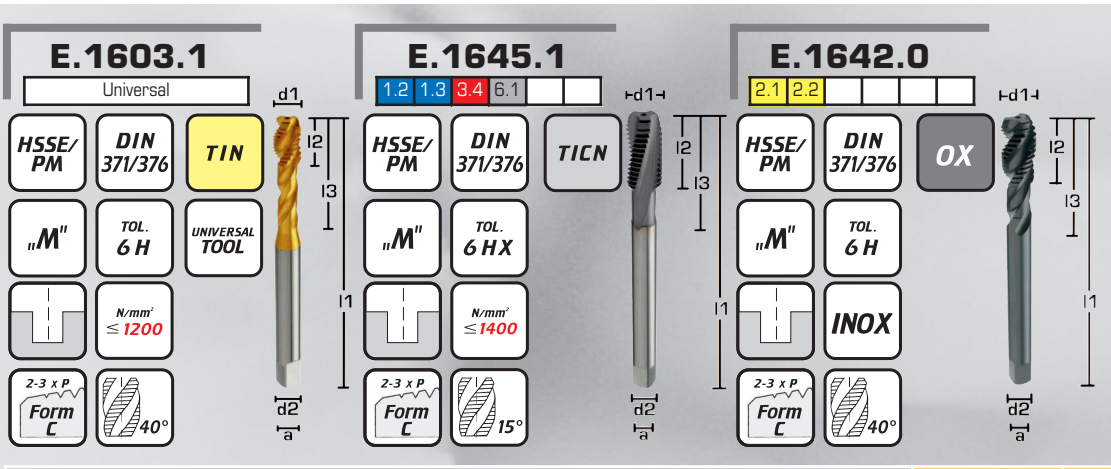
E.1627.0
Universal

HSS-E | DIN 371/376 | UNIVERSAL TOOL | „M" | TOL. 6 H | N/mm² ≤800 | 2-3 x P Form C | 15°



- HSSE-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE
- Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1627.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 3,0	0,50	56	11	18	3,5	2,7	2,50	**10,00**
M 4,0	0,70	63	13	21	4,5	3,4	3,30	**10,00**
M 5,0	0,80	70	15	25	6,0	4,9	4,20	**11,00**
M 6,0	1,00	80	17	30	6,0	4,9	5,00	**12,00**
M 8,0	1,25	90	20	35	8,0	6,2	6,80	**14,00**
M 10,0	1,50	100	20	39	10,0	8,0	8,50	**17,00**
DIN 376								
M 12,0	1,75	110	29		9,0	7,0	10,20	**21,00**
M 16,0	2,00	110	32		12,0	9,0	14,00	**30,00**



HSSE/PM-Machine taps for blind holes

Gwintowniki maszynowe HSS-E/PM do otw. nieprzelot., gwint metryczny "M"

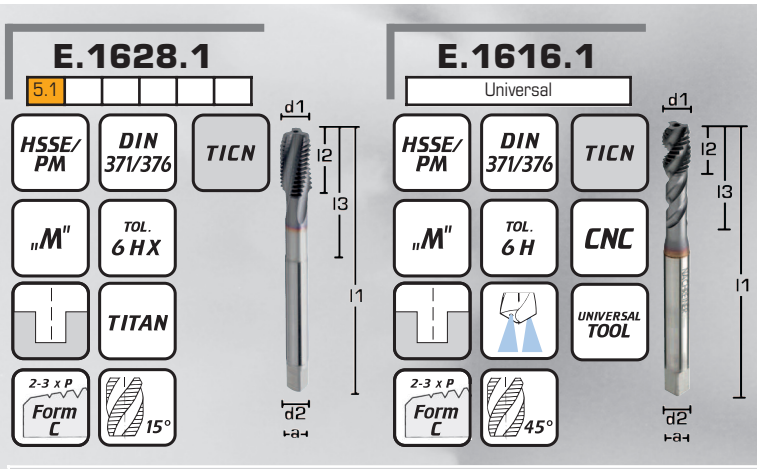
Maschi a macchina fori ciechi HSSE/PM

Machos de máquina en HSSE/PM para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1603.1 € Stück *piece*	E.1645.1* € Stück *piece*	E.1642.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 2,0	0,40	45	8	12	2,8	2,1	1,60			**15,00**
M 2,5	0,45	50	9	14	2,8	2,1	2,05			**15,00**
M 3,0	0,50	56	5 / 11*	18	3,5	2,7	2,50	**10,00**	**14,00**	**8,00**
M 3,5	0,60	56	6 / 12*	20	4,0	3,0	2,90	**12,00**	**16,00**	**10,00**
M 4,0	0,70	63	7 / 13*	21	4,5	3,4	3,30	**10,00**	**14,00**	**8,00**
M 5,0	0,80	70	8 / 15*	25	6,0	4,9	4,20	**10,50**	**14,00**	**8,50**
M 6,0	1,00	80	10 / 17*	30	6,0	4,9	5,00	**11,50**	**15,00**	**9,00**
M 8,0	1,25	90	13 / 20*	35	8,0	6,2	6,80	**16,00**	**20,00**	**11,50**
M 10,0	1,50	100	15 / 20*	39	10,0	8,0	8,50	**20,00**	**24,00**	**13,50**
DIN 376										
M 12,0	1,75	110	18 / 29*		9,0	7,0	10,20	**26,00**	**32,00**	**17,50**
M 14,0	2,00	110	20 / 30*		11,0	9,0	12,00	**32,00**	**40,00**	**23,00**
M 16,0	2,00	110	20 / 32*		12,0	9,0	14,00	**35,50**	**44,00**	**25,00**
M 18,0	2,50	125	25 / 34*		14,0	11,0	15,50	**51,00**		**37,00**
M 20,0	2,50	140	25 / 34*		16,0	12,0	17,50	**54,00**		**38,00**
M 22,0	2,50	140	25 / 34*		18,0	14,5	19,50	**70,00**		**50,00**
M 24,0	3,00	160	30 / 38*		18,0	14,5	21,00	**73,00**		**51,00**
M 27,0	3,00	160	30 / 38*		20,0	16,0	24,00	**95,00**		**74,00**
M 30,0	3,50	180	35 / 45*		22,0	18,0	26,50	**120,00**		**86,00**
M 33,0	3,50	180	35 / 50*		25,0	20,0	29,50			**128,00**
M 36,0	4,00	200	40 / 56*		28,0	22,0	32,00			**175,00**

HSSE/PM-MGB für Sacklochgewinde

„M"

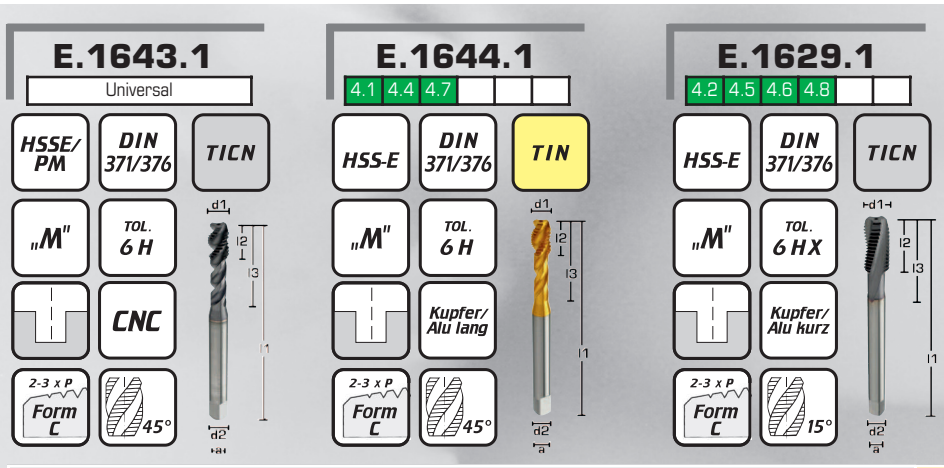


- HSSE/PM-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E/PM do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE/PM
- Machos de máquina en HSSE/PM para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1628.1* € Stück *piece*	E.1616.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 3,0	0,50	56	5 / 11*	18	3,5	2,7	2,50	**46,00**	
M 4,0	0,70	63	7 / 13*	21	4,5	3,4	3,30	**50,00**	
M 5,0	0,80	70	8 / 15*	25	6,0	4,9	4,20	**50,00**	**26,00**
M 6,0	1,00	80	10 / 17*	30	6,0	4,9	5,00	**68,00**	**26,00**
M 8,0	1,25	90	13 / 20*	35	8,0	6,2	6,80	**74,00**	**32,00**
M 10,0	1,50	100	15 / 20*	39	10,0	8,0	8,50	**90,00**	**38,00**
DIN 376									
M 12,0	1,75	110	18 / 29*		9,0	7,0	10,20	**103,00**	**45,00**
M 14,0	2,00	110	20 / 30*		11,0	9,0	12,00		**52,00**
M 16,0	2,00	110	20 / 32*		12,0	9,0	14,00	**144,00**	**57,00**
M 20,0	2,50	140	25 / 34*		16,0	12,0	17,50	**250,00**	
M 24,0	3,00	160	30 / 38*		18,0	14,5	21,00	**286,00**	

HSSE/PM-MGB für Sacklochgewinde

„M"

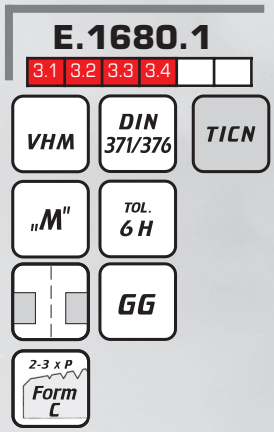


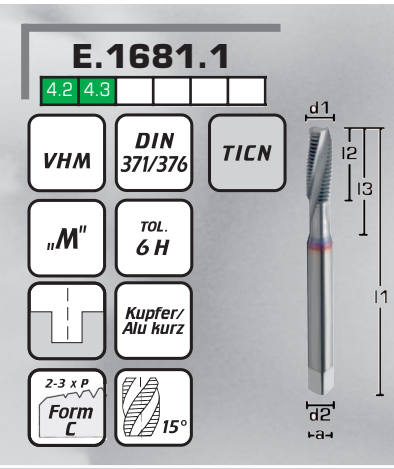
- HSSE/PM-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E/PM do otw. nieprzelot., gwint metryczny "M"
- Maschi a macchina fori ciechi HSSE/PM
- Machos de máquina en HSSE/PM para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1643.1 € Stück *piece*	E.1644.1 € Stück *piece*	E.1629.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
M 3,0	0,50	56	5	18	3,5	2,7	2,50	**13,00**	**11,00**	**12,00**
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**13,00**	**11,00**	**12,00**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**13,00**	**12,00**	**13,00**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**14,00**	**13,00**	**14,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**19,50**	**17,00**	**18,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**25,00**	**22,00**	**22,00**
DIN 376										
M 12,0	1,75	110	18		9,0	7,0	10,20	**32,00**	**28,00**	**28,00**
M 16,0	2,00	110	20		12,0	9,0	14,00	**48,00**	**38,00**	**41,00**

VHM-MGB für Sacklochgewinde

„M"





Solid carbid machine taps for blind holes

Gwintowniki maszynowe z węglika spiekanego do otworów przelot. i nieprzelot., gwint metryczny "M"

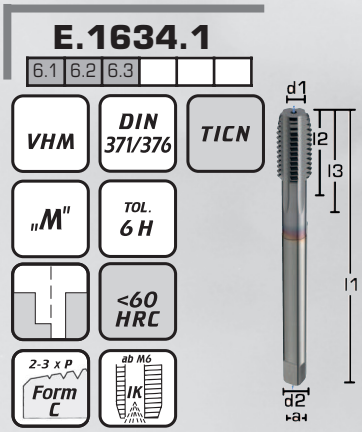
Maschi a macchina in MD fori ciechi

Machos de máquina en metal duro integral para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1680.1 € Stück *piece*	E.1681.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**71,00**	**67,00**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**82,00**	**76,00**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**91,00**	**84,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**108,00**	**101,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**133,00**	**125,00**

VHM-MGB mit Innenkühlung für die Hartbearbeitung

„M"



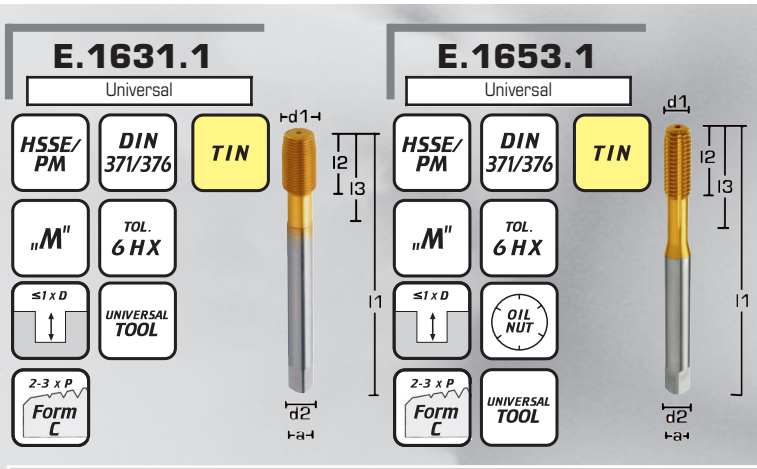
Solid carbide machine taps with internal coolant for hard working

Gwintowniki maszynowe z węg. spiekanego z chłodz. wew. do materiałów do 60 HRC, gwint metryczny "M"

Maschi a macchina in MD con lubrificazione interna lavorazioni mat duri

Machos de máquina en metal duro integral con refrigeración interior para trabajos duros

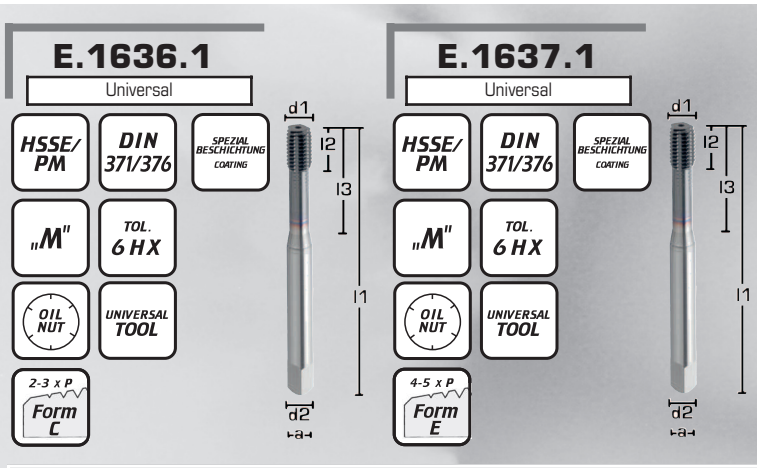
Artikel-Nr. *Article-No.*								E.1634.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
M 3,0	0,50	56	5	18	3,5	2,7	2,50	**108,00**
M 4,0	0,70	63	7	21	4,5	3,4	3,30	**108,00**
M 5,0	0,80	70	8	25	6,0	4,9	4,20	**140,00**
M 6,0	1,00	80	10	30	6,0	4,9	5,00	**142,00**
M 8,0	1,25	90	13	35	8,0	6,2	6,80	**190,00**
M 10,0	1,50	100	15	39	10,0	8,0	8,50	**230,00**
DIN 376								
M 12,0	1,75	110	18		9,0	7,0	10,20	**283,00**
M 16,0	2,00	110	20		12,0	9,0	14,00	**478,00**



- HSSE/PM-Forming taps
- Wygniataki HSS-E/PM, gwint metryczny "M"
- Maschi a macchina a rullare HSSE/PM
- Machos de laminación en HSSE/PM

Artikel-Nr. *Article-No.*								E.1631.1 € Stück *piece*	E.1653.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 2,0	0,40	45	7	12	2,8	2,1	1,83	**24,00**	**26,00**
M 2,2	0,45	45	7	12	2,8	2,1	2,00	**30,00**	**32,00**
M 2,5	0,45	50	9	14	2,8	2,1	2,30	**24,00**	**26,00**
M 3,0	0,50	56	11	18	3,5	2,7	2,80	**20,00**	**20,00**
M 4,0	0,70	63	13	21	4,5	3,4	3,70	**14,00**	**15,00**
M 5,0	0,80	70	15	25	6,0	4,9	4,65	**15,00**	**16,00**
M 6,0	1,00	80	17	30	6,0	4,9	5,55	**16,00**	**18,00**
M 8,0	1,25	90	20	35	8,0	6,2	7,40	**21,00**	**23,00**
M 10,0	1,50	100	22	39	10,0	8,0	9,30	**25,00**	**27,00**
DIN 376									
M 12,0	1,75	110	18		9,0	7,0	11,20	**38,00**	**40,00**
M 14,0	2,00	110	20		11,0	9,0	13,00	**59,00**	**61,00**
M 16,0	2,00	110	22		12,0	9,0	15,00	**57,00**	**59,00**
M 18,0	2,50	125	25		14,0	11,0	16,80	**102,00**	**100,00**
M 20,0	2,50	140	25		16,0	12,0	18,80	**116,00**	**119,00**

HSSE/PM-Gewindeformer



- HSSE/PM-Forming taps
- Wygniataki HSS-E/PM, gwint metryczny "M"
- Maschi a macchina a rullare HSSE/PM
- Machos de laminación en HSSE/PM

Artikel-Nr. *Article-No.*								E.1636.1 € Stück *piece*	E.1637.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*		
DIN 371									
M 4,0	0,70	63	13	21	4,5	3,4	3,70		**17,00**
M 5,0	0,80	70	15	25	6,0	4,9	4,65	**24,00**	**20,00**
M 6,0	1,00	80	17	30	6,0	4,9	5,55	**26,00**	**22,00**
M 8,0	1,25	90	20	35	8,0	6,2	7,40	**30,00**	**28,00**
M 10,0	1,50	100	22	39	10,0	8,0	9,30	**35,00**	**35,00**
DIN 376									
M 12,0	1,75	110	18		9,0	7,0	11,20	**48,00**	**52,00**

HSSE/PM-Kombi-MGB

„M"

E.1611.0

Universal

HSSE/PM | WERKS-(COMPANY)NORM | TOL. 6H | 35° | UNIVERSAL TOOL | 2-3 x P Form C



HSSE/PM-Drill taps

Wiertło-gwintowniki HSSE/PM, gwint metryczny "M"

Punta maschio a HSSE/PM

Macho-Broca en HSSE/PM

Artikel-Nr. *Article-No.*								E.1611.0 € Stück *piece*
für Gewinde *for thread*	P	l1	l2	l3	d2	a	d1	
M 3,0	0,50	62	12,5	9,0	3,5	2,7	2,55	**30,00**
M 4,0	0,70	66	16,0	10,0	4,5	3,4	3,36	**30,00**
M 5,0	0,80	75	18,0	12,5	6,0	4,9	4,26	**32,00**
M 6,0	1,00	81	20,0	14,0	6,0	4,9	5,05	**44,00**
M 8,0	1,25	91	14,0	20,0	6,0	4,9	6,80	**55,00**
M 10,0	1,50	105	18,0	25,0	7,0	5,5	8,55	**74,00**
M 12,0	1,75	118	20,0	28,0	9,0	7,0	10,30	**79,00**

PM-Gewindebohrer zum Nachschneiden

„MF"

E.1638.1

1.3 | 6.1

PM | WERKS-(COMPANY)NORM | TICN | „MF" | TOL. 6HX | Form C F FINISH | <45 HRC



PM-Taps for retapping narrow threads

Gwintowniki PM o zawężonej tolerancji, gwint metryczny drobnozwojowy "MF"

Maschi a PM per rigenerare la filettatura esistente

Machos en PM para repasar

Artikel-Nr. *Article-No.*							E.1638.1 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
M 8 x 1,0	1,0	63	17	6,0	4,9	7,0	**18,00**
M 10 x 1,0	1,0	63	18	7,0	5,5	9,0	**16,00**
M 12 x 1,5	1,5	70	20	9,0	7,0	10,5	**22,00**
M 16 x 1,5	1,5	70	20	12,0	9,0	14,5	**26,00**

E.1647.1

Universal

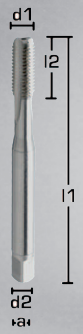
HSS-E | DIN 374 | TIN | „MF" | TOL. 6 H | UNIVERSAL TOOL | N/mm² ≤800 | 4-5 x P Form B | Schälanschnitt



E.1648.0

Universal

HSS-E | DIN 374 | „MF" | TOL. 6 H | UNIVERSAL TOOL | 2-3 x P Form C



HSSE-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otworów przelot, i nieprzelot., gwint metryczny drobnozwojowy "MF"

Maschi a macchina per fori passanti e fori ciechi HSSE

Machos de máquina en HSSE para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1647.1 € Stück *piece*	E.1648.0 € Stück *piece*
d1	P	l1	l2	d2	a	Zähne *flutes*	Bohr-Ø *drill-Ø*		
M 4 x 0,50	0,50	63	12	2,8	2,1	3	3,50	**15,00**	**13,00**
M 5 x 0,50	0,50	70	13	3,5	2,7	3	4,50	**19,00**	**16,00**
M 6 x 0,50	0,50	80	15	4,5	3,4	3	5,50	**16,00**	**14,00**
M 6 x 0,75	0,75	80	15	4,5	3,4	3	5,20	**15,00**	**13,00**
M 7 x 0,75	0,75	80	15	5,5	4,3	3	6,20	**21,00**	**19,00**
M 8 x 0,75	0,75	80	15	6,0	4,9	3	7,20	**19,00**	**16,00**
M 10 x 0,75	0,75	90	20	7,0	5,5	3	9,20	**23,00**	**18,00**
M 8 x 1,00	1,00	90	18	6,0	4,9	3	7,00	**16,00**	**13,00**
M 10 x 1,00	1,00	90	20	7,0	5,5	3	9,00	**19,00**	**16,00**
M 12 x 1,00	1,00	100	21	9,0	7,0	3	11,00	**25,00**	**17,00**
M 14 x 1,00	1,00	100	21	11,0	9,0	3	13,00	**28,00**	**20,00**
M 15 x 1,00	1,00	100	21	12,0	9,0	3	14,00	**43,00**	**36,00**
M 16 x 1,00	1,00	100	21	12,0	9,0	3	15,00	**35,00**	**26,00**
M 18 x 1,00	1,00	110	24	14,0	11,0	3	17,00	**50,00**	**40,00**
M 20 x 1,00	1,00	125	24	16,0	12,0	3	19,00	**48,00**	**38,00**
M 22 x 1,00	1,00	125	24	18,0	14,5	3	21,00	**74,00**	**59,00**
M 24 x 1,00	1,00	140	26	18,0	14,5	4	23,00	**75,00**	**56,00**
M 27 x 1,00	1,00	140	26	20,0	16,0	4	26,00	**89,00**	**62,00**
M 30 x 1,00	1,00	150	28	22,0	18,0	4	29,00	**118,00**	**85,00**
M 10 x 1,25	1,25	100	20	7,0	5,5	3	8,00	**21,00**	**16,00**
M 12 x 1,25	1,25	100	21	9,0	7,0	3	10,80	**26,00**	**19,00**
M 14 x 1,25	1,25	100	21	11,0	9,0	3	12,80	**32,00**	**23,00**
M 12 x 1,50	1,50	100	21	9,0	7,0	3	10,50	**23,00**	**17,00**
M 14 x 1,50	1,50	100	21	11,0	9,0	3	12,50	**29,00**	**20,00**
M 15 x 1,50	1,50	100	21	12,0	9,0	3	13,50	**43,00**	**31,00**
M 16 x 1,50	1,50	100	21	12,0	9,0	3	14,50	**32,00**	**22,00**
M 18 x 1,50	1,50	110	24	14,0	11,0	3	16,50	**40,00**	**28,00**
M 20 x 1,50	1,50	125	24	16,0	12,0	3	18,50	**44,00**	**29,00**
M 22 x 1,50	1,50	125	24	18,0	14,5	3	20,00	**55,00**	**38,00**
M 24 x 1,50	1,50	140	26	18,0	14,5	4	22,50	**68,00**	**43,00**
M 25 x 1,50	1,50	140	26	18,0	14,5	4	23,50	**91,00**	**65,00**
M 26 x 1,50	1,50	140	26	18,0	14,5	4	24,50	**90,00**	**64,00**
M 27 x 1,50	1,50	140	26	20,0	16,0	4	25,50	**92,00**	**64,00**
M 28 x 1,50	1,50	140	26	20,0	16,0	4	26,50	**112,00**	**79,00**
M 30 x 1,50	1,50	150	28	22,0	18,0	4	28,50	**106,00**	**73,00**
M 32 x 1,50	1,50	150	28	22,0	18,0	4	30,50	**125,00**	**82,00**
M 33 x 1,50	1,50	160	30	25,0	20,0	4	31,50	**139,00**	**94,00**
M 35 x 1,50	1,50	170	30	28,0	22,0	4	33,50	**181,00**	**125,00**
M 36 x 1,50	1,50	170	30	28,0	22,0	4	34,50	**179,00**	**120,00**
M 18 x 2,00	2,00	125	24	14,0	11,0	3	16,00	**46,00**	**32,00**
M 20 x 2,00	2,00	140	30	16,0	12,0	3	18,00	**54,00**	**37,00**
M 22 x 2,00	2,00	140	30	18,0	14,5	3	20,00	**75,00**	**54,00**
M 24 x 2,00	2,00	140	26	18,0	14,5	4	22,00	**73,00**	**48,00**
M 27 x 2,00	2,00	140	26	20,0	16,0	4	25,00	**97,00**	**67,00**
M 28 x 2,00	2,00	140	26	20,0	16,0	4	26,00	**118,00**	**83,00**
M 30 x 2,00	2,00	150	28	22,0	18,0	4	28,00	**108,00**	**75,00**
M 33 x 2,00	2,00	160	30	25,0	20,0	4	31,00	**150,00**	**105,00**
M 36 x 2,00	2,00	170	30	28,0	22,0	4	34,00	**184,00**	**125,00**
M 36 x 3,00	3,00	200	42	28,0	22,0	4	33,00	**188,00**	**136,00**

E.1649.1

Universal

HSS-E | DIN 374 | TIN | „MF" | TOL. 6 H | UNIVERSAL TOOL | N/mm² ≤800 | 2-3 x P Form C | 35°



E.1651.0

2.1 | 2.2

HSS-E | DIN 374 | OX | „MF" | TOL. 6 H | INOX | 2-3 x P Form C | 40°



- HSSE-Machine taps for blind holes
- Gwintowniki maszynowe HSS-E do otw. nieprzelot., gwint metryczny drobnozwojowy "MF"
- Maschi a macchina per fori ciechi HSSE
- Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1649.1 € Stück *piece*	E.1651.0 € Stück *piece*
d1	P	l1	l2	d2	a	Zähne *flutes*	Bohr-Ø *drill-Ø*		
M 4 x 0,50	0,50	63	12	2,8	2,1	3	3,50	**16,00**	**17,00**
M 5 x 0,50	0,50	70	13	3,5	2,7	3	4,50	**22,00**	**23,00**
M 6 x 0,50	0,50	80	15	4,5	3,4	3	5,50	**18,00**	**18,00**
M 6 x 0,75	0,75	80	15	4,5	3,4	3	5,20	**17,00**	**17,00**
M 7 x 0,75	0,75	80	15	5,5	4,3	3	6,20	**24,00**	**24,00**
M 8 x 0,75	0,75	80	15	6,0	4,9	3	7,20	**21,00**	**23,00**
M 10 x 0,75	0,75	90	20	7,0	5,5	3	9,20	**24,00**	**24,00**
M 8 x 1,00	1,00	90	20	6,0	4,9	3	7,00	**18,00**	**18,00**
M 10 x 1,00	1,00	90	20	7,0	5,5	3	9,00	**21,00**	**19,00**
M 12 x 1,00	1,00	100	21	9,0	7,0	3	11,00	**27,00**	**24,00**
M 14 x 1,00	1,00	100	21	11,0	9,0	3	13,00	**31,00**	**28,00**
M 15 x 1,00	1,00	100	21	12,0	9,0	3	14,00	**47,00**	**45,00**
M 16 x 1,00	1,00	100	21	12,0	9,0	3	15,00	**38,00**	**36,00**
M 18 x 1,00	1,00	110	24	14,0	11,0	3	17,00	**54,00**	**52,00**
M 20 x 1,00	1,00	125	24	16,0	12,0	3	19,00	**52,00**	**46,00**
M 22 x 1,00	1,00	125	24	18,0	14,5	3	21,00	**80,00**	**78,00**
M 24 x 1,00	1,00	140	26	18,0	14,5	4	23,00	**81,00**	**74,00**
M 27 x 1,00	1,00	140	26	20,0	16,0	4	26,00	**95,00**	**85,00**
M 30 x 1,00	1,00	150	28	22,0	18,0	4	29,00	**126,00**	**118,00**
M 10 x 1,25	1,25	100	20	7,0	5,5	3	8,00	**24,00**	**22,00**
M 12 x 1,25	1,25	100	21	9,0	7,0	3	10,80	**29,00**	**26,00**
M 14 x 1,25	1,25	100	21	11,0	9,0	3	12,80	**36,00**	**32,00**
M 12 x 1,50	1,50	100	21	9,0	7,0	3	10,50	**26,00**	**23,00**
M 14 x 1,50	1,50	100	21	11,0	9,0	3	12,50	**31,00**	**27,00**
M 15 x 1,50	1,50	100	21	12,0	9,0	3	13,50	**47,00**	**48,00**
M 16 x 1,50	1,50	100	21	12,0	9,0	3	14,50	**34,00**	**30,00**
M 18 x 1,50	1,50	110	24	14,0	11,0	3	16,50	**44,00**	**40,00**
M 20 x 1,50	1,50	125	24	16,0	12,0	3	18,50	**47,00**	**41,00**
M 22 x 1,50	1,50	125	24	18,0	14,5	3	20,00	**59,00**	**54,00**
M 24 x 1,50	1,50	140	26	18,0	14,5	4	22,50	**72,00**	**61,00**
M 25 x 1,50	1,50	140	26	18,0	14,5	4	23,50	**98,00**	**94,00**
M 26 x 1,50	1,50	140	26	18,0	14,5	4	24,50	**98,00**	**90,00**
M 27 x 1,50	1,50	140	26	20,0	16,0	4	25,50	**98,00**	**88,00**
M 28 x 1,50	1,50	140	26	20,0	16,0	4	26,50	**122,00**	**115,00**
M 30 x 1,50	1,50	150	28	22,0	18,0	4	28,50	**112,00**	**104,00**
M 32 x 1,50	1,50	150	28	22,0	18,0	4	30,50	**133,00**	**118,00**
M 33 x 1,50	1,50	160	30	25,0	20,0	4	31,50	**149,00**	**136,00**
M 35 x 1,50	1,50	170	30	28,0	22,0	4	33,50	**194,00**	**178,00**
M 36 x 1,50	1,50	170	30	28,0	22,0	4	34,50	**190,00**	**174,00**
M 18 x 2,00	2,00	125	24	14,0	11,0	3	16,00	**50,00**	**46,00**
M 20 x 2,00	2,00	140	30	16,0	12,0	3	18,00	**57,00**	**53,00**
M 22 x 2,00	2,00	140	30	18,0	14,5	3	20,00	**79,00**	**77,00**
M 24 x 2,00	2,00	140	26	18,0	14,5	4	22,00	**78,00**	**70,00**
M 27 x 2,00	2,00	140	26	20,0	16,0	4	25,00	**106,00**	**96,00**
M 28 x 2,00	2,00	140	26	20,0	16,0	4	26,00	**128,00**	**124,00**
M 30 x 2,00	2,00	150	28	22,0	18,0	4	28,00	**118,00**	**108,00**
M 33 x 2,00	2,00	160	30	25,0	20,0	4	31,00	**164,00**	**151,00**
M 36 x 2,00	2,00	170	30	28,0	22,0	4	34,00	**196,00**	**181,00**
M 36 x 3,00	3,00	200	42	28,0	22,0	4	33,00	**205,00**	**189,00**

HSSE-Gewindeformer

„MF"

E.1655.1

Universal

HSS-E | DIN 374 | TIN | „MF" | TOL. 6HX | OIL NUT | UNIVERSAL TOOL | 2-3 x P Form C



HSSE-Forming taps

Gwintowniki - wygniataki HSS-E, gwint metryczny drobnozwojowy "MF"

Maschi a macchina a rullare HSSE

Machos de laminación en HSSE

Artikel-Nr. *Article-No.*							E.1655.1 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
M 8 x 1,00	1,00	90	16	6	4,9	7,55	**28,00**
M 10 x 1,00	1,00	90	16	7	5,5	9,50	**28,00**
M 12 x 1,00	1,00	100	22	9	7,0	11,50	**42,00**
M 10 x 1,25	1,25	100	20	7	5,5	9,40	**44,00**
M 12 x 1,25	1,25	100	22	9	7,0	11,40	**45,00**
M 12 x 1,50	1,50	100	22	9	7,0	11,30	**44,00**
M 16 x 1,50	1,50	100	22	12	9,0	15,30	**65,00**
M 18 x 1,50	1,50	110	25	14	11,0	17,30	**105,00**
M 20 x 1,50	1,50	125	22	16	12,0	19,30	**120,00**

HSSE/PM-MGB kurze Ausführung zum Nachschneiden

„G"

E.1657.1

Universal

HSSE/PM | WERKS-(COMPANY) NORM | TICN | „G" | TOL. 6HX | <45 HRC | Form C F FINISH



HSSE/PM-Machine taps short version for retapping narrow threads

Gwintowniki maszynowe HSS-E/PM o zawężonej tolerancji, krótkie, gwint calowy rurowy, walcowy "G"

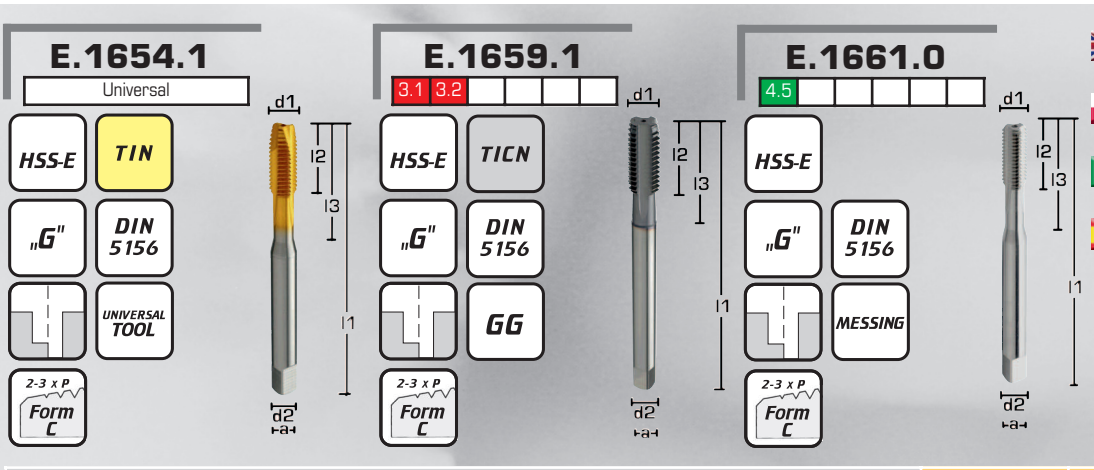
Maschi per rigenerare la filettatura esistente, serie corta

Machos de máquina en HSSE/PM, serie corta, para repasar

Artikel-Nr. *Article-No.*							E.1657.1 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
G 1/8"	28	63	18	7,0	5,5	8,80	**21,00**
G 1/4"	19	70	22	11,0	9,0	11,80	**38,00**
G 3/8"	19	70	22	12,0	9,0	15,25	**41,00**
G 1/2"	14	80	22	16,0	12,0	19,00	**57,00**

HSSE-MGB für Durchgangs- und Sacklochgewinde

„G"



HSSE-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otworów przelot. i nieprzelot., gwint calowy rurowy, walcowy "G"

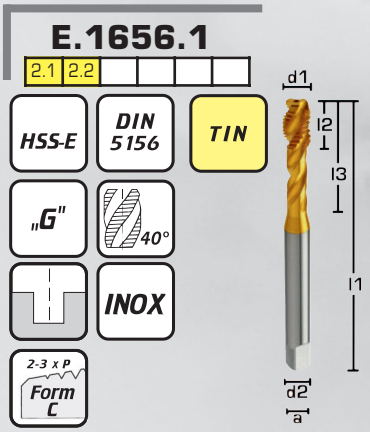
Maschi a macchina per fori passanti e fori ciechi HSSE

Machos de máquina en HSSE para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1654.1 € Stück *piece*	E.1659.1 € Stück *piece*	E.1661.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
G 1/8"	28	90	18	38	7	5,5	8,80	**19,00**	**21,00**	**15,00**
G 1/4"	19	100	22	44	11	9,0	11,80	**25,00**	**37,00**	**27,00**
DIN 5156										
G 3/8"	19	100	22		12	9,0	15,25	**31,00**	**39,00**	**26,00**
G 1/2"	14	125	25		16	12,0	19,00	**41,00**	**54,00**	**36,00**
G 3/4"	14	140	28		20	16,0	24,50	**64,00**	**90,00**	**63,00**
G 1"	11	160	30		25	20,0	30,75	**91,00**	**160,00**	**120,00**

HSSE-MGB für Sacklochgewinde

„G"



HSSE-Machine taps for blind holes

Gwintowniki masz. HSS-E do otw. nieprzelot., gwint calowy rurowy, walcowy "G"

Maschi a macchina per fori ciechi HSSE

Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1656.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
G 1/8"	28	90	18	38	7	5,5	8,80	**22,00**
G 1/4"	19	100	22	44	11	9,0	11,80	**31,00**
DIN 5156								
G 3/8"	19	100	22		12	9,0	15,25	**38,00**
G 1/2"	14	125	25		16	12,0	19,00	**48,00**
G 3/4"	14	140	28		20	16,0	24,50	**77,00**
G 1"	11	160	30		25	20,0	30,75	**119,00**

HSSE/PM-Gewindeformer

„G"

E.1663.1

Universal

HSSE/PM | DIN 5156 | TIN | „G" | TOL. AX | OIL NUT | 2-3 x P Form C



HSSE/PM-Forming taps

Wygniataki HSS-E/PM, gwint calowy rurowy, walcowy "G"

Maschi a macchina a rullare HSSE/PM

Machos de laminación en HSSE/PM

Artikel-Nr. *Article-No.*								E.1663.1 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
G 1/8"	28	90	18	38	7	5,5	8,80	**60,00**
G 1/4"	19	100	22	44	11	9,0	11,80	**80,00**
DIN 5156								
G 3/8"	19	100	22		12	9,0	15,25	**99,00**
G 1/2"	14	125	25		16	12,0	19,00	**148,00**
G 3/4"	14	140	28		20	16,0	24,50	**205,00**

HSSE-MGB für Durchgangs- und Sacklochgewinde

„UNC"

E.1662.0

Universal

HSS-E | DIN 371/376 | „UNC" | TOL. 2 B | N/mm² ≤800 | 4-5 x P Form B | TIN

E.1718.0

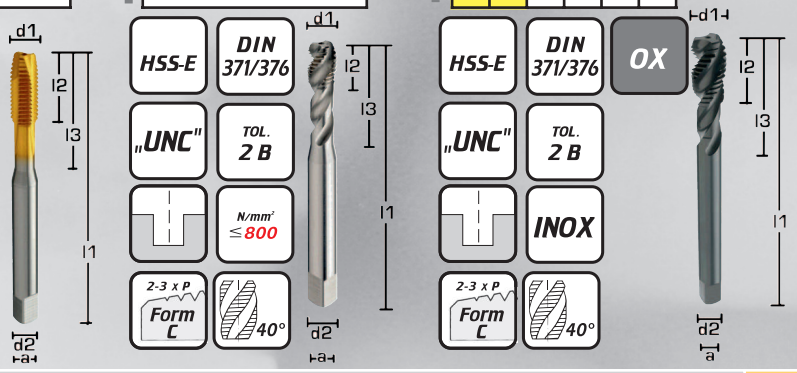
Universal

HSS-E | DIN 371/376 | „UNC" | TOL. 2 B | N/mm² ≤800 | 2-3 x P Form C | 40°

E.1664.0

2.1 | 2.2

HSS-E | DIN 371/376 | OX | „UNC" | TOL. 2 B | INOX | 2-3 x P Form C | 40°



HSSE-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otworów przelot. i nieprzelot., gwint amerykański zunifikowany UNC

Maschi a macchina per fori passanti e fori ciechi HSSE

Machos de máquina en HSSE para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1662.0 € Stück *piece*	E.1718.0* € Stück *piece*	E.1664.0* € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
5-40	40	56	10 / 5*	18	3,5	2,7	2,60	**11,00**	**11,00**	**12,00**
6-32	32	56	12 / 6*	20	4,0	3,0	2,70	**11,00**	**11,00**	**12,00**
8-32	32	63	12 / 7*	21	4,5	3,4	3,50	**11,00**	**11,00**	**12,00**
10-24	24	70	14 / 8*	25	6,0	4,9	3,80	**11,00**	**12,00**	**12,00**
1/4-20	20	80	18 / 12*	30	7,0	5,5	5,10	**11,00**	**12,00**	**12,00**
5/16-18	18	90	20 / 15*	35	8,0	6,2	6,50	**14,00**	**14,00**	**18,00**
3/8-16	16	100	21 / 18*	39	10,0	8,0	8,00	**16,00**	**17,00**	**20,00**
DIN 376										
7/16-14	14	100	20 / 15*		8,0	6,2	9,30	**22,00**	**23,00**	**28,00**
1/2-13	13	110	24 / 18*		9,0	7,0	10,70	**22,00**	**23,00**	**28,00**
9/16-12	12	110	28 / 20*		11,0	9,0	12,30	**27,00**	**28,00**	**33,00**
5/8-11	11	110	30 / 20*		12,0	9,0	13,50	**30,00**	**30,00**	**37,00**
3/4-10	10	125	32 / 25*		14,0	11,0	16,50	**42,00**	**42,00**	**54,00**
7/8-9	9	140	32 / 25*		18,0	14,5	19,50	**52,00**	**50,00**	**63,00**
1-8	8	160	36 / 30*		18,0	14,5	22,25	**70,00**	**67,00**	**88,00**

HSSE-MGB für Durchgangs- und Sacklochgewinde

„UNF"

E.1658.0 Universal

HSS-E | DIN 371/374 | „UNF" | TOL. 2 B | UNIVERSAL TOOL | 4-5 x P Form B | Schälanschnitt



E.1719.0 Universal

HSS-E | DIN 371/374 | UNIVERSAL TOOL | „UNF" | TOL. 2 B | N/mm² ≤800 | 2-3 x P Form C | 40°



E.1660.0 2.1 | 2.2

HSS-E | DIN 371/374 | OX | „UNF" | TOL. 2 B | INOX | 2-3 x P Form C | 40°



HSSE-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otw. przelot. i nieprzelot., gwint amerykański drobnozwojny UNF

Maschi a macchina per fori passanti e fori ciechi HSSE

Machos de máquina en HSSE para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*								E.1658.0 € Stück *piece*	E.1719.0* € Stück *piece*	E.1660.0* € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*			
DIN 371										
5-44	44	56	10 / 5*	18	3,5	2,7	2,70	**10,00**	**11,00**	**12,00**
6-40	40	56	12 / 6*	20	4,0	3,0	3,00	**10,00**	**11,00**	**12,00**
8-36	36	63	12 / 7*	21	4,5	3,4	3,50	**10,00**	**12,00**	**12,00**
10-32	32	70	14 / 8*	25	6,0	4,9	4,10	**10,00**	**13,00**	**13,00**
12-28	28	80	18 / 10*	30	6,0	4,9	4,65	**13,00**	**13,00**	**15,00**
1/4-28	28	80	18 / 12*	30	7,0	5,5	5,50	**11,00**	**17,00**	**13,00**
5/16-24	24	90	20 / 15*	35	8,0	6,2	6,90	**14,00**	**17,00**	**18,00**
3/8-24	24	100	21 / 18*	39	10,0	8,0	8,50	**22,00**	**20,00**	**23,00**
DIN 374										
7/16-20	20	100	20 / 15*		8,0	6,2	9,90	**23,00**	**25,00**	**31,00**
1/2-20	20	100	20 / 15*		9,0	7,0	11,50	**23,00**	**25,00**	**31,00**
9/16-18	18	100	20 / 15*		11,0	9,0	13,00	**28,00**	**31,00**	**37,00**
5/8-18	18	100	20 / 15*		12,0	9,0	14,50	**31,00**	**33,00**	**41,00**
3/4-16	16	110	24 / 17*		14,0	11,0	17,50	**43,00**	**49,00**	**59,00**
7/8-14	14	125	24 / 17*		18,0	14,5	20,50	**54,00**	**56,00**	**69,00**
1-12	12	140	27 / 20*		18,0	14,5	23,30	**71,00**	**75,00**	**94,00**

HSSE-MGB für Sacklochgewinde

BSW

E.1665.0 Universal

HSS-E | DIN 371/376 | BSW | UNIVERSAL TOOL | N/mm² ≤800 | 2-3 x P Form C | 40°



HSSE-Machine taps for blind holes

Gwintowniki masz HSS-E do otw. nieprzelot., gwint calowy whitwortha BSW

Maschi a macchina fori ciechi HSSE

Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1665.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
1/4-20	20	80	12	30	7,0	5,5	5,10	**15,00**
5/16-18	18	90	15	35	8,0	6,2	6,50	**19,00**
3/8-16	16	100	18	39	10,0	8,2	7,90	**25,00**
DIN 376								
7/16-14	14	100	15		8,0	6,2	9,25	**31,00**
1/2-12	12	110	18		9,0	7,0	10,50	**31,00**
3/4-10	10	125	25		14,0	11,0	16,50	**50,00**
1-8	8	160	30		18,0	14,5	22,00	**79,00**

HSSE-MGB für Sacklochgewinde

„BSF"

E.1684.0

Universal

HSS-E | DIN 371/374 | „BSF" | UNIVERSAL TOOL | 40° | 2-3 x P Form C



HSSE-Machine taps for blind holes

Gwintowniki maszynowe HSS-E do otw nieprzelot., gwint drobnozwojny BSF

Maschi a macchina fori ciechi HSSE

Machos de máquina en HSSE para agujeros ciegos

Artikel-Nr. *Article-No.*								E.1684.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
1/4-26	26	80	12	30	7,0	5,5	5,30	**16,00**
5/16-22	22	90	15	35	8,0	6,2	6,80	**20,00**
3/8-20	20	100	18	39	10,0	8,0	8,30	**26,00**
DIN 374								
7/16-18	18	100	15		8,0	6,2	9,70	**32,00**
1/2-16	16	100	15		9,0	7,0	11,10	**32,00**
3/4-12	12	110	17		14,0	11,0	16,75	**53,00**
1-10	10	140	20		18,0	14,5	22,75	**85,00**

HSSE-MGB für Durchgangs- und Sacklochgewinde

NPT

E.1685.0

Universal

HSS-E | DIN 371/374 | NPT | UNIVERSAL TOOL | 2-3 x P Form C



HSSE-Machine taps for through and blind holes

Gwintowniki maszynowe HSS-E do otworów przelot. i nieprzelot., gwint amerykański rurowy stożkowy NPT

Maschi per fori passanti e fori ciechi HSSE

Machos de máquina en HSSE/PM para agujeros pasantes y ciegos

Artikel-Nr. *Article-No.*							E.1685.0 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
DIN 371							
1/8"	27	90	12	10,0	8,0	8,50	**24,00**
1/4"	18	100	18	14,0	11,0	11,10	**42,00**
DIN 374							
3/8"	18	110	18	14,0	11,0	14,70	**41,00**
1/2"	14	140	23	16,0	12,0	18,00	**54,00**
3/4"	14	150	24	20,0	16,0	23,25	**83,00**
1"	11 1/2	170	30	25,0	20,0	29,25	**178,00**

HSSE-MGB lang DIN 40430

Pg

E.1687.0

Universal

HSS-E

Pg

UNIVERSAL TOOL

2-3 x P Form C



HSSE-Machine taps long DIN 40430

Gwintowniki maszynowe HSS-E, długie DIN 40430, gwint do rurek instalacyjnych stalowych pancernych Pg

Maschi a macchina HSSE, serie lunga, DIN 40430

Machos de máquina en HSSE, serie larga DIN 40430

Artikel-Nr. *Article-No.*							E.1687.0 € Stück *piece*
d1	P	l1	l2	d2	a	Bohr-Ø *drill-Ø*	
Pg 7,0	20	100	22	9,0	7,0	11,35	**95,00**
Pg 9,0	18	100	22	12,0	9,0	13,95	**120,00**
Pg 11,0	18	110	25	14,0	11,0	17,35	**135,00**
Pg 13,5	18	125	25	16,0	12,0	19,15	**154,00**
Pg 16,0	18	125	25	18,0	14,5	21,25	**185,00**
Pg 21,0	16	150	28	22,0	18,0	26,95	**265,00**
Pg 29,0	16	170	30	28,0	22,0	35,60	**360,00**

HSSE-MGB für Helicoil-Einsätze

EG

E.1630.0

Universal

HSS-E

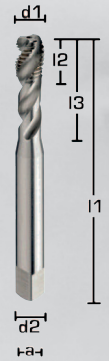
DIN 371/376

EG

35°

UNIVERSAL TOOL

2-3 x P Form C



HSSE-Machine taps for helicoil

Gwintowniki maszynowe HSS-E do wkładek Heli-Coil

Maschi a macchina HSSE per utilizzo helicoil

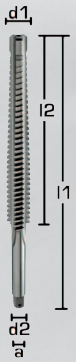
Machos de máquina en HSSE para insertos Helicoil

Artikel-Nr. *Article-No.*								E.1630.0 € Stück *piece*
d1	P	l1	l2	l3	d2	a	Bohr-Ø *drill-Ø*	
DIN 371								
EG-M 2,0	0,40	50	5	12	2,8	2,1	2,15	**20,00**
EG-M 2,5	0,45	56	12	14	3,5	2,7	2,65	**20,00**
EG-M 2,6	0,45	56	12	14	3,5	2,7	2,75	**24,00**
EG-M 3,0	0,50	63	14	18	4,5	3,4	3,15	**17,00**
EG-M 4,0	0,70	70	17	21	6,0	4,9	4,20	**17,00**
EG-M 5,0	0,80	80	21	25	6,0	4,9	5,25	**17,00**
EG-M 6,0	1,00	90	24	30	8,0	6,2	6,30	**17,00**
EG-M 8,0	1,25	100	27	35	10,0	8,0	8,40	**20,00**
DIN 376								
EG-M 10,0	1,50	110	14		9,0	7,0	10,40	**25,00**
EG-M 12,0	1,75	110	18		11,0	9,0	12,50	**32,00**
EG-M 14,0	2,00	110	18		12,0	9,0	14,50	**39,00**
EG-M 16,0	2,00	125	22		14,0	11,0	16,50	**46,00**
EG-M 18,0	2,00	140	22		18,0	14,5	18,75	**63,00**
EG-M 20,0	2,50	160	28		18,0	14,5	20,75	**81,00**

E.1632.0

Universal

HSS | RH | Tr | UNIVERSAL TOOL | TOL. 7 H



E.1633.0

Universal

HSS | LH | Tr | UNIVERSAL TOOL | TOL. 7 H



HSS-Machine taps for through holes

Gwintowniki maszynowe HSS do otworów przelotowych, gwint trapezowy Tr

Maschi a macchina fori passanti HSS

machos de máquina en HSS para agujeros pasantes

Artikel-Nr. *Article-No.*								E.1632.0 € Stück *piece*	E.1633.0 € Stück *piece*
d1	P	l1	l2	d2	a	Zähne *flutes*	Bohr-Ø *drill-Ø*		
Tr 10 x 3	3	140	84	6,3	5,0	5,0	7,50	**185,00**	
Tr 12 x 3	3	140	84	8,0	6,3	6,3	9,25	**194,00**	
Tr 14 x 3	3	140	84	10,0	8,0	8,0	11,25	**201,00**	
Tr 16 x 4	4	220	142	11,2	9,0	9,0	12,25	**220,00**	**Auf Anfrage**
Tr 18 x 4	4	220	142	12,5	10,0	10,0	14,25	**226,00**	
Tr 20 x 4	4	220	142	14,0	11,2	11,2	16,25	**273,00**	*on demand*
Tr 22 x 5	5	260	163	16,0	12,5	12,5	17,25	**285,00**	
Tr 28 x 5	5	260	163	22,4	18,0	18,0	23,25	**396,00**	
Tr 32 x 6	6	310	195	25,0	20,0	20,0	26,25	**485,00**	

Sondermaße auf Anfrage *Special sizes on demand*



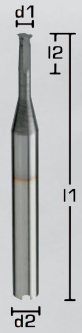
VHM-Mikro-Innengewindefräser

„M"

E.1666.0

Universal

VHM | UNIVERSAL TOOL | „M" | HRC



Solid carbide micro internal thread milling cutters

Frezy miniaturowe z węg spiekanego do gwint. wew., gwint metryczny "M"

Microfrese MD, filettature interne

Microfresa en metal duro integral para roscas interiores

Artikel-Nr. *Article-No.*							E.1666.0 € Stück *piece*
d1	P	ab Bohrung *min. core hole*	l1	l2	d2 h5	Zähne *flutes*	
M 0,8	**0,20**	0,60	2,4	32	3,0	1	**105,00**
M 1,0	**0,25**	0,75	3,0	32	3,0	2	**84,00**
M 1,2	**0,25**	0,95	3,5	32	3,0	2	**84,00**
M 1,4	**0,30**	1,10	3,5	32	3,0	2	**84,00**
M 1,6	**0,35**	1,25	4,0	32	3,0	3	**79,00**
M 2,0	**0,40**	1,60	5,0	32	3,0	4	**79,00**
M 2,5	**0,45**	2,05	6,0	32	3,0	4	**79,00**
M 3,0	**0,50**	2,50	6,0	32	3,0	4	**79,00**
M 4,0	**0,70**	3,20	8,0	40	5,0	4	**88,00**
M 5,0	**0,80**	4,20	9,0	40	5,0	4	**88,00**
M 6,0	**1,00**	5,00	9,0	40	5,0	4	**88,00**

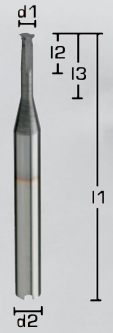
VHM-Gewindefräser

„M"

E.1689.0

2.1 | 2.2 | 5.1

VHM | TITAN | „M" | INOX | HSC TOOL



Solid carbide thread milling cutters

Frezy z węglika spiekanego do gwintowania, gwint metryczny "M"

Fresa MD per filettature

Fresas de roscar en metal duro integral

Artikel-Nr. *Article-No.*							E.1689.0 € Stück *piece*
d1	P	l3	l2	l1	d2	Zähne *flutes*	
M 0,8	**0,200**	2,4	0,16	32	3,0	1	**130,00**
M 0,9	**0,225**	2,7	0,18	32	3,0	1	**124,00**
M 1,0	**0,250**	5,0	0,20	32	3,0	3	**122,00**
M 1,2	**0,250**	3,0	0,20	32	3,0	3	**119,00**
M 1,2	**0,250**	5,0	0,20	32	3,0	3	**122,00**
M 1,4	**0,300**	5,5	0,24	32	3,0	4	**110,00**
M 1,6	**0,350**	6,0	0,28	32	3,0	4	**110,00**
M 1,8	**0,350**	6,0	0,28	32	3,0	4	**110,00**
M 2,0	**0,400**	6,0	0,32	32	3,0	4	**110,00**
M 2,5	**0,450**	9,0	0,36	32	3,0	4	**110,00**
M 3,0	**0,500**	11,0	0,40	32	3,0	4	**110,00**

VHM-Innengewindefräser

„M"

E.1667.1

Universal

VHM | 2 x D | Blue Cut | „M" | UNIVERSAL TOOL | HA



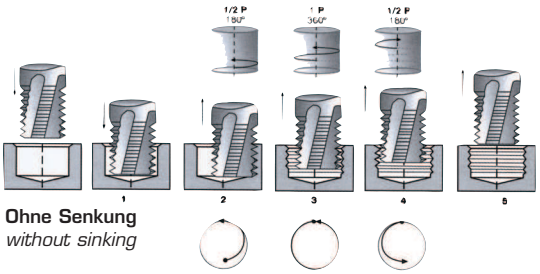
Solid carbide internal thread milling cutters

Frezy z wêglika spiekanego do gwintowania wew., gwint metryczny "M"

Frese MD per filettature interne

Fresas de roscar en metal duro integral

Artikel-Nr. *Article-No.*						E.1667.1 € Stück *piece*
d1	P	l1	l2	d2	Zähne *flutes*	
M 6,0	1,00	57	13,00	6,0	3	96,00
M 8,0	1,25	65	17,50	6,0	3	115,00
M 10,0	1,50	72	21,00	8,0	4	125,00
M 12,0	1,75	80	26,25	10,0	4	165,00
M 14,0	2,00	83	30,00	10,0	4	165,00
M 16,0	2,00	92	34,00	12,0	4	224,00



Ohne Senkung
without sinking

VHM-Bohrgewindefräser für Innengewinde

„M"

E.1711.1

Universal

VHM | TICN | „M" | Z=2 | UNIVERSAL TOOL



Solid carbide internal thread thrillers

Frezy z węglika spiekanego do gwintowania wew., gwint metryczny "M"

Frese MD per filettature interne

Fresas de taladrar y roscar para roscas interiores en metal duro integral

Artikel-Nr. *Article-No.*						E.1711.1 € Stück *piece*
d1	P	l2	l3	l1	d2	
M 4,0	0,70	8,9	9,5	48	6,0	322,00
M 5,0	0,80	11,0	11,8	54	6,0	316,00
M 6,0	1,00	13,7	14,6	62	8,0	305,00
M 7,0	1,00	18,6	19,7	74	10,0	428,00
M 8,0	1,25	18,4	19,6	74	10,0	386,00
M 10,0	1,50	22,2	23,7	80	12,0	460,00
M 12,0	1,75	22,5	27,4	90	14,0	633,00

VHM-Innengewindefräser

„MF"

E.1690.1

Universal

VHM | TICN | „MF" | UNIVERSAL TOOL | 2 x D



Solid carbide internal thread milling cutters

Frezy z węg. spiekanego do gwint. wew. gwint metryczny drobnozwojowy "MF"

Frese MD per filettature interne

Fresas de roscar en metal duro integral

Artikel-Nr. *Article-No.*							E.1690.1 € Stück *piece*
d1	P	l2	l3	l1	d2	Zähne *flutes*	
M 4 x 0,50	**0,50**	8,75	9,2	48	6,0	3	**320,00**
M 5 x 0,50	**0,50**	10,75	11,3	54	6,0	3	**325,00**
M 6 x 0,50	**0,50**	12,75	13,4	62	8,0	3	**355,00**
M 8 x 0,50	**0,50**	17,75	18,5	74	10,0	3	**405,00**
M 6 x 0,75	**0,75**	13,10	13,8	62	8,0	3	**315,00**
M 8 x 0,75	**0,75**	16,85	17,7	74	10,0	3	**360,00**
M 8 x 1,00	**1,00**	17,45	18,4	74	10,0	3	**350,00**
M 10 x 1,00	**1,00**	21,45	22,5	80	12,0	4	**415,00**
M 12 x 1,00	**1,00**	25,45	26,6	90	14,0	4	**535,00**
M 10 x 1,25	**1,25**	21,85	22,9	80	12,0	4	**400,00**
M 12 x 1,50	**1,50**	26,20	27,5	90	14,0	4	**515,00**
M 14 x 1,50	**1,50**	30,70	32,1	102	16,0	4	**610,00**
M 16 x 1,50	**1,50**	33,70	35,2	102	18,0	4	**730,00**

VHM-Innen- und Außengewindefräser

„G"

E.1691.1

Universal

VHM | TICN | „G" | UNIVERSAL TOOL



Solid carbide internal and external thread milling cutters

Frezy z węg. spiekanego do gwintowania wew. i zew., gwint calowy rurowy walcowy "G"

Frese MD per filettature interne/esterne

Fresas de roscar en metal duro integral para roscas interiores y exteriores

Artikel-Nr. *Article-No.*						E.1691.1 € Stück *piece*
d1	P	l2	l1	d2	Zähne *flutes*	
G 1/8"	**28**	24,9	64	8,0	4	**345,00**
G 1/4"	**19**	35,4	74	10,0	4	**430,00**
G 3/8"	**19**	43,5	90	14,0	4	**550,00**

E.1618.0
Universal
HSS | TOL. 6g | „M" | UNIVERSAL TOOL



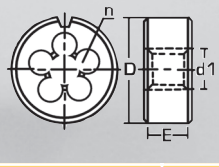
E.1692.0
Universal
HSS | TOL. 6e | „M" | UNIVERSAL TOOL



E.1693.0
2.1 | 2.2
HSS-E | TOL. 6g | „M" | INOX



HSS/HSSE-Dies DIN 13
Narzynki HSS/HSS-E, gwint metryczny "M" DIN 13
Filiere HSS/HSSE DIN 13
Cojinetes en HSS/HSSE DIN 13



Artikel-Nr. *Article-No.*				E.1618.0 € Stück *piece*	E.1692.0* € Stück *piece*	E.1693.0* € Stück *piece*
d1	P	D x E	n			
M 1,0	0,25	16 x 5	3	**11,00**		
M 1,4	0,30	16 x 5	3	**12,00**		
M 1,7	0,35	16 x 5	3	**12,00**		
M 2,0	0,40	16 x 5	3 / 4*	**10,00**	**37,00**	**40,00**
M 2,5	0,45	16 x 5	3 / 4*	**10,00**	**32,00**	**34,00**
M 3,0	0,50	20 x 5	3 / 4*	**10,00**	**27,00**	**26,00**
M 3,5	0,60	20 x 5	3	**10,00**	**30,00**	**28,00**
M 4,0	0,70	20 x 5	3 / 4*	**10,00**	**26,00**	**24,00**
M 5,0	0,80	20 x 7	4	**10,00**	**23,00**	**23,00**
M 6,0	1,00	20 x 7	4	**10,00**	**23,00**	**23,00**
M 7,0	1,00	25 x 9	4	**12,00**	**29,00**	**51,00**
M 8,0	1,25	25 x 9	4	**10,00**	**26,00**	**28,00**
M 9,0	1,25	25 x 9	4	**12,00**		
M 10,0	1,50	30 x 11	4	**10,00**	**31,00**	**33,00**
M 12,0	1,75	38 x 14	4	**16,00**	**41,00**	**44,00**
M 14,0	2,00	38 x 14	4	**16,00**	**54,00**	**43,00**
M 16,0	2,00	45 x 18	4	**18,00**	**68,00**	**58,00**
M 18,0	2,50	45 x 18	5	**20,00**		**60,00**
M 20,0	2,50	45 x 18	5	**20,00**		**60,00**
M 22,0	2,50	55 x 22	5	**24,00**		**90,00**
M 24,0	3,00	55 x 22	5	**28,00**		**90,00**
M 27,0	3,00	65 x 25	5	**40,00**		**155,00**
M 30,0	3,50	65 x 25	5	**36,00**		
M 33,0	3,50	65 x 25	6	**38,00**		
M 36,0	4,00	65 x 25	7	**40,00**		

E.1694.0
Universal
HSS | TOL. 6g | „MF" | UNIVERSAL TOOL



E.1695.0
Universal
HSS | TOL. 6e | „MF" | UNIVERSAL TOOL



E.1696.0
2.1 | 2.2
HSS-E | TOL. 6g | „MF" | INOX

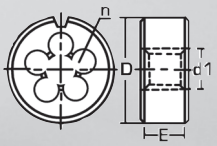


HSS/HSSE-Dies DIN 13

Narzynki HSS/HSS-E, gwint metryczny drobnozwojny "MF" DIN13

Filiere HSS/HSSE DIN 13

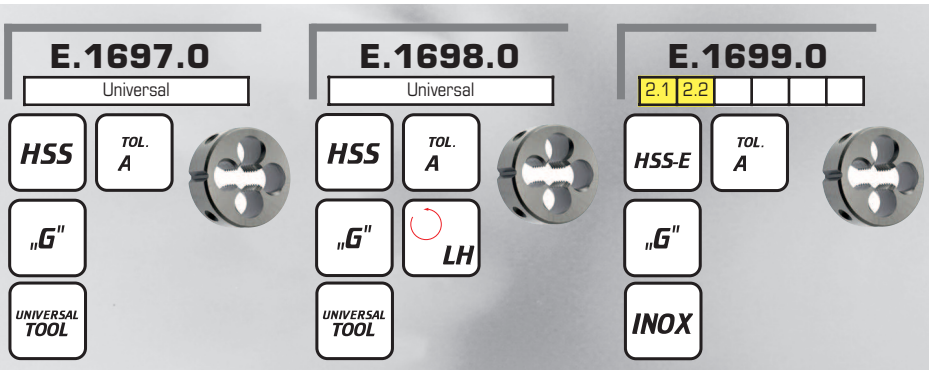
Cojinetes en HSS/HSSE DIN 13



Artikel-Nr. *Article-No.*				E.1694.0 € Stück *piece*	E.1695.0 € Stück *piece*	E.1696.0* € Stück *piece*
d1	P	D x E	n			
M 2,0 x 0,25	0,25	16 x 5	4	**35,00**		
M 2,5 x 0,35	0,35	16 x 5	4	**10,00**		
M 3,0 x 0,35	0,35	20 x 5	4	**10,00**		
M 3,5 x 0,35	0,35	20 x 5	4	**10,00**		
M 4,0 x 0,35	0,35	20 x 5	4	**28,00**		
M 5,0 x 0,35	0,35	20 x 5	4	**50,00**		
M 4,0 x 0,50	0,50	20 x 5	4	**10,00**	**44,00**	**40,00**
M 5,0 x 0,50	0,50	20 x 5	4	**10,00**	**44,00**	**35,00**
M 6,0 x 0,50	0,50	20 x 5	4	**22,00**	**37,00**	**33,00**
M 7,0 x 0,50	0,50	25 x 9	4	**38,00**		
M 8,0 x 0,50	0,50	25 x 9	5	**32,00**	**60,00**	**65,00**
M 10,0 x 0,50	0,50	30 x 11	5	**43,00**		
M 12,0 x 0,50	0,50	38 x 10	5	**55,00**		
M 14,0 x 0,50	0,50	38 x 10	5	**70,00**		
M 6,0 x 0,75	0,75	20 x 7	4	**10,00**	**34,00**	**31,00**
M 7,0 x 0,75	0,75	25 x 9	4	**11,00**	**45,00**	
M 8,0 x 0,75	0,75	25 x 9	4	**10,00**	**43,00**	**37,00**
M 10,0 x 0,75	0,75	30 x 11	5	**11,00**	**59,00**	**45,00**
M 11,0 x 0,75	0,75	30 x 11	5	**14,00**		
M 8,0 x 1,00	1,00	25 x 9	4	**10,00**	**32,00**	**31,00**
M 9,0 x 1,00	1,00	25 x 9	5	**11,00**		
M 10,0 x 1,00	1,00	30 x 11	5	**11,00**	**36,00**	**38,00**
M 11,0 x 1,00	1,00	30 x 11	5	**14,00**		
M 12,0 x 1,00	1,00	38 x 10	5	**14,00**	**48,00**	**49,00**
M 14,0 x 1,00	1,00	38 x 10	5	**15,00**	**52,00**	**49,00**
M 16,0 x 1,00	1,00	45 x 14	5	**20,00**	**70,00**	**68,00**
M 18,0 x 1,00	1,00	45 x 14	5	**20,00**	**105,00**	**90,00**
M 20,0 x 1,00	1,00	45 x 14	6	**20,00**	**105,00**	**75,00**
M 24,0 x 1,00	1,00	55 x 16	6	**30,00**	**145,00**	
M 27,0 x 1,00	1,00	65 x 18	6	**36,00**		
M 10,0 x 1,25	1,25	30 x 11	4	**12,00**		
M 12,0 x 1,25	1,25	38 x 10	4	**14,00**		
M 14,0 x 1,25	1,25	38 x 10	5	**15,00**		
M 12,0 x 1,50	1,50	38 x 10	4 / 5*	**15,00**	**45,00**	**47,00**
M 14,0 x 1,50	1,50	38 x 10	5	**15,00**	**45,00**	**47,00**
M 16,0 x 1,50	1,50	45 x 14	5	**19,00**	**61,00**	**65,00**
M 18,0 x 1,50	1,50	45 x 14	5	**20,00**	**61,00**	**65,00**
M 20,0 x 1,50	1,50	45 x 14	6	**20,00**	**70,00**	**65,00**
M 22,0 x 1,50	1,50	55 x 16	5 / 6*	**27,00**	**88,00**	**91,00**
M 24,0 x 1,50	1,50	55 x 16	6	**30,00**	**114,00**	**91,00**
M 26,0 x 1,50	1,50	55 x 16	6	**30,00**	**130,00**	**132,00**
M 27,0 x 1,50	1,50	65 x 18	6	**36,00**		
M 30,0 x 1,50	1,50	65 x 18	6	**39,00**		**142,00**
M 33,0 x 1,50	1,50	65 x 18	7	**40,00**		
M 36,0 x 1,50	1,50	65 x 18	8	**42,00**		
M 18,0 x 2,00	2,00	45 x 14	5	**20,00**		
M 20,0 x 2,00	2,00	45 x 14	6	**20,00**		
M 22,0 x 2,00	2,00	55 x 16	5	**28,00**		
M 24,0 x 2,00	2,00	55 x 16	6	**30,00**		
M 27,0 x 2,00	2,00	65 x 18	6	**36,00**		
M 30,0 x 2,00	2,00	65 x 18	6	**39,00**		
M 33,0 x 2,00	2,00	65 x 18	7	**41,00**		

HSS/HSSE-Schneideisen DIN 228 mit Schälanschnitt

„G"

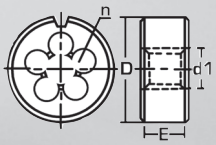


HSS/HSSE-Dies DIN 228

Narzynki HSS/HSS-E, gwint calowy rurowy, walcowy "G" DIN 228

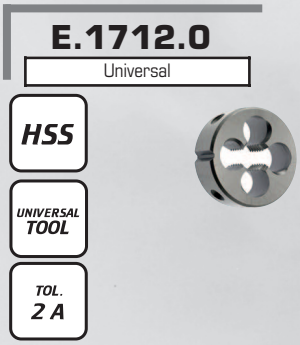
Filiere HSS/HSSE DIN 228

Cojinetes en HSS/HSSE DIN 228



Artikel-Nr. *Article-No.*				E.1697.0 € Stück *piece*	E.1698.0 € Stück *piece*	E.1699.0 € Stück *piece*
d1	P	D x E	n			
G 1/8"	28	30 x 11	5	10,00		44,00
G 1/4"	19	38 x 10	5	12,00	56,00	44,00
G 3/8"	19	45 x 14	5	14,00	70,00	60,00
G 1/2"	14	45 x 14	6	14,00	70,00	60,00
G 5/8"	14	55 x 16	5	19,00		
G 3/4"	14	55 x 16	6	20,00	112,00	91,00
G 7/8"	14	65 x 18	6	24,00		
G 1"	11	65 x 18	7	24,00	173,00	125,00
G 1 1/8"	11	75 x 20	7	31,00		
G 1 1/4"	11	75 x 20	8	31,00	240,00	197,00
G 1 3/8"	11	90 x 22	7	48,00		
G 1 1/2"	11	90 x 22	8	48,00		272,00
G 1 3/4"	11	90 x 22	9	56,00		
G 2"	11	105 x 22	9	62,00		

HSS-Schneideisen UN-Gewinde ANSI B1.1 mit Schälanschnitt



HSS-Dies ANSI B1.1

Narzynki HSS ANSI B1.1

Filiere HSS ANSI B1.1

Cojinetes en HSS ANSI B1.1

Artikel-Nr. *Article-No.*				E.1712.0 € Stück *piece*
d1	P	D x E	n	
UN 1 1/16"	12	65 x 18	5	125,00
UN 1 5/16"	12	65 x 18	7	133,00
UN 1 5/8"	12	75 x 20	8	183,00
UN 1 3/4"	12	90 x 22	7	227,00
UN 1 1/8"	8	65 x 25	5	154,00
UN 1 1/4"	8	65 x 25	6	154,00
UN 1 3/8"	8	65 x 25	7	172,00
UN 1 1/2"	8	75 x 20	7	172,00

HSS/HSSE-Schneideisen ANSI B1.1 mit Schälanschnitt

„UNC"

E.1701.0
Universal
HSS | TOL. 2 A | „UNC" | UNIVERSAL TOOL



E.1703.0
2.1 | 2.2
HSS-E | TOL. 2 A | „UNC" | INOX

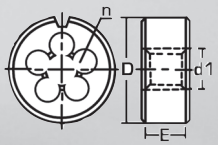


HSS/HSSE-Dies ANSI B1.1

Narzynki HSS/HSS-E, gwint amerykański zunifikowany UNC ANSI B1.1

Filiere HSS/HSSE ANSI B1.1

Cojinetes en HSS/HSSE ANSI B1.1



Artikel-Nr. *Article-No.*				E.1701.0 € Stück *piece*	E.1703.0 € Stück *piece*
d1	P	D x E	n		
UNC Nr. 4	40	16 x 5	4	**11,00**	**57,00**
UNC Nr. 5	40	20 x 5	4	**18,00**	
UNC Nr. 6	32	20 x 7	4	**16,00**	**48,00**
UNC Nr. 8	32	20 x 7	4	**16,00**	**43,00**
UNC Nr. 10	24	20 x 7	4	**16,00**	
UNC Nr. 12	24	20 x 7	4	**16,00**	
UNC 1/4"	20	20 x 7	4	**15,00**	**40,00**
UNC 5/16"	18	25 x 9	4	**16,00**	**57,00**
UNC 3/8"	16	30 x 11	4	**19,00**	**61,00**
UNC 7/16"	14	30 x 11	4	**19,00**	
UNC 1/2"	13	38 x 14	4	**26,00**	
UNC 5/8"	11	45 x 18	4	**28,00**	
UNC 3/4"	10	45 x 18	5	**36,00**	
UNC 1"	8	55 x 22	5	**55,00**	

HSS/HSSE-Schneideisen ANSI B1.1 mit Schälanschnitt

„UNF"

E.1704.0
Universal
HSS | TOL. 2 A | „UNF" | UNIVERSAL TOOL



E.1705.0
Universal
HSS | TOL. 2 A | „UNF" | LH | UNIVERSAL TOOL



E.1706.0
2.1 | 2.2
HSS-E | TOL. 2 A | „UNF" | INOX

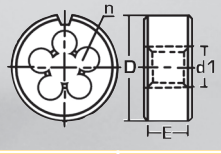


HSS/HSSE-Dies ANSI B1.1

Narzynki HSS/HSS-E, gwint amerykaski zunifikowany drobnozwojny UNF ANSI B1.1

Filiere HSS/HSSE ANSI B1.1

Cojinetes en HSS/HSSE ANSI B1.1



Artikel-Nr. *Article-No.*				E.1704.0 € Stück *piece*	E.1705.0 € Stück *piece*	E.1706.0 € Stück *piece*
d1	P	D x E	n			
UNF Nr. 5	44	20 x 5	4	**14,00**		
UNF Nr. 6	40	20 x 5	4	**14,00**		
UNF Nr. 8	36	20 x 7	4	**14,00**		
UNF Nr. 10	32	20 x 7	4	**14,00**		**41,00**
UNF Nr. 12	28	20 x 7	4	**14,00**		
UNF 1/4"	28	20 x 7	4	**14,00**	**44,00**	**49,00**
UNF 5/16"	24	25 x 9	4	**15,00**	**50,00**	**51,00**
UNF 3/8"	24	30 x 11	4	**15,00**	**54,00**	**63,00**
UNF 7/16"	20	30 x 11	5	**15,00**	**68,00**	**61,00**
UNF 1/2"	20	38 x 10	5	**19,00**	**70,00**	
UNF 5/8"	18	45 x 14	5	**24,00**	**91,00**	
UNF 3/4"	16	45 x 14	6	**25,00**	**94,00**	
UNF 7/8"	14	55 x 16	5	**32,00**	**114,00**	
UNF 1"	12	55 x 16	6	**35,00**		

E.1707.0
Universal

HSS | TOL. 7e | Tr | UNIVERSAL TOOL



E.1708.0
Universal

HSS | TOL. 7e | Tr | LH | UNIVERSAL TOOL

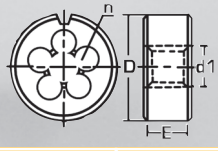


HSS-Dies

Narzynki HSS, gwint trapezowy Tr

Filiere HSS

Cojinetes en HSS

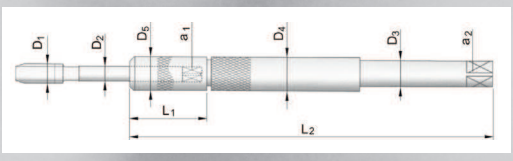


Artikel-Nr. *Article-No.*				E.1707.0 € Stück *piece*	E.1708.0 € Stück *piece*
d1	P	D x E	n		
Tr 10	2,00	38 x 14	4	**91,00**	**115,00**
Tr 10	3,00	38 x 14	4	**122,00**	**241,00**
Tr 12	2,00	38 x 14	4	**118,00**	
Tr 12	3,00	38 x 14	4	**91,00**	**169,00**
Tr 14	2,00	38 x 14	4	**118,00**	
Tr 14	3,00	45 x 18	4	**131,00**	
Tr 14	4,00	45 x 18	4	**144,00**	**186,00**
Tr 16	2,00	45 x 18	4	**156,00**	
Tr 16	4,00	45 x 18	4	**119,00**	**186,00**
Tr 18	2,00	45 x 18	5	**170,00**	
Tr 18	4,00	45 x 18	5	**119,00**	**186,00**
Tr 20	2,00	45 x 18	6	**170,00**	
Tr 20	4,00	55 x 22	5	**156,00**	**217,00**
Tr 22	5,00	55 x 22	5	**207,00**	
Tr 24	5,00	65 x 25	5	**207,00**	**296,00**
Tr 26	5,00	65 x 25	5	**207,00**	
Tr 28	5,00	65 x 25	5	**222,00**	
Tr 30	6,00	65 x 25	5	**250,00**	
Tr 32	6,00	65 x 25	6	**256,00**	
Tr 36	6,00	65 x 25	6	**250,00**	

Schaftverlängerungen für Gewindebohrer

E.1709.0





Shank extensions for taps

Przedłużki chwytu gwintowników

Prolungamenti gambo maschi

Mangos extensibles para machos

Artikel-Nr. *Article-No.*									E.1709.0 € Stück *piece*
D1 DIN 371	D1 DIN 376	D2	D3	D4=D5	L1	L2	a1	a2	
M 2 - M 2,6	**M 4**	2,8	6	6,1	22	130	2,1	4,9	**170,00**
M 3	**M 4,5 - M 5**	3,5	6	7,5	23	130	2,7	4,9	**170,00**
M 4	**M 6**	4,5	6	8,4	23	130	3,4	4,9	**170,00**
M 4,5 - M 6	**M 8**	6,0	7	12,1	26	130	4,9	5,5	**170,00**
M 7	**M 9 - M 10**	7,0	7	12,1	26	130	5,5	5,5	**170,00**
M 8	**M 11**	8,0	8	13,0	30	130	6,2	6,2	**170,00**
M 9	**M 12**	9,0	9	15,0	31	130	7,0	7,0	**170,00**
M 10		10,0	10	15,0	33	130	8,0	8,0	**170,00**
	M 14	11,0	11	18,0	36	130	9,0	9,0	**170,00**
	M 16	12,0	12	18,0	36	130	9,0	9,0	**170,00**
				lang					**E.1709.0L**
M 2 - M 2,6	**M 4**	2,8	6	6,1	22	230	2,1	4,9	**185,00**
M 3	**M 4,5 - M 5**	3,5	6	7,5	23	230	2,7	4,9	**185,00**
M 4	**M 6**	4,5	6	8,4	23	230	3,4	4,9	**185,00**
M 4,5 - M 6	**M 8**	6,0	7	12,1	26	230	4,9	5,5	**185,00**
M 7	**M 9 - M 10**	7,0	7	12,1	26	230	5,5	5,5	**185,00**
M 8	**M 11**	8,0	8	13,0	30	230	6,2	6,2	**185,00**
M 9	**M 12**	9,0	9	15,0	31	230	7,0	7,0	**185,00**
M 10		10,0	10	15,0	33	230	8,0	8,0	**185,00**
	M 14	11,0	11	18,0	36	230	9,0	9,0	**185,00**
	M 16	12,0	12	18,0	36	230	9,0	9,0	**185,00**

Schaftverlängerungen für Gewindebohrer

E.1710.0



Shank extensions for taps

Przedłużki chwytu gwintowników

Prolungamenti gambo maschi

Mangos extensibles para machos

Artikel-Nr. *Article-No.*				E.1710.0 € Stück *piece*
Vierkant (a) *square (a)*	D1 ISO 529	D1 DIN 352	l1	
5,0	M 6		110	**7,00**
6,3	M 8 / M 11		120	**7,00**
7,1	M 9 / M 12		125	**7,00**
8,0	M 10		130	**7,00**
9,0	M 14	M 14 / M 16	130	**9,00**
10,0	M 16		140	**7,00**

Verstellbare Windeisen

E.1713.0



Adjustable tap wrenches

Pokrętła nastawne do gwintowników

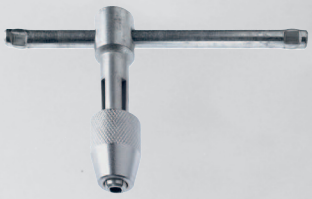
Giramaschi regolabili

Giramachos ajustables

Artikel-Nr. *Article-No.*				E.1713.0 € Stück *piece*
Vierkant *square*	D1 ISO 529	D1 DIN 352	l1	
2,00 ÷ 4,5	M 1 ÷ M 8	M 1,0 ÷ M 10	125	**10,00**
3,15 ÷ 6,3	M 3 ÷ M 12	M 3,0 ÷ M 12	205	**15,00**
2,50 ÷ 7,1	M 5 ÷ M 14	M 4,5 ÷ M 16	205	**18,00**
3,55 ÷ 9,0	M 6 ÷ M 24	M 4,5 ÷ M 20	305	**18,00**
5,60 ÷ 16,0	M 7 ÷ M 30	M 9,0 ÷ M 27	395	**30,00**

Verstellbare Windeisen Typ “T”

E.1714.0



Adjustable tap wrenches type “T”

Pokrętła nastawne typu T do gwintowników

Giramaschi regolabili tipo “T”

Giramachos ajustables tipo “T”

Artikel-Nr. *Article-No.*				E.1714.0 € Stück *piece*
Vierkant *square*	D1 ISO 529	D1 DIN 352	l1	
2,00 ÷ 4,0	M 2 ÷ M 5	M 2 ÷ M 4	55	**10,00**
2,00 ÷ 4,0	M 2 ÷ M 5	M 2 ÷ M 4	200	**14,00**
4,00 ÷ 7,1	M 6 ÷ M 12	M 5 ÷ M 12	90	**18,00**
4,00 ÷ 7,1	M 6 ÷ M 12	M 5 ÷ M 12	250	**24,00**
9,00 ÷ 11,2	M 14 ÷ M 20	M 14 ÷ M 18	110	**27,00**

Windeisen mit Ratsche

E.1715.0



Tap wrenches with ratchet system

Pokrętła z systemem zapadkowym

Giramschi a cricco

Giramachos con raqueta

Artikel-Nr. *Article-No.*		E.1715.0 € Stück *piece*
D	l1	
M 3 ÷ M 6	85	**15,00**
M 3 ÷ M 6	250	**21,00**
M 6 ÷ M 12	110	**23,00**
M 6 ÷ M 12	300	**30,00**

Schneideisenhalter

E.1716.0



Dieholder

Oprawki do narzynek

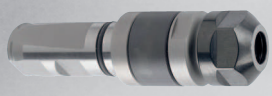
Girafaliliere

Portacojinetes

Artikel-Nr. *Article-No.*		E.1716.0 € Stück *piece*
D	l1	
M 1 ÷ M 2,5	160	**8,00**
M 3 ÷ M 4,0	185	**10,00**
M 7 ÷ M 9,0	220	**11,00**
M 10 ÷ M 11,0	260	**12,00**
M 12 ÷ M 14,0	310	**15,00**
M 16 ÷ M 20,0	400	**19,00**
M 22 ÷ M 24,0	500	**28,00**
M 27 ÷ M 36,0	560	**40,00**

Softsynchro-Spannzangenfutter

E.1620.0



mit Minimallängenausgleich auf Zug und Druck, innere Kühlmittelzufuhr, Kühlmitteldruck am Futtereintritt, Werkzeugadaptierung über Spannzangen, Dichtscheibenmutter Hi-Q/ERC und Mutternschlüssel sind inklusive

with miminum length compensation on traction and pressure and internal coolant supply through tool holder. Tool adjusting bay collets, tightening screw Hi-Q/ERC and adjusting key are inclusive.

Softsynchro-Collet holder

Uchwyt oprawkowy Soft-synchro

Mandrini softsynchro

Portamachos softsynchro

Artikel-Nr. *Article-No.*							E.1620.0 € Stück *piece*
Schaft *shank*	Schneidbereich *cutting range*	Zangengröße *size of use*	L1	L2	C	T	
HSK 63	M 3 - M 20	ER 32	110,0	40	0,5	0,5	**450,00**
25 DIN 1835 B+E	M 4 - M 12	ER 20	65,0	57	0,5		**250,00**

Schnellwechsel-Aufnahmen mit Morsekegelschaft

E.1672.0





Quick-change tap holder with morse taper shank

Oprawka szybkozmienna do gwintowników z chwytem stożkowym Morse'a

Maschiatore cambio rapido MK

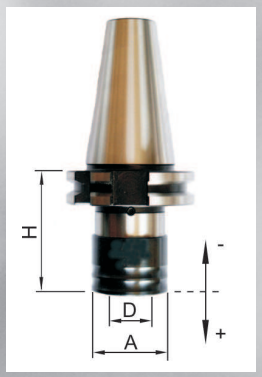
Cambios rápidos con cono Morse

Artikel-Nr. *Article-No.*							**E.1672.0** €
Schaft *shank*	**Schneidbereich** *cutting range*	**Einsatzgröße** *size of use*	**D**	**A**	**H**	**Längenausgleich** *length compensation*	**Stück** *piece*
MK 2	**M 2 - M 12**	SE 19	19	38	46	9	**255,00**
MK 3	**M 2 - M 12**	SE 19	19	38	46	9	**255,00**
MK 3	**M 6 - M 20**	SE 31	31	55	69	15	**314,00**
MK 4	**M 14 - M 33**	SE 48	48	79	108	24	**760,00**
MK 5	**M 22 - M 48**	SE 60	60	98	116	26	**1180,00**

Schnellwechsel-Aufnahmen mit Steilkegelschaft

E.1673.0





Quick-change tap holder with steep taper shank

Oprawka szybkozmienna do gwintowników z chwytem stożkowym wg ISO 7:24

Maschiatore cambio rapido iso

Cambios rápidos con mango cónico

Artikel-Nr. *Article-No.*							**E.1673.0** €
Schaft *shank*	**Schneidbereich** *cutting range*	**Einsatzgröße** *size of use*	**D**	**A**	**H**	**Längenausgleich** *length compensation*	**Stück** *piece*
ISO 30	**M 2 - M 12**	SE 19	19	38	60	9	**370,00**
ISO 30	**M 6 - M 20**	SE 31	31	55	101	15	**420,00**
ISO 40	**M 2 - M 12**	SE 19	19	38	60	9	**280,00**
ISO 40	**M 6 - M 20**	SE 31	31	55	100	15	**365,00**
ISO 40	**M 14 - M 33**	SE 48	48	79	138	24	**790,00**
ISO 40	**M 22 - M 48**	SE 60	60	98	154	26	**1260,00**
ISO 50	**M 2 - M 12**	SE 19	19	38	62	9	**420,00**
ISO 50	**M 6 - M 20**	SE 31	31	55	83	15	**460,00**
ISO 50	**M 14 - M 33**	SE 48	48	79	133	24	**840,00**
ISO 50	**M 22 - M 48**	SE 60	60	98	147	26	**1180,00**

E.1674.0





Quick-change adapters with overload clutch

Zabieraki szybkozmienne ze sprzęgłem przeciążeniowym do mocowania gwintowników

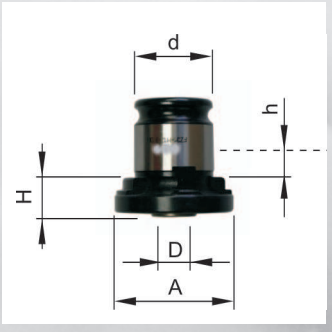
Bussola con frizione

Manguitos de cambio rápido con embrague

Artikel-Nr. *Article-No.*									E.1674.0 €
Gewinde *thread*	Einsatzgröße *size of use*	Vierkant *square*	Schaft *shank*	d	A	H	h	DIN	Stück *piece*
M 2	**SEU 13**	2,1	2,8	13	23	21	6	371	**80,00**
M 2	**SEU 19**	2,1	2,8	19	32	25	8	371	**75,00**
M 3	**SEU 13**	2,7	3,5	13	23	21	6	371	**80,00**
M 3	**SEU 19**	2,7	3,5	19	32	25	8	371	**75,00**
M 4	**SEU 13**	3,4	4,5	13	23	21	6	371	**80,00**
M 4	**SEU 19**	3,4	4,5	19	32	25	8	371	**75,00**
M 5	**SEU 13**	4,9	6,0	13	23	21	6	371	**80,00**
M 5	**SEU 19**	4,9	6,0	19	32	25	8	371	**75,00**
M 6	**SEU 13**	4,9	6,0	13	23	21	6	371	**80,00**
M 6	**SEU 19**	4,9	6,0	19	32	25	8	371	**75,00**
M 6	**SEU 31**	4,9	6,0	31	50	34	4	371	**98,00**
M 8	**SEU 19**	6,2	8,0	19	32	25	8	371	**75,00**
M 8	**SEU 31**	6,2	8,0	31	50	34	4	371	**98,00**
M 10	**SEU 19**	8,0	10,0	19	32	25	8	371	**75,00**
M 10	**SEU 31**	8,0	10,0	31	50	34	4	371	**98,00**
M 12	**SEU 19**	7,0	9,0	19	32	25	8	376	**75,00**
M 12	**SEU 31**	7,0	9,0	31	50	34	4	376	**98,00**
M 14	**SEU 31**	9,0	11,0	31	50	34	4	376	**98,00**
M 14	**SEU 48**	9,0	11,0	48	72	45	1	376	**230,00**
M 16	**SEU 31**	9,0	12,0	31	50	34	4	376	**98,00**
M 16	**SEU 48**	9,0	12,0	48	72	45	1	376	**230,00**
M 18	**SEU 31**	11,0	14,0	31	50	34	4	376	**98,00**
M 18	**SEU 48**	11,0	14,0	48	72	45	1	376	**230,00**
M 20	**SEU 31**	12,0	16,0	31	50	34	4	376	**98,00**
M 20	**SEU 48**	12,0	16,0	48	72	45	1	376	**230,00**
M 22	**SEU 48**	14,5	18,0	48	72	45	1	376	**230,00**
M 22	**SEU 60**	14,5	18,0	60	95	68	3	376	**500,00**
M 24	**SEU 48**	14,5	18,0	48	72	45	1	376	**230,00**
M 24	**SEU 60**	14,5	18,0	60	95	68	3	376	**500,00**
M 27	**SEU 48**	16,0	20,0	48	72	45	1	376	**230,00**
M 27	**SEU 60**	16,0	20,0	60	95	68	3	376	**500,00**
M 30	**SEU 48**	18,0	22,0	48	72	45	1	376	**230,00**
M 30	**SEU 60**	18,0	22,0	60	95	68	3	376	**500,00**
M 33	**SEU 48**	20,0	25,0	48	72	45	1	376	**230,00**
M 33	**SEU 60**	20,0	25,0	60	95	68	3	376	**500,00**
M 36	**SEU 60**	22,0	28,0	60	95	68	3	376	**500,00**
M 39	**SEU 60**	24,0	32,0	60	95	68	3	376	**500,00**
M 42	**SEU 60**	24,0	32,0	60	95	68	3	376	**500,00**
M 45	**SEU 60**	29,0	36,0	60	95	68	3	376	**500,00**
M 48	**SEU 60**	29,0	36,0	60	95	68	3	376	**500,00**

E.1675.0





Quick-change adapters without overload clutch

Zabieraki szybkozmienne bez sprzęgła przeciążeniowego do mocowania gwintowników

Bussola senza frizione

Manguitos de cambio rápido sin embrague

Artikel-Nr. *Article-No.*									E.1675.0 € Stück *piece*
Gewinde *thread*	Einsatzgröße *size of use*	Vierkant ***square***	Schaft *shank*	d	A	H	h	DIN	
M 2	**SE 13**	2,1	2,8	13	22	7	8	371	**32,00**
M 3	**SE 13**	2,7	3,5	13	22	7	8	371	**30,00**
M 3	**SE 19**	2,7	3,5	19	30	7	10	371	**28,00**
M 4	**SE 13**	3,4	4,5	13	22	7	8	371	**32,00**
M 4	**SE 19**	3,4	4,5	19	30	7	10	371	**33,00**
M 5	**SE 13**	4,9	6,0	13	22	7	8	371	**32,00**
M 5	**SE 19**	4,9	6,0	19	30	7	10	371	**33,00**
M 5	**SE 31**	4,9	6,0	31	46	11	19	371	**37,00**
M 6	**SE 13**	4,9	6,0	13	22	7	8	371	**32,00**
M 6	**SE 19**	4,9	6,0	19	30	7	10	371	**33,00**
M 6	**SE 31**	4,9	6,0	31	46	11	19	371	**37,00**
M 8	**SE 19**	6,2	8,0	19	30	7	10	371	**28,00**
M 8	**SE 31**	6,2	8,0	31	46	11	19	371	**37,00**
M 10	**SE 19**	8,0	10,0	19	30	7	10	371	**28,00**
M 10	**SE 31**	8,0	10,0	31	46	11	19	371	**37,00**
M 12	**SE 19**	7,0	9,0	19	30	7	10	376	**28,00**
M 12	**SE 31**	7,0	9,0	31	46	11	19	376	**37,00**
M 14	**SE 31**	9,0	11,0	31	46	11	19	376	**37,00**
M 14	**SE 48**	9,0	11,0	48	68	14	25	376	**114,00**
M 16	**SE 31**	9,0	12,0	31	46	11	19	376	**36,00**
M 16	**SE 48**	9,0	12,0	48	68	14	25	376	**114,00**
M 18	**SE 31**	11,0	14,0	31	46	11	19	376	**37,00**
M 18	**SE 48**	11,0	14,0	48	68	14	25	376	**114,00**
M 20	**SE 31**	12,0	16,0	31	46	11	19	376	**37,00**
M 20	**SE 48**	12,0	16,0	48	68	14	25	376	**114,00**
M 22	**SE 48**	14,5	18,0	48	68	14	25	376	**114,00**
M 22	**SE 60**	14,5	18,0	60	83	42	29	376	**173,00**
M 24	**SE 48**	14,5	18,0	48	68	14	25	376	**114,00**
M 24	**SE 60**	14,5	18,0	60	83	42	29	376	**173,00**
M 27	**SE 48**	16,0	20,0	48	68	14	25	376	**114,00**
M 27	**SE 60**	16,0	20,0	60	83	42	29	376	**173,00**
M 30	**SE 48**	18,0	22,0	48	68	14	25	376	**114,00**
M 30	**SE 60**	18,0	22,0	60	83	42	29	376	**173,00**
M 33	**SE 48**	20,0	25,0	48	68	14	25	376	**114,00**
M 33	**SE 60**	20,0	25,0	60	83	42	29	376	**173,00**
M 36	**SE 60**	22,0	28,0	60	83	42	29	376	**173,00**
M 39	**SE 60**	24,0	32,0	60	83	42	29	376	**173,00**
M 42	**SE 60**	24,0	32,0	60	83	42	29	376	**173,00**
M 45	**SE 60**	29,0	36,0	60	83	42	29	376	**173,00**
M 48	**SE 60**	29,0	36,0	60	83	42	29	376	**173,00**

Als Stützpunkthändler liefern wir Ihnen auf Wunsch das komplette Emuge/Franken Programm.

We are a locally based trading company for Emuge/Franken and on request we can supply the whole production range of Emuge/Franken.



Einsatzrichtwerte *Estimated values for use*

	Gewindebohrer *taps*			Gewindeformer *forming taps*		VHM Gewindefräser *VHM tread milling cutters*	
	HSSE / PM blank *HSSE / PM uncoated*	HSSE/PM beschichtet *HSSE/ PM coated*	VHM *solid carbide*	HSSE / PM beschichtet *HSSE / PM coated*	VHM *solid carbide*		
Materialgruppe *material group*	Vc (m/min)			Vc (m/min)		Vc (m/min)	fz (mm)
1.1	6 - 20	20 - 40		15 - 60		60 - 100	0,05 - 0,12
1.2	3 - 8	8 - 25	20 - 50	8 - 25		60 - 100	0,04 - 0,10
1.3	1 - 3	3 - 8	3 - 15	3 - 12	10 - 30	30 - 60	0,02 - 0,08
2.1	3 - 12	10 - 25		8 - 20		50 - 90	0,03 - 0,10
2.2	1 - 5	3 - 8		3 - 12		30 - 60	0,02 - 0,06
3.1	6 - 20	15 - 40	8 - 25			100 - 200	0,04 - 0,14
3.2	5 - 15	10 - 30	8 - 25			80 - 160	0,03 - 0,12
3.3	3 - 12	15 - 25	30 - 50			80 - 140	0,04 - 0,13
3.4	4 - 10	10 - 20	20 - 45			80 - 140	0,04 - 0,13
4.1	5 - 20	12 - 45		15 - 60		150 - 300	0,06 - 0,20
4.2	5 - 20	12 - 40	12 - 40	8 - 40		130 - 230	0,06 - 0,18
4.3	3 - 10	8 - 20	10 - 40			120 - 180	0,06 - 0,18
4.4	8 - 30	20 - 50		15 - 40		120 - 220	0,05 - 0,12
4.5	3 - 15	12 - 25	20 - 60			100 - 200	0,04 - 0,12
4.6	3 - 15	12 - 25	20 - 60	15 - 40			
4.7	3 - 12	10 - 30	30 - 80				
4.8			3 - 20				
4.9	3 - 15		15 - 50				
5.1	1 - 4	3 - 8		3 - 12	5 - 20	30 - 60	0,01 - 0,06
5.2	1 - 4	3 - 8		3 - 12	3 - 12	30 - 60	0,01 - 0,06
6.1		1 - 4	3 - 10			30 - 80	0,01 - 0,07
6.2			1 - 4			30 - 60	0,01 - 0,06
6.3			1 - 2				
6.4		1 - 4	3 - 10				

1. Welche Lochform wird geschnitten? ❑ Durchgangsloch ❑ Sackloch

1.1 Bei Durchgangsloch Angabe der Mutterhöhe: _____ mm

1.2 Bei Sackloch Angabe der Vorbohrtiefe: _____ mm

nutzbaren Gewindetiefe: _____ mm

2. Durchmesser der Mutterbohrung (Kernlochdurchmesser)? _____ mm

3. Welcher Werkstoff wird bearbeitet (Welche Werkstoff-Nummer oder chemische Analyse)?

Werkstoff-Nummer: _____ chemische Analyse: _____

4. Festigkeit des Werkstoffes im Bearbeitungszustand? _____ N/mm^2

5. Bei mehrgängigen Gewinden Angabe der Teilung: _____ mm

Gesamtsteigung: _____ mm

6. Dünnwandige Werkstücke? ❑ ja ❑ nein

1. What kind of hole has to be cut? ❑ *through hole* ❑ *blind hole*

1.1 When through hole please state height of internal thread: _____ *mm*

1.2 When blind hole please state pre-bore depth: _____ *mm*

effective depth of thread: _____ *mm*

2. Diameter of internal bore (core hole diameter)? _____ *mm*

3. What kind of material has to be cut (material-No. or chemical analysis)?

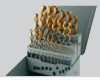
Material-No.: _____ *chemical analysis:* _____

4. Tensile strength of material in working condition? _____ N/mm^2

5. For multiple threads please state Division: _____ *mm*

Total pitch: _____ *mm*

6. Thin-walled work pieces: ❑ *yes* ❑ *no*

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS-E	ähnl. DIN 1899		E.2601.0	3	✔		✔					
	HSS-E	90°		E.2621.0	4	✔	✔	✔	✔				
	HSS-E	90°	TIN	E.2621.1	4	✔	✔	✔	✔				
	HSS-E	90°	TIN	SET.2621.1	4	✔	✔	✔	✔				
	HSS-E	90°	LH	E.2623.0	4	✔	✔	✔	✔				
	HSS-E	60°	TIN	E.2647.1	4	✔	✔	✔	✔				
	HSS-E	120°		E.2622.0	5	✔	✔	✔	✔				
	HSS-E	120°	TIN	E.2622.1	5	✔	✔	✔	✔				
	HSS	90°		E.2626.0	5	✔	✔	✔	✔				
	HSS	90°	TIN	E.2626.1	5	✔	✔	✔	✔				
	HSS-E	DIN 1897	TIN	E.2656.1	6	✔	✔	✔	✔	✔			
	HSS-E	DIN 1897	Blue Cut	E.2603.1	6	✔	✔	✔	✔	✔			
	HSS	DIN 338	Blue Cut	E.2605.0	7 - 8	✔							
	HSS-E	DIN 338	TIN	E.2653.1	7 - 8	✔	✔	✔	✔	✔			
	HSS-E	DIN 338		E.2604.0	9 - 10		✔	✔		✔			
	HSS	DIN 338		E.2606.0	10	✔							
	HSS-E	DIN 338	TIN	SET.2653.1	11	✔	✔	✔	✔	✔			
	HSS-E	DIN 338	TIN	SET.2653.2	11	✔	✔	✔	✔	✔			
	HSS-E	DIN 338	TIN	SET.2653.3	11	✔	✔	✔	✔	✔			
	HSS-E	DIN 338	TIN	SET.2653.4	11	✔	✔	✔	✔	✔			
	HSS-E	DIN 338	TIN	SET.2653.5	11	✔	✔	✔	✔	✔			
	HSS	DIN 338		SET.2611.0 SET.2611.1	12	✔	✔	✔	✔				
	HSS-E	DIN 338		SET.2612.0	12	✔	✔	✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS-E	DIN 338		SET.2614.0	12	✔	✔	✔	✔				
	HSS	DIN 338		SET.2613.0 SET.2613.1	12	✔	✔	✔	✔				
	HSS-E	DIN 340	TIN	E.2615.1	13	✔	✔	✔	✔				
	HSS	WERKS-NORM (COMPANY)		E.2616.0	14-16	✔		✔					
	HSS-E	WERKS-NORM (COMPANY)		E.2617.0	14-16	✔		✔	✔				
	HSS	WERKS-NORM (COMPANY)		E.2618.0	16	✔		✔					
	HSS	DIN 345		E.2619.0	17	✔			✔				
	HSS	DIN 341		E.2607.0	18	✔							
	HSS	DIN 1870		E.2608.0	19	✔							
	HSS	DIN 1870		E.2609.0	20	✔							
	HSS	FORM A	RH	E.2631.0	21	✔	✔	✔	✔				
	HSS	FORM A	RH	SET.2631.2	21	✔	✔	✔	✔				
	HSS	FORM A	RH	SET.2631.3	21	✔	✔	✔	✔				
	HSS	FORM B	RH	E.2635.0	22	✔	✔	✔	✔				
	HSS	FORM B	LH	E.2636.0	22	✔	✔	✔	✔				
	HSS	FORM B	RH	E.2637.0	22	✔	✔	✔	✔				
	HSS-E	FORM B	RH	E.2638.0	22	✔	✔	✔	✔				
	HSS-E	FORM A	RH	E.2639.0	23	✔	✔	✔	✔				
	HSS	FORM R	RH	E.2640.0	24	✔	✔	✔	✔				
	HSS	FORM R	LH	E.2641.0	24	✔	✔	✔	✔				
	HSS-E	FORM R	RH	E.2642.0	24	✔	✔	✔	✔				
	HSS-E	90° 130°		E.2643.0	24	✔	✔	✔	✔				
	HSS-E	90° 130°	TIN	E.2643.1	24	✔	✔	✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS	90° 140°		E.2654.0	25	✔	✔	✔	✔				
	HSS	90° 140°		E.2655.0	25	✔	✔	✔	✔				
	HSS	180° 118°		E.2644.0	26	✔	✔	✔	✔				
	HSS	180° 118°	TIN	E.2644.1	26	✔	✔	✔	✔				
	HSS-E	FORM D		E.2649.0	26	✔	✔	✔	✔				
	HSS-E	FORM D		E.2650.0	26	✔	✔	✔	✔				
	HSS	DIN 8374	OX	E.2610.0	27	✔							
	HSS		OX	E.2620.0	27	✔							
	HSS		OX	E.2611.0	28	✔							
	HSS	DIN 8376	OX	E.2645.0	28	✔							
	HSS	DIN 8375	OX	E.2612.0	29	✔							
	HSS	DIN 8377	OX	E.2646.0	29	✔							
	HSS	DIN 8379	OX	E.2613.0	30	✔							
				E.2614.0	31	✔	✔	✔	✔				
				E.2624.0	31								

E.2601.0

Universal

HSS-E | ähnl. DIN 1899 | 118° | UNIVERSAL TOOL | TYP N



HSSE-Mini drills similar DIN 1899A

Wiertła miniaturowe HSS-E odpowiednik wierteł wg DIN 1899A

Micropunte HSSE simile DIN 1899A

Microbrocas en HSSE sim. DIN 1899A

Verpackungseinheit: 10 Stück/Abm.
Unit size: 10 pieces/size

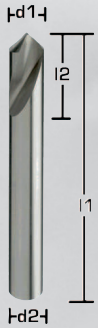
Artikel-Nr. *Article-No.*				E.2601.0 € Stück *piece*	Artikel-Nr. *Article-No.*				E.2601.0 € Stück *piece*
d1 0/-0,004	l2	l1	d2		d1 0/-0,004	l2	l1	d2	
0,15	0,8	25	1,0	**9,70**	**0,55**	3,9	25	1,0	**5,20**
0,16	1,1	25	1,0	**9,00**	**0,56**	3,9	25	1,0	**5,20**
0,17	1,1	25	1,0	**8,70**	**0,57**	3,9	25	1,0	**5,20**
0,18	1,1	25	1,0	**8,40**	**0,58**	3,9	25	1,0	**5,20**
0,19	1,1	25	1,0	**8,50**	**0,59**	3,9	25	1,0	**5,80**
0,20	1,5	25	1,0	**7,80**	**0,60**	3,9	25	1,0	**4,70**
0,21	1,5	25	1,0	**8,20**	**0,61**	4,2	25	1,0	**4,50**
0,22	1,5	25	1,0	**8,20**	**0,62**	4,2	25	1,0	**5,10**
0,23	1,5	25	1,0	**8,20**	**0,63**	4,2	25	1,0	**5,10**
0,24	1,5	25	1,0	**8,20**	**0,64**	4,2	25	1,0	**5,10**
0,25	1,9	25	1,0	**7,00**	**0,65**	4,2	25	1,0	**5,10**
0,26	1,9	25	1,0	**6,70**	**0,66**	4,2	25	1,0	**5,10**
0,27	1,9	25	1,0	**6,70**	**0,67**	4,2	25	1,0	**4,50**
0,28	1,9	25	1,0	**6,60**	**0,68**	4,8	25	1,0	**4,50**
0,29	1,9	25	1,0	**6,60**	**0,69**	4,8	25	1,0	**4,50**
0,30	1,9	25	1,0	**6,60**	**0,70**	4,8	25	1,0	**4,60**
0,31	2,4	25	1,0	**5,60**	**0,71**	4,8	25	1,0	**5,10**
0,32	2,4	25	1,0	**6,20**	**0,72**	4,8	25	1,0	**5,10**
0,33	2,4	25	1,0	**6,20**	**0,73**	4,8	25	1,0	**5,10**
0,34	2,4	25	1,0	**6,20**	**0,75**	4,8	25	1,0	**5,10**
0,35	2,4	25	1,0	**5,90**	**0,76**	5,3	25	1,0	**4,50**
0,36	2,4	25	1,0	**6,20**	**0,77**	5,3	25	1,0	**4,50**
0,37	2,4	25	1,0	**5,60**	**0,79**	5,3	25	1,0	**5,10**
0,38	2,4	25	1,0	**6,20**	**0,80**	5,3	25	1,5	**4,70**
0,39	3,0	25	1,0	**6,10**	**0,85**	5,3	25	1,5	**5,20**
0,40	3,0	25	1,0	**5,10**	**0,90**	6,0	25	1,5	**4,70**
0,41	3,0	25	1,0	**5,50**	**0,95**	6,0	25	1,5	**5,20**
0,42	3,0	25	1,0	**6,10**	**1,00**	6,8	25	1,5	**4,70**
0,43	3,0	25	1,0	**6,10**	**1,05**	6,8	25	1,5	**5,10**
0,44	3,0	25	1,0	**6,10**	**1,10**	7,6	25	1,5	**5,10**
0,45	3,0	25	1,0	**5,50**	**1,15**	7,6	25	1,5	**5,30**
0,47	3,0	25	1,0	**5,70**	**1,20**	8,5	25	1,5	**5,10**
0,48	3,0	25	1,0	**5,80**	**1,25**	8,5	25	1,5	**5,30**
0,49	3,4	25	1,0	**5,50**	**1,30**	8,5	25	1,5	**5,10**
0,50	3,4	25	1,0	**4,80**	**1,35**	9,5	25	1,5	**4,80**
0,51	3,4	25	1,0	**4,90**	**1,40**	9,5	25	1,5	**5,20**
0,52	3,4	25	1,0	**5,50**	**1,45**	9,5	25	1,5	**5,50**
0,53	3,4	25	1,0	**4,90**	**1,50**	9,5	30	2,0	**7,00**

HSSE-NC-Anbohrer

E.2621.0

Universal

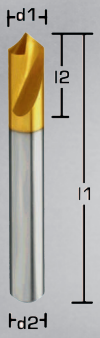
HSS-E | UNIVERSAL TOOL | 90° | RH



E.2621.1

Universal

HSS-E | UNIVERSAL TOOL | TIN | 90° | RH



SET.2621.1

Universal



- HSSE-NC-Center drills
- Wiertła centrujące HSS-E do maszyn CNC
- Punte da centro HSSE
- Brocas de puntear en HSSE

Artikel-Nr. *Article-No.*			E.2621.0 € Stück *piece*	E.2621.1 € Stück *piece*
d1	l2	l1		
2,00	8	40	**2,80**	**4,40**
3,00	12	46	**4,00**	**5,50**
4,00	12	55	**4,20**	**5,70**
5,00	15	60	**4,30**	**5,90**
6,00	20	66	**4,60**	**6,10**
8,00	25	79	**5,50**	**8,20**
10,00	25	89	**7,00**	**9,90**
12,00	30	102	**9,40**	**13,00**
14,00	34	107	**21,50**	**25,50**
16,00	35	115	**17,20**	**20,70**
20,00	40	131	**28,00**	**38,90**
25,00	53	151	**75,00**	**85,50**
	Satz *Set*			**SET.2621.1**
10 St. *pc.* **Ø 3/4/5/6 mm**			**5 St.** *pc.* **Ø 8/10 mm**	**290,00**

HSSE-NC-Anbohrer

E.2623.0

Universal

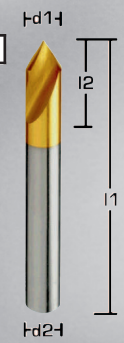
HSS-E | UNIVERSAL TOOL | 90° | LH



E.2647.1

Universal

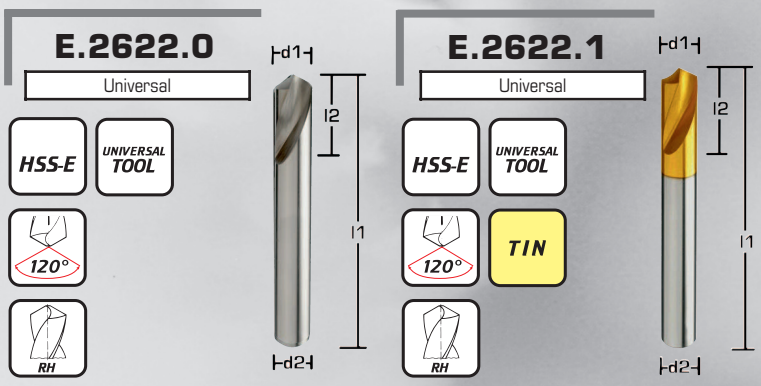
HSS-E | UNIVERSAL TOOL | TIN | 60° | RH



- HSSE-NC-Center drills
- Wiertła centrujące HSS-E do maszyn CNC
- Punte da centro HSSE
- Brocas de puntear en HSSE

Artikel-Nr. *Article-No.*			E.2623.0 € Stück *piece*	E.2647.1 € Stück *piece*
d1	l2	l1		
3,00	12	46	**40,00**	**9,50**
4,00	12	55	**41,00**	**9,50**
5,00	15	60	**41,00**	**9,80**
6,00	20	66	**42,00**	**10,00**
8,00	25	79	**43,00**	**17,00**
10,00	25	89	**44,00**	**22,00**
12,00	30	102	**50,00**	**25,00**
14,00	34	107		**50,00**
16,00	35	115		**50,00**

HSSE-NC-Anbohrer



HSSE-NC-Center drills

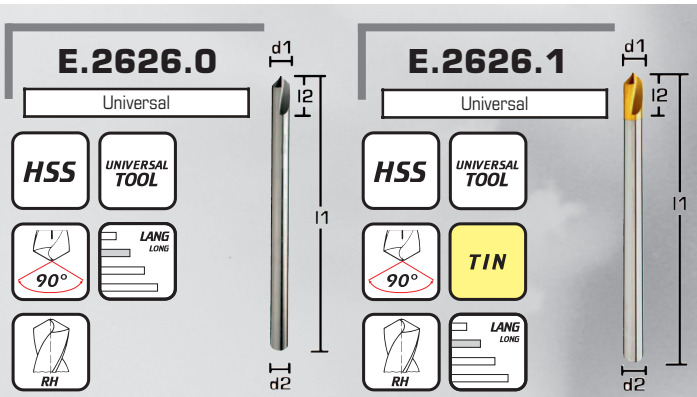
Wiertła centrujące HSS-E do maszyn CNC

Punte da centro HSSE

Brocas de puntear en HSSE

Artikel-Nr. *Article-No.*			E.2622.0 € Stück *piece*	E.2622.1 € Stück *piece*
d1	l2	l1		
2,00	8	40	**2,80**	**4,40**
3,00	12	46	**4,00**	**5,50**
4,00	12	55	**4,20**	**5,70**
5,00	15	60	**4,30**	**5,90**
6,00	20	66	**4,60**	**6,10**
8,00	25	79	**5,50**	**8,20**
10,00	25	89	**7,00**	**9,90**
12,00	30	102	**9,40**	**13,00**
14,00	34	107	**21,50**	**25,50**
16,00	35	115	**17,20**	**20,70**
20,00	40	131	**28,00**	**38,90**
25,00	53	151	**75,00**	**85,50**

HSS-NC-Anbohrer lang



HSSE-NC-Center drills long

Wiertła centrujące długie HSS-E do maszyn CNC

Punte da centro HSSE serie lunga

Brocas de puntear en HSSE, serie larga

Artikel-Nr. *Article-No.*				E.2626.0 € Stück *piece*	E.2626.1 € Stück *piece*
d1	l2	l1	d2		
3,00	6	100	3,0	**8,00**	**10,00**
4,00	6	100	4,0	**8,00**	**10,00**
5,00	10	132	5,0	**9,00**	**11,00**
6,00	15	139	6,0	**11,00**	**13,00**
8,00	17	165	8,0	**12,00**	**15,00**
10,00	20	184	10,0	**14,00**	**18,00**
12,00	25	205	12,0	**18,00**	**22,00**
16,00	35	227	16,0	**23,00**	**28,00**
20,00	40	254	20,0	**41,00**	**48,00**

E.2656.1

Universal

HSS-E | DIN 1897 | TiN | 135° | ausgespitzt | Kegelmantelanschliff < Ø 1,6 mm | LG Tiefloch-spirale | Kreuzanschliff > Ø 1,6 mm | UNIVERSAL TOOL



E.2603.1

Universal

HSS-E | DIN 1897 | Blue Cut | 130° | UNIVERSAL TOOL | LG Tiefloch-spirale



Standard HSSE stub drills DIN 1897

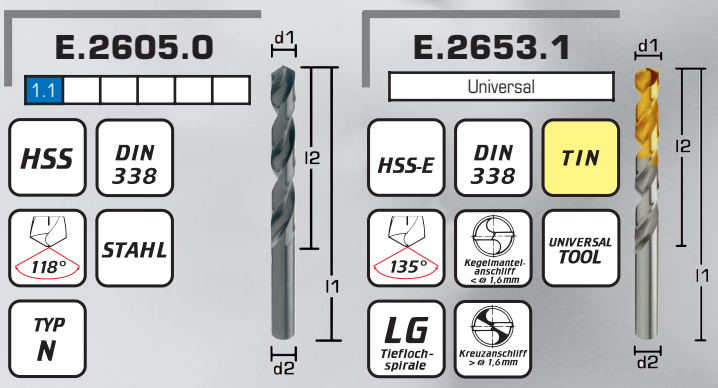
Wiertła standardowe automatowe HSS-E, wg DIN 1897

Punte extra corte DIN 1897 HSSE

Brocas en HSSE extracortas DIN 1897

Verpackungseinheit: bis Ø 6,5 mm 10 Stück/Abm., ab Ø 6,5 mm 5 Stück/Abm.
Unit size: up to Ø 6,5 mm 10 pieces/size, from Ø 6,5 mm 5 pieces/size

Artikel.-Nr. *Art.-No.*			E.2656.1 €	E.2603.1 €	Artikel.-Nr. *Art.-No.*			E.2656.1 €	E.2603.1 €	Artikel.-Nr. *Art.-No.*			E.2656.1 €	E.2603.1 €
d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*
1,00	6	26	1,90		5,20	26	62	3,00	4,50	9,25	40	84	8,40	
1,10	7	28	1,90		5,25	26	62	3,50		9,30	40	84	7,20	
1,20	8	30	1,90		5,30	26	62	3,00	4,50	9,35	40	84	7,80	
1,25	8	30	2,40		5,40	28	66	3,00	4,50	9,40	40	84	7,20	
1,30	8	30	1,90		5,50	28	66	3,00	4,50	9,50	40	84	7,20	7,90
1,40	9	32	1,90		5,55	28	66	3,50		9,60	43	89	6,90	
1,50	9	32	1,90		5,60	28	66	3,20	4,80	9,70	43	89	6,90	
1,60	10	34	1,90		5,70	28	66	3,20	4,80	9,75	43	89	8,00	
1,70	10	34	1,90		5,75	28	66	3,80		9,80	43	89	6,90	
1,75	11	36	2,40		5,80	28	66	3,20	4,80	9,90	43	89	6,90	
1,80	11	36	1,90		5,90	28	66	3,20	4,80	10,00	43	89	6,90	8,00
1,90	11	36	1,90		6,00	28	66	3,20	4,50	10,20	43	89	8,00	9,00
2,00	12	38	1,90	2,50	6,10	31	70	3,40	5,20	10,25	43	89	10,20	
2,10	12	38	1,90	3,10	6,20	31	70	3,40	5,20	10,50	43	89	8,70	9,80
2,20	13	40	1,90	3,10	6,25	31	70	4,00		10,75	47	95	11,40	
2,25	13	40	2,30		6,30	31	70	3,40	5,20	11,00	47	95	9,80	10,50
2,30	13	40	1,90	3,10	6,40	31	70	3,40	5,20	11,25	47	95	12,50	
2,40	14	43	1,90	3,10	6,50	31	70	3,40	4,80	11,50	47	95	10,60	13,00
2,50	14	43	1,90	2,80	6,60	31	70	3,60	5,50	11,75	47	95	12,90	
2,60	14	43	1,90	3,10	6,70	31	70	3,60	5,50	11,80	47	95	10,90	
2,70	16	46	1,90	3,10	6,75	34	74	4,10		12,00	51	102	11,30	13,50
2,75	16	46	2,40		6,80	34	74	3,30	5,50	12,25	51	102	14,00	
2,80	16	46	1,90	3,10	6,90	34	74	3,60	5,50	12,50	51	102	12,90	14,80
2,90	16	46	1,90	3,10	7,00	34	74	3,80	5,00	12,75	51	102	18,50	
3,00	16	46	1,90	2,50	7,10	34	74	4,30	5,90	13,00	51	102	16,00	17,20
3,10	18	49	2,00	3,10	7,20	34	74	4,30	5,40	13,50	54	107	16,50	17,50
3,20	18	49	2,00	3,10	7,25	34	74	5,00		13,80	54	107	16,50	
3,25	18	49	2,50		7,30	34	74	4,30		14,00	54	107	17,40	19,80
3,30	18	49	2,00	3,10	7,40	34	74	4,30		14,50	56	111	17,50	19,80
3,40	20	52	2,00	3,10	7,45	34	74	4,70		15,00	56	111	18,00	20,00
3,50	20	52	2,00	2,80	7,50	34	74	4,30	5,50	15,50	58	115	20,00	
3,60	20	52	2,10	3,20	7,60	37	79	4,50	6,10	16,00	58	115	20,40	22,00
3,70	20	52	2,30	3,20	7,70	37	79	4,50		16,50	60	119	22,30	
3,75	20	52	2,80		7,75	37	79	5,30		17,00	60	119	22,60	
3,80	22	55	2,30	3,20	7,80	37	79	4,50	6,10	17,50	62	123	25,10	
3,90	22	55	2,30	3,20	7,90	37	79	4,50		18,00	62	123	25,30	
4,00	22	55	2,30	3,20	8,00	37	79	4,70	5,50	18,50	64	127	29,00	
4,10	22	55	2,60	3,80	8,10	37	79	5,00		19,00	64	127	29,20	
4,20	22	55	2,30	3,80	8,20	37	79	5,00	7,20	19,50	66	131	31,50	
4,25	22	55	3,00		8,25	37	79	5,80		20,00	66	131	34,00	
4,30	24	58	2,70	3,80	8,30	37	79	5,00		20,50	68	136	39,30	
4,40	24	58	2,70	3,80	8,40	37	79	5,00		21,00	68	136	39,60	
4,50	24	58	2,70	3,80	8,50	37	79	4,50	7,00	21,50	70	141	41,50	
4,60	24	58	2,80	4,30	8,60	40	84	5,80		22,00	70	141	42,80	
4,65	24	58	3,00		8,70	40	84	5,80		22,50	72	146	50,40	
4,70	24	58	2,80	4,30	8,75	40	84	6,80		23,00	72	146	50,40	
4,75	24	58	3,20		8,80	40	84	5,80	7,40	23,50	72	146	56,00	
4,80	26	62	2,80	4,30	8,90	40	84	5,80		24,00	75	151	56,60	
4,90	26	62	2,80	4,30	9,00	40	84	5,80	7,40	24,50	75	151	59,80	
5,00	26	62	2,70	4,00	9,10	40	84	7,20		25,00	75	151	60,20	
5,10	26	62	3,00	4,50	9,20	40	84	7,20		31,00	87	174	107,50	



HSS-Twist drills DIN 338

Wiertła skrętne HSS/HSS-E wg DIN 338

Punte corte DIN 338 HSS

Brocas helicoidales DIN 338 HSS

Verpackungseinheit:
bis Ø 6,5 mm 10 St./Abm., ab Ø 6,5 mm 5 St./Abm.
Unit size:
up to Ø 6,5 mm 10 pc./size, from Ø 6,5 mm 5 pc/size

Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €	Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €	Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €
d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*
0,20	3	19	4,90		1,98	24	49	1,70		4,15	43	75	2,60	
0,21	3	19	5,50		1,99	24	49	2,60		4,20	43	75	1,00	2,20
0,22	3	19	5,50		2,00	24	49	0,90	1,20	4,25	43	75	2,40	
0,25	3	19	4,80		2,02	24	49	3,60		4,30	47	80	1,20	2,20
0,30	3	19	3,50		2,03	24	49	3,00		4,35	47	80	3,60	
0,35	4	19	3,40		2,04	24	49	2,80		4,40	47	80	2,10	2,20
0,40	5	20	3,00		2,05	24	49	1,60		4,45	47	80	3,60	
0,45	5	20	3,20		2,06	24	49	2,70		4,50	47	80	1,30	2,20
0,49	6	22	4,40		2,10	24	49	1,40	1,40	4,55	47	80	3,50	
0,50	6	22	2,30		2,13	27	53	3,80		4,60	47	80	2,10	
0,55	7	24	3,60		2,15	27	53	1,90		4,65	47	80	3,50	2,20
0,60	7	24	2,30		2,20	27	53	1,40	1,40	4,70	47	80	2,20	2,20
0,62	8	26	3,90		2,25	27	53	1,80		4,75	47	80	3,50	
0,65	8	26	3,50		2,30	27	53	1,50	1,40	4,80	52	86	2,20	2,20
0,68	9	28	3,60		2,35	27	53	2,40		4,85	52	86	3,30	
0,70	9	28	2,10		2,40	30	57	1,40	1,40	4,90	52	86	2,30	2,20
0,72	9	28	3,60		2,45	30	57	2,40		4,95	52	86	3,90	
0,73	9	28	3,20		2,50	30	57	1,40	1,40	5,00	52	86	1,20	2,20
0,75	9	28	2,50		2,55	30	57	2,20		5,05	52	86	4,10	
0,80	10	30	2,00		2,60	30	57	1,50	1,40	5,10	52	86	2,30	2,80
0,81	10	30	3,30		2,63	30	57	3,60		5,15	52	86	4,20	
0,83	10	30	3,30		2,65	30	57	2,60		5,20	52	86	2,40	2,80
0,85	10	30	2,20		2,70	33	61	1,50	1,40	5,25	52	86	3,70	
0,90	11	32	1,90		2,75	33	61	1,90		5,30	52	86	2,40	2,80
0,92	11	32	3,20		2,80	33	61	1,50	1,40	5,35	57	93	4,90	
0,94	11	32	3,20		2,85	33	61	2,50		5,40	57	93	2,80	2,80
0,95	11	32	2,20		2,90	33	61	1,50	1,40	5,45	57	93	5,10	
1,00	12	34	0,90	1,20	2,94	33	61	3,90		5,50	57	93	1,50	2,80
1,05	12	34	2,30		2,95	33	61	2,10		5,55	57	93	5,10	
1,10	14	36	1,00	1,20	3,00	33	61	0,90	1,40	5,60	57	93	2,90	3,00
1,13	14	36	3,00		3,05	36	65	1,80		5,65	57	93	5,30	
1,15	14	36	2,10		3,10	36	65	1,60	1,60	5,70	57	93	2,90	3,00
1,20	16	38	1,00	1,20	3,15	36	65	1,90		5,75	57	93	4,80	
1,22	16	38	2,80		3,20	36	65	1,00	1,60	5,80	57	93	2,90	3,00
1,25	16	38	2,10		3,25	36	65	1,80		5,85	57	93	5,30	
1,30	16	38	1,00	1,20	3,30	36	65	1,00	1,60	5,90	57	93	3,00	3,00
1,35	18	40	2,00		3,35	36	65	2,10		5,95	57	93	3,50	
1,40	18	40	1,00	1,20	3,40	39	70	1,60	1,60	6,00	57	93	1,80	3,00
1,43	18	40	2,80		3,45	39	70	2,10		6,05	63	101	5,70	
1,45	18	40	2,00		3,50	39	70	1,00	1,60	6,10	63	101	3,20	3,40
1,50	18	40	0,90	1,20	3,55	39	70	2,30		6,15	63	101	5,70	
1,55	20	43	1,80		3,60	39	70	1,80	2,00	6,20	63	101	3,20	3,40
1,60	20	43	1,00	1,20	3,62	39	70	4,00		6,25	63	101	5,30	
1,62	20	43	2,70		3,65	39	70	2,30		6,30	63	101	3,30	3,40
1,63	20	43	2,70		3,70	39	70	1,80	2,00	6,35	63	101	3,40	
1,65	20	43	2,70		3,75	39	70	2,30		6,40	63	101	3,50	3,40
1,70	20	43	1,00	1,20	3,80	43	75	1,90	2,00	6,45	63	101	6,40	
1,75	22	46	1,80		3,85	43	75	2,40		6,50	63	101	2,50	3,40
1,80	22	46	1,00	1,20	3,90	43	75	1,90	2,00	6,55	63	101	6,90	
1,83	22	46	2,80		3,95	43	75	2,50		6,60	63	101	3,50	3,60
1,85	22	46	1,80		4,00	43	75	1,00	2,00	6,65	63	101	6,90	
1,90	22	46	1,00	1,20	4,05	43	75	2,60		6,70	63	101	3,60	3,60
1,95	24	49	1,80		4,10	43	75	2,10	2,20					

E.2605.0

1.1

HSS | DIN 338 | 118° | STAHL | TYP N



E.2653.1

Universal

HSS-E | DIN 338 | TIN | 135° | Kegelmantelanschliff < ø 1,6 mm | UNIVERSAL TOOL | LG Tiefloch-spirale | Kreuzanschliff > ø 1,6 mm



HSS-Twist drills DIN 338

Wiertła skrętne HSS/HSS-E wg DIN 338

Punte corte DIN 338 HSS

Brocas helicoidales DIN 338 HSS

Verpackungseinheit:
bis Ø 6,5 mm 10 St./Abm., ab Ø 6,5 mm 5 St./Abm.
Unit size:
up to Ø 6,5 mm 10 pc./size, from Ø 6,5 mm 5 pc./size

Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €	Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €	Art.-Nr. *Art.-No.*			E.2605.0 €	E.2653.1 €
d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*	d1	l2	l1	Stück *piece*	Stück *piece*
6,75	69	109	4,30		9,35	81	125	14,80		13,30	108	160	23,00	
6,80	69	109	2,80	3,60	9,40	81	125	7,20	8,00	13,40	108	160	30,50	
6,85	69	109	7,70		9,45	81	125	15,10		13,50	108	160	12,80	
6,90	69	109	4,30	3,60	9,50	81	125	4,50	8,00	13,60	108	160	12,80	
6,95	69	109	7,70		9,55	87	133	16,90		13,70	108	160	12,80	
7,00	69	109	2,80	3,60	9,60	87	133	7,90	8,00	13,75	108	160	33,80	
7,05	69	109	8,40		9,65	87	133	16,90		13,80	108	160	13,20	
7,10	69	109	4,50	4,40	9,70	87	133	8,00	8,00	13,90	108	160	13,20	
7,15	69	109	8,00		9,75	87	133	10,80		14,00	108	160	12,80	
7,20	69	109	4,60	4,40	9,80	87	133	8,20	8,00	14,10	114	169	29,50	
7,25	69	109	7,60		9,85	87	133	18,00		14,20	114	169	30,50	
7,30	69	109	4,70	4,40	9,90	87	133	8,40	8,00	14,25	114	169	37,40	
7,35	69	109	8,40		9,95	87	133	18,00		14,30	114	169	35,20	
7,40	69	109	4,90	4,40	10,00	87	133	5,00	8,00	14,40	114	169	35,20	
7,45	69	109	8,20		10,10	87	133	8,90	8,80	14,50	114	169	13,50	
7,50	69	109	3,00	4,40	10,20	87	133	6,10	8,80	14,60	114	169	36,70	
7,55	75	117	9,70		10,25	87	133	12,30		14,70	114	169	36,70	
7,60	75	117	5,10	5,00	10,30	87	133	11,00	8,80	14,75	114	169	37,40	
7,65	75	117	9,70		10,40	87	133	11,00	8,80	14,80	114	169	35,20	
7,70	75	117	5,00	5,00	10,50	87	133	6,50	8,80	14,90	114	169	37,40	
7,75	75	117	7,90		10,60	87	133	11,70	9,20	15,00	114	169	14,00	
7,80	75	117	4,90	5,00	10,70	94	142	14,80	9,20	15,25	120	178	44,50	
7,85	75	117	9,40		10,75	94	142	14,80		15,50	120	178	16,80	
7,90	75	117	5,20	5,00	10,80	94	142	13,00	9,20	15,75	120	178	47,50	
7,95	75	117	9,90		10,90	94	142	15,50	9,20	15,80	120	178	43,10	
8,00	75	117	3,20	5,00	11,00	94	142	7,60	9,20	16,00	120	178	17,00	
8,05	75	117	10,00		11,10	94	142	13,90	11,00	16,20	125	184	59,00	
8,10	75	117	5,40	5,60	11,20	94	142	13,40	11,00	16,25	125	184	64,60	
8,15	75	117	10,20		11,25	94	142	17,60		16,50	125	184	22,60	
8,20	75	117	5,40	5,60	11,30	94	142	15,80	11,00	16,75	125	184	81,90	
8,25	75	117	6,50		11,40	94	142	15,80	11,00	16,80	125	184	84,10	
8,30	75	117	5,90	5,60	11,50	94	142	8,00	11,00	17,00	125	184	24,50	
8,35	75	117	10,80		11,60	94	142	15,80	11,00	17,25	130	191	79,00	
8,40	75	117	5,90	5,60	11,70	94	142	14,70	11,00	17,50	130	191	37,40	
8,45	75	117	11,50		11,75	94	142	16,50		17,75	130	191	81,90	
8,50	75	117	4,00	5,60	11,80	94	142	14,70	11,00	18,00	130	191	27,50	
8,55	81	125	13,20		11,90	101	151	18,00	11,00	18,25	135	198	89,00	
8,60	81	125	6,50	6,20	12,00	101	151	8,00	11,00	18,50	135	198	43,10	
8,65	81	125	13,20		12,10	101	151	17,60	12,00	18,75	135	198	93,50	
8,70	81	125	6,50	6,20	12,20	101	151	17,60	12,00	19,00	135	198	31,50	
8,75	81	125	10,70		12,25	101	151	19,00		19,50	140	205	53,90	
8,80	81	125	6,70	6,20	12,30	101	151	16,20	12,00	19,75	140	205	110,00	
8,85	81	125	14,40		12,40	101	151	20,50	12,00	20,00	140	205	36,50	
8,90	81	125	6,90	6,20	12,50	101	151	9,50	12,80					
8,95	81	125	13,80		12,60	101	151	21,00	12,80					
9,00	81	125	4,00	6,20	12,70	101	151	15,80	12,80					
9,05	81	125	13,80		12,75	101	151	24,50						
9,10	81	125	6,90	8,00	12,80	101	151	19,80	12,80					
9,15	81	125	13,80		12,90	101	151	23,70	12,80					
9,20	81	125	7,10	8,00	13,00	101	151	11,00	14,00					
9,25	81	125	9,90		13,20	101	151	23,00						
9,30	81	125	7,20	8,00	13,25	108	160	29,50						

E.2604.0

2.1 | 2.2 | 5.1 | 5.2

HSS-E | DIN 338 | 130° | TITAN | ausgespitzt | LG Tiefloch-spirale | INOX



HSSE-Stainless steels twist drills DIN 338

Wiertła skrętne HSS-E wg DIN 338 do stali nierdzewnych tytanowych, kobaltowych

Punte corte DIN 338 HSSE lavorazione acciai inossidabili

Brocas helicoidales DIN 338 en HSSE para inoxidable

* = Auslaufartikel
* = *no future production anymore*

Verpackungseinheit: bis Ø 6,5 mm 10 Stück/Abm., ab Ø 6,5 mm 5 Stück/Abm.
Unit size: up to Ø 6,5 mm 10 pieces/size, from Ø 6,5 mm 5 pieces/size

Artikel-Nr. *Article-No.*			E.2604.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.2604.0 € Stück *piece*
d1	l2	l1		d1	l2	l1	
0,40	5	20	**7,00**	**3,80**	43	75	**2,80**
0,50	6	22	**5,90**	**3,90**	43	75	**2,80**
0,60	7	24	**5,90**	**3,95***	43	75	**2,50**
0,70	9	28	**5,30**	**4,00**	43	75	**2,20**
0,80	10	30	**3,50**	**4,05***	43	75	**1,80**
0,90	11	32	**3,50**	**4,10**	43	75	**3,10**
1,00	12	34	**3,00**	**4,20**	43	75	**2,80**
1,10	14	36	**3,00**	**4,30**	47	80	**2,80**
1,15*	14	36	**4,10**	**4,40**	47	80	**3,10**
1,20	16	38	**3,40**	**4,45***	47	80	**2,80**
1,25*	16	38	**4,00**	**4,50**	47	80	**2,50**
1,30	16	38	**3,30**	**4,60**	47	80	**3,10**
1,35*	18	40	**3,80**	**4,65***	47	80	**2,80**
1,40	18	40	**3,00**	**4,70**	47	80	**3,10**
1,45*	18	40	**3,60**	**4,80**	52	86	**3,10**
1,50	18	40	**2,80**	**4,90**	52	86	**3,10**
1,55*	20	43	**3,40**	**5,00**	52	86	**2,80**
1,60	20	43	**3,40**	**5,10**	52	86	**3,50**
1,70	20	43	**3,20**	**5,20**	52	86	**3,50**
1,80	22	46	**3,20**	**5,30**	52	86	**3,50**
1,85*	22	46	**3,80**	**5,40**	57	93	**3,50**
1,90	22	46	**3,20**	**5,50**	57	93	**3,50**
1,95*	24	49	**3,80**	**5,55***	57	93	**3,00**
2,00	24	49	**1,80**	**5,60**	57	93	**4,10**
2,05*	24	49	**3,20**	**5,70**	57	93	**4,10**
2,10	24	49	**2,10**	**5,80**	57	93	**4,10**
2,15*	27	53	**1,80**	**5,90**	57	93	**4,10**
2,20	27	53	**2,10**	**6,00**	57	93	**3,80**
2,30	27	53	**2,10**	**6,10**	63	101	**4,80**
2,35*	27	53	**1,80**	**6,20**	63	101	**4,80**
2,40	30	57	**2,60**	**6,30**	63	101	**4,80**
2,45*	30	57	**1,80**	**6,40**	63	101	**4,80**
2,50	30	57	**2,00**	**6,50**	63	101	**4,50**
2,53*	30	57	**1,80**	**6,55***	63	101	**4,70**
2,55*	30	57	**1,80**	**6,60**	63	101	**5,20**
2,60	30	57	**2,60**	**6,70**	63	101	**5,20**
2,70	33	61	**2,60**	**6,80**	69	109	**4,80**
2,75*	33	61	**1,80**	**6,90**	69	109	**5,40**
2,80	33	61	**2,60**	**7,00**	69	109	**4,80**
2,90	33	61	**2,60**	**7,10**	69	109	**6,80**
3,00	33	61	**1,80**	**7,20**	69	109	**6,80**
3,05*	36	65	**1,60**	**7,30**	69	109	**6,80**
3,10	36	65	**2,60**	**7,40**	69	109	**6,80**
3,15*	36	65	**1,90**	**7,45***	69	109	**6,10**
3,20	36	65	**2,60**	**7,50**	69	109	**5,20**
3,30	36	65	**2,60**	**7,60**	75	117	**7,10**
3,40	39	70	**2,60**	**7,70**	75	117	**7,10**
3,45*	39	70	**2,10**	**7,80**	75	117	**7,10**
3,50	39	70	**2,20**	**7,90**	75	117	**7,10**
3,60	39	70	**2,80**	**8,00**	75	117	**6,50**
3,65*	39	70	**2,20**	**8,10**	75	117	**7,80**
3,70	39	70	**2,80**	**8,20**	75	117	**7,80**

Fortsetzung nächste Seite *to be continued*

HSSE-Inox/Titan-Spiralbohrer DIN 338

E.2604.0

2.1 | 2.2 | 5.1 | 5.2

HSS-E | DIN 338 | 130° | TITAN | ausgespitzt | LG Tiefloch-spirale | INOX



HSSE-Stainless steels twist drills DIN 338

Wiertła skrętne HSS-E wg DIN 338 do stali nierdzewnych tytanowych, kobaltowych

Punte corte DIN 338 HSSE lavorazione acciai inossidabili

Brocas helicoidales DIN 338 en HSSE para inoxidable

* = Auslaufartikel
** = no future production anymore*

Verpackungseinheit: bis Ø 6,5 mm 10 Stück/Abm., ab Ø 6,5 mm 5 Stück/Abm.
Unit size: up to Ø 6,5 mm 10 pieces/size, from Ø 6,5 mm 5 pieces/size

Artikel-Nr. *Article-No.*			E.2604.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.2604.0 € Stück *piece*
d1	l2	l1		d1	l2	l1	
Ø 0,4 - 8,2 mm siehe Seite 2.09			*Ø 0,4 - 8,2 mm see page 2.09*	**9,90**	87	133	**9,60**
8,30	75	117	**7,80**	**10,00**	87	133	**9,00**
8,40	75	117	**7,80**	**10,20**	87	133	**9,50**
8,50	75	117	**6,80**	**10,50**	87	133	**10,60**
8,60	81	125	**8,10**	**10,80**	94	142	**10,60**
8,70	81	125	**8,10**	**10,90***	94	142	**10,60**
8,80	81	125	**8,10**	**11,00**	94	142	**12,00**
8,90	81	125	**8,10**	**11,20**	94	142	**13,50**
9,00	81	125	**7,80**	**11,50**	94	142	**13,50**
9,10	81	125	**8,60**	**12,00**	101	151	**14,00**
9,20	81	125	**8,60**	**12,50**	101	151	**15,00**
9,30	81	125	**8,60**	**12,80**	101	151	**15,00**
9,40	81	125	**8,60**	**13,00**	101	151	**16,80**
9,50	81	125	**8,00**	**14,00**	108	160	**18,00**
9,60	87	133	**9,60**	**16,00**	120	178	**20,00**
9,70	87	133	**9,60**				
9,80	87	133	**9,60**				

HSS-Spezial-Spiralbohrer für Plexiglas

E.2606.0

4.7

HSS | DIN 338



HSS-Special twist drills for plexiglas

Wiertła specjalne skrętne HSS do tworzyw sztucznych typu pleksiglas

Punte speciali HSS per plexiglass

Brocas en HSS especialmente para Plexiglas

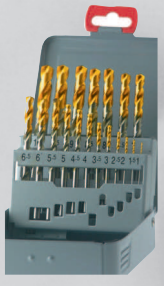
Artikel-Nr. *Article-No.*			E.2606.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.2606.0 € Stück *piece*
d1	l2	l1		d1	l2	l1	
2,00	24	49	**4,00**	**5,50**	57	93	**6,50**
2,50	30	57	**4,00**	**6,00**	57	93	**6,50**
3,00	33	61	**4,00**	**6,50**	63	101	**8,00**
3,30	36	65	**4,80**	**6,80**	69	109	**8,00**
3,50	39	70	**4,80**	**7,00**	69	109	**8,00**
4,00	43	75	**4,80**	**8,00**	75	117	**9,50**
4,20	43	75	**5,50**	**8,50**	75	117	**9,50**
4,50	47	80	**5,50**	**10,00**	87	133	**12,00**
5,00	52	86	**5,50**	**12,00**	101	151	**14,00**

SET.2653.1

Universal

HSS-E | DIN 338 | 135° | TIN | Kegelmantelanschliff < ø 1,6mm | LG Tiefloch-spirale

49 Stück *pieces*
ø 1 - 10 mm
0,5 mm steigend *rising 0,5 mm*



SET.2653.2

Universal

HSS-E | DIN 338 | 135° | TIN | Kegelmantelanschliff < ø 1,6mm | LG Tiefloch-spirale

25 Stück *pieces*
ø 1 - 13 mm
0,5 mm steigend *rising 0,5 mm*



HSSE-Twist drills in metal cassettes
Zestawy wierteł skrętnych HSS-E w metalowej kasetce
Assortimenti di punte HSSE in cassetta metallica
Brocas HSSE en estuches metálicos

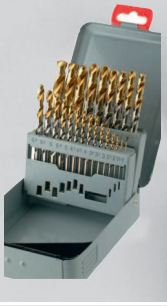
SET.2653.1 € Stück *piece*	SET.2653.2 € Stück *piece*
65,00	120,00

SET.2653.3

Universal

HSS-E | DIN 338 | 135° | TIN | Kegelmantelanschliff < ø 1,6mm | LG Tiefloch-spirale

24 Stück *pieces*
ø 1 - 10,5 mm
0,5 mm steigend *rising 0,5 mm*
+ ø 3,3 / 4,2 / 6,8 / 10,2 mm

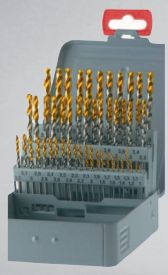


SET.2653.4

Universal

HSS-E | DIN 338 | 135° | TIN | Kegelmantelanschliff < ø 1,6mm | LG Tiefloch-spirale

60 Stück *pieces*
ø 1 - 5,9 mm
0,1 mm steigend *rising 0,1 mm*



HSSE-Twist drills in metal cassettes
Zestawy wierteł skrętnych HSS-E w metalowej kasetce
Assortimenti di punte HSSE in cassetta metallica
Brocas HSSE en estuches metálicos

SET.2653.3 € Stück *piece*	SET.2653.4 € Stück *piece*
95,00	110,00

SET.2653.5

Universal

HSS-E | DIN 338 | 135° | TIN | Kegelmantelanschliff < ø 1,6mm | LG Tiefloch-spirale

41 Stück *pieces*
ø 6 - 10 mm
0,1 mm steigend *rising 0,1 mm*



HSSE-Twist drills in metal cassettes
Zestawy wierteł skrętnych HSS-E w metalowej kasetce
Assortimenti di punte HSSE in cassetta metallica
Brocas HSSE en estuches metálicos

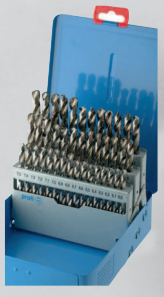
SET.2653.5 € Stück *piece*
220,00

SET.2611.0

Universal

HSS | DIN 338 | TYP N | UNIVERSAL TOOL

41 Stück *pieces*
Ø 6 - 10 mm
0,1 mm steigend *rising 0,1 mm*



SET.2611.1

Universal

HSS | DIN 338 | TYP N | TIN | UNIVERSAL TOOL

41 Stück *pieces*
Ø 6 - 10 mm
0,1 mm steigend *rising 0,1 mm*



HSS-Twist drills in metal cassettes

Zestawy wierteł skrętnych HSS w metalowej kasetce

Assortimenti di punte HSS in cassetta metallica

Brocas HSS en estuches metálicos

SET.2611.0 € Stück *piece*	SET.2611.1 € Stück *piece*
135,00	230,00

SET.2612.0

Universal

HSS-E | DIN 338 | TYP N | UNIVERSAL TOOL

41 Stück *pieces*
Ø 6 - 10 mm
0,1 mm steigend *rising 0,1mm*



SET.2614.0

Universal

HSS-E | DIN 338 | TYP N | UNIVERSAL TOOL

50 Stück *pieces*
Ø 1 - 5,9 mm
0,1 mm steigend *rising 0,1mm*



HSSE-Twist drills in metal cassettes

Zestawy wierteł skrętnych HSSE w metalowej kasetce

Assortimenti di punte HSSE in cassetta metallica

Brocas HSSE en estuches metálicos

SET.2612.0 € Stück *piece*	SET.2614.0 € Stück *piece*
195,00	85,00

SET.2613.0

Universal

HSS | DIN 338 | TYP N | OX | UNIVERSAL TOOL

50 Stück *pieces*
Ø 1 - 5,9 mm
0,1 mm steigend *rising 0,1 mm*

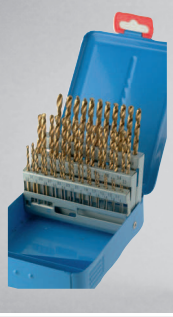


SET.2613.1

Universal

HSS | DIN 338 | TYP N | TIN | UNIVERSAL TOOL

50 Stück *pieces*
Ø 1 - 5,9 mm
0,1 mm steigend *rising 0,1 mm*



HSS-Twist drills in metal cassettes

Zestawy wierteł skrętnych HSS w metalowej kasetce

Assortimenti di punte HSS in cassetta metallica

Brocas HSS en estuches metálicos

SET.2613.0 € Stück *piece*	SET.2613.1 € Stück *piece*
56,00	148,00

E.2615.1

Universal

HSS-E | DIN 340 | 130° | UNIVERSAL TOOL | LG Tiefloch-spirale | TIN



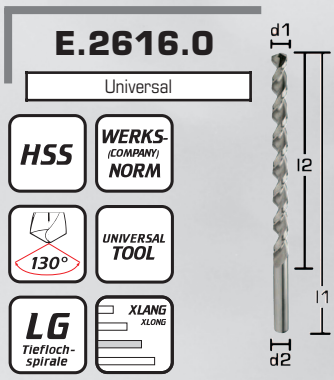
HSSE-Twist drills DIN 340

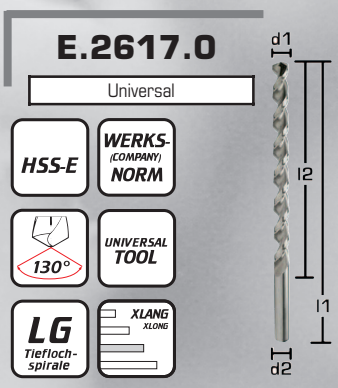
Wiertła skrętne HSS-E, wg DIN 340

Punta HSSE serie lunga DIN 340

Brocas serie larga DIN 340, HSSE

Artikel-Nr. *Article-No.*			E.2615.1 € Stück *piece*	Artikel-Nr. *Article-No.*			E.2615.1 € Stück *piece*
d1	l2	l1		d1	l2	l1	
1,00	33	56	**9,60**	**6,10**	97	148	**12,40**
1,10	37	60	**11,50**	**6,20**	97	148	**12,40**
1,20	41	65	**11,50**	**6,30**	97	148	**12,40**
1,30	41	65	**11,20**	**6,40**	97	148	**12,40**
1,40	45	70	**11,00**	**6,50**	97	148	**10,50**
1,50	45	70	**9,20**	**6,60**	97	148	**12,40**
1,60	50	76	**10,80**	**6,70**	97	148	**12,40**
1,70	50	76	**10,80**	**6,80**	102	156	**12,40**
1,80	53	80	**10,50**	**6,90**	102	156	**12,40**
1,90	53	80	**9,90**	**7,00**	102	156	**11,50**
2,00	56	85	**6,80**	**7,10**	102	156	**14,90**
2,10	56	85	**8,40**	**7,20**	102	156	**14,90**
2,20	59	90	**8,40**	**7,30**	2	156	**14,90**
2,30	59	90	**8,40**	**7,40**	102	156	**14,90**
2,40	62	95	**8,40**	**7,50**	102	156	**12,80**
2,50	62	95	**7,50**	**7,60**	109	165	**15,40**
2,60	62	95	**8,40**	**7,70**	109	165	**15,40**
2,70	66	100	**8,40**	**7,80**	109	165	**15,40**
2,80	66	100	**8,40**	**7,90**	109	165	**15,40**
2,90	66	100	**8,40**	**8,00**	109	165	**14,00**
3,00	66	100	**6,80**	**8,10**	109	165	**19,40**
3,10	69	106	**8,80**	**8,20**	109	165	**19,40**
3,20	69	106	**8,80**	**8,30**	109	165	**19,40**
3,30	69	106	**8,80**	**8,40**	109	165	**19,40**
3,40	73	112	**8,80**	**8,50**	109	165	**16,50**
3,50	73	112	**7,00**	**8,60**	115	175	**19,40**
3,60	73	112	**8,80**	**8,70**	115	175	**19,40**
3,70	73	112	**8,80**	**8,80**	115	175	**19,40**
3,80	78	119	**8,80**	**8,90**	115	175	**19,40**
3,90	78	119	**8,80**	**9,00**	115	175	**18,50**
4,00	78	119	**7,50**	**9,10**	115	175	**24,70**
4,10	78	119	**9,10**	**9,20**	115	175	**24,70**
4,20	78	119	**8,80**	**9,30**	115	175	**24,70**
4,30	82	126	**8,80**	**9,40**	115	175	**24,70**
4,40	82	126	**9,10**	**9,50**	115	175	**21,00**
4,50	82	126	**8,80**	**9,60**	121	184	**26,10**
4,60	82	126	**9,10**	**9,70**	121	184	**26,10**
4,70	82	126	**9,10**	**9,80**	121	184	**26,10**
4,80	87	132	**9,10**	**9,90**	121	184	**26,10**
4,90	87	132	**9,10**	**10,00**	121	184	**23,00**
5,00	87	132	**8,00**	**10,20**	121	184	**23,00**
5,10	87	132	**9,80**	**10,50**	121	184	**24,10**
5,20	87	132	**9,80**	**10,80**	121	184	**25,00**
5,30	87	132	**9,80**	**11,00**	128	195	**25,00**
5,40	91	139	**9,80**	**11,20**	128	195	**26,00**
5,50	91	139	**8,80**	**11,50**	128	195	**26,00**
5,60	91	139	**9,80**	**11,80**	128	195	**26,00**
5,70	91	139	**9,80**	**12,00**	134	205	**24,00**
5,80	91	139	**9,80**	**12,50**	134	205	**27,50**
5,90	91	139	**9,80**	**13,00**	134	205	**29,00**
6,00	91	139	**9,50**				





HSS/HSSE-Twist drills extra long

Wiertła skrętne HSS/HSS-E, długie i bardzo długie wg normy zakładowej

Punte HSS/HSSE extra lunghe

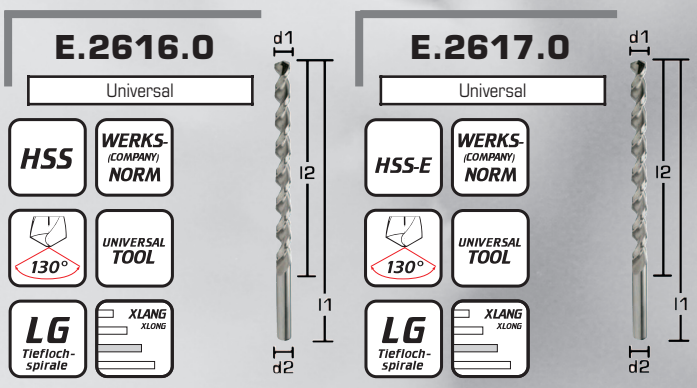
Brocas extralargas, norma fábrica, en HSS/HSSE

E.2616.0 = Auslaufartikel
E.2616.0 = no future production anymore

Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*
l2 x l1	93 x 125	
2,00		13,00
2,10		18,00
2,20		18,00
2,30		18,00
2,40		18,00
2,50		13,00
2,60		18,00
2,70		18,00
2,80		18,00
2,90		18,00
3,00		13,50
l2 x l1	120 x 160	
2,00	7,50	14,50
2,10		20,50
2,20		20,50
2,30		20,50
2,40		20,50
2,50		14,50
2,90		20,50
3,00		15,50
3,30		21,00
3,50	8,40	16,00
4,00	8,40	16,00
4,20		21,50
4,50		16,00
5,00		17,00
6,00		19,00
l2 x l1	150 x 200	
3,00	9,50	18,00
3,10		26,00
3,20		26,00
3,30		26,00
3,40		26,00
3,50	11,00	19,00
3,60		27,00
3,70		27,00
3,80		27,00
3,90		27,00
4,00	13,00	20,00
4,10		27,00
4,20		27,00
4,30		27,00
4,40		27,00
4,50	13,00	22,00
4,60		29,00
4,70		29,00
4,80		29,00
4,90		29,00
5,00		21,00
5,10		29,00

Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*
5,20		29,00
5,30		29,00
5,40		29,00
5,50	11,00	23,00
5,60		31,50
5,70		31,50
5,80		31,50
5,90		31,50
6,00		23,00
6,10		32,00
6,20		32,00
6,30		32,00
6,40		32,00
6,50		25,00
6,60		34,50
6,70		34,50
6,80	24,10	34,50
6,90		34,50
7,00		26,50
7,10		27,00
7,20		27,00
7,30		27,00
7,40		27,00
7,50	19,00	28,00
8,00		30,50
8,50		31,50
9,00		33,00
9,50		35,00
10,00		35,50
l2 x l1	187 x 250	
3,00	14,00	28,00
3,10		38,00
3,20		38,00
3,30		38,00
3,40		38,00
3,50		23,00
3,60		32,00
3,70		32,00
3,80		32,00
3,90		32,00
4,00	15,10	23,00
4,10		35,00
4,20	18,00	35,00
4,30		35,00
4,40		35,00
4,50	18,00	25,00
4,60		34,50
4,70		34,50
4,80		34,50
4,90		34,50
5,00		26,00

Fortsetzung nächste Seite *to be continued*



HSS/HSSE-Twist drills extra long

Wiertła skrętne HSS/HSS-E, długie i bardzo długie wg normy zakładowej

Punte HSS/HSSE extra lunghe

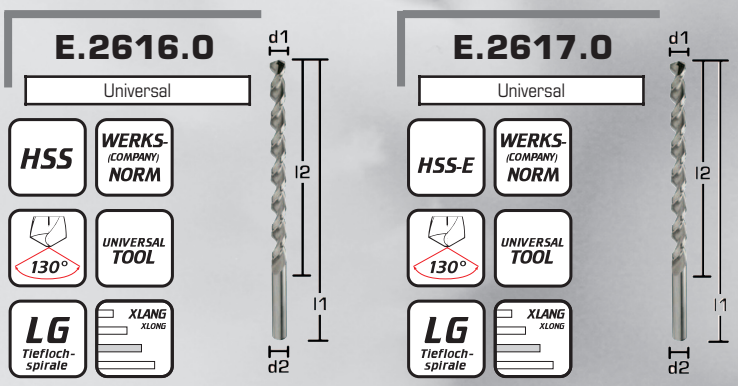
Brocas extralargas, norma fábrica, en HSS/HSSE

E.2616.0 = Auslaufartikel
E.2616.0 = no future production anymore

Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*	Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*
Fortsetzung *continuation* **187 x 250**			5,40		45,00
5,10		36,50	5,50	19,80	35,50
5,20		36,50	5,60		49,00
5,30		36,50	5,70		49,00
5,40		36,50	5,80		49,00
5,50		27,00	5,90		49,00
5,60		38,00	6,00	22,80	37,00
5,70		38,00	6,10		52,00
5,80		38,00	6,20		52,00
5,90		38,00	6,30		52,00
6,00		28,00	6,40		52,00
6,10		39,00	6,50	27,00	40,00
6,20		39,00	6,60		54,00
6,30		39,00	6,70		54,00
6,40		39,00	6,80		54,00
6,50		31,00	6,90		54,00
6,60		43,00	7,00	23,90	42,00
6,70		43,00	7,10		58,00
6,80		43,00	7,20		58,00
6,90		43,00	7,30		58,00
7,00	18,40	32,00	7,40		58,00
7,10		45,00	7,50	29,00	44,00
7,20		45,00	8,00		45,00
7,30		45,00	8,50	30,20	47,00
7,40		45,00	9,00		49,00
7,50	19,00	34,50	9,50	33,80	50,00
8,00		35,00	10,00		51,00
8,50		37,00	10,50		54,00
9,00		39,00	11,00		56,00
9,50	22,30	41,00	11,50		57,00
10,00		41,00	12,00		58,00
10,50		43,00	12,50		62,00
11,00		50,00	13,00		65,00
11,50		50,00	**l2 x l1**	**300 x 400**	
12,00		57,00	5,00		41,00
12,50		57,00	5,10		57,00
13,00		65,00	5,20		57,00
l2 x l1	**235 x 315**		5,30		57,00
4,00		28,00	5,40		57,00
4,10		40,00	5,50		45,00
4,20		40,00	5,60		62,00
4,30		40,00	5,70		62,00
4,40		40,00	5,80		62,00
4,50	18,00	30,00	5,90		62,00
4,60		43,00	6,00		40,00
4,70		43,00	6,10		56,00
4,80		43,00	6,20		56,00
4,90		43,00	6,30		56,00
5,00		32,00	6,40		56,00
5,10		45,00	6,50		45,00
5,20		45,00	6,60		50,00
5,30		45,00	6,70		50,00

Fortsetzung nächste Seite *to be continued*

HSS/HSSE-Spiralbohrer überlang



HSS/HSSE-Twist drills extra long

Wiertła skrętne HSS/HSS-E, długie i bardzo długie wg normy zakładowej

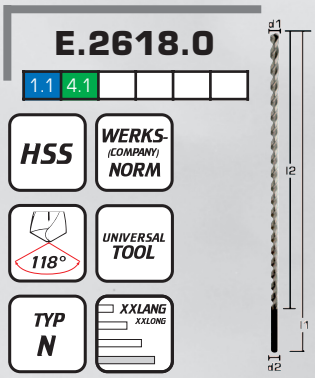
Punte HSS/HSSE extra lunghe

Brocas extralargas, norma fábrica, en HSS/HSSE

E.2616.0 = Auslaufartikel
E.2616.0 = no future production anymore

Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*	Artikel-Nr. *Article-No.* d1	E.2616.0 € Stück *piece*	E.2617.0 € Stück *piece*
Fortsetzung *continuation* **300 x 400**			**11,00**		**70,00**
6,80		**50,00**	**11,50**		**72,00**
6,90		**50,00**	**12,00**		**74,00**
7,00		**45,00**	**12,50**		**79,00**
7,10		**63,00**	**13,00**		**82,00**
7,20		**63,00**	**l2 x l1**	**450 x 500**	
7,30		**63,00**	**5,00**		**70,00**
7,40		**63,00**	**6,00**		**71,00**
7,50		**56,00**	**7,00**		**77,00**
8,00		**52,00**	**8,00**		**80,00**
8,50		**55,00**	**9,00**		**82,00**
9,00	**39,00**	**58,00**	**10,00**		**91,00**
9,50		**60,00**	**11,00**		**95,00**
10,00	**43,60**	**62,00**	**12,00**		**102,00**
10,50		**66,00**	**13,00**		**115,00**

HSS-Spiralbohrer XXL



HSS-Twist drills XXL

Wiertła skrętne HSS, XXL

Punte HSS serie XXL

Brocas extralargas XXL, norma fábrica, en HSS

Artikel-Nr. *Article-No.*			E.2618.0 € Stück *piece*
d1	l2	l1	
6,00	400	500	**64,00**
8,00	400	500	**89,00**
10,00	500	600	**121,00**
11,00	500	600	**126,00**
12,00	500	600	**154,00**
lang *long*			**E.2618.0L**
8,00	650	750	**114,00**
10,00	650	750	**162,00**
11,00	650	750	**155,00**
12,00	650	750	**173,00**
überlang *extended long*			**E.2618.0XL**
10,00	850	1000	**228,00**
11,00	850	1000	**268,00**
12,00	850	1000	**325,00**

E.2619.0

Universal

HSS | DIN 345 | UNIVERSAL TOOL | 118° | RH | TYP N | MK



HSS-Twist drills DIN 345

Wiertła skrętne HSS na stożku Morse'a, wg DIN 345

Punte HSS DIN 345

Brocas cónicas DIN 345 en HSS

Mit gefrästen Nuten
With milled flutes

Artikel-Nr. *Article-No.*				E.2619.0 €	Artikel-Nr. *Article-No.*				E.2619.0 €	Artikel-Nr. *Article-No.*				E.2619.0 €
d1	l2	l1	d2 MK	Stück *piece*	d1	l2	l1	d2 MK	Stück *piece*	d1	l2	l1	d2 MK	Stück *piece*
10,00	87	168	1	**11,50**	**21,75**	150	248	2	**32,40**	**36,00**	195	344	4	**97,00**
10,25	87	168	1	**11,50**	**22,00**	150	148	2	**30,00**	**37,00**	195	344	4	**114,00**
10,50	87	168	1	**11,50**	**22,25**	150	248	2	**33,50**	**38,00**	200	349	4	**118,00**
10,75	94	175	1	**13,00**	**22,50**	155	253	2	**30,00**	**39,00**	200	349	4	**124,00**
11,00	94	175	1	**12,00**	**22,75**	155	253	2	**34,80**	**39,50**	200	349	4	**127,00**
11,25	94	175	1	**13,00**	**23,00**	155	253	2	**32,00**	**40,00**	200	349	4	**130,00**
11,50	94	175	1	**12,00**	**23,25**	155	276	3	**30,50**	**40,50**	205	354	4	**133,00**
11,75	94	175	1	**14,00**	**23,50**	155	276	3	**36,50**	**41,00**	205	354	4	**136,00**
12,00	101	182	1	**13,00**	**23,75**	160	281	3	**36,50**	**41,50**	205	354	4	**138,00**
12,25	101	182	1	**14,00**	**24,00**	160	281	3	**35,00**	**42,00**	205	354	4	**140,00**
12,50	101	182	1	**13,00**	**24,25**	160	281	3	**38,00**	**42,50**	205	354	4	**143,00**
12,75	101	182	1	**15,00**	**24,50**	160	281	3	**35,00**	**43,00**	210	359	4	**148,00**
13,00	101	182	1	**14,00**	**24,75**	160	281	3	**40,00**	**43,50**	210	359	4	**150,00**
13,25	108	189	1	**16,00**	**25,00**	160	281	3	**36,00**	**44,00**	210	359	4	**153,00**
13,50	108	189	1	**15,00**	**25,25**	160	281	3	**41,00**	**44,50**	210	359	4	**153,00**
13,75	108	189	1	**17,00**	**25,50**	165	286	3	**41,00**	**45,00**	210	359	4	**160,00**
14,00	108	189	1	**16,00**	**25,75**	165	286	3	**44,00**	**45,50**	215	364	4	**165,00**
14,25	114	212	2	**17,50**	**26,00**	165	286	3	**40,00**	**46,00**	215	364	4	**168,00**
14,50	114	212	2	**16,50**	**26,25**	165	286	3	**44,00**	**46,50**	215	364	4	**175,00**
14,75	114	212	2	**18,50**	**26,50**	165	286	3	**42,00**	**47,00**	215	364	4	**180,00**
15,00	114	212	2	**17,40**	**26,75**	170	291	3	**46,00**	**47,50**	215	364	4	**185,00**
15,25	120	218	2	**18,70**	**27,00**	170	291	3	**42,00**	**48,00**	220	369	4	**195,00**
15,50	120	218	2	**17,80**	**27,25**	170	291	3	**47,00**	**48,50**	220	369	4	**204,00**
15,75	120	218	2	**19,50**	**27,50**	170	291	3	**43,00**	**49,00**	220	369	4	**210,00**
16,00	120	218	2	**18,30**	**27,75**	170	291	3	**51,00**	**49,50**	220	369	4	**218,00**
16,25	125	223	2	**19,80**	**28,00**	170	291	3	**47,00**	**50,00**	220	369	4	**228,00**
16,50	125	223	2	**18,90**	**28,25**	175	296	3	**54,00**	**50,50**	225	374	4	**228,00**
16,75	125	223	2	**20,50**	**28,50**	175	296	3	**48,00**	**51,00**	225	412	5	**302,00**
17,00	125	223	2	**19,50**	**28,75**	175	296	3	**56,00**	**52,00**	225	412	5	**305,00**
17,25	130	228	2	**21,20**	**29,00**	175	296	3	**53,00**	**53,00**	225	412	5	**310,00**
17,50	130	228	2	**20,20**	**29,25**	175	296	3	**58,00**	**53,50**	230	417	5	**318,00**
17,75	130	228	2	**22,00**	**29,50**	175	296	3	**53,00**	**54,00**	230	417	5	**320,00**
18,00	130	228	2	**21,00**	**29,75**	175	296	3	**64,00**	**55,00**	230	417	5	**325,00**
18,25	135	233	2	**23,50**	**30,00**	175	296	3	**57,00**	**56,00**	230	417	5	**346,00**
18,50	135	233	2	**22,50**	**30,25**	180	301	3	**67,00**	**57,00**	235	422	5	**370,00**
18,75	135	233	2	**25,00**	**30,50**	180	301	3	**61,00**	**58,00**	235	422	5	**410,00**
19,00	135	233	2	**23,80**	**30,75**	180	301	3	**70,00**	**59,00**	235	422	5	**440,00**
19,25	140	238	2	**26,50**	**31,00**	180	301	3	**65,00**	**60,00**	235	422	5	**475,00**
19,50	140	238	2	**25,00**	**31,25**	180	301	3	**74,00**	**61,00**	240	427	5	**530,00**
19,75	140	238	2	**27,70**	**31,50**	180	301	3	**69,00**	**62,00**	240	427	5	**548,00**
20,00	140	238	2	**23,00**	**31,75**	185	306	3	**78,00**	**63,00**	240	427	5	**560,00**
20,25	145	243	2	**29,50**	**32,00**	185	334	4	**69,00**	**65,00**	245	432	5	**595,00**
20,50	145	243	2	**28,00**	**32,50**	185	334	4	**70,00**	**68,00**	250	437	5	**658,00**
20,75	145	243	2	**31,00**	**33,00**	185	334	4	**73,00**	**70,00**	250	437	5	**680,00**
21,00	145	243	2	**29,50**	**33,50**	185	334	4	**76,00**	**75,00**	255	442	5	**790,00**
21,25	150	248	2	**31,80**	**34,00**	190	339	4	**78,00**	**80,00**	260	514	6	**990,00**
21,50	150	248	2	**31,00**	**35,00**	190	339	4	**86,00**	**100,00**	280	534	6	**1620,00**

E.2607.0

Universal

HSS | DIN 341 | LANG LONG | 118° | RH | TYP N | MK



- HSS-Twist drills milled quality long
- Wiertła skrętne frezowane HSS, długie
- Punte HSS qualità fresata, serie lunga
- Brocas cónicas, serie larga en HSS, fresadas a muela

Artikel-Nr. *Article-No.*				E.2607.0 € Stück *piece*
d1	l2	l1	d2 MK	
15,00	147	245	2	**35,00**
16,00	153	251	2	**38,00**
17,00	159	257	2	**41,00**
18,00	165	263	2	**43,00**
20,00	177	275	2	**54,00**
21,00	184	282	2	**66,00**
22,00	191	289	2	**74,00**
23,00	198	296	2	**79,00**
24,00	206	327	3	**98,00**
25,00	206	327	3	**108,00**
26,00	214	335	3	**118,00**
27,00	222	343	3	**128,00**
28,00	222	343	3	**135,00**
29,00	230	351	3	**146,00**
30,00	230	351	3	**151,00**
32,00	248	397	4	**180,00**
34,00	248	397	4	**204,00**
36,00	267	416	4	**231,00**
38,00	277	426	4	**260,00**
40,00	277	426	4	**286,00**
42,00	287	436	4	**320,00**
45,00	298	447	4	**380,00**
50,00	321	470	4	**525,00**



E.2608.0

Universal

HSS | DIN 1870 | XLANG XLONG | 118° | RH | TYP N | MK



HSS-Twist drills milled quality XL

Wiertła skrętne frezowane HSS, XL

Punte HSS qualità fresata, serie extra lunga

Brocas cónicas, XL, en HSS, fresadas a muela

Artikel-Nr. *Article-No.*				E.2608.0 € Stück *piece*
d1	l2	l1	d2 MK	
12,00	205	310	1	**60,00**
13,00	205	310	1	**63,00**
14,00	220	325	1	**72,00**
15,00	220	340	2	**73,00**
16,00	230	355	2	**78,00**
17,00	230	355	2	**80,00**
18,00	245	370	2	**86,00**
19,00	245	370	2	**91,00**
20,00	260	385	2	**110,00**
21,00	260	385	2	**138,00**
22,00	270	405	2	**150,00**
23,00	270	405	2	**164,00**
24,00	290	440	3	**175,00**
25,00	290	440	3	**185,00**
26,00	290	440	3	**190,00**
27,00	305	460	3	**215,00**
28,00	305	460	3	**220,00**
29,00	305	460	3	**230,00**
30,00	305	460	3	**238,00**
32,00	320	505	4	**285,00**
35,00	340	530	4	**326,00**
38,00	360	555	4	**380,00**
40,00	360	555	4	**425,00**
42,00	360	555	4	**480,00**
45,00	385	585	4	**535,00**
48,00	405	605	4	**658,00**
50,00	405	605	4	**660,00**

E.2609.0

Universal

HSS | DIN 1870 | XXLANG XXLONG | 118° | RH | TYP N | MK



HSS-Twist drills milled quality XXL

Wiertła skrętne frezowane na stożku Morse'a, XXL

Punte HSS qualità fresata, serie XXL

Brocas cónicas, XXL, en HSS, fresadas a muela

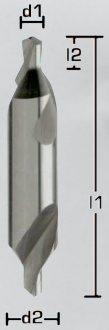
Artikel-Nr. *Article-No.*				E.2609.0 € Stück *piece*
d1	l2	l1	d2 MK	
12,00	260	395	1	**82,00**
13,00	260	395	1	**86,00**
14,00	275	410	1	**95,00**
15,00	275	425	2	**95,00**
16,00	295	445	2	**102,00**
17,00	295	445	2	**104,00**
18,00	310	465	2	**114,00**
20,00	325	490	2	**135,00**
21,00	325	490	2	**165,00**
22,00	345	515	2	**180,00**
23,00	345	515	2	**190,00**
24,00	365	555	3	**215,00**
25,00	365	555	3	**225,00**
26,00	365	555	3	**248,00**
27,00	385	580	3	**271,00**
28,00	385	580	3	**283,00**
29,00	385	580	3	**304,00**
30,00	385	580	3	**310,00**
32,00	410	635	4	**395,00**
35,00	430	665	4	**410,00**
38,00	460	695	4	**495,00**
40,00	460	695	4	**520,00**
42,00	460	695	4	**620,00**
45,00	490	735	4	**735,00**
48,00	510	765	4	**850,00**
50,00	510	765	4	**885,00**

HSS-Zentrierbohrer 60°

E.2631.0

Universal

HSS | UNIVERSAL TOOL | DIN 333 | FORM A | RH



HSS-Center drills 60°

Nawiertaki HSS 60°

Punte da centro a 60°, HSS

Brocas de centar de 60°, HSS

***= nur einseitig**
**= only one side*

Verpackungseinheit: bis Ø 3,15 mm 10 Stück/Abm.
Unit size: up to Ø 3,15 mm 10 pieces/size

Artikel-Nr. *Article-No.*				E.2631.0 € Stück *piece*
d1 k12	l2 + - 1	l1	d2 h8	
0,50*	0,6 - 0,8	25	3,15	**3,90**
0,80*	1,0 - 1,2	25	3,15	**4,00**
1,00	1,3 - 1,6	31	3,15	**3,70**
1,25	1,6 - 1,9	31	3,15	**3,70**
1,60	2,0 - 2,4	35	4,00	**3,60**
2,00	2,5 - 2,9	40	5,00	**4,00**
2,50	3,1 - 3,6	45	6,30	**4,40**
3,15	3,9 - 4,4	50	8,00	**5,30**
4,00	5,0 - 5,6	55	10,00	**8,00**
5,00	6,3 - 6,9	63	12,50	**11,40**
6,30	8,0 - 8,6	71	16,00	**20,00**
8,00	10,1 - 10,8	80	20,00	**32,00**
10,00	12,8 - 13,5	100	25,00	**63,00**

HSS-Zentrierbohrer 60° im Satz

SET.2631.2

Universal

HSS | DIN 333 | FORM A | RH | UNIVERSAL TOOL



30 Stück *pieces*
5 St. Ø 1 / 1,6 / 2 / 2,5 / 3,15 mm
4 St. Ø 4 mm
1 St. Ø 5 mm

SET.2631.3

Universal

HSS | DIN 333 | FORM A | RH | UNIVERSAL TOOL



15 Stück *pieces*
3 St. Ø 1 / 1,6 / 2 / 2,5 / 3,15 mm
2 St. Ø 4 mm
1 St. Ø 5 mm

Set of HSS-Center drills 60°

Zestaw nawiertaków HSS 60°

Assortimento punte da centro a 60°, HSS

Juego de brocas de centar de 60°, HSS

SET.2631.2 € Stück *piece*	SET.2631.3 € Stück *piece*
154,00	**78,00**

HSS/HSSE-Zentrierbohrer 60°/120°

E.2635.0
Universal

HSS | UNIVERSAL TOOL | DIN 333 | FORM B | RH



E.2636.0
Universal

HSS | UNIVERSAL TOOL | DIN 333 | FORM B | LH



HSS-Center drills 60°/120°

Nawiertaki HSS 60°/120°

Punte da centro 60°/120°, HSS

Brocas de centrar de 60°/120°, HSS

Artikel-Nr. *Article-No.*				E.2635.0 € Stück *piece*	E.2636.0 € Stück *piece*
d1 k12	l2 + - 1	l1	d2 h8		
1,00	1,3 - 1,6	35	4,0	**5,20**	**12,10**
1,25	1,6 - 1,9	40	5,0	**5,70**	**14,00**
1,60	2,0 - 2,4	45	6,3	**6,30**	**18,60**
2,00	2,5 - 2,9	50	8,0	**7,00**	**20,30**
2,50	3,1 - 3,6	55	10,0	**8,60**	**21,40**
3,15	3,9 - 4,4	63	11,2	**11,00**	**25,60**
4,00	5,0 - 5,6	71	14,0	**18,40**	**31,00**
5,00	6,3 - 6,9	80	18,0	**23,00**	**34,00**

HSS/HSSE-Zentrierbohrer 60°/120°

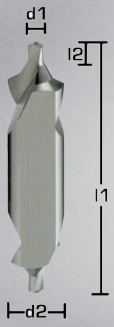
E.2637.0
Universal

HSS | UNIVERSAL TOOL | DIN 333 | FORM B | RH



E.2638.0
Universal

HSS-E | UNIVERSAL TOOL | DIN 333 | FORM B | RH



HSS-Center drills 60°/120°

Nawiertaki HSS 60°/120°

Punte da centro 60°/120°, HSS

Brocas de centrar de 60°/120°, HSS

Artikel-Nr. *Article-No.*				E.2637.0 € Stück *piece*	E.2638.0 € Stück *piece*
d1 k12	l2 + - 1	l1	d2 h8		
1,60	2,0 - 2,4	45	6,3	**7,70**	**10,70**
2,00	2,5 - 2,9	50	8,0	**8,50**	**12,50**
2,50	3,1 - 3,6	55	10,0	**11,00**	**14,50**
3,15	3,9 - 4,4	63	11,2	**14,00**	**17,70**
4,00	5,0 - 5,6	71	14,0	**21,00**	**26,70**
5,00	6,3 - 6,9	80	18,0	**28,00**	**35,50**

E.2639.0

Universal

HSS-E | UNIVERSAL TOOL | DIN 332 A | XLANG XLONG | RH | FORM A



HSSE-Center drills 60° extra long

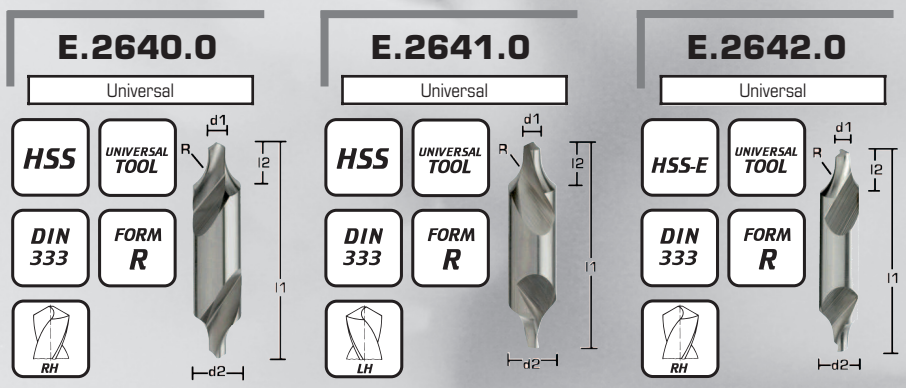
Nawiertaki HSS-E wydłużone 60°

Punte da centro 60°/120°, HSSE, extra lunghe

Brocas de centrar de 60°, HSSE, extralargas

Artikel-Nr. *Article-No.*			**E.2639.0** € **Stück** *piece*
d1 k12	l1	d2 h8	
0,75	60	3,5	**8,30**
0,75	120	3,5	**31,00**
1,00	60	4,0	**8,60**
1,00	100	4,0	**14,60**
1,00	120	4,0	**15,00**
1,00	150	4,0	**31,30**
1,50	60	5,0	**9,00**
1,50	100	5,0	**13,70**
1,50	150	5,0	**29,00**
2,00	80	6,0	**9,70**
2,00	100	6,0	**13,80**
2,00	120	6,0	**13,60**
2,00	150	6,0	**29,20**
2,00	200	5,0	**51,80**
2,50	80	8,0	**11,50**
2,50	100	8,0	**14,20**
2,50	120	8,0	**16,30**
2,50	150	8,0	**35,00**
2,50	200	6,3	**50,00**
3,00	80	8,0	**11,50**
3,00	100	8,0	**14,20**
3,00	100	10,0	**15,20**
3,00	150	8,0	**35,00**
3,00	150	10,0	**42,00**
3,15	120	8,0	**17,50**
3,15	120	10,0	**19,60**
3,15	200	8,0	**46,00**
4,00	100	10,0	**15,10**
4,00	100	12,0	**20,00**
4,00	120	10,0	**21,00**
4,00	120	12,0	**33,00**
4,00	150	10,0	**41,00**
4,00	150	12,0	**50,00**
4,00	200	10,0	**51,00**
5,00	120	14,0	**46,00**

HSS/HSSE-Radiuszentrierbohrer 60°



HSS/HSSE-Ball nose center drills 60°

Nawiertaki HSS/HSS-E 60° z czołem kulistym

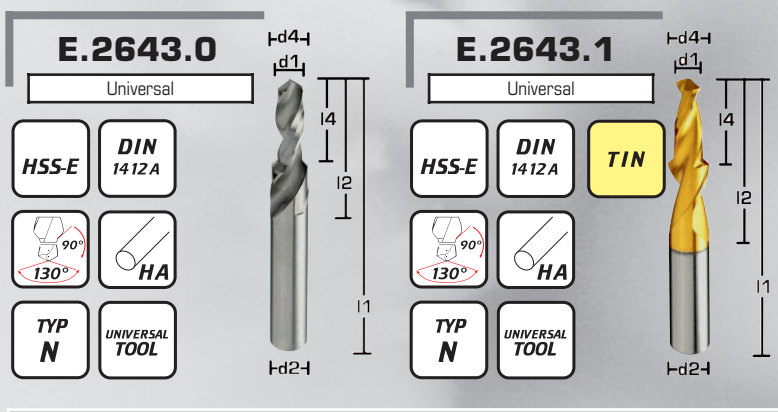
Punte da centro 60° con salvaraggio HSS/HSSE

Broca de centrar de 60° con radio, HSS/HSSE

***= nur einseitig**
**= only one side*

Artikel-Nr. *Article-No.*					E.2640.0 € Stück *piece*	E.2641.0 € Stück *piece*	E.2642.0 € Stück *piece*
d1 k12	R	l2 + - 1	l1	d2 h8			
0,50*	2,00	2,3 - 2,6	25	3,15	**3,80**	**11,30**	
0,80*	2,50	2,6 - 2,9	25	3,15	**4,00**	**9,30**	
1,00	2,90	3,0 - 3,3	31	3,15	**3,60**	**9,90**	
1,25	3,15	3,3 - 3,6	31	3,15	**3,60**	**8,30**	
1,60	4,00	4,2 - 4,7	35	4,00	**3,60**	**8,90**	**7,00**
2,00	5,00	5,0 - 5,4	40	5,00	**4,00**	**9,70**	**7,50**
2,50	6,30	6,3 - 6,8	45	6,30	**4,40**	**12,30**	**8,00**
3,15	8,00	8,0 - 8,5	50	8,00	**5,30**	**15,30**	**10,50**
4,00	10,00	10,0 - 10,6	55	10,00	**8,00**	**15,30**	**15,00**
5,00	12,50	12,5 - 13,1	63	12,50	**11,50**	**23,00**	**19,00**
6,30	16,00	16,0 - 16,6	71	16,00	**20,50**		**30,00**
8,00	20,00	20,0 - 20,7	80	20,00	**32,00**		**46,00**
10,00	25,00	25,0 - 25,7	100	25,00	**64,00**		

HSSE-Kurzstufenbohrer 90° Kernloch



HSSE-Short step drills 90° core hole

Wiertła krótkie stopniowe HSS-E pod gwint dla śrub z łbem stożkowym 90°

Punte a gradino , corte, 90° per filettatura

Broca escalonada 90° para agujeros previos, HSSE

Artikel-Nr. *Article-No.*							E.2643.0 € Stück *piece*	E.2643.1 € Stück *piece*
Gewinde *thread*	d1	l4	d4	l2	l1 + - 1	d2		
M 3,0	2,5	8	3,4	20	52	3,4	**7,00**	**9,00**
M 4,0	3,3	11	4,5	24	58	4,5	**7,00**	**9,00**
M 5,0	4,2	13	5,5	28	66	5,5	**8,00**	**11,00**
M 6,0	5,0	16	6,6	31	70	6,6	**10,00**	**12,00**
M 8,0	6,8	20	9,0	40	81	9,0	**12,00**	**14,50**
M 10,0	8,5	24	11,0	47	95	11,0	**14,00**	**18,00**
M 12,0	10,2	29	14,0	54	107	14,0	**19,00**	**25,00**

HSS-Kurzstufenbohrer 90° fein

E.2654.0

Universal

HSS

UNIVERSAL TOOL

TYP N



HSS-Short step drills 90° fine

Wiertła stopniowe HSS krótkie 90°, do otworów dokładnych

Punte a gradino HSS 90°, fine

Broca escalonada 90°, fino, HSS

Artikel-Nr. *Article-No.*							E.2654.0 € Stück *piece*
Gewinde *thread*	d1	l4	d4	l2	l1 + - 1	d2	
M 3,0	3,2	9	6,0	28	66	6,0	**9,00**
M 4,0	4,3	11	8,0	37	79	8,0	**12,00**
M 5,0	5,3	13	10,0	43	89	10,0	**14,50**
M 6,0	6,4	15	11,5	47	95	11,5	**18,50**
M 8,0	8,4	19	15,0	56	111	15,0	**29,80**
M 10,0	10,5	23	19,0	64	127	19,0	**36,00**

HSS-Kurzstufenbohrer 90° mittel

E.2655.0

Universal

HSS

UNIVERSAL TOOL

TYP N



HSS-Short step drills 90° medium

Wiertła stopniowe HSS krókie 90°, do otworów średnio-dokładnych

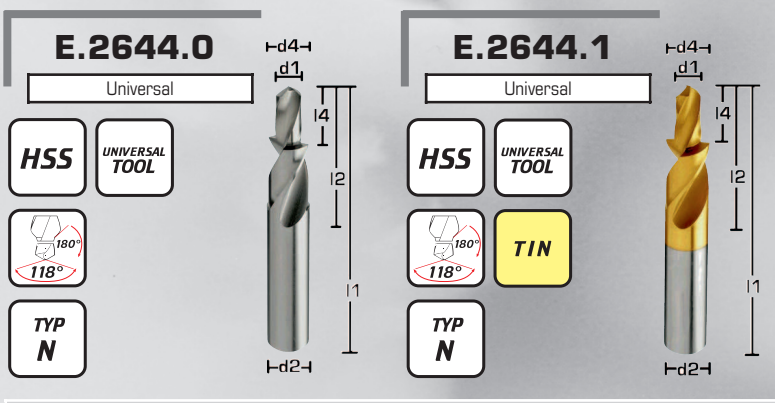
Punte a gradino HSS 90°, medio

Broca escalonada 90°, medio, HSS

Artikel-Nr. *Article-No.*							E.2655.0 € Stück *piece*
Gewinde *thread*	d1	l4	d4	l2	l1 + - 1	d2	
M 3,0	3,4	6,6	9	31	70	6,6	**11,00**
M 4,0	4,5	9,0	11	40	84	9,0	**14,00**
M 5,0	5,5	11,0	13	47	95	11,0	**19,00**
M 6,0	6,6	13,0	15	51	105	13,0	**22,00**
M 8,0	9,0	17,2	19	62	123	17,2	**35,00**
M 10,0	11,0	21,5	23	70	141	21,5	**44,00**

Mehrfasenstufenbohrer DIN 8374, 8376, 8378, 8375, 8377 und 8379 kurzfristig lieferbar
Multiple margines step drills DIN 8374, 8376, 8378, 8375, 8377 and 8379 with short delivery time

HSS-Kurzstufenbohrer 180°



HSS-Short step drills 180°

Wiertła stopniowe HSS krótkie 180°

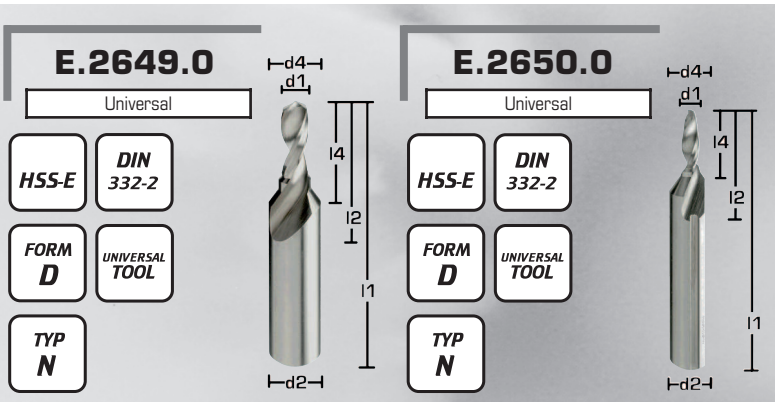
Punte a gradino HSS 180°, corte

Broca escalonada 180°, HSS

Gewinde *thread*	d1 + - *0,05*	l4	d4	l2	l1 + - 1	d2	E.2644.0 € Stück *piece*	E.2644.1 € Stück *piece*
M 3,0	3,4	6	9	28	66	6	**14,00**	**16,00**
M 4,0	4,5	8	11	37	79	8	**16,00**	**19,00**
M 5,0	5,5	10	13	43	89	10	**18,00**	**22,00**
M 6,0	6,6	11	15	47	95	11	**22,00**	**28,00**
M 8,0	9,0	15	19	56	111	15	**28,00**	**37,00**
M 10,0	11,0	18	23	62	127	18	**42,00**	**50,00**

Artikel-Nr. *Article-No.*

HSSE-Stufenbohrer für Kernlochzentrierungen



HSSE-Step drills for core hole centering

Wiertła stopniowe HSS-E do fazowania nakiełków

Punte a gradino HSSE per accentrare fori

Broca escalonada HSSE para centrar agujeros previos

Für Kernlochzentrierungen 90°/60°
For core hole centering 90°/60°

Gewinde *thread*	d1	l4	d4	l2	l1	d2	E.2649.0 € Stück *piece*	E.2650.0 € Stück *piece*
M 3,0	2,5	3,2	9,0	18	55	6,0	**45,00**	
M 4,0	3,3	4,3	12,6	23	63	8,0	**36,00**	**43,00**
M 5,0	4,2	5,3	15,1	27	67	10,0	**38,00**	**45,00**
M 6,0	5,0	6,4	18,9	33	71	12,5	**45,00**	**52,00**
M 8,0	6,8	8,4	23,0	41	88	14,0	**60,00**	**70,00**
M 10,0	8,5	10,5	27,7	47	90	16,0	**65,00**	**76,00**
M 12,0	10,2	13,0	34,5	59	105	20,0	**84,00**	**97,00**
M 16,0	14,0	17,0	41,3	67	132	25,0		**172,00**
M 20,0	17,5	21,0	48,3	77	145	31,5		**272,00**
M 24,0	21,0	25,0	57,0	90	160	40,0		**433,00**

Artikel-Nr. *Article-No.*

HSS-Mehrfasenstufenbohrer fein 90°

E.2610.0

Universal

HSS | DIN 8374 | OX

RH

TYP N



HSS-Subland drills 90° fine

Wiertła stopniowe HSS 90°, do otworów dokładnych

Punte a gradino HSS 90°, fine

Broca bidiametral, 90°, fino, HSS

Artikel-Nr. *Article-No.*						**E.2610.0** €
für Gewinde *for thread*	d1	l4	d4	l2	l1	**Stück** *piece*
M 3	3,2	9,0	6,0	57	93	**32,00**
M 4	4,3	11,0	8,0	75	117	**38,00**
M 5	5,3	13,0	10,0	87	133	**46,00**
M 6	6,4	15,0	11,5	94	142	**55,00**
M 8	8,4	19,0	15,5	114	169	**89,00**
M 10	10,5	23,0	19,0	135	198	**108,00**

HSS-Mehrfasenstufenbohrer 90° mittel

E.2620.0

Universal

HSS | OX

RH

TYP N



HSS-Subland drills 90° middle

Wiertła stopniowe HSS 90°, do otworów średnio-dokładnych

Punte a gradino HSS, multifase 90°, medio

Broca bidiametral, 90°, medio, HSS

Artikel-Nr. *Article-No.*						**E.2620.0** €
für Gewinde *for thread*	d1	l4	d4	l2	l1	**Stück** *piece*
M 3	3,4	9,0	6,6	63	101	**37,00**
M 4	4,5	11,0	9,0	81	125	**43,00**
M 5	5,5	13,0	11,0	94	142	**52,00**
M 6	6,6	15,0	13,0	101	151	**80,00**
M 8	9,0	19,0	17,2	130	191	**124,00**

HSS-Mehrfasenstufenbohrer 90°

E.2611.0

Universal

HSS | DIN 8378 | RH | OX | TYP N



- HSS-Subland drills 90°
- Wiertła stopniowe HSS 90°
- Punte a gradino HSS, multifase 90°
- Broca bidiametral 90°, HSS

Artikel-Nr. *Article-No.*						E.2611.0 € Stück *piece*
für Gewinde *for thread*	d1	l4	d4	l2	l1	
M 3	2,5	8,8	3,4	39	70	**26,00**
M 4	3,3	11,4	4,5	47	80	**27,00**
M 5	4,2	13,6	5,5	57	93	**28,00**
M 6	5,0	16,5	6,6	63	101	**32,00**
M 8	6,8	21,0	9,0	81	125	**37,00**
M 10	8,5	25,5	11,0	94	142	**47,00**
M 12	10,2	30,0	13,5	108	160	**62,00**

HSS-Mehrfasenstufenbohrer 180°

E.2645.0

Universal

HSS | DIN 8376 | RH | OX | TYP N



- HSS-Subland drills 180°
- Wiertła stopniowe HSS 180°
- Punte a gradino HSS, multifase 180°
- Broca bidiametral 180°, HSS

Artikel-Nr. *Article-No.*						E.2645.0 € Stück *piece*
für Gewinde *for thread*	d1	l4	d4	l2	l1	
M 3	3,4	9,0	6,0	57	93	**28,00**
M 4	4,5	11,0	8,0	75	117	**34,00**
M 5	5,5	13,0	10,0	87	133	**40,00**
M 6	6,6	15,0	11,0	94	142	**48,00**
M 8	9,0	19,0	15,0	114	169	**60,00**
M 10	11,0	23,0	18,0	130	191	**90,00**

HSS-Mehrfasenstufenbohrer 90°

E.2612.0

Universal

HSS | DIN 8375 | RH | OX | TYP N | MK



HSS-Subland drills 90°

Wiertła skrętne 90° HSS na stożku Morse'a

Punte a gradino HSS, multifase 90°

Broca bidiametral 90°, HSS

Artikel-Nr. *Article-No.*							**E.2612.0** € Stück *piece*
für Gewinde *for thread*	d1	l4	d4	l2	l1	d2 MK	
M 5	5,5	13	11,0	94	175	1	**66,00**
M 6	6,6	15	13,0	101	182	1	**90,00**
M 8	9,0	19	17,2	130	228	2	**109,00**
M 10	11,0	23	21,5	150	248	2	**156,00**
M 12	14,0	27	26,0	165	286	3	**194,00**
M 14	16,0	31	29,0	175	296	3	**225,00**

HSS-Mehrfasenstufenbohrer 180°

E.2646.0

Universal

HSS | DIN 8377 | RH | OX | TYP N | MK



HSS-Subland drills 180°

Wiertła skrętne 180° HSS na stożku Morse'a

Punte a gradino HSS, multifase 180°

Broca bidiametral 180°, HSS

Artikel-Nr. *Article-No.*							**E.2646.0** € Stück *piece*
für Gewinde *for thread*	d1	l4	d4	l2	l1	d2 MK	
M 5	5,5	13	10,0	87	168	1	**58,00**
M 6	6,6	15	11,0	94	175	1	**60,00**
M 8	9,0	19	15,0	114	212	2	**80,00**
M 10	11,0	23	18,0	130	228	2	**105,00**
M 12	13,5	27	20,0	140	238	2	**126,00**
M 14	15,5	31	24,0	160	281	3	**160,00**
M 16	17,5	35	26,0	165	286	3	**188,00**
M 18	20,0	39	30,0	175	296	3	**218,00**
M 20	22,0	43	33,0	185	334	4	**260,00**

E.2613.0

Universal

HSS | DIN 8379 | RH | OX | TYP N | MK



HSS-Subland drills 90°

Wiertła skrętne 90° HSS na stożku Morse'a

Punte a gradino HSS, multifase 90°

Broca bidiametral 90°, HSS

Artikel-Nr. *Article-No.*							E.2613.0 € Stück *piece*
für Gewinde *for thread*	d1	l4	d4	l2	l1	d2 MK	
M 8	6,8	21,0	9,0	81	162	1	**59,00**
M 10	8,5	25,5	11,0	94	175	1	**67,00**
M 12	10,2	30,0	13,5	108	189	1	**79,00**
M 14	12,0	34,5	15,5	120	218	2	**95,00**
M 16	14,0	38,5	17,5	130	228	2	**114,00**
M 18	15,5	43,5	20,0	140	238	2	**145,00**
M 20	17,5	47,5	22,0	150	248	2	**154,00**



HSSE-Kernbohrer

E.2614.0

1.1

HSS-E



HSSE-Core cutters

Wiertła trepanacyjne HSS-E

Punte a svasare, HSSE

Broca escariador HSSE

Artikel-Nr. *Article-No.*		E.2614.0 € Stück *piece*	Artikel-Nr. *Article-No.*		E.2614.0 € Stück *piece*
d1	Zähne *flutes*		d1	Zähne *flutes*	
20,00	6	**58,00**	**37,00**	10	**130,00**
21,00	6	**62,00**	**38,00**	10	**134,00**
22,00	6	**65,00**	**39,00**	10	**139,00**
23,00	6	**70,00**	**40,00**	10	**145,00**
24,00	6	**74,00**	**41,00**	12	**148,00**
25,00	8	**78,00**	**42,00**	12	**153,00**
26,00	8	**82,00**	**43,00**	12	**158,00**
27,00	8	**85,00**	**44,00**	12	**163,00**
28,00	8	**90,00**	**45,00**	12	**170,00**
29,00	8	**93,00**	**46,00**	12	**167,00**
30,00	8	**97,00**	**47,00**	12	**173,00**
31,00	8	**102,00**	**48,00**	12	**180,00**
32,00	8	**106,00**	**49,00**	12	**197,00**
33,00	10	**111,00**	**50,00**	14	**204,00**
34,00	10	**116,00**	**51,00**	14	**212,00**
35,00	10	**120,00**	**52,00**	14	**218,00**
36,00	10	**125,00**			

Aufnahme für Kernbohrer

E.2624.0

HSS-E



Boring bar for core cutters

Uchwyt do wierteł trepanacyjnych pod chwyt stożek Morse'a

Barre per svasatori

Barra para brocas escariadores

Artikel-Nr. *Article-No.*			E.2624.0 € Stück *piece*
d1 +0,01	d2	l1	
19,05	20,0	112	**62,00**
MK-Schaft *MT-shank*			
19,05	2	145	**70,00**
19,05	3	166	**75,00**

Einsatzrichtwerte für HSS/HSSE-Bohrer *Estimated values for use for HSS/HSSE-Drills*

VR/fz	Vorschub (mm/U) *feed (mm/U)*														
	< Ø 0,5	< Ø 1	< Ø 2	< Ø 2,5	< Ø 3	< Ø 4	< Ø 5	< Ø 6	< Ø 8	< Ø 10	< Ø 12	< Ø 16	< Ø 20	< Ø 25	< Ø 30
1	0,004	0,006	0,020	0,025	0,032	0,040	0,040	0,050	0,063	0,080	0,080	0,100	0,125	0,160	0,160
2	0,006	0,008	0,025	0,032	0,040	0,050	0,050	0,063	0,080	0,100	0,100	0,125	0,160	0,200	0,200
3	0,007	0,012	0,032	0,040	0,050	0,063	0,063	0,080	0,100	0,15	0,125	0,160	0,200	0,250	0,250
4	0,008	0,014	0,040	0,050	0,063	0,080	0,080	0,100	0,125	0,160	0,160	0,200	0,250	0,315	0,315
5	0,010	0,016	0,050	0,063	0,080	0,100	0,100	0,125	0,160	0,200	0,200	0,250	0,315	0,400	0,400
6	0,012	0,018	0,063	0,080	0,100	0,125	0,125	0,160	0,200	0,250	0,250	0,315	0,400	0,500	0,500
7	0,014	0,020	0,080	0,100	0,125	0,160	0,160	0,200	0,250	0,315	0,315	0,400	0,500	0,630	0,630
8	0,016	0,023	0,100	0,125	0,160	0,200	0,200	0,250	0,315	0,400	0,400	0,500	0,630	0,800	0,800
9	0,019	0,025	0,125	0,160	0,160	0,200	0,250	0,315	0,315	0,400	0,500	0,630	0,630	0,800	1,000

	Bohrer *drills* **HSS blank** *uncoated* **OX** *black* **DIN 1897/338/345**		**Bohrer** *drills* **HSSE/Inox/Alu blank** *uncoated* **DIN 1897/338**		**Bohrer** *drills* **HSSE TIN DIN 1897/338**		**Bohrer** *drills* **HSSE BlueCut DIN 1897/338**		**Bohrer** *drills* **HSSE TIN DIN 340**		**Bohrer** *drills* **HSSE blank** *uncoated* **DIN 1870/>1870**	
Materialgruppe *material group*	**Vc** (m/min)	**VR / fz**	**Vc** (m/min)	**VR / fz**	**Vc** (m/min)	**VR / fz**	**Vc** (m/min)	**VR / fz**	**Vc** (m/min)	**VR**	**Vc** (m/min)	**VR**
1.1	18	6			30	5			30	6	22	4
1.2	15	3	20	5	25	5	25	6	20	6	20	4
1.3			14	3	18	4	20	4	20	4	12	3
2.1			15	4	20	4	20	4	14	3	8	2
2.2			10	3	10	2	10	3	10	2		
3.1	30	6	28	6	35	6			30	6	25	5
3.2	25	4										
3.3	20	4					50	6	25	5		
3.4									20	5		
4.1	80	7	60	6	70	7	100	8	60	6	70	6
4.2	60	7	50	5	60	6	100	8	60	6	50	6
4.3	45	5	40	5	50	6	80	7	50	6	40	5
4.4									60	6		
4.5							50	6	30	4		
4.6							50	6				
4.7	15	4	18	4	28	4	30	5	20	4	15	3
4.8												
4.9												
5.1			10	2	10	2	10	2	10	1	6	1
5.2			6	2					15	2		
6.1					4	1	4	2				
6.2												
6.3												
6.4												



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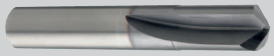
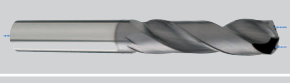
	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	Stahl	Inox	NE-Metalle	Guss	Titan	HRC	Graphit	
	VHM	Werks-(Company) Norm		E.3604.0	3		✔	✔		✔			
	VHM	Werks-(Company) Norm		E.3608.0	3		✔	✔		✔			
	VHM	Werks-(Company) Norm		E.3673.0	4		✔			✔			
	VHM	Werks-(Company) Norm	Blue Cut	E.3676.1	5 - 6		✔			✔			
	VHM	ähnl. DIN 1899		E.3601.0	6	✔		✔	✔				
	VHM	90°		E.3631.0	7	✔	✔	✔	✔				
	VHM	90°	LH	E.3632.0	7	✔	✔	✔	✔				
	VHM	120°		E.3633.0	7	✔	✔	✔	✔				
	VHM	142°		E.3671.0	7	✔	✔	✔	✔				
	VHM	90°	Blue Cut	E.3636.1	8	✔					✔		
	VHM	120°	Blue Cut	E.3637.1	8	✔					✔		
	VHM	142°	Blue Cut	E.3652.1	8	✔					✔		
	VHM	90°		E.3634.0	9	✔	✔	✔	✔				
	VHM	120°		E.3635.0	9	✔	✔	✔	✔				
	VHM	Werks-(Company) Norm	Blue Cut	E.3602.1	9	✔					✔		
	VHM	DIN 1897	Blue Cut	E.3603.1	10	✔					✔		
	VHM	Werks-(Company) Norm		E.3605.0	11	✔	✔	✔	✔				
	VHM	Werks-(Company) Norm	LH	E.3677.0	12	✔	✔	✔	✔				
	VHM	Werks-(Company) Norm		E.3668.0	13	✔	✔	✔	✔				
	VHM	DIN 1897		E.3606.0	14	✔	✔	✔	✔				
	VHM	DIN 338		E.3607.0	15	✔	✔	✔	✔				
	VHM	Werks-(Company) Norm		E.3609.0	16	✔	✔	✔	✔				
	VHM	Werks-(Company) Norm	Blue Cut	E.3611.1	17	✔	✔	✔	✔	✔			

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	WERKS-(COMPANY) NORM	Blue Cut	E.3684.1	17	✔	✔	✔	✔	✔			
	VHM	WERKS-(COMPANY) NORM	Blue Cut	E.3612.1	17	✔	✔	✔	✔	✔			
	VHM	WERKS-(COMPANY) NORM	Blue Cut	E.3685.1	17	✔	✔	✔	✔	✔			
	VHM	3xD	Blue Cut	E.3645.1	18 - 20	✔			✔				
	VHM	3xD	Blue Cut	E.3646.1	18 - 20	✔			✔				✔
	VHM	3xD	Blue Cut	E.3647.1	18 - 20		✔			✔			✔
	VHM	5xD	Blue Cut	E.3665.1	21 - 23	✔			✔				
	VHM	5xD	Blue Cut	E.3617.1	21 - 23	✔							✔
	VHM	5xD	Blue Cut	E.3618.1	21 - 23		✔			✔			✔
	VHM	5xD	Blue Cut	E.3619.1	21 - 23			✔		✔			✔
	VHM	5xD	POLIERT polished	E.3628.0	24			✔	✔				✔
	VHM	8xD	Blue Cut	E.3610.1	25		✔			✔			
	VHM	8xD	Blue Cut	E.3666.1	26 - 28	✔			✔				✔
	VHM	8xD	Blue Cut	E.3623.1	26 - 28		✔			✔			✔
	VHM	8xD	Blue Cut	E.3624.1	26 - 28			✔					✔
	VHM	8xD	POLIERT polished	E.3629.0	29			✔	✔				✔
	VHM	8xD	Blue Cut	E.3672.1	30						✔		✔
	VHM	12xD	Blue Cut	E.3613.1	31		✔	✔		✔			
	VHM	12xD	Blue Cut	E.3667.1	32 - 34	✔							✔
	VHM	12xD	Blue Cut	E.3625.1	32 - 34	✔							✔
	VHM	12xD	Blue Cut	E.3681.1	32 - 34		✔	✔		✔			✔
	VHM	12xD	POLIERT polished	E.3630.0	35			✔	✔				✔
	VHM	15xD	Blue Cut	E.3674.1	36	✔		✔	✔				✔

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	20xD	Blue Cut	E.3616.1	37	✔							
	VHM	20xD	SPEZIAL BESCHICHTUNG COATING	E.3620.1	37		✔			✔			
Tieflochbohrer *Deephole drill*				E.3614.0	38 - 39	✔			✔				
	VHM	DIN 333		E.3638.0	40	✔	✔	✔	✔				
	VHM	180° 140°		E.3639.0	40	✔	✔	✔	✔				
	VHM	90° 140°	Blue Cut	E.3640.1	41	✔	✔	✔	✔				
	VHM	90° 140°		E.3642.0	41	✔	✔	✔	✔				
	VHM	90° 140°	Blue Cut	E.3643.1	42	✔	✔	✔	✔				✔
	VHM	90° 140°	POLIERT polished	E.3644.0	42			✔	✔				✔

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

VHM-Spitzbohrer

E.3604.0

2.1 | 2.2 | 5.1

VHM | WERKS-NORM (COMPANY) | 118° | INOX | HA | TITAN



Pointed solid carbide drills

Wiertła spiczaste z węglika spiekanego

Punte a lancia in MD

Brocas punteadas de metal duro integral

Artikel-Nr. *Article-No.*				E.3604.0 € Stück *piece*
d1	l2	l1	d2 h6	
0,50 - 0,79	3	30	1,0	
0,80 - 1,49	9	30	1,5	
1,50 - 1,99	10	38	2,0	***Auf Anfrage***
2,00 - 2,49	12	38	2,5	
2,50 - 2,99	15	38	3,0	*on demand*
3,00 - 3,99	18	50	4,0	
4,00 - 4,99	20	50	5,0	
5,00 - 5,99	25	50	6,0	

VHM-Kanonenbohrer

E.3608.0

2.1 | 2.2 | 5.1

VHM | WERKS-NORM (COMPANY) | 118° | INOX | HA | TITAN



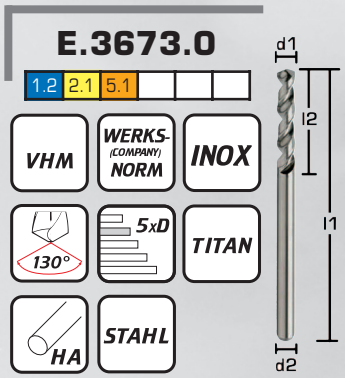
Solid carbide gun drill

Wiertła pistoletowe z węglika spiekanego

Punte in MD a cannone

Brocas de canón de metal duro integral

Artikel-Nr. *Article-No.*				E.3608.0 € Stück *piece*
d1	l2	l1	d2 h6	
0,50 - 0,79	3	30	1,0	
0,80 - 1,49	9	30	1,5	
1,50 - 1,99	10	38	2,0	***Auf Anfrage***
2,00 - 2,49	12	38	2,5	
2,50 - 2,99	15	38	3,0	*on demand*
3,00 - 3,99	18	50	4,0	
4,00 - 4,99	20	50	5,0	
5,00 - 5,99	25	50	6,0	



Solid carbide micro drills rising in steps of 0,01 mm

Wiertła miniaturowe z węglika spiekanego - średnice co 0.01 mm

Micropunte in MD centesimali 0,01 mm

Microbrocas de metal duro integral con incrementos de 0,01 mm

Artikel-Nr. *Article-No.*				E.3673.0 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3673.0 € Stück *piece*
d1 h5	l2	l1	d2 h7		d1 h5	l2	l1	d2 h7	
0,10 - 0,14	0,7	30	1,0	**15,00**	**1,35**	11,0	38	3,0	**16,00**
0,15 - 0,19	1,0	30	1,0	**13,00**	**1,36 - 1,39**	11,0	38	3,0	**18,30**
0,20	1,0	30	1,0	**10,00**	**1,40**	11,0	38	3,0	**16,00**
0,21 - 0,24	1,0	30	1,0	**11,60**	**1,41 - 1,44**	11,0	38	3,0	**18,30**
0,25 - 0,29	1,0	30	1,0	**11,60**	**1,45**	11,0	38	3,0	**16,80**
0,30	1,5	38	3,0	**15,30**	**1,46 - 1,49**	11,0	38	3,0	**19,30**
0,31 - 0,34	1,5	38	3,0	**17,30**	**1,50**	11,0	38	3,0	**16,80**
0,35	1,5	38	3,0	**15,30**	**1,51 - 1,54**	12,0	38	3,0	**19,30**
0,36 - 0,39	1,5	38	3,0	**17,30**	**1,55**	12,0	38	3,0	**16,80**
0,40	2,0	38	3,0	**15,30**	**1,56 - 1,59**	12,0	38	3,0	**19,30**
0,41 - 0,44	2,0	38	3,0	**17,30**	**1,60**	12,0	38	3,0	**17,30**
0,45	3,5	38	3,0	**14,50**	**1,61 - 1,64**	12,0	38	3,0	**20,00**
0,46 - 0,49	3,5	38	3,0	**16,50**	**1,65**	12,0	38	3,0	**17,30**
0,50	4,0	38	3,0	**14,50**	**1,66 - 1,69**	12,0	38	3,0	**20,00**
0,51 - 0,54	4,0	38	3,0	**16,50**	**1,70**	12,0	38	3,0	**17,30**
0,55	4,5	38	3,0	**14,50**	**1,71 - 1,74**	12,0	38	3,0	**20,00**
0,56 - 0,59	4,5	38	3,0	**16,50**	**1,75**	12,0	38	3,0	**17,30**
0,60	5,0	38	3,0	**14,50**	**1,76 - 1,79**	12,0	38	3,0	**20,00**
0,61 - 0,64	5,0	38	3,0	**16,50**	**1,80**	12,0	38	3,0	**17,90**
0,65	5,0	38	3,0	**14,50**	**1,81 - 1,84**	12,0	38	3,0	**20,50**
0,66 - 0,69	5,0	38	3,0	**16,50**	**1,85**	12,0	38	3,0	**17,90**
0,70	5,5	38	3,0	**14,50**	**1,86 - 1,89**	12,0	38	3,0	**20,50**
0,71 - 0,74	5,5	38	3,0	**16,50**	**1,90**	12,0	38	3,0	**17,90**
0,75	5,5	38	3,0	**14,50**	**1,91 - 1,94**	12,0	38	3,0	**20,50**
0,76 - 0,79	5,5	38	3,0	**16,50**	**1,95**	12,0	38	3,0	**17,90**
0,80	5,5	38	3,0	**14,50**	**1,96 - 1,99**	12,0	38	3,0	**20,50**
0,81 - 0,84	5,5	38	3,0	**16,50**	**2,00**	12,0	38	3,0	**17,90**
0,85	5,5	38	3,0	**14,50**	**2,05**	15,0	50	3,0	**20,00**
0,86 - 0,89	7,0	38	3,0	**16,50**	**2,10**	15,0	50	3,0	**20,00**
0,90	7,0	38	3,0	**15,00**	**2,20**	15,0	50	3,0	**20,80**
0,91 - 0,94	7,0	38	3,0	**16,70**	**2,25**	15,0	50	3,0	**20,80**
0,95	7,0	38	3,0	**15,00**	**2,30**	15,0	50	3,0	**20,80**
0,96 - 0,99	8,0	38	3,0	**16,70**	**2,35**	15,0	50	3,0	**21,00**
1,00	8,0	38	3,0	**15,00**	**2,40**	15,0	50	3,0	**21,00**
1,01 - 1,04	8,0	38	3,0	**16,70**	**2,45**	15,0	50	3,0	**21,00**
1,05	8,0	38	3,0	**15,00**	**2,50**	15,0	50	3,0	**21,50**
1,06 - 1,09	8,0	38	3,0	**16,70**	**2,55**	15,0	50	3,0	**22,60**
1,10	8,0	38	3,0	**15,30**	**2,60**	18,0	50	3,0	**22,60**
1,11 - 1,14	8,0	38	3,0	**17,30**	**2,65**	18,0	50	3,0	**22,60**
1,15	8,0	38	3,0	**15,30**	**2,70**	18,0	50	3,0	**23,20**
1,16 - 1,19	8,0	38	3,0	**17,30**	**2,75**	18,0	50	3,0	**23,20**
1,20	10,0	38	3,0	**15,30**	**2,80**	18,0	50	3,0	**23,70**
1,21 - 1,24	10,0	38	3,0	**17,30**	**2,85**	18,0	50	3,0	**23,70**
1,25	10,0	38	3,0	**15,30**	**2,90**	18,0	50	3,0	**24,00**
1,26 - 1,29	10,0	38	3,0	**17,30**	**2,95**	18,0	50	3,0	**24,00**
1,30	10,0	38	3,0	**16,00**	**3,00**	18,0	50	3,0	**24,00**
1,31 - 1,34	10,0	38	3,0	**18,30**					

E.3676.1

1.2 | 2.1 | 5.1

VHM | WERKS-NORM (COMPANY) | Blue Cut

140° | 8xD | TITAN

HA | STAHL | INOX



Solid carbide micro drills rising in steps of 0,01 mm

Wiertła miniaturowe z węglika spiekanego - średnice skokiem co 0.01 mm

Micropunte in MD centesimali 0,01 mm

Microbrocas de metal duro integral con incrementos de 0,01 mm para alta velocidad

Artikel-Nr. *Article-No.*				E.3676.1 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3676.1 € Stück *piece*
d1 g5	l2	l1	d2 h7		d1 g5	l2	l1	d2 h7	
0,78	5,7	50	3,0	**80,00**	**1,29**	9,4	50	3,0	**76,00**
0,79	5,7	50	3,0	**80,00**	**1,30**	9,4	50	3,0	**69,00**
0,80	5,8	50	3,0	**73,00**	**1,31**	9,5	50	3,0	**76,00**
0,81	5,9	50	3,0	**80,00**	**1,32**	9,6	50	3,0	**76,00**
0,82	5,9	50	3,0	**80,00**	**1,33**	9,6	50	3,0	**76,00**
0,83	6,0	50	3,0	**80,00**	**1,34**	9,7	50	3,0	**76,00**
0,84	6,1	50	3,0	**80,00**	**1,35**	9,8	50	3,0	**72,50**
0,85	6,2	50	3,0	**76,40**	**1,36**	9,9	50	3,0	**76,00**
0,86	6,2	50	3,0	**80,00**	**1,37**	9,9	50	3,0	**76,00**
0,87	6,3	50	3,0	**80,00**	**1,38**	10,0	50	3,0	**76,00**
0,88	6,4	50	3,0	**80,00**	**1,39**	10,1	50	3,0	**76,00**
0,89	6,5	50	3,0	**80,00**	**1,40**	10,2	50	3,0	**69,00**
0,90	6,5	50	3,0	**72,70**	**1,41**	10,2	50	3,0	**76,00**
0,91	6,6	50	3,0	**80,00**	**1,42**	10,3	50	3,0	**76,00**
0,92	6,7	50	3,0	**80,00**	**1,43**	10,4	50	3,0	**76,00**
0,93	6,7	50	3,0	**80,00**	**1,44**	10,4	50	3,0	**76,00**
0,94	6,8	50	3,0	**80,00**	**1,45**	10,5	50	3,0	**72,50**
0,95	6,9	50	3,0	**76,50**	**1,46**	10,6	50	3,0	**76,00**
0,96	7,0	50	3,0	**80,00**	**1,47**	10,7	50	3,0	**76,00**
0,97	7,0	50	3,0	**80,00**	**1,48**	10,7	50	3,0	**76,00**
0,98	7,1	50	3,0	**80,00**	**1,49**	10,8	50	3,0	**76,00**
0,99	7,2	50	3,0	**80,00**	**1,50**	10,9	50	3,0	**69,00**
1,00	7,3	50	3,0	**69,00**	**1,51**	10,9	50	3,0	**76,00**
1,01	7,3	50	3,0	**76,00**	**1,52**	11,0	50	3,0	**76,00**
1,02	7,4	50	3,0	**76,00**	**1,53**	11,1	50	3,0	**76,00**
1,03	7,5	50	3,0	**76,00**	**1,54**	11,2	50	3,0	**76,00**
1,04	7,5	50	3,0	**76,00**	**1,55**	11,2	50	3,0	**72,50**
1,05	7,6	50	3,0	**72,50**	**1,56**	11,3	50	3,0	**76,00**
1,06	7,7	50	3,0	**76,00**	**1,57**	11,4	50	3,0	**76,00**
1,07	7,8	50	3,0	**76,00**	**1,58**	11,5	50	3,0	**76,00**
1,08	7,8	50	3,0	**76,00**	**1,59**	11,5	50	3,0	**76,00**
1,09	7,9	50	3,0	**76,00**	**1,60**	11,6	50	3,0	**69,00**
1,10	8,0	50	3,0	**69,00**	**1,61**	11,7	50	3,0	**76,00**
1,11	8,0	50	3,0	**76,00**	**1,62**	11,7	50	3,0	**76,00**
1,12	8,1	50	3,0	**76,00**	**1,63**	11,8	50	3,0	**76,00**
1,13	8,2	50	3,0	**76,00**	**1,64**	11,9	50	3,0	**76,00**
1,14	8,3	50	3,0	**76,00**	**1,65**	12,0	50	3,0	**72,50**
1,15	8,3	50	3,0	**72,50**	**1,66**	12,0	50	3,0	**76,00**
1,16	8,4	50	3,0	**76,00**	**1,67**	12,1	50	3,0	**76,00**
1,17	8,5	50	3,0	**76,00**	**1,68**	12,2	50	3,0	**76,00**
1,18	8,6	50	3,0	**76,00**	**1,69**	12,3	50	3,0	**76,00**
1,19	8,6	50	3,0	**76,00**	**1,70**	12,3	50	3,0	**69,00**
1,20	8,7	50	3,0	**69,00**	**1,71**	12,4	50	3,0	**76,00**
1,21	8,8	50	3,0	**76,00**	**1,72**	12,5	50	3,0	**76,00**
1,22	8,8	50	3,0	**76,00**	**1,73**	12,5	50	3,0	**76,00**
1,23	8,9	50	3,0	**76,00**	**1,74**	12,6	50	3,0	**76,00**
1,24	9,0	50	3,0	**76,00**	**1,75**	12,7	50	3,0	**72,50**
1,25	9,1	50	3,0	**72,50**	**1,76**	12,8	50	3,0	**76,00**
1,26	9,1	50	3,0	**76,00**	**1,77**	12,8	50	3,0	**76,00**
1,27	9,2	50	3,0	**76,00**	**1,78**	12,9	50	3,0	**76,00**
1,28	9,3	50	3,0	**76,00**	**1,79**	13,0	50	3,0	**76,00**

Fortsetzung nächste Seite *to be continued*

VHM-HSC-Mikrobohrer 0,01 mm steigend

E.3676.1

1.2 | 2.1 | 5.1

VHM | WERKS-(COMPANY)-NORM | Blue Cut | 140° | 8xD | TITAN | HA | STAHL | INOX



- Solid carbide micro drills rising in steps of 0,01 mm
- Wiertła miniaturowe z węglika spiekanego - średnice skokiem co 0.01 mm
- Micropunte in MD centesimali 0,01 mm
- Microbrocas de metal duro integral con incrementos de 0,01 mm para alta velocidad

Artikel-Nr. *Article-No.*				E.3676.1 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3676.1 € Stück *piece*
d1 g5	l2	l1	d2 h7		d1 g5	l2	l1	d2 h7	
Ø 0,75 - 1,79 mm siehe Seite 3.05 *Ø 0,75 - 1,79 mm see page 3.05*									
1,80	13,1	50	3,0	**69,00**	**1,91**	13,8	50	3,0	**76,00**
1,81	13,1	50	3,0	**76,00**	**1,92**	13,9	50	3,0	**76,00**
1,82	13,2	50	3,0	**76,00**	**1,93**	14,0	50	3,0	**76,00**
1,83	13,3	50	3,0	**76,00**	**1,94**	14,1	50	3,0	**76,00**
1,84	13,3	50	3,0	**76,00**	**1,95**	14,1	50	3,0	**72,50**
1,85	13,4	50	3,0	**72,50**	**1,96**	14,2	50	3,0	**76,00**
1,86	13,5	50	3,0	**76,00**	**1,97**	14,3	50	3,0	**76,00**
1,87	13,6	50	3,0	**76,00**	**1,98**	14,4	50	3,0	**76,00**
1,88	13,6	50	3,0	**76,00**	**1,99**	14,4	50	3,0	**76,00**
1,89	13,7	50	3,0	**76,00**	**2,00**	14,5	50	3,0	**69,00**
1,90	13,8	50	3,0	**69,00**					

VHM-Kleinstbohrer

E.3601.0

Universal

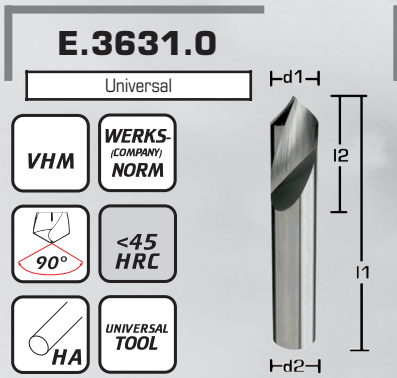
VHM | ähnl. DIN 1899 | 118° | STAHL | HA | ALU

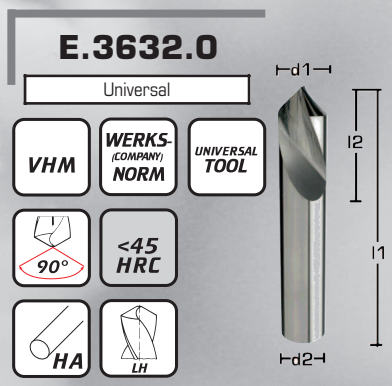


- Solid carbide mini drills
- Wiertła miniaturowe z węglika spiekanego
- Micropunte in MD
- Microbrocas de metal duro integral

Artikel-Nr. *Article-No.*				E.3601.0 € Stück *piece*	Artkel-Nr. *Article-No.*				E.3601.0 € Stück *piece*
d1 h6	l2	l1	d2 h7		d1 h6	l2	l1	d2 h7	
0,25 - 0,29	2,5	30	1,0	**11,00**	**1,15 - 1,19**	10,0	30	1,5	**5,80**
0,30 - 0,34	3,0	30	1,0	**8,80**	**1,20 - 1,24**	12,0	30	1,5	**6,00**
0,35 - 0,39	4,0	30	1,0	**8,80**	**1,25 - 1,29**	12,0	30	1,5	**6,00**
0,40 - 0,44	4,0	30	1,0	**8,80**	**1,30 - 1,34**	12,0	30	1,5	**6,00**
0,45 - 0,49	4,0	30	1,0	**8,00**	**1,35 - 1,39**	12,0	30	1,5	**6,00**
0,50 - 0,54	4,5	30	1,0	**6,50**	**1,40 - 1,44**	12,0	30	1,5	**6,00**
0,55 - 0,59	5,0	30	1,0	**6,50**	**1,45 - 1,49**	12,0	30	1,5	**6,00**
0,60 - 0,64	5,0	30	1,0	**6,00**	**1,50 - 1,54**	12,0	30	2,0	**6,00**
0,65 - 0,69	6,0	30	1,0	**6,00**	**1,55 - 1,59**	12,0	30	2,0	**6,00**
0,70 - 0,74	6,0	30	1,0	**6,00**	**1,60 - 1,64**	12,0	30	2,0	**6,00**
0,75 - 0,79	6,5	30	1,0	**6,00**	**1,65 - 1,69**	12,0	30	2,0	**6,00**
0,80 - 0,84	6,5	30	1,5	**6,00**	**1,70 - 1,74**	12,0	30	2,0	**6,00**
0,85 - 0,89	6,5	30	1,5	**5,80**	**1,75 - 1,79**	12,0	30	2,0	**6,00**
0,90 - 0,94	8,0	30	1,5	**5,80**	**1,80 - 1,84**	12,0	30	2,0	**6,00**
0,95 - 0,99	8,0	30	1,5	**5,80**	**1,85 - 1,89**	12,0	30	2,0	**6,00**
1,00 - 1,04	8,0	30	1,5	**5,80**	**1,90 - 1,94**	12,0	30	2,0	**6,00**
1,05 - 1,09	8,0	30	1,5	**5,80**	**1,95 - 1,99**	12,0	30	2,0	**6,00**
1,10 - 1,14	8,0	30	1,5	**5,80**	**2,00**	12,0	30	2,5	**4,80**

VHM-NC-Anbohrer





Solid carbide NC-Center drills

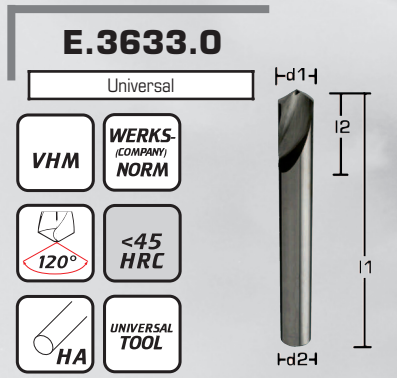
Wiertła centrujące węglika spiekanego do maszyn CNC

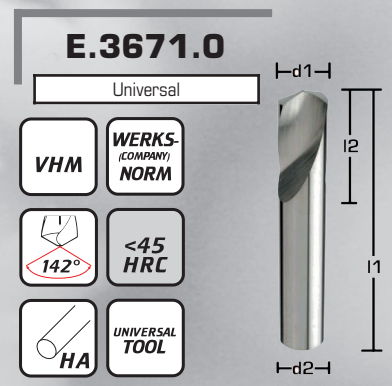
Punte in MD da centro NC

Brocas de puntear de metal duro integral

Artikel-Nr. *Article-No.*			E.3631.0 € Stück *piece*	E.3632.0 € Stück *piece*
d1 h6	l2	l1		
1,00	6	26	**8,00**	
1,50	9	32	**8,00**	
2,00	12	38	**8,00**	
3,00	12	45	**8,00**	**11,00**
4,00	15	50	**9,00**	**12,00**
5,00	18	50	**12,70**	**13,00**
6,00	21	50	**12,00**	**20,00**
8,00	25	60	**17,50**	**29,00**
10,00	27	66	**24,00**	**38,00**
12,00	27	70	**32,00**	**50,00**
14,00	30	75	**50,00**	**65,00**
16,00	30	75	**65,00**	**98,00**
18,00	33	100	**110,00**	
20,00	33	100	**135,00**	

VHM-NC-Anbohrer





Solid carbide NC-Center drills

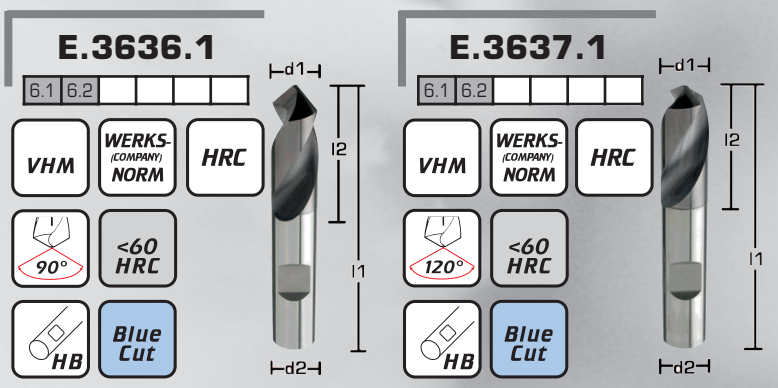
Wiertła centrujące z węglika spiekanego do maszyn CNC

Punte in MD da centro NC

Brocas de puntear de metal duro integral

Artikel-Nr. *Article-No.*			E.3633.0 € Stück *piece*	E.3671.0 € Stück *piece*
d1 h6	l2	l1		
3,00	12	45	**9,00**	**7,00**
4,00	15	50	**11,00**	**8,50**
5,00	18	50	**14,00**	**11,00**
6,00	21	50	**15,00**	**12,00**
8,00	25	60	**22,00**	**19,00**
10,00	27	70	**31,00**	**26,00**
12,00	27	70	**40,00**	**34,00**
14,00	30	75	**59,00**	**48,00**
16,00	30	75	**74,00**	**62,00**
18,00	33	100	**118,00**	**101,00**
20,00	33	100	**134,00**	**116,00**

VHM-NC-Anbohrer



Solid carbide NC-Center drills

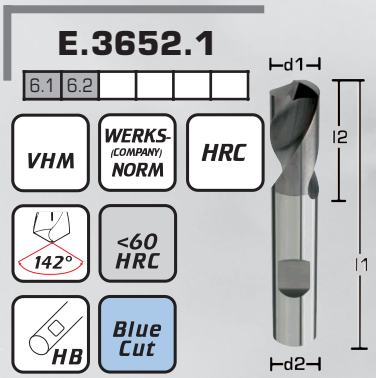
Wiertła centrujące z węglika spiekanego do materiaoów utwardzonych do maszyn CNC

Punte in MD da centro NC

Brocas de puntear de metal duro integral

Artikel-Nr. *Article-No.*			E.3636.1 € Stück *piece*	E.3637.1 € Stück *piece*
d1 h6	l2	l1		
3,00	8	38	**16,00**	**16,00**
4,00	10	50	**16,00**	**16,00**
5,00	13	50	**16,00**	**16,00**
6,00	13	57	**17,50**	**17,50**
8,00	19	63	**21,50**	**21,50**
10,00	20	66	**33,50**	**33,50**
12,00	22	73	**41,00**	**41,00**
16,00	24	82	**78,00**	**78,00**
20,00	30	92	**124,00**	**124,00**

VHM-Pilotzentrierbohrer für Hochleistungsbohrer ab 8xd



Solid carbide pilot center drills

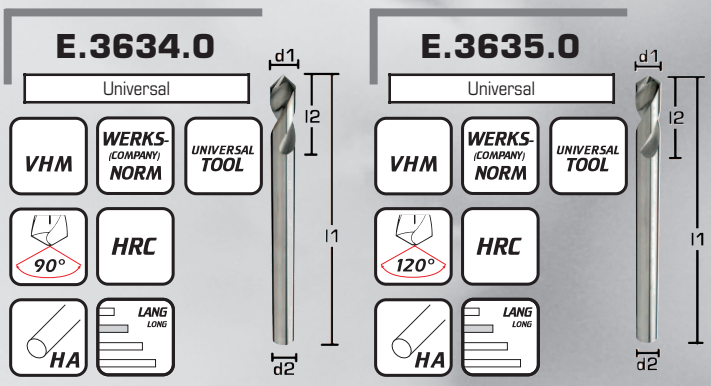
Wiertła pilotująco-centrujące z węglika spiekanego do zastosowania przed wiertłami powyżej 8xD

Punte pilota in MD

Broca piloto de central metal duro integral para brocas de alto rendimiento desde 8xd

Artikel-Nr. *Article-No.*				E.3652.1 € Stück *piece*
d1 h6	l2	l1	d2	
3,00	11	57	3,0	**17,00**
4,00	11	57	4,0	**17,00**
6,00	11	57	6,0	**17,00**
8,00	19	63	8,0	**22,00**
10,00	20	66	10,0	**34,00**
12,00	22	73	12,0	**40,00**
16,00	24	82	16,0	**78,00**
20,00	30	92	20,0	**123,00**

VHM-NC-Anbohrer lang



Solid carbide NC-Center drills long

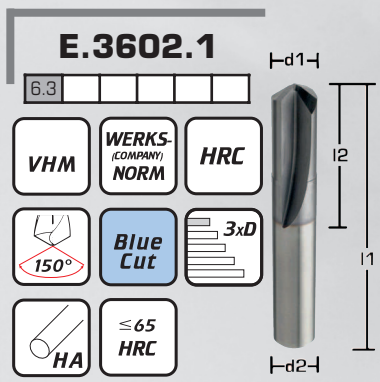
Wiertła długie centrujące z węglika spiekanego do materiałów utwardzanych do maszyn CNC

Punte in MD da centro NC serie lunga

Brocas de puntear de metal duro integral, serie larga

Artikel-Nr. *Article-No.*				E.3634.0 € Stück *piece*	E.3635.0 € Stück *piece*
d1 h6	l2	l1	d2		
3,00	15	100	3,0	**21,00**	**21,00**
4,00	15	100	4,0	**23,00**	**23,00**
5,00	20	100	5,0	**25,00**	**25,00**
6,00	20	100	6,0	**30,00**	**30,00**
8,00	25	100	8,0	**43,00**	**43,00**
10,00	25	100	10,0	**50,00**	**50,00**
12,00	25	150	12,0	**60,00**	**60,00**

VHM-HRC-Hochleistungsbohrer



Solid carbide HRC-Heavy duty twist drills

Wiertła z węglika spiekanego do obróki wysokowydajnej materiałów utwardzanych do 65 HRC

Punte in MD per lavorazioni HRC

Brocas de alto rendimiento de metal duro integral

* = Auslaufartikel

* = *no future production anymore*

Artikel-Nr. *Article-No.*				E.3602.1 € Stück piece	Artikel-Nr. *Article-No.*				E.3602.1 € Stück *piece*
d1 + - 0,01	l2	l1	d2 h6		d1 + - 0,01	l2	l1	d2 h6	
1,00	6	38	1,0	**28,00**	**5,50**	19	50	5,5	**52,00**
1,50	8	38	1,5	**28,00**	**6,00**	19	50	6,0	**56,00**
2,00	9	38	2,0	**28,00**	**6,50**	19	50	6,5	**62,00**
2,50	13	38	2,5	**32,00**	**6,80**	19	63	6,8	**70,00**
2,70	16	38	2,7	**32,00**	**7,00**	19	63	7,0	**70,00**
3,00	16	38	3,0	**35,00**	**7,80** *	19	63	8,0	**85,00**
3,30	16	38	3,3	**35,00**	**8,00**	19	63	8,0	**78,00**
3,50	16	50	3,5	**36,00**	**8,50**	25	63	8,5	**90,00**
4,00	16	50	4,0	**43,00**	**9,00** *	25	70	9,0	**120,00**
4,20	16	50	4,2	**45,00**	**10,00**	25	70	10,0	**124,00**
4,50	16	50	4,5	**45,00**	**10,20**	25	70	10,2	**130,00**
4,80 *	19	50	5,0	**48,00**	**12,00**	25	75	12,0	**160,00**
5,00	19	50	5,0	**48,00**	**14,00**	28	89	14,0	**170,00**

E.3603.1

6.1 | 6.2 | 6.3

VHM · DIN 1897 · HRC · 140° · Blue Cut · 3xD · HA · ≤65 HRC



Solid carbide HRC-Heavy duty twist drills

Wiertła z węglika spiekanego do obróbki wysokowydajnej materiałów utwardzanych do 65 HRC

Punte in MD per lavorazioni HRC

Brocas de alto rendimiento de metal duro integral

Artikel-Nr. *Article-No.*				E.3603.1 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3603.1 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3603.1 € Stück *piece*
d1 h7	l2	l1	d2 h6		d1 h7	l2	l1	d2 h6		d1 h7	l2	l1	d2 h6	
1,00	7	45	4,0	**24,80**	**6,10**	34	79	8,0	**39,50**	**13,00**	60	107	14,0	**84,50**
1,10	7	45	4,0	**24,80**	**6,20**	34	79	8,0	**39,50**	**13,50**	60	107	14,0	**84,50**
1,20	7	45	4,0	**24,80**	**6,30**	34	79	8,0	**39,50**	**13,80**	60	107	14,0	**84,50**
1,30	7	45	4,0	**24,80**	**6,40**	34	79	8,0	**39,50**	**14,00**	60	107	14,0	**84,50**
1,40	7	45	4,0	**24,80**	**6,50**	34	79	8,0	**39,50**	**14,20**	65	115	16,0	**109,00**
1,50	14	55	4,0	**26,30**	**6,60**	34	79	8,0	**39,50**	**14,50**	65	115	16,0	**109,00**
1,60	14	55	4,0	**26,30**	**6,70**	34	79	8,0	**39,50**	**14,80**	65	115	16,0	**109,00**
1,70	14	55	4,0	**26,30**	**6,80**	34	79	8,0	**39,50**	**15,00**	65	115	16,0	**109,00**
1,80	14	55	4,0	**26,30**	**6,90**	34	79	8,0	**39,50**	**15,20**	65	115	16,0	**109,00**
1,90	14	55	4,0	**26,30**	**7,00**	34	79	8,0	**38,20**	**15,50**	65	115	16,0	**109,00**
2,00	20	55	4,0	**36,60**	**7,10**	41	79	8,0	**39,50**	**15,80**	65	115	16,0	**109,00**
2,10	20	55	4,0	**36,60**	**7,20**	41	79	8,0	**39,50**	**16,00**	65	115	16,0	**109,00**
2,20	20	55	4,0	**36,60**	**7,30**	41	79	8,0	**39,50**	**16,50**	73	123	18,0	**173,00**
2,30	20	55	4,0	**36,60**	**7,40**	41	79	8,0	**39,50**	**16,80**	73	123	18,0	**173,00**
2,40	20	55	4,0	**36,60**	**7,50**	41	79	8,0	**39,50**	**17,00**	73	123	18,0	**173,00**
2,50	20	55	4,0	**36,60**	**7,60**	41	79	8,0	**39,50**	**17,50**	73	123	18,0	**173,00**
2,60	20	55	4,0	**36,60**	**7,70**	41	79	8,0	**39,50**	**18,00**	73	123	18,0	**173,00**
2,70	20	55	4,0	**36,60**	**7,80**	41	79	8,0	**39,50**	**18,50**	79	131	20,0	**202,00**
2,80	20	55	4,0	**36,60**	**7,90**	41	79	8,0	**39,50**	**18,80**	79	131	20,0	**202,00**
2,90	20	55	4,0	**36,60**	**8,00**	41	79	8,0	**38,20**	**19,00**	79	131	20,0	**202,00**
3,00	20	62	6,0	**35,40**	**8,10**	47	89	10,0	**44,50**	**19,50**	79	131	20,0	**202,00**
3,10	20	62	6,0	**36,60**	**8,20**	47	89	10,0	**44,50**	**20,00**	79	131	20,0	**202,00**
3,20	20	62	6,0	**36,60**	**8,30**	47	89	10,0	**44,50**					
3,30	20	62	6,0	**36,60**	**8,40**	47	89	10,0	**44,50**					
3,40	20	62	6,0	**36,60**	**8,50**	47	89	10,0	**43,30**					
3,50	20	62	6,0	**36,60**	**8,60**	47	89	10,0	**44,50**					
3,60	20	62	6,0	**36,60**	**8,70**	47	89	10,0	**44,50**					
3,70	20	62	6,0	**36,60**	**8,80**	47	89	10,0	**44,50**					
3,80	24	66	6,0	**38,50**	**8,90**	47	89	10,0	**44,50**					
3,90	24	66	6,0	**38,50**	**9,00**	47	89	10,0	**43,30**					
4,00	24	66	6,0	**37,20**	**9,10**	47	89	10,0	**44,50**					
4,10	24	66	6,0	**38,50**	**9,20**	47	89	10,0	**44,50**					
4,20	24	66	6,0	**38,50**	**9,30**	47	89	10,0	**44,50**					
4,30	24	66	6,0	**38,50**	**9,40**	47	89	10,0	**44,50**					
4,40	24	66	6,0	**38,50**	**9,50**	47	89	10,0	**44,50**					
4,50	24	66	6,0	**37,20**	**9,60**	47	89	10,0	**44,50**					
4,60	24	66	6,0	**38,50**	**9,70**	47	89	10,0	**44,50**					
4,70	24	66	6,0	**38,50**	**9,80**	47	89	10,0	**44,50**					
4,80	28	66	6,0	**38,50**	**9,90**	47	89	10,0	**44,50**					
4,90	28	66	6,0	**38,50**	**10,00**	47	89	10,0	**43,30**					
5,00	28	66	6,0	**37,20**	**10,20**	55	102	12,0	**64,00**					
5,10	28	66	6,0	**38,50**	**10,50**	55	102	12,0	**64,00**					
5,20	28	66	6,0	**38,50**	**10,80**	55	102	12,0	**64,00**					
5,30	28	66	6,0	**38,50**	**11,00**	55	102	12,0	**64,00**					
5,40	28	66	6,0	**38,50**	**11,20**	55	102	12,0	**64,00**					
5,50	28	66	6,0	**37,20**	**11,50**	55	102	12,0	**64,00**					
5,60	28	66	6,0	**38,50**	**11,80**	55	102	12,0	**64,00**					
5,70	28	66	6,0	**38,50**	**12,00**	55	102	12,0	**62,50**					
5,80	28	66	6,0	**38,50**	**12,20**	60	107	14,0	**84,50**					
5,90	28	66	6,0	**38,50**	**12,50**	60	107	14,0	**84,50**					
6,00	28	66	6,0	**37,20**	**12,80**	60	107	14,0	**84,50**					

E.3605.0

Universal

VHM | WERKS-NORM (COMPANY) | 118° | DIN 1897 | HA | KURZ SHORT



Solid carbide twist drills similar to DIN 1897 (6539)

Wiertła skrętne z węglika spiekanego, odpowiednik wierteł wg DIN 1897 (6539)

Punte in MD simile DIN 1897 (6539)

Brocas de metal duro integral, sim. DIN 1897 (6539)

* = Auslaufartikel
* = *no future production anymore*

Artikel-Nr. *Article-No.*			E.3605.0 €	Artikel-Nr. *Article-No.*			E.3605.0 €	Artikel-Nr. *Article-No.*			E.3605.0 €	Artikel-Nr. *Article-No.*			E.3605.0 €
d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*
0,50	5,0	30	**3,70**	**2,80**	16,0	46	**5,00**	**5,15**	26,0	60	**17,90**	**8,80**	40,0	84	**28,00**
0,55	5,0	30	**3,70**	**2,85**	20,0	45	**6,40**	**5,20**	26,0	62	**11,60**	**8,90**	40,0	84	**28,00**
0,60	5,5	30	**3,70**	**2,90**	16,0	46	**5,00**	**5,25**	26,0	60	**17,90**	**9,00**	40,0	84	**23,50**
0,65	6,0	30	**3,70**	**2,95**	20,0	45	**6,40**	**5,30**	26,0	62	**11,60**	**9,10**	40,0	84	**30,50**
0,70	6,0	30	**3,70**	**3,00**	16,0	46	**4,50**	**5,35**	28,0	60	**18,80**	**9,20**	40,0	84	**30,50**
0,75	8,0	30	**3,70**	**3,05**	22,0	50	**9,10**	**5,40**	28,0	66	**11,60**	**9,30**	40,0	84	**30,50**
0,80	8,0	30	**3,70**	**3,10**	18,0	49	**5,80**	**5,45**	28,0	60	**18,80**	**9,40**	40,0	84	**30,50**
0,85	9,0	30	**3,70**	**3,15**	22,0	50	**9,80**	**5,50**	28,0	66	**11,30**	**9,50**	40,0	84	**29,50**
0,90	9,0	30	**3,70**	**3,20**	18,0	49	**5,80**	**5,55**	28,0	60	**18,80**	**9,60**	43,0	89	**33,00**
0,95	10,0	30	**3,70**	**3,25**	20,0	50	**9,80**	**5,60**	28,0	66	**12,70**	**9,70**	43,0	89	**33,00**
1,00	6,0	26	**2,30**	**3,30**	18,0	49	**5,80**	**5,65**	28,0	60	**19,00**	**9,80**	43,0	89	**33,00**
1,05	10,0	30	**3,80**	**3,35**	22,0	50	**9,80**	**5,70**	28,0	66	**12,70**	**9,90**	43,0	89	**33,00**
1,10	7,0	28	**2,50**	**3,40**	20,0	52	**5,80**	**5,75**	28,0	60	**19,50**	**10,00**	43,0	89	**29,30**
1,15	10,0	30	**3,50**	**3,45**	22,0	50	**9,80**	**5,80**	28,0	66	**12,70**	**10,20**	43,0	89	**34,80**
1,20	8,0	30	**2,50**	**3,50**	20,0	52	**5,80**	**5,85**	28,0	60	**19,50**	**10,50**	43,0	89	**37,60**
1,25	12,0	30	**3,50**	**3,55**	22,0	50	**9,80**	**5,90**	28,0	66	**12,70**	**10,80**	47,0	95	**37,60**
1,30	8,0	30	**2,50**	**3,60**	20,0	52	**7,10**	**5,95**	28,0	60	**19,50**	**11,00**	47,0	95	**42,50**
1,35	12,0	30	**3,50**	**3,65**	22,0	50	**10,10**	**6,00**	28,0	66	**12,,0**	**11,20**	47,0	95	**42,50**
1,40	9,0	32	**2,50**	**3,70**	20,0	52	**7,10**	**6,10**	31,0	70	**15,40**	**11,50**	47,0	95	**48,30**
1,45	12,0	32	**3,50**	**3,75**	22,0	50	**13,50**	**6,20**	31,0	70	**15,40**	**11,80**	47,0	95	**48,30**
1,50	9,0	32	**2,50**	**3,80**	22,0	55	**7,10**	**6,30**	31,0	70	**15,40**	**12,00**	51,0	102	**45,00**
1,55	16,0	40	**3,80**	**3,85**	22,0	50	**13,50**	**6,40**	31,0	70	**15,40**	**12,50**	51,0	102	**46,50**
1,60	10,0	34	**2,80**	**3,90**	22,0	55	**7,10**	**6,50**	31,0	70	**14,40**	**12,70**	51,0	102	**50,00**
1,65	16,0	40	**3,80**	**3,95**	22,0	50	**13,50**	**6,55***	31,0	70	**19,50**	**12,80**	51,0	102	**50,00**
1,70	10,0	34	**2,80**	**4,00**	22,0	55	**6,40**	**6,60**	31,0	70	**17,30**	**13,00**	51,0	102	**52,80**
1,75	16,0	40	**4,10**	**4,05**	25,0	50	**13,50**	**6,70**	31,0	70	**17,30**	**13,50**	54,0	107	**53,00**
1,80	11,0	36	**2,80**	**4,10**	22,0	55	**7,40**	**6,80**	34,0	74	**15,60**	**14,00**	54,0	107	**66,00**
1,85	16,0	40	**4,10**	**4,15**	25,0	60	**14,50**	**6,90**	34,0	74	**17,30**	**14,50**	56,0	111	**67,00**
1,90	11,0	36	**2,80**	**4,20**	22,0	55	**7,20**	**7,00**	34,0	74	**16,60**	**15,00**	56,0	111	**73,00**
1,95	16,0	40	**4,10**	**4,25**	25,0	60	**14,50**	**7,10**	34,0	74	**20,90**	**16,00**	58,0	115	**83,00**
2,00	12,0	38	**3,00**	**4,30**	24,0	58	**7,90**	**7,20**	34,0	74	**20,90**	**17,00**	60,0	119	**83,00**
2,04*	12,0	38	**4,80**	**4,35**	25,0	60	**15,70**	**7,30**	34,0	74	**20,90**	**18,00**	62,0	123	**96,00**
2,05	18,0	40	**4,40**	**4,40**	24,0	58	**8,00**	**7,40**	34,0	74	**20,90**	**19,00**	64,0	127	**98,00**
2,10	12,0	38	**3,60**	**4,45**	25,0	60	**15,70**	**7,50**	34,0	74	**20,00**	**20,00**	66,0	131	**101,00**
2,15	18,0	40	**4,40**	**4,50**	24,0	58	**8,00**	**7,60**	37,0	79	**23,30**				
2,20	13,0	40	**3,60**	**4,55**	25,0	60	**15,70**	**7,70**	37,0	79	**23,30**				
2,25	18,0	40	**4,40**	**4,60**	24,0	58	**9,40**	**7,80**	37,0	79	**23,30**				
2,30	13,0	40	**3,60**	**4,65**	25,0	60	**15,70**	**7,90**	37,0	79	**23,30**				
2,35	18,0	40	**4,40**	**4,70**	24,0	58	**9,40**	**8,00**	37,0	79	**20,00**				
2,40	14,0	43	**3,60**	**4,75**	26,0	60	**15,70**	**8,05***	37,0	79	**26,00**				
2,45	18,0	43	**4,40**	**4,80**	26,0	62	**9,80**	**8,10**	37,0	79	**26,60**				
2,50	14,0	43	**3,60**	**4,85**	26,0	60	**15,70**	**8,20**	37,0	79	**26,60**				
2,55	18,0	45	**6,40**	**4,90**	26,0	62	**9,80**	**8,30**	37,0	79	**26,60**				
2,60	14,0	43	**5,00**	**4,95**	26,0	60	**16,70**	**8,40**	37,0	79	**26,60**				
2,65	18,0	45	**6,40**	**5,00**	26,0	60	**7,20**	**8,50**	37,0	79	**23,50**				
2,70	16,0	46	**5,00**	**5,05**	26,0	60	**16,70**	**8,60**	40,0	84	**28,00**				
2,75	20,0	46	**6,40**	**5,10**	26,0	62	**11,60**	**8,70**	40,0	84	**28,00**				

E.3677.0

Universal

VHM | WERKS-NORM (COMPANY) | 118° | KURZ SHORT | HA | LH



Solid carbide twist drills left hand similar to DIN 1897 (6539)

Wiertła lewoskrętne z węglika spiekanego, odpowiednik wierteł wg DIN 1897 (6539)

Punte in MD simile DIN 1897 (6539) elica sinistra

Brocas de metal duro integral, izquierdas, sim. DIN 1897 (6539)

Artikel-Nr. *Article-No.*			E.3677.0 €	Artikel-Nr. *Article-No.*			E.3677.0 €	Artikel-Nr. *Article-No.*			E.3677.0 €
d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*
0,30	4	30	**6,70**	**2,55**	18	40	**8,20**	**4,80**	26	60	**16,30**
0,35	4	30	**6,70**	**2,60**	18	40	**8,20**	**4,85**	26	60	**16,30**
0,40	6	30	**6,70**	**2,65**	18	40	**8,20**	**4,90**	26	60	**16,30**
0,45	6	30	**6,70**	**2,70**	20	50	**8,70**	**4,95**	26	60	**17,30**
0,50	6	30	**6,70**	**2,75**	20	50	**8,70**	**5,00**	26	60	**17,30**
0,55	6	30	**6,70**	**2,80**	20	50	**8,70**	**5,05**	26	60	**17,30**
0,60	6	30	**6,70**	**2,85**	20	50	**8,70**	**5,10**	26	60	**19,30**
0,65	6	30	**6,70**	**2,90**	20	50	**8,70**	**5,15**	26	60	**19,30**
0,70	6	30	**6,70**	**2,95**	20	50	**8,70**	**5,20**	26	60	**19,30**
0,75	8	30	**6,70**	**3,00**	20	50	**8,70**	**5,25**	26	60	**19,30**
0,80	8	30	**6,70**	**3,05**	22	50	**9,30**	**5,30**	26	60	**19,30**
0,85	8	30	**6,20**	**3,10**	22	50	**9,30**	**5,35**	28	60	**19,30**
0,90	9	30	**6,20**	**3,15**	22	50	**9,40**	**5,40**	28	60	**20,00**
0,95	9	30	**6,20**	**3,20**	22	50	**9,40**	**5,45**	28	60	**20,00**
1,00	10	30	**6,20**	**3,25**	22	50	**9,40**	**5,50**	28	60	**20,00**
1,05	10	30	**6,20**	**3,30**	22	50	**9,40**	**5,55**	28	60	**20,00**
1,10	10	30	**6,20**	**3,35**	22	50	**9,40**	**5,60**	28	60	**20,00**
1,15	10	30	**6,20**	**3,40**	22	50	**9,40**	**5,65**	28	60	**20,60**
1,20	12	30	**6,20**	**3,45**	22	50	**9,40**	**5,70**	28	60	**20,60**
1,25	12	30	**6,20**	**3,50**	22	50	**9,40**	**5,75**	28	60	**22,90**
1,30	12	30	**6,20**	**3,55**	22	50	**9,40**	**5,80**	28	60	**22,90**
1,35	12	30	**6,20**	**3,60**	22	50	**9,70**	**5,85**	28	60	**22,90**
1,40	12	30	**6,20**	**3,65**	22	50	**9,70**	**5,90**	28	60	**22,90**
1,45	12	30	**6,20**	**3,70**	22	50	**14,60**	**5,95**	28	60	**22,90**
1,50	12	30	**6,20**	**3,75**	22	50	**14,60**	**6,00**	28	60	**22,90**
1,55	16	40	**6,30**	**3,80**	22	50	**14,60**	**6,10**	31	70	**28,00**
1,60	16	40	**6,30**	**3,85**	22	50	**14,60**	**6,20**	31	70	**28,00**
1,65	16	40	**6,30**	**3,90**	22	50	**14,60**	**6,30**	31	70	**28,00**
1,70	16	40	**6,30**	**3,95**	22	50	**14,60**	**6,40**	31	70	**28,00**
1,75	16	40	**6,30**	**4,00**	22	50	**14,60**	**6,50**	31	70	**28,00**
1,80	16	40	**6,30**	**4,05**	25	50	**14,60**	**6,60**	31	70	**28,00**
1,85	16	40	**6,30**	**4,10**	25	50	**14,60**	**6,70**	31	70	**28,00**
1,90	16	40	**7,00**	**4,15**	25	60	**15,80**	**6,80**	34	74	**31,20**
1,95	16	40	**7,00**	**4,20**	25	60	**15,80**	**6,90**	34	74	**31,20**
2,00	18	40	**7,00**	**4,25**	25	60	**15,80**	**7,00**	34	74	**31,20**
2,05	18	40	**7,00**	**4,30**	25	60	**15,80**	**7,10**	34	74	**35,00**
2,10	18	40	**7,00**	**4,35**	25	60	**16,30**	**7,20**	34	74	**35,00**
2,15	18	40	**7,00**	**4,40**	25	60	**16,30**	**7,30**	34	74	**35,00**
2,20	18	40	**7,00**	**4,45**	25	60	**16,30**	**7,40**	34	74	**35,00**
2,25	18	40	**7,00**	**4,50**	25	60	**16,30**	**7,50**	34	74	**35,00**
2,30	18	40	**7,00**	**4,55**	25	60	**16,30**	**7,60**	37	79	**38,20**
2,35	18	40	**7,40**	**4,60**	25	60	**16,30**	**7,70**	37	79	**38,20**
2,40	18	40	**7,40**	**4,65**	25	60	**16,30**	**7,80**	37	79	**38,20**
2,45	18	40	**7,40**	**4,70**	25	60	**16,30**	**7,90**	37	79	**38,20**
2,50	18	40	**7,40**	**4,75**	26	60	**16,30**	**8,00**	37	79	**38,20**

E.3668.0

Universal

VHM | WERKS-NORM (COMPANY) | 150° | KURZ SHORT | HA | Z=3



Solid carbide pilot drills H7

Wiertła pilotujące 3-ostrzowe z węglika spiekanego w tolerancji H7

Punta in MD pilota H7

Brocas piloto de metal duro integral, tolerancia H7

Artikel-Nr. *Article-No.*			E.3668.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.3668.0 € Stück *piece*
d1 H7	l2	l1		d1 H7	l2	l1	
3,00	16	46	**12,00**	**7,00**	34	74	**27,00**
3,20	18	49	**13,00**	**7,50**	34	74	**30,00**
3,30	18	49	**13,00**	**8,00**	37	79	**32,00**
3,50	20	52	**13,00**	**8,50**	37	79	**36,00**
4,00	22	55	**14,00**	**9,00**	40	84	**40,00**
4,20	22	55	**16,00**	**9,50**	40	84	**42,00**
4,50	24	58	**16,00**	**10,00**	43	89	**47,00**
5,00	26	62	**17,00**	**10,20**	43	89	**54,00**
5,50	28	66	**19,00**	**11,00**	47	95	**63,00**
6,00	28	66	**20,00**	**12,00**	51	102	**75,00**
6,80	34	74	**27,00**				

Speziell geeignet für die Pilotbohrung bei Einlippentieflochbohrern
Especially designed for pilot drilling with one flute deephole drills



E.3606.0

Universal

VHM | DIN 1897 | 150° | KURZ SHORT | HA | Z=3



Solid carbide twist drills with 3 flutes

Wiertła skrętne trzyostrzowe z węglika spiekanego wg DIN 1897

Punte in MD 3 eliche

Broca avellanador de tres labios de metal duro integral

Artikel-Nr. *Article-No.*			E.3606.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.3606.0 € Stück *piece*
d1 h6	l2	l1		d1 h6	l2	l1	
3,00	16	46	**12,30**	**7,20**	34	74	**31,00**
3,10	18	49	**13,30**	**7,30**	34	74	**31,00**
3,20	18	49	**13,30**	**7,40**	34	74	**31,00**
3,30	18	49	**13,30**	**7,50**	34	74	**30,00**
3,40	20	52	**13,30**	**7,60**	37	79	**33,00**
3,50	20	52	**13,30**	**7,70**	37	79	**33,00**
3,60	20	52	**14,00**	**7,80**	37	79	**33,00**
3,70	20	52	**14,00**	**7,90**	37	79	**33,00**
3,80	22	55	**14,00**	**8,00**	37	79	**25,00**
3,90	22	55	**14,00**	**8,10**	37	79	**36,00**
4,00	22	55	**13,70**	**8,20**	37	79	**36,00**
4,10	22	55	**16,20**	**8,30**	37	79	**36,00**
4,20	22	55	**15,00**	**8,40**	37	79	**36,00**
4,30	24	58	**16,20**	**8,50**	37	79	**26,00**
4,40	24	58	**16,20**	**8,60**	40	84	**40,00**
4,50	24	58	**15,80**	**8,70**	40	84	**40,00**
4,60	24	58	**17,80**	**8,80**	40	84	**40,00**
4,70	24	58	**17,80**	**8,90**	40	84	**40,00**
4,80	26	62	**17,80**	**9,00**	40	84	**40,00**
4,90	26	62	**17,80**	**9,10**	40	84	**42,50**
5,00	26	62	**14,00**	**9,20**	40	84	**42,50**
5,10	26	62	**20,00**	**9,30**	40	84	**42,50**
5,20	26	62	**20,00**	**9,40**	40	84	**42,50**
5,30	26	62	**20,00**	**9,50**	40	84	**42,50**
5,40	28	66	**20,00**	**9,60**	43	89	**48,00**
5,50	28	66	**19,50**	**9,70**	43	89	**48,00**
5,60	28	66	**21,00**	**9,80**	43	89	**48,00**
5,70	28	66	**21,00**	**9,90**	43	89	**48,00**
5,80	28	66	**21,00**	**10,00**	43	89	**34,00**
5,90	28	66	**21,00**	**10,20**	43	89	**37,00**
6,00	28	66	**15,00**	**10,50**	43	89	**37,00**
6,10	31	70	**23,50**	**11,00**	47	95	**42,00**
6,20	31	70	**23,50**	**11,50**	47	95	**46,00**
6,30	31	70	**23,50**	**12,00**	51	102	**50,00**
6,40	31	70	**23,50**	**12,50**	51	102	**52,00**
6,50	31	70	**23,50**	**13,00**	51	102	**56,00**
6,60	31	70	**27,00**	**13,50**	54	107	**81,00**
6,70	31	70	**27,00**	**14,00**	54	107	**65,00**
6,80	34	74	**19,00**	**14,50**	56	111	**92,00**
6,90	34	74	**27,00**	**15,00**	56	111	**72,00**
7,00	34	74	**21,00**	**15,50**	58	115	**130,00**
7,10	34	74	**31,00**	**16,00**	58	115	**82,00**

E.3607.0

Universal

VHM | DIN 338 | 118° | UNIVERSAL TOOL | HA



Solid carbide twist drills DIN 338

Wiertła skrętne z węglika spiekanego wg DIN 338

Punte in MD DIN 338

Brocas de metal duro integral, DIN 338

* = Auslaufartikel
* = *no future production anymore*

Artikel-Nr. *Article-No.*			E.3607.0 €	Artikel-Nr. *Article-No.*			E.3607.0 €	Artikel-Nr. *Article-No.*			E.3607.0 €
d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*	d1 h6	l2	l1	Stück *piece*
0,40	5	20	**8,70**	**3,80**	43	75	**8,50**	**7,50**	69	109	**27,60**
0,50	6	26	**3,40**	**3,90**	43	75	**9,10**	**7,60**	75	117	**31,20**
0,60	7	27	**3,40**	**4,00**	43	75	**7,90**	**7,70**	75	117	**31,20**
0,70	9	28	**3,00**	**4,05***	43	75	**9,10**	**7,80**	75	117	**31,20**
0,80	10	30	**3,00**	**4,10**	43	75	**9,70**	**7,90**	75	117	**31,20**
0,90	11	32	**3,00**	**4,20**	43	75	**9,20**	**8,00**	75	117	**28,50**
1,00	12	34	**2,50**	**4,30**	47	80	**11,40**	**8,10**	75	117	**34,00**
1,10	14	36	**3,10**	**4,35***	47	80	**13,10**	**8,20**	75	117	**34,00**
1,20	16	38	**3,10**	**4,40**	47	80	**11,40**	**8,30**	75	117	**34,00**
1,30	16	38	**3,10**	**4,50**	47	80	**10,80**	**8,40**	75	117	**34,00**
1,40	18	40	**2,50**	**4,55***	47	80	**12,40**	**8,50**	75	117	**31,20**
1,45*	18	40	**5,80**	**4,60**	47	80	**12,00**	**8,60**	81	125	**37,80**
1,50	18	40	**2,80**	**4,65***	47	80	**13,80**	**8,70**	81	125	**37,80**
1,55*	20	43	**5,80**	**4,70**	47	80	**12,00**	**8,80**	81	125	**37,80**
1,60	20	43	**3,10**	**4,80**	52	86	**12,00**	**8,90**	81	125	**37,80**
1,70	20	43	**3,10**	**4,90**	52	86	**12,00**	**9,00**	81	125	**36,30**
1,80	22	46	**4,20**	**5,00**	52	86	**11,50**	**9,10**	81	125	**43,60**
1,90	22	46	**4,20**	**5,03***	52	86	**16,10**	**9,20**	81	125	**43,60**
1,95*	24	49	**5,80**	**5,05***	52	86	**14,80**	**9,30**	81	125	**43,60**
2,00	24	49	**3,60**	**5,10**	52	86	**14,80**	**9,40**	81	125	**43,60**
2,02*	24	49	**5,80**	**5,20**	52	86	**14,80**	**9,50**	81	125	**42,10**
2,10	24	49	**5,00**	**5,30**	52	86	**14,80**	**9,60**	87	133	**46,70**
2,15*	27	53	**5,80**	**5,40**	57	93	**16,80**	**9,70**	87	133	**46,70**
2,20	27	53	**5,00**	**5,50**	57	93	**16,50**	**9,80**	87	133	**46,70**
2,25*	27	53	**6,20**	**5,55***	57	93	**18,20**	**9,90**	87	133	**46,70**
2,30	27	53	**5,00**	**5,60**	57	93	**16,80**	**10,00**	87	133	**46,00**
2,40	30	57	**5,00**	**5,70**	57	93	**16,80**	**10,20**	87	133	**46,30**
2,50	30	57	**4,50**	**5,80**	57	93	**18,20**	**10,40**	87	133	**53,30**
2,55*	30	57	**6,20**	**5,90**	57	93	**18,20**	**10,50**	87	133	**58,80**
2,60	30	57	**6,70**	**6,00**	57	93	**16,50**	**10,60**	87	133	**58,80**
2,70	33	61	**6,70**	**6,05***	63	101	**21,80**	**10,80**	94	142	**58,80**
2,80	33	61	**6,70**	**6,10**	63	101	**22,20**	**11,00**	94	142	**64,00**
2,90	33	61	**6,70**	**6,20**	63	101	**22,20**	**11,20**	94	142	**64,00**
3,00	33	61	**6,70**	**6,30**	63	101	**22,20**	**11,50**	94	142	**70,50**
3,05*	33	61	**7,40**	**6,40**	63	101	**22,20**	**11,80**	94	142	**77,30**
3,10	36	65	**7,00**	**6,50**	63	101	**20,60**	**12,00**	101	151	**68,00**
3,20	36	65	**7,00**	**6,60**	63	101	**25,60**	**12,30**	101	151	**69,50**
3,30	36	65	**7,00**	**6,70**	63	101	**25,60**	**12,50**	101	151	**78,80**
3,40	39	70	**7,00**	**6,80**	69	109	**24,00**	**12,80**	101	151	**78,80**
3,50	39	70	**7,00**	**6,90**	69	109	**26,80**	**13,00**	101	151	**78,80**
3,55*	39	70	**7,80**	**7,00**	69	109	**25,00**	**13,50**	108	160	**96,00**
3,60	39	70	**8,50**	**7,10**	69	109	**30,00**	**14,00**	108	160	**100,00**
3,65*	39	70	**9,50**	**7,20**	69	109	**30,00**	**14,50**	108	160	**102,00**
3,70	39	70	**8,50**	**7,30**	69	109	**30,00**	**15,00**	114	169	**102,00**
3,75*	39	70	**9,20**	**7,40**	69	109	**30,00**	**16,00**	120	178	**108,00**

E.3609.0

Universal

VHM | WERKS-(COMPANY)NORM | 130° | LANG LONG | HA | UNIVERSAL TOOL



Solid carbide twist drills similar DIN 340

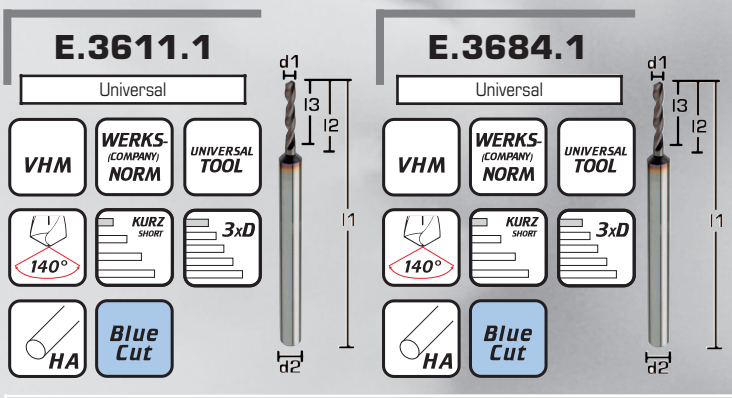
Wiertła skrętne długie z węglika spiekanego odpowiednik wierteł wg DIN 340

Punte in MD simile DIN 340

Brocas de metal duro integral, sim. DIN 340

Artikel-Nr. *Article-No.*			E.3609.0 € Stück *piece*	Artikel-Nr. *Article-No.*			E.3609.0 € Stück *piece*
d1 h6	l2	l1		d1 h6	l2	l1	
1,00	25	75	**10,40**	**5,90**	75	150	**41,00**
1,10	25	75	**10,40**	**6,00**	75	150	**32,00**
1,20	25	75	**10,40**	**6,10**	75	150	**46,00**
1,30	25	75	**10,40**	**6,20**	75	150	**46,00**
1,40	30	75	**11,00**	**6,30**	75	150	**46,00**
1,50	30	75	**11,00**	**6,40**	75	150	**46,00**
1,60	30	75	**11,00**	**6,50**	75	150	**36,00**
1,70	30	75	**11,00**	**6,60**	75	150	**51,00**
1,80	30	75	**11,00**	**6,70**	75	150	**51,00**
1,90	30	75	**11,00**	**6,80**	75	150	**38,00**
2,00	30	75	**13,20**	**6,90**	75	150	**51,00**
2,10	30	75	**13,20**	**7,00**	75	150	**40,00**
2,20	30	75	**13,20**	**7,10**	75	150	**55,00**
2,30	30	75	**13,20**	**7,20**	75	150	**55,00**
2,40	35	100	**16,00**	**7,30**	75	150	**55,00**
2,50	35	100	**16,00**	**7,40**	75	150	**55,00**
2,60	35	100	**16,00**	**7,50**	75	150	**52,00**
2,70	35	100	**16,00**	**7,60**	75	150	**58,00**
2,80	35	100	**16,00**	**7,70**	75	150	**58,00**
2,90	35	100	**16,00**	**7,80**	75	150	**58,00**
3,00	50	100	**18,50**	**7,90**	75	150	**58,00**
3,10	50	100	**19,00**	**8,00**	75	150	**44,00**
3,20	50	100	**18,50**	**8,10**	75	150	**66,00**
3,30	50	100	**19,00**	**8,20**	75	150	**66,00**
3,40	50	100	**19,00**	**8,30**	75	150	**66,00**
3,50	50	100	**18,00**	**8,40**	75	150	**66,00**
3,60	50	100	**20,50**	**8,50**	75	150	**48,00**
3,70	50	100	**20,50**	**8,60**	75	150	**75,00**
3,80	50	100	**20,50**	**8,70**	75	150	**75,00**
3,90	50	100	**20,50**	**8,80**	75	150	**75,00**
4,00	50	100	**19,00**	**8,90**	75	150	**75,00**
4,10	50	100	**22,00**	**9,00**	75	150	**76,00**
4,20	50	100	**19,50**	**9,10**	75	150	**78,00**
4,30	50	100	**22,00**	**9,20**	75	150	**78,00**
4,40	50	100	**23,00**	**9,30**	75	150	**78,00**
4,50	50	100	**19,50**	**9,40**	75	150	**78,00**
4,60	50	100	**25,00**	**9,50**	75	150	**76,00**
4,70	50	100	**25,00**	**9,60**	75	150	**81,00**
4,80	50	100	**25,00**	**9,70**	75	150	**81,00**
4,90	50	100	**25,00**	**9,80**	75	150	**81,00**
5,00	75	150	**24,00**	**9,90**	75	150	**81,00**
5,10	75	150	**40,00**	**10,00**	75	150	**58,00**
5,20	75	150	**40,00**	**10,50**	90	200	**102,00**
5,30	75	150	**40,00**	**11,00**	90	200	**110,00**
5,40	75	150	**40,00**	**11,50**	90	200	**116,00**
5,50	75	150	**40,00**	**12,00**	90	200	**70,00**
5,60	75	150	**41,00**	**12,50**	90	200	**132,00**
5,70	75	150	**41,00**	**13,00**	90	200	**145,00**
5,80	75	150	**41,00**				

VHM-Spiralbohrer 3xd



Solid carbide twist drills, 3xd

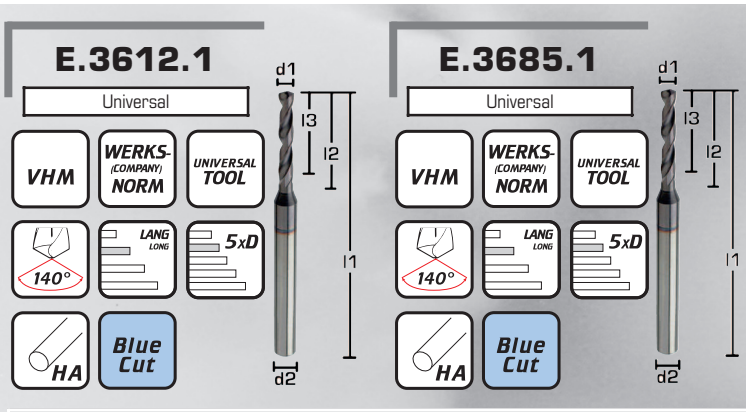
Wiertła skrętne z węglika spiekanego 3xD

Punte in MD 3xd

Brocas de metal duro integral, 3xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					Schaft 3 *shank 3* E.3611.1 € Stück *piece*	Schaft 6 *shank 6* E.3684.1 € Stück *piece*
d1 h6	l3	l2	l1	d2		
1,00	3	8	38	3,0	**10,00**	
1,10	3	8	38	3,0	**10,00**	
1,20	3	8	38	3,0	**10,00**	
1,30	3	8	38	3,0	**10,00**	
1,40	3	8	38	3,0	**10,00**	
Ø 1,50-1,90 mm nur in langer Ausführung lieferbar *Ø 1,50-1,90 mm can only be supplied in long version*						
2,00	10	16	50	3,0 / 6,0	**14,00**	**22,00**
2,10	10	16	50	3,0 / 6,0	**14,00**	**22,00**
2,20	10	16	50	3,0 / 6,0	**14,00**	**22,00**
2,30	10	16	50	3,0 / 6,0	**14,00**	**22,00**
2,40	10	16	50	3,0 / 6,0	**14,00**	**22,00**
2,50	14	20	50	3,0 / 6,0	**14,80**	**22,00**
2,60	14	20	50	3,0 / 6,0	**14,80**	**22,00**
2,70	14	20	50	3,0 / 6,0	**14,80**	**22,00**
2,80	14	20	50	3,0 / 6,0	**14,80**	**22,00**
2,90	14	20	50	3,0 / 6,0	**14,80**	**22,00**

VHM-Spiralbohrer 5xd



Solid carbide twist drills 5xd

Wiertła skrętne długie z węglika spiekanego 5xD

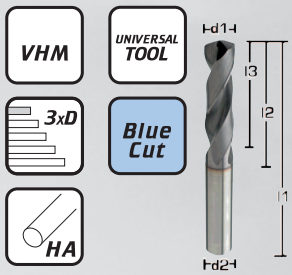
Punte in MD 5xd

Brocas de metal duro integral, 5xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					Schaft 3 *shank 3* E.3612.1 € Stück *piece*	Schaft 6 *shank 6* E.3685.1 € Stück *piece*
d1 h6	l3	l2	l1	d2		
1,50	10	13	38	3,0 / 6,0	**11,00**	**24,00**
1,60	10	13	38	3,0 / 6,0	**11,00**	**24,00**
1,70	10	13	38	3,0 / 6,0	**11,00**	**24,00**
1,80	10	13	38	3,0 / 6,0	**11,00**	**24,00**
1,90	10	13	38	3,0 / 6,0	**11,00**	**24,00**
2,00	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,10	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,20	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,30	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,40	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,45	14	20	60	3,0 / 6,0	**14,00**	**24,00**
2,50	20	26	60	3,0 / 6,0	**15,00**	**24,00**
2,60	20	26	60	3,0 / 6,0	**15,00**	**24,00**
2,70	20	26	60	3,0 / 6,0	**15,00**	**24,00**
2,80	20	26	60	3,0 / 6,0	**15,00**	**24,00**
2,90	20	26	60	3,0 / 6,0	**15,00**	**24,00**

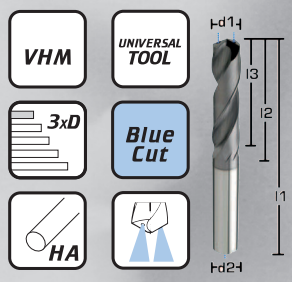
E.3645.1

Universal



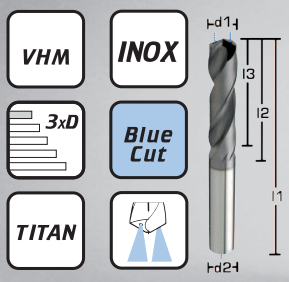
E.3646.1

Universal



E.3647.1

2.1 | 2.2 | 5.1



Solid carbide twist drills 3xd

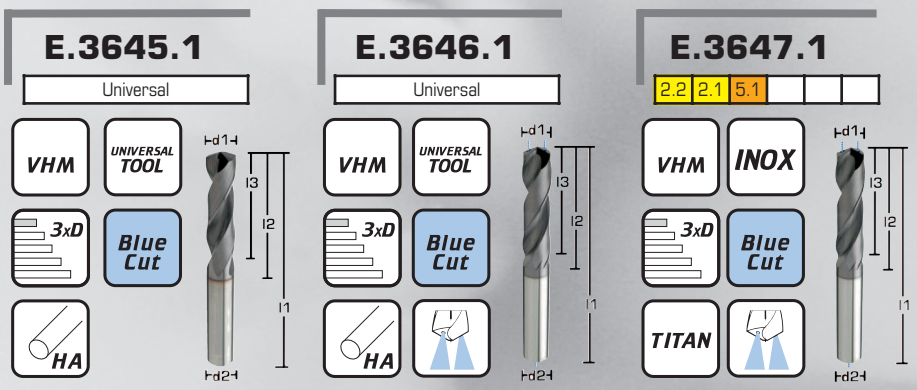
Wiertła skrętne z węglika spiekanego 3xD

Punte in MD 3xd

Brocas de metal duro integral, 3xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3645.1 € Stück *piece*	E.3646.1 € Stück *piece*	E.3647.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
1,00	4,0	7	45	4,0			
1,10	4,4	7	45	4,0			
1,20	4,8	7	45	4,0			
1,30	5,2	7	45	4,0	**siehe**		
1,40	5,6	7	45	4,0			
1,50	6,0	14	55	4,0	**Art-Nr. E.3611.1**		
1,60	6,4	14	55	4,0	**Art-Nr. E.3684.1**		
1,70	6,8	14	55	4,0			
1,80	7,2	14	55	4,0			
1,90	7,6	14	55	4,0			
2,00	8,0	20	55	4,0			
2,10	8,4	20	55	4,0	*see*		
2,20	8,8	20	55	4,0			
2,30	9,2	20	55	4,0	*Art-No. E.3611.1*		
2,40	9,6	20	55	4,0	*Art-No. E.3684.1*		
2,50	10,0	20	55	4,0			
2,60	10,4	20	55	4,0			
2,70	10,8	20	55	4,0			
2,80	11,2	20	55	4,0			
2,90	11,6	20	55	4,0			
3,00	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,10	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,20	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,30	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,40	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,50	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,60	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,70	14,0	20	62	6,0	**17,00**	**31,00**	**38,00**
3,80	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
3,90	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,00	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,10	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,20	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,30	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,40	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,50	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,60	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,70	17,0	24	66	6,0	**17,00**	**31,00**	**38,00**
4,80	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
4,90	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,00	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,10	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,20	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,30	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,40	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,50	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,60	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,70	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**
5,80	20,0	28	66	6,0	**17,00**	**31,00**	**38,00**

Fortsetzung nächste Seite *to be continued*



Solid carbide twist drills 3xd

Wiertła skrętne z węglika spiekanego 3xD

Punte in MD 3xd

Brocas de metal duro integral, 3xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3645.1 € Stück *piece*	E.3646.1 € Stück *piece*	E.3647.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
5,90	20	28	66	6,0	17,00	31,00	38,00
6,00	20	28	66	6,0	17,00	31,00	38,00
6,10	24	34	79	8,0	28,50	41,00	49,00
6,20	24	34	79	8,0	28,50	41,00	49,00
6,30	24	34	79	8,0	28,50	41,00	49,00
6,40	24	34	79	8,0	28,50	41,00	49,00
6,50	24	34	79	8,0	28,50	41,00	49,00
6,60	24	34	79	8,0	28,50	41,00	49,00
6,70	24	34	79	8,0	28,50	41,00	49,00
6,80	24	34	79	8,0	28,50	41,00	49,00
6,90	24	34	79	8,0	28,50	41,00	49,00
7,00	24	34	79	8,0	28,50	41,00	49,00
7,10	29	41	79	8,0	28,50	41,00	49,00
7,20	29	41	79	8,0	28,50	41,00	49,00
7,30	29	41	79	8,0	28,50	41,00	49,00
7,40	29	41	79	8,0	28,50	41,00	49,00
7,50	29	41	79	8,0	28,50	41,00	49,00
7,60	29	41	79	8,0	28,50	41,00	49,00
7,70	29	41	79	8,0	28,50	41,00	49,00
7,80	29	41	79	8,0	28,50	41,00	49,00
7,90	29	41	79	8,0	28,50	41,00	49,00
8,00	29	41	79	8,0	28,50	41,00	49,00
8,10	35	47	89	10,0	37,00	46,00	55,00
8,20	35	47	89	10,0	37,00	46,00	55,00
8,30	35	47	89	10,0	37,00	46,00	55,00
8,40	35	47	89	10,0	37,00	46,00	55,00
8,50	35	47	89	10,0	37,00	46,00	55,00
8,60	35	47	89	10,0	37,00	46,00	55,00
8,70	35	47	89	10,0	37,00	46,00	55,00
8,80	35	47	89	10,0	37,00	46,00	55,00
8,90	35	47	89	10,0	37,00	46,00	55,00
9,00	35	47	89	10,0	37,00	46,00	55,00
9,10	35	47	89	10,0	37,00	46,00	55,00
9,20	35	47	89	10,0	37,00	46,00	55,00
9,30	35	47	89	10,0	37,00	46,00	55,00
9,40	35	47	89	10,0	37,00	46,00	55,00
9,50	35	47	89	10,0	37,00	46,00	55,00
9,60	35	47	89	10,0	37,00	46,00	55,00
9,70	35	47	89	10,0	37,00	46,00	55,00
9,80	35	47	89	10,0	37,00	46,00	55,00
9,90	35	47	89	10,0	37,00	46,00	55,00
10,00	35	47	89	10,0	37,00	46,00	55,00
10,10	40	55	102	12,0	47,00	65,00	76,00
10,20	40	55	102	12,0	47,00	65,00	76,00
10,30	40	55	102	12,0	47,00	65,00	76,00
10,40	40	55	102	12,0	47,00	65,00	76,00
10,50	40	55	102	12,0	47,00	65,00	76,00
10,60	40	55	102	12,0	47,00	65,00	76,00
10,70	40	55	102	12,0	47,00	65,00	76,00

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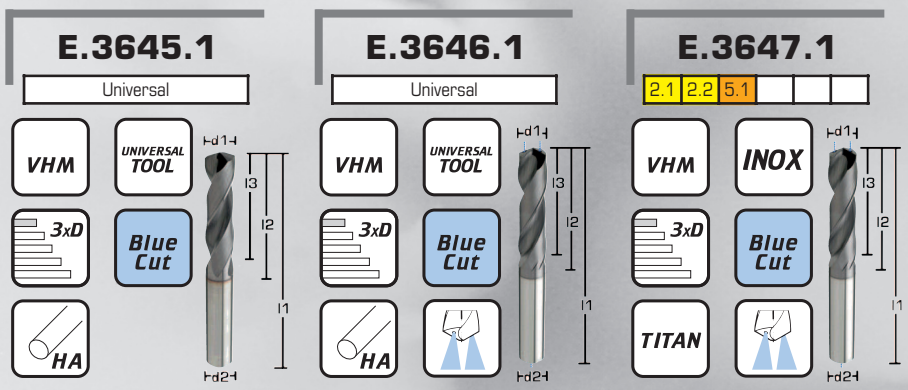


Solid carbide twist drills 3xd

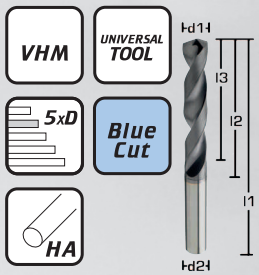
Wiertła skrętne z węglika spiekanego 3xD

Punte in MD 3xd

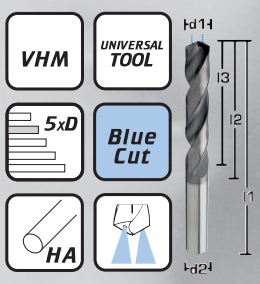
Brocas de metal duro integral, 3xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3645.1 € Stück *piece*	E.3646.1 € Stück *piece*	E.3647.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
Ø 1,00-10,70 mm siehe Seite 3.18 + 3.19					*Ø 1,00-10,70 mm see page 3.18 + 3.19*		
10,80	40	55	102	12,0	**47,00**	**65,00**	**76,00**
10,90	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,00	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,10	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,20	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,30	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,40	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,50	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,60	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,70	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,80	40	55	102	12,0	**47,00**	**65,00**	**76,00**
11,90	40	55	102	12,0	**47,00**	**65,00**	**76,00**
12,00	40	55	102	12,0	**47,00**	**65,00**	**76,00**
12,30	43	60	107	14,0	**69,00**	**92,00**	**108,00**
12,50	43	60	107	14,0	**69,00**	**92,00**	**108,00**
12,80	43	60	107	14,0	**69,00**	**92,00**	**108,00**
13,00	43	60	107	14,0	**69,00**	**92,00**	**108,00**
13,50	43	60	107	14,0	**69,00**	**92,00**	**108,00**
13,80	43	60	107	14,0	**69,00**	**92,00**	**108,00**
14,00	43	60	107	14,0	**69,00**	**92,00**	**108,00**
14,50	45	65	115	16,0	**85,00**	**105,00**	**122,00**
14,80	45	65	115	16,0	**85,00**	**105,00**	**122,00**
15,00	45	65	115	16,0	**85,00**	**105,00**	**122,00**
15,50	45	65	115	16,0	**85,00**	**105,00**	**122,00**
15,80	45	65	115	16,0	**85,00**	**105,00**	**122,00**
16,00	45	65	115	16,0	**85,00**	**105,00**	**122,00**
16,50	51	73	123	18,0	**107,00**	**155,00**	**180,00**
16,80	51	73	123	18,0	**107,00**	**155,00**	**180,00**
17,00	51	73	123	18,0	**107,00**	**155,00**	**180,00**
17,50	51	73	123	18,0	**107,00**	**155,00**	**180,00**
17,80	51	73	123	18,0	**107,00**	**155,00**	**180,00**
18,00	51	73	123	18,0	**107,00**	**155,00**	**180,00**
18,50	55	79	131	20,0	**131,00**	**196,00**	**212,00**
19,00	55	79	131	20,0	**131,00**	**196,00**	**212,00**
19,50	55	79	131	20,0	**131,00**	**196,00**	**212,00**
19,80	55	79	131	20,0	**131,00**	**196,00**	**212,00**
20,00	55	79	131	20,0	**131,00**	**196,00**	**212,00**

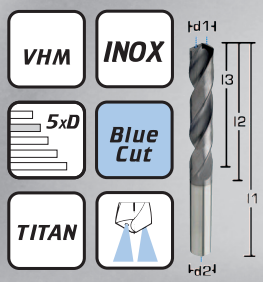
E.3665.1 Universal



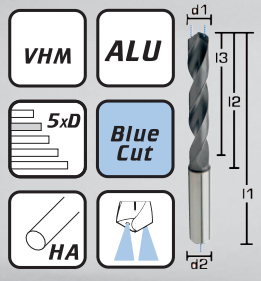
E.3617.1 Universal



E.3618.1 2.1 5.1



E.3619.1 4.1 4.2 4.4



Solid carbide twist drills 5xd

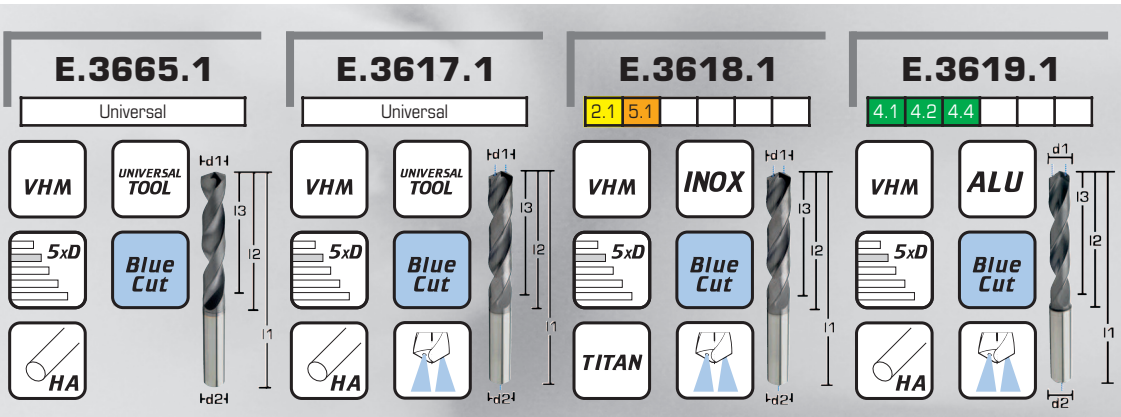
Wiertła skrętne z węglika spiekanego 5xD

Punte in MD 5xd

Brocas de metal duro integral, 5xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3665.1 € Stück *piece*	E.3617.1 € Stück *piece*	E.3618.1* € Stück *piece*	E.3619.1 € Stück *piece*
d1	l3	l2	l1	d2 h6				
1,00	6,5	8	55	3,0/4,0*		**65,00**		
1,10	9,5	12	55	3,0/4,0*		**65,00**		
1,20	9,5	12	55	3,0/4,0*		**65,00**		
1,30	9,5	12	55	3,0/4,0*	**siehe**	**65,00**		
1,40	9,5	12	55	3,0/4,0*	**Art-Nr. E.3612.1**	**65,00**		
1,50	9,5	12	55	3,0/4,0*		**30,00**		
1,60	13,0	16	55	3,0/4,0*	**Art-Nr. E.3685.1**	**30,00**		
1,70	13,0	16	55	3,0/4,0*		**30,00**		
1,80	13,0	16	55	3,0/4,0*		**30,00**		
1,90	13,0	16	55	3,0/4,0*		**30,00**		
2,00	13,0	16	57	6,0/4,0*		**28,00**		
2,10	16,0	21	57	6,0/4,0*	*see*	**28,00**		
2,20	16,0	21	57	6,0/4,0*	*Art-No. E.3612.1*	**28,00**		
2,30	16,0	21	57	6,0/4,0*		**28,00**		
2,40	16,0	21	57	6,0/4,0*	*Art-No. E.3685.1*	**28,00**		
2,50	16,0	21	57	6,0/4,0*		**28,00**		
2,60	18,0	21	57	6,0/4,0*		**28,00**		
2,70	18,0	21	57	6,0/4,0*		**28,00**		
2,80	18,0	21	57	6,0/4,0*		**28,00**		
2,90	18,0	21	57	6,0/4,0*		**28,00**		
3,00	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,10	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,20	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,30	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,40	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,50	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,60	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,70	23,0	28	66	6,0	**22,00**	**30,00**	**35,00**	**35,00**
3,80	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
3,90	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,00	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,10	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,20	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,30	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,40	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,50	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,60	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,65	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,70	29,0	36	74	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,80	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
4,90	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,00	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,10	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,20	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,30	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,40	35,0	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**

Fortsetzung nächste Seite *to be continued*



Solid carbide twist drills 5xd

Wiertła skrętne z węglika spiekanego 5xD

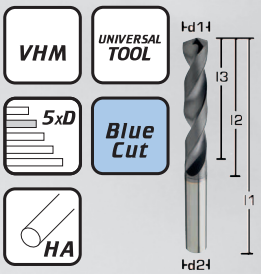
Punte in MD 5xd

Brocas de metal duro integral, 5xd, ranuras helicoidales

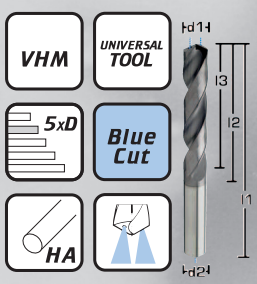
Artikel-Nr. *Article-No.*					E.3665.1 € Stück *piece*	E.3617.1 € Stück *piece*	E.3618.1 € Stück *piece*	E.3619.1 € Stück *piece*
d1	l3	l2	l1	d2 h6				
Ø 1,00-5,40 mm siehe Seite 3.21 *Ø 1,00-5,40 mm see page 3.21*								
5,50	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,55	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,60	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,70	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,80	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
5,90	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
6,00	35	44	82	6,0	**22,00**	**33,00**	**38,00**	**38,00**
6,10	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,20	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,30	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,40	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,50	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,60	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,70	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,80	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
6,90	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,00	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,10	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,20	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,30	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,40	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,50	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,60	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,70	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,80	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
7,90	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
8,00	43	53	91	8,0	**31,00**	**43,00**	**52,00**	**52,00**
8,10	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,20	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,30	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,40	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,50	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,60	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,70	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,80	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
8,90	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,00	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,10	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,20	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,30	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,40	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,50	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,60	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,70	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
9,80	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**

Fortsetzung nächste Seite *to be continued*

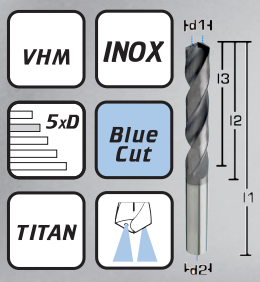
E.3665.1
Universal



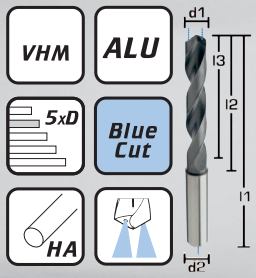
E.3617.1
Universal



E.3618.1
2.1 5.1



E.3619.1
4.1 4.2 4.4



Solid carbide twist drills 5xd

Wiertła skrętne z węglika spiekanego 5xD

Punte in MD 5xd

Brocas de metal duro integral, 5xd, ranuras helicoidales

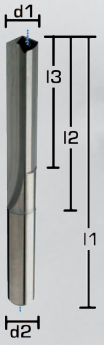
Artikel-Nr. *Article-No.*					E.3665.1 € Stück *piece*	E.3617.1 € Stück *piece*	E.3618.1 € Stück *piece*	E.3619.1 € Stück *piece*
d1	l3	l2	l1	d2 h6				
9,90	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
10,00	49	61	103	10,0	**40,00**	**50,00**	**64,00**	**64,00**
10,10	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,20	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,30	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,40	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,50	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,60	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,70	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,80	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
10,90	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,00	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,10	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,20	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,30	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,40	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,50	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,60	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,70	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,80	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
11,90	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
12,00	56	71	118	12,0	**61,00**	**72,00**	**88,00**	**88,00**
12,20	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
12,30	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
12,50	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
12,80	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
13,00	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
13,50	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
13,80	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
14,00	60	77	124	14,0	**73,00**	**95,00**	**115,00**	**115,00**
14,50	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
14,80	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
15,00	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
15,50	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
15,80	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
16,00	63	83	133	16,0	**92,00**	**128,00**	**152,00**	**152,00**
16,50	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
16,80	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
17,00	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
17,50	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
17,80	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
18,00	71	93	143	18,0	**116,00**	**175,00**	**198,00**	**198,00**
18,50	77	101	153	20,0	**147,00**	**210,00**	**241,00**	**241,00**
19,00	77	101	153	20,0	**147,00**	**210,00**	**241,00**	**241,00**
19,50	77	101	153	20,0	**147,00**	**210,00**	**241,00**	**241,00**
19,80	77	101	153	20,0	**147,00**	**210,00**	**241,00**	**241,00**
20,00	77	101	153	20,0	**147,00**	**210,00**	**241,00**	**241,00**

E.3628.0

3.1 | 3.2 | 4.3 | 4.5 | 4.6

VHM | GUSS | ALU

5xD | 4 FÜHRUNGSFASEN GUIDE MARGINS | HA | 130° | POLIERT polished



Solid carbide drills 4 margins 5xd straight fluted

Wiertła proste 4–łysinkowe z węglika spiekanego 5xD do materiałów dających krótki wiór

Punte MD, 4 fasi, denti dritti 5xd

Brocas de metal duro integral, 5xd, con cuatro caras y ranuras rectas

Artikel-Nr. *Article-No.*					E.3628.0 € Stück *piece*
d1 m7	l3	l2	l1	d2	
2,80	18	21	57	6,0	**38,00**
3,00	23	28	66	6,0	**38,00**
3,30	23	28	66	6,0	**38,00**
3,50	23	28	66	6,0	**38,00**
3,80	29	36	74	6,0	**38,00**
4,00	29	36	74	6,0	**38,00**
4,20	29	36	74	6,0	**38,00**
4,50	29	36	74	6,0	**38,00**
4,80	35	44	82	6,0	**38,00**
5,00	35	44	82	6,0	**38,00**
5,50	35	44	82	6,0	**38,00**
5,80	35	44	82	6,0	**38,00**
6,00	35	44	82	6,0	**38,00**
6,50	43	53	91	8,0	**48,00**
6,80	43	53	91	8,0	**48,00**
7,00	43	53	91	8,0	**48,00**
7,50	43	53	91	8,0	**48,00**
7,80	43	53	91	8,0	**48,00**
8,00	43	53	91	8,0	**48,00**
8,50	49	61	103	10,0	**56,00**
8,80	49	61	103	10,0	**56,00**
9,00	49	61	103	10,0	**56,00**
9,50	49	61	103	10,0	**56,00**
9,80	49	61	103	10,0	**56,00**
10,00	49	61	103	10,0	**56,00**
10,20	56	71	118	12,0	**78,00**
10,50	56	71	118	12,0	**78,00**
10,80	56	71	118	12,0	**78,00**
11,00	56	71	118	12,0	**78,00**
11,50	56	71	118	12,0	**78,00**
11,80	56	71	118	12,0	**78,00**
12,00	56	71	118	12,0	**78,00**
12,50	60	77	124	14,0	**106,00**
12,80	60	77	124	14,0	**106,00**
13,00	60	77	124	14,0	**106,00**
13,50	60	77	124	14,0	**106,00**
13,80	60	77	124	14,0	**106,00**
14,00	60	77	124	14,0	**106,00**
14,50	63	83	133	16,0	**138,00**
14,80	63	83	133	16,0	**138,00**
15,00	63	83	133	16,0	**138,00**
15,50	63	83	133	16,0	**138,00**
15,80	63	83	133	16,0	**138,00**
16,00	63	83	133	16,0	**138,00**
17,00	71	93	143	18,0	**185,00**
18,00	71	93	143	18,0	**185,00**
19,00	77	101	153	20,0	**220,00**
20,00	77	101	153	20,0	**220,00**

E.3610.1

2.1 2.2 5.1

VHM | 120° | Blue Cut | 8xD | TITAN | HA | INOX



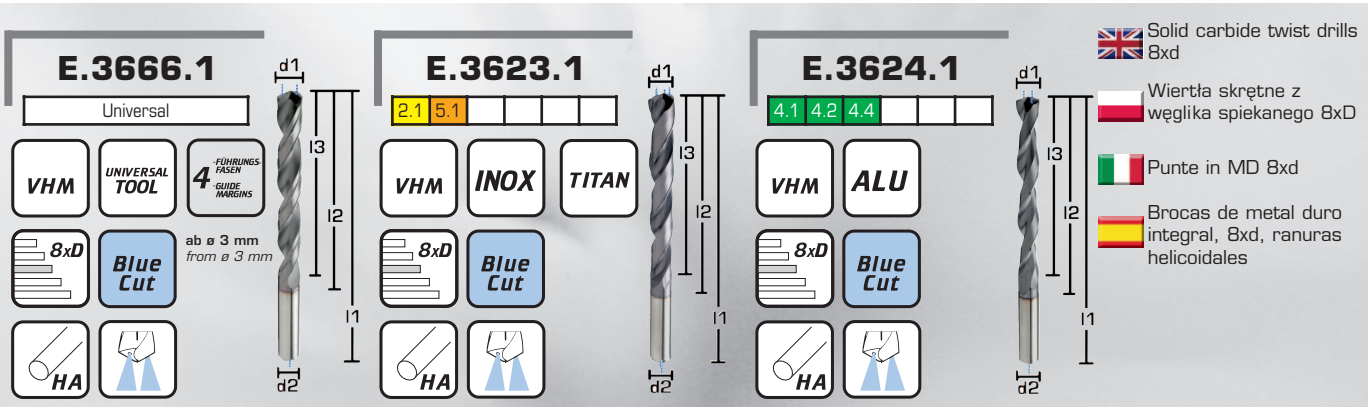
Solid carbide micro drills 8xd

Wiertła miniaturowe z węglika spiekanego 8xD do stali nierdzewnej i stopów tytanu

Micropunte in MD 8xd

Microbrocas de metal duro integral, 8xd

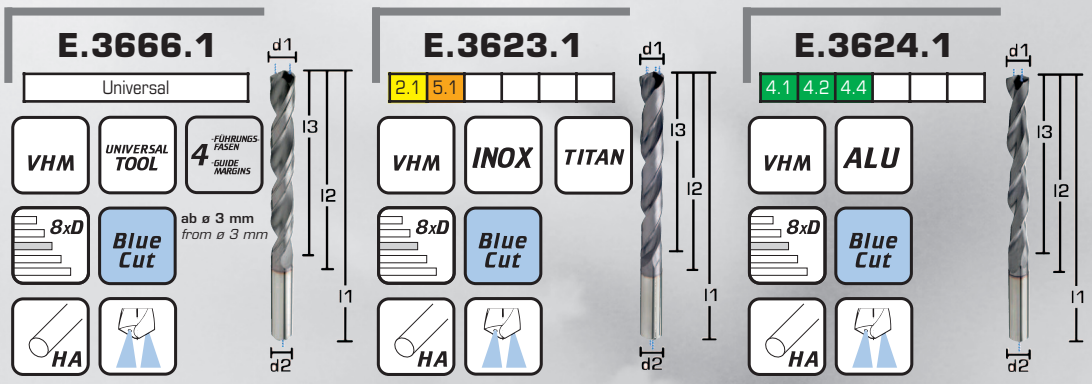
Artikel-Nr. *Article-No.*				E.3610.1 € Stück *piece*
d1	l2	l1	d2 h6	
0,50	3,8	38	3,0	**31,00**
0,55	4,1	38	3,0	**31,00**
0,60	4,5	38	3,0	**31,00**
0,65	4,9	38	3,0	**31,00**
0,70	5,3	38	3,0	**31,00**
0,75	5,6	38	3,0	**31,00**
0,80	6,0	38	3,0	**31,00**
0,85	6,4	38	3,0	**31,00**
0,90	6,8	38	3,0	**31,50**
0,95	7,1	38	3,0	**31,50**
1,00	7,5	38	3,0	**31,50**
1,05	7,9	38	3,0	**31,50**
1,10	8,3	38	3,0	**32,00**
1,15	8,6	38	3,0	**32,00**
1,20	9,0	38	3,0	**32,00**
1,25	9,4	38	3,0	**32,00**
1,30	9,8	38	3,0	**32,50**
1,35	10,1	38	3,0	**32,50**
1,40	10,5	38	3,0	**32,50**
1,45	10,9	38	3,0	**33,30**
1,50	11,3	38	3,0	**33,30**
1,55	11,6	45	3,0	**33,30**
1,60	12,0	45	3,0	**34,50**
1,65	12,4	45	3,0	**34,50**
1,70	12,8	45	3,0	**34,50**
1,75	13,1	45	3,0	**34,50**
1,80	13,5	45	3,0	**35,30**
1,85	13,9	45	3,0	**35,30**
1,90	14,3	45	3,0	**35,30**
1,95	14,6	45	3,0	**35,30**
2,00	15,0	45	3,0	**39,00**
2,05	15,4	45	3,0	**39,00**
2,10	15,8	45	3,0	**40,60**
2,15	16,1	45	3,0	**40,60**
2,20	16,5	45	3,0	**41,50**
2,25	16,9	45	3,0	**41,50**
2,30	17,3	45	3,0	**41,50**
2,35	17,6	45	3,0	**43,00**
2,40	18,0	45	3,0	**43,00**
2,45	18,4	45	3,0	**43,00**
2,50	18,8	53	3,0	**45,00**
2,55	19,1	53	3,0	**46,00**
2,60	19,5	53	3,0	**46,00**
2,65	19,9	53	3,0	**46,00**
2,70	20,3	53	3,0	**47,00**
2,75	20,6	53	3,0	**47,00**
2,80	21,0	53	3,0	**49,00**
2,85	21,4	53	3,0	**49,00**
2,90	21,8	53	3,0	**50,00**
2,95	22,1	53	3,0	**50,00**
3,00	22,5	53	3,0	**50,00**



Artikel-Nr. *Article-No.*					E.3666.1 € Stück *piece*	E.3623.1 € Stück *piece*	E.3624.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
1,00	9,0	11	55	3,0	**65,00**		
1,10	13,5	17	55	3,0	**65,00**		
1,20	13,5	17	55	3,0	**65,00**		
1,30	13,5	17	55	3,0	**65,00**		
1,40	13,5	17	55	3,0	**65,00**		
1,50	13,5	17	55	3,0	**36,00**		
1,60	17,5	22	65	3,0	**36,00**		
1,70	17,5	22	65	3,0	**36,00**		
1,80	17,5	22	65	3,0	**36,00**		
1,90	17,5	22	65	3,0	**36,00**		
2,00	17,5	22	65	3,0	**36,00**		
2,10	22,5	28	74	3,0	**36,00**		
2,20	22,5	28	74	3,0	**36,00**		
2,30	22,5	28	74	3,0	**36,00**		
2,40	22,5	28	74	3,0	**36,00**		
2,50	22,5	28	74	3,0	**36,00**		
2,60	25,5	32	81	3,0	**36,00**		
2,70	25,5	32	81	3,0	**36,00**		
2,80	25,5	32	81	3,0	**36,00**		
2,90	25,5	32	81	3,0	**36,00**		
3,00	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,10	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,20	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,30	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,40	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,50	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,60	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,70	27,0	34	81	6,0	**68,00**	**95,00**	**95,00**
3,80	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
3,90	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,00	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,10	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,20	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,30	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,40	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,50	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,60	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,70	35,0	43	81	6,0	**68,00**	**95,00**	**95,00**
4,80	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**
4,90	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**
5,00	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**
5,10	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**
5,20	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**
5,30	45,0	57	95	6,0	**68,00**	**95,00**	**95,00**

Fortsetzung nächste Seite *to be continued*

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13



Solid carbide twist drills 8xd

Wiertła skrętne z węglika spiekanego 8xD

Punte in MD 8xd

Brocas de metal duro integral, 8xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3666.1 €	E.3623.1 €	E.3624.1 €
d1	l3	l2	l1	d2 h6	Stück *piece*	Stück *piece*	Stück *piece*
Ø 1,00-5,30 mm siehe Seite 3.26 *Ø 1,00-5,30 mm see page 3.26*							
5,40	45	57	95	6,0	**68,00**	**95,00**	**95,00**
5,50	45	57	95	6,0	**68,00**	**95,00**	**95,00**
5,60	45	57	95	6,0	**68,00**	**95,00**	**95,00**
5,70	45	57	95	6,0	**68,00**	**95,00**	**95,00**
5,80	45	57	95	6,0	**68,00**	**95,00**	**95,00**
5,90	45	57	95	6,0	**68,00**	**95,00**	**95,00**
6,00	45	57	95	6,0	**68,00**	**95,00**	**95,00**
6,10	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,20	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,30	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,40	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,50	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,60	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,70	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,80	52	76	114	8,0	**86,00**	**102,00**	**102,00**
6,90	52	76	114	8,0	**86,00**	**102,00**	**102,00**
7,00	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,10	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,20	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,30	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,40	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,50	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,60	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,70	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,80	60	76	114	8,0	**86,00**	**102,00**	**102,00**
7,90	60	76	114	8,0	**86,00**	**102,00**	**102,00**
8,00	60	76	114	8,0	**86,00**	**102,00**	**102,00**
8,10	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,20	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,30	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,40	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,50	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,60	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,70	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,80	68	95	142	10,0	**112,00**	**139,00**	**139,00**
8,90	68	95	142	10,0	**112,00**	**139,00**	**139,00**
9,00	68	95	142	10,0	**112,00**	**139,00**	**139,00**
9,10	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,20	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,30	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,40	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,50	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,60	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,70	76	95	142	10,0	**112,00**	**139,00**	**139,00**

Fortsetzung nächste Seite *to be continued*

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13

E.3666.1

Universal

VHM | UNIVERSAL TOOL | 4 FÜHRUNGS FASEN GUIDE MARGINS | 8xD | Blue Cut | HA

ab ø 3 mm
from ø 3 mm



E.3623.1

2.1 | 5.1

VHM | INOX | TITAN | 8xD | Blue Cut | HA



E.3624.1

4.1 | 4.2 | 4.4

VHM | ALU | 8xD | Blue Cut | HA



Solid carbide twist drills 8xd

Wiertła skrętne z węglika spiekanego 8xD

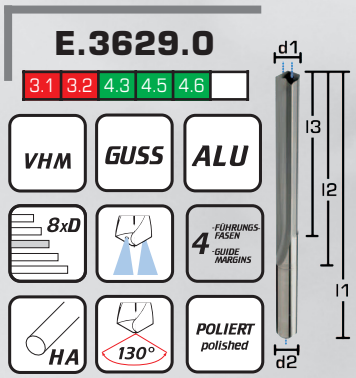
Punte in MD 8xd

Brocas de metal duro integral, 8xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3666.1 € Stück *piece*	E.3623.1 € Stück *piece*	E.3624.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
9,80	76	95	142	10,0	**112,00**	**139,00**	**139,00**
9,90	76	95	142	10,0	**112,00**	**139,00**	**139,00**
10,00	76	95	142	10,0	**112,00**	**139,00**	**139,00**
10,10	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,20	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,30	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,40	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,50	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,60	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,70	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,80	90	114	162	12,0	**145,00**	**185,00**	**185,00**
10,90	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,00	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,10	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,20	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,30	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,40	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,50	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,60	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,70	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,80	90	114	162	12,0	**145,00**	**185,00**	**185,00**
11,90	90	114	162	12,0	**145,00**	**185,00**	**185,00**
12,00	90	114	162	12,0	**145,00**	**185,00**	**185,00**
12,50	106	133	178	14,0	**189,00**	**220,00**	**220,00**
12,80	106	133	178	14,0	**189,00**	**220,00**	**220,00**
13,00	106	133	178	14,0	**189,00**	**220,00**	**220,00**
13,50	106	133	178	14,0	**189,00**	**220,00**	**220,00**
14,00	106	133	178	14,0	**189,00**	**220,00**	**220,00**
14,50	122	152	203	16,0	**249,00**		
15,00	122	152	203	16,0	**249,00**		
15,50	122	152	203	16,0	**249,00**		
16,00	122	152	203	16,0	**249,00**		

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13

VHM-4 Fasenbohrer 8xd gerade genutet



Solid carbide drills 4 margins 8xd straight fluted

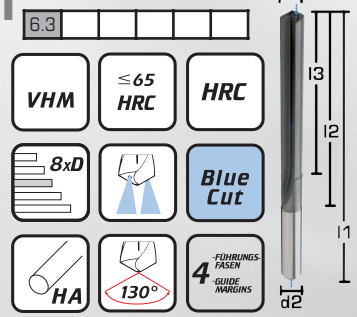
Wiertła proste 4-łysinkowe z węglika spiekanego 8xD

Punte MD, 4 fasi, denti dritti 8xd

Brocas de metal duro integral, 8xd, con cuatro caras y ranuras rectas

Artikel-Nr. *Article-No.*					E.3629.0 € Stück *piece*
d1 m7	l3	l2	l1	d2 h6	
2,50	22,5	28	74	3,0	**58,00**
2,80	25,5	32	81	3,0	**58,00**
3,00	27,0	34	72	6,0	**58,00**
3,30	27,0	34	72	6,0	**58,00**
3,50	27,0	34	72	6,0	**58,00**
3,80	35,0	43	81	6,0	**58,00**
4,00	35,0	43	81	6,0	**58,00**
4,20	35,0	43	81	6,0	**58,00**
4,50	35,0	43	81	6,0	**58,00**
4,80	45,0	57	95	6,0	**58,00**
5,00	45,0	57	95	6,0	**58,00**
5,50	45,0	57	95	6,0	**58,00**
5,80	45,0	57	95	6,0	**58,00**
6,00	45,0	57	95	6,0	**58,00**
6,50	52,0	76	114	8,0	**75,00**
6,80	52,0	76	114	8,0	**75,00**
7,00	60,0	76	114	8,0	**75,00**
7,50	60,0	76	114	8,0	**75,00**
7,80	60,0	76	114	8,0	**75,00**
8,00	60,0	76	114	8,0	**75,00**
8,50	68,0	95	142	10,0	**105,00**
8,80	68,0	95	142	10,0	**105,00**
9,00	68,0	95	142	10,0	**105,00**
9,50	76,0	95	142	10,0	**105,00**
9,80	76,0	95	142	10,0	**105,00**
10,00	76,0	95	142	10,0	**105,00**
10,20	90,0	114	162	12,0	**130,00**
10,50	90,0	114	162	12,0	**130,00**
10,80	90,0	114	162	12,0	**130,00**
11,00	90,0	114	162	12,0	**130,00**
11,50	90,0	114	162	12,0	**130,00**
11,80	90,0	114	162	12,0	**130,00**
12,00	90,0	114	162	12,0	**130,00**
12,50	106,0	133	178	14,0	**185,00**
12,80	106,0	133	178	14,0	**185,00**
13,00	106,0	133	178	14,0	**185,00**
13,50	106,0	133	178	14,0	**185,00**
13,80	106,0	133	178	14,0	**185,00**
14,00	106,0	133	178	14,0	**185,00**
14,50	122,0	152	203	16,0	**295,00**
14,80	122,0	152	203	16,0	**295,00**
15,00	122,0	152	203	16,0	**295,00**
15,50	122,0	152	203	16,0	**295,00**
15,80	122,0	152	203	16,0	**295,00**
16,00	122,0	152	203	16,0	**295,00**

E.3672.1



Solid carbide HRC drills 4 margins 8xd

Wiertła 4-łysinkowe z węglika spiekanego do materiałów utwardzanych 8xD

Punte in MD, 4 fasi, denti dritti 8xd lavorazioni HRC

Brocas de metal duro integral, 8xd, con cuatro caras para gran dureza

Artikel-Nr. *Article-No.*					E.3672.1 € Stück *piece*
d1 m7	l3	l2	l1	d2 h6	
5,00	46	60	98	6,0	**128,00**
5,50	46	60	98	6,0	**128,00**
5,80	46	60	98	6,0	**128,00**
6,00	46	60	98	6,0	**122,00**
6,50	60	76	114	8,0	**175,00**
6,80	60	76	114	8,0	**175,00**
7,00	60	76	114	8,0	**175,00**
7,50	60	76	114	8,0	**175,00**
7,80	60	76	114	8,0	**175,00**
8,00	60	76	114	8,0	**161,00**
8,50	74	92	134	10,0	**215,00**
8,80	74	92	134	10,0	**215,00**
9,00	74	92	134	10,0	**215,00**
9,20	74	92	134	10,0	**215,00**
9,50	74	92	134	10,0	**215,00**
9,80	74	92	134	10,0	**215,00**
10,00	74	92	134	10,0	**198,00**
10,20	88	108	155	12,0	**248,00**
10,50	88	108	155	12,0	**248,00**
10,80	88	108	155	12,0	**248,00**
11,00	88	108	155	12,0	**248,00**
11,50	88	108	155	12,0	**248,00**
11,80	88	108	155	12,0	**248,00**
12,00	88	108	155	12,0	**238,00**
13,00	104	125	172	14,0	**337,00**
14,00	104	125	172	14,0	**310,00**
15,00	120	143	193	16,0	**490,00**
16,00	120	143	193	16,0	**450,00**

GEEIGNET BIS 65 HRC
SUITABLE UP TO 65 HRC



E.3613.1

2.1 | 2.2 | 5.1

VHM | Blue Cut | 12xD | TITAN | HA | INOX



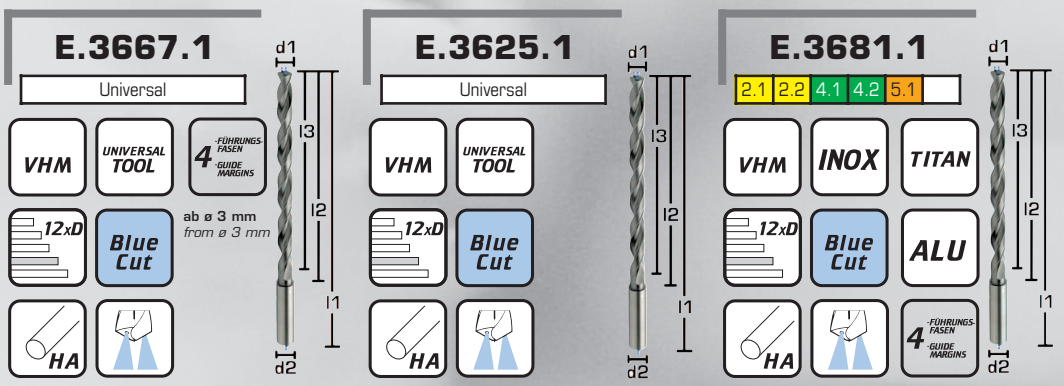
Solid carbide micro drills 12xd

Wiertła miniaturowe z węglika spiekanego 12xD

Micropunte in MD 12xd

Microbrocas de metal duro integral, 12xd

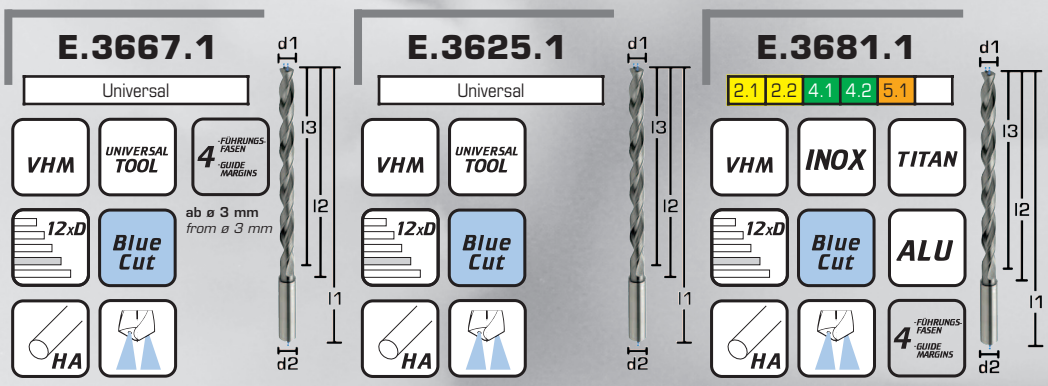
Artikel-Nr. *Article-No.*				E.3613.1 € Stück *piece*
d1	l2	l1	d2 h6	
0,50	6,8	38	3,0	**35,00**
0,55	7,4	38	3,0	**35,00**
0,60	8,1	38	3,0	**35,00**
0,65	8,8	38	3,0	**35,00**
0,70	9,5	38	3,0	**35,00**
0,75	10,1	38	3,0	**35,00**
0,80	10,8	38	3,0	**35,00**
0,85	11,5	38	3,0	**35,00**
0,90	12,2	38	3,0	**35,50**
0,95	12,8	38	3,0	**35,50**
1,00	13,5	45	3,0	**35,50**
1,05	14,2	45	3,0	**35,50**
1,10	14,9	45	3,0	**36,00**
1,15	15,5	45	3,0	**36,00**
1,20	16,2	45	3,0	**36,00**
1,25	16,9	45	3,0	**38,50**
1,30	17,6	45	3,0	**39,50**
1,35	18,2	45	3,0	**39,50**
1,40	18,9	45	3,0	**39,50**
1,45	19,6	45	3,0	**40,00**
1,50	20,3	53	3,0	**42,00**
1,55	20,9	53	3,0	**42,00**
1,60	21,6	53	3,0	**43,00**
1,65	22,3	53	3,0	**43,00**
1,70	23,0	53	3,0	**43,00**
1,75	23,6	53	3,0	**44,60**
1,80	24,3	53	3,0	**45,50**
1,85	25,0	53	3,0	**45,50**
1,90	25,7	53	3,0	**45,50**
1,95	26,3	53	3,0	**45,50**
2,00	27,0	64	3,0	**50,50**
2,05	27,7	64	3,0	**50,50**
2,10	28,4	64	3,0	**52,30**
2,15	29,0	64	3,0	**52,30**
2,20	29,7	64	3,0	**53,00**
2,25	30,4	64	3,0	**53,00**
2,30	31,1	64	3,0	**53,00**
2,35	31,7	64	3,0	**54,60**
2,40	32,4	64	3,0	**54,60**
2,45	33,1	64	3,0	**54,60**
2,50	33,8	64	3,0	**56,60**
2,55	34,4	75	3,0	**59,30**
2,60	35,1	75	3,0	**59,30**
2,65	35,8	75	3,0	**59,30**
2,70	36,5	75	3,0	**60,20**
2,75	37,1	75	3,0	**60,20**
2,80	37,8	75	3,0	**63,80**
2,85	38,5	75	3,0	**63,80**
2,90	39,2	75	3,0	**64,50**
2,95	39,8	75	3,0	**64,50**
3,00	40,5	75	3,0	**64,50**



Artikel-Nr. *Article-No.*					E.3667.1 € Stück *piece*	E.3625.1 € Stück *piece*	E.3681.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
1,00	12,0	15	55	3,0		**80,00**	
1,10	18,5	23	55	3,0		**80,00**	
1,20	18,5	23	55	3,0		**80,00**	
1,30	18,5	23	55	3,0		**80,00**	
1,40	18,5	23	55	3,0		**80,00**	
1,50	18,5	23	55	3,0		**35,00**	
1,60	24,0	30	65	3,0		**35,00**	
1,70	24,0	30	65	3,0		**35,00**	
1,80	24,0	30	65	3,0		**35,00**	
1,90	24,0	30	65	3,0		**35,00**	
2,00	24,0	30	65	3,0		**38,00**	
2,10	30,5	38	74	3,0		**38,00**	
2,20	30,5	38	74	3,0		**38,00**	
2,30	30,5	38	74	3,0		**38,00**	
2,40	30,5	38	74	3,0		**38,00**	
2,50	30,5	38	74	3,0		**41,00**	
2,60	35,0	44	81	3,0		**41,00**	
2,70	35,0	44	81	3,0		**41,00**	
2,80	35,0	44	81	3,0		**41,00**	
2,90	35,0	44	81	3,0		**41,00**	
3,00	48,0	54	92	6,0	**139,00**	**75,00**	**141,00**
3,10	48,0	54	92	6,0	**139,00**		**141,00**
3,20	48,0	54	92	6,0	**139,00**		**141,00**
3,30	48,0	54	92	6,0	**139,00**	**80,00**	**141,00**
3,40	48,0	54	92	6,0	**139,00**		**141,00**
3,50	48,0	54	92	6,0	**139,00**	**80,00**	**141,00**
3,60	48,0	54	92	6,0	**139,00**		**141,00**
3,70	48,0	54	92	6,0	**139,00**		**141,00**
3,80	58,0	64	102	6,0	**139,00**	**80,00**	**141,00**
3,90	58,0	64	102	6,0	**139,00**		**141,00**
4,00	58,0	64	102	6,0	**139,00**	**80,00**	**141,00**
4,10	58,0	64	102	6,0	**139,00**		**141,00**
4,20	58,0	64	102	6,0	**139,00**	**80,00**	**141,00**
4,30	58,0	64	102	6,0	**139,00**		**141,00**
4,40	58,0	64	102	6,0	**139,00**		**141,00**
4,50	58,0	64	102	6,0	**139,00**	**80,00**	**141,00**
4,60	58,0	64	102	6,0	**139,00**		**141,00**
4,70	58,0	64	102	6,0	**139,00**		**141,00**
4,80	70,0	78	116	6,0	**139,00**	**80,00**	**141,00**
4,90	70,0	78	116	6,0	**139,00**		**141,00**
5,00	70,0	78	116	6,0	**139,00**	**80,00**	**141,00**
5,10	70,0	78	116	6,0	**139,00**		**141,00**
5,20	70,0	78	116	6,0	**139,00**		**141,00**
5,30	70,0	78	116	6,0	**139,00**		**141,00**
5,40	70,0	78	116	6,0	**139,00**		**141,00**
5,50	70,0	78	116	6,0	**139,00**	**80,00**	**141,00**
5,60	70,0	78	116	6,0	**139,00**		**141,00**
5,70	70,0	78	116	6,0	**139,00**		**141,00**
5,80	70,0	78	116	6,0	**139,00**	**80,00**	**141,00**

Fortsetzung nächste Seite *to be continued*

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13



Solid carbide twist drills 12xd

Wiertła skrętne z węglika spiekanego 12xD

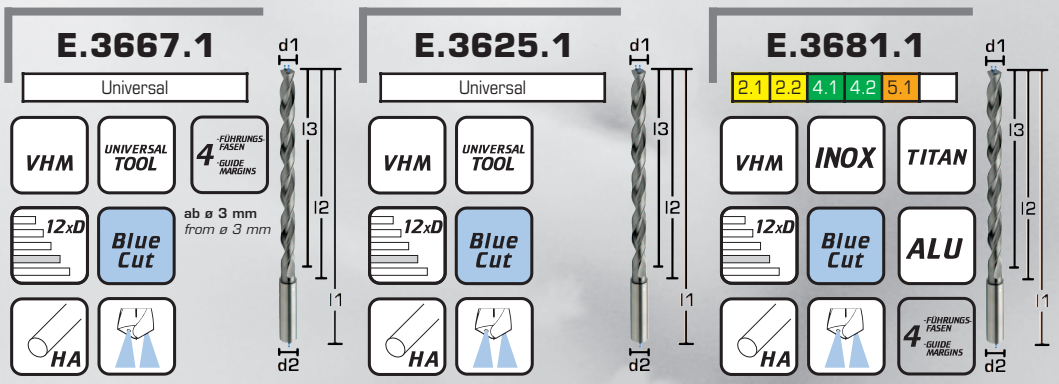
Punte in MD 12xd

Brocas de metal duro integral, 12xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3667.1 € Stück *piece*	E.3625.1 € Stück *piece*	E.3681.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
5,90	70	78	116	6,0	**139,00**		**141,00**
6,00	70	78	116	6,0	**139,00**	**80,00**	**141,00**
6,10	94	108	146	8,0	**190,00**		**192,00**
6,20	94	108	146	8,0	**190,00**		**192,00**
6,30	94	108	146	8,0	**190,00**		**192,00**
6,40	94	108	146	8,0	**190,00**		**192,00**
6,50	94	108	146	8,0	**190,00**	**98,00**	**192,00**
6,60	94	108	146	8,0	**190,00**		**192,00**
6,70	94	108	146	8,0	**190,00**		**192,00**
6,80	94	108	146	8,0	**190,00**	**98,00**	**192,00**
6,90	94	108	146	8,0	**190,00**		**192,00**
7,00	94	108	146	8,0	**190,00**	**98,00**	**192,00**
7,10	94	108	146	8,0	**190,00**		**192,00**
7,20	94	108	146	8,0	**190,00**		**192,00**
7,30	94	108	146	8,0	**190,00**		**192,00**
7,40	94	108	146	8,0	**190,00**		**192,00**
7,50	94	108	146	8,0	**190,00**	**104,00**	**192,00**
7,60	94	108	146	8,0	**190,00**		**192,00**
7,70	94	108	146	8,0	**190,00**		**192,00**
7,80	94	108	146	8,0	**190,00**	**104,00**	**192,00**
7,90	94	108	146	8,0	**190,00**		**192,00**
8,00	94	108	146	8,0	**190,00**	**98,00**	**192,00**
8,10	110	120	162	10,0	**245,00**		**243,00**
8,20	110	120	162	10,0	**245,00**		**243,00**
8,30	110	120	162	10,0	**245,00**		**243,00**
8,40	110	120	162	10,0	**245,00**		**243,00**
8,50	110	120	162	10,0	**245,00**	**130,00**	**243,00**
8,60	110	120	162	10,0	**245,00**		**243,00**
8,70	110	120	162	10,0	**245,00**		**243,00**
8,80	110	120	162	10,0	**245,00**	**130,00**	**243,00**
8,90	110	120	162	10,0	**245,00**		**243,00**
9,00	110	120	162	10,0	**245,00**	**130,00**	**243,00**
9,10	110	120	162	10,0	**245,00**		**243,00**
9,20	110	120	162	10,0	**245,00**		**243,00**
9,30	110	120	162	10,0	**245,00**		**243,00**
9,40	110	120	162	10,0	**245,00**		**243,00**
9,50	110	120	162	10,0	**245,00**	**130,00**	**243,00**
9,60	110	120	162	10,0	**245,00**		**243,00**
9,70	110	120	162	10,0	**245,00**		**243,00**
9,80	110	120	162	10,0	**245,00**	**130,00**	**243,00**
9,90	110	120	162	10,0	**245,00**		**243,00**
10,00	110	120	162	10,0	**245,00**	**130,00**	**243,00**
10,10	142	156	204	12,0	**318,00**		**310,00**
10,20	142	156	204	12,0	**318,00**	**182,00**	**310,00**
10,30	142	156	204	12,0	**318,00**		**310,00**
10,40	142	156	204	12,0	**318,00**		**310,00**
10,50	142	156	204	12,0	**318,00**	**182,00**	**310,00**
10,60	142	156	204	12,0	**318,00**		**310,00**

Fortsetzung nächste Seite *to be continued*

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13



Solid carbide twist drills 12xd

Wiertła skrętne z węglika spiekanego 12xD

Punte in MD 12xd

Brocas de metal duro integral, 12xd, ranuras helicoidales

Artikel-Nr. *Article-No.*					E.3667.1 € Stück *piece*	E.3625.1 € Stück *piece*	E.3681.1 € Stück *piece*
d1	l3	l2	l1	d2 h6			
Ø 1,00-10,60 mm siehe Seite 3.32 - 3.33					*Ø 1,00-10,60 mm see page 3.32 - 3.33*		
10,70	142	156	204	12,0	**318,00**		**310,00**
10,80	142	156	204	12,0	**318,00**	**182,00**	**310,00**
10,90	142	156	204	12,0	**318,00**		**310,00**
11,00	142	156	204	12,0	**318,00**	**182,00**	**310,00**
11,10	142	156	204	12,0	**318,00**		**310,00**
11,20	142	156	204	12,0	**318,00**	**182,00**	**310,00**
11,30	142	156	204	12,0	**318,00**		**310,00**
11,40	142	156	204	12,0	**318,00**		**310,00**
11,50	142	156	204	12,0	**318,00**	**182,00**	**310,00**
11,60	142	156	204	12,0	**318,00**		**310,00**
11,70	142	156	204	12,0	**318,00**		**310,00**
11,80	142	156	204	12,0	**318,00**	**182,00**	**310,00**
11,90	142	156	204	12,0	**318,00**		**310,00**
12,00	142	156	204	12,0	**318,00**	**182,00**	**310,00**
12,50	166	182	230	14,0	**399,00**	**238,00**	**330,00**
12,80	166	182	230	14,0	**399,00**	**238,00**	**330,00**
13,00	166	182	230	14,0	**399,00**	**238,00**	**330,00**
13,50	166	182	230	14,0	**399,00**	**238,00**	**330,00**
13,80	166	182	230	14,0	**399,00**		**330,00**
14,00	166	182	230	14,0	**399,00**	**238,00**	**330,00**
14,50	192	208	260	16,0	**540,00**	**310,00**	**530,00**
14,80	192	208	260	16,0	**540,00**		**530,00**
15,00	192	208	260	16,0	**540,00**	**310,00**	**530,00**
15,50	192	208	260	16,0	**540,00**	**310,00**	**530,00**
15,80	192	208	260	16,0	**540,00**		**530,00**
16,00	192	208	260	16,0	**540,00**	**310,00**	**530,00**
16,50	216	234	285	18,0	**598,00**		**610,00**
16,80	216	234	285	18,0	**598,00**		**610,00**
17,00	216	234	285	18,0	**598,00**		**610,00**
17,50	216	234	285	18,0	**598,00**		**610,00**
17,80	216	234	285	18,0	**598,00**		**610,00**
18,00	216	234	285	18,0	**598,00**		**610,00**
18,50	240	258	310	20,0	**730,00**		**740,00**
18,80	240	258	310	20,0	**730,00**		**740,00**
19,00	240	258	310	20,0	**730,00**		**740,00**
19,50	240	258	310	20,0	**730,00**		**740,00**
19,80	240	258	310	20,0	**730,00**		**740,00**
20,00	240	258	310	20,0	**730,00**		**740,00**

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13

E.3630.0

3.1 | 3.2 | 4.3 | 4.5 | 4.6

VHM | GUSS | ALU

12xD | 4 FÜHRUNGSFASEN GUIDE MARGINS | HA | 130° | POLIERT polished



Solid carbide drills 4 margins 12xd straight fluted

Wiertła proste 4-łysinkowe z węglika spiekanego 12xD do materiałów dających krótki wiór

Punte in MD, 4 fasi, denti dritti,12xd

Brocas de metal duro integral, 12xd, con cuatro caras y ranuras rectas

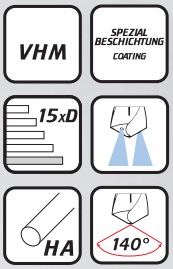
Artikel-Nr. *Article-No.*					E.3630.0 € Stück *piece*
d1 m7	l3	l2	l1	d2 h6	
3,00	38	48	86	6,0	**108,00**
3,30	42	52	90	6,0	**108,00**
3,50	42	52	90	6,0	**108,00**
3,80	48	61	100	6,0	**108,00**
4,00	48	61	100	6,0	**105,00**
4,20	48	61	100	6,0	**105,00**
4,50	54	67	105	6,0	**105,00**
4,80	68	82	121	6,0	**105,00**
5,00	68	82	121	6,0	**102,00**
5,50	68	82	121	6,0	**102,00**
5,80	68	82	121	6,0	**102,00**
6,00	68	82	121	6,0	**92,00**
6,50	90	106	146	8,0	**140,00**
6,80	90	106	146	8,0	**140,00**
7,00	90	106	146	8,0	**140,00**
7,50	90	106	146	8,0	**140,00**
7,80	90	106	146	8,0	**140,00**
8,00	90	106	146	8,0	**120,00**
8,50	112	130	175	10,0	**188,00**
8,80	112	130	175	10,0	**188,00**
9,00	112	130	175	10,0	**188,00**
9,20	112	130	175	10,0	**188,00**
9,50	112	130	175	10,0	**188,00**
9,80	112	130	175	10,0	**188,00**

Artikel-Nr. *Article-No.*					E.3630.0 € Stück *piece*
d1 m7	AP	l2	l1	d2 h6	
10,00	112	130	175	10,0	**169,00**
10,20	139	159	209	12,0	**222,00**
10,50	139	159	209	12,0	**222,00**
10,80	139	159	209	12,0	**222,00**
11,00	139	159	209	12,0	**222,00**
11,50	139	159	209	12,0	**222,00**
11,80	139	159	209	12,0	**222,00**
12,00	139	159	209	12,0	**198,00**
12,50	162	183	233	14,0	**298,00**
12,80	162	183	233	14,0	**298,00**
13,00	162	183	233	14,0	**298,00**
13,50	162	183	233	14,0	**298,00**
13,80	162	183	233	14,0	**298,00**
14,00	162	183	233	14,0	**270,00**
14,50	184	207	260	16,0	**392,00**
14,80	184	207	260	16,0	**392,00**
15,00	184	207	260	16,0	**392,00**
15,50	184	207	260	16,0	**392,00**
15,80	184	207	260	16,0	**392,00**
16,00	184	207	260	16,0	**359,00**
17,00	207	231	284	18,0	**508,00**
18,00	207	231	284	18,0	**465,00**
19,00	230	255	308	20,0	**610,00**
20,00	230	255	308	20,0	**575,00**



E.3674.1

Universal





Solid carbide deep hole drills appr. 15xd

Wiertła z węglika spiekanego do głębokich otworów do ok. 15xD

Punte in MD per foratura profonda circa 15xd

Brocas de metal duro integral con hélice para agujeros profundos hasta 15xd

Mindestbestellmenge 3 Stück
Minimum order quantity: 3 Stück

Artikel-Nr. *Article-No.*				E.3674.1 € Stück *piece*	Artikel-Nr. *Article-No.*				E.3674.1 € Stück *piece*
d1 h7	l2	l1	d2		d1 h7	l2	l1	d2	
1,00	20	60	3,0	**98,00**	**4,00**	68	108	6,0	**95,00**
1,10	22	60	3,0	**98,00**	**4,20**	78	115	6,0	**95,00**
1,20	24	60	3,0	**98,00**	**4,50**	78	115	6,0	**95,00**
1,30	25	60	3,0	**98,00**	**5,00**	84	125	6,0	**95,00**
1,40	27	60	3,0	**98,00**	**5,50**	92	130	6,0	**95,00**
1,50	27	60	3,0	**90,00**	**6,00**	100	140	6,0	**95,00**
1,60	32	65	3,0	**90,00**	**6,50**	108	145	8,0	**140,00**
1,70	32	65	3,0	**90,00**	**6,80**	130	170	8,0	**140,00**
1,80	35	65	3,0	**90,00**	**7,00**	130	170	8,0	**140,00**
1,90	35	65	3,0	**90,00**	**7,50**	130	170	8,0	**140,00**
2,00	35	65	3,0	**90,00**	**7,80**	130	170	8,0	**140,00**
2,10	40	75	3,0	**90,00**	**8,00**	130	170	8,0	**140,00**
2,20	40	75	3,0	**90,00**	**8,50**	163	208	10,0	**188,00**
2,30	40	75	3,0	**90,00**	**9,00**	163	208	10,0	**188,00**
2,40	45	75	3,0	**90,00**	**9,50**	163	208	10,0	**188,00**
2,50	45	75	3,0	**90,00**	**10,00**	163	208	10,0	**188,00**
2,60	48	80	3,0	**90,00**	**10,50**	195	245	12,0	**240,00**
2,70	48	80	3,0	**90,00**	**11,00**	195	245	12,0	**240,00**
2,80	50	80	3,0	**90,00**	**11,50**	195	245	12,0	**240,00**
2,90	50	80	3,0	**90,00**	**12,00**	195	245	12,0	**240,00**
3,00	60	100	6,0	**95,00**	**12,50**	230	280	14,0	**330,00**
3,30	60	100	6,0	**95,00**	**13,00**	230	280	14,0	**330,00**
3,50	60	100	6,0	**95,00**	**14,00**	230	280	14,0	**330,00**

Pilotbohrer für Zentrierungen: E.3652.1 Seite 3.08 oder E.3668.0 Seite 3.13
Pilot-Drills for center drill holes: E.3652.1 page 3.08 or E.3668.0 page 3.13

VHM-Tiefloch-Spiralbohrer 20xd

E.3616.1

Universal

VHM | Blue Cut | 20xD | UNIVERSAL TOOL | HA



E.3620.1

2.1 | 2.2 | 5.1

VHM | SPEZIAL BESCHICHTUNG COATING | 20xD | TITAN | HA | INOX



Solid carbide high performance twist drill 20xd

Wiertła skrętne wysokowydajne z węglika spiekanego 20xD

Punte in MD alte prestazioni 20xd

Brocas de metal duro integral con hélice para agujeros profundos hasta 20xd

Artikel-Nr. *Article-No.*				E.3616.1 € Stück *piece*	E.3620.1 € Stück *piece*
d1	l2	l1	d2 h5		
2,00	50	92	4,0	**173,00**	**180,00**
2,50	70	112	4,0	**187,00**	**195,00**
2,80	70	112	4,0	**187,00**	**195,00**
3,00	80	120	6,0	**260,00**	**275,00**
3,20	80	120	6,0	**260,00**	**275,00**
3,30	80	120	6,0	**260,00**	**275,00**
3,50	80	120	6,0	**260,00**	**275,00**
3,80	90	130	6,0	**270,00**	**280,00**
4,00	90	130	6,0	**270,00**	**280,00**
4,20	110	160	6,0	**290,00**	**300,00**
4,50	110	160	6,0	**290,00**	**300,00**
4,80	120	160	6,0	**307,00**	**315,00**
5,00	120	160	6,0	**307,00**	**315,00**
5,50	140	185	6,0	**313,00**	**320,00**
5,80	140	185	6,0	**313,00**	**320,00**
6,00	140	185	6,0	**328,00**	**335,00**
6,50	160	210	8,0	**342,00**	**350,00**
6,80	160	210	8,0	**367,00**	**374,00**
7,00	160	210	8,0	**367,00**	**374,00**
7,50	180	230	8,0	**410,00**	**420,00**
7,80	180	230	8,0	**410,00**	**420,00**
8,00	180	230	8,0	**410,00**	**420,00**
8,50	195	260	10,0	**452,00**	**462,00**
8,80	230	290	10,0	**506,00**	**518,00**
9,00	230	290	10,0	**506,00**	**518,00**
9,80	230	290	10,0	**506,00**	**518,00**
10,00	230	290	10,0	**506,00**	**518,00**
10,20	268	315	12,0	**558,00**	**570,00**
10,80	268	315	12,0	**558,00**	**570,00**
11,80	268	315	12,0	**558,00**	**570,00**
12,00	268	315	12,0	**558,00**	**570,00**

Einlippentieflochbohrer mit Innenkühlung und VHM-Kopf universal

E.3614.0

One flute deephole drill with internal coolant and solid carbide head

Wiertło lufowe do głębokiego wiercenia ostrzami z węglika spiekanego

Punte in MD monoelica con fori lubrificanti e testa in MD

Brocas de un labio para agujeros profundos con refrigeración interior y cabeza de metal duro integral

Baukastensystem	*Modular system*
1. VHM-Kopf	*1. Solid carbide head*
2. Profilrohr Stahl vergütet	*2. Tempered steel profile tube*
3. Spannhülsen-Drm. in mm angeben (ab ø 6,0 mm lieferbar)	*3. Indicate diameter of clamping sleeve in mm (available from ø 6,0 mm)*
4. Ausführung HA, HB, Whistle Notch	*4. Type HA, HB, Whistle Notch*
ø 0,7 - 5,0 mm in Vollhartmetall ø 1,9 - 40,0 mm mit HM-Kopf	*ø 0,7 - 5,0 mm in solid carbide* *ø 1,9 - 40,0 mm with carbide head*
Längen bis ca. 3000 mm möglich	*Total length up to 3000 mm possible*
Grundsätzlich muß eine Pilotbohrung gemacht werden ca. 3-5xd	*A pilothole has to be drilled first in any case, about 3-5xd*
Geeignet für alle kurzspanende Werkstoffe	*Suitable for all short chipping materials*

Formular *Form*

❑ **Anfrage** *inquiry* ❑ **Bestellung** *order*

für die optimale Auslegung benötigen wir folgende Angaben
In order to provide the best tool we need the following data

1. zum Werkzeug *regarding the tool*

Bohrdurchmeser *drill diameter* _____mm

Bohrdurchmesser-Toleranz *drill diameter tolerance* _____mm

Gesamtlänge incl. Hülse *total length including sleeve* _____mm

Bohrtiefe (Nutzlänge) *drilling length* _____mm

Durchgangsloch *through hole* Sackloch *blind hole*

Spannhülsen-Drm. *diameter of clamping sleeve* _____ ❑ HA ❑ HB ❑ Whistle Notch

Sonderhülse n. Zg. (bitte beifügen) *Special clamping sleeve according to drawing (please add drawing)*

2. Einsatzgebiet *operation data*

Werkstoff *workpiece material* _____

kurzspanend *short chipping* ❑ ja *yes* ❑ nein *no*

Zugfestigkeit *Tensile strength* _____

dünnwandig *thin walls* ❑

3. Maschine *machine*

Werkzeug rotiert *tool rotating* ❑

Werkstück rotiert *workpiece rotating* ❑

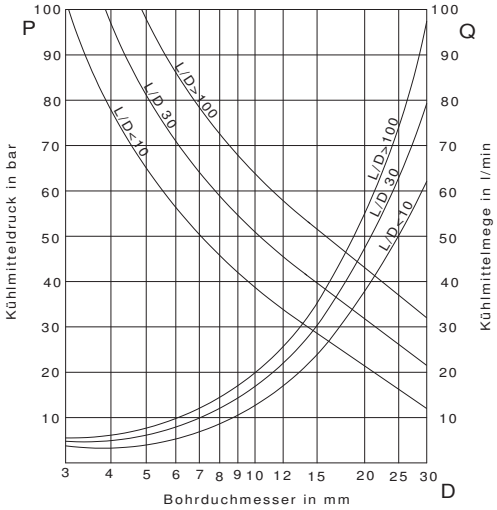
Werkzeug und Werkstück rotiert *both tool and workpiece rotate* ❑

Kühlmitteldruck *coolant pressure* _____

Art des Kühlmittels *type of coolant* _____

4. Besonderheiten *remarks*

Spezial-Einlippenbohrer zum Aufbohren vorgebohrter oder gegossener Bohrungen auf Anfrage
Special one flute deephole drills for drilling predrilled or casted drill holes can be offered upon demand



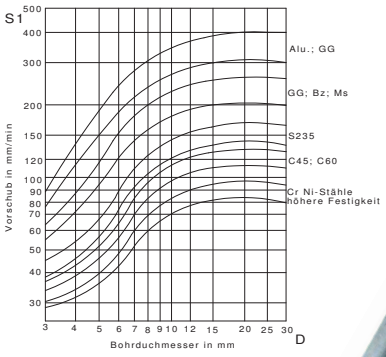
Die Zerspanbarkeit jedes Werkstückes hängt direkt von der Werkstoffart und dem Gefüge-Zustand ab. Die Form der erzeugten Späne ist bestimmend für den störungsfreien Rücklauf.
Die Spanform kann durch die Wahl von Schnittgeschwindigkeit, Vorschub und Schneidegeometrie beeinflusst werden.
Der Idealspan hat die Form eines kurzen Spiralwendelspanes.

<u>Vorteile vom Tiefbohren:</u>
- genauere Toleranzen IT 6 - IT 9
- genauerer Bohrungsverlauf
- gute Oberfläche
- teilweise kann man sich das Reiben ersparen und Passbohrungen direkt bohren

			N12	N11	N10	N9	N8	N7	N6	N5	N4	N3	N2	N1
Wendelbohren														
Reiben														
Räumen														
Honen														
Tiefbohren														
Arthmetischer Mittenrauh-wert	Ra	µ m	50	25	12,5	6,30	3,20	1,60	0,80	0,40	0,20	0,10	0,05	0,025
	CLA	µ in	2000	1000	500	250	125	63	32	16	8	4	2	1

unter normalen Bedin-gungen erreichbare

unter günstigsten Bedin-gungen erreichbare Werte



The machineability of each workpiece depends on the material and its actual properties. The form of the produced chips determines hassle-free chip clearance. The chipform can be influenced by cutting speed, feed rate and cutting geometry. The ideal chip is a short, spiral one.

Advantages of deephole drilling:

- precise tolerances IT 6 - IT 9
- precise drilling length
- good surface
- reaming may not always be necessary and dowel holes can be drilled directly

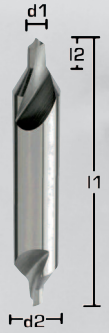
Lieferbar bis 3000 mm
Available until 3000 mm

VHM-Zentrierbohrer 60°

E.3638.0

Universal

VHM | DIN 333 | 120° | UNIVERSAL TOOL | FORM A



- Solid carbide center drills 60°
- Nawiertaki 60° z węglika spiekanego wg DIN 333
- Punte in MD da centro 60°
- Brocas de centrar de 60° de metal duro integral

Artikel-Nr. *Article-No.*				E.3638.0 € Stück *piece*
d1 K13	l2 +-1 mm	l1	d2 h9	
0,50	0,8	31,5	3,15	**17,00**
0,80	1,1	31,5	3,15	**17,00**
1,00	1,3	31,5	3,15	**17,00**
1,25	1,6	31,5	3,15	**17,00**
1,60	2,0	35,5	4,00	**18,00**
2,00	2,5	40,0	5,00	**21,00**
2,50	3,1	45,0	6,30	**24,00**
3,15	3,9	50,0	8,00	**29,00**
4,00	5,0	56,0	10,00	**44,00**
5,00	6,3	63,0	12,50	**56,00**
6,30	8,0	71,0	16,00	**92,00**

VHM-Stufenbohrer 180° für Zylinderschrauben

E.3639.0

Universal

VHM | WERKS-(COMPANY) NORM | 180° 140° | Z=2 | HA | UNIVERSAL TOOL



- Solid carbide step drills 180° for cylindrical screws
- Wiertła stopniowe z węglika spiekanego pod śruby z łbem cylindrycznym 180° wykonanie średniodokładne
- Punte in MD a gradino 180° per viti cilindriche
- Broca escalonada de metal duro integral de 180° para tornillos cilíndricos

Artikel-Nr. *Article-No.*							E.3639.0 € Stück *piece*
für Schraube *for screw*	d1 h8	l4	d4 h8	l2	l1	d2 h6	
M 3,0	3,4	9	6	28	66	6,0	**38,00**
M 4,0	4,5	11	8	37	80	8,0	**41,00**
M 5,0	5,5	13	10	43	89	10,0	**52,00**
M 6,0	6,6	15	11	47	95	12,0	**85,00**
M 8,0	9,0	19	15	56	110	16,0	**122,00**
M 10,0	11,0	23	18	62	123	18,0	**180,00**

VHM-Kernloch-Stufenbohrer 90°

E.3640.1

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | 90° 140° | Z=2 | HA | Blue Cut



Solid carbide step drills 90° for core holes

Wiertła z węglika spiekanego pod gwint do śrub z łbem stożkowym 90°

Punte in MD a gradino 90° per filettatura

Broca escalonada de metal duro integral de 90° para agujeros previos

Artikel-Nr. *Article-No.*							E.3640.1 € Stück *piece*
für Gewinde *for thread*	d1 h8	l4	d4 h8	l2	l1	d2 h6	
M 3,0	2,5	8,8	6	20	62	6,0	**28,50**
M 4,0	3,3	11,4	6	24	62	6,0	**32,50**
M 5,0	4,2	13,6	6	28	66	6,0	**36,50**
M 6,0	5,0	16,5	8	34	79	8,0	**44,00**
M 8,0	6,8	21,0	10	47	89	10,0	**62,00**
M 10,0	8,5	25,5	12	55	102	12,0	**84,00**
M 12,0	10,2	30,0	14	60	107	14,0	**115,00**
M 14,0	12,0	34,5	16	65	115	16,0	**148,00**
M 16,0	14,0	38,5	18	73	123	18,0	**168,00**

VHM-Stufenbohrer 90° für Gewindeformer

E.3642.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | 90° 140° | Z=2 | HA | 118°



Solid carbide step drill 90° for forming taps

Wiertła stopniowe z węglika spiekanego pod gwint wygniatany do śrub z łbem stożkowym 90°

Punte in MD a gradino 90° per maschi a rullare

Broca escalonada de metal duro integral de 90° para agujeros previos de machos de laminación

Artikel-Nr. *Article-No.*							E.3642.0 € Stück *piece*
für Gewinde *for thread*	d1 h8	l4 ohne Spitze *l4 without center*	d4 h8	l2	l1	d2	
M 2,5	2,35	10	4	16	60	4,0	**19,00**
M 3,0	2,80	12	4	20	62	4,0	**19,00**
M 4,0	3,70	14	6	27	64	6,0	**22,00**
M 5,0	4,65	20	6	27	80	6,0	**22,00**
M 6,0	5,55	24	8	35	80	8,0	**33,00**
M 8,0	7,45	30	10	45	80	10,0	**40,00**
M 10,0	9,30	40	12	50	90	12,0	**57,00**
M 12,0	11,20	45	14	55	100	14,0	**70,00**

VHM-Kernloch-Stufenbohrer 90° mit Innenkühlung

E.3643.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | 90° 140° | Z=2 | UNIVERSAL TOOL | HA



- Solid carbide step drills 90° with internal coolant for core holes
- Wiertła stopniowe z węglika spiekanego z chłodzeniem wewnętrznym pod gwint do śrub z łbem stożkowym 90°
- Punte in MD a gradino 90° con lubrificazione interna
- Broca escalonada de metal duro integral de 90° para agujeros previos con refrigeración interior

Artikel-Nr. *Article-No.*							E.3643.1 € Stück *piece*
für Gewinde *for thread*	d1 m7	l4	d4 h8	l2	l1	d2 h6	
M 3,0	2,5	8,8	6	20	62	6,0	**43,50**
M 4,0	3,3	11,4	6	24	62	6,0	**50,00**
M 5,0	4,2	13,6	6	28	66	6,0	**55,00**
M 6,0	5,0	16,5	8	34	79	8,0	**65,00**
M 8,0	6,8	21,0	10	47	89	10,0	**70,00**
M 10,0	8,5	25,5	12	55	102	12,0	**148,00**
M 12,0	10,2	30,0	14	60	107	14,0	**197,00**
M 14,0	12,0	34,5	16	65	115	16,0	**234,00**
M 16,0	14,0	38,5	18	73	123	18,0	**270,00**

VHM-Stufenbohrer 90° mit Innenkühlung

E.3644.0

3.1 | 3.2 | 4.3 | 4.5 | 4.6

VHM | WERKS-NORM (COMPANY) | POLIERT polished | 90° 140° | Z=2 | GUSS | HE | ALU



- Solid carbide step drills 90° with internal coolant
- Wiertła stopniowe z węglika spiekanego z chłodzeniem wewnętrznym pod gwint do śrub stożkowych 90°
- Punte in MD a gradino con fori di lubrificazione
- Broca escalonada de metal duro integral de 90° con refrigeración interior

Auslaufartikel
no future production anymore

Artikel-Nr. *Article-No.*							E.3644.0 € Stück *piece*
für Gewinde *for thread*	d1 m7	l4	d4 h8	l2	l1	d2 h6	
M 3,0	2,5	8,8	6	20	62	6,0	
M 4,0	3,3	11,4	6	24	62	6,0	
M 5,0	4,2	13,6	6	28	66	6,0	
M 6,0	5,0	16,5	8	34	79	8,0	**Auf Anfrage**
M 8,0	6,8	21,0	10	47	89	10,0	
M 10,0	8,5	25,5	12	55	102	12,0	*on demand*
M 12,0	10,2	30,0	14	60	107	14,0	
M 14,0	12,0	34,5	16	65	115	16,0	
M 16,0	14,0	38,5	18	73	123	18,0	
M 18,0	15,5	43,5	20	79	131	20,0	
M 20,0	17,5	47,5	22	89	147	22,0	

Korrekturfaktor *Factor of correction:*

DIN	Korrekturfaktor *Factor of correction*
DIN 1897	1,0
DIN 338	1,0
DIN 340	0,8

Materialgruppe *material group*	Vc (m/min)	Ø 1 - 4 mm	Ø 4 - 8 mm	Ø 8 - 12 mm	Ø 12 - 16 mm	Ø 16 - 20 mm
1.1	100	0,03	0,05	0,07	0,09	0,12
1.2	70	0,02	0,04	0,06	0,08	0,09
1.3	40	0,02	0,03	0,04	0,06	0,08
2.1	30	0,02	0,03	0,04	0,10	0,12
2.2	25	0,01	0,02	0,03	0,06	0,08
3.1	100	0,05	0,07	0,09	0,13	0,16
3.2	80	0,03	0,05	0,07	0,10	0,14
3.3	80	0,05	0,07	0,10	0,14	0,16
3.4	60	0,04	0,06	0,08	0,12	0,14
4.1	120	0,06	0,09	0,12	0,15	0,18
4.2	100	0,05	0,08	0,10	0,12	0,14
4.3	60	0,03	0,05	0,08	0,10	0,12
4.4	100	0,05	0,08	0,10	0,12	0,14
4.5	80	0,03	0,05	0,08	0,10	0,12
4.6	80	0,03	0,05	0,07	0,10	0,14
4.7	100	0,05	0,08	0,12	0,18	0,25
4.8						
4.9						
5.1	30	0,02	0,03	0,05	0,08	0,10
5.2						
6.1						
6.2						
6.3						
6.4						

Einsatzrichtwerte für VHM-Mikro-Spiralbohrer *Estimated values for use for VHM-Micro-Twist Drills*

		E.3673.0 / E.3601.0 / E.3676.1 f (mm/U)	
Materialgruppe *material group*	**Vc** **(m/min)**	**Ø** **0,3 - 1,0 mm**	**Ø** **1,0 - 3,0 mm**
1.1	5 - 100	0,003 - 0,01	0,008 - 0,03
1.2	5 - 100	0,003 - 0,01	0,008 - 0,03
1.3	5 - 100	0,002 - 0,008	0,007 - 0,02
2.1	4 - 120	0,002 - 0,006	0,005 - 0,016
2.2			
3.1	5 - 120	0,004 - 0,016	0,01 - 0,02
3.2			
3.3			
3.4			
4.1			
4.2	8 - 170	0,004 - 0,012	0,010 - 0,06
4.3	4 - 120	0,002 - 0,018	0,015 - 0,045
4.4			
4.5	5 - 75	0,003 - 0,02	0,015 - 0,04
4.6			
4.7			
4.8			
4.9			
5.1	5 - 60	0,007 - 0,02	0,015 - 0,04
5.2	5 - 20	0,003 - 0,02	0,015 - 0,03
6.1			
6.2			
6.3			
6.4			

1. Bohrer 3xd - 5xd ohne Pilotbohrung

2. Bohrer 8xd - 20xd mit Pilotbohrung

2.1 Pilotbohrung setzen:
- für das Bohren der Pilotbohrung muß ein VHM-Bohrwerkzeug mit der Durchmessertoleranz "**m7 bwz H7**" verwendet werden.
  Es dürfen **keine nachgeschliffenen** Bohrwerkzeuge eingesetzt werden.
- Die Mindestbohrtiefe der Pilotbohrung sollte 3xd sein, besser 5xd.

2.2 Eintritt in die Pilotbohrung mit Tieflochbohrer:
- Kühlung an
- Mit einer niedrigen Drehzahl (n ca. 300 min/U) und einem Vorschub von vf ca. 1000 mm/min in die Bohrung einfahren. Die Tiefe sollte 0,5xd kleiner als die Bohrtiefe der Pilotbohrung sein.
- Drehzahl auf Arbeitswert hochfahren.
- Vorschub auf Arbeitswert einstellen.

2.3 Tieflochbohren:
- Ohne entspanen auf vorgegebenen Arbeitstiefe fahren.

2.4 Herausfahren des Bohrers aus der Bohrung:
- Bei erreichen der Arbeitstiefe 1 mm mit dem Bohrer zurückfahren.
- Die Drehzahl sofort auf den niedrigen Wert (n ca. 300 min/U) einstellen.
- Mit einem Eilgang von 1000 mm/min bis 3000 mm/min und eingeschaltetem Kühlmittel aus der Bohrung ausfahren.

1. Drills 3xd - 5xd without pilot drill hole

2. Drills 8xd - 20xd with pilot drill hole

2.1 Fixing the pilot drill hole:
- *for drilling the pilot drill hole a Carbide Drilling Tools with a diameter tolerance "**m7 resp. H7**" has to be used.*
  Reground Drilling Tools may not to be used.
- *The miminum drilling depth of the pilot drill hole should be 3xd, even better would be 5xd.*

2.2 Entering into the pilot-drill hole with a deep hole gun drill:
- *start coolant*
- *entering into the drill hole with a low r.p.m. (about 300 min/1) and with a feed of about 1000 mm/min. The depth should be 0,5xd smaller than the drilling depth of the pilot drill hole.*
- *adjust r.p.m. to working speed.*
- *adjust feed to working feed.*

2.3 Deep hole gun drilling:
- *adjust to the indicated working depth without drilling.*

2.4 Removing the drill out of the drill hole:
- *when reaching the working depth remove the drill by 1 mm.*
- *adjust the r.pm. immediately to the low speed (about 300 mm/1).*
- *remove out of the drill hole with fast speed of 1000 mm/min up to 3000 mm/min and by using the coolant.*

Korrekturfaktor *Factor of correction:*

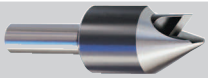
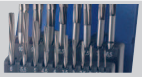
Bohrtiefe *Drilling depth*	**Korrekturfaktor** *Factor of correction*
1xd	1,3
3xd	1,0
5xd	0,8
8xd	0,7
12xd	0,6
15xd	0,5
20xd	0,4

Materialgruppe *material group*	**Vc (m/min)**	**Ø 1 - 2 mm**	**Ø 2 - 3 mm**	**Ø 3 - 5 mm**	**Ø 5 - 8 mm**	**Ø 8 - 12 mm**	**Ø 12 - 16 mm**	**Ø 16 - 20 mm**
1.1	60 - 100	0,03 - 0,05	0,05 - 0,08	0,1 - 0,18	0,16 - 0,24	0,2 - 0,3	0,2 - 0,33	0,25 - 0,4
1.2	50 - 80	0,02 - 0,04	0,05 - 0,08	0,08 - 0,15	0,10 - 0,18	0,12 - 0,22	0,15 - 0,28	0,2 - 0,35
1.3	40 - 60	0,02 - 0,04	0,05 - 0,08	0,08 - 0,15	0,10 - 0,18	0,12 - 0,22	0,15 - 0,28	0,2 - 0,35
2.1	30 - 50	0,01 -0,03	0,03 - 0,06	0,05 - 0,10	0,08 - 0,15	0,12 - 0,20	0,1 - 0,2	0,16 - 0,28
2.2	25 - 35	0,01 -0,03	0,03 - 0,06	0,05 - 0,10	0,08 - 0,15	0,12 - 0,20	0,1 - 0,2	0,16 - 0,28
3.1	50 - 130			0,15 - 0,30	0,12 - 0,30	0,2 - 0,4	0,25 - 0,40	0,4 - 0,5
3.2	70 - 90			0,15 - 0,30	0,12 - 0,30	0,2 - 0,4	0,25 - 0,40	0,4 - 0,5
3.3	70 - 90		0,05 - 0,10	0,1 - 0,2	0,1 - 0,2	0,2 - 04	0,35 - 0,45	0,4 - 0,6
3.4	60 - 80			0,08 - 0,12	0,1 - 0,18	0,16 - 0,28	0,22 - 0,33	0,3 - 0,5
4.1	50 - 350	0,04 - 0,07	0,01 - 0,15	0,15 - 0,25	0,2 - 0,3	0,25 - 0,40	0,35 - 0,50	0,4 - 0,6
4.2	100 - 250		0,05 - 0,12	0,15 - 0,25	0,2 - 0,3	0,25 - 0,40	0,35 - 0,50	0,4 - 0,6
4.3	100 - 200	0,6 - 0,8	0,6 - 0,10	0,12 - 0,20	0,18 - 0,22	0,20 - 0,28	0,26 - 0,30	0,25 - 0,32
4.4								
4.5	60 - 200	0,05 - 0,08	0,08 - 0,15	0,07 - 0,15	0,10 - 0,20	0,20 - 0,30	0,25 - 0,40	0,35 - 0,50
4.6								
4.7								
4.8								
4.9								
5.1	20 - 40	0,01 - 0,03	0,03 - 0,06	0,02 - 0,06	0,05 - 0,08	0,08 - 0,14	0,10 - 0,16	0,10 - 0,20
5.2								
6.1	25 - 45	0,3 - 0,5	0,3 - 0,5	0,6 - 0,8	0,8 - 0,12	0,12 - 0,18	0,15 - 0,22	
6.2	20 - 25	0,2 - 0,4	0,2 - 0,4	0,3 - 0,5	0,4 - 0,1	0,6 - 0,1	0,80 - 0,12	
6.3	20 - 25	0,2 - 0,4	0,2 - 0,4	0,3 - 0,5	0,4 - 0,1	0,6 - 0,1	0,80 - 0,12	
6.4	12 - 18	0,2 - 0,4	0,2 - 0,4	0,3 - 0,5	0,4 - 0,1	0,6 - 0,1	0,80 - 0,12	

NACHREINER

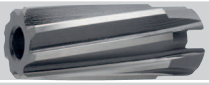
spanabhebende Werkzeuge



	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS	DURCHGANG FEIN THROUGH HOLE FINE	DIN 373	E.4608.0	2	✔	✔	✔	✔				
	HSS	DURCHGANG MITTEL THROUGH HOLE MIDDLE	DIN 373	E.4609.0	2	✔	✔	✔	✔				
	HSS	KERNLOCH CORE HOLE	DIN 373	E.4610.0	2	✔	✔	✔	✔				
	HSS-E	90°		E.4601.0	3	✔	✔	✔	✔				
	HSS-E	90°		E.4601.1	3	✔	✔	✔	✔				
	HSS	90°	TIN	E.4646.0	4	✔	✔	✔	✔				
	HSS	90°		E.4605.0	4	✔	✔	✔	✔				
	HSS-E	60°		E.4602.0	5	✔	✔	✔	✔				
	HSS-E	120°		E.4603.0	5	✔	✔	✔	✔				
	HSS-E	90°		E.4606.0	5			✔					
	HSS	90°		E.4607.0	6	✔	✔	✔	✔				
	HSS	90°		E.4612.0	6	✔	✔	✔	✔				
	HSS			E.4613.0	7	✔	✔	✔	✔				
	HSS			E.4618.0	7	✔	✔	✔	✔				
	HSS	TYP N		E.4611.0	8	✔	✔	✔	✔				
	HSS	DIN 343		E.4625.0	9	✔	✔	✔	✔				
	HSS	TYP N		E.4633.0	10	✔	✔	✔	✔				
	HSS	DIN 206	TOL. H 7	E.4624.0	11	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 8089	TOL. H 7	E.4634.0	12	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 8089	TOL. 0/+0,005	E.4614.0	12	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 212	TOL. H 7	E.4615.0	13	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 212	TOL. H 7	SET.4629	13	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 212	TOL. H 7	E.4617.0	14	✔	✔	✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS-E	ähnl. DIN 212	TOL. H 7	E.4630.0	14		✔	✔					
	HSS-E	ähnl. DIN 212	TOL. 0/+0,005	E.4616.0	15	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 212	TOL. H 7	E.4628.0	16	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 212	TOL. H 7	E.4628.1	16	✔	✔	✔	✔				
	HSS-E	WERKS- (COMPANY) NORM	TOL. H 7	E.4619.0	16	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 208 B	TOL. H 7	E.4620.0	17	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 208 B	TOL. H 7	E.4631.0	17		✔	✔					
	HSS-E	WERKS- (COMPANY) NORM	TOL. H 7	E.4632.0	18	✔	✔	✔	✔				
	HSS-E	ähnl. DIN 208 B	TOL. 0/+0,005	E.4621.0	19	✔	✔	✔	✔				
	HSS-E	WERKS- (COMPANY) NORM	TOL. H 7	E.4622.0	20	✔	✔	✔	✔				
	HSS-E	WERKS- (COMPANY) NORM	TOL. H 7	E.4623.0	20	✔	✔	✔	✔				
	HSS	DIN 311		E.4647.0	21	✔	✔	✔	✔				
	HSS	DIN 9		E.4626.0	22	✔	✔	✔	✔				
	HSS	DIN 2179		E.4627.0	23	✔	✔	✔	✔				
	HSS			E.4635.0	23	✔	✔	✔	✔				
	HSS			E.4636.0	24	✔	✔	✔	✔				
	HSS			E.4637.0	24	✔	✔	✔	✔				
	HSS	DIN 204		E.4638.0	25	✔	✔	✔	✔				
	HSS	DIN 204		E.4641.0	25	✔	✔	✔	✔				
	HSS	DIN 217		E.4640.0	25								
	HSS	$\lambda \approx 9°$		E.4639.0	26	✔	✔	✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

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HSS-Flachsenker mit festem Führungszapfen 180°

E.4608.0

Universal

HSS | DURCHGANG FEIN THROUGH HOLE FINE | UNIVERSAL TOOL | DIN 373 | HA | Z=3



E.4609.0

Universal

HSS | DURCHGANG MITTEL THROUGH HOLE MIDDLE | UNIVERSAL TOOL | DIN 373 | HA | Z=3



E.4610.0

Universal

HSS | KERNLOCH CORE HOLE | UNIVERSAL TOOL | DIN 373 | HA | Z=3



HSS-Counterbores for 180° capscrew

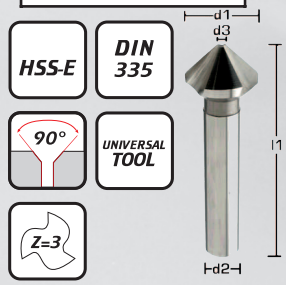
Pogłębiacze HSS trzyostrzowe 180° z pilotem prowadzącym

Svasatori HSS piatti con guida fissa

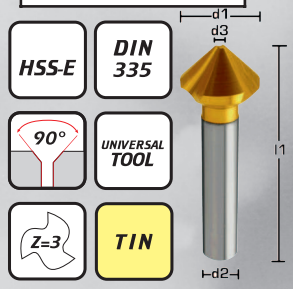
Avellanadores planos de 180° guía, HSS

Artikel-Nr. *Article-No.*					E.4608.0 € Stück *piece*	E.4609.0 € Stück *piece*	E.4610.0 € Stück *piece*
für Gewinde *for thread*	l1	d1	d4	d2 h9			
M 2	56	2,2	4,3	4,3	10,80		
M 2	56	2,4	4,3	4,3		10,80	
M 2	56	1,6	4,3	4,3			
M 3	71	3,2	6,0	5,0	12,80		
M 3	71	3,4	6,0	5,0		12,80	
M 3	71	2,5	6,0	5,0			12,80
M 4	71	4,3	8,0	5,0	13,50		
M 4	71	4,5	8,0	5,0		13,50	
M 4	71	3,3	8,0	5,0			13,50
M 5	80	5,3	10,0	8,0	14,50		
M 5	80	5,5	10,0	8,0		14,50	
M 5	80	4,2	10,0	8,0			14,80
M 6	80	6,4	11,0	8,0	15,60		
M 6	80	6,6	11,0	8,0		15,60	
M 6	80	5,0	11,0	8,0			17,50
M 8	100	8,4	15,0	12,5	25,00		
M 8	100	9,0	15,0	12,5		25,00	
M 8	100	6,8	15,0	12,5			25,50
M 10	100	10,5	18,0	12,5	30,00		
M 10	100	11,0	18,0	12,5		30,00	
M 10	100	8,5	18,0	12,5			52,50
M 12	100	13,0	20,0	12,5	33,50		
M 12	100	14,0	20,0	12,5		33,50	
M 12	100	10,2	20,0	12,5			33,50

E.4601.0



E.4601.1



HSSE-Countersink

Pogłębiacze HSS-E trzyostrzowe 90°

Svasatori conici 90°, HSSE

Avellanadores cónicos de 90°, HSSE

Artikel-Nr. *Article-No.*				E.4601.0 € Stück *piece*	E.4601.1 € Stück *piece*
d1 z9	d3	l1	d2 h9		
4,30	1,3	40	4,0	**8,00**	**11,00**
5,00	1,3	40	4,0	**8,00**	**11,00**
6,30	1,3	45	5,0	**8,50**	**12,00**
7,00	1,3	50	6,0	**9,00**	**13,00**
8,00	1,3	50	6,0	**9,00**	**14,00**
8,30	1,3	50	6,0	**9,50**	**14,00**
9,40	1,6	50	6,0	**10,50**	**15,00**
10,00	1,6	50	6,0	**11,00**	**16,00**
10,40	1,8	50	6,0	**11,30**	**16,00**
12,40	1,8	56	8,0	**12,00**	**18,00**
15,00	2,0	60	10,0	**14,00**	**20,00**
16,50	2,0	60	10,0	**15,00**	**22,00**
19,00	2,2	63	10,0	**20,50**	**28,00**
20,50	2,2	63	10,0	**20,60**	**29,00**
23,00	2,5	67	10,0	**27,00**	**35,00**
25,00	2,5	67	10,0	**28,50**	**38,00**
31,00	2,5	71	12,0	**42,50**	**60,00**



HSS-Kegelsenker 90° lang

E.4646.0

Universal

HSS | DIN 335 | 90° | UNIVERSAL TOOL | Z=3 | LANG LONG



HSSE-Countersink long

Pogłębiacze HSS trzyostrzowe długie 90°

Svasatori conici 90° HSSE, serie lunga

Avellanadores cónicos de 90°, serie larga, HSSE

Artikel-Nr. *Article-No.*				**E.4646.0** € Stück *piece*
d1	d3	l1	d2	
6,30	1,5	154	5,0	**28,00**
8,30	2,0	155	6,0	**29,00**
10,40	2,5	157	6,0	**33,00**
12,40	2,8	158	8,0	**34,00**
16,50	3,2	161	10,0	**44,00**
20,50	3,5	164	10,0	**62,00**
25,00	3,8	168	10,0	**85,00**

HSS-Kegelsenker 90°

E.4605.0

Universal

HSS | DIN 335 | 90° | UNIVERSAL TOOL | Z=3 | MK



HSS-Countersink

Pogłębiacze HSS trzyostrzowe 90°

Svasatori conici 90°, HSS

Avellanadores cónicos de 90°, HSS

Artikel-Nr. *Article-No.*			**E.4605.0** € Stück *piece*
d1 z9	l1	d2 MK	
31,00	112	2	**45,00**
34,00	118	2	**49,00**
37,00	118	2	**52,00**
40,00	140	3	**66,00**
50,00	150	3	**82,00**
63,00	180	4	**134,00**
80,00	190	4	**228,00**
100,00	200	4	**520,00**

HSSE-Kegelsenker

E.4602.0

Universal

HSS-E | DIN 335 | 60° | UNIVERSAL TOOL | Z=3



E.4603.0

Universal

HSS-E | DIN 335 | 120° | UNIVERSAL TOOL | Z=3



HSSE-Countersink

Pogłębiacze HSS-E trzyostrzowe 60°, 120°

Svasatori HSSE

Avellanadores HSSE

Artikel-Nr. *Article-No.*			E.4602.0 € Stück *piece*	E.4603.0 € Stück *piece*
d1	l1	d2 h9		
6,30	45	5,0	**8,00**	
8,00	50	6,0	**8,50**	**13,00**
10,00	50	6,0	**10,50**	**16,00**
12,50	56	8,0	**11,00**	**21,00**
16,00	63	10,0	**14,00**	**22,00**
20,00	67	10,0	**19,00**	**33,00**
25,00	71	10,0	**26,00**	**36,00**

HSSE-Querlochsenker 90°

E.4606.0

4.1 | 4.2 | 4.3 | 4.4 | 4.7

HSS-E | WERKS-(COMPANY) NORM | 90° | Z=1



HSSE-Countersink with hole

Pogłębiacze HSS-E jednoostrzowe 90° z otworem

Svasatori con foro 90°, HSSE

Avellanadores unicorte de 90°, HSSE

Artikel-Nr. *Article-No.*				E.4606.0 € Stück *piece*
d1 +-0,05	l1 +1/-1	Senkbereich *countersinking range*	d2 h9	
10,00	45	2 - 5	6,0	**11,00**
15,00	48	6 - 14	6,0	**14,00**
20,00	63	8 - 18	10,0	**25,00**
25,00	72	10 - 23	12,0	**40,00**
28,00	76	11 - 26	12,0	**46,00**
30,00	78	12 - 28	12,0	**56,00**
35,00	103	14 - 33	16,0	**70,00**
40,00	118	16 - 38	16,0	**131,00**

HSS-Zweiteilige Kegelsenker 90°

E.4607.0

Universal

HSS

90°

WERKS- (COMPANY) NORM



HSS-Two part countersinks 90°

Pogłębiacze HSS dwuczęściowe 90°

Svasatori HSS bilaterali, 90°

Avellanadores de dos partes, 90°, HSS

Artikel-Nr. *Article-No.*			E.4607.0 € Stück *piece*
d1	l1	d2	
15,00	84	10,0	**75,00**
20,00	94	12,0	**95,00**
25,00	108	13,0	**117,00**
30,00	112	15,0	**138,00**
35,00	112	15,0	**171,00**
40,00	117	15,0	**207,00**
45,00	121	15,0	**251,00**
50,00	128	15,0	**301,00**
60,00	135	15,0	**360,00**
80,00	168	20,0	**690,00**

Beide Werkzeuge sind hervorragend geeignet für glatte Senkungen und werden vorzugsweise in der Serienfertigung eingesetzt.
Both tools are used preferably in quantity production where accurate and smooth countersinking is important.

HSS-Zweiteilige Kegelsenker 90°

E.4612.0

Universal

HSS

MK

90°

WERKS- (COMPANY) NORM



HSSE-Two part countersinks 90°

Pogłębiacze HSS dwuczęściowe 90°

Svasatori HSS bilaterali, 90°

Avellanadores de dos partes, 90°, HSS

Artikel-Nr. *Article-No.*			E.4612.0 € Stück *piece*
d1	l1	d2 MK	
15,00	107	1	**81,00**
20,00	126	2	**104,00**
25,00	130	2	**128,00**
30,00	134	2	**148,00**
35,00	136	2	**181,00**
40,00	164	3	**225,00**
45,00	168	3	**266,00**
50,00	178	3	**319,00**
60,00	193	3	**377,00**
80,00	228	4	**725,00**
100,00	270	4	**1075,00**

HSS-Außenentgrater mit einem Messer

E.4613.0

Universal

HSS



E.4613M.0

Universal



HSS-External deburrer with 1 knife

Fazowniki zewnętrzne HSS z wymiennym ostrzem

Sbavatori esterni HSS con 1 lama

Rebabador exterior con cuchilla, HSS

Artikel-Nr. *Article-No.*				E.4613.0 € Stück *piece*	E.4613M.0 € Stück *piece*
d1	Entgratbereich *deburring range*	l1	d2		
AE 10	4 - 8	50	12,0	**70,00**	**25,00**
AE 18	6 - 16	65	10,0	**99,00**	**30,00**
AE 26	8 - 22	85	12,0	**125,00**	**33,00**
AE 36	20 - 32	90	15,0	**180,00**	**33,00**
AE 42	25 - 42	90	15,0	**258,00**	**72,00**

HSS-Kleinrohrentgrater

E.4618.0

Universal

HSS



E.4618M.0

Universal



HSS-Tube deburrer

Fazowniki HSS do rur z wymiennym ostrzem

Sbavatori HSS piccolo per tubi

Rebabador para tubos pequeños HSS

Artikel-Nr. *Article-No.*				E.4618.0 € Stück *piece*	E.4618M.0 € Stück *piece*
d1	Entgratbereich *deburring range*	l1	d2		
REU 2/10	2 - 10	72	10,0	**98,00**	**28,00**
REU 5/10	5 - 20	90	13,0	**148,00**	**32,00**

E.4611.0

Universal

HSS | HA | Z=3 | TYP N



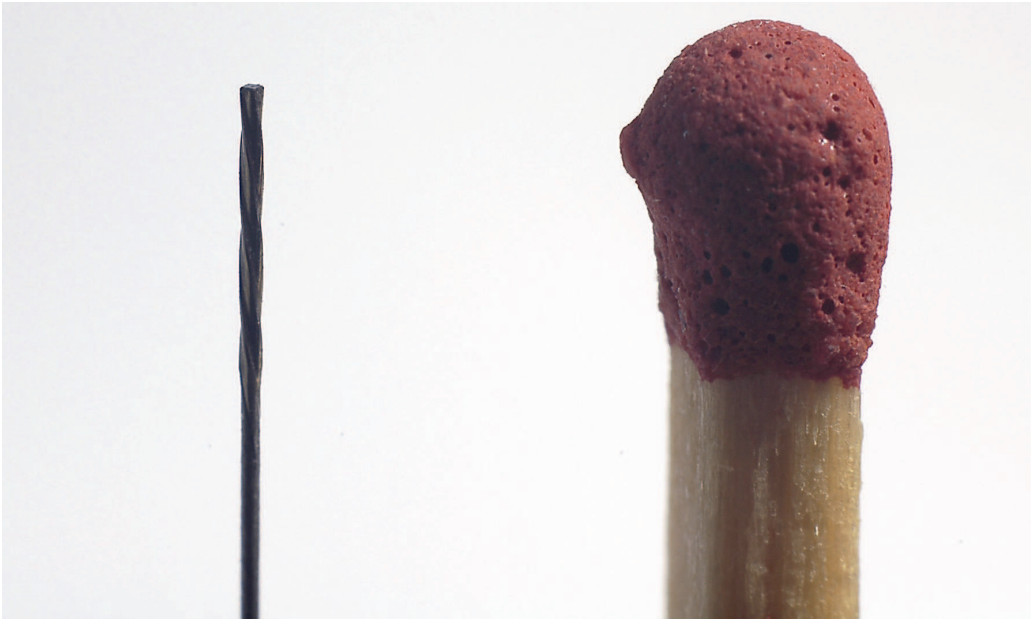
HSS-Core drills DIN 344

Rozwiertaki HSS trzyostrzowe do obróbki zgrubnej, wg DIN 344

Allargatori HSS DIN 344

Broca escariador DIN 344, HSS

Artikel-Nr. *Article-No.*					E.4611.0 € Stück *piece*
d1 h8	d3	l2	l1	d2	
2,80	2,0	55	84	3,0	**38,00**
3,80	2,6	64	96	4,0	**38,00**
4,80	3,2	74	108	5,0	**17,00**
5,80	3,9	80	116	6,0	**17,00**
6,30	3,9	86	124	6,5	**19,50**
6,80	4,5	93	133	7,0	**19,50**
7,80	5,2	100	142	8,0	**22,00**
8,80	5,8	107	151	9,0	**24,00**
9,80	6,5	116	162	10,0	**25,00**
10,75	7,1	125	173	11,0	**31,00**
11,75	7,8	134	184	12,0	**32,00**
12,75	8,4	134	184	13,0	**40,00**
13,75	9,1	142	194	14,0	**45,00**
14,75	9,7	147	202	15,0	**49,00**
15,75	10,4	153	211	16,0	**55,00**
16,75	11,0	159	218	17,0	**65,00**
17,75	11,7	165	226	18,0	**72,00**
18,70	12,3	171	234	19,0	**70,00**
19,70	13,0	177	242	20,0	**84,00**



E.4625.0

Universal

HSS | DIN 343 | Z=3 | MK | TYP N | KURZ SHORT



HSS-Core drills DIN 343 short

Rozwiertaki HSS trzyostrzowe krótkie wg DIN 1864

Allargatori HSS DIN 343, serie corta

Broca escariador, serie corta, DIN 343, HSS

Artikel-Nr. *Article-No.*					E.4625.0 € Stück *piece*
d1 h8	d3	l2	l1	d2 MK	
7,80	5,2	75	156	1	**32,00**
8,80	5,8	81	162	1	**33,00**
9,80	6,5	87	168	1	**33,00**
10,75	7,1	94	175	1	**33,00**
11,75	7,8	101	182	1	**33,00**
12,75	8,4	101	182	1	**37,00**
13,75	9,1	108	189	1	**37,00**
14,75	9,7	114	212	2	**41,00**
15,75	10,4	120	218	2	**43,00**
16,75	11,0	125	223	2	**45,00**
17,75	11,7	130	228	2	**48,00**
18,70	12,3	135	233	2	**52,00**
19,70	13,0	140	238	2	**52,00**
20,70	13,6	145	243	2	**60,00**
21,70	14,3	150	248	2	**61,00**
22,70	15,0	155	253	2	**68,00**
23,70	15,6	160	281	3	**71,00**
24,70	16,3	160	281	3	**76,00**
25,70	17,0	165	286	3	**80,00**
26,70	17,6	170	291	3	**91,00**
27,70	18,3	170	291	3	**94,00**
28,70	19,0	175	296	3	**102,00**
29,70	19,5	175	296	3	**106,00**
30,60	20,0	180	301	3	**124,00**
31,60	21,0	185	334	4	**135,00**
32,60	21,5	185	334	4	**142,00**
33,60	22,0	190	339	4	**150,00**
34,60	23,0	190	339	4	**155,00**
35,60	23,5	195	344	4	**167,00**
36,60	24,0	195	344	4	**178,00**
37,60	24,5	200	349	4	**185,00**
38,60	25,0	200	349	4	**195,00**
39,60	26,0	200	349	4	**198,00**
40,60	26,5	205	354	4	**255,00**
41,60	27,0	205	354	4	**255,00**
42,60	28,0	210	359	4	**288,00**
43,60	28,5	210	359	4	**300,00**
44,60	29,0	210	359	4	**303,00**
45,60	30,0	215	364	4	**325,00**
46,60	30,5	215	364	4	**361,00**
47,60	31,0	220	369	4	**375,00**
48,60	32,0	220	369	4	**397,00**
49,60	32,5	220	369	4	**397,00**

E.4633.0

Universal

HSS | DIN 1864 | Z=3 | MK | TYP N | LANG LONG



HSS-Core drills DIN 1864

Rozwiertaki HSS trzyostrzowe wg DIN 1864

Allargatori HSS DIN 1864, serie lunga

Broca escariador, serie larga, DIN 1864, HSS

Artikel-Nr. *Article-No.*					E.4633.0 € Stück *piece*
d1 h8	d3	l2	l1	d2 MK	
8,80	5,80	107	188	1	**45,00**
9,80	6,50	116	197	1	**45,00**
10,75	7,10	125	206	1	**44,00**
11,75	7,80	134	215	1	**45,00**
12,75	8,40	134	215	1	**50,00**
13,75	9,10	142	223	1	**52,00**
14,75	9,70	147	245	2	**55,00**
15,75	10,40	153	251	2	**58,00**
16,75	11,00	159	257	2	**65,00**
17,75	11,70	165	263	2	**70,00**
18,70	12,30	171	269	2	**76,00**
19,70	13,00	177	275	2	**79,00**
20,70	13,60	184	282	2	**92,00**
21,70	14,30	191	289	2	**92,00**
22,70	15,00	198	296	2	**108,00**
23,70	15,60	206	327	3	**112,00**
24,70	16,30	206	327	3	**112,00**
25,70	17,00	214	335	3	**126,00**
26,70	17,60	222	343	3	**142,00**
27,70	18,30	222	343	3	**142,00**
28,70	19,00	230	351	3	**157,00**
29,70	19,50	230	351	3	**157,00**
30,60	20,00	239	360	3	**171,00**

E.4624.0

Universal

HSS | DIN 206 | TOL. H 7 | FORM B | UNIVERSAL TOOL



HSS-Hand reamers

Rozwiertaki ręczne HSS w tolerancji H7, wg DIN 206

Alesatori a mano, HSS

Escariadores de mano, HSS

Artikel-Nr. *Article-No.*					E.4624.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.4624.0 € Stück *piece*
d1 H7	l2	l1	d2	Zähne *flutes*		d1 H7	l2	l1	d2	Zähne *flutes*	
1,50	20	41	1,5	4	**18,00**	**40,00**	152	305	40,0	12	**333,00**
1,60	21	44	1,6	4	**17,00**	**41,00**	152	305	41,0	12	**355,00**
1,80	23	47	1,8	4	**17,00**	**42,00**	152	305	42,0	12	**420,00**
2,00	25	50	2,0	4	**14,00**	**43,00**	163	326	43,0	12	**445,00**
2,20	27	54	2,2	4	**17,00**	**44,00**	163	326	44,0	12	**430,00**
2,50	29	58	2,5	4	**14,00**	**45,00**	163	326	45,0	14	**470,00**
2,80	31	62	2,8	6	**17,00**	**46,00**	163	326	46,0	14	**480,00**
3,00	31	62	3,0	6	**14,00**	**47,00**	174	347	47,0	14	**510,00**
3,20	33	66	3,2	6	**17,00**	**48,00**	174	347	48,0	14	**440,00**
3,50	35	71	3,5	6	**14,00**	**49,00**	174	347	49,0	14	**580,00**
4,00	38	76	4,0	6	**14,00**	**50,00**	174	347	50,0	14	**540,00**
4,50	41	81	4,5	6	**14,00**						
5,00	44	87	5,0	6	**14,00**						
5,50	47	93	5,5	6	**14,00**						
6,00	47	93	6,0	6	**14,00**						
6,50	50	100	6,5	6	**14,00**						
7,00	54	107	7,0	6	**14,00**						
8,00	58	115	8,0	6	**15,00**						
9,00	62	124	9,0	6	**16,00**						
10,00	66	133	10,0	6	**17,00**						
11,00	71	142	11,0	8	**21,00**						
12,00	76	152	12,0	8	**23,00**						
13,00	76	152	13,0	8	**29,00**						
14,00	81	163	14,0	8	**31,00**						
15,00	81	163	15,0	8	**34,00**						
16,00	87	175	16,0	8	**37,00**						
17,00	87	175	17,0	8	**44,00**						
18,00	93	188	18,0	8	**53,00**						
19,00	93	188	19,0	8	**53,00**						
20,00	100	201	20,0	10	**58,00**						
21,00	100	201	21,0	10	**72,00**						
22,00	107	215	22,0	10	**74,00**						
23,00	107	215	23,0	10	**77,00**						
24,00	115	231	24,0	10	**85,00**						
25,00	115	231	25,0	10	**90,00**						
26,00	115	231	26,0	10	**99,00**						
27,00	124	247	27,0	10	**108,00**						
28,00	124	247	28,0	10	**112,00**						
29,00	124	247	29,0	10	**150,00**						
30,00	124	247	30,0	10	**150,00**						
34,00	142	284	34,0	12	**240,00**						
35,00	142	284	35,0	12	**260,00**						
36,00	142	284	36,0	12	**265,00**						
38,00	152	305	38,0	12	**290,00**						
39,00	152	305	39,0	12	**305,00**						

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4634.0

Universal

HSS-E | ähnl. DIN 8089 | TOL. H 7 | FORM B | UNIVERSAL TOOL



HSSE-Reamers for automatics

Rozwiertaki automatowe HSS-E w tolerancji H7 podobne do DIN 8089

Alesatori a macchina, HSSE

Escariadores para máquinas automáticas, HSSE

Artikel-Nr. *Article-No.*					E.4634.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.4634.0 € Stück *piece*
d1 H7	l2	l1	d2 h8	Zähne *flutes*		d1 H7	l2	l1	d2 h8	Zähne *flutes*	
1,50	12	45	1,50	4	**13,00**	**8,50**	25	71	6,3	6	**20,00**
2,00	16	50	2,00	4	**12,00**	**9,00**	25	71	8,0	6	**19,00**
2,50	18	56	2,50	4	**12,00**	**9,50**	25	71	8,0	6	**21,00**
3,00	18	56	3,00	6	**12,00**	**10,00**	25	71	8,0	6	**19,00**
3,50	20	56	3,00	6	**13,00**	**11,00**	28	80	10,0	6	**26,00**
4,00	20	56	3,55	6	**12,00**	**12,00**	28	80	10,0	6	**28,00**
4,50	22	63	4,00	6	**13,00**	**13,00**	28	80	10,0	6	**31,00**
5,00	22	63	4,00	6	**13,00**	**14,00**	32	90	12,5	8	**32,00**
5,50	22	63	5,00	6	**15,00**	**15,00**	32	90	12,5	8	**32,00**
6,00	22	63	5,00	6	**13,00**	**16,00**	32	90	12,5	8	**34,00**
6,50	22	63	5,00	6	**16,00**	**17,00**	32	90	12,5	8	**37,00**
7,00	25	71	6,30	6	**16,00**	**18,00**	36	100	16,0	8	**42,00**
7,50	25	71	6,30	6	**18,00**	**19,00**	36	100	16,0	8	**48,00**
8,00	25	71	6,30	6	**16,00**	**20,00**	36	100	16,0	8	**46,00**

HSSE-Automatenreibahlen

E.4614.0

Universal

HSS-E | ähnl. DIN 8089 | TOL. 0/+0,005 | FORM B | UNIVERSAL TOOL



HSSE-Reamers for automatics

Rozwiertaki automatowe HSS-E w tolerancji 0/+0,005 podobne do DIN 8089

Alesatori a macchina, HSSE

Escariadores para máquinas automáticas, HSSE

Artikel-Nr. *Article-No.*					E.4614.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.4614.0 € Stück *piece*
d1 H7	l2	l1	d2	Zähne *flutes*		d1 0/+0,005	l2	l1	d2	Zähne *flutes*	
1,50 - 1,70	12	45	2,0	4	**23,00**	**7,26 - 8,50**	25	71	6,0	6	**27,50**
1,71 - 1,90	12	45	2,0	4	**23,00**	**8,51 - 9,25**	25	71	8,0	6	**31,50**
1,91 - 2,12	16	50	2,0	4	**23,00**	**9,26 - 10,60**	25	71	8,0	6	**31,50**
2,13 - 2,36	18	56	3,0	4	**23,00**	**10,61 - 11,25**	28	80	10,0	6	**42,00**
2,37 - 2,65	18	56	3,0	6	**23,00**	**11,26 - 12,00**	28	80	10,0	6	**43,00**
2,66 - 3,00	18	56	3,0	6	**23,00**	**12,01 - 13,20**	28	80	10,0	8	**48,00**
3,01 - 3,35	22	63	4,0	6	**23,00**	**13,21 - 14,20**	32	90	12,5	8	**49,00**
3,36 - 3,75	22	63	4,0	6	**23,00**	**14,21 - 15,20**	32	90	12,5	8	**50,00**
3,76 - 4,25	22	63	4,0	6	**23,00**	**15,21 - 16,20**	32	90	12,5	8	**52,00**
4,26 - 5,30	22	63	4,0	6	**23,00**	**16,21 - 17,20**	32	90	12,5	8	**55,00**
5,31 - 6,25	22	63	5,0	6	**23,00**	**17,21 - 18,20**	36	100	16,0	8	**63,00**
6,26 - 6,70	22	63	5,0	6	**27,50**	**18,21 - 19,20**	36	100	16,0	8	**70,00**
6,71 - 7,25	22	63	6,0	6	**27,50**	**19,21 - 20,00**	36	100	16,0	8	**70,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSSE-Maschinen-Stirnreibahlen

E.4615.0

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7 | FORM A | UNIVERSAL TOOL



HSSE-machine bottoming reamers

Rozwietaki maszynowe HSS-E do otworów nieprzelotowych z płaskim dnem, podobne do DIN 212

Alesatori HSSE a macchina, lavorazione di testa

Escariadores de máquina frontales, HSSE

Artikel-Nr. *Article-No.*						E.4615.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 h9	Zähne *flutes*	
3,00	12	33	61	3,0	4	**23,50**
3,50	12	39	70	3,5	4	**23,50**
4,00	16	44	75	4,0	6	**23,50**
4,50	16	48	80	4,5	6	**26,00**
5,00	20	53	86	5,0	6	**25,00**
6,00	20	59	93	6,0	6	**26,00**
7,00	22	69	109	7,0	6	**33,00**
8,00	24	71	117	8,0	6	**24,00**
9,00	24	77	125	9,0	6	**38,00**
10,00	26	84	133	10,0	6	**35,00**
11,00	26	89	142	11,0	6	**45,00**
12,00	26	96	151	12,0	6	**43,00**

HSSE-Maschinenreibahlen-Sätze

SET.4629.2

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7

19 Stück *pieces*
Ø 1 - 10 mm
0,5 mm steigend *rising 0,5 mm*



SET.4629.3

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7

50 Stück *pieces*
Ø 1 - 5,9 mm
0,1 mm steigend *rising 0,1 mm*



Sets of HSSE-Machine reamers

Zestaw rozwiertaków masz. HSS-E

Serie di alesatori a macchina, HSSE

Juegos de escariadores de máquina, HSSE

SET.4629.0 € Stück *piece*	SET.4629.1 € Stück *piece*
280,00	**650,00**

SET.4629.4

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7

41 Stück *pieces*
Ø 6 - 10 mm
0,1 mm steigend *rising 0,1 mm*



SET.4629.5

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7

51 Stück *pieces*
Ø 1 - 6 mm
0,1 mm steigend *rising 0,1 mm*



Sets of HSSE-Machine reamers

Zestaw rozwiertaków masz. HSS-E

Serie di alesatori a macchina, HSSE

Juegos de escariadores de máquina, HSSE

SET.4629.2 € Stück *piece*	SET.4629.3 € Stück *piece*
700,00	**660,00**

E.4617.0

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7 | FORM B | UNIVERSAL TOOL



E.4630.0

Universal

HSS-E | ähnl. DIN 212 | TOL. H 7 | λ=45° | FORM E | UNIVERSAL TOOL



HSSE-Machine reamers

Rozwiertaki maszynowe HSS-E w tolerancji H7, podobne do DIN 212

Alesatori a macchina, HSSE

Escariadores de máquina, HSSE

Artikel-Nr. *Article-No.*						E.4617.0 € Stück *piece*	E.4630.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 h9	Zähne *flutes*		
1,00	7	15	34	1,0	3	**21,00**	
1,40	8	24	40	1,4	3	**14,00**	
1,50	8	24	40	1,5	3	**13,00**	
1,60	9	25	43	1,6	3	**14,00**	
1,80	10	28	46	1,8	4	**14,00**	
2,00	11	29	49	2,0	4	**12,00**	**14,00**
2,20	12	32	53	2,2	4	**14,50**	
2,50	14	34	57	2,5	4	**12,00**	**15,00**
2,80	15	41	61	2,8	4	**15,50**	
3,00	15	41	61	3,0	6	**14,50**	**17,00**
3,20	16	41	65	3,2	6	**14,50**	**20,00**
3,50	18	43	70	3,5	6	**13,00**	**20,00**
4,00	19	43	75	4,0	6	**12,00**	**17,00**
4,50	21	47	80	4,5	6	**13,00**	**20,00**
5,00	23	52	86	5,0	6	**13,00**	**19,00**
5,50	26	57	93	5,6	6	**16,00**	
6,00	26	57	93	5,6	6	**13,50**	**17,00**
6,50	28	63	101	6,3	6	**16,00**	
7,00	31	69	109	7,1	6	**16,00**	**21,00**
8,00	33	75	117	8,0	6	**17,00**	**20,00**
9,00	36	81	125	9,0	6	**19,00**	**26,00**
10,00	38	87	133	10,0	6	**19,00**	**25,00**
11,00	41	96	142	10,0	6	**28,00**	**32,00**
12,00	44	105	151	10,0	6	**28,00**	**30,00**
13,00	44	105	151	10,0	8	**32,50**	**42,00**
14,00	47	110	160	12,5	8	**32,50**	**39,00**
15,00	50	112	162	12,5	8	**34,00**	**40,00**
16,00	52	120	170	12,5	8	**35,00**	**42,00**
17,00	54	123	175	14,0	8	**42,00**	**63,00**
18,00	56	130	182	14,0	8	**43,00**	**57,00**
19,00	58	131	189	16,0	8	**52,00**	**66,00**
20,00	60	137	195	16,0	8	**50,00**	**63,00**
21,00	55	159	215	18,0	8	**101,00**	
22,00	55	162	225	18,0	8	**101,00**	
23,00	60	167	230	18,0	8	**118,00**	
24,00	60	177	240	20,0	10	**130,00**	
25,00	60	182	245	20,0	10	**132,00**	
26,00	60	180	250	20,0	10	**140,00**	
27,00	60	190	260	22,0	10	**168,00**	
28,00	65	200	270	22,0	10	**172,00**	
29,00	65	200	270	22,0	10	**210,00**	
30,00	70	200	280	24,0	10	**210,00**	
31,00	70	210	290	24,0	10	**255,00**	
32,00	70	210	290	24,0	10	**235,00**	

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4616.0

Universal

HSS-E | ähnl. DIN 212 | FORM B | TOL. 0/+0,005 | UNIVERSAL TOOL



HSSE-machine reamers

Roziwertaki maszynowe HSS-E w tolerancji 0/+0.005 podobne do DIN 212 do maszyn CNC

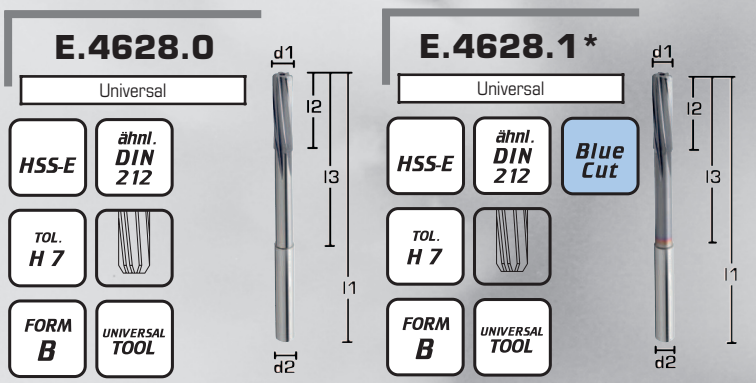
Alesatori NC a macchina, HSSE

Escariadores de máquina NC, HSSE

*** = ab Lager**
** = from stock*

Artikel-Nr. *Article-No.*					E.4616.0 € Stück *piece*
d1 0/+0,005	l2	l3	l1	Schaft h9 *shank h9*	
0,70 - 0,79	7	10	33		**28,00**
0,80 - 0,89	12	14	38		**28,00**
0,90 - 0,95	12	14	38		**24,00**
0,96 - 1,05 *	12	14	38		**15,00**
1,06 - 1,44	15	24	40		**15,00**
1,45 - 1,79	18	26	43		**14,50**
1,80 - 1,95	19	31	49		**12,50**
1,96 - 2,05 *	19	31	49		**12,00**
2,06 - 2,30	19	31	49		**14,50**
2,31 - 2,95	20	38	50		**15,00**
2,96 - 3,05 *	20	38	50		**11,50**
3,06 - 3,35	20	38	50		**15,00**
3,36 - 3,75	20	47	75		**14,50**
3,76 - 3,95	24	50	75		**14,50**
3,96 - 4,05 *	24	50	75		**12,00**
4,06 - 4,25	24	50	75		**14,50**
4,26 - 4,75	25	54	80		**14,50**
4,76 - 4,95	26	59	86		**14,50**
4,96 - 5,05 *	26	59	86		**12,30**
5,06 - 5,30	26	59	86		**14,80**
5,31 - 5,80	27	65	93		**16,00**
5,81 - 5,95	28	71	101		**16,00**
5,96 - 6,05 *	28	71	101		**13,50**
6,06 - 6,70	28	71	101		**16,00**
6,71 - 6,95	31	78	109		**16,00**
6,96 - 7,05 *	31	78	109		**14,00**
7,06 - 7,55	31	78	109		**16,00**
7,56 - 7,95	33	84	117	**zylindrisch** *straight*	**16,00**
7,96 - 8,05 *	33	84	117		**14,00**
8,06 - 8,55	33	84	117		**16,00**
8,56 - 8,95	36	88	125		**21,00**
8,96 - 9,05 *	36	88	125		**17,00**
9,06 - 9,55	36	88	125		**21,00**
9,56 - 9,95	38	97	133		**22,00**
9,96 - 10,05 *	38	97	133		**22,00**
10,06 - 10,55	38	97	133		**27,00**
10,56 - 10,95	38	97	133		**27,00**
10,96 - 11,05 *	38	97	133		**25,00**
11,06 - 11,55	38	97	133		**30,00**
11,56 - 11,95	44	110	151		**30,00**
11,96 - 12,05 *	44	110	151		**30,00**
12,06 - 13,20	44	110	151		**34,00**
13,21 - 13,96	47	114	160		**37,00**
13,97 - 14,05 *	47	114	160		**35,50**
14,06 - 14,96	50	115	162		**38,00**
14,97 - 15,05 *	50	115	162		**36,30**
15,06 - 15,96	52	120	170		**40,00**
15,97 - 16,05 *	52	120	170		**40,00**
16,06 - 16,96	56	132	182		**46,00**
16,97 - 17,05	60	150	195		**48,00**
17,06 - 17,96	60	150	195		**48,00**
17,97 - 18,05	60	150	195		**50,00**
18,06 - 18,96	60	150	195		**50,00**
18,97 - 19,05	60	150	195		**54,00**
19,06 - 19,96	60	150	195		**58,00**
19,97 - 20,05	60	150	195		**55,00**

HSSE-NC-Maschinenreibahlen



HSSE-NC-Machine reamers

Rozwiertaki maszynowe HSS-E w tolerancji H7, podobne do DIN 212, do maszyn CNC

Alesatori NC a macchina, HSSE

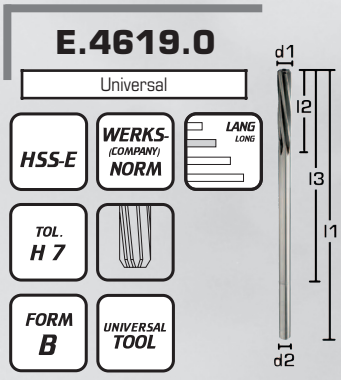
Escariadores de máquina NC, HSSE

***= Lieferzeit 3 Arbeitswochen**
**= delivery time 3 working weeks*

Artikel-Nr. *Article-No.*						E.4628.0 € Stück *piece*	E.4628.1 € Stück *piece*
d1 H7	l2	l3	l1	d2 h6	Zähne *flutes*		
3,00	15	41	61	3,0	6	**12,00**	**23,00**
3,50	18	43	70	4,0	6	**12,00**	**25,00**
4,00	19	43	75	4,0	6	**12,0,0**	**25,00**
4,50	21	47	80	5,0	6	**12,00**	**28,00**
5,00	23	52	86	5,0	6	**12,00**	**27,00**
5,50	26	57	93	6,0	6	**14,50**	**38,00**
6,00	26	57	93	6,0	6	**12,50**	**29,00**
6,50	28	63	101	6,0	6	**15,50**	**34,00**
7,00	31	69	109	8,0	6	**15,50**	**34,00**
8,00	33	75	117	8,0	6	**15,50**	**37,00**
9,00	36	81	125	10,0	6	**18,00**	**42,00**

Artikel-Nr. *Article-No.*						E.4628.0 € Stück *piece*	E.4628.1 € Stück *piece*
d1 H7	l2	l3	l1	d2 h6	Zähne *flutes*		
10,00	38	87	133	10,0	6	**18,50**	**45,00**
11,00	41	96	142	10,0	6	**26,00**	**61,00**
12,00	44	105	151	10,0	6	**27,00**	**65,00**
14,00	47	110	160	14,0	8	**31,00**	**74,00**
15,00	50	112	162	14,0	8	**33,00**	**78,00**
16,00	52	120	170	14,0	8	**34,00**	**81,00**
18,00	56	130	182	14,0	8	**41,00**	**97,00**
20,00	60	137	195	16,0	8	**46,00**	**107,00**

HSSE-Maschinenreibahlen lang



HSSE-Machine reamers long

Rozwiertaki maszynowe długie HSS-E w tolerancji H7, wg normy zakładowej

Alesatori a macchina, serie lunga, HSSE

Escariadores de máquina, serie larga, HSSE

Artikel-Nr. *Article-No.*						E.4619.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 h9	Zähne *flutes*	
2,00	11	45	65	2,0	4	**44,00**
2,50	14	55	75	2,5	4	**44,00**
3,00	15	65	90	3,0	6	**34,00**
3,50	18	65	90	3,5	6	**50,00**
4,00	19	70	105	4,0	6	**34,00**
4,50	21	70	105	4,5	6	**52,00**
5,00	23	80	115	5,0	6	**36,00**
5,50	26	80	115	5,5	6	**54,00**
6,00	26	90	130	6,0	6	**37,00**
6,00	26	210	250	6,0	6	**86,00**
6,50	28	90	130	6,0	6	**56,00**

Artikel-Nr. *Article-No.*						E.4619.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 h9	Zähne *flutes*	
7,00	31	95	140	7,0	6	**40,00**
7,50	31	95	140	7,0	6	**57,00**
8,00	33	115	160	8,0	6	**38,00**
8,00	33	205	250	8,0	6	**88,00**
8,50	33	115	160	8,0	6	**59,00**
9,00	36	130	175	9,0	6	**44,00**
9,50	36	130	175	9,0	6	**61,00**
10,00	38	140	190	10,0	6	**44,00**
10,00	38	200	250	10,0	6	**89,00**
11,00	41	150	200	10,0	6	**50,00**
12,00	44	160	210	12,0	6	**50,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4620.0

Universal

HSS-E | ähnl. DIN 208 B | MK | TOL. H 7 | FORM B | UNIVERSAL TOOL



E.4631.0

Universal

HSS-E | ähnl. DIN 208 B | MK | TOL. H 7 | λ≈45° | UNIVERSAL TOOL



HSSE-Machine reamers with morse taper shank

Rozwiertaki maszynowe HSS-E w tolerancji H7 z chwytem stożkowym Morse'a, podobne do DIN 208B

Alesatori a macchina, gambo MK, HSSE

Escariadores de máquina con mango cónico, HSSE

Artikel-Nr. *Article-No.*						E.4620.0 € Stück *piece*	E.4631.0* € Stück *piece*
d1 H7	l2	l3	l1	d2 MK	Zähne *flutes*		
3,00	15	46,5	112	1	6	**33,00**	
4,00	19	59,5	125	1	6	**32,00**	
5,00	23	67,5	133	1	6 / 3*	**32,00**	**37,50**
6,00	26	72,5	138	1	6 / 3*	**32,00**	**38,00**
7,00	31	84,5	150	1	6 / 3*	**33,00**	**41,00**
8,00	33	90,5	156	1	6 / 3*	**33,00**	**39,00**
9,00	36	96,5	162	1	6 / 3*	**37,00**	**46,00**
10,00	38	102,5	168	1	6 / 4*	**28,00**	**32,00**
11,00	41	109,5	175	1	6 / 4*	**31,00**	**37,00**
12,00	44	116,5	182	1	6 / 4*	**31,00**	**34,00**
13,00	44	116,5	182	1	8 / 4*	**32,00**	**40,00**
14,00	47	123,5	189	1	8 / 4*	**33,00**	**40,00**
15,00	50	124,0	204	2	8 / 4*	**40,00**	**43,00**
16,00	52	130,0	210	2	8 / 4*	**40,00**	**43,00**
17,00	54	134,0	214	2	8 / 4*	**43,00**	**47,00**
18,00	56	139,0	219	2	8 / 4*	**45,00**	**47,00**
19,00	58	143,0	223	2	8 / 4*	**48,00**	**49,00**
20,00	60	148,0	228	2	8 / 4*	**48,00**	**49,00**
21,00	62	152,0	232	2	8 / 4*	**54,00**	**58,00**
22,00	64	157,0	237	2	8 / 4*	**54,00**	**57,00**
23,00	66	161,0	241	2	8 / 4*	**62,00**	**71,00**
24,00	68	169,0	268	3	10 / 4*	**63,00**	**71,00**
25,00	68	169,0	268	3	10 / 4*	**65,00**	**71,00**
26,00	70	174,0	273	3	10 / 6*	**70,00**	**75,00**
27,00	71	178,0	277	3	10 / 6*	**77,00**	**85,00**
28,00	71	178,0	277	3	10 / 6*	**77,00**	**84,00**
29,00	73	182,0	281	3	10 / 6*	**87,00**	**98,00**
30,00	73	182,0	281	3	10 / 6*	**80,00**	**88,00**
31,00	75	186,0	285	3	12 / 6*	**104,00**	**136,00**
32,00	77	193,0	317	4	12 / 6*	**106,00**	**118,00**
33,00	77	193,0	317	4	12	**120,00**	
34,00	78	197,0	321	4	12	**120,00**	
35,00	78	197,0	321	4	12	**120,00**	
36,00	79	201,0	325	4	12	**130,00**	
37,00	79	201,0	325	4	12	**143,00**	
38,00	81	205,0	329	4	12	**143,00**	
39,00	81	205,0	329	4	12	**175,00**	
40,00	81	205,0	329	4	12	**145,00**	
41,00	82	209,0	333	4	12	**190,00**	
42,00	82	209,0	333	4	12	**158,00**	
43,00	83	212,0	336	4	12	**224,00**	
44,00	83	212,0	336	4	14	**186,00**	
45,00	83	212,0	336	4	14	**188,00**	
46,00	84	216,0	340	4	14	**220,00**	
47,00	84	216,0	340	4	14	**235,00**	
48,00	86	220,0	344	4	14	**238,00**	
49,00	86	220,0	344	4	14	**285,00**	
50,00	86	220,0	344	4	14	**238,00**	
52,00	90	236,0	360	4	14	**335,00**	
54,00	90	236,0	360	4	14	**368,00**	
55,00	90	236,0	360	4	14	**385,00**	
56,00	90	236,0	360	4	14	**385,00**	
58,00	90	234,0	390	5	16	**420,00**	
60,00	90	234,0	390	5	16	**440,00**	

E.4632.0

Universal

HSS-E | WERKS-(COMPANY) NORM | FORM A | TOL. H 7 | MK | UNIVERSAL TOOL



HSSE-Machine bottoming reamers with morse taper shank

Rozwiertaki maszynowe HSS-E z chwytem stożkowym Morse', do otworów nieprzelot. z płaskim dnem

Alesatori a macchina, gambo MK, lavorazione di testa

Escariadores de máquina frontales con mango cónico, HSSE

Artikel-Nr. *Article-No.*						E.4632.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 MK	Zähne *flutes*	
13,00	26	96	182	1	8	**54,00**
14,00	28	103	189	1	8	**56,00**
15,00	28	104	204	2	8	**62,00**
16,00	30	108	210	2	8	**65,00**
17,00	30	112	214	2	8	**77,00**
18,00	30	117	219	2	8	**74,00**
19,00	32	118	223	2	8	**84,00**
20,00	32	124	228	2	8	**81,00**
21,00	34	133	232	2	8	**102,00**
22,00	34	133	237	2	8	**99,00**
23,00	34	139	268	3	8	**118,00**
24,00	34	139	268	3	10	**118,00**
25,00	36	139	268	3	10	**118,00**
26,00	36	144	273	3	10	**129,00**
27,00	38	148	277	3	10	**144,00**
28,00	38	148	277	3	10	**140,00**
29,00	42	150	281	3	10	**178,00**
30,00	42	150	281	3	10	**147,00**
31,00	44	157	317	4	12	**280,00**
32,00	44	157	317	4	12	**188,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4621.0

Universal

HSS-E | ähnl. DIN 208 B | MK | TOL. 0/+0,005 | FORM B | UNIVERSAL TOOL



HSSE-Machine reamers with morse taper shank

Rozwiertaki maszynowe HSS-E z chwytem stożkowym Morse'a, podobne do DIN 208 B

Alesatori a macchina, gambo MK, HSSE

Escariadores de máquina con mango cónico, HSSE

Lieferzeit 1-2 Arbeitswochen
Delivery time 1-2 working weeks

Artikel-Nr. *Article-No.*					**E.4621.0** € **1-2 Stück** *piece*	**E.4621.0** € **ab 3 St.** *from 3 pc.*
d1 0/+0,005	l2	l3	l1	d2 MK		
6,01 - 6,70	28	78	144	1	**50,00**	**38,00**
6,71 - 7,50	31	84	150	1	**51,00**	**40,00**
7,51 - 8,50	33	90	156	1	**51,00**	**40,00**
8,51 - 9,50	36	96	162	1	**60,00**	**45,00**
9,51 - 10,60	38	102	168	1	**51,00**	**40,00**
10,61 - 11,80	41	109	175	1	**50,00**	**40,00**
11,81 - 13,20	44	116	182	1	**50,00**	**40,00**
13,21 - 14,00	47	109	189	1	**50,00**	**41,00**
14,01 - 15,00	50	124	204	2	**62,00**	**48,00**
15,01 - 16,00	52	130	210	2	**63,00**	**49,00**
16,01 - 17,00	54	134	214	2	**65,00**	**52,00**
17,01 - 18,00	56	139	219	2	**71,00**	**55,00**
18,01 - 19,00	58	143	223	2	**73,00**	**57,00**
19,01 - 20,00	60	148	228	2	**73,00**	**57,00**
20,01 - 21,20	62	152	232	2	**81,00**	**65,00**
21,21 - 22,40	64	157	237	2	**81,00**	**65,00**
22,41 - 23,02	66	161	241	2	**92,00**	**75,00**
23,03 - 23,60	66	164	241	3	**95,00**	**78,00**
23,61 - 25,00	68	168	268	3	**96,00**	**78,00**
25,01 - 26,50	70	173	273	3	**99,00**	**80,00**
26,51 - 28,00	71	177	277	3	**112,00**	**90,00**
28,01 - 30,00	73	181	281	3	**115,00**	**93,00**
30,01 - 31,50	75	185	285	3	**139,00**	**115,00**
31,51 - 32,00	77	190	317	4	**140,00**	**120,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSSE-Maschinenreibahlen lang

E.4622.0

Universal

HSS-E | WERKS-NORM (COMPANY) | MK | TOL. H 7 | LANG LONG | FORM B | UNIVERSAL TOOL



HSSE-Machine reamers long

Rozwiertaki maszynowe HSS-E długie w tolerancji H7, z chwytem stożkowym Morse'a, wg normy zakładowej

Alesatori a macchina HSSE, gambo MK, serie lunga

Escariadores de máquina con mango cónico, serie larga

Artikel-Nr. *Article-No.*						E.4622.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 MK	Zähne *flutes*	
12,00	44	245	315	1	6	**115,00**
13,00	44	179	245	1	8	**58,00**
14,00	47	179	245	1	8	**58,00**
15,00	50	180	260	2	8	**62,00**
16,00	52	180	260	2	8	**68,00**
18,00	56	180	260	2	8	**73,00**
20,00	60	190	270	2	8	**77,00**
22,00	64	200	280	2	10	**87,00**
24,00	68	220	300	2	10	**115,00**
25,00	68	220	320	3	10	**138,00**
26,00	70	230	330	3	10	**161,00**
28,00	71	210	310	3	10	**161,00**
30,00	73	250	350	3	10	**167,00**
32,00	77	250	375	4	12	**194,00**
34,00	78	250	375	4	12	**230,00**
36,00	79	250	375	4	12	**238,00**
38,00	81	270	395	4	12	**256,00**
40,00	81	270	395	4	12	**270,00**
42,00	82	280	405	4	12	**290,00**
45,00	83	280	405	4	14	**335,00**
50,00	86	290	415	4	14	**403,00**

HSSE-Maschinenreibahlen XL

E.4623.0

Universal

HSS-E | WERKS-NORM (COMPANY) | MK | TOL. H 7 | XLANG XLONG | FORM B | UNIVERSAL TOOL



HSSE-Machine reamers XL

Rozwiertaki maszynowe HSS-E bardzo długie w tolerancji H7, z chwytem stożkowym Morse'a, wg normy zakładowej

Alesatori a macchina HSSE, gambo MK, serie extra lunga

Escariadores de máquina, serie extra larga, HSSE

Artikel-Nr. *Article-No.*						E.4623.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 MK	Zähne *flutes*	
14,00	47	245	315	1	8	**124,00**
16,00	52	270	350	2	8	**200,00**
18,00	56	270	350	2	8	**210,00**
20,00	60	270	350	2	8	**225,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4647.0

Universal

HSS | DIN 311 | ALU | PLASTIK | MK | STAHL



HSS-Bridge reamers

Rozwiertaki kotlarskie HSS wg DIN 311 z chwytem stożkowym Morse'a

Alesatori HSS per fori da chiodi

Escariadores para agujeros para remaches, HSS

Artikel-Nr. *Article-No.*					E.4647.0 € Stück *piece*
d1	l2	l1	d2 MK	Zähne *flutes*	
6,40	75	151	1	4	**17,00**
7,40	80	156	1	4	**18,00**
8,40	85	161	1	4	**19,00**
9,50	90	166	1	4	**21,00**
10,00	95	171	1	4	**23,00**
11,00	100	176	1	4	**23,00**
12,00	105	199	2	4	**24,00**
13,00	105	199	2	5	**26,00**
14,00	115	209	2	5	**32,00**
15,00	125	219	2	5	**34,00**
16,00	135	229	2	5	**42,00**
17,00	135	251	3	5	**44,00**
18,00	145	261	3	5	**48,00**
19,00	145	261	3	5	**53,00**
20,00	155	271	3	5	**63,00**
21,00	155	271	3	5	**65,00**
22,00	165	281	3	5	**74,00**
23,00	165	281	3	5	**81,00**
24,00	180	296	3	5	**89,00**
25,00	180	296	3	5	**94,00**
26,00	180	296	3	5	**121,00**
27,00	195	311	3	5	**121,00**
28,00	195	311	3	5	**121,00**
30,00	195	311	3	5	**137,00**
31,00	210	326	3	5	**137,00**
32,00	210	354	4	5	**153,00**
33,00	210	354	4	5	**153,00**
34,00	220	364	4	5	**165,00**
35,00	220	364	4	5	**165,00**
37,00	220	364	4	5	**177,00**
40,00	230	374	4	5	**218,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSS-Kegelreibahle 1:50 für Kegelstifte

E.4626.0

Universal

HSS

DIN 9



HSS-Taper reamers 1:50 for taper pins

Rozwiertaki HSS stożkowe, zbieżność 1:50

Alesatori conici 1:50, HSS

Escariadores cónicos 1:50, HSS

Artikel-Nr. *Article-No.*						E.4626.0 € Stück *piece*
d1	d3	l2	l1	d2	Zähne *flutes*	
1,40	2,14	37	57	2,50	3	**21,50**
1,50	2,24	37	57	2,70	4	**21,50**
1,90	2,86	48	68	2,50	4	**20,50**
2,40	3,36	48	68	2,50	4	**20,50**
2,90	4,06	58	80	3,15	5	**18,30**
3,40	4,90	75	100	3,55	5	**21,50**
3,90	5,26	68	93	4,00	5	**20,50**
4,40	6,14	87	115	4,50	5	**24,50**
4,90	6,36	73	100	5,00	5	**21,50**
5,40	7,78	119	150	5,60	6	**31,00**
5,90	8,00	105	135	6,30	6	**25,50**
6,40	8,78	119	150	6,30	6	**32,00**
6,90	9,72	141	177	7,10	6	**37,00**
7,90	10,80	145	180	8,00	6	**40,00**
8,90	12,16	163	205	9,00	6	**56,00**
9,90	13,40	175	215	10,00	6	**56,00**
11,80	16,00	210	255	11,20	8	**72,00**
12,86	16,74	194	240	12,50	8	**77,00**
13,86	17,74	194	240	12,50	8	**81,00**
15,80	20,40	230	280	14,00	8	**100,00**
19,80	24,80	250	310	18,00	10	**130,00**
24,70	30,70	300	370	22,40	10	**225,00**
29,70	36,10	320	400	25,00	12	**277,00**
39,70	46,50	340	430	31,50	12	**460,00**
49,70	56,90	360	460	40,00	14	**710,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSS-Kegel-Schälreibahle 1:50 für Kegelstifte

E.4627.0

Universal

HSS

λ≈45°

DIN 2179



HSS-Conical reamers 1:50 for taper pins

Rozwiertaki HSS stożkowe, zbieżność 1:50

Alesatori conici 1:50, HSS

Escariadores cónicos 1:50, HSS

Zylinderschaft mit Mitnehmerklappen
Straight shank with tang

Artikel-Nr. *Article-No.*						**E.4627.0** € **Stück** *piece*
d1	**d3**	**l2**	**l1**	**d2**	**Zähne** *flutes*	
1,90	2,86	48	86	3,15	2	**20,50**
2,40	3,36	48	86	3,15	3	**24,50**
2,90	4,06	58	100	4,00	3	**22,50**
3,90	5,26	68	112	5,00	3	**22,50**
4,90	6,36	73	122	6,30	3	**24,00**
5,90	8,00	105	160	8,00	3	**27,00**
6,40	8,78	119	187	8,50	3	**34,00**
7,90	10,80	145	207	10,00	3	**41,00**
9,90	13,40	175	245	12,50	3	**52,00**
11,80	16,00	210	290	16,00	3	**66,00**
12,86	16,74	194	275	16,00	3	**120,00**
13,86	17,74	194	275	17,00	3	**144,00**
15,84	21,12	264	355	20,00	3	**222,00**
19,80	25,20	270	370	24,00	3	**299,00**

HSS-Kegelreibahle 1:10

E.4635.0

Universal

HSS



HSS-Conical reamers 1:10

Rozwiertaki HSS stożkowe, zbieżność 1:10

Alesatori conici 1:10, HSS

Escariadores cónicos 1:10, HSS

Artikel-Nr. *Article-No.*						**E.4635.0** € **Stück** *piece*
d1	**d3**	**l2**	**l1**	**d2**	**Zähne** *flutes*	
3,00	10	70	100	6,3	5	**36,00**
5,00	15	100	140	10,0	5	**50,00**
10,00	25	150	195	16,0	7	**106,00**
15,00	35	200	250	22,4	9	**210,00**
23,00	45	220	275	31,5	11	**287,00**
30,00	55	250	310	40,0	13	**453,00**
37,00	65	280	345	45,0	15	**830,00**
45,00	75	300	370	45,0	17	**1160,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSS-Kegelreibahle 1:16 für konische Gewinde

E.4636.0

Universal

HSS

NPT

NPTF



HSS-Conical reamers 1:16 for taper threads

Rozwiertaki HSS stożkowe, zbieżność 1:16 do otworów pod gwinty stożkowe

Alesatori conici 1:16 per maschiature coniche, HSS

Escariadores 1:16 para roscas cónicas, HSS

Artikel-Nr. *Article-No.*						E.4636.0 € Stück *piece*
d1	d3	l2	l1	d2	Zähne *flutes*	
1/16”	6,998	17	70	6,0	6	**82,00**
1/8”	9,105	17	70	8,0	6	**90,00**
1/4”	11,996	27	80	11,0	6	**103,00**
3/8”	15,416	27	85	12,0	8	**117,00**
1/2”	19,126	35	95	16,0	8	**155,00**
3/4”	24,411	35	105	20,0	10	**189,00**
1”	30,684	43	130	25,0	10	**247,00**
1 1/4”	39,471	44	140	32,0	12	**345,00**
1 1/2”	45,604	45	150	36,0	12	**494,00**
2”	57,678	46	160	48,0	14	**810,00**

HSS-Kegelreibahle 1:20

E.4637.0

Universal

HSS



HSS-Conical reamers 1:20

Rozwiertaki HSS stożkowe, zbieżność 1:20

Alesatori conici 1:20, HSS

Escariadores cónicos 1:20, HSS

Artikel-Nr. *Article-No.*						E.4637.0 € Stück *piece*
d1	d3	l2	l1	d2	Zähne *flutes*	
2,00	5,0	60	85	3,8	4	**41,00**
2,50	5,5	60	85	4,3	4	**41,00**
3,00	7,0	80	110	5,5	5	**48,00**
3,50	7,5	80	110	6,2	5	**48,00**
4,00	8,0	80	120	6,2	5	**50,00**
4,50	9,0	90	130	7,0	6	**54,00**
5,00	9,5	90	130	8,0	6	**60,00**
5,50	10,0	90	130	8,0	6	**65,00**
6,00	11,0	100	140	9,0	6	**68,00**
7,00	12,0	100	140	9,0	6	**78,00**
8,00	14,0	125	165	11,0	6	**90,00**
9,00	15,0	125	165	12,0	8	**103,00**
10,00	16,0	125	165	12,0	8	**129,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HSS-Kegelreibahle

E.4638.0

Universal

HSS

FORM C

DIN 204



E.4641.0

Universal

HSS

FORM W

DIN 204



HSS-Conical reamers

Rozwiertaki HSS stożkowe do gwintów stożkowych Morse'a

Alesatori conici, HSS

Escariadores cónicos, HSS

Artikel-Nr. *Article-No.*							E.4638.0 € Stück *piece*	E.4641.0 € Stück *piece*
für Morsekegel *for morse taper*	d1	d3	l2	l1	d2	Zähne *flutes*		
0	6,547	9,722	61	93	6,3	6	**37,00**	**32,00**
1	9,571	12,863	66	102	8,0	8	**41,00**	**35,00**
2	14,733	18,679	79	121	11,2	8	**60,00**	**50,00**
3	20,010	24,829	96	146	16,0	10	**81,00**	**67,00**
4	26,229	32,410	119	179	20,0	10	**127,00**	**115,00**
5	37,873	45,767	150	222	25,0	12	**258,00**	**227,00**
6	54,172	65,016	208	300	35,5	16	**742,00**	**618,00**

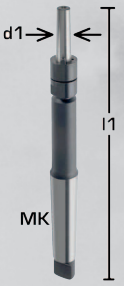
Aufsteckhalter für Aufsteckreibahlen

E.4640.0

HSS

DIN 217

MK



Holder for shell reamers

Trzpień zabierakowy do rozwiertaków

Mandrino portalesatori a manicotto, codolo conico

Portaescariadores para escaradores huecos

Artikel-Nr. *Article-No.*					E.4640.0 € Stück *piece*
d1	Größe *size*	l3	l1	d2 MK	
10,00	1	140	220	2	**112,00**
13,00	2	150	250	3	**112,00**
16,00	3	160	261	3	**123,00**
19,00	4	174	298	4	**148,00**
22,00	5	188	312	4	**165,00**
27,00	6	203	359	5	**249,00**
32,00	7	220	376	5	**305,00**
40,00	8	240	396	5	**386,00**
50,00	9	260	416	5	**651,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.4639.0

Universal

HSS-E

TOL. H 7

λ = 9°



HSSE-Shell reamers

Rozwiertak nasadzany, odmiana B - wykańczak

Alesatori HSSE a manicotto, elicoidali

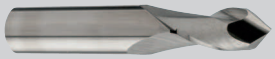
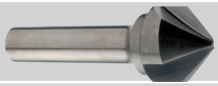
Escariadores huecos, HSSE

Artikel-Nr. *Article-No.*						E.4639.0 € Stück *piece*
d1 H7	l2	l1	d2	Aufsteckhaltergröße *size of holder*	Zähne *flutes*	
20,00	40	50	10	1	4	**96,00**
21,00	40	50	10	1	4	**96,00**
22,00	40	50	10	1	4	**96,00**
23,00	40	50	10	1	4	**96,00**
24,00	40	50	10	1	4	**96,00**
25,00	32	45	13	2	6	**78,00**
26,00	32	45	13	2	6	**82,00**
27,00	32	45	13	2	6	**99,00**
28,00	32	45	13	2	6	**85,00**
29,00	32	45	13	2	6	**104,00**
30,00	32	45	13	2	6	**83,00**
31,00	36	50	16	3	6	**107,00**
32,00	36	50	16	3	6	**93,00**
33,00	36	50	16	3	6	**101,00**
34,00	36	50	16	3	6	**101,00**
35,00	36	50	16	3	6	**101,00**
36,00	40	56	19	4	6	**106,00**
37,00	40	56	19	4	6	**125,00**
38,00	40	56	19	4	6	**110,00**
39,00	40	56	19	4	6	**139,00**
40,00	40	56	19	4	6	**110,00**
41,00	40	56	19	4	6	**139,00**
42,00	40	56	19	4	6	**115,00**
43,00	45	63	22	5	6	**188,00**
44,00	45	63	22	5	6	**156,00**
45,00	45	63	22	5	6	**156,00**
46,00	45	63	22	5	6	**156,00**
47,00	45	63	22	5	8	**156,00**
48,00	45	63	22	5	8	**149,00**
49,00	45	63	22	5	8	**180,00**
50,00	45	63	22	6	8	**149,00**
52,00	50	71	27	6	8	**198,00**
55,00	50	71	27	6	8	**191,00**
56,00	50	71	27	6	8	**270,00**
58,00	50	71	27	6	8	**224,00**
60,00	50	71	27	6	8	**201,00**
62,00	56	80	32	7	8	**271,00**
65,00	56	80	32	7	8	**277,00**
68,00	56	80	32	7	8	**324,00**
70,00	56	80	32	7	8	**308,00**
72,00	63	90	40	8	8	**412,00**
75,00	63	90	40	8	10	**412,00**
78,00	63	90	40	8	10	**470,00**
80,00	63	90	40	8	10	**470,00**
82,00	63	90	40	8	10	**565,00**
85,00	63	90	40	8	10	**565,00**
88,00	71	100	50	9	10	**672,00**
90,00	71	100	50	9	10	**775,00**
92,00	71	100	50	9	10	**775,00**
95,00	71	100	50	9	10	**753,00**
98,00	71	100	50	9	10	**805,00**
100,00	71	100	50	9	10	**805,00**

Einsatzrichtwerte für HSS/HSSE-Reibahlen *Estimated values for use for HSS/HSSE reamers*

VR / fz	Reibahlen *reamers* Vorschub (mm/U) *feed*										
	< Ø 2	< Ø 4	< Ø 6	< Ø 8	< Ø 10	< Ø 12	< Ø 14	< Ø 18	< Ø 22	< Ø 26	< Ø 30
1	0,020	0,040	0,050	0,060	0,080	0,090	0,105	0,130	0,160	0,185	0,215
2	0,025	0,050	0,060	0,080	0,090	0,100	0,115	0,145	0,175	0,200	0,230
3	0,030	0,060	0,080	0,100	0,120	0,140	0,165	0,205	0,250	0,290	0,335
4	0,040	0,080	0,100	0,125	0,160	0,180	0,210	0,265	0,320	0,375	0,430
5	0,050	0,100	0,120	0,160	0,200	0,220	0,260	0,330	0,395	0,465	0,530
6	0,060	0,120	0,160	0,200	0,250	0,280	0,330	0,410	0,500	0,590	0,680
7	0,080	0,160	0,200	0,250	0,310	0,340	0,400	0,505	0,610	0,710	0,810
8	0,100	0,200	0,250	0,320	0,400	0,440	0,520	0,650	0,790	0,920	1,050

	HSSE-Reibahlen *HSSE-reamers*				HSSE-Kegelsenker *HSSE-countersink*			
	blank *uncoated*		beschichtet *coated*		Vc (m/min)	f (mm/U)		
Materialgruppe *material group*	Vc (m/min)	VR / fz	Vc (m/min)	VR / fz		< Ø 10	< Ø 20	< Ø 31
1.1	10 - 15	5	14 - 20	6	17 - 22	210	100	75
1.2	10 - 15	5	14 - 20	6	8 - 12	100	50	36
1.3	4 - 6	4	6 - 8	5	6 - 8	32	16	11
2.1	3 - 5	3	4 - 8	4	6 - 8	32	16	11
2.2	3 - 5	3	4 - 8	4	4 - 6	15	8	5
3.1	8 - 12	4	14 - 18	6	15 - 25	80	60	50
3.2	10 - 15	5	12 - 14	5	10 - 15	40	20	15
3.3					10 - 15	40	20	15
3.4					6 - 10	36	18	12
4.1	18 - 25	7	22 - 30	8	35 - 45	375	190	130
4.2	10 - 20	6	18 - 25	7	20 - 30	240	120	80
4.3	8 - 10	6	10 - 14	7	15 - 25	80	60	50
4.4	16 - 22	6	18 - 25	7	30 - 40	350	160	110
4.5	8 - 16	6	14 - 20	7	20 - 30	240	120	80
4.6	16 - 22	6	18 - 25	7	20 - 30	200	100	60
4.7	8 - 10	7	10 - 14	8	35 - 70	720	360	240
4.8								
4.9								
5.1	2 - 6	4	4 - 6	5	4 - 6	15	8	5
5.2	2 - 6	5	4 - 6	6	3 - 5	12	6	4
6.1								
6.2								
6.3								
6.4								

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	90°		E.5615.0	2	✔	✔	✔	✔				
	VHM	60°		E.5616.0	2	✔	✔	✔	✔				
	VHM	120°		E.5617.0	2	✔	✔	✔	✔				
	VHM	90°	60°	E.5604.0	3	✔	✔	✔	✔				
	VHM	90°	Blue Cut	E.5603.1	3	✔	✔	✔	✔		✔		
	VHM	45° 45°	Blue Cut	E.5612.1	4	✔	✔	✔	✔				
	VHM	60°	Blue Cut	E.5613.1	4	✔	✔	✔	✔		✔		
	VHM	90°	Blue Cut	E.5614.1	4	✔	✔	✔	✔		✔		
	VHM	60°	Blue Cut	E.5636.1	5	✔	✔	✔	✔				
	VHM	90°	Blue Cut	E.5637.1	5	✔	✔	✔	✔				
	VHM	TOL. H 7	Blue Cut	E.5635.1	5	✔		✔	✔				✔
	VHM	TOL. H 7		E.5605.0	6	✔	✔	✔	✔	✔			
	VHM	TOL. 0/+0,005		E.5619.0	7	✔	✔	✔	✔				
	VHM	TOL. H 7	SPEZIAL BESCHICHTUNG COATING	E.5624.1	8	✔			✔		✔		✔
	VHM	TOL. 0/+0,005	SPEZIAL BESCHICHTUNG COATING	E.5619K.1	8	✔	✔	✔	✔		✔		✔
	VHM	TOL. 0/+0,005		E.5622.0	9	✔	✔	✔	✔				
	VHM	TOL. H 7		E.5632.0	10	✔	✔	✔	✔				
	VHM	TOL. 0/+0,005		E.5620.0	10	✔	✔	✔	✔				
	VHM	TOL. H 7		E.5618.0	11	✔	✔	✔	✔				
	VHM	TOL. H 7	Blue Cut	E.5634.1	12	✔			✔		✔		✔
	VHM	TOL. 0/+0,005	Blue Cut	E.5625.1	12	✔			✔		✔		✔
	VHM	TOL. H 7	Blue Cut	E.5631.1	13	✔	✔	✔	✔		✔		
	CERMET	TOL. H 7		E.5626.0	14	✔		✔	✔	✔	✔		

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

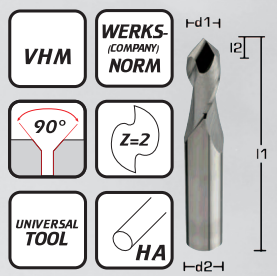
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	TOL. 0/+0,005		E.5621.0	15	✔	✔	✔	✔				
	HM	TOL. H 7		E.5606.0	16	✔	✔	✔	✔				
	HM	TOL. H 7		E.5607.0	17	✔	✔	✔	✔				
	HM	TOL. H 7		E.5608.0	18	✔	✔	✔	✔				
	VHM	TOL. H 7		E.5609.0	18	✔	✔	✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

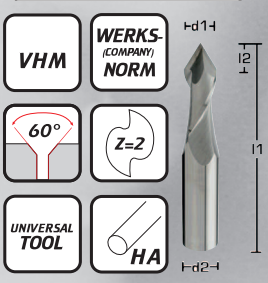
E.5615.0

Universal



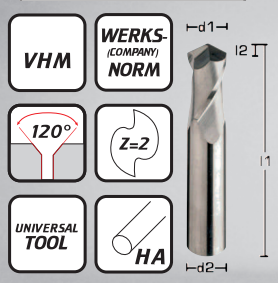
E.5616.0

Universal



E.5617.0

Universal



Solid carbide CNC-8-fold tools

Fazowniki 8-funkcyjne z węgli-ka spiekanego do maszyn CNC

Svasatore MD per CNC

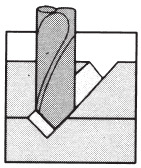
Herramienta metal duro para 8 aplicaciones CNC

Artikel-Nr. *Article-No.*				E.5615.0 € Stück *piece*	E.5616.0 € Stück *piece*	E.5617.0 € Stück *piece*
d1	l2	l1	d2			
0,50	1,0	38	3,0	**29,00**	**38,00**	**29,00**
0,60	1,2	38	3,0	**29,00**		
0,70	1,4	38	3,0	**29,00**		
0,80	1,6	38	3,0	**29,00**		
0,90	1,8	38	3,0	**29,00**		
1,00	2,0	38	3,0	**29,00**		
1,20	2,4	38	3,0	**29,00**		
1,40	2,8	38	3,0	**29,00**		
1,50	3,0	38	3,0	**29,00**	**36,00**	**29,00**
1,80	3,6	38	3,0	**29,00**		
2,00	4,0	38	3,0	**29,00**	**36,00**	**29,00**
2,50	5,0	38	3,0	**29,00**	**36,00**	**29,00**
3,00	6,0	50	4,0	**24,50**	**29,00**	**24,00**
4,00	8,0	50	5,0	**25,80**	**31,00**	**25,00**
5,00	10,0	50	6,0	**27,00**	**33,00**	**27,00**
6,00	12,0	60	8,0	**33,20**	**39,00**	**31,00**
8,00	16,0	70	10,0	**42,00**	**54,00**	**45,00**
10,00	18,0	70	12,0	**53,00**	**68,00**	**57,00**
12,00	20,0	70	12,0	**55,00**	**70,00**	**58,00**
16,00	26,0	80	16,0	**78,00**	**98,00**	**78,00**
20,00	32,0	100	20,0	**130,00**	**170,00**	**134,00**

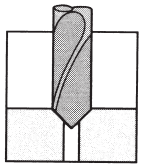
1

Werkzeug…

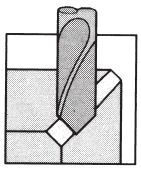
Tool …



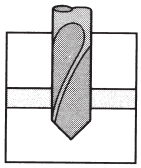
V-Nuten-Fräsen
V-slot milling



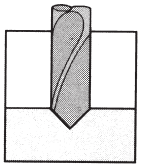
Senken
Sinking



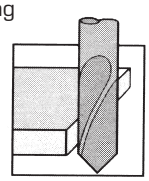
Schrägfräsen
Milling of sloping surface



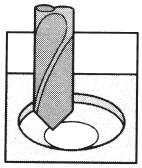
Bohren
Drilling



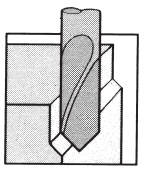
Anbohren
Center Drilling



Planfräsen
Face milling



Planetfräsen
Circular milling



Kombiniertes Plan- und Schrägfräsen
Combinde Face milling and milling of sloping surfaces

…8

Anwendungen

Applications

VHM-Kombi-Kegelsenker 60°/90°

E.5604.0

Universal

VHM | WERKS-(COMPANY) NORM | 90° | UNIVERSAL TOOL | 60° | Z=3



Solid carbide countersink 60°/90°

Pogłębiacze trzyostrzowe 60°/90° z węglika spiekanego wg normy zakładowej

Svasatore in MD combinati 60°/90°

Avellanador cónico combi 60°/90° en metal duro integral

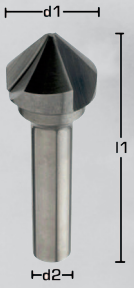
Artikel-Nr. *Article-No.*			E.5604.0 € Stück *piece*
d1	l1	d2	
2,00	60	6,0	**20,00**
2,00	70	8,0	**31,00**
2,00	75	10,0	**34,00**
2,00	75	12,0	**48,00**

VHM-Kegelsenker

E.5603.1

Universal

VHM | DIN 335 | Blue Cut | 90° | UNIVERSAL TOOL | Z=3 | <60 HRC



Solid carbide countersink

Pogłębiacze trzyostrzowe 90° z węglika spiekanego wg DIN 335

Svasatori in MD

Avellanador cónico en metal duro integral

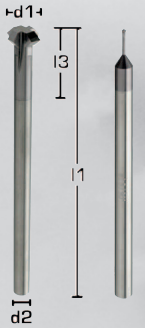
Artikel-Nr. *Article-No.*			E.5603.1 € Stück *piece*
d1	l1	d2 h9	
4,30	40	4,0	**36,00**
5,30	40	4,0	**36,00**
6,30	45	5,0	**36,00**
8,30	50	6,0	**45,00**
10,40	50	6,0	**53,00**
12,40	56	8,0	**58,00**
16,50	60	10,0	**65,00**
20,50	63	10,0	**87,00**
25,00	67	10,0	**104,00**
31,00	67	10,0	**169,00**

VHM-Vor-/Rückwärtsentgrater 45°

E.5612.1

Universal

VHM | WERKS-NORM (COMPANY) | 45° 45° | Blue Cut | UNIVERSAL TOOL



Solid carbide forwards/backwards deburring tool 45°

Fazowniki z węglika spiekanego 45° od czoła i od spodu, wg normy zakładowej

Svasatori per interni 45°

Rebabador 45° hacia delante y atrás en metal duro integral

Artikel-Nr. *Article-No.*							E.5612.1 € Stück *piece*
d1	l3	Schneidenbreite *cutting width*	l1	Hals *neck*	d2	Zähne *flutes*	
1,80	9	1,2	100	1,2 x 8	6,0	3	**42,00**
2,80	10	1,2	100	2,0 x 8	6,0	3	**42,00**
4,00	13	2,0	100	2,0 x 10	6,0	4	**42,00**
6,00	19	2,0	100	4 x 15	6,0	4	**45,00**
8,00	60	2,0	100	6	6,0	4	**57,00**
10,00	60	4,0	100	6	6,0	4	**69,00**
12,00	60	4,0	100	6	6,0	4	**82,00**
16,00	60	8,0	100	10	10,0	4	**110,00**

VHM-Entgrater

E.5613.1

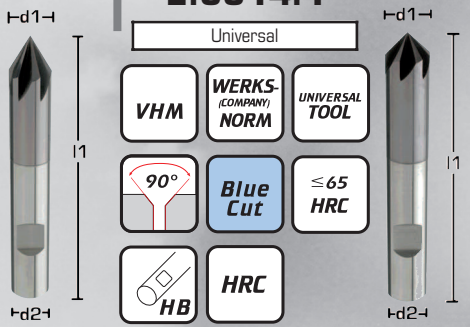
Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | 60° | Blue Cut | ≤65 HRC | HB | HRC

E.5614.1

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | 90° | Blue Cut | ≤65 HRC | HB | HRC



Solid carbide deburring tool

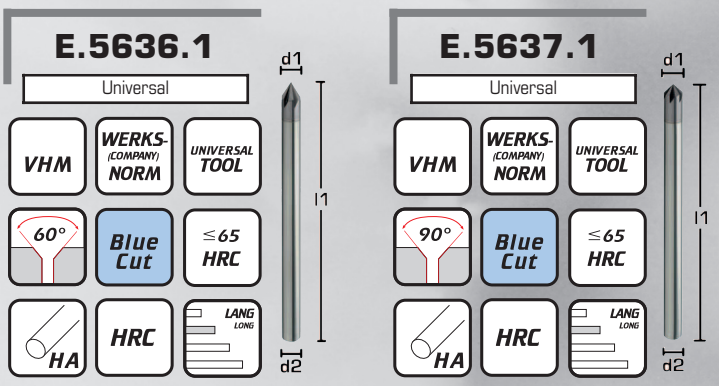
Fazowniki 60/90° z węglika spiekanego do materiałów utwardzanych do 65HRC

Svasatori frese in MD

Rebabador en metal duro integral

Artikel-Nr. *Article-No.*				E.5613.1 € Stück *piece*	E.5614.1 € Stück *piece*
d1 h6	l1	d2	Zähne *flutes*		
1,00	38	3	3		**16,00**
2,00	38	3	3		**16,00**
3,00	38	3	3		**16,00**
4,00	54	4	4	**15,00**	**15,00**
6,00	57	6	4	**18,00**	**18,00**
8,00	63	8	5	**22,00**	**22,00**
10,00	72	10	6	**26,50**	**26,50**
12,00	83	12	6	**39,00**	**39,00**
16,00	92	16	6	**58,00**	**58,00**
20,00	104	20	6	**84,00**	**84,00**

VHM-Entgrater lang



Solid carbide deburring tool long

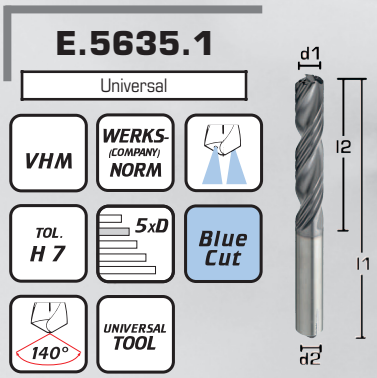
Fazowniki długie 60°/90° z węglika spiekanego do materiałów utwardzanych do 65HRC

Svasatori frese in MD, serie lunga

Rebabador en metal duro integral, serie larga

Artikel-Nr. *Article-No.*				E.5636.1 € Stück *piece*	E.5637.1 € Stück *piece*
d1 h6	l1	d2	Zähne *flutes*		
4,00	100	4	4	**26,50**	**26,50**
6,00	110	6	4	**38,00**	**38,00**
8,00	150	8	5	**56,00**	**56,00**
10,00	150	10	6	**70,00**	**70,00**
12,00	150	12	6	**86,00**	**86,00**
16,00	150	16	6	**142,00**	**142,00**

VHM-Bohrreibahlen mit Innenkühlung



Solid carbide drill reamers with internal coolant

Wiertło-rozwiertaki z węglika spiekanego z chłodzeniem wewnętrznym

Punte alesatori MD con fori lubrificanti

Broca escariador con refrigeración interior metal duro integral

Artikel-Nr. *Article-No.*					E.5635.1 € Stück *piece*
d1 H7	l2	l1	d2 h6	Zähne *flutes*	
3,00	28	66	6,0	2 / 4	
4,00	36	74	6,0	2 / 4	
5,00	44	82	6,0	2 / 4	
6,00	44	82	6,0	2 / 4	**Auf Anfrage**
8,00	53	91	8,0	2 / 4	
10,00	61	103	10,0	2 / 4	*on demand*
12,00	71	118	12,0	2 / 4	
14,00	77	124	14,0	2 / 4	
16,00	83	133	16,0	2 / 4	

Zwischenmaße auf Anfrage *Intermediate sizes on demand*

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5605.0

Universal

VHM | ähnl. DIN 8089

TOL. H 7

FORM B



Solid carbide machine reamers short

Rozwiertaki maszynowe krótkie z węglika spiekanego

Alesatori a macchina MD serie corta

Escariador de máquina en metal duro integral, serie corta

Artikel-Nr. *Article-No.*					E.5605.0 € Stück *piece*
d1 H7	l2	l1	d2 h6	Zähne *flutes*	
3,00	20	56	2,5	6	**31,00**
3,20	20	56	2,8	6	**35,00**
3,50	20	56	3,0	6	**35,00**
4,00	20	56	3,6	6	**36,00**
4,50	22	63	4,0	6	**42,00**
5,00	22	63	4,0	6	**45,00**
5,50	22	63	5,0	6	**47,00**
6,00	22	63	5,0	6	**48,00**
6,50	22	63	5,0	6	**51,00**
7,00	20	71	6,3	6	**57,00**
7,50	20	71	6,3	6	**60,00**
8,00	20	71	6,3	6	**60,00**
8,50	20	71	6,3	6	**69,00**
9,00	22	71	8,0	6	**69,00**
9,50	22	71	8,0	6	**72,00**
10,00	22	71	8,0	6	**72,00**
11,00	22	80	10,0	6	**91,00**
12,00	22	80	10,0	6	**100,00**
13,00	20	80	10,0	6	**133,00**
14,00	20	90	12,5	8	**151,00**
15,00	20	90	12,5	8	**168,00**
16,00	20	90	12,5	8	**208,00**
17,00	22	90	12,5	8	**231,00**
18,00	22	100	16,0	8	**247,00**
19,00	22	100	16,0	8	**259,00**
20,00	22	100	16,0	8	**298,00**

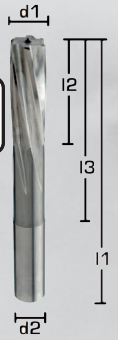
Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5619.0

Universal

VHM | WERKS-NORM (COMPANY) | KURZ SHORT | TOL. 0/+0,005 | FORM B | UNIVERSAL TOOL



Solid carbide machine reamers short

Rozwiertaki maszynowe krótkie z węglika spiekanego

Alesatori MD, serie corta

Escariador de máquina en metal duro integral, serie corta

* = ab Ø 3,0 mm Zähnezahl 6
* = *starting from Ø 3,0 mm 6 flutes*

Lieferzeit: 2 Arbeitstage
Delivery time: 2 working days

Artikel-Nr. *Article-No.*						E.5619.0 € Stück *piece*
d1 0/+0,005	l2	l3	l1	d2	Zähne *flutes*	
0,10 - 0,19	5	10	35	1,5	4	**78,00**
0,20 - 0,29	5	10	35	1,5	4	**71,00**
0,30 - 0,47	5	10	35	1,5	4	**64,00**
0,48 - 0,53	5	10	35	1,5	4	**64,00**
0,54 - 0,59	5	10	35	1,5	4	**62,00**
0,60 - 0,69	6	12	35	1,5	4	**58,00**
0,70 - 0,79	6	12	35	1,5	4	**50,00**
0,80 - 0,90	6	15	35	1,5	4	**43,00**
0,91 - 1,00	8	15	35	1,5	4	**42,00**
1,01 - 1,20	10	17	35	1,5	4	**39,00**
1,21 - 1,50	12	23	40	1,5	4	**37,00**
1,51 - 2,00	16	28	45	2,0	4	**35,00**
2,01 - 2,40	18	31	50	2,0 - 3,0	4	**35,00**
2,41 - 2,70	20	34	55	3,0	4	**35,00**
2,71 - 3,10	20	39	60	3,0	4 - 6 *	**37,00**
3,11 - 3,70	22	37	60	4,0	6	**37,00**
3,71 - 4,10	24	40	65	4,0	6	**39,00**
4,11 - 4,60	24	40	65	5,0	6	**42,00**
4,61 - 4,90	26	38	65	5,0	6	**46,00**
4,91 - 5,20	26	48	75	5,0	6	**48,00**
5,21 - 5,70	26	48	75	5,0	6	**51,00**
5,71 - 6,20	26	48	75	5,0 - 6,0	6	**56,00**
6,21 - 6,60	30	49	80	6,0	6	**60,00**
6,61 - 6,90	30	49	80	6,0 - 7,0	6	**64,00**
6,91 - 7,20	35	59	95	7,0	6	**69,00**
7,21 - 7,70	35	59	95	7,0	6	**78,00**
7,71 - 8,20	35	59	95	7,0 - 8,0	6	**85,00**
8,21 - 8,70	35	64	100	8,0	6	**94,00**
8,71 - 8,90	35	64	100	8,0 - 9,0	6	**97,00**
8,91 - 9,20	35	64	100	9,0	6	**99,00**
9,21 - 9,70	35	64	100	9,0	6	**103,00**
9,71 - 9,90	35	64	100	9,0 - 10,0	6	**110,00**
9,91 - 10,70	35	64	100	10,0	6	**119,00**
10,71 - 10,90	35	64	100	10,0 - 11,0	6	**122,00**
10,91 - 11,20	35	64	100	11,0	6	**126,00**
11,21 - 11,70	35	64	100	11,0	6	**129,00**
11,71 - 11,90	35	64	100	11,0 - 12,0	6	**135,00**
11,91 - 12,60	35	64	100	12,0	6	**140,00**
12,61 - 12,90	35	64	100	12,0 - 13,0	6	**149,00**
12,91 - 13,52	35	64	100	13,0	6	**149,00**
13,90 - 14,10	35	64	100	14,0	6	**202,00**
14,90 - 15,10	35	64	100	14,0	6	**216,00**
15,90 - 16,10	35	64	100	16,0	6	**216,00**
17,90 - 18,10	35	64	100	18,0	6	**254,00**

Mehrpreis für: *Extra costs for:*

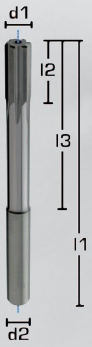
- **3. Stelle nach dem Komma (Bsp. 2,955)** — *3rd place after comma (example 2,955)* — **+ 10% Aufschlag** / *+ 10% surcharge*
- **eingeengte Toleranz +/- 0,001 mm** — *restricted tolerance +/- 0,001 mm* — **+ 10% Aufschlag** / *+ 10% surcharge*
- **Passungsreibahlen (Bsp. 5 P7)** — *Reamers for precise seats (example 5 P7)* — **+ 10% Aufschlag** / *+ 10% surcharge*

VHM-HSC-Sackloch-Reibahlen mit Innenkühlung kurz

E.5624.1

Universal

VHM | WERKS-(COMPANY) NORM | TOL. H 7 | HSC TOOL | FORM A | SPEZIAL BESCHICHTUNG COATING



Solid carbide HSC blind hole reamers with internal coolant short

Rozwiertaki krótkie z węglika spiekanego z chłodz. wew. do obróbki szybkościowej HSC do otw. nieprzelotowych

Alesatori MD-HSC con fori lubrificanti per fori ciechi, serie corta

Escariador para agujeros ciegos metal duro integral, serie corta con refrigeración interior para alta velocidad

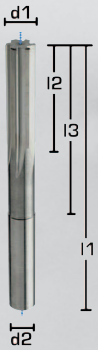
Artikel-Nr. *Article-No.*						E.5624.1 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
5,00	12	32	74	6,0	4	**136,00**
6,00	12	33	74	6,0	4	**136,00**
8,00	16	50	91	8,0	6	**150,00**
10,00	20	58	103	10,0	6	**180,00**
12,00	24	68	118	12,0	6	**225,00**
14,00	28	81	132	14,0	6	**259,00**

VHM-HSC-Sacklochreibahlen mit Innenkühlung kurz

E.5619K.1

Universal

VHM | WERKS-(COMPANY) NORM | TOL. 0/+0,005 | FORM A | UNIVERSAL TOOL | SPEZIAL BESCHICHTUNG COATING



Solid carbide HSC blind hole reamers with internal coolant short

Rozwiertaki krótkie z węglika spiekanego z chłodz. wew. do obróbki szybkościowej HSC do otwo. nieprzelotowych

Alesatori MD-HSC con fori lubrificanti, serie corta

Escariador para agujeros ciegos metal duro integral, serie corta con refrigeración interior para alta velocidad

Artikel-Nr. *Article-No.*						E.5619K.1 € Stück *piece*
d1 0/+0,005	l2	l3	l1	d2 h6	Zähne *flutes*	
2,95 - 3,05	22	40	75	6,0	6	**116,00**
3,06 - 3,96	24	40	75	6,0	6	**123,00**
3,97 - 4,05	24	40	75	6,0	6	**104,00**
4,06 - 4,96	24	40	75	6,0	6	**108,00**
4,97 - 5,05	24	40	75	6,0	6	**98,00**
5,06 - 5,96	24	40	75	6,0	6	**102,00**
5,97 - 6,05	30	45	80	6,0	6	**97,00**
6,06 - 6,47	30	45	80	6,0	6	**132,00**
6,48 - 6,96	30	63	103	8,0	6	**132,00**
6,97- 7,05	30	63	103	8,0	6	**128,00**
7,06 - 7,96	30	63	103	8,0	6	**132,00**
7,97 - 8,05	35	63	103	8,0	6	**127,00**
8,06 - 8,47	35	63	103	8,0	6	**150,00**
8,48 - 8,96	35	63	103	10,0	6	**150,00**
8,97 - 9,05	35	63	103	10,0	6	**150,00**
9,06 - 9,96	35	63	103	10,0	6	**150,00**
9,97 - 10,05	35	63	103	10,0	6	**148,00**
10,06 - 10,47	35	63	103	10,0	6	**201,00**
10,48 - 10,96	40	63	103	12,0	6	**201,00**
10,97 - 11,05	40	63	103	12,0	6	**201,00**
11,06 - 11,96	40	63	103	12,0	6	**201,00**
11,97 - 12,10	40	63	103	12,0	6	**203,00**

E.5622.0

Universal

VHM | WERKS-(COMPANY) NORM | TOL. 0/+0,005 | RH | UNIVERSAL TOOL



Solid carbide blind hole reamers short

Rozwiertaki krótkie z węglika spiekanego do otworów nieprzelotowych

Alesatori MD per fori ciechi, serie corta

Escariador para agujeros ciegos metal duro integral, serie corta

* = ab Ø 3,0 mm Zähnezahl 6
* = *starting from Ø 3,0 mm 6 flutes*

Artikel-Nr. *Article-No.*						E.5622.0 € Stück *piece*
d1 0/+0,005	l2	l3	l1	d2 h6	Zähne *flutes*	
1,51 - 2,00	16	28	45	2,0	4	**44,00**
2,01 - 2,40	18	31	50	2,0 - 3,0	4	**44,00**
2,41 - 2,70	20	34	55	3,0	4	**44,00**
2,71 - 3,10	20	39	60	3,0	4 - 6*	**47,00**
3,11 - 3,70	22	37	60	4,0	6	**47,00**
3,71 - 4,10	24	40	65	4,0	6	**49,00**
4,11 - 4,60	24	40	65	5,0	6	**53,00**
4,61 - 4,90	26	38	65	5,0	6	**58,00**
4,91 - 5,20	26	48	75	5,0	6	**60,00**
5,21 - 5,70	26	48	75	5,0	6	**64,00**
5,71 - 6,20	26	48	75	5,0 - 6,0	6	**71,00**
6,21 - 6,60	30	49	80	6,0	6	**76,00**
6,61 - 6,90	30	49	80	6,0 - 7,0	6	**80,00**
6,91 - 7,20	35	59	95	7,0	6	**87,00**
7,21 - 7,70	35	59	95	7,0	6	**98,00**
7,71 - 8,20	35	59	95	7,0 - 8,,0	6	**107,00**
8,21 - 8,70	35	64	100	8,0	6	**118,00**
8,71 - 8,90	35	64	100	8,0 - 9,0	6	**123,00**
8,91 - 9,20	35	64	100	9,0	6	**124,00**
9,21 - 9,70	35	64	100	9,0	6	**129,00**
9,71 - 9,90	35	64	100	9,0 - 10,0	6	**138,00**
9,91 - 10,70	35	64	100	10,0	6	**149,00**
10,71 - 10,90	35	64	100	10,0 - 11,0	6	**154,00**
10,91 - 11,20	35	64	100	11,0	6	**158,00**
11,21 - 11,70	35	64	100	11,0	6	**162,00**
11,71 - 11,90	35	64	100	11,0 - 12,0	6	**169,00**
11,91 - 12,60	35	64	100	12,0	6	**176,00**
12,61 - 12,90	35	64	100	12,0 - 13,0	6	**187,00**
12,91 - 13,52	35	64	100	13,0	6	**187,00**
13,90 - 14,10	35	64	100	14,0	6	**254,00**
14,90 - 15,10	35	64	100	14,0	6	**271,00**
15,90 - 16,10	35	64	100	16,0	6	**278,00**
17,90 - 18,10	35	64	100	18,0	6	**319,00**

Aufpreis für Stirnverzahnung: *Extra charge for end cut:*

ø	€ **1 - 2 Stück** *1 - 2 piece*	€ **ab 3 Stück** starting from 3 pieces
2,95 - 6,05	**21,00**	**18,00**
6,06 - 18,10	**28,00**	**24,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

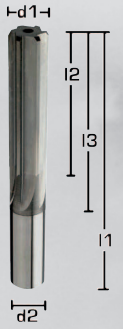
< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

VHM-Superfinish-Maschinenreibahlen kurz

E.5632.0

Universal

VHM | WERKS-NORM (COMPANY) | TOL. H 7 | FORM A



- Solid carbide superfinish machine reamers short
- Rozwiertaki maszynowe krótkie z węglika spiekanego do obróbki super-finiszowej
- Alesatori a macchina MD per super finitura, serie corta
- Escariador de máquina en metal duro integral, serie corta para acabado fino

Rt 1,6 - 3,2

Artikel-Nr. *Article-No.*						E.5632.0 € Stück *piece*
d1 H7	l2	l3	l1	d2 h6	Zähne *flutes*	
2,00	18	28	50	3,0	4	**36,00**
3,00	27	37	60	3,0	4	**40,00**
4,00	27	37	80	6,0	4	**45,00**
5,00	30	40	80	6,0	6	**50,00**
6,00	30	50	80	6,0	6	**58,00**
8,00	35	50	80	8,0	6	**86,00**
10,00	40	60	90	10,0	6	**102,00**
12,00	45	60	90	12,0	6	**130,00**

VHM-Maschinenreibahlen lang

E.5620.0

Universal

VHM | ähnl. DIN 212 | TOL. 0/+0,005 | FORM B | UNIVERSAL TOOL



- Solid carbide machine reamers long
- Rozwiertaki maszynowe długie z węglika spiekanego
- Alesatori a macchina MD serie lunga
- Escariador de máquina en metal duro integral, serie larga

Artikel-Nr. *Article-No.*					E.5620.0 € Stück *piece*
d1 0/+0,005	l2	l1	d2	Zähne *flutes*	
0,97 - 1,05	5	40	1,5	4	**24,50**
1,97 - 2,05	11	49	2,0	4	**21,80**
2,97 - 3,05	15	61	3,0	6	**24,10**
3,97 - 4,05	19	75	4,0	6	**31,20**
4,97 - 5,05	23	86	5,0	6	**39,50**
5,97 - 6,05	26	93	6,0	6	**43,00**
6,97 - 6,99	31	109	8,0	6	**56,00**
7,01 - 7,05	31	109	8,0	6	**61,00**
7,97 - 8,05	33	117	8,0	6	**65,00**
8,97 - 9,05	36	125	10,0	6	**81,00**
9,97 - 10,05	38	133	10,0	6	**94,00**
10,97 - 11,05	41	142	12,0	6	**98,00**
11,97 - 12,05	44	151	12,0	6	**122,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5618.0

Universal

VHM | ähnl. DIN 212 | TOL. H 7 | FORM B | UNIVERSAL TOOL



Solid carbide machine reamers long

Rozwiertaki maszynowe długie z węglika spiekanego

Alesatori a macchina MD serie lunga

Escariador de máquina en metal duro integral, serie larga

*= Auslaufartikel

*= *no future production anymore*

Artikel-Nr. *Article-No.*					E.5618.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.5618.0 € Stück *piece*
d1 H7	l2	l1	d2	Zähne *flutes*		d1 H7	l2	l1	d2	Zähne *flutes*	
1,00	5	40	1,0	4	**14,50**	**4,60**	21	80	4,6	4	**25,50**
1,10	7	40	1,1	4	**14,50**	**4,70**	21	80	4,7	4	**25,50**
1,20	7	40	1,2	4	**14,50**	**4,80**	23	86	4,8	6	**28,00**
1,30	7	40	1,3	4	**14,50**	**4,90**	23	86	4,9	6	**28,00**
1,40	8	40	1,4	4	**14,50**	**5,00**	23	86	5,0	6	**28,00**
1,50	8	40	1,5	4	**14,50**	**5,10**	23	86	5,1	6	**28,00**
1,60	9	43	1,6	4	**14,50**	**5,20**	23	86	5,2	6	**28,00**
1,70	10	46	1,7	4	**14,50**	**5,30**	23	86	5,3	6	**28,00**
1,80	10	46	1,8	4	**14,50**	**5,40**	26	93	5,4	6	**32,00**
1,90	10	46	1,9	4	**14,00**	**5,50**	26	93	5,5	6	**32,00**
2,00	11	49	2,0	4	**14,00**	**5,60**	26	93	5,6	6	**36,00**
2,10	11	49	2,1	4	**14,00**	**5,70**	26	93	5,7	6	**36,00**
2,20	12	53	2,2	4	**14,00**	**5,80**	26	93	5,8	6	**36,00**
2,30	12	53	2,3	4	**15,00**	**5,90**	26	93	5,9	6	**36,00**
2,40	14	54	2,4	4	**17,00**	**6,00**	26	93	6,0	6	**36,00**
2,50	14	57	2,5	4	**17,00**	**6,50**	28	101	6,5	6	**48,00**
2,60	14	57	2,6	4	**17,00**	**7,00**	31	109	7,0	6	**52,00**
2,70	15	61	2,7	4	**18,50**	**7,50**	31	109	7,5	6	**56,00**
2,80	15	61	2,8	4	**18,50**	**8,00**	33	117	8,0	6	**57,00**
2,90	15	61	2,9	4	**18,50**	**8,50**	33	117	8,5	6	**63,00**
3,00	15	61	3,0	4	**18,50**	**9,00**	36	125	9,0	6	**64,00**
3,10	16	65	3,1	4	**19,60**	**9,50**	36	125	9,5	6	**72,00**
3,20	16	65	3,2	4	**19,60**	**10,00**	38	133	10,0	6	**74,00**
3,30	16	65	3,3	4	**19,60**	**10,50**	38	133	10,5	6	**80,00**
3,40	18	70	3,4	4	**19,60**	**11,00**	41	142	11,0	6	**81,00**
3,50	18	70	3,5	4	**19,60**	**11,50**	41	142	11,5	6	**90,00**
3,60	18	70	3,6	4	**19,60**	**12,00**	44	151	12,0	6	**93,00**
3,70	18	70	3,7	4	**19,60**	**12,50**	44	151	12,5	6	**93,00**
3,80	19	75	3,8	4	**22,50**	**13,00**	44	151	13,0	6	**128,00**
3,90	19	75	3,9	4	**22,50**						
4,00	19	75	4,0	4	**22,50**						
4,10	19	75	4,1	4	**22,50**						
4,20	19	75	4,2	4	**22,50**						
4,30	21	80	4,3	4	**25,50**						
4,40	21	80	4,4	4	**25,50**						
4,50	21	80	4,5	4	**25,50**						

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

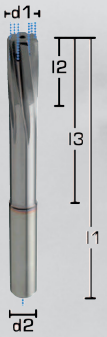
< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

VHM-HSC-Reibahlen mit Kühlkanälen in den Nuten lang

E.5634.1

Universal

VHM | WERKS-NORM (COMPANY) | TOL. H 7 | HSC TOOL | FORM B | Blue Cut



Solid carbide HSC reamers with coolant system in the flutes long

Rozwiertaki długie z węglika spiekanego do obróbki szybkościowej HSC z chłodz. wew. w ostrzach

Alesatori MD-HSC con fori lubrificanti lungo i taglienti

Escariador en metal duro integral con refrigeración interior en las ranuras, serie larga para alta velocidad

Für Durchgangsbohrungen
For through holes

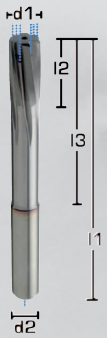
Artikel-Nr. *Article-No.*						E.5634.1 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
5,00	12	32	74	6,0	4	**148,00**
6,00	12	33	74	6,0	4	**148,00**
8,00	16	50	91	8,0	6	**168,00**
10,00	20	58	103	10,0	6	**197,00**
12,00	24	68	118	12,0	6	**249,00**
14,00	28	81	132	14,0	6	**289,00**

VHM-HSC-Reibahlen mit Kühlkanälen in den Nuten lang

E.5625.1

Universal

VHM | WERKS-NORM (COMPANY) | TOL. 0/+0,005 | HSC TOOL | FORM B | Blue Cut



Solid carbide HSC reamers with coolant system in the flutes long

Rozwiertaki długie z węglika siekanego do obróbki szybkościowej HSC z chłodzeniem wewnętrznym w ostrzach

Alesatori MD-HSC con fori lubrificanti lungo i taglienti

Escariador en metal duro integral con refrigeración interior en las ranuras, serie larga para alta velocidad

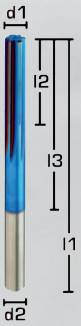
Für Durchgangsbohrungen
For through holes

Artikel-Nr. *Article-No.*						E.5625.1 € Stück *piece*
d1 0/+0,005	l2	l3	l1	d2	Zähne *flutes*	
4,80 - 5,15	12	32	74	6,0	4	**178,00**
5,16 - 5,79	12	32	74	6,0	4	**217,00**
5,80 - 6,15	12	33	74	6,0	4	**217,00**
6,16 - 6,79	16	49	91	8,0	4	**248,00**
6,80 - 7,15	16	49	91	8,0	4	**248,00**
7,16 - 7,69	16	49	91	8,0	6	**248,00**
7,70 - 8,15	16	50	91	8,0	6	**248,00**
8,16 - 8,69	20	57	103	10,0	6	**292,00**
8,70 - 9,15	20	57	103	10,0	6	**292,00**
9,16 - 9,59	20	57	103	10,0	6	**292,00**
9,60 - 10,15	20	58	103	10,0	6	**292,00**
10,16 - 10,59	24	67	118	12,0	6	**368,00**
10,60 - 11,15	24	67	118	12,0	6	**368,00**
11,16 - 11,59	24	67	118	12,0	6	**368,00**
11,60 - 12,15	24	68	118	12,0	6	**368,00**
12,16 - 12,70	28	81	132	14,0	6	**425,00**
12,71 - 13,15	28	81	132	14,0	6	**425,00**
13,16 - 13,59	28	81	132	14,0	6	**425,00**
13,60 - 14,15	28	81	132	14,0	6	**425,00**

E.5631.1

6.1 | 6.2 | 6.3 | 6.4

VHM | ähnl. DIN 212 | ≤65 HRC | TOL. H 7 | HRC | FORM A | Blue Cut



Solid carbide HRC/NC reamers

Rozwiertaki z węglika spiekanego do materiałów utwardzanych do 65 HRC do maszyn CNC

Alesatori MD-HRC/NC a macchina

Escariador de máquina NC en metal duro integral para alta dureza

Artikel-Nr. *Article-No.*						E.5631.1 €
d1 H7	l2	l3	l1	d2	Zähne *flutes*	St. *pc.*
0,98	6	16	50	4,0	3	**44,00**
0,99	6	16	50	4,0	3	**44,00**
1,00	6	16	50	4,0	3	**44,00**
1,01	6	16	50	4,0	3	**44,00**
1,02	6	16	50	4,0	3	**44,00**
1,03	9	16	50	4,0	3	**44,00**
1,48	9	16	50	4,0	3	**51,00**
1,49	9	16	50	4,0	3	**51,00**
1,50	9	16	50	4,0	3	**51,00**
1,51	9	16	50	4,0	3	**51,00**
1,52	9	16	50	4,0	3	**51,00**
1,60	10	16	50	4,0	3	**51,00**
1,70	10	16	50	4,0	3	**51,00**
1,80	11	16	50	4,0	3	**51,00**
1,90	11	16	50	4,0	3	**51,00**
1,97	12	16	50	4,0	4	**51,00**
1,98	12	16	50	4,0	4	**51,00**
1,99	12	16	50	4,0	4	**51,00**
2,00	18	28	50	3,0	4	**51,00**
2,01	12	16	50	4,0	4	**51,00**
2,02	12	16	50	4,0	4	**51,00**
2,03	12	16	50	4,0	4	**51,00**
2,10	12	16	50	4,0	4	**51,00**
2,20	13	16	50	4,0	4	**51,00**
2,30	13	16	50	4,0	4	**51,00**
2,40	16	26	60	4,0	4	**51,00**
2,50	16	26	60	4,0	4	**51,00**
2,60	16	26	60	4,0	4	**51,00**
2,70	17	30	64	4,0	4	**51,00**
2,80	17	30	64	4,0	4	**51,00**
2,90	17	30	64	4,0	4	**51,00**
2,97	17	30	64	4,0	4	**51,00**
2,98	17	30	64	4,0	4	**51,00**
2,99	17	30	64	4,0	4	**51,00**
3,00	27	37	60	3,0	4	**51,00**
3,01	17	30	64	4,0	4	**51,00**
3,02	17	30	64	4,0	4	**51,00**
3,03	17	30	64	4,0	4	**51,00**
3,10	18	34	68	4,0	4	**51,00**
3,20	18	34	68	4,0	4	**51,00**
3,30	18	34	68	4,0	4	**51,00**
3,40	20	40	74	4,0	4	**51,00**
3,50	20	40	74	4,0	4	**51,00**
3,60	20	40	74	4,0	4	**51,00**
3,70	20	40	74	4,0	4	**51,00**
3,80	21	43	77	4,0	4	**51,00**
3,90	21	43	77	4,0	4	**51,00**
3,97	21	43	77	4,0	4	**51,00**
3,98	21	43	77	4,0	4	**51,00**
3,99	21	43	77	4,0	4	**51,00**

Artikel-Nr. *Article-No.*						E.5631.1 €
d1 H7	l2	l3	l1	d2	Zähne *flutes*	St. *pc.*
4,00	27	37	80	4,0	4	**51,00**
4,01	21	43	77	4,0	4	**51,00**
4,02	21	43	77	4,0	4	**51,00**
4,03	21	43	77	4,0	4	**51,00**
4,10	21	40	82	6,0	6	**62,00**
4,20	21	40	82	6,0	6	**62,00**
4,30	23	40	82	6,0	6	**62,00**
4,40	23	40	82	6,0	6	**62,00**
4,50	23	40	82	6,0	6	**62,00**
4,60	23	40	82	6,0	6	**62,00**
4,70	23	40	82	6,0	6	**62,00**
4,80	26	51	93	6,0	6	**62,00**
4,90	26	51	93	6,0	6	**62,00**
4,97	26	51	93	6,0	6	**62,00**
4,98	26	51	93	6,0	6	**62,00**
4,99	26	51	93	6,0	6	**62,00**
5,00	30	40	80	6,0	6	**62,00**
5,01	26	51	93	6,0	6	**62,00**
5,02	26	51	93	6,0	6	**62,00**
5,03	26	51	93	6,0	6	**62,00**
5,10	26	51	93	6,0	6	**62,00**
5,20	26	51	93	6,0	6	**62,00**
5,30	26	51	93	6,0	6	**62,00**
5,40	26	51	93	6,0	6	**62,00**
5,50	26	51	93	6,0	6	**62,00**
5,60	26	51	93	6,0	6	**62,00**
5,70	26	51	93	6,0	6	**62,00**
5,80	26	51	93	6,0	6	**62,00**
5,90	26	51	93	6,0	6	**62,00**
5,97	26	51	93	6,0	6	**62,00**
5,98	26	51	93	6,0	6	**62,00**
5,99	26	51	93	6,0	6	**62,00**
6,00	30	50	80	6,0	6	**62,00**
6,01	26	51	93	6,0	6	**62,00**
6,02	26	51	93	6,0	6	**62,00**
6,03	26	51	93	6,0	6	**62,00**
6,10	26	59	101	8,0	6	**77,00**
6,20	26	59	101	8,0	6	**77,00**
6,30	26	59	101	8,0	6	**77,00**
6,40	26	59	101	8,0	6	**77,00**
6,50	26	59	101	8,0	6	**77,00**
6,60	26	59	101	8,0	6	**77,00**
6,70	26	59	101	8,0	6	**77,00**
6,80	31	67	109	8,0	6	**77,00**
6,90	31	67	109	8,0	6	**77,00**
7,00	31	67	109	8,0	6	**77,00**
7,10	31	67	109	8,0	6	**77,00**
7,20	31	67	109	8,0	6	**77,00**
7,30	31	67	109	8,0	6	**77,00**
7,40	31	67	109	8,0	6	**77,00**

Artikel-Nr. *Article-No.*						E.5631.1 €
d1 H7	l2	l3	l1	d2	Zähne *flutes*	St. *pc.*
7,50	31	67	109	8,0	6	**77,00**
7,60	31	67	109	8,0	6	**77,00**
7,70	33	75	117	8,0	6	**77,00**
7,80	33	75	117	8,0	6	**77,00**
7,90	33	75	117	8,0	6	**77,00**
7,97	33	75	117	8,0	6	**77,00**
7,98	33	75	117	8,0	6	**77,00**
7,99	33	75	117	8,0	6	**77,00**
8,00	35	50	117	8,0	6	**77,00**
8,01	33	75	117	8,0	6	**77,00**
8,02	33	75	117	8,0	6	**77,00**
8,03	33	75	117	8,0	6	**77,00**
8,10	33	71	117	10,0	6	**95,00**
8,20	33	71	117	10,0	6	**95,00**
8,30	33	71	117	10,0	6	**95,00**
8,40	33	71	117	10,0	6	**95,00**
8,50	33	71	117	10,0	6	**95,00**
8,60	33	71	117	10,0	6	**95,00**
8,70	36	79	125	10,0	6	**95,00**
8,80	36	79	125	10,0	6	**95,00**
8,90	36	79	125	10,0	6	**95,00**
9,00	36	79	125	10,0	6	**95,00**
9,10	36	79	125	10,0	6	**95,00**
9,20	36	79	125	10,0	6	**95,00**
9,30	36	79	125	10,0	6	**95,00**
9,40	36	79	125	10,0	6	**95,00**
9,50	36	79	125	10,0	6	**95,00**
9,60	36	79	125	10,0	6	**95,00**
9,70	38	87	133	10,0	6	**95,00**
9,80	38	87	133	10,0	6	**95,00**
9,90	38	87	133	10,0	6	**95,00**
9,97	41	87	133	10,0	6	**95,00**
9,98	41	87	133	10,0	6	**95,00**
9,99	41	87	133	10,0	6	**95,00**
10,00	40	60	133	10,0	6	**95,00**
10,01	41	87	133	10,0	6	**95,00**
10,02	41	87	133	10,0	6	**95,00**
10,03	41	87	133	10,0	6	**95,00**
10,04	41	87	133	10,0	6	**95,00**
10,05	41	87	133	10,0	6	**95,00**
11,97	44	99	150	12,0	6	**125,00**
11,98	44	99	150	12,0	6	**125,00**
11,99	44	99	150	12,0	6	**125,00**
12,00	45	60	150	12,0	6	**125,00**
12,01	44	99	150	12,0	6	**125,00**
12,02	44	99	150	12,0	6	**125,00**
12,03	44	99	150	12,0	6	**125,00**
12,04	44	99	150	12,0	6	**125,00**

E.5626.0

Universal

CERMET | ähnl. DIN 8089 | HSC TOOL | TOL. H 7 | FORM B | UNIVERSAL TOOL



Cermet NC machine reamers

Rozwiertaki maszynowe cermetowe do obróbkii szybkościowej HSC do maszyn CNC

Alesatori a macchina in cermet NC

Escariador de máquina NC en Cermet

ab ø 11 mm mit Cermetkopf und Stahlschaft
from ø 11 mm with Cermet head and steel shank

Artikel-Nr. *Article-No.*						E.5626.0 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
3,00	15	41	60	3,0	4	**63,00**
3,50	18	44	60	4,0	4	**69,00**
4,00	19	43	75	4,0	4	**70,00**
4,50	21	47	75	5,0	4	**84,00**
5,00	23	52	85	5,0	4	**88,00**
5,50	26	57	93	6,0	4	**99,00**
6,00	26	57	93	6,0	4	**100,00**
6,50	28	63	101	8,0	6	**113,00**
7,00	31	69	109	8,0	6	**115,00**
7,50	33	69	109	8,0	6	**122,00**
8,00	33	75	117	8,0	6	**121,00**
8,50	36	75	117	8,0	6	**130,00**
9,00	38	81	120	10,0	6	**133,00**
9,50	38	81	125	10,0	6	**153,00**
10,00	38	87	133	10,0	6	**146,00**
11,00	41	96	142	10,0	6	**164,00**
12,00	44	105	151	10,0	6	**169,00**
13,00	44	105	151	10,0	6	**207,00**
14,00	47	110	160	14,0	6	**223,00**
15,00	50	112	162	14,0	6	**259,00**
16,00	53	120	170	14,0	6	**291,00**
17,00	54	123	175	14,0	6	**324,00**
18,00	56	130	182	14,0	6	**360,00**
19,00	58	131	189	16,0	6	**423,00**
20,00	60	137	196	16,0	6	**448,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5621.0

Universal

VHM | WERKS-NORM (COMPANY) | XLANG XLONG | TOL. 0/+0,005 | FORM B | UNIVERSAL TOOL



Solid carbide reamers XL

Rozwiertaki z węglika spiekanego bardzo długie

Alesatori MD, XL

Escariador de máquina en metal duro integral, serie extra larga

Artikel-Nr. *Article-No.*						E.5621.0 € Stück *piece*
d1 0/+0,005	l2	l3	l1	d2 h6	Zähne *flutes*	
2,95 - 3,05	20	79	100	3,0	6	**72,00**
2,95 - 3,05	20	129	150	3,0	6	**98,00**
3,95 - 4,05	24	75	100	4,0	6	**64,00**
3,95 - 4,05	24	125	150	4,0	6	**98,00**
4,95 - 5,05	26	73	100	5,0	6	**79,00**
4,95 - 5,05	26	123	150	5,0	6	**98,00**
5,95 - 6,05	26	73	100	6,0	6	**86,00**
5,95 - 6,05	26	123	150	6,0	6	**101,00**
6,95 - 7,05	35	115	150	7,0	6	**113,00**
7,90 - 8,10	35	115	150	8,0	6	**140,00**
8,90 - 9,10	35	115	150	9,0	6	**163,00**
9,90 - 10,10	35	115	150	10,0	6	**181,00**
10,90 - 11,10	35	115	150	11,0	6	**207,00**
11,90 - 12,10	35	115	150	12,0	6	**230,00**
12,90 - 13,10	35	115	150	13,0	6	**242,00**
13,90 - 14,10	35	115	150	13,0	6	**258,00**
14,90 - 15,10	35	115	150	14,0	6	**278,00**
15,90 - 16,10	35	115	150	16,0	6	**294,00**

Zwischenmaße zum nächsthöheren Preis! *Intermediate sizes to the next higher price!*

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5606.0

Universal

HM | DIN 8051 | KURZ SHORT | TOL. H 7 | MK | FORM B | UNIVERSAL TOOL



Carbide tipped machine reamers short flutes

Rozwiertaki maszynowe krótkie z chwytem ze stali narzędziowej i ostrzem z węglika spiekanego

Alesatori a macchina con placchette in MD, taglienti corti

Escariador de máquina con plaquitas de metal duro, serie corta

Artikel-Nr. *Article-No.*						E.5606.0 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
16,00	22	130	210	2	6	**60,00**
17,00	22	134	214	2	6	**67,00**
18,00	22	139	219	2	6	**64,00**
19,00	22	143	223	2	6	**68,00**
20,00	22	148	228	2	6	**67,00**
21,00	25	152	232	2	6	**73,00**
22,00	25	157	237	2	6	**73,00**
23,00	25	161	241	2	6	**90,00**
24,00	25	169	268	3	8	**93,00**
25,00	25	169	268	3	8	**93,00**
26,00	25	174	273	3	8	**101,00**
27,00	30	178	277	3	8	**120,00**
28,00	30	178	277	3	8	**175,00**
29,00	30	182	281	3	8	**120,00**
30,00	30	182	281	3	8	**120,00**
31,00	30	186	285	3	8	**132,00**
32,00	30	193	317	4	8	**132,00**
34,00	30	197	321	4	8	**156,00**
35,00	30	197	321	4	8	**156,00**
36,00	30	201	325	4	8	**171,00**
38,00	30	205	329	4	8	**171,00**
40,00	30	205	329	4	8	**180,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

E.5607.0

Universal

HM | DIN 8094 | LANG LONG | TOL. H 7 | MK | FORM B | UNIVERSAL TOOL



Carbide tipped machine reamers long flutes

Rozwiertaki maszynowe długie z chwytem ze stali narzędziowej i ostrzem z węglika spiekanego

Alesatori a macchina con placchette in MD, taglienti lunghi

Escariador de máquina con plaquitas de metal duro, serie larga

Artikel-Nr. *Article-No.*						E.5607.0 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
16,00	45	130	210	2	6	**80,00**
17,00	56	134	214	2	6	**87,00**
18,00	56	139	219	2	6	**82,00**
19,00	56	143	223	2	6	**97,00**
20,00	56	148	228	2	6	**91,00**
21,00	56	152	232	2	6	**105,00**
22,00	56	157	237	2	6	**105,00**
23,00	56	161	241	2	6	**129,00**
24,00	70	169	268	3	8	**129,00**
25,00	70	169	268	3	8	**129,00**
26,00	70	174	273	3	8	**142,00**
27,00	70	178	277	3	8	**167,00**
28,00	70	178	277	3	8	**167,00**
29,00	70	182	281	3	8	**168,00**
30,00	70	182	281	3	8	**168,00**
31,00	70	186	285	3	8	**192,00**
32,00	70	193	317	4	8	**192,00**
34,00	70	197	321	4	8	**223,00**
35,00	70	197	321	4	8	**223,00**
36,00	70	201	325	4	8	**249,00**
38,00	70	205	329	4	8	**249,00**
40,00	70	205	329	4	8	**257,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

HM-bestückte-Maschinendehnreibahlen kurz

E.5608.0

Universal

HM | DIN ähnl. 8051 | KURZ SHORT | TOL. H 7 | MK | FORM A | UNIVERSAL TOOL



Carbide tipped machine reamers short

Rozwiertaki maszynowe krótkie z chwytem ze stali narzędziowej i ostrzem z węglika spiekanego

Alesatori a macchina con placchette in MD, serie lunga

Escariador expansible de máquina con plaquitas de metal duro, serie corta

Artikel-Nr. *Article-No.*						E.5608.0 € Stück *piece*
d1 H7	l2	l3	l1	d2	Zähne *flutes*	
16,00	22	130	210	2	6	**253,00**
17,00	22	134	214	2	6	**268,00**
18,00	22	139	219	2	6	**260,00**
19,00	22	143	223	2	6	**274,00**
20,00	22	148	228	2	6	**262,00**
22,00	25	157	237	2	6	**276,00**
24,00	25	169	268	3	8	**336,00**
25,00	25	169	268	3	8	**336,00**
26,00	25	174	273	3	8	**376,00**
28,00	30	178	277	3	8	**396,00**
30,00	30	182	281	3	8	**409,00**
32,00	30	193	317	4	8	**470,00**
34,00	30	197	321	4	8	**562,00**
35,00	30	197	321	4	8	**562,00**
36,00	30	201	325	4	8	**577,00**
38,00	30	205	329	4	8	**591,00**
40,00	30	205	329	4	8	**594,00**

VHM-Kegelreibahle 1:50

E.5609.0

Universal

VHM | WERKS-(COMPANY) NORM | KURZ SHORT | TOL. H 7 | FORM A | UNIVERSAL TOOL



Solid carbide conical reamers 1:50

Rozwiertaki z węglika spiekanego stożkowe, zbieżność 1:50

Alesatori conici 1:50 MD

Escariadores cónicos de metal duro 1:50

Artikel-Nr. *Article-No.*					E.5609.0 € Stück *piece*
d1	l2	l1	d2	Zähne *flutes*	
1,50	37	57	2,50	3	**104,00**
2,00	48	68	2,50	4	**108,00**
3,00	58	80	3,15	5	**126,00**
4,00	68	93	4,00	5	**138,00**
5,00	73	100	5,00	5	**160,00**
6,00	105	135	6,30	6	**215,00**
8,00	145	180	8,00	6	**270,00**

Bohrungsuntermaßtabelle für Reibahlen *Prehole diameter chart for reamers:*

< ø 1 mm	> ø 10 mm	> ø 20	> ø 30	< ø 30
- 0,10	- 0,20	- 0,25	- 0,30	- 0,40

Einsatzrichtwerte *Estimated values for use*

VR / fz	Vorschub (mm/U) *feed*										
	< Ø 2	< Ø 4	< Ø 6	< Ø 8	< Ø 10	< Ø 12	< Ø 14	< Ø 18	< Ø 22	< Ø 26	< Ø 30
1	0,020	0,040	0,050	0,060	0,080	0,090	0,105	0,130	0,160	0,185	0,215
2	0,025	0,050	0,060	0,080	0,090	0,100	0,115	0,145	0,175	0,200	0,230
3	0,030	0,060	0,080	0,100	0,120	0,140	0,165	0,205	0,250	0,290	0,335
4	0,040	0,080	0,100	0,125	0,160	0,180	0,210	0,265	0,320	0,375	0,430
5	0,050	0,100	0,120	0,160	0,200	0,220	0,260	0,330	0,395	0,465	0,530
6	0,060	0,120	0,160	0,200	0,250	0,280	0,330	0,410	0,500	0,590	0,680
7	0,080	0,160	0,200	0,250	0,310	0,340	0,400	0,505	0,610	0,710	0,810
8	0,100	0,200	0,250	0,320	0,400	0,440	0,520	0,650	0,790	0,920	1,050

	VHM-Reibahlen *VHM-reamers*				VHM-Kegelsenker *VHM-countersink*			
	blank *uncoated*		beschichtet *coated*		Vc (m/min)	Vf (mm/min)		
Materialgruppe *material group*	Vc (m/min)	VR / fz	Vc (m/min)	VR / fz		< Ø 10	< Ø 20	< Ø 31
1.1	20 - 25	7	18 - 24	8	50	340	320	220
1.2	15 - 20	7	18 - 24	8	45	500	245	170
1.3	10 - 15	5	12 - 16	6	35	220	110	75
2.1	6 - 10	3	8 - 12	3	25	120	60	40
2.2	6 - 10	3	8 - 12	3				
3.1	30 - 40	7	30 - 35	7	25	130	70	45
3.2	20 - 25	6	30 - 35	7				
3.3	15 - 20	6	18 - 24	7				
3.4	15 - 20	6	18 - 24	7				
4.1	30 - 35	8	33 - 40	8	50	400	200	140
4.2	20 - 30	7	25 - 32	7				
4.3	18 - 24	7	22 - 28	7				
4.4	20 - 30	7	24 - 32	7				
4.5	18 - 24	7	22 - 30	7				
4.6	18 - 24	7	22 - 30	7	25	800	400	270
4.7	15 - 20	8	18 - 24	8				
4.8					100	1600	800	500
4.9								
5.1	6 - 10	5	8 - 14	6	25	120	60	40
5.2	4 - 6	3	6 - 8	4	20	100	40	30
6.1			8	4	30	180	80	60
6.2			8	3				
6.3			5	2				
6.4			5	2				

Reibahlen mit IK blank: Vc und fz + 50 % *Reamers with internal coolant uncoated: Vc and fz + 50 %*
Reibahlen mit IK beschichtet: Vc und fz +100 % *Reamers with internal coolant coated: Vc and fz +100 %*

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	UNIVERSAL TOOL	HRC	E.6624.0	1	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6625.0	2	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6626.0	3	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6627.0	4	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6628.0	4	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6629.0	5	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6630.0	6	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6631.0	6	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6632.0	7	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6633.0	7	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6634.0	8	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6635.0	8	✔	✔		✔	✔	✔		
	VHM	UNIVERSAL TOOL	HRC	E.6636.0	9	✔	✔		✔	✔	✔		

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

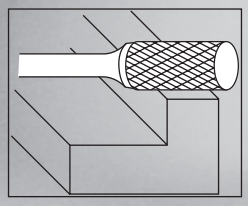
The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

E.6624.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs "cylindrical"

Pilniki obrotowe walcowe z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD "forma cilindrica"

Fresas rotativas en metal duro "forma cilíndrica"

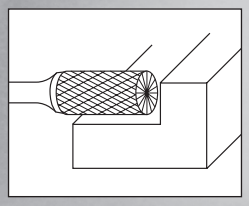
Artikel-Nr. *Article-No.*				E.6624.0 € Stück *piece*
d1	l2	l1	d2	
1,50	6,0	38	3,0	**5,30**
1,50	6,0	50	3,0	**7,40**
1,50	6,0	75	3,0	**8,30**
2,50	11,0	38	3,0	**5,30**
2,50	11,0	50	3,0	**7,40**
2,50	11,0	75	3,0	**8,30**
3,00	14,0	38	3,0	**5,30**
3,00	14,0	50	3,0	**7,40**
3,00	14,0	75	3,0	**8,30**
3,00	12,0	56	6,0	**9,60**
3,00	12,7	60	6,0	**9,60**
4,00	12,7	38	3,0	**12,80**
4,00	16,0	50	6,0	**9,00**
5,00	12,7	38	3,0	**12,70**
5,00	16,0	50	6,0	**9,00**
6,00	25,0	50	6,0	**13,10**
6,00	16,0	50	6,0	**9,00**
6,30	12,7	50	3,0	**8,70**
8,00	19,0	63	6,0	**11,80**
9,50	19,0	63	6,0	**12,70**
9,50	25,0	69	6,0	**15,10**
11,00	25,0	69	6,0	**18,40**
12,70	25,0	69	6,0	**19,90**
16,00	25,0	69	6,0	**27,20**
19,00	25,0	69	6,0	**37,20**
25,00	25,0	69	6,0	**52,00**

E.6625.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “cylindrical with end cut”

Pilniki obrotowe walcowe z węglika spiekanego z ostrzami na czole do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma cilindrica con taglio in testa”

Fresas rotativas en metal duro “forma cilíndrica con dentado frontal”

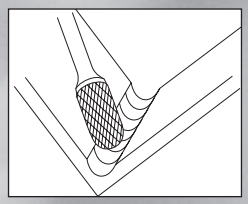
Artikel-Nr. *Article-No.*				E.6625.0 € Stück *piece*
d1	l2	l1	d2	
1,50	6,0	38	3,0	**5,30**
1,50	6,0	50	3,0	**7,30**
1,50	6,0	75	3,0	**8,30**
2,50	11,0	38	3,0	**5,30**
2,50	11,0	50	3,0	**7,30**
2,50	11,0	75	3,0	**8,30**
3,00	14,0	38	3,0	**5,30**
3,00	14,0	38	3,0	**5,60**
3,00	14,0	50	3,0	**7,30**
3,00	14,0	75	3,0	**8,30**
3,00	12,0	56	6,0	**10,20**
3,00	12,7	60	6,0	**10,20**
4,00	16,0	50	6,0	**10,20**
5,00	16,0	50	6,0	**10,20**
6,00	16,0	50	6,0	**10,20**
6,00	25,0	50	6,0	**14,50**
6,30	4,7	43	3,0	**8,70**
8,00	19,0	63	6,0	**13,00**
9,50	19,0	63	6,0	**14,00**
9,50	25,0	69	6,0	**16,60**
11,00	25,0	69	6,0	**20,40**
12,70	25,0	69	6,0	**21,90**
16,00	25,0	69	6,0	**32,60**
19,00	25,0	69	6,0	**41,00**
25,00	25,0	69	6,0	**64,50**

E.6626.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “cylindrical with radius end”

Pilniki obrotowe walcowe z węglika spiekan. z końcówką promieniową do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma cilindrica, semisferica in testa”

Fresas rotativas en metal duro “forma semiesférica”

Artikel-Nr. *Article-No.*				E.6626.0 € Stück *piece*
d1	l2	l1	d2	
2,50	11,0	38	3,0	**5,30**
3,00	14,0	38	3,0	**5,30**
3,00	14,0	50	3,0	**7,40**
3,00	14,0	75	3,0	**8,30**
3,00	12,0	56	6,0	**10,50**
3,00	16,0	60	6,0	**10,50**
4,00	12,7	38	3,0	**12,70**
4,00	16,0	50	6,0	**10,50**
5,00	12,7	38	3,0	**12,70**
5,00	16,0	50	6,0	**10,50**
6,00	16,0	50	6,0	**10,50**
6,00	25,0	50	6,0	**14,40**
6,30	12,7	50	3,0	**8,70**
8,00	19,0	63	6,0	**12,90**
9,50	19,0	63	6,0	**14,20**
9,50	25,0	69	6,0	**16,70**
11,00	25,0	69	6,0	**20,30**
12,70	25,0	69	6,0	**22,30**
16,00	25,0	69	6,0	**28,00**
19,00	25,0	69	6,0	**40,20**
25,00	25,0	69	6,0	**61,00**

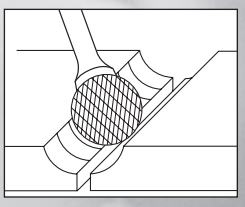
VHM-Frässtifte “Kugel”

E.6627.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | <60 HRC | HA | HRC





- Solid carbide rotary burrs “ball”
- Pilniki obrotowe kuliste z węglika spiekanego do materiałów utwardzanych do 60 HRC
- Lime rotative MD “a palla”
- Fresas rotativas en metal duro “forma esférica”

Artikel-Nr. *Article-No.*				**E.6627.0** € Stück *piece*
d1	l2	l1	d2	
2,50	2,3	38	3,0	**5,30**
3,00	2,8	38	3,0	**5,30**
3,00	2,8	50	3,0	**7,40**
3,00	2,8	75	3,0	**8,30**
3,00	2,8	50	6,0	**9,70**
5,00	4,0	38	3,0	**12,80**
5,00	4,0	50	6,0	**9,70**
6,00	5,0	50	6,0	**9,70**
6,30	5,0	44	3,0	**8,70**
8,00	6,4	50	6,0	**10,40**
9,50	8,0	52	6,0	**11,70**
11,00	9,5	54	6,0	**13,40**
12,70	11,0	55	6,0	**15,70**
16,00	14,0	58	6,0	**22,00**
19,00	16,0	62	6,0	**26,80**
25,00	23,0	68	6,0	**46,10**

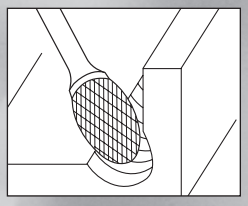
VHM-Frässtifte “Tropfen”

E.6628.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | <60 HRC | HA | HRC





- Solid carbide rotary burrs “oval”
- Pilniki obrotowe walcowe zaokrąglon ez węglika spiekanego do materiałów utwardzanych do 60 HRC
- Lime rotative MD “forma a goccia”
- Fresas rotativas en metal duro “forma gota”

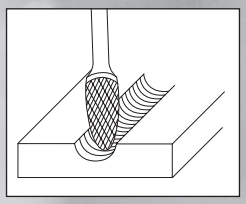
Artikel-Nr. *Article-No.*				**E.6628.0** € Stück *piece*
d1	l2	l1	d2	
3,00	5,5	38	3,0	**5,30**
3,00	5,5	50	3,0	**7,40**
3,00	5,5	75	3,0	**8,30**
5,00	7,1	38	3,0	**12,70**
6,00	9,5	50	6,0	**11,80**
6,30	9,5	47	3,0	**8,70**
9,50	16,0	60	6,0	**14,20**
12,70	22,0	66	6,0	**20,80**
16,00	25,0	69	6,0	**28,80**
19,00	25,0	69	6,0	**38,70**

E.6629.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “arch round nose”

Pilniki obrotowe łukowe zaokrąglone z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma conica”

Fresas rotativas en metal duro “forma ovalada radio”

Artikel-Nr. *Article-No.*				E.6629.0 € Stück *piece*
d1	l2	l1	d2	
3,00	6,0	38	3,0	**5,30**
3,00	12,7	38	3,0	**5,30**
3,00	12,7	56	6,0	**11,00**
3,00	12,7	50	3,0	**7,40**
3,00	12,7	75	3,0	**8,30**
5,00	12,7	38	3,0	**12,80**
6,00	16,0	50	6,0	**11,00**
6,30	12,7	50	3,0	**8,70**
9,50	19,0	63	6,0	**13,90**
11,00	25,0	69	6,0	**20,20**
12,70	19,0	63	6,0	**20,20**
12,70	25,0	69	6,0	**20,50**
16,00	25,0	69	6,0	**28,30**
19,00	25,0	69	6,0	**37,20**
19,00	32,0	76	6,0	**46,80**
19,00	38,0	82	6,0	**55,00**



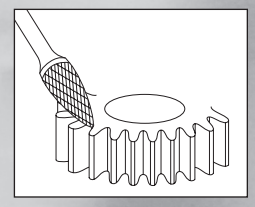
VHM-Frässtifte “Spitzbogen”

E.6630.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “arch pointed nose”

Pilniki obrotowe ostrołukowe z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma con punta conica”

Fresas rotativas en metal duro “forma ovalada punta”

Artikel-Nr. *Article-No.*				E.6630.0 € Stück *piece*
d1	l2	l1	d2	
3,00	6,0	38	3,0	**5,30**
3,00	9,5	38	3,0	**5,30**
3,00	12,7	38	3,0	**5,30**
3,00	12,7	50	3,0	**7,40**
3,00	12,7	75	3,0	**8,30**
5,00	12,7	38	3,0	**12,80**
6,00	16,0	50	6,0	**11,00**
6,30	12,7	50	3,0	**8,70**
8,00	19,0	63	6,0	**13,30**
9,50	19,0	63	6,0	**14,80**
12,70	19,0	63	6,0	**20,10**
12,70	25,0	69	6,0	**20,10**
16,00	25,0	69	6,0	**28,00**
19,00	25,0	69	6,0	**37,20**
19,00	38,0	82	6,0	**55,00**

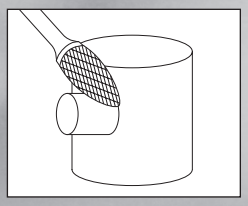
VHM-Frässtifte “Flamme”

E.6631.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “flame”

Pilniki obrotowe płomieniowe z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma a fiamma”

Fresas rotativas en metal duro “forma llama”

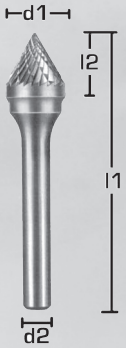
Artikel-Nr. *Article-No.*				E.6631.0 € Stück *piece*
d1	l2	l1	d2	
3,00	6,3	38	3,0	**5,30**
3,00	6,3	50	3,0	**7,40**
3,00	6,3	75	3,0	**8,30**
5,00	9,5	38	3,0	**12,80**
8,00	19,0	63	6,0	**14,60**
12,70	32,0	76	6,0	**29,60**
16,00	36,0	80	6,0	**41,00**
19,00	41,0	85	6,0	**52,00**

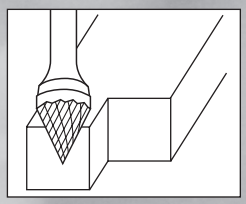
VHM-Frässtifte “Kegel 60°”

E.6632.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “countersink 60°”

Pilniki obrotowe - pogłębiacze 60° z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma con conicità a 60°”

Fresas rotativas en metal duro “forma cónica 60°”

Artikel-Nr. *Article-No.*				E.6632.0 € Stück *piece*
d1	l2	l1	d2	
3,00	2,5	38	3,0	**5,30**
6,00	4,0	50	6,0	**9,70**
9,50	8,0	55	6,0	**12,70**
12,70	11,0	58	6,0	**15,40**
16,00	13,5	61	6,0	**20,50**
19,00	16,5	65	6,0	**26,90**
25,00	21,5	68	6,0	**43,10**

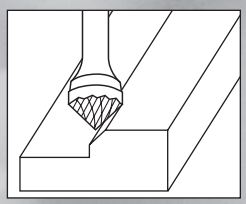
VHM-Frässtifte “Kegel 90°”

E.6633.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “countersink 90°”

Pilniki obrotowe - pogłębiacze 90 ° z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma con conicità 90°”

Fresas rotativas en metal duro “forma cónica 90°”

Artikel-Nr. *Article-No.*				E.6633.0 € Stück *piece*
d1	l2	l1	d2	
3,00	1,5	38	3,0	**5,30**
6,00	3,0	50	6,0	**9,70**
9,50	4,7	52	6,0	**12,60**
12,70	6,3	54	6,0	**15,40**
16,00	8,0	57	6,0	**20,50**
19,00	9,5	58	6,0	**26,90**
25,00	12,7	60	6,0	**43,10**

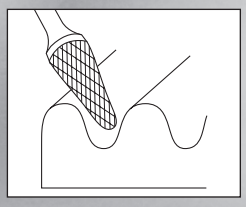
VHM-Frässtifte “Rundkegel”

E.6634.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “conical round nose”

Pilniki obrotowe stożkowe zaokrąglone z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma conica con raggio”

Fresas rotativas en metal duro “forma cónica radio”

Artikel-Nr. *Article-No.*				E.6634.0 € Stück *piece*
d1	l2	l1	d2	
3,00	9,5	38	3,0	**5,30**
3,00	12,7	38	3,0	**5,30**
3,00	12,7	50	3,0	**7,30**
3,00	12,7	75	3,0	**8,30**
5,00	12,7	38	3,0	**12,70**
6,00	16,0	50	6,0	**11,20**
8,00	22,0	69	6,0	**15,50**
9,50	27,0	74	6,0	**17,70**
12,70	28,0	76	6,0	**21,70**
16,00	30,0	77	6,0	**38,70**
19,00	38,0	85	6,0	**56,20**

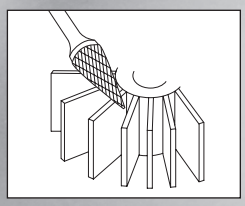
VHM-Frässtifte “Spitzkegel”

E.6635.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “conical pointed nose”

Pilniki obrotowe stożkowe z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma conica con punta”

Fresas rotativas en metal duro “forma cónica punta”

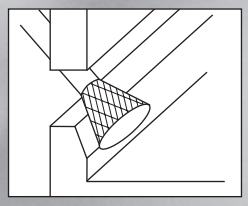
Artikel-Nr. *Article-No.*				E.6635.0 € Stück *piece*
d1	l2	l1	d2	
3,00	8,9	38	3,0	**5,30**
3,00	11,0	38	3,0	**5,30**
3,00	11,0	50	3,0	**7,30**
3,00	11,0	75	3,0	**8,30**
3,00	16,0	38	3,0	**5,30**
5,00	12,7	38	3,0	**12,80**
6,00	12,7	50	6,0	**10,70**
6,00	19,0	50	6,0	**11,20**
6,00	25,0	50	6,0	**12,00**
6,30	12,7	53	3,0	**8,70**
9,50	16,0	63	6,0	**17,70**
12,70	22,0	69	6,0	**22,20**
16,00	25,0	73	6,0	**29,60**

E.6636.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | <60 HRC | HA | HRC





Solid carbide rotary burrs “inverted cone”

Pilniki obrotowe stożkowe odwrócone z węglika spiekanego do materiałów utwardzanych do 60 HRC

Lime rotative MD “forma a cono inverso”

Fresas rotativas en metal duro “forma ángulo”

Artikel-Nr. *Article-No.*				E.6636.0 € Stück *piece*
d1	l2	l1	d2	
2,50	3,0	38	3,0	**5,30**
3,00	4,0	38	3,0	**5,30**
5,00	6,3	38	3,0	**12,80**
6,00	8,0	50	6,0	**10,80**
6,30	6,0	44	3,0	**9,50**
9,50	9,5	53	6,0	**15,70**
12,70	12,7	57	6,0	**22,10**
16,00	19,0	63	6,0	**29,90**
19,00	16,0	60	6,0	**32,00**

Tools you can trust

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
HPC-SUPERSTAR *HPC-SUPERSTAR*													
	Z=4		Blue Cut	E.7675W.1	9	✔	✔	✔		✔			
	Z=4		Blue Cut	E.7675H.1	9	✔		✔	✔	✔			
	Z=4		Blue Cut	E.7676W.1	9	✔	✔	✔		✔			
	Z=4		Blue Cut	E.7676H.1	9	✔		✔	✔	✔			
	Z=4		Blue Cut	SET.7676.1	9	✔		✔	✔	✔			
	Z=4		Blue Cut	E.7698W.1	10	✔	✔	✔		✔			
	Z=4		Blue Cut	E.7698H.1	10	✔		✔	✔	✔			
	Z=4		Blue Cut	E.7602.1	10	✔		✔	✔	✔			
	Z=4		Blue Cut	E.7609.1	11	✔				✔			
	Z=4		Blue Cut	E.7612.1	12	✔				✔			
	Z=4		Blue Cut	E.7614.1	12	✔				✔			✔
	Z=4		Blue Cut	E.7615.1	13	✔			✔	✔			
	Z=3		Blue Cut	E.7716.1	13	✔				✔	✔		
	Z=4		Blue Cut	E.7728.1	14	✔					✔		
	Z=4		Blue Cut	E.7785.1	14	✔	✔	✔	✔				
	Z=6		Blue Cut	E.7661.1	14	✔	✔	✔	✔	✔			
INOX *INOX*													
	Z=2			E.7604.0	15		✔	✔					
	Z=2			E.7611.0	16		✔	✔					
	Z=3		Blue Cut	E.7693.1	17		✔	✔		✔			
	Z=4	λ≈45°	SPEZIAL BESCHICHTUNG COATING	E.7673.1	17		✔	✔		✔			
	Z=4	λ≈60°	SPEZIAL BESCHICHTUNG COATING	E.7674.1	18		✔	✔		✔			

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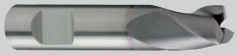
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
UNIVERSAL *UNIVERSAL*													
	Z=2	λ≈30°		E.7601.0	19	✔		✔					
	Z=2	λ≈30°	Blue Cut	E.7601.1	19	✔	✔	✔	✔				
	Z=2	λ≈30°	Blue Cut	E.7603.0	20	✔	✔	✔	✔				
	Z=2	λ≈30°	Blue Cut	E.7603.1	20	✔	✔	✔	✔		✔		
	Z=2	λ≈30°		E.7606.0	21	✔	✔	✔					
	Z=2	λ≈30°	Blue Cut	E.7613.1	22	✔	✔	✔	✔				
	Z=2	λ≈30°	Blue Cut	E.7666.1	22	✔							
	Z=2	λ≈30°	Blue Cut	E.7618.1	23	✔							
	Z=2	λ≈30°	Blue Cut	E.7653.1	23	✔							
	Z=2	λ≈30°	Blue Cut	E.7647.1	24	✔							
	Z=2	λ≈30°	Blue Cut	E.7660.1	24	✔							
	Z=2	λ≈30°	Blue Cut	E.7641.1	25	✔		✔	✔		✔		
	Z=3	λ≈30°	Blue Cut	E.7622.1	26	✔		✔	✔				
	Z=3	λ≈45°	Blue Cut	E.7668.1	26	✔	✔	✔					
	Z=3	λ≈30°		E.7626.0	27	✔			✔				
	Z=3	λ≈30°	Blue Cut	E.7623.1	28	✔			✔				
	Z=3	λ≈30°	Blue Cut	E.7624.1	28	✔			✔				
	Z=3	λ≈30°	Blue Cut	E.7625.1	29	✔			✔				
	Z=3	λ≈30°		E.7628.0	29	✔	✔	✔	✔				
	Z=3	λ≈45°	Blue Cut	E.7631.1	30	✔	✔	✔	✔				
	Z=3	λ≈45°	Blue Cut	E.7632.1	30	✔	✔	✔	✔				
	Z=3	λ≈60°	Blue Cut	E.7634.1	31	✔	✔	✔	✔		✔		

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	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	Z=4	λ≈30°	Blue Cut	E.7662.1	31	✔			✔				
	Z=4	λ≈30°		E.7648.0	32	✔	✔	✔	✔				
	Z=4	λ≈30°	Blue Cut	E.7649.1	33	✔		✔	✔				
	Z=4	λ≈30°	Blue Cut	E.7650.1	33	✔		✔	✔				
	Z=4	λ≈45°	Blue Cut	E.7651.1	34	✔	✔	✔					
	Z=4	λ≈45°	Blue Cut	E.7652.1	34	✔	✔	✔					
	Z=4	λ≈45°	Blue Cut	E.7723.1	35	✔	✔	✔		✔	✔		
	Z=4	λ≈45°	Blue Cut	E.7670.1	35	✔		✔	✔		✔		
	Z=4	λ≈30°	Blue Cut	E.7657.1	36	✔			✔		✔		
	MEHR SCHNEIDER	λ≈30°		E.7680.0	37	✔	✔	✔	✔				
	MEHR SCHNEIDER	λ≈45°	Blue Cut	E.7701.1	37	✔		✔					
	MEHR SCHNEIDER	λ≈45°	Blue Cut	E.7681.1	38	✔		✔			✔		
	MEHR SCHNEIDER	λ≈25°		E.7688.0	38	✔	✔	✔	✔				
UNISPEZIAL *UNISPECIAL*													
				E.6607.0	39	✔	✔	✔					
	Z=2	60°		E.6608.0	40	✔	✔	✔					
	Z=2	λ≈30°	Blue Cut	E.6609.1	40	✔	✔	✔					
	Z=3	λ≈30°		E.7627.0	41	✔							
	MEHR SCHNEIDER	λ≈30°		E.7635.0	41	✔							
	Z=4	λ≈25°		E.7704.0	42	✔		✔	✔		✔		
	Z=4	λ≈25°		E.7705.0	42	✔		✔	✔		✔		
	MEHR SCHNEIDER	λ≈30°		E.7671.0	43	✔		✔	✔				
	Z=3	λ≈30°		E.7629.0	44	✔		✔	✔		✔		

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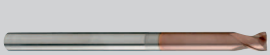
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	Z=3	λ≈30°		E.7630.0	44	✔		✔	✔		✔		
	Z=2			E.7658.0	45	✔	✔	✔	✔				
	Z=4			E.7659.0	45	✔	✔	✔	✔				
	Z=4		Blue Cut	E.7683.1	46	✔	✔	✔	✔				
SCHRUPPFRÄSER *ROUGHING END MILLS*													
	Z=3	λ≈30°	TYP NR	E.7677.1	47	✔	✔	✔	✔				
	Z=4	λ≈25°	TYP HR	E.7663.1	47	✔	✔	✔	✔				
	Z=4	λ≈30°	TYP HF	E.7664.1	48	✔	✔	✔	✔				
	Z=4	λ≈25°	TYP HR	E.7665.1	48	✔	✔	✔	✔				✔
	Z=4	λ≈45°	TYP HF	E.7672.1	49		✔			✔			
	MEHR SCHNEIDER	λ≈20°	TYP HR	E.7633.1	49	✔			✔		✔		
	MEHR SCHNEIDER	λ≈45°	TYP HR	E.7678.1	50	✔	✔	✔		✔			
	MEHR SCHNEIDER	λ≈45°	TYP HR	SET.7678.1	50	✔	✔	✔		✔			
	MEHR SCHNEIDER	λ≈45°	TYP HR	E.7724.1	50	✔	✔	✔		✔			
	MEHR SCHNEIDER	λ≈45°	TYP HR	E.7718.1	51	✔	✔	✔	✔				
	Z=6	λ≈30°	TYP HR	E.7669.1	51						✔		
	MEHR SCHNEIDER	λ≈30°	TYP HR	E.7679.1	52	✔	✔	✔		✔			
ALUMINIUM *ALUMINIUM*													
	Z=1	λ≈30°		E.6602.0	53			✔					
	Z=1	λ≈30°		E.6611.0	54			✔					
	Z=1	λ≈30°		E.7684.0	54			✔					
	Z=2	λ≈30°	POLIERT polished	E.7694.0	55			✔					
	Z=2	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7695.1	55			✔					

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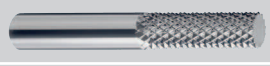
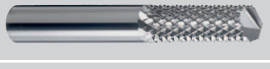
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	Z=2	λ≈30°	POLIERT polished	E.7690.0	56			✔					
	Z=2	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7691.1	56			✔					
	Z=2			E.7607.0	57			✔	✔				
	Z=2			E.7685.0	58			✔	✔				
	Z=2	λ≈55°		E.7608.0	58			✔					
	Z=2	λ≈25°		E.7617.0	59			✔					
	Z=2	λ≈40°	SPEZIAL BESCHICHTUNG COATING	E.7621.1	59			✔					
	Z=3	λ≈45°		E.7636.0	60			✔					
	Z=3	λ≈45°		E.7637.0	60			✔					
	Z=4	λ≈45°	POLIERT polished	E.7715.0	61			✔					✔
	MEHR SCHNEIDER	λ≈40°		E.7646.0	61			✔					
	MEHR SCHNEIDER	λ≈20°		E.7727.0	62			✔					
	MEHR SCHNEIDER			E.7755.0	62			✔					
	MEHR SCHNEIDER	λ≈30°		E.7756.0	63			✔					
	MEHR SCHNEIDER	λ≈25°		E.7757.0	63			✔					
	MEHR SCHNEIDER	λ≈20°		E.7758.0	63			✔					
	MEHR SCHNEIDER	λ≈30°		E.7759.0	64			✔					
	MEHR SCHNEIDER	λ≈20°		E.7760.0	64			✔					
	MEHR SCHNEIDER	λ≈30°		E.7761.0	65			✔					
	MEHR SCHNEIDER			E.7762.0	65			✔					
	MEHR SCHNEIDER			E.7763.0	66			✔					
	MEHR SCHNEIDER			E.7764.0	66			✔					

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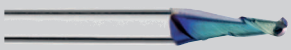
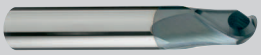
	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
FORMENBAU *MOULDS*													
	Z=2	λ≈30°	Blue Cut	E.7689.1	67	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7642.1	68	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7719.1	69	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7720.1	69	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7640.1	70-71	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7731.1	72	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7732.1	72	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7639.1	73	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7610.1	73	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7730.1	74	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7605.1	75-76	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7729.1	77	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7734.1	77	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7735.1	78	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7737.1	78	✔					✔		
	Z=2	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7643.1	79	✔					✔		
	Z=2	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7644.1	80	✔					✔		
	Z=2	λ≈15°	Blue Cut	E.7645.1	80	✔					✔		
	Z=2		Blue Cut	E.7638.1	81	✔					✔		
	Z=2	λ≈30°	Blue Cut	E.7738.1	81	✔					✔		
	Z=3		Blue Cut	E.7739.1	82	✔					✔		
	Z=3	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7697.1	82	✔					✔		

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

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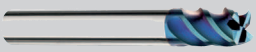
	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	Z=4	λ≈45°	Blue Cut	E.7740.1	83	✔					✔		
	Z=4	λ≈30°	Blue Cut	E.7741.1	83	✔					✔		
	Z=4	λ≈30°	Blue Cut	E.7742.1	84	✔					✔		
	Z=4	λ≈30°	SPEZIAL BESCHICHTUNG COATING	E.7699.1	84	✔					✔		
	Z=4	λ≈30°	Blue Cut	E.7654.1	85-86	✔					✔		
	Z=4	λ≈30°	Blue Cut	E.7733.1	87	✔					✔		
	Z=4	λ≈45°	Blue Cut	E.7743.1	88	✔					✔		
	Z=4	λ≈30°	Blue Cut	E.7655.1	89	✔					✔		
	Z=4	λ≈50°	SPEZIAL BESCHICHTUNG COATING	E.7744.1	90	✔					✔		
	Z=4		Blue Cut	E.7745.1	90	✔					✔		
	Z=4	λ≈15°	Blue Cut	E.7746.1	91	✔					✔		
	MEHR SCHNEIDER	λ≈50°	Blue Cut	E.7682.1	92	✔					✔		
	MEHR SCHNEIDER	λ≈45°	Blue Cut	E.7619.1	93	✔					✔		
	Z=6	λ≈45°	SPEZIAL BESCHICHTUNG COATING	E.7686.1	93	✔					✔		
	MEHR SCHNEIDER		Blue Cut	E.7747.1	94	✔					✔		
	MEHR SCHNEIDER	λ≈50°	Blue Cut	E.7748.1	95	✔					✔		
	MEHR SCHNEIDER	λ≈50°	Blue Cut	E.7749.1	95	✔					✔		
GRAPHIT *GRAPHITE*													
	Z=2	λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7696.1	96-97							✔	
	Z=2	λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7692.1	98-99							✔	
	Z=2	λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7765.1	99							✔	
		λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7766.1	100							✔	
		λ≈25°	DIAMANT BESCHICHTUNG COATING	E.7782.1	101							✔	

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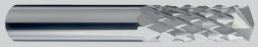
	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	Z=2	λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7712.1	101							✔	
		λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7767.1	102							✔	
		λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7778.1	102							✔	
		λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7779.1	102							✔	
		λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7780.1	103							✔	
		λ≈25°	DIAMANT BESCHICHTUNG COATING	E.7781.1	103							✔	
	Z=4	λ≈30°	DIAMANT BESCHICHTUNG COATING	E.7714.1	103							✔	
RUNDSTÄBE *RODS*													
				E.7783.0	104								
				E.7784.0	105								
				E.7752.0	106								

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

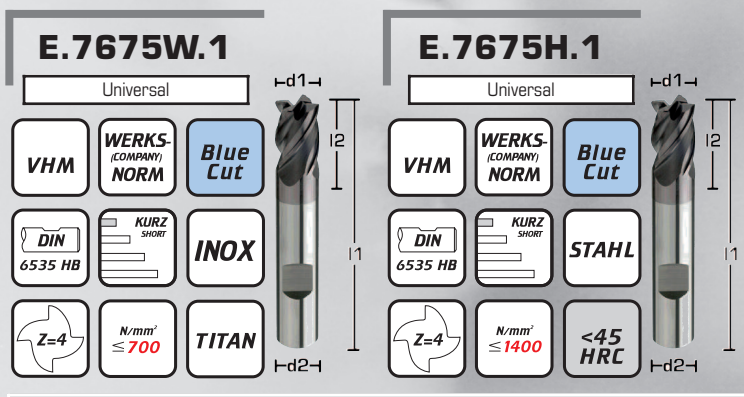
The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!



Vorteile *advantages:*

- **großer Einsatzbereich (Fein-Schlichten, Schlichten, Schrupp-Schlicht und Schrupp)**
  large range of use (Fine-Finishing, Finishing, Roughing-Finishing and Roughing)
- **hohe Standzeit** *long tool life*
- **vibrationsfreier Lauf** *vibration-free running*
- **bis zu 60% mehr Vorschub** *up to 60% additional feed*
- **bessere Oberflächengüte** *better surface quality*
- **größere Schnitttiefen** *larger cutting depths*
- **Schutzfase** *with corner of chamfer*

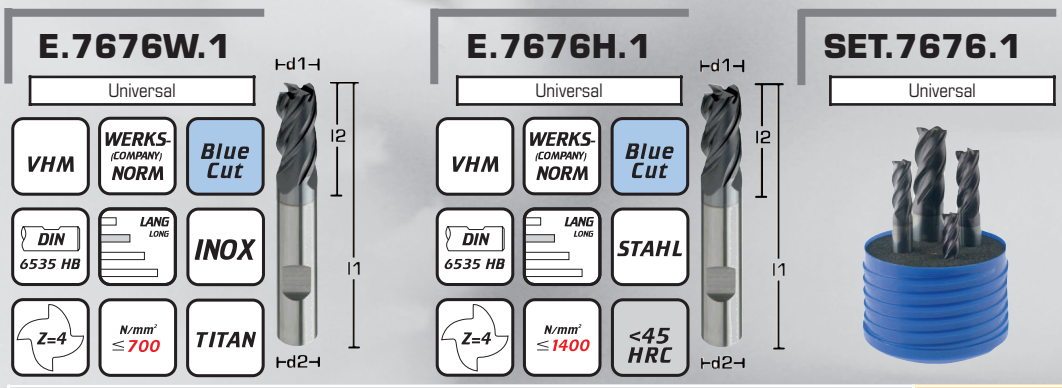
VHM-HPC-Superstar-Fräser (ungleiche Teilung) kurz



- Solid carbide HPC Superstar end mills (unequal pitch) short
- Frezy Superstar z węglika spiekanego czterostrzowe krótkie do obróbki wysokowydajnej (HPC)
- Frese in MD superstar, divisione irregolare, serie corta
- Fresas de metal duro "Superstar HPC" (división irregular), serie corta

Artikel-Nr. *Article-No.*				E.7675W.1 € Stück *piece*	E.7675H.1 € Stück *piece*
d1	l2	l1	d2 h6		
3,00	6	54	6,0	**17,10**	**17,10**
4,00	8	54	6,0	**17,10**	**17,10**
5,00	9	54	6,0	**17,10**	**17,10**
6,00	10	54	6,0	**17,10**	**17,10**
7,00	12	58	8,0	**23,00**	**23,00**
8,00	12	58	8,0	**20,50**	**20,50**
9,00	14	66	10,0	**33,20**	**33,20**
10,00	14	66	10,0	**28,50**	**28,50**
11,00	16	73	12,0	**42,80**	**42,80**
12,00	16	73	12,0	**37,00**	**37,00**
14,00	18	75	14,0	**49,40**	**49,40**
16,00	22	82	16,0	**60,80**	**60,80**
18,00	24	84	18,0	**90,20**	**90,20**
20,00	26	92	20,0	**93,10**	**83,10**
25,00	32	92	25,0	**224,00**	**224,00**

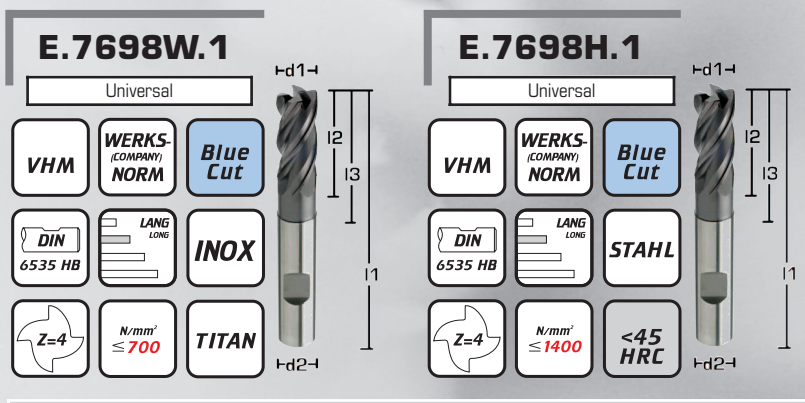
VHM-HPC-Superstar-Fräser (ungleiche Teilung) lang



- Solid carbide HPC Superstar end mills (unequal pitch) long
- Zestaw frezów Superstar z węglika spiekanego czteroostrzowych długich do obróbki wysokowydajnej (HPC)
- Frese in MD superstar, divisione irregolare, serie lunga
- Fresas de metal duro "Superstar HPC" (división irregular), serie larga

Artikel-Nr. *Article-No.*				E.7676W.1 € Stück *piece*	E.7676H.1 € Stück *piece*
d1	l2	l1	d2 h6		
3,00	8	57	6,0	**18,00**	**18,00**
4,00	11	57	6,0	**18,00**	**18,00**
5,00	13	57	6,0	**18,00**	**18,00**
6,00	13	57	6,0	**18,00**	**18,00**
7,00	19	63	8,0	**27,50**	**27,60**
8,00	19	63	8,0	**24,70**	**24,70**
9,00	22	72	10,0	**40,80**	**40,80**
10,00	22	72	10,0	**36,10**	**36,10**
11,00	26	83	12,0	**51,30**	**51,30**
12,00	26	83	12,0	**44,60**	**44,60**
14,00	26	83	14,0	**64,40**	**64,40**
16,00	32	92	16,0	**77,90**	**77,90**
18,00	32	92	18,0	**130,10**	**130,10**
20,00	38	104	20,0	**120,60**	**120,60**
25,00	38	104	25,0	**245,10**	**245,10**
Satz *Set*				**SET.7676W.1**	**SET.7676H.1**
1 Stück Ø 8 / 10 / 12 / 16 mm *1 piece Ø 8 / 10 / 12 / 16 mm*				**165,00**	**165,00**

VHM-HPC-Superstar-Fräser (ungleiche T.) abgesetzt



Solid carbide HPC Superstar end mills (unequal pitch) reduced

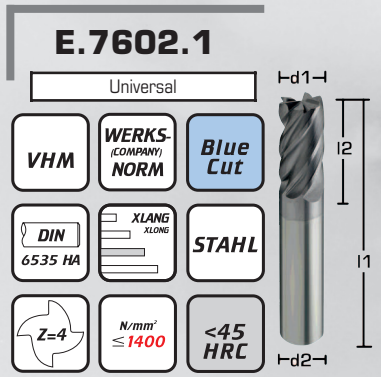
Frezy Superstar z węglika spiekanego czteroostrzowe zredukowane do obróbki wysokowydajnej (HPC)

Frese in MD superstar, divisione irregolare, ribassate

Fresas de metal duro "Superstar HPC" (división irregular), serie rebajada

Artikel-Nr. *Article-No.*					E.7698W.1 € Stück *piece*	E.7698H.1 € Stück *piece*
d1	l2	l3	l1	d2 h6		
4,00	8	18	57	6,0	**22,00**	**22,00**
5,00	13	21	57	6,0	**22,00**	**22,00**
6,00	13	21	57	6,0	**22,00**	**22,00**
7,00	19	27	63	8,0	**29,00**	**29,00**
8,00	19	27	63	8,0	**29,00**	**29,00**
9,00	22	32	72	10,0	**41,00**	**41,00**
10,00	22	32	72	10,0	**41,00**	**41,00**
11,00	26	38	83	12,0	**52,00**	**52,00**
12,00	26	38	83	12,0	**52,00**	**52,00**
13,00	26	42	83	14,0	**68,00**	**68,00**
14,00	26	42	83	14,0	**68,00**	**68,00**
16,00	32	44	92	16,0	**87,00**	**87,00**
18,00	32	50	100	18,0	**121,00**	**121,00**
20,00	38	54	104	20,0	**134,00**	**134,00**

VHM-HPC-Superstar-Fräser (ungleiche T.) extra lang



Solid carbide HPC Superstar end mills (unequal pitch) extra long

Frezy Superstar z węglika spiekanego czteroostrzowe bardzo długie do obróbki wysokowydajnej (HPC)

Frese in MD superstar, divisione irregolare serie extra lunga

Fresas de metal duro "Superstar HPC" (división irregular), serie extra larga

Artikel-Nr. *Article-No.*				E.7602.1 € Stück *piece*
d1	l2	l1	d2 h6	
5,00	21	63	6,0	**30,00**
6,00	22	63	6,0	**30,00**
8,00	28	80	8,0	**36,00**
10,00	33	100	10,0	**48,00**
12,00	42	100	12,0	**60,00**
14,00	48	100	14,0	**76,00**
16,00	53	150	16,0	**110,00**
20,00	68	150	20,0	**160,00**

E.7609.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut

DIN 6535 HB | LANG LONG | ER

Z=4 | N/mm² ≤1400 | <45 HRC



Solid carbide HPC Superstar end mills (unequal pitch) with corner radius

Frezy Superstar z węglika spiekanego czteroostrzowe długie do obróbki wysokowydajnej (HPC) z promieniem

Frese in MD superstar, divisione irreegolare, con raggio d´angolo

Fresas de metal duro "Superstar HPC" (división irregular) con radio lateral

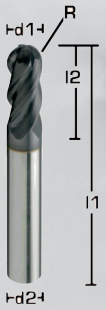
Artikel-Nr. *Article-No.*					E.7609.1 € Stück *piece*
d1	ER + - 0,02	l2	l1	d2 h6	
4,00	0,25	11	57	6,0	**21,00**
4,00	0,50	11	57	6,0	**21,00**
4,00	1,00	11	57	6,0	**21,00**
5,00	0,50	13	57	6,0	**21,00**
5,00	1,00	13	57	6,0	**21,00**
5,00	1,50	13	57	6,0	**21,00**
6,00	0,50	13	57	6,0	**21,00**
6,00	1,00	13	57	6,0	**21,00**
6,00	1,50	13	57	6,0	**21,00**
6,00	2,00	13	57	6,0	**21,00**
8,00	0,50	19	63	8,0	**28,00**
8,00	1,00	19	63	8,0	**28,00**
8,00	1,50	19	63	8,0	**28,00**
8,00	2,00	19	63	8,0	**28,00**
10,00	0,50	22	72	10,0	**41,00**
10,00	1,00	22	72	10,0	**41,00**
10,00	1,50	22	72	10,0	**41,00**
10,00	2,00	22	72	10,0	**41,00**
12,00	0,50	26	83	12,0	**52,00**
12,00	1,00	26	83	12,0	**52,00**
12,00	1,50	26	83	12,0	**52,00**
12,00	2,00	26	83	12,0	**52,00**
14,00	1,00	26	83	14,0	**69,50**
14,00	2,00	26	83	14,0	**69,50**
16,00	1,00	32	92	16,0	**90,00**
16,00	1,50	32	92	16,0	**90,00**
16,00	2,00	32	92	16,0	**90,00**
16,00	2,50	32	92	16,0	**90,00**
18,00	1,50	32	92	18,0	**126,00**
18,00	2,50	32	92	18,0	**126,00**
20,00	1,00	38	104	20,0	**138,00**
20,00	1,50	38	104	20,0	**138,00**
20,00	2,00	38	104	20,0	**138,00**
20,00	2,50	38	104	20,0	**138,00**
20,00	3,00	38	104	20,0	**138,00**
20,00	4,00	38	104	20,0	**138,00**
20,00	5,00	38	104	20,0	**138,00**

VHM-HPC-Superstar-Radius-Fräser (ungleiche T.)

E.7612.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | DIN 6535 HA | LANG LONG | R | Z=4 | N/mm² ≤1400 | <45 HRC



Solid carbide HPC Superstar ball nose end mills (unequal pitch)

Frezy Superstar z węglika spiekanego czteroostrzowe z czołem kulistym do obróbki wysokowydajnej (HPC)

Frese in MD superstar, divisione irregolare, raggiate

Fresas de radio de metal duro "Superstar HPC" (división irregular)

Artikel-Nr. *Article-No.*					E.7612.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
3,00	1,5	8	57	6,0	**20,00**
4,00	2,0	13	57	6,0	**20,00**
5,00	2,5	13	57	6,0	**20,00**
6,00	3,0	13	57	6,0	**20,00**
8,00	4,0	16	63	8,0	**27,00**
10,00	5,0	22	72	10,0	**41,00**
12,00	6,0	26	83	12,0	**52,00**
14,00	7,0	26	83	14,0	**70,00**
16,00	8,0	32	92	16,0	**92,00**
20,00	10,0	38	104	20,0	**140,00**

VHM-HPC-Superstar-Fräser (ungleiche T.) mit IK

E.7614.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | DIN 6535 HA | LANG LONG | Z=4 | N/mm² ≤1400 | <45 HRC



Solid carbide HPC Superstar end mills (unequal pitch) with internal coolant

Frezy Superstar z węglika spiekanego czteroostrzowe z chłodzeniem wew. do obróbki wysokowydajnej (HPC)

Frese in MD superstar, divisione irregolare, con refrigerazione interna

Fresas de metal duro "Superstar HPC" (división irregular) con refrigeración interior

Artikel-Nr. *Article-No.*				E.7614.1 € Stück *piece*
d1	l2	l1	d2 h6	
6,00	13	57	6,0	**51,00**
8,00	16	63	8,0	**55,00**
10,00	22	72	10,0	**61,00**
12,00	26	83	12,0	**70,00**
16,00	32	92	16,0	**105,00**
20,00	38	104	20,0	**160,00**

VHM-HPC-Superstar-Schruppfräser (ungleiche Teilung)

E.7615.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | DIN 6535 HB | LANG LONG | TYP HR | Z=4 | INOX | TITAN



Solid carbide HPC Superstar roughing end mills (unequal pitch)

Frezy Superstar z węglika spiekanego czteroostrzowe do obróbki zgrubnej wysokowydajnej (HPC)

Frese in MD superstar a rompitruciolo, divisione irregolare, a sgrossare

Fresas de desbaste de metal duro "Superstar HPC" (división irregular)

Artikel-Nr. *Article-No.*				E.7615.1 € Stück *piece*
d1	l2	l1	d2 h6	
4,00	11	57	6,0	**21,00**
5,00	13	57	6,0	**21,00**
6,00	13	57	6,0	**21,00**
8,00	16	63	8,0	**29,00**
10,00	22	72	10,0	**43,00**
12,00	26	83	12,0	**55,00**
14,00	26	83	14,0	**73,00**
16,00	32	92	16,0	**89,00**
20,00	38	104	20,0	**195,00**

VHM-HPC-Superstar-Schlichtfräser (ungleiche Teilung)

E.7716.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | DIN 6535 HB | LANG LONG | Z=3 | N/mm² ≤1400



Solid carbide HPC Superstar finishing end mills (unequal pitch)

Frezy Superstar z węglika spiekanego trzyostrzow do obróbki wykańczającej wysokowydajnej (HPC)

Frese in MD superstar rompitruciolo, divisione irregolare, a finire

Fresas de acabado de metal duro "Superstar HPC" (división irregular)

1 Vorschneide und 1 Fertigschneide
1 taper cutting edge and 1 finishing cutting edge

Artikel-Nr. *Article-No.*					E.7716.1 € Stück *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
6,00	13	57	6,0	3 / 6	**19,00**
8,00	19	63	8,0	3 / 6	**21,00**
10,00	22	72	10,0	3 / 6	**36,00**
12,00	26	83	12,0	3 / 6	**47,50**
16,00	32	92	16,0	3 / 6	**85,00**
20,00	38	104	20,0	3 / 6	**116,00**
25,00	42	110	25,0	3 / 6	**225,00**

VHM-HPC-HSC-Fräser

E.7728.1

Universal

VHM | WERKS-(COMPANY)NORM | Blue Cut | DIN 6535 HA | ≤65 HRC | HRC | Z=4 | UNIVERSAL TOOL | HSC TOOL



E.7785.1

Universal

VHM | WERKS-(COMPANY)NORM | Blue Cut | DIN 6535 HA | UNIVERSAL TOOL | Z=4



Solid carbide HPC HSC end mills

Frezy czteroostrzowe z węglika spiekanego do obróbki wysokowydajnej (HPC) szybkościowej (HSC)

Frese in MD HPC HSC per alte prestazioni

Fresas de metal duro HPC para alta velocidad

Artikel-Nr. *Article-No.*				E.7728.1 € Stück *piece*	E.7785.1 € Stück *piece*
d1	l2	l1	d2 h6		
4,00	11	57	6,0	**28,00**	
5,00	13	57	6,0	**28,00**	
6,00	13	57	6,0	**30,00**	**21,00**
8,00	19	63	8,0	**33,00**	**27,00**
10,00	22	72	10,0	**54,00**	**39,00**
12,00	26	83	12,0	**74,00**	**47,00**
14,00	26	83	14,0	**104,00**	
16,00	32	92	16,0	**137,00**	**82,00**
18,00	32	92	18,0	**157,00**	
20,00	38	104	20,0	**198,00**	**128,00**

VHM-HPC-Superstarfräser-Superfinish (ungleiche Teilung)

E.7661.1

Universal

VHM | WERKS-(COMPANY)NORM | Blue Cut | DIN 6535 HA | Z=6 | UNIVERSAL TOOL



Solid carbide HPC Superstar end mills (unequal pitch) superfinish

Frezy Superstar z węglika spiekanego sześcioostrzowe do obróbki superfiniszowej wysokowydajnej (HPC)

Frese in MD superstar, divisione irregolare per superfinitura

Fresas de acabado superfino de metal duro "Superstar HPC" (división irregular)

Artikel-Nr. *Article-No.*				E.7661.1 € Stück *piece*
d1	l2	l1	d2 h6	
8,00	19	63	8,0	**32,00**
10,00	22	72	10,0	**52,00**
12,00	26	83	12,0	**68,00**
16,00	32	92	16,0	**121,00**
20,00	38	104	20,0	**174,00**
25,00	42	110	25,0	**271,00**

E.7604.0

2.1 | 2.2 | 4.1 | 4.2 | 4.4 | 4.7

VHM | WERKS-(COMPANY) NORM | NE-METALLE | INOX | λ≈30° | Z=2 | DIN 6535 HA



Solid carbide Inox micro end mills

Frezy miniaturowe z węglika spiekanego dwuostrzowe do stali nierdzewnej

Microfrese in MD inox

Microfresas de metal duro para inoxidable

Artikel-Nr. *Article-No.*				E.7604.0 € Stück *piece*
d1 +-0,005	l2	l1	d2 h4	
0,05	0,10	39	3,0	**71,00**
0,06	0,12	39	3,0	**71,00**
0,07	0,14	39	3,0	**71,00**
0,08	0,16	39	3,0	**71,00**
0,09	0,18	39	3,0	**71,00**
0,10	0,20	39	3,0	**62,00**
0,15	0,30	39	3,0	**62,00**
0,20	0,40	39	3,0	**52,00**
0,25	0,50	39	3,0	**52,00**
0,30	0,60	39	3,0	**49,00**
0,35	0,70	39	3,0	**46,00**
0,40	0,80	39	3,0	**42,00**
0,45	0,90	39	3,0	**42,00**
0,50	1,00	39	3,0	**42,00**
0,60	1,20	39	3,0	**37,00**
0,70	1,40	39	3,0	**37,00**
0,80	1,60	39	3,0	**37,00**
0,90	1,80	39	3,0	**37,00**
1,00	2,50	50	4,0	**32,00**
1,10	2,50	50	4,0	**34,00**
1,20	3,00	50	4,0	**34,00**
1,30	3,00	50	4,0	**34,00**
1,40	3,00	50	4,0	**34,00**
1,50	4,00	50	4,0	**31,00**
1,60	4,00	50	4,0	**32,00**
1,70	4,00	50	4,0	**32,00**
1,80	5,00	50	4,0	**32,00**
1,90	5,00	50	4,0	**32,00**
2,00	6,00	50	4,0	**30,00**
2,10	6,00	50	4,0	**31,00**
2,20	6,00	50	4,0	**31,00**
2,30	7,00	50	4,0	**31,00**
2,40	7,00	50	4,0	**31,00**
2,50	7,00	50	4,0	**28,00**
2,60	7,00	50	4,0	**30,00**
2,70	7,00	50	4,0	**30,00**
2,80	8,00	50	4,0	**30,00**
2,90	8,00	50	4,0	**30,00**
3,00	12,00	50	4,0	**28,00**
3,50	12,00	50	4,0	**30,00**
4,00	14,00	50	4,0	**28,00**
4,50	14,00	50	5,0	**37,00**
5,00	16,00	50	5,0	**37,00**
6,00	19,00	64	6,0	**42,00**

E.7611.0

2.1 | 2.2 | 4.1 | 4.2 | 4.4 | 4.7

VHM | WERKS-(COMPANY)-NORM | NE-METALLE | INOX | λ≈30° | R | Z=2 | DIN 6535 HA



Solid carbide Inox micro ball nose end mills

Frezy miniaturowe z węglika spiekanego dwuostrzowe z czołem kulistym do stali nierdzewnej

Microfrese in MD per inox con raggio

Microfresas de radio de metal duro para inoxidable

Artikel-Nr. *Article-No.*					E.7611.0 € Stück *piece*
d1 +-0,005	R	l2	l1	d2 h4	
0,05	0,025	0,1	39	3,0	**83,00**
0,10	0,050	0,2	39	3,0	**74,00**
0,15	0,075	0,3	39	3,0	**74,00**
0,20	0,100	0,4	39	3,0	**64,00**
0,25	0,125	0,5	39	3,0	**64,00**
0,30	0,150	0,6	39	3,0	**61,00**
0,35	0,175	0,7	39	3,0	**58,00**
0,40	0,200	0,8	39	3,0	**64,00**
0,45	0,225	0,9	39	3,0	**54,00**
0,50	0,250	1,0	39	3,0	**54,00**
0,60	0,300	1,2	39	3,0	**49,00**
0,70	0,350	1,4	39	3,0	**49,00**
0,80	0,400	1,6	39	3,0	**49,00**
0,90	0,450	1,8	39	3,0	**49,00**
1,00	0,500	2,5	50	4,0	**44,00**
1,10	0,550	2,5	50	4,0	**45,00**
1,20	0,600	3,0	50	4,0	**45,00**
1,30	0,650	3,0	50	4,0	**45,00**
1,40	0,700	3,0	50	4,0	**45,00**
1,50	0,750	4,0	50	4,0	**41,00**
1,60	0,800	4,0	50	4,0	**43,00**
1,70	0,850	4,0	50	4,0	**43,00**
1,80	0,900	5,0	50	4,0	**43,00**
1,90	0,950	5,0	50	4,0	**43,00**
2,00	1,000	6,0	50	4,0	**38,00**
2,10	1,050	6,0	50	4,0	**40,00**
2,20	1,100	6,0	50	4,0	**40,00**
2,30	1,150	7,0	50	4,0	**40,00**
2,40	1,200	7,0	50	4,0	**40,00**
2,50	1,250	7,0	50	4,0	**40,00**
2,60	1,300	7,0	50	4,0	**39,00**
2,70	1,350	7,0	50	4,0	**39,00**
2,80	1,400	8,0	50	4,0	**40,00**
2,90	1,450	8,0	50	4,0	**40,00**
3,00	1,500	12,0	50	4,0	**38,00**
3,50	1,750	12,0	50	4,0	**40,00**
4,00	2,000	14,0	50	4,0	**38,00**
4,50	2,250	14,0	50	5,0	**45,00**
5,00	2,500	16,0	50	5,0	**45,00**
6,00	3,000	19,0	64	6,0	**55,00**

VHM-Inox-Advantage-Schaftfräser 48°

E.7693.1

2.1 | 2.2 | 4.1 | 4.2 | 4.4 | 4.7

VHM | WERKS-(COMPANY) NORM | NE-METALLE | INOX | Blue Cut | Z=3 | DIN 6535 HA



Solid carbide Inox Advantage end mills 48°

Frezy Advantage z węglika spiekanego trzyostrzowe 48° do stali nierdzewnej

Frese in MD advantage inox 48°

Fresas de metal duro "Ventaja" de 48° para inoxidable

Artikel-Nr. *Article-No.*				E.7693.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	4	57	6,0	**22,00**
2,00	6	57	6,0	**22,00**
3,00	8	57	6,0	**32,00**
4,00	11	57	6,0	**32,00**
5,00	13	57	6,0	**32,00**
6,00	13	57	6,0	**34,00**
8,00	19	63	8,0	**38,00**
10,00	22	72	10,0	**64,00**
12,00	26	83	12,0	**88,00**
16,00	32	92	16,0	**162,00**
20,00	38	104	20,0	**228,00**

VHM-Inox-Schlichtfräser 45°

E.7673.1

2.1 | 2.2 | 4.1 | 4.2 | 4.4 | 4.7

VHM | WERKS-(COMPANY) NORM | SPEZIAL BESCHICHTUNG COATING | NE-METALLE | λ≈45° | INOX | Z=4 | DIN 6535 HB | TITAN



Solid carbide Inox finishing end mills 45°

Frezy z węglika spiekanego czteroostrzowe 45° do obróbki wykańczającej do stali nierdzewnej

Frese in MD per finitura inox 45°

Fresas de metal duro de acabado de 45° para inoxidable

Artikel-Nr. *Article-No.*				E.7673.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
6,00	13	57	6,0	**45,00**
8,00	19	63	8,0	**62,00**
10,00	22	72	10,0	**78,00**
12,00	26	83	12,0	**106,00**
16,00	32	92	16,0	**161,00**
20,00	38	104	20,0	**204,00**

E.7674.1

2.1 | 2.2 | 4.1 | 4.2 | 4.4 | 4.7

VHM | WERKS-(COMPANY) NORM | SPEZIAL BESCHICHTUNG COATING | NE-METALLE | λ≈60° | INOX | Z=4 | DIN 6535 HB | TITAN



Solid carbide Inox finishing end mills 60°

Frezy z węglika spiekanego czteroostrzowe 60° do obróbki wykańczającej do stali nierdzewnej

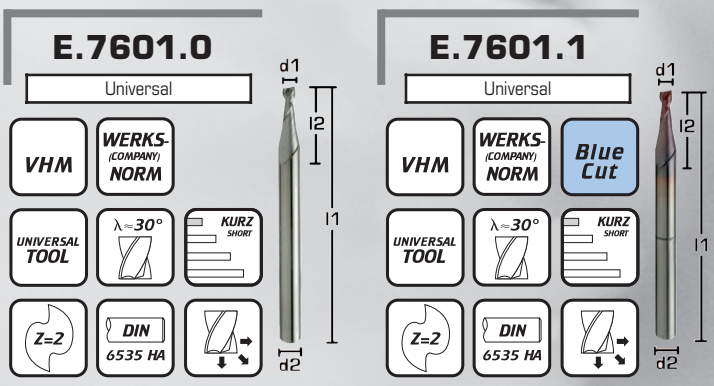
Frese in MD per finitura inox 60°

Fresas de metal duro de acabado de 60° para inoxidable

Für dünnwandige Bearbeitung
Working at thin walls

Artikel-Nr. *Article-No.*				E.7674.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
6,00	13	57	6,0	**29,80**
8,00	19	63	8,0	**30,80**
10,00	22	72	10,0	**47,00**
12,00	26	83	12,0	**57,50**
16,00	32	92	16,0	**114,00**
18,00	32	92	18,0	**140,00**
20,00	38	104	20,0	**158,00**





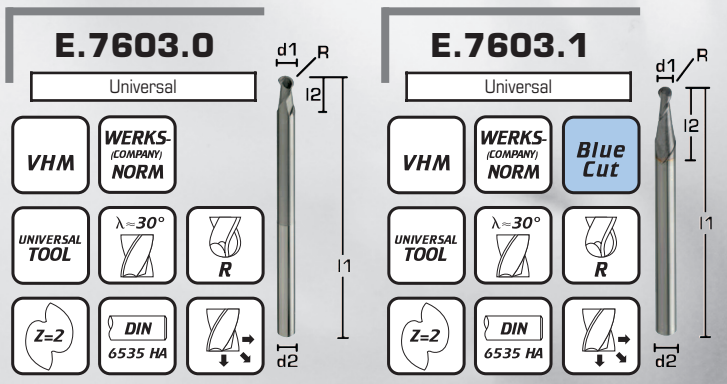
Solid carbide Universal micro end mills 30° short

Frezy miniaturowe z węglika spiekanego dwuostrzowe krótkie 30° uniwersalne

Microfrese in MD universale 30° corta

Microfresas de metal duro de 30°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7601.0 € Stück *piece*	E.7601.1 € Stück *piece*
d1	l2	l1	d2 h6		
0,10	0,30	38	3,0	**30,00**	
0,15	0,30	38	3,0	**30,00**	
0,20	0,50	38	3,0	**28,00**	**30,00**
0,25	0,50	38	3,0	**20,00**	**36,00**
0,30	1,00	38	3,0	**19,00**	**20,00**
0,40	1,00	38	3,0	**17,00**	**19,00**
0,50	1,50	38	3,0	**15,00**	**17,00**
0,60	1,50	38	3,0	**16,00**	**18,00**
0,70	2,00	38	3,0	**16,00**	**18,00**
0,80	2,00	38	3,0	**16,00**	**18,00**
0,90	2,50	38	3,0	**16,00**	**18,00**
1,00	3,00	38	3,0	**16,00**	**18,00**
1,10	3,00	38	3,0	**16,00**	**18,00**
1,20	4,00	38	3,0	**16,00**	**18,00**
1,30	4,00	38	3,0	**17,00**	**19,00**
1,40	4,00	38	3,0	**17,00**	**19,00**
1,50	4,00	38	3,0	**17,00**	**19,00**
1,60	4,00	38	3,0	**17,00**	**19,00**
1,70	4,00	38	3,0	**17,00**	**19,00**
1,80	5,00	38	3,0	**17,00**	**19,00**
1,90	5,00	38	3,0	**17,00**	**19,00**
2,00	5,00	38	3,0	**16,00**	**18,00**



Solid carbide Universal micro ball nose end mills 30°

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym uniwersalne

Microfrese in MD raggiata universale 30°

Microfresas de radio de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*					E.7603.0 € Stück *piece*	E.7603.1 € Stück *piece*
d1	R	l2	l1	d2 h6		
0,10	0,050	0,2	38	3,0	**76,00**	
0,15	0,075	0,3	38	3,0	**65,00**	
0,20	0,100	0,5	38	3,0	**60,00**	
0,25	0,125	0,5	38	3,0	**40,00**	**42,00**
0,30	0,150	1,0	38	3,0	**40,00**	**42,00**
0,40	0,200	1,0	38	3,0	**20,00**	**22,00**
0,50	0,250	1,5	38	3,0	**18,00**	**20,00**
0,60	0,300	1,5	38	3,0	**20,00**	**22,00**
0,70	0,350	2,0	38	3,0	**20,00**	**22,00**
0,80	0,400	2,0	38	3,0	**18,00**	**20,00**
0,90	0,450	2,5	38	3,0	**20,00**	**22,00**
1,00	0,500	3,0	38	3,0	**16,00**	**18,00**
1,10	0,550	3,0	38	3,0	**18,00**	**20,00**
1,20	0,600	3,0	38	3,0	**18,00**	**20,00**
1,40	0,700	4,0	38	3,0	**18,00**	**20,00**
1,50	0,750	4,0	38	3,0	**18,00**	**20,00**
1,60	0,800	5,0	38	3,0	**18,00**	**20,00**
1,80	0,900	5,0	38	3,0	**18,00**	**20,00**
2,00	1,000	5,0	38	3,0	**16,00**	**18,00**
2,50	1,250	7,0	38	3,0	**23,00**	**31,00**

E.7606.0

Universal

VHM | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | λ≈30° | Z=2 | DIN 6535 HA



Solid carbide Universal end mills 30°

Frezy z węglika spiekanego dwuostrzowe 30° uniwersalne

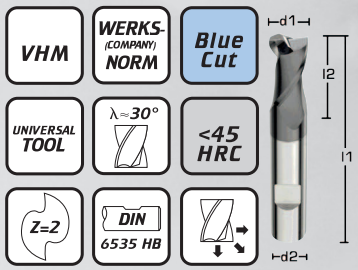
Frese in MD universale 30°

Fresas de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*				E.7606.0 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	8,0	38	2,0	**11,00**
2,50	8,0	38	2,5	**11,00**
3,00	12,0	38	3,0	**11,00**
3,50	12,0	40	3,5	**12,00**
4,00	12,0	40	4,0	**12,00**
4,50	14,0	50	4,5	**15,00**
5,00	14,0	50	5,0	**15,00**
5,50	16,0	50	5,5	**18,00**
6,00	16,0	50	6,0	**18,00**
6,50	16,0	50	6,5	**20,00**
7,00	20,0	60	7,0	**20,00**
7,50	20,0	60	7,5	**24,00**
8,00	20,0	60	8,0	**24,00**
8,50	20,0	60	8,5	**30,00**
9,00	20,0	60	9,0	**30,00**
9,50	22,0	70	9,5	**40,00**
10,00	22,0	70	10,0	**36,00**
11,00	22,0	70	11,0	**42,00**
12,00	22,0	70	12,0	**45,00**
13,00	25,0	75	13,0	**55,00**
14,00	25,0	75	14,0	**63,00**
15,00	25,0	75	15,0	**75,00**
16,00	25,0	75	16,0	**79,00**
18,00	32,0	100	18,0	**114,00**
20,00	32,0	100	20,0	**141,00**
	lang *long*			**E.7606.0L**
3,00	20,0	55	3,0	**16,00**
4,00	20,0	60	4,0	**19,00**
5,00	20,0	60	5,0	**21,00**
6,00	24,0	65	6,0	**22,50**
8,00	32,0	80	8,0	**32,00**
10,00	32,0	80	10,0	**48,00**
12,00	50,0	100	12,0	**63,00**
14,00	50,0	100	14,0	**76,00**
16,00	50,0	100	16,0	**108,00**
18,00	50,0	100	18,0	**131,00**
20,00	50,0	100	20,0	**152,00**
	überlang *extended long*			**E.7606.0XL**
3,00	30,0	70	3,0	**19,00**
4,00	40,0	75	4,0	**23,00**
5,00	40,0	80	5,0	**28,00**
6,00	45,0	80	6,0	**29,00**
8,00	50,0	100	8,0	**41,00**
10,00	50,0	100	10,0	**56,00**
12,00	70,0	150	12,0	**87,00**
14,00	75,0	150	14,0	**119,00**
16,00	75,0	150	16,0	**168,00**
18,00	75,0	150	18,0	**186,00**
20,00	75,0	150	20,0	**215,00**

E.7613.1

Universal



Solid carbide Universal end mills 30° short

Frezy z węglika spiekanego dwuostrzowe krótkie 30° uniwersalne

Frese in MD universale 30° corte

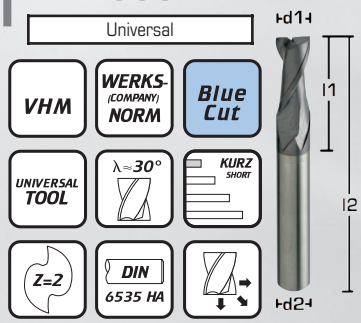
Fresas de metal duro de 30°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7613.1 € Stück *piece*
d1	l2	l1	d2	
2,00	3	38	3,0	**13,00**
3,00	4	38	3,0	**13,00**
4,00	5	54	6,0	**15,00**
5,00	6	54	6,0	**16,00**
6,00	7	54	6,0	**16,00**
8,00	9	58	8,0	**18,00**
10,00	11	66	10,0	**24,00**
12,00	12	73	12,0	**35,00**
14,00	14	75	14,0	**50,00**
16,00	16	82	16,0	**63,00**
18,00	18	84	18,0	**78,00**
20,00	20	92	20,0	**99,00**

VHM-Universal-Schaftfräser 30° kurz

E.7666.1

Universal



Solid carbide Universal end mills 30° short

Frezy z węglika spiekanego dwuostrzowe krótkie 30° uniwersalne

Frese in MD universale 30° corte

Fresas de metal duro de 30°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7666.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
1,00	5	50	6,0	**12,00**
2,00	6	50	6,0	**12,00**
3,00	6	50	6,0	**12,00**
4,00	8	50	6,0	**12,00**
5,00	8	50	6,0	**12,00**
6,00	16	50	6,0	**12,00**
8,00	20	60	8,0	**15,00**
10,00	22	70	10,0	**23,00**
12,00	22	70	12,0	**32,00**
16,00	25	75	16,0	**56,00**
20,00	32	100	20,0	**88,00**

VHM-Universal-Schaftfräser 30° lang

E.7618.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | <45 HRC | Z=2 | DIN 6535 HB



Solid carbide Universal end mills 30° long

Frezy z węglika spiekanego dwuostrzowe długie 30° uniwersalne

Frese in MD universale 30° lunga

Fresas de metal duro de 30°, uso universal, serie larga

Artikel-Nr. *Article-No.*				E.7618.1 € Stück *piece*
d1	l2	l1	d2	
2,00	6	38	3,0	**14,00**
2,50	6	38	3,0	**16,00**
3,00	7	38	3,0	**16,00**
3,50	8	57	6,0	**16,00**
4,00	8	57	6,0	**16,00**
4,50	10	57	6,0	**16,00**
4,70	10	57	6,0	**16,00**
5,00	10	57	6,0	**16,00**
5,50	10	57	6,0	**16,00**
5,70	10	57	6,0	**16,00**
6,00	10	57	6,0	**15,00**
7,00	16	63	8,0	**18,00**
7,70	16	63	8,0	**18,00**
8,00	16	63	8,0	**18,00**
9,70	19	72	10,0	**27,00**
10,00	19	72	10,0	**27,00**
11,70	22	83	12,0	**39,00**
12,00	22	83	12,0	**38,00**
13,70	22	83	14,0	**58,00**
14,00	22	83	14,0	**56,00**
15,70	26	92	16,0	**67,00**
16,00	26	92	16,0	**65,00**
18,00	26	92	18,0	**90,00**
20,00	32	104	20,0	**105,00**

VHM-Universal-Schaftfräser 30° mit Eckenradius lang

E.7653.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | ER | Z=2 | DIN 6535 HA



Solid carbide Universal end mills 30° with corner radius long

Frezy z węglika spiekanego dwuostrzowe długie 30° z promieniem na czole uniwersalne

Frese in MD universale 30°, con raggio d´angolo, serie lunga

Fresas de metal duro con radio lateral de 30°, uso universal, serie larga

Speziell geeignet zum Fräsen mit geringer Schnitttiefe
Specially suited for milling with minimum cutting depth

Artikel-Nr. *Article-No.*						E.7653.1 € Stück *piece*
d1 0/-0,04	ER	l2	l3	l1	d2 h6	
6,00	0,4	2,5	42	85	5,0	**99,00**
8,00	0,6	3,0	42	85	7,0	**125,00**
10,00	0,7	3,0	42	85	9,0	**165,00**
12,00	0,9	4,5	42	85	11,0	**178,00**
16,00	1,0	5,5	70	110	15,0	**270,00**

VHM-Universal-Schaftfräser 30° mit Eckenradius XL

E.7647.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | ER | Z=2 | DIN 6535 HB



Solid carbide Universal end mills 30° with corner radius XL

Frezy z węglika spiekanego dwuostrzowe bardzo długie 30° z promieniem na czole uniwersalne

Frese in MD universale 30°, con raggio d´angolo, serie extra lunga

Fresas de metal duro con radio lateral de 30°, uso universal, serie extra larga

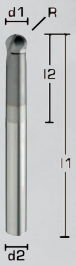
Artikel-Nr. *Article-No.*						E.7647.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
6,00	0,3	25	120	200	6,0	**58,00**
8,00	0,3	25	120	200	8,0	**74,00**
10,00	0,3	50	120	200	10,0	**89,00**
12,00	0,4	50	120	200	12,0	**109,00**
16,00	0,4	65	150	220	16,0	**188,00**
20,00	0,4	65	150	250	20,0	**298,00**

VHM-Universal-Kugelfräser 30°

E.7660.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | R | Z=2 | DIN 6535 HA | <45 HRC



Solid carbide Universal ball nose end mills 30°

Frezy z węglika spiekanego dwuostrzowe 30° z czołem kulistym uniwersalne

Frese in MD universale 30° raggiata

Fresas de bola de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*					E.7660.1 € Stück *piece*
d1	R	l2	l1	d2	
3,00	1,5	7	60	2,1	**99,00**
4,00	2,0	9	60	2,8	**99,00**
5,00	2,5	12	60	3,5	**99,00**
6,00	3,0	15	70	4,3	**112,00**
8,00	4,0	21	70	5,7	**125,00**
10,00	5,0	25	70	7,0	**142,00**
12,00	6,0	30	90	8,5	**154,00**

E.7641.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | R | Z=2 | DIN 6535 HB



Solid carbide Universal ball nose end mills 30°

Frezy z węglika spiekanego dwuostrzowe 30° z czołem kulistym uniwersalne

Frese in MD universale 30° raggiata

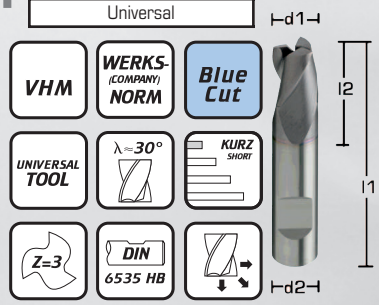
Fresas de radio de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*					E.7641.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
1,00	0,50	3	50	6,0	**19,50**
2,00	1,00	4	50	6,0	**19,50**
2,50	1,25	4	50	6,0	**19,50**
3,00	1,50	5	50	6,0	**20,50**
3,50	1,75	5	50	6,0	**20,50**
4,00	2,00	6	54	6,0	**20,50**
4,50	2,25	6	54	6,0	**21,50**
5,00	2,50	7	54	6,0	**23,00**
6,00	3,00	9	54	6,0	**23,50**
8,00	4,00	12	58	8,0	**28,00**
10,00	5,00	14	66	10,0	**36,00**
12,00	6,00	14	73	12,0	**49,00**
14,00	7,00	16	75	14,0	**68,00**
16,00	8,00	18	82	16,0	**86,00**
18,00	9,00	20	88	18,0	**105,00**
20,00	10,00	22	92	20,0	**128,00**
		lang *long*			**E.7641.1L**
3,00	1,50	20	60	3,0	**29,00**
4,00	2,00	25	60	4,0	**29,00**
5,00	2,50	25	75	5,0	**33,00**
6,00	3,00	30	75	6,0	**36,00**
8,00	4,00	45	100	8,0	**45,00**
10,00	5,00	45	100	10,0	**55,00**
12,00	6,00	45	100	12,0	**74,00**
16,00	8,00	45	100	16,0	**148,00**
20,00	10,00	45	100	20,0	**190,00**
		überlang *extended long*			**E.7641.1XL**
6,00	3,00	40	150	6,0	**49,00**
8,00	4,00	40	150	8,0	**54,00**
10,00	5,00	40	150	10,0	**65,00**
12,00	6,00	50	150	12,0	**92,00**
16,00	8,00	50	150	16,0	**161,00**
20,00	10,00	50	150	20,0	**190,00**
25,00	12,50	50	150	25,0	**302,00**
		extra lang *extra long*			**E.7641.1XXL**
8,00	4,00	40	200	8,0	**70,00**
10,00	5,00	40	200	10,0	**85,00**
12,00	6,00	40	200	12,0	**98,00**
16,00	8,00	60	200	16,0	**196,00**
20,00	10,00	80	200	20,0	**240,00**
25,00	12,50	80	200	25,0	**370,00**
		super lang *super long*			**E.7641.1SL**
6,00	3,00	25	200	6,0	**76,00**
8,00	4,00	25	200	8,0	**90,00**
10,00	5,00	50	200	10,0	**104,00**
12,00	6,00	50	200	12,0	**110,00**
16,00	8,00	65	220	16,0	**215,00**
20,00	10,00	65	250	20,0	**289,00**

VHM-Universal-Einweg-Schaftfräser 30°

E.7622.1

Universal



Solid carbide Universal throw away end mills 30°

Frezy z węglika spiekanego trzyostrzowe 30° z ostrzami na czole uniwersalne

Frese in MD a gettare 30°

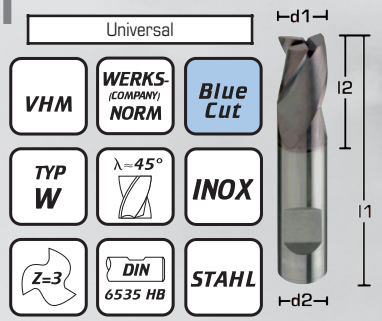
Fresas de metal duro de 30°, uso universal de un solo uso

Artikel-Nr. *Article-No.*				E.7622.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
0,50	1,5	38	3,0	**12,50**
1,00	2,0	38	3,0	**10,50**
1,50	2,0	38	3,0	**10,50**
2,00	4,0	38	6,0	**10,50**
2,50	5,0	36	6,0	**10,50**
3,00	5,0	38	6,0	**10,50**
3,50	6,0	38	6,0	**10,50**
4,00	7,0	38	6,0	**10,50**
4,50	8,0	38	6,0	**10,50**
5,00	8,0	38	6,0	**10,50**
5,50	8,0	39	6,0	**10,50**
5,75	8,0	39	6,0	**10,50**
6,00	8,0	38	6,0	**10,50**
7,00	10,0	42	8,0	**16,00**
8,00	11,0	43	8,0	**16,00**
9,00	11,0	48	10,0	**22,00**
10,00	13,0	50	10,0	**20,00**
12,00	15,0	55	12,0	**32,00**

VHM-Universal-Einweg-Schaftfräser 45°

E.7668.1

Universal



Solid carbide Universal throw away end mills 45°

Frezy z węglika spiekanego trzyostrzowe 45° z ostrzami na czole uniwersalne

Frese in MD a gettare 45°

Fresas de metal duro de 45°, uso universal de un solo uso

Artikel-Nr. *Article-No.*				E.7668.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	4	38	6,0	**11,30**
2,00	4	38	6,0	**11,30**
3,00	5	38	6,0	**11,30**
4,00	7	38	6,0	**11,30**
5,00	8	38	6,0	**11,30**
6,00	8	38	6,0	**11,30**
8,00	11	43	8,0	**15,00**
10,00	13	50	10,0	**21,00**

E.7626.0

Universal

VHM | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | λ≈30° | Z=3 | DIN 6535 HA



Solid carbide Universal end mills 30°

Frezy z węglika spiekanego trzyostrzowe 30° uniwersalne

Frese in MD universali 30°

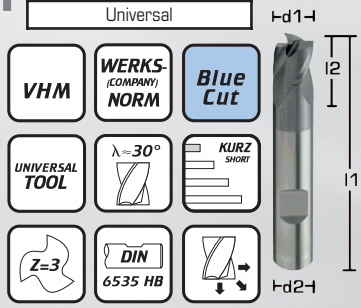
Fresas de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*				E.7626.0 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	8,0	38	2,0	**11,00**
2,50	8,0	38	2,5	**11,00**
3,00	12,0	38	3,0	**11,00**
3,50	12,0	40	3,5	**12,00**
4,00	12,0	40	4,0	**12,00**
4,50	14,0	50	4,5	**15,00**
5,00	14,0	50	5,0	**15,00**
5,50	16,0	50	5,5	**18,00**
6,00	16,0	50	6,0	**18,00**
6,50	16,0	50	6,5	**20,00**
7,00	20,0	60	7,0	**20,00**
7,50	20,0	60	7,5	**24,00**
8,00	20,0	60	8,0	**24,00**
8,50	20,0	60	8,5	**30,00**
9,00	20,0	60	9,0	**30,00**
9,50	22,0	70	9,5	**40,00**
10,00	22,0	70	10,0	**36,00**
11,00	22,0	70	11,0	**42,00**
12,00	22,0	70	12,0	**45,00**
13,00	25,0	75	13,0	**55,00**
14,00	25,0	75	14,0	**63,00**
15,00	25,0	75	15,0	**75,00**
16,00	25,0	75	16,0	**79,00**
18,00	32,0	100	18,0	**114,00**
20,00	32,0	100	20,0	**141,00**
	lang *long*			**E.7626.0L**
3,00	20,0	55	3,0	**16,00**
4,00	20,0	60	4,0	**19,00**
5,00	20,0	60	5,0	**21,00**
6,00	24,0	65	6,0	**22,50**
8,00	32,0	80	8,0	**32,00**
10,00	32,0	80	10,0	**48,00**
12,00	50,0	100	12,0	**63,00**
14,00	50,0	100	14,0	**76,00**
16,00	50,0	100	16,0	**108,00**
18,00	50,0	100	18,0	**131,00**
20,00	50,0	100	20,0	**152,00**
	überlang *extended long*			**E.7626.0XL**
3,00	30,0	70	3,0	**19,00**
4,00	40,0	75	4,0	**23,00**
5,00	40,0	80	5,0	**28,00**
6,00	45,0	80	6,0	**29,00**
8,00	50,0	100	8,0	**41,00**
10,00	50,0	100	10,0	**56,00**
12,00	70,0	150	12,0	**87,00**
14,00	75,0	150	14,0	**119,00**
16,00	75,0	150	16,0	**168,00**
18,00	75,0	150	18,0	**186,00**
20,00	75,0	150	20,0	**215,00**

VHM-Universal-Schaftfräser 30° kurz

E.7623.1

Universal



Solid carbide Universal end mills 30° short

Frezy z węglika spiekanego trzyostrzowe krótkie 30° uniwersalne

Frese in MD universali 30° corte

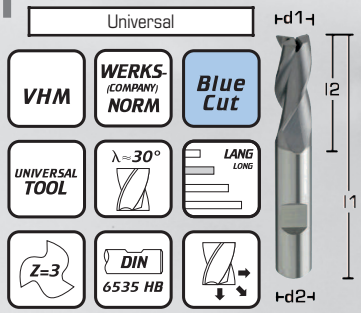
Fresas de metal duro de 30°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7623.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
1,00	5	50	6,0	**14,00**
2,00	6	50	6,0	**14,00**
3,00	6	50	6,0	**14,00**
4,00	8	50	6,0	**16,00**
5,00	8	50	6,0	**16,00**
6,00	16	50	6,0	**16,00**
8,00	20	60	8,0	**19,00**
10,00	22	70	10,0	**26,00**
12,00	22	70	12,0	**29,00**
16,00	25	75	16,0	**68,00**
20,00	32	100	20,0	**108,00**

VHM-Universal-Schaftfräser 30° lang

E.7624.1

Universal



Solid carbide Universal end mills 30° long

Frezy z węglika spiekanego trzyostrzowe długie 30° uniwersalne

Frese in MD universali 30° lunghe

Fresas de metal duro de 30°, uso universal, serie larga

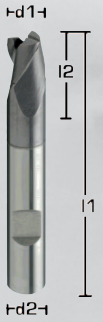
Artikel-Nr. *Article-No.*				E.7624.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	6	57	6,0	**17,00**
1,50	7	57	6,0	**17,00**
2,00	6	57	6,0	**17,00**
2,50	7	57	6,0	**17,00**
3,00	7	57	6,0	**16,00**
3,50	8	57	6,0	**16,00**
4,00	8	57	6,0	**16,00**
5,00	10	57	6,0	**16,00**
5,50	10	57	6,0	**16,00**
6,00	10	57	6,0	**14,00**
8,00	16	63	8,0	**18,00**
10,00	19	72	10,0	**24,00**
12,00	22	83	12,0	**40,00**
14,00	22	83	14,0	**60,00**
16,00	26	92	16,0	**72,00**
18,00	26	92	18,0	**92,00**
20,00	32	104	20,0	**112,00**
22,00	40	100	22,0	**225,00**
25,00	60	150	25,0	**330,00**
32,00	60	150	32,0	**450,00**
40,00	60	150	40,0	**750,00**

VHM-Universal-Bohrnutenfräser 30° mit Untermaß

E.7625.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | UNIVERSAL TOOL | λ≈30° | Z=3 | DIN 6535 HB



Solid carbide Universal center cut end mills 30° with undersize

Frezy z węglika spiekan. trzyostrzowe 30° z przesuniętym ostrzem na czole poza oś freza - do frezowania rowków

Frese in MD universali 30° minorate

Fresas de metal duro de dos labios de 30° con medida rebajada para uso universal

Artikel-Nr. *Article-No.*				E.7625.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,80	3	50	6,0	**12,00**
2,80	4	50	6,0	**12,00**
3,80	5	50	6,0	**12,00**
4,80	6	50	6,0	**12,00**
5,75	7	50	6,0	**13,00**
6,70	8	50	8,0	**20,00**
7,75	10	60	8,0	**18,00**
8,70	10	70	12,0	**30,00**
9,70	11	70	12,0	**28,00**

VHM-Universal-Schaftfräser 30° linksschneidend

E.7628.0

Universal

VHM | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | λ≈30° | LH | Z=3 | DIN 6535 HB



Solid carbide Universal end mills 30° LH-cutting

Frezy z węglika spiekanego trzyostrzowe 30° lewoskrętne uniwersalne

Frese in MD universali 30° elica sx

Fresas de metal duro de 30°, uso universal, corte izquierdo

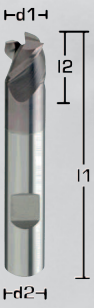
Artikel-Nr. *Article-No.*				E.7628.0 € Stück *piece*
d1	l2	l1	d2 h6	
4,00	10	57	6,0	**24,00**
5,00	10	57	6,0	**24,00**
6,00	10	57	6,0	**24,00**
8,00	16	63	8,0	**38,00**
9,00	19	72	10,0	**42,00**
10,00	19	72	10,0	**45,00**
12,00	22	83	12,0	**71,00**

VHM-Universal-Schaftfräser 45° kurz

E.7631.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | KURZ SHORT | Z=3 | DIN 6535 HB



Solid carbide Universal end mills 45° short

Frezy z węglika spiekanego trzyostrzowe 45° krótkie uniwersalne

Frese in MD universali 45° corta

Fresas de metal duro de 45°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7631.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	4	50	6,0	**16,00**
4,00	5	54	6,0	**16,00**
5,00	6	54	6,0	**16,50**
6,00	7	54	6,0	**17,00**
8,00	9	58	8,0	**20,00**
10,00	11	66	10,0	**27,00**
12,00	12	73	12,0	**39,00**
14,00	14	75	14,0	**58,00**
16,00	16	82	16,0	**69,00**
20,00	20	92	20,0	**105,00**
25,00	32	104	25,0	**215,00**

VHM-Universal-Schaftfräser 45° lang

E.7632.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | LANG LONG | Z=3 | DIN 6535 HB



Solid carbide Universal end mills 45° long

Frezy z węglika spiekanego trzyostrzowe długie 45° uniwersalne

Frese in MD universali 45° lunghe

Fresas de metal duro de 45°, uso universal, serie larga

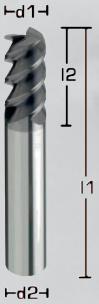
Artikel-Nr. *Article-No.*				E.7632.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	5	57	6,0	**13,00**
2,00	6	57	6,0	**13,00**
3,00	7	57	6,0	**13,00**
3,50	8	57	6,0	**17,00**
4,00	8	57	6,0	**13,00**
4,50	10	57	6,0	**17,00**
5,00	10	57	6,0	**13,00**
5,50	10	57	6,0	**17,00**
6,00	10	57	6,0	**13,00**
7,00	16	63	8,0	**26,00**
8,00	19	63	8,0	**22,00**
9,00	19	72	10,0	**38,00**
10,00	19	72	10,0	**32,00**
12,00	22	83	12,0	**42,00**
14,00	22	83	14,0	**59,00**
16,00	26	92	16,0	**68,00**
18,00	26	92	18,0	**95,00**
20,00	32	104	20,0	**102,00**

VHM-Universal-Schaftfräser 60°

E.7634.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | λ≈60° | UNIVERSAL TOOL | Z=3 | DIN 6535 HA



Solid carbide Universal end mills 60°

Frezy z węglika spiekanego trzyostrzowe 60° uniwersalne

Frese in MD universali 60°

Fresas de metal duro de 60°, uso universal

Artikel-Nr. *Article-No.*				E.7634.1 € Stück *piece*
d1	l2	l1	d2 h6	
4,00	12	50	6,0	**28,00**
5,00	14	50	6,0	**28,00**
6,00	16	50	6,0	**28,00**
8,00	20	60	8,0	**38,00**
10,00	22	70	10,0	**57,00**
12,00	22	70	12,0	**71,00**
14,00	25	75	14,0	**85,00**
16,00	25	75	16,0	**120,00**
18,00	30	100	18,0	**156,00**
20,00	30	100	20,0	**178,00**

VHM-Universal-Schaftfräser 30° extra kurz

E.7662.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | λ≈30° | UNIVERSAL TOOL | Z=4 | DIN 6535 HA



Solid carbide Universal end mills 30° extra short

Frezy z węglika spiekanego czteroostrzowe bardzo krótkie 30° uniwersalne

Frese in MD universali 30° extra corte

Fresas de metal duro de 30°, uso universal, serie extra corta

Artikel-Nr. *Article-No.*				E.7662.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	2,0	38	3,0	**24,00**
1,50	3,0	38	3,0	**24,00**
1,60	3,0	38	3,0	**24,00**
2,00	4,0	38	3,0	**24,00**
2,50	5,0	38	3,0	**24,00**
3,00	6,0	38	3,0	**24,00**
3,50	7,0	50	4,0	**27,00**
4,00	8,0	50	4,0	**28,00**
4,50	9,5	50	5,0	**33,00**
5,00	10,0	50	5,0	**31,00**
6,00	12,0	50	6,0	**34,00**
8,00	12,0	50	8,0	**40,00**
10,00	16,0	50	10,0	**60,00**
12,00	19,0	63	12,0	**70,00**
16,00	32,0	89	16,0	**139,00**

E.7648.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | λ≈30° | Z=4 | DIN 6535 HA



Solid carbide Universal end mills 30°

Frezy z węglika spiekanego czteroostrzowe 30° uniwersalne

Frese in MD universali 30°

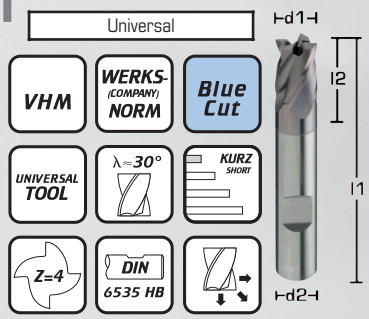
Fresas de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*				E.7648.0 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	8,0	38	2,0	**11,00**
2,50	8,0	38	2,5	**11,00**
3,00	12,0	38	3,0	**11,00**
3,50	12,0	40	3,5	**12,00**
4,00	12,0	40	4,0	**12,00**
4,50	14,0	50	4,5	**15,00**
5,00	14,0	50	5,0	**15,00**
5,50	16,0	50	5,5	**18,00**
6,00	16,0	50	6,0	**18,00**
6,50	16,0	50	6,5	**20,00**
7,00	20,0	60	7,0	**20,00**
7,50	20,0	60	7,5	**24,00**
8,00	20,0	60	8,0	**24,00**
8,50	20,0	60	8,5	**30,00**
9,00	20,0	60	9,0	**30,00**
9,50	22,0	70	9,5	**40,00**
10,00	22,0	70	10,0	**36,00**
11,00	22,0	70	11,0	**42,00**
12,00	22,0	70	12,0	**45,00**
13,00	25,0	75	13,0	**55,00**
14,00	25,0	75	14,0	**63,00**
15,00	25,0	75	15,0	**75,00**
16,00	25,0	75	16,0	**79,00**
18,00	32,0	100	18,0	**114,00**
20,00	32,0	100	20,0	**141,00**
	lang *long*			**E.7648.0L**
3,00	20,0	55	3,0	**16,00**
4,00	20,0	60	4,0	**19,00**
5,00	20,0	60	5,0	**21,00**
6,00	24,0	65	6,0	**22,50**
8,00	32,0	80	8,0	**32,00**
10,00	32,0	80	10,0	**48,00**
12,00	50,0	100	12,0	**63,00**
14,00	50,0	100	14,0	**76,00**
16,00	50,0	100	16,0	**108,00**
18,00	50,0	100	18,0	**131,00**
20,00	50,0	100	20,0	**152,00**
	überlang *extended long*			**E.7648.0XL**
3,00	30,0	70	3,0	**19,00**
4,00	40,0	75	4,0	**23,00**
5,00	40,0	80	5,0	**28,00**
6,00	45,0	80	6,0	**29,00**
8,00	50,0	100	8,0	**41,00**
10,00	50,0	100	10,0	**56,00**
12,00	70,0	150	12,0	**87,00**
14,00	75,0	150	14,0	**119,00**
16,00	75,0	150	16,0	**168,00**
18,00	75,0	150	18,0	**186,00**
20,00	75,0	150	20,0	**215,00**

VHM-Universal-Schaftfräser 30° kurz

E.7649.1

Universal



Solid carbide Universal end mills 30° short

Frezy z węglika spiekanego czte-roostrzowe krótkie 30° uniwersalne

Frese in MD universali 30° corte

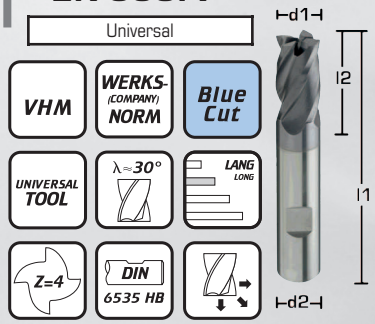
Fresas de metal duro de 30°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7649.1 € Stück *piece*
d1	l2	l1	d2	
2,00	4	38	3,0	**13,50**
3,00	5	38	3,0	**13,50**
4,00	8	54	6,0	**15,50**
5,00	9	54	6,0	**16,50**
6,00	10	54	6,0	**16,50**
8,00	12	58	8,0	**18,00**
10,00	14	66	10,0	**27,00**
12,00	16	73	12,0	**39,00**
14,00	18	75	14,0	**57,00**
16,00	22	82	16,0	**72,00**
18,00	24	84	18,0	**89,00**
20,00	26	92	20,0	**110,00**

VHM-Universal-Schaftfräser 30° lang

E.7650.1

Universal



Solid carbide Universal end mills 30° long

Frezy z węglika spiekanego czte-roostrzowe długie 30° uniwersalne

Frese in MD universali 30° lunghe

Fresas de metal duro de 30°, uso universal, serie larga

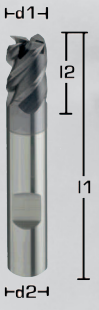
Artikel-Nr. *Article-No.*				E.7650.1 € Stück *piece*
d1	l2	l1	d2 h6	
1,00	3	38	3,0	**18,00**
2,00	7	38	3,0	**18,00**
3,00	8	38	3,0	**18,00**
4,00	11	57	6,0	**16,00**
5,00	13	57	6,0	**16,00**
6,00	13	57	6,0	**16,00**
8,00	19	63	8,0	**22,00**
10,00	22	72	10,0	**35,00**
12,00	26	83	12,0	**44,00**
14,00	26	83	14,0	**72,00**
16,00	32	92	16,0	**81,00**
18,00	32	92	18,0	**115,00**
20,00	38	104	20,0	**125,00**
22,00	40	100	22,0	**201,00**
25,00	60	150	25,0	**315,00**
32,00	60	150	32,0	**440,00**
40,00	60	150	40,0	**750,00**

VHM-Universal-Schaftfräser 45° kurz

E.7651.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | KURZ SHORT | Z=4 | DIN 6535 HB



Solid carbide Universal end mills 45° short

Frezy z węglika spiekanego cztero-roostrzowe krótkie 45° uniwersalne

Frese in MD universali 45° corte

Fresas de metal duro de 45°, uso universal, serie corta

Artikel-Nr. *Article-No.*				E.7651.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	5	50	6,0	**17,00**
4,00	8	54	6,0	**17,00**
5,00	9	54	6,0	**17,00**
6,00	10	54	6,0	**17,00**
8,00	12	58	8,0	**19,00**
10,00	14	66	10,0	**27,00**
12,00	16	73	12,0	**39,00**
14,00	18	75	14,0	**59,00**
16,00	22	82	16,0	**70,00**
20,00	26	92	20,0	**108,00**

VHM-Universal-Schaftfräser 45° lang

E.7652.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | LANG LONG | Z=4 | DIN 6535 HB



Solid carbide Universal end mills 45° long

Frezy z węglika spiekanego cztero-roostrzowe długie 45° uniwersalne

Frese in MD universali 45° lunghe

Fresas de metal duro de 45°, uso universal, serie larga

Artikel-Nr. *Article-No.*				E.7652.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	8	57	6,0	**21,00**
4,00	11	57	6,0	**21,00**
5,00	13	57	6,0	**21,00**
6,00	13	57	6,0	**21,00**
8,00	19	63	8,0	**23,00**
10,00	22	72	10,0	**38,00**
12,00	26	83	12,0	**52,00**
14,00	26	83	14,0	**72,00**
16,00	32	92	16,0	**98,00**
18,00	32	92	18,0	**120,00**
20,00	38	104	20,0	**138,00**

VHM-Universal-Schaftfräser 45° extra lang

E.7723.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | XLANG XLONG | Z=4 | DIN 6535 HB



Solid carbide Universal end mills 45° extra long

Frezy z węglika spiekanego czteroostrzowe bardzo długie 45° uniwersalne

Frese in MD universali 45° extra lunghe

Fresas de metal duro de 45°, uso universal, serie extra larga

Artikel-Nr. *Article-No.*				E.7723.1 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	8	57	6,0	**19,00**
3,00	14	57	6,0	**20,00**
4,00	18	57	6,0	**21,00**
5,00	20	57	6,0	**21,00**
6,00	22	57	6,0	**21,00**
8,00	30	63	8,0	**24,00**
10,00	33	72	10,0	**36,00**
12,00	34	83	12,0	**50,00**
16,00	38	92	16,0	**82,00**
20,00	47	104	20,0	**124,00**

VHM-Universal-Schaftfräser 45° mit Eckenradius

E.7670.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | ER | Z=4 | DIN 6535 HA



Solid carbide Universal end mills 45° with corner radius

Frezy z węglika spiekanego czteroostrzowe 45° z promieniem na czole uniwersalne

Frese in MD universali 45° con raggio d´angolo

Fresas de metal duro de 45°, uso universal, con radio lateral

Artikel-Nr. *Article-No.*					E.7670.1 € Stück *piece*
d1	ER	l2	l1	d2	
7,00	0,5	9	120	6,0	**74,00**
9,00	1,0	12	135	8,0	**87,00**
11,00	1,0	15	150	10,0	**119,00**
13,00	1,0	18	160	12,0	**148,00**
17,00	1,5	24	180	16,0	**203,00**

E.7657.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈30° | R | Z=4 | DIN 6535 HB



Solid carbide Universal ball nose end mills 30°

Frezy z węglika spiekanego czte-roostrzowe 30° z czołem kulistym uniwersalne

Frese in MD universali raggiate 30°

Fresas de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*					E.7657.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
3,00	1,5	7	38	3,0	**18,00**
4,00	2,0	14	50	4,0	**19,00**
5,00	2,5	16	50	6,0	**20,00**
6,00	3,0	19	60	6,0	**23,00**
8,00	4,0	20	60	8,0	**29,00**
10,00	5,0	21	70	10,0	**42,00**
12,00	6,0	25	83	12,0	**60,00**
16,00	8,0	32	88	16,0	**95,00**
20,00	10,0	38	100	20,0	**145,00**
		lang *long*			**E.7657.1L**
3,00	1,5	20	60	3,0	**29,00**
4,00	2,0	25	60	4,0	**30,00**
5,00	2,5	25	75	5,0	**32,00**
6,00	3,0	30	75	6,0	**36,00**
8,00	4,0	45	100	8,0	**44,00**
10,00	5,0	45	100	10,0	**56,00**
12,00	6,0	45	100	12,0	**75,00**
16,00	8,0	45	100	16,0	**149,00**
20,00	10,0	45	100	20,0	**198,00**
		überlang *extended long*			**E.7657.1XL**
12,00	6,0	65	150	12,0	**130,00**
16,00	8,0	65	150	16,0	**189,00**
20,00	10,0	65	150	20,0	**240,00**



VHM-Universal-Schaftfräser 30°

E.7680.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | λ≈30° | MEHR SCHNEIDER | DIN 6535 HA



Solid carbide Universal end mills 30°

Frezy z węglika spiekanego wieloostrzowe 30° uniwersalne

Frese in MD universali 30°

Fresas de metal duro de 30°, uso universal

Artikel-Nr. *Article-No.*					**E.7680.0** € **Stück** *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
3,00	12	38	3,0	6	**13,00**
4,00	12	40	4,0	6	**14,50**
5,00	14	50	5,0	6	**18,00**
6,00	16	50	6,0	8	**21,90**
7,00	20	60	7,0	8	**25,30**
8,00	20	60	8,0	8	**27,70**
10,00	22	70	10,0	8	**49,80**
12,00	22	70	12,0	10	**62,10**
16,00	25	75	16,0	12	**116,90**

VHM-Universal-Schaftfräser 45°

E.7701.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | UNIVERSAL TOOL | λ≈45° | MEHR SCHNEIDER | DIN 6535 HB



Solid carbide Universal end mills 45°

Frezy z węglika spiekanego wieloostrzowe 45° uniwersalne

Frese in MD universali 45°

Fresas de metal duro de 45°, uso universal

Artikel-Nr. *Article-No.*					**E.7701.1** € **Stück** *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
4,00	11	57	6,0	6	**19,00**
5,00	13	57	6,0	6	**19,00**
6,00	13	57	6,0	6	**19,00**
8,00	19	63	8,0	6	**23,00**
10,00	22	72	10,0	6	**39,00**
12,00	26	83	12,0	6	**47,00**
16,00	32	92	16,0	6	**81,00**
20,00	38	104	20,0	8	**115,00**
		lang *long*			**E.7701.1L**
4,00	16	62	6,0	6	**23,00**
5,00	18	62	6,0	6	**23,00**
6,00	18	62	6,0	6	**23,00**
8,00	24	68	8,0	6	**27,00**
10,00	30	80	10,0	6	**47,00**
12,00	36	93	12,0	6	**55,00**
16,00	48	108	16,0	6	**103,00**
20,00	60	126	20,0	8	**143,00**

VHM-Universal-Schaftfräser 45°

E.7681.1

Universal

VHM · WERKS-(COMPANY) NORM · Blue Cut · UNIVERSAL TOOL · λ≈45° · MEHR SCHNEIDER · DIN 6535 HB



Solid carbide Universal end mills 45°

Frezy z węglika spiekanego wieloostrzowe 45° uniwersalne

Frese in MD universali 45°

Fresas de metal duro de 45°, uso universal

Artikel-Nr. *Article-No.*						E.7681.1 € Stück *piece*
d1	l2	l3	l1	d2 h6	Zähne *flutes*	
5,00	13	18	57	6,0	6	**17,40**
6,00	13	18	57	6,0	6	**22,20**
8,00	19	24	63	8,0	6	**25,00**
10,00	22	32	72	10,0	6	**39,00**
12,00	26	36	83	12,0	6	**51,00**
14,00	26	36	83	14,0	6	**72,00**
16,00	32	42	92	16,0	6	**94,00**
18,00	32	42	92	18,0	8	**119,00**
20,00	38	48	104	20,0	8	**132,00**
		lang *long*				**E.7681.1L**
12,00	40		100	12,0	6	**80,00**
16,00	60		150	16,0	6	**180,00**
20,00	80		150	20,0	8	**270,00**
25,00	60		150	25,0	8	**325,00**

HM-bestückte Universal Schaftfräser 25°

E.7688.0

Universal

HM · WERKS-(COMPANY) NORM · UNIVERSAL TOOL · λ≈25° · MEHR SCHNEIDER · SK DIN 69871A



Carbide tipped Universal end mills 25°

Frezy wieloostrzowe 25° uniwersalne z chwytem ze stali narzędziowej i ostrzem z węglika spiekanego

Frese in MD universali 45°, saldobrasate

Fresas con placas de metal duro de 25°, uso universal

Artikel-Nr. *Article-No.*					E.7688.0 € Stück *piece*
d1 h10	l2	l1	d2 SK	Zähne *flutes*	
40,00	63	183	40	6	**665,00**
50,00	80	205	40	6	**890,00**
40,00	63	215	50	6	**770,00**
50,00	80	239	50	6	**920,00**
50,00	150	309	50	6	**1.420,00**
63,00	100	258	50	6	**1.150,00**
63,00	200	359	50	6	**1.540,00**
63,00	250	408	50	6	**1.700,00**
80,00	200	359	50	8	**1.790,00**
80,00	250	408	50	8	**2.040,00**
80,00	300	459	50	8	**2.480,00**

E.6607.0

Universal

VHM

WERKS-(COMPANY) NORM

UNIVERSAL TOOL



Solid carbide Unispecial single lip cutters

Frezy z węglika spiekanego jednoostrzowe do grawerowania stali

Bulini in MD monospaccatae

Buriles de metal duro unispecial

Artikel-Nr. *Article-No.*			E.6607.0 € Stück *piece*
d1	l2	l1	
2,00	3,0	50	**4,80**
2,50	4,0	50	**5,20**
3,00	4,5	50	**6,80**
4,00	6,0	50	**7,20**
4,00	10,0	50	**8,00**
5,00	7,5	50	**10,50**
6,00	9,0	50	**11,60**
7,00	10,0	50	**15,50**
8,00	12,0	50	**20,50**
9,00	13,5	50	**22,00**
10,00	15,0	50	**26,00**
11,00	16,5	50	**32,00**
12,00	18,0	50	**35,00**
2,00	3,0	100	**7,00**
2,50	4,0	100	**7,50**
3,00	4,5	100	**10,00**
4,00	6,0	100	**11,00**
5,00	7,5	100	**15,00**
6,00	9,0	100	**17,50**
7,00	10,0	100	**25,00**
8,00	12,0	100	**30,00**
9,00	13,5	100	**33,00**
10,00	15,0	100	**40,00**
11,00	16,5	100	**48,00**
12,00	18,0	100	**52,00**
14,00	21,0	100	**75,00**
15,00	22,5	100	**80,00**
16,00	24,0	100	**90,00**
18,00	27,0	100	**112,00**
20,00	30,0	100	**145,00**
4,00	6,0	150	**16,00**
5,00	7,5	150	**22,00**
6,00	9,0	150	**26,00**
7,00	10,0	150	**37,00**
8,00	12,0	150	**45,00**
9,00	13,5	150	**52,00**
10,00	15,0	150	**60,00**
11,00	16,5	150	**70,00**
12,00	18,0	150	**80,00**
14,00	21,0	150	**108,00**
15,00	22,5	150	**121,00**
16,00	24,0	150	**140,00**
18,00	27,0	150	**175,00**
20,00	30,0	150	**220,00**

VHM-Unispezial-Gravierstichel mit Spitze fertiggeschliffen

E.6608.0

Universal

VHM | 90° | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | 60°



Solid carbide Unispecial steel graver with finished point

Frezy z węglika spiekanego do grawerowania stali

Bulini in MD con punta affilata

Buriles de metal duro unispecial con punta afilada

Artikel-Nr. *Article-No.*			E.6608.0 € Stück *piece*
d1	l2	l1	
2,00	3,0	50	**7,50**
2,50	3,0	50	**7,80**
3,00	4,5	50	**10,00**
4,00	6,0	50	**11,20**
5,00	7,5	50	**14,90**
6,00	9,0	50	**17,50**
7,00	11,5	50	**23,80**
8,00	12,0	50	**28,80**
2,00	3,0	100	**11,00**
2,50	3,0	100	**11,50**
3,00	4,5	100	**15,00**
4,00	6,0	100	**16,80**
5,00	7,5	100	**22,20**
6,00	9,0	100	**26,00**
7,00	11,5	100	**35,50**
8,00	12,0	100	**43,00**
9,00	13,5	100	**48,00**
10,00	15,0	100	**56,00**
11,00	16,5	100	**66,00**
12,00	18,0	100	**72,00**
14,00	21,0	100	**97,00**
16,00	24,0	100	**125,00**

VHM-Unispezial-Gravierfräser

E.6609.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | UNIVERSAL TOOL | λ≈30° | 60° | Z=2 | DIN 6535 HA



Solid carbide Unispecial engraving end mills

Frezy z węglika spiekanego dwuostrzowe do grawerowania

Frese in MD a gravare

Fresas de metal duro unispecial para grabar

Artikel-Nr. *Article-No.*					E.6609.1 € Stück *piece*
d1	l3	l2	l1	d2 h6	
3,00	2	10	40	3,0	**20,00**
4,00	3	10	40	4,0	**22,00**
6,00	5	10	50	6,0	**30,00**

VHM-Unispezial-Plattensitz-Gesenkfräser 30°

E.7627.0

Universal

VHM | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | λ≈30° | Z=3 | DIN 6535 HA



Solid carbide Unispecial milling cutters for indexable seats 30°

Frezy z węglika spiekanego trzyostrzowe 30° do frezowania gniazd pod płytki skrawające

Frese coniche in MD 30° per la lavorazione delle placchette per inserti

Fresas cónicas de metal duro unispecial para alojamientos de plaquitas de metal duro

Zur Herstellung des Plattensitzes bei Wendeplattenwerkzeugen!
For production of indexable inserts seats at inserts tools!

Artikel-Nr. *Article-No.*					E.7627.0 € Stück *piece*
Grad *degree*	d1	l2	l1	d2 h6	
5°	1,80	8	50	6,0	**34,00**
6°	1,80	8	50	6,0	**34,00**
7°	1,80	8	50	6,0	**34,00**
11°	1,80	8	50	6,0	**34,00**
15°	1,80	8	50	6,0	**34,00**
20°	1,80	8	50	6,0	**34,00**

VHM-Unispezial-Schaftfräser für HSK-Innenkontur 30°

E.7635.0

Universal

VHM | WERKS-(COMPANY) NORM | UNIVERSAL TOOL | λ≈30° | MEHR SCHNEIDER | DIN 6535 HA



Solid carbide Unispecial end mills for HSK-internal contour 30°

Frezy z węglika spiekanego wieloostrzowe 30° do konturów wewnętrznych HSK

Frese in MD 30° per scontornare interni HSK

Fresas de metal duro unispecial de 30° para contornear HSK

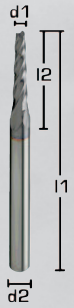
Artikel-Nr. *Article-No.*								E.7635.0 € Stück *piece*
für HSK *for HSK*	d1	d3	l2 + - 0,1	l3 + - 0,5	l1	d2 h6	Zähne *flutes*	
25,00	2,4	2,0	5,0	15,6	53	6,0	3	**43,00**
32,00	2,9	2,4	6,0	18,0	50	6,0	3	**43,00**
40,00	3,8	3,3	7,0	21,0	50	6,0	3	**43,00**
50,00	4,8	4,3	9,0	29,0	60	8,0	3	**43,00**
63,00	5,7	5,3	11,5	36,5	65	10,0	3	**60,00**
80,00	7,7	7,2	13,0	41,0	75	12,0	3	**92,00**
100,00	9,5	9,0	16,0	54,0	90	10,0	3	**108,00**
125,00	11,5	10,8	21,0	66,0	115	16,0	4	**145,00**
160,00	14,0	13,0	25,0	80,0	132	16,0	4	**165,00**

VHM-Unispezial-Mikrogesenkfräser 25°

E.7704.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | λ≈25° | Z=4 | DIN 6535 HA



Solid carbide Unispecial micro diesinking cutters 25°

Frezy z węglika spiekanego czteroostrzowe zbieżne, linia śrubowa ostrza 25°

Microfrese coniche MD universali a 25°

Microfresas cónicas de metal duro unispecial de 25°

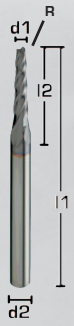
Artikel-Nr. *Article-No.*					E.7704.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.7704.0 € Stück *piece*
Winkel *angle*	d1	l2	l1	d2 h6		Winkel *angle*	d1	l2	l1	d2 h6	
30`	1,0	8	45	4,0	**43,00**	**1°**	1,2	8	45	4,0	**43,00**
30`	1,0	12	45	4,0	**43,00**	**1°**	1,2	12	45	4,0	**43,00**
1°	1,0	8	45	4,0	**43,00**	**1° 30`**	1,2	8	45	4,0	**50,00**
1°	1,0	12	45	4,0	**43,00**	**1° 30`**	1,2	12	45	4,0	**50,00**
1° 30`	1,0	8	45	4,0	**50,00**	**2°**	1,2	8	45	4,0	**50,00**
1° 30`	1,0	12	45	4,0	**50,00**	**2°**	1,2	12	45	4,0	**50,00**
2°	1,0	8	45	4,0	**50,00**	**30`**	1,5	8	45	4,0	**43,00**
2°	1,0	12	45	4,0	**50,00**	**30`**	1,5	12	45	4,0	**43,00**
30`	1,2	8	45	4,0	**43,00**	**30`**	1,5	16	50	4,0	**45,00**
30`	1,2	12	45	4,0	**43,00**	**1°**	1,5	8	45	4,0	**43,00**

VHM-Unispezial-Radiusgesenkfräser 25°

E.7705.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | R | λ≈25° | Z=4 | DIN 6535 HA



Solid carbide Unispecial diesinking ball nose cutters 25°

Frezy z węglika spiekanego czteroostrzowe zbieżne z czołem kulistym, linia środkowa ostrza 25°

Frese raggiate coniche MD universali a 25°

Fresas cónicas de metal duro unispecial de 25° con radio

Artikel-Nr. *Article-No.*					E.7705.0 € Stück *piece*	Artikel-Nr. *Article-No.*					E.7705.0 € Stück *piece*
Winkel *angle*	d1	l2	l1	d2 h6		Winkel *angle*	d1	l2	l1	d2 h6	
30`	1,0	8	45	4,0	**53,00**	**1°**	1,2	8	45	4,0	**53,00**
30`	1,0	12	45	4,0	**53,00**	**1°**	1,2	12	45	4,0	**53,00**
1°	1,0	8	45	4,0	**53,00**	**1° 30`**	1,2	8	45	4,0	**63,00**
1°	1,0	12	45	4,0	**53,00**	**1° 30`**	1,2	12	45	4,0	**63,00**
1° 30`	1,0	8	45	4,0	**63,00**	**2°**	1,2	8	45	4,0	**63,00**
1° 30`	1,0	12	45	4,0	**63,00**	**2°**	1,2	12	45	4,0	**63,00**
2°	1,0	8	45	4,0	**63,00**	**30`**	1,5	8	45	4,0	**53,00**
2°	1,0	12	45	4,0	**63,00**	**30`**	1,5	12	45	4,0	**53,00**
30`	1,2	8	45	4,0	**53,00**	**30`**	1,5	16	50	4,0	**56,00**
30`	1,2	12	45	4,0	**53,00**	**1°**	1,5	8	45	4,0	**53,00**

E.7671.0

Universal

VHM

λ≈30°

UNIVERSAL TOOL

DIN 6535 HB

MEHR SCHNEIDER



Solid carbide Unispecial die-milling cutters conical

Frezy z węglika spiekanego stożkowe zbieżne

Frese coniche universali MD

Fresas cónicas de metal duro unispecial

Artikel-Nr. *Article-No.*						E.7671.0 € Stück *piece*	Artikel-Nr. *Article-No.*						E.7671.0 € Stück *piece*
Winkel *angle*	d1	l2	l1	d2	Zähne *flutes*		Winkel *angle*	d1	l2	l1	d2	Zähne *flutes*	
0,5°	3,0	20	60	4,0	4	**48,00**	**2,00**	3,0	20	60	5,0	4	**52,00**
0,5°	4,0	20	60	5,0	4	**51,00**	**2,00**	3,5	20	60	5,0	4	**52,00**
0,5°	5,0	30	75	6,0	6	**57,00**	**2,00**	4,0	20	65	6,0	4	**54,00**
0,5°	6,0	30	75	8,0	6	**57,00**	**2,00**	4,5	30	75	8,0	4	**58,00**
0,5°	8,0	30	80	10,0	6	**60,00**	**2,00**	5,0	30	75	8,0	6	**61,00**
0,5°	10,0	30	85	12,0	6	**68,00**	**2,00**	6,0	28	75	8,0	6	**64,00**
0,5°	12,0	30	85	14,0	6	**88,00**	**2,00**	8,0	28	75	10,0	6	**62,00**
0,5°	16,0	60	120	18,0	6	**135,00**	**2,00**	10,0	28	85	12,0	6	**69,00**
1,0°	3,0	20	60	4,0	4	**51,00**	**2,00**	12,0	28	85	14,0	6	**89,00**
1,0°	3,5	20	60	5,0	4	**51,00**	**2,00**	16,0	55	115	20,0	6	**172,00**
1,0°	4,0	20	60	5,0	4	**58,00**	**2,50**	3,0	20	60	5,0	4	**52,00**
1,0°	4,5	20	65	6,0	6	**58,00**	**2,50**	4,0	20	65	6,0	4	**54,00**
1,0°	5,0	25	70	6,0	6	**58,00**	**2,50**	5,0	30	75	8,0	6	**59,00**
1,0°	6,0	30	75	8,0	6	**58,00**	**2,50**	6,0	30	80	10,0	6	**59,00**
1,0°	8,0	30	80	10,0	6	**61,00**	**2,50**	8,0	30	85	12,0	6	**70,00**
1,0°	10,0	30	85	12,0	6	**69,00**	**2,50**	10,0	40	100	14,0	6	**89,00**
1,0°	12,0	30	85	14,0	6	**89,00**	**3,00**	8,0	30	75	8,0	4	**59,00**
1,0°	16,0	55	115	18,0	6	**156,00**	**3,00**	8,0	30	75	8,0	6	**59,00**
1,5°	3,0	20	60	4,0	4	**48,00**	**3,00**	10,0	40	90	10,0	6	**72,00**
1,5°	3,5	20	60	5,0	4	**49,00**	**3,00**	10,0	30	80	10,0	6	**61,00**
1,5°	4,0	20	60	5,0	4	**49,00**	**3,00**	12,0	30	85	12,0	6	**70,00**
1,5°	4,5	20	65	6,0	4	**50,00**	**3,00**	14,0	30	85	14,0	6	**89,00**
1,5°	5,0	30	75	6,0	6	**53,00**	**3,00**	16,0	30	90	16,0	6	**99,00**
1,5°	6,0	30	75	8,0	6	**53,00**							
1,5°	8,0	30	75	10,0	6	**60,00**							
1,5°	10,0	30	85	12,0	6	**63,00**							
1,5°	12,0	30	85	14,0	6	**63,00**							
1,5°	16,0	55	125	20,0	6	**160,00**							

VHM-Unispezial-Gesenkfräser 30°

E.7629.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | λ≈30° | Z=3 | DIN 6535 HA



Solid carbide Unispecial diesinking cutters 30°

Frezy z węglika spiekanego trzyostrzowe zbieżne, linia środkowa ostrza 30°

Frese coniche universali MD a 30°

Fresas cónicas de metal duro unispecial de 30°

Artikel-Nr. *Article-No.*					E.7629.0 € Stück *piece*
Winkel *angle*	d1	l2	l1	d2 h6	
1°	4,5	20	57	6,0	42,00
1°	6,0	30	63	8,0	56,00
1°	8,0	30	72	10,0	75,00
1°	10,0	35	83	12,0	90,00
1°	12,0	35	83	14,0	125,00
3°	4,0	30	63	8,0	60,00
3°	6,0	30	72	10,0	83,00
3°	8,0	35	83	12,0	97,00
3°	10,0	35	83	14,0	135,00
3°	12,0	55	100	18,0	133,00
5°	3,0	25	63	8,0	64,00
5°	3,5	30	72	10,0	86,00
5°	4,0	35	83	12,0	110,00
5°	8,0	35	83	14,0	143,00
5°	9,0	40	92	16,0	182,00

VHM-Unispezial-Gesenkfräser 30° mit Stirnradius

E.7630.0

Universal

VHM | WERKS-NORM (COMPANY) | UNIVERSAL TOOL | R | λ≈30° | Z=3 | DIN 6535 HA



Solid carbide Unispecial diesinking cutters 30° with face radius

Frezy z węglika spiekanego trzyostrzowe zbieżne z czołem kulistym, linia środkowa ostrza 30°

Frese coniche con raggio frontale, universali a 30°

Fresas cónicas de metal duro unispecial de 30° con radio frontal

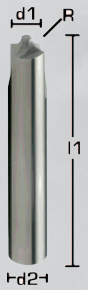
Artikel-Nr. *Article-No.*						E.7630.0 € Stück *piece*
Winkel *angle*	d1	R	l2	l1	d2 h6	
1°	4,5	2,25	20	57	6,0	51,00
1°	6,0	3,00	30	63	8,0	67,00
1°	8,0	4,00	30	72	10,0	89,00
1°	10,0	5,00	35	83	12,0	107,00
1°	12,0	6,00	35	83	14,0	150,00
3°	4,0	2,00	30	63	8,0	72,00
3°	6,0	3,00	30	72	10,0	96,00
3°	8,0	4,00	35	83	12,0	117,00
3°	10,0	5,00	35	83	14,0	162,00
3°	12,0	6,00	55	100	18,0	245,00
5°	3,0	1,50	25	63	8,0	76,00
5°	3,5	1,75	30	72	10,0	102,00
5°	4,0	2,00	35	83	12,0	123,00
5°	8,0	4,00	35	83	14,0	172,00
5°	9,0	4,50	40	92	16,0	220,00

VHM-Unispezial-Mikro-Viertelkreis-Konkavfräser

E.7658.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | DIN 6535 HA | Z=2 | UNIVERSAL TOOL



Solid carbide Unispecial micro corner rounding cutters concave

Frezy miniaturowe z węglika spiekanego dwuostrzowe wklęsłe do załamywania krawędzi

Microfrese universali MD con un quarto di raggio per fresatura concava

Microfresas cóncavas de metal duro unispecial con un cuarto de radio

Artikel-Nr. *Article-No.*				E.7658.0 € Stück *piece*
R	d1	l1	d2 h6	
0,10	1,0	50	3,0	**60,00**
0,15	1,0	50	3,0	**60,00**
0,20	1,0	50	3,0	**60,00**
0,25	1,0	50	3,0	**50,00**
0,30	1,0	50	3,0	**38,00**
0,40	1,0	50	3,0	**50,00**
0,50	1,5	50	3,0	**38,00**
0,60	1,5	50	3,0	**38,00**
0,70	1,5	50	3,0	**50,00**
0,80	1,5	50	3,0	**50,00**
0,90	1,5	50	3,0	**50,00**
1,00	1,5	50	3,0	**41,00**
1,50	2,0	50	6,0	**48,00**
2,00	2,5	50	8,0	**62,00**

VHM-Unispezial-Viertelkreisfräser konkav

E.7659.0

Universal

VHM | WERKS-(COMPANY)NORM | UNIVERSAL TOOL | DIN 6535 HA | Z=4 | UNIVERSAL TOOL



Solid carbide Unispecial corner rounding cutters concave

Frezy z węglika spiekanego czteroostrzowe wklęsłe do załamywania krawędzi

Frese universali MD con un quarto di raggio, concave

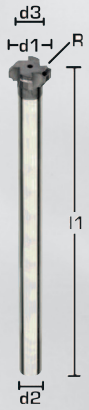
Fresas cóncavas de metal duro unispecial con un cuarto de radio

Artikel-Nr. *Article-No.*				E.7659.0 € Stück *piece*
R	d1	l1	d2 h6	
0,50	7,0	70	8,0	**66,00**
0,75	6,5	70	8,0	**66,00**
1,00	6,0	70	8,0	**62,00**
1,25	5,5	70	8,0	**61,00**
1,50	7,0	75	10,0	**64,00**
1,75	6,5	75	10,0	**70,00**
2,00	6,0	75	10,0	**64,00**
2,25	5,5	75	10,0	**70,00**
2,50	7,0	75	12,0	**66,00**
3,00	6,0	75	12,0	**66,00**
3,50	9,0	80	16,0	**81,00**
4,00	8,0	80	16,0	**81,00**
4,50	7,0	80	16,0	**81,00**
5,00	10,0	80	20,0	**124,00**
6,00	8,0	80	20,0	**124,00**

E.7683.1

Universal

VHM | WERKS-(COMPANY)NORM | Blue Cut | UNIVERSAL TOOL | Z=4 | DIN 6535 HA



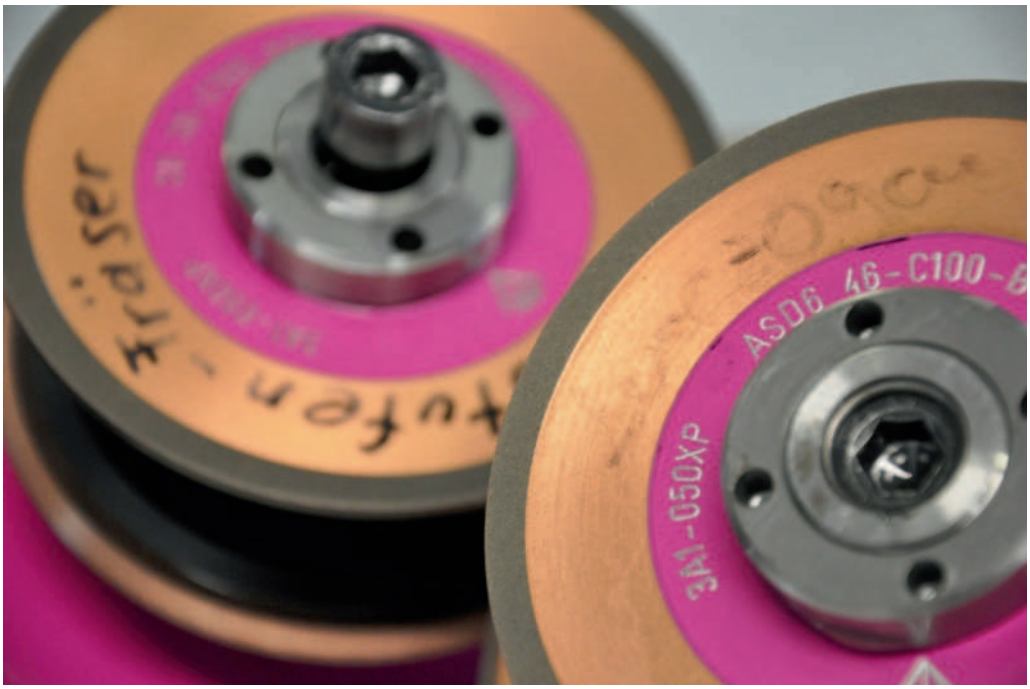
Solid carbide Unispecial forward and backward quatercircle profile end mills

Frezy z węglika spiekanego profilowe ćwierć wypukło-wklęsłe

Frese universali MD con un quarto di raggio per lavori bidirezionali

Fresas de metal duro unispecial con un cuarto de radio para trabajos bidireccionales

Artikel-Nr. *Article-No.*					E.7683.1 € Stück *piece*
R	d1	d3	l1	d2	
0,20	8	7,6	100	6,0	**87,00**
0,30	8	7,4	100	6,0	**87,00**
0,40	8	7,2	100	6,0	**87,00**
0,50	8	7,0	100	6,0	**87,00**
0,80	10	8,4	100	6,0	**91,00**
1,00	10	8,0	100	6,0	**91,00**
1,20	10	7,6	100	6,0	**91,00**
1,50	10	7,0	100	6,0	**91,00**



VHM-Schruppfräser 30°

E.7677.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut

TYP HR | λ≈30° | Z=3 | DIN 6535 HB



Solid carbide roughing end mills 30°

Frezy z węglika spiekanego trzyostrzowe 30° do obróbki zgrubnej

Frese universali MD con rompitruciolo a sgrossare, 30°

Fresas de metal duro para desbaste de 30°

Artikel-Nr. *Article-No.*				E.7677.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	6	57	6,0	**31,00**
4,00	8	57	6,0	**31,00**
5,00	10	57	6,0	**31,00**
6,00	16	57	6,0	**29,00**
8,00	16	63	8,0	**32,00**
10,00	22	72	10,0	**45,00**
12,00	26	83	12,0	**57,00**
16,00	32	92	16,0	**82,00**
20,00	38	104	20,0	**123,00**

VHM-Schruppfräser 25°

E.7663.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut

TYP HR | λ≈25° | Z=4 | DIN 6535 HB



Solid carbide roughing end mills 25°

Frezy z węglika spiekanego czteroostrzowe 25° do obróbki zgrubnej

Frese universali MD conrompitruciolo a sgrossare, 25°

Fresas de metal duro para desbaste de 25°

Artikel-Nr. *Article-No.*				E.7663.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	6	57	6,0	**29,50**
4,00	8	57	6,0	**29,50**
5,00	10	57	6,0	**29,50**
6,00	13	57	6,0	**29,50**
8,00	16	63	8,0	**34,00**
10,00	22	72	10,0	**46,00**
12,00	26	83	12,0	**58,00**
14,00	26	83	14,0	**82,00**
16,00	32	92	16,0	**90,00**
18,00	38	104	18,0	**108,00**
20,00	38	104	20,0	**130,00**
25,00	45	121	25,0	**192,00**

VHM-Schruppschlichtfräser 30°

E.7664.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | TYP HF | λ≈30° | Z=4 | DIN 6535 HB



Solid carbide roughing finishing end mills 30°

Frezy z węglika spiekanego czteroostrzowe 30° do obróbki zgrubno-wykańczającej

Frese universali MD con rompitruciolo a sgrossar-finire, 30°

Fresas de metal duro de 30° para desbaste y acabado

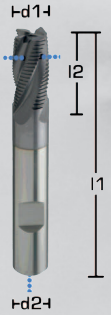
Artikel-Nr. *Article-No.*				E.7664.1 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	9	38	3,0	**34,00**
3,50	11	50	4,0	**34,00**
4,00	11	50	4,0	**34,00**
4,50	14	50	5,0	**34,00**
5,00	14	50	5,0	**39,20**
6,00	14	57	6,0	**39,20**
8,00	19	63	8,0	**45,30**
10,00	22	66	10,0	**52,00**
12,00	26	73	12,0	**62,00**
14,00	26	83	14,0	**87,00**
16,00	32	92	16,0	**99,30**
20,00	38	104	20,0	**143,80**
25,00	55	110	25,0	**250,00**

VHM-Schruppfräser 25° mit Innenkühlung

E.7665.1

Universal

VHM | WERKS-(COMPANY) NORM | Blue Cut | TYP HR | λ≈25° | Z=4 | DIN 6535 HB



Solid carbide roughing end mills 25° with internal coolant

Frezy z węglika spiekanego czteroostrzowe 25° z chłodzeniem wew. do obróbki zgrubnej

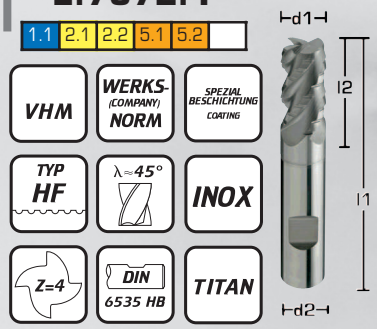
Frese universali MD con rompitruciolo a sgrossare, 25° con refrigerazione interna

Fresas de metal duro para desbaste de 25° con refrigeración interior

Artikel-Nr. *Article-No.*				E.7665.1 € Stück *piece*
d1	l2	l1	d2 h6	
6,00	13	57	6,0	**50,00**
8,00	16	63	8,0	**54,00**
10,00	22	72	10,0	**60,00**
12,00	26	83	12,0	**70,00**
16,00	32	92	16,0	**112,00**
20,00	38	104	20,0	**168,00**

VHM-Inox-Schruppfräser 45°

E.7672.1



Solid carbide Inox roughing end mills 45°

Frezy z węglika spiekanego czteroostrzowe 45° do obróbki zgrubnej stali nierdzewnej, tytanu i kobaltu

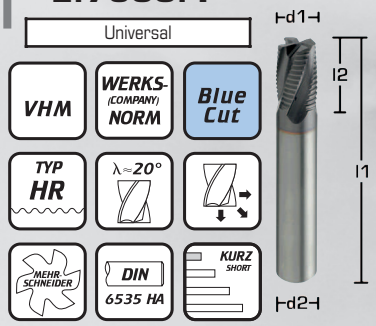
Frese con rompitruciolo a sgrossare MD per inox, 45°

Fresas de metal duro para desbaste de 45° para inoxidable

Artikel-Nr. *Article-No.*				E.7672.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	
6,00	16	57	6,0	**44,00**
7,00	19	63	8,0	**44,00**
8,00	19	63	8,0	**44,00**
9,00	22	72	10,0	**48,00**
10,00	22	72	10,0	**48,00**
12,00	26	83	12,0	**68,00**
16,00	32	92	16,0	**106,00**
20,00	38	104	20,0	**147,00**

VHM-Schruppfräser 20° extra kurz

E.7633.1



Solid carbide roughing end mills 20° extra short

Frezy z węglika spiekanego wieloostrzowe bardzo krótkie 20° do obróbki zgrubnej

Frese con rompitruciolo a sgrossare MD per inox, serie extra corta

Fresas de metal duro para desbaste de 20°, serie extra corta

Artikel-Nr. *Article-No.*					E.7633.1 € Stück *piece*
d1 h10	l2	l1	d2 h6	Zähne *flutes*	
6,00	7	54	6,0	3	**36,00**
7,00	8	58	8,0	3	**42,00**
8,00	9	58	8,0	3	**42,00**
9,00	13	66	10,0	4	**63,00**
10,00	14	66	10,0	4	**62,00**
12,00	16	73	12,0	4	**80,00**
14,00	18	75	14,0	4	**96,00**
16,00	22	82	16,0	4	**130,00**
18,00	24	84	18,0	4	**166,00**
20,00	26	92	20,0	4	**208,00**
25,00	25	110	25,0	5	**365,00**

VHM-Primus-Schruppfräser 45° kurz

E.7678.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | TYP HR | λ≈45° | KURZ SHORT | MEHR SCHNEIDER | DIN 6535 HB | UNIVERSAL TOOL



SET.7678.1

Universal



Vorteile *advantages:*

- hohe Standzeit
  long tool life
- hohe Stabilität
  high stability
- schnelle Spanabfuhr
  fast chip removal
- sehr stabile Schneidkanten
  very stable cutting edges

Solid carbide Primus roughing end mills 45° short

Zestaw frezów Primus z węglika spiekanego wieloostrzowych krótkich 45° do obróbki zgrubnej

Frese con rompitruciolo MD "Primus" a sgrossare, 45°, serie corta

Fresas de metal duro "Primus" para desbaste de 45°, serie corta

Artikel-Nr. *Article-No.*					**E.7678.1** €
d1	l2	l1	d2 h6	Zähne *flutes*	Stück *piece*
4,00	11	57	6,0	3	**39,00**
5,00	13	57	6,0	4	**39,00**
6,00	16	57	6,0	4	**39,00**
7,00	16	63	8,0	4	**43,00**
8,00	16	63	8,0	4	**43,00**
9,00	19	72	10,0	4	**47,00**
10,00	22	72	10,0	4	**47,00**
12,00	26	83	12,0	4	**57,00**
14,00	26	83	14,0	5	**78,50**
16,00	32	92	16,0	5	**99,00**
20,00	38	104	20,0	6	**150,00**
25,00	45	121	25,0	6	**242,00**
Satz *Set*					**SET.7678.1**
1 Stück Ø 8 / 10 / 12 / 16 mm *1 piece Ø 8 / 10 / 12 / 16 mm*					**220,00**

VHM-Primus-Schruppfräser 45° lang

E.7724.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | TYP HR | λ≈45° | LANG LONG | MEHR SCHNEIDER | DIN 6535 HA | UNIVERSAL TOOL



Solid carbide Primus roughing end mills 45° long

Frezy wieloostrzowe Primus z węglika spiekanego 45° długie do obróbki zgrubnej

Frese con rompitruciolo a sgrossare MD "Primus", 45°, serie lunga

Fresas de metal duro "Primus" para desbaste de 45°, serie larga

Artikel-Nr. *Article-No.*						**E.7724.1** €
d1	l2	l3	l1	d2 h6	Zähne *flutes*	Stück *piece*
6,00	16	20	57	6,0	4	**45,30**
8,00	16	26	63	8,0	4	**50,50**
10,00	22	31	72	10,0	4	**59,30**
12,00	26	37	83	12,0	4	**68,00**
16,00	32	51	100	16,0	5	**118,00**
20,00	38	59	110	20,0	6	**179,00**

VHM-Schruppfräser 45° extra lang

E.7718.1

Universal

VHM | WERKS-NORM (COMPANY) | Blue Cut | TYP HR | λ≈45° | XLANG XLONG | MEHR SCHNEIDER | DIN 6535 HB | UNIVERSAL TOOL



Solid carbide roughing end mills 45° extra long

Frezy z węglika spiekanego wieloostrzowe bardzo długie 45° do obróbki zgrubnej

Frese con rompitruciolo a sgrossare MD, 45°, serie extra lunga

Fresas de metal duro para desbaste de 45°, serie extra larga

Artikel-Nr. *Article-No.*						E.7718.1 € Stück *piece*
d1	l2	l3	l1	d2 h6	Zähne *flutes*	
6,00	12	16	57	6,0	5	**54,00**
8,00	16	24	63	8,0	5	**63,00**
10,00	20	30	72	10,0	5	**82,00**
12,00	24	36	83	12,0	5	**105,00**
16,00	32	48	100	16,0	5	**154,00**
20,00	40	60	110	20,0	7	**186,00**

VHM-HRC-Schruppfräser 30°

E.7669.1

6.1 | 6.2 | 6.3 | 6.4

VHM | WERKS-NORM (COMPANY) | Blue Cut | TYP HR | λ≈30° | HRC TOOL | Z=6 | DIN 6535 HB | ≤65 HRC



Solid carbide HRC roughing end mills 30°

Frezy z węglika spiekanego sześcioostrzowe do obróbki zgrubnej materiałów utwardzanych do 65 HRC

Frese MD HRC con rompitruciolo a sgrossare 30°

Fresas de metal duro para desbaste de 30° HRC

Artikel-Nr. *Article-No.*				E.7669.1 € Stück *piece*
d1	l2	l1	d2 h6	
6,00	13	57	6,0	**52,00**
8,00	19	63	8,0	**69,00**
10,00	22	72	10,0	**83,00**
12,00	26	83	12,0	**119,00**
16,00	32	92	16,0	**177,00**
20,00	38	104	20,0	**253,00**

E.7679.1

Universal

VHM | WERKS-(COMPANY)NORM | Blue Cut | TYP HR | λ≈30° | R | MEHR SCHNEIDER | DIN 6535 HB | UNIVERSAL TOOL



Solid carbide ball nose roughing end mills 30°

Frezy z węglika spiekanego wieloostrzowe 30° z czołem kulistym do obróbki zgrubnej

Frese raggiate con rompitruciolo MD a sgrossare 30°

Fresas de metal duro para desbaste de 30° con radio

Artikel-Nr. *Article-No.*						E.7679.1 € Stück *piece*
d1	R	l2	l1	d2 h6	Zähne *flutes*	
5,00	2,5	10	57	6,0	3	**51,40**
6,00	3,0	13	57	6,0	3	**51,40**
8,00	4,0	19	63	8,0	3	**60,10**
10,00	5,0	22	72	10,0	4	**62,70**
12,00	6,0	26	83	12,0	4	**82,80**
14,00	7,0	26	83	14,0	4	**97,50**
16,00	8,0	32	92	16,0	4	**108,90**
18,00	9,0	32	92	18,0	4	**164,70**
20,00	10,0	38	104	20,0	4	**173,40**



E.6602.0

4.1 4.7

VHM | WERKS-NORM (COMPANY) | ALU

NE-METALLE | λ≈30° | Z=1 | DIN 6535 HA



Solid carbide Alu 1-flute end mills

Frezy z węglika spiekanego jednoostrzowe do aluminium

Frese monoelica MD per Alu

Fresas de metal duro de un diente para aluminio

Artikel-Nr. *Article-No.*				E.6602.0 € Stück *piece*
d1	l2	l1	d2 h6	
0,50	2,5	35	3,0	**20,00**
0,80	3,0	35	3,0	**20,00**
1,00	4,5	35	3,0	**18,00**
1,50	6,0	50	3,0	**14,00**
2,00	10,0	40	2,0	**15,00**
2,50	6,5	35	3,0	**15,00**
3,00	10,0	40	3,0	**15,00**
4,00	10,0	40	4,0	**16,00**
4,00	14,0	50	4,0	**16,00**
5,00	16,0	60	5,0	**19,00**
6,00	14,0	50	6,0	**20,00**
6,00	20,0	60	6,0	**21,00**
8,00	25,0	75	8,0	**28,00**
10,00	25,0	75	10,0	**42,00**
12,00	25,0	75	12,0	**56,00**
14,00	25,0	75	14,0	**68,00**
16,00	25,0	82	16,0	**80,00**
18,00	25,0	87	18,0	**106,00**
20,00	30,0	92	20,0	**125,00**

VHM-Alu-Einzahnfräser mit verstärktem Schaft rechts/rechts

E.6611.0

4.1 4.7

VHM | WERKS-NORM (COMPANY) | ALU | NE-METALLE | λ≈30° | Z=1 | DIN 6535 HA



Solid carbide Alu 1-flute end mills with reinforced shank RH/RH

Frezy z węglika spiekanego jednoostrzowe ze wzmocnionym chwytem do aluminium

Frese monoelica MD per Alu, gambo rinforzato

Fresas de metal duro de un diente para aluminio con mango reforzado derecho/derecho

Artikel-Nr. *Article-No.*				E.6611.0 € Stück *piece*
d1	l2	l1	d2 h6	
1,50	5	40	6,0	**22,00**
2,00	6	40	6,0	**22,00**
2,50	8	40	6,0	**22,00**
3,00	10	40	6,0	**24,00**
3,50	10	40	6,0	**24,00**
4,00	12	40	6,0	**24,00**
4,50	12	40	6,0	**24,00**
5,00	14	40	6,0	**24,00**
5,50	14	40	6,0	**24,00**
6,00	14	40	6,0	**22,00**

VHM-Alu-Einzahnfräser Linksspirale, rechtsschneidend

E.7684.0

4.1 4.7

VHM | WERKS-NORM (COMPANY) | POLIERT polished | NE-METALLE | λ≈30° | ALU | Z=1 | DIN 6535 HA



Solid carbide Alu 1-flute end mills

Frezy z węglika spiekanego jednoostrzowe do aluminium

Frese monoelica MD per Alu

Fresas de metal duro de un diente para aluminio

Artikel-Nr. *Article-No.*				E.7684.0 € Stück *piece*
d1 h10	l2	l1	d2 h6	
2,00	10	40	2,0	**12,00**
3,00	12	40	3,0	**16,00**
4,00	15	40	4,0	**17,50**
5,00	16	50	5,0	**20,00**
6,00	20	60	6,0	**23,00**
8,00	22	63	8,0	**38,00**
10,00	25	72	10,0	**55,00**
12,00	30	83	12,0	**70,00**
16,00	35	92	16,0	**149,00**
20,00	40	104	20,0	**210,00**

VHM-Alu-Mikroschaftfräser 30° mit Eckenradius

E.7694.0

4.1 4.2 4.3

VHM | WERKS-(COMPANY) NORM | POLIERT polished

ER | λ≈30° | HSC TOOL

Z=2 | DIN 6535 HA | ALU



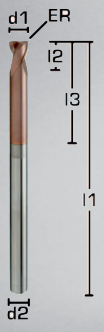
E.7695.1

4.4 4.5 4.6

VHM | WERKS-(COMPANY) NORM | SPEZIAL BESCHICHTUNG COATING

ER | λ≈30° | HSC TOOL

Z=2 | DIN 6535 HA | KUPFER



Solid carbide Alu micro end mills 30° with corner radius

Frezy miniaturowe węglika spiekanego dwuostrzowe 30° z promieniem na czole do aluminium

Microfrese MD con raggio d´angolo per Alu 30°

Microfresas de metal duro de 30° para aluminio con radio lateral

Artikel-Nr. *Article-No.*						E.7694.0 € Stück *piece*	E.7695.1 € Stück *piece*
d1 e8	ER	l2	l3	l1	d2 h6		
0,40	0,05	0,5	2	55	3,0	**40,00**	**44,00**
0,40	0,05	0,5	4	55	3,0	**40,00**	**44,00**
0,50	0,05	0,6	3	55	3,0	**33,00**	**38,00**
0,50	0,05	0,6	5	55	3,0	**33,00**	**38,00**
0,60	0,06	0,8	2	55	4,0	**31,00**	**36,00**
0,60	0,06	0,8	4	55	4,0	**31,00**	**36,00**
0,60	0,06	0,8	6	55	4,0	**31,00**	**36,00**
0,80	0,08	1,0	4	55	4,0	**31,00**	**36,00**
0,80	0,08	1,0	6	55	4,0	**31,00**	**36,00**
0,80	0,08	1,0	8	55	4,0	**31,00**	**36,00**
0,80	0,08	1,0	10	55	4,0	**31,00**	**36,00**
1,00	0,10	1,2	5	55	4,0	**31,00**	**36,00**
1,00	0,10	1,2	10	55	4,0	**31,00**	**36,00**
1,00	0,10	1,2	15	55	4,0	**31,00**	**36,00**
1,00	0,10	1,2	20	55	4,0	**31,00**	**36,00**
1,00	0,10	1,2	25	60	4,0	**31,00**	**36,00**
1,20	0,12	1,4	6	55	4,0	**31,00**	**36,00**
1,20	0,12	1,4	12	55	4,0	**31,00**	**36,00**
1,20	0,12	1,4	18	55	4,0	**31,00**	**36,00**
1,20	0,12	1,4	25	60	4,0	**31,00**	**36,00**
1,50	0,15	1,8	4	55	4,0	**31,00**	**36,00**
1,50	0,15	1,8	8	55	4,0	**31,00**	**36,00**
1,50	0,15	1,8	12	55	4,0	**31,00**	**36,00**
1,50	0,15	1,8	16	55	4,0	**31,00**	**36,00**
1,50	0,15	1,8	20	55	4,0	**31,00**	**36,00**
1,50	0,15	1,8	25	60	4,0	**31,00**	**36,00**
2,00	0,20	2,0	5	65	4,0	**31,00**	**36,00**
2,00	0,20	2,0	10	65	4,0	**31,00**	**36,00**
2,00	0,20	2,0	15	65	4,0	**31,00**	**36,00**
2,00	0,20	2,0	20	75	4,0	**31,00**	**36,00**
2,00	0,20	2,0	25	75	4,0	**31,00**	**36,00**
2,00	0,20	2,0	30	75	4,0	**31,00**	**36,00**
3,00	0,30	3,0	5	65	4,0	**31,00**	**36,00**
3,00	0,30	3,0	10	65	4,0	**31,00**	**36,00**
3,00	0,30	3,0	15	65	4,0	**31,00**	**36,00**
3,00	0,30	3,0	20	75	4,0	**31,00**	**36,00**
3,00	0,30	3,0	25	75	4,0	**31,00**	**36,00**
3,00	0,30	3,0	30	75	4,0	**31,00**	**36,00**
4,00	0,30	4,0	10	65	6,0	**33,00**	**39,00**
4,00	0,30	4,0	15	65	6,0	**33,00**	**39,00**
4,00	0,30	4,0	20	65	6,0	**33,00**	**39,00**
4,00	0,30	4,0	25	75	6,0	**33,00**	**39,00**
4,00	0,30	4,0	30	75	6,0	**33,00**	**39,00**
5,00	0,30	5,0	10	65	6,0	**33,00**	**39,00**
5,00	0,30	5,0	20	65	6,0	**33,00**	**39,00**
5,00	0,30	5,0	30	75	6,0	**33,00**	**39,00**
5,00	0,30	5,0	40	90	6,0	**33,00**	**39,00**
6,00	0,30	6,0	10	65	6,0	**33,00**	**39,00**
6,00	0,30	6,0	20	65	6,0	**33,00**	**39,00**
6,00	0,30	6,0	30	75	6,0	**33,00**	**39,00**
6,00	0,30	6,0	40	90	6,0	**33,00**	**39,00**

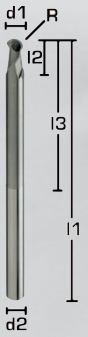
E.7690.0

4.1 4.2 4.3

VHM | WERKS-(COMPANY) NORM | POLIERT polished

R | λ≈30° | HSC TOOL

Z=2 | DIN 6535 HA | ALU



E.7691.1

4.4 4.5 4.6

VHM | WERKS-(COMPANY) NORM | SPEZIAL BESCHICHTUNG COATING

R | λ≈30° | HSC TOOL

Z=2 | DIN 6535 HA | KUPFER



Solid carbide Alu micro ball nose end mills 30°

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do aluminium

Microfrese raggiate MD per Alu, 30°

Microfresas de metal duro de 30° para aluminio con radio

Artikel-Nr. *Article-No.*						E.7690.0 € Stück *piece*	E.7691.1 € Stück *piece*
d1	R	l2	l3	l1	d2		
0,40	0,20	0,5	2	55	3,0	**40,00**	**45,00**
0,40	0,20	0,5	4	55	3,0	**40,00**	**45,00**
0,50	0,25	0,6	3	55	3,0	**33,00**	**40,00**
0,50	0,25	0,6	5	55	3,0	**33,00**	**40,00**
0,60	0,30	0,8	2	55	4,0	**31,00**	**37,00**
0,60	0,30	0,8	4	55	4,0	**31,00**	**37,00**
0,60	0,30	0,8	6	55	4,0	**31,00**	**37,00**
0,80	0,40	1,0	4	55	4,0	**31,00**	**37,00**
0,80	0,40	1,0	6	55	4,0	**31,00**	**37,00**
0,80	0,40	1,0	8	55	4,0	**31,00**	**37,00**
0,80	0,40	1,0	10	55	4,0	**31,00**	**37,00**
1,00	0,50	1,2	5	55	4,0	**31,00**	**37,00**
1,00	0,50	1,2	10	55	4,0	**31,00**	**37,00**
1,00	0,50	1,2	15	55	4,0	**31,00**	**37,00**
1,00	0,50	1,2	20	55	4,0	**31,00**	**37,00**
1,00	0,50	1,2	25	60	4,0	**31,00**	**37,00**
1,20	0,60	1,4	6	55	4,0	**31,00**	**37,00**
1,20	0,60	1,4	12	55	4,0	**31,00**	**37,00**
1,20	0,60	1,4	18	55	4,0	**31,00**	**37,00**
1,20	0,60	1,4	25	60	4,0	**31,00**	**37,00**
1,50	0,75	1,8	4	55	4,0	**31,00**	**37,00**
1,50	0,75	1,8	8	55	4,0	**31,00**	**37,00**
1,50	0,75	1,8	12	55	4,0	**31,00**	**37,00**
1,50	0,75	1,8	16	55	4,0	**31,00**	**37,00**
1,50	0,75	1,8	20	55	4,0	**31,00**	**37,00**
1,50	0,75	1,8	25	60	4,0	**31,00**	**37,00**
2,00	1,00	2,0	5	65	4,0	**31,00**	**37,00**
2,00	1,00	2,0	10	65	4,0	**31,00**	**37,00**
2,00	1,00	2,0	15	65	4,0	**31,00**	**37,00**
2,00	1,00	2,0	20	75	4,0	**31,00**	**37,00**
2,00	1,00	2,0	25	75	4,0	**31,00**	**37,00**
2,00	1,00	2,0	30	75	4,0	**31,00**	**37,00**
3,00	1,50	3,0	5	65	4,0	**31,00**	**37,00**
3,00	1,50	3,0	10	65	4,0	**31,00**	**37,00**
3,00	1,50	3,0	15	65	4,0	**31,00**	**37,00**
3,00	1,50	3,0	20	75	4,0	**31,00**	**37,00**
3,00	1,50	3,0	25	75	4,0	**31,00**	**37,00**
3,00	1,50	3,0	30	75	4,0	**31,00**	**37,00**
4,00	2,00	4,0	10	65	6,0	**32,00**	**39,00**
4,00	2,00	4,0	15	65	6,0	**32,00**	**39,00**
4,00	2,00	4,0	20	65	6,0	**32,00**	**39,00**
4,00	2,00	4,0	25	75	6,0	**32,00**	**39,00**
4,00	2,00	4,0	30	75	6,0	**32,00**	**39,00**
5,00	2,50	5,0	10	65	6,0	**32,00**	**39,00**
5,00	2,50	5,0	20	65	6,0	**32,00**	**39,00**
5,00	2,50	5,0	30	75	6,0	**32,00**	**39,00**
5,00	2,50	5,0	40	90	6,0	**32,00**	**39,00**
6,00	3,00	6,0	10	65	6,0	**32,00**	**39,00**
6,00	3,00	6,0	20	65	6,0	**32,00**	**39,00**
6,00	3,00	6,0	30	75	6,0	**32,00**	**39,00**
6,00	3,00	6,0	40	90	6,0	**32,00**	**39,00**

E.7607.0

3.2 | 4.3 | 4.5 | 4.6

VHM | WERKS-(COMPANY)NORM | Kupfer/Alu kurz | KURZ SHORT | MESSING | Z=2 | DIN 6535 HA | BRONZE



Solid carbide Alu end mills straight fluted short

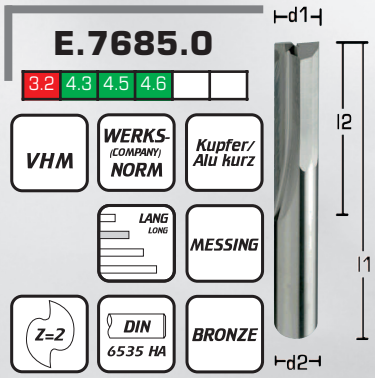
Frezy z węglika spiekanego dwuostrzowe krókie o ostrzach prostych do aluminium

Frese MD per Alu, denti dritti

Fresas de metal duro de 30° para aluminio, labios rectos, serie corta

Artikel-Nr. *Article-No.*				E.7607.0 € Stück *piece*
d1 h7	l2	l1	d2 h6	
2,00	8	38	2,0	**12,50**
2,50	8	38	2,5	**12,50**
3,00	12	38	3,0	**14,00**
3,50	12	40	3,5	**16,00**
4,00	12	40	4,0	**16,00**
4,50	14	50	4,5	**19,00**
5,00	14	50	5,0	**19,00**
5,50	16	50	5,5	**23,00**
6,00	16	50	6,0	**23,00**
6,50	16	50	6,5	**29,00**
7,00	20	60	7,0	**29,00**
7,50	20	60	7,5	**34,00**
8,00	20	60	8,0	**34,00**
8,50	20	60	8,5	**39,00**
9,00	20	60	9,0	**39,00**
9,50	22	70	9,5	**48,00**
10,00	22	70	10,0	**48,00**
11,00	22	70	11,0	**61,00**
12,00	22	70	12,0	**61,00**
13,00	25	75	13,0	**80,00**
14,00	25	75	14,0	**85,00**
15,00	25	75	15,0	**100,00**
16,00	25	75	16,0	**105,00**
18,00	32	100	18,0	**148,00**
20,00	32	100	20,0	**173,00**

VHM-Alu-Schaftfräser gerade genutet lang



Solid carbide Alu end mills straight fluted long

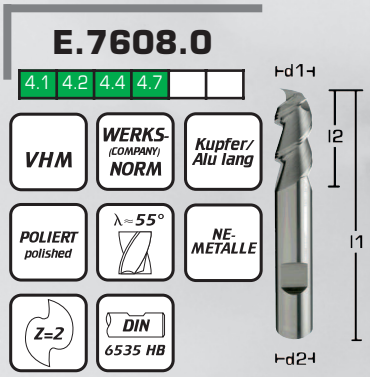
Frezy z węglika spiekanego dwuostrzowe długie o ostrzach prostych do aluminium

Frese MD per Alu, denti dritti, serie lunga

Fresas de metal duro para aluminio, labios rectos, serie larga

Artikel-Nr. *Article-No.*				E.7685.0 € Stück *piece*
d1 h10	l2	l1	d2 h6	
3,00	12	40	3,0	**16,00**
4,00	14	40	4,0	**17,00**
5,00	16	50	5,0	**20,00**
6,00	18	50	6,0	**26,00**
8,00	20	63	8,0	**38,00**
10,00	25	72	10,0	**51,00**
12,00	30	83	12,0	**70,00**
16,00	35	92	16,0	**148,00**
20,00	45	104	20,0	**210,00**

VHM-Alu-Universalfräser 55°



Solid carbide Alu universal end mills 55°

Frezy z węglika spiekanego uniwersalne dwuostrzowe 55° do aluminium

Frese MD universali per Alu, 55°

Fresas de metal duro para aluminio de 55° para uso universal

Artikel-Nr. *Article-No.*				E.7608.0 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	8	57	6,0	**14,00**
4,00	11	57	6,0	**14,00**
5,00	13	57	6,0	**14,00**
6,00	13	57	6,0	**14,00**
8,00	19	63	8,0	**15,00**
10,00	22	72	10,0	**25,00**
12,00	26	83	12,0	**36,00**
14,00	26	83	14,0	**46,00**
16,00	32	92	16,0	**59,00**
18,00	32	92	18,0	**68,00**
20,00	38	104	20,0	**115,00**

VHM-Alu-Schaftfräser 25°

E.7617.0

4.2 | 4.3 | 4.5 | 4.7

VHM | WERKS-NORM (COMPANY) | Kupfer/ Alu kurz | λ≈25° | Z=2 | DIN 6535 HA



Solid carbide Alu end mills 25°

Frezy z węglika spiekanego dwuostrzowe 25° do aluminium

Frese in MD ALU 25°

Fresas de metal duro para aluminio de 25°

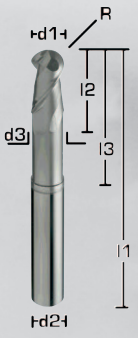
Artikel-Nr. *Article-No.*				E.7617.0 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	10	38	2,0	**14,00**
3,00	12	38	3,0	**15,00**
4,00	12	40	4,0	**18,00**
5,00	12	50	5,0	**21,00**
6,00	18	60	6,0	**26,00**
7,00	18	60	7,0	**30,00**
8,00	18	60	8,0	**35,00**
9,00	22	70	9,0	**49,00**
10,00	22	70	10,0	**57,00**
12,00	22	70	12,0	**70,00**
14,00	25	80	14,0	**95,00**
16,00	25	80	16,0	**125,00**
18,00	30	100	18,0	**165,00**
20,00	35	100	20,0	**190,00**

VHM-Alu-Kugelfräser 40°

E.7621.1

4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 4.6

VHM | WERKS-NORM (COMPANY) | SPEZIAL BESCHICHTUNG COATING | ALU | λ≈40° | HSC TOOL | Z=2 | DIN 6535 HA | NE-METALLE



Solid carbide Alu ball nose end mills 40°

Frezy z węglika spiekanego dwuostrzowe 40° z czołem kulistym do aluminium

Frese raggiate MD, 40°

Fresas de metal duro para aluminio de 40° con punta bola

Kugel bis 220° einsetzbar
Ball useable up to 220°

Artikel-Nr. *Article-No.*							E.7621.1 € Stück *piece*
d1	R	d3	l2	l3	l1	d2 h6	
1,00	0,5	0,9	2	15	60	6,0	**41,00**
2,00	1,0	1,8	4	20	60	6,0	**34,00**
3,00	1,5	2,8	6	25	70	6,0	**33,00**
4,00	2,0	3,7	8	25	70	6,0	**33,00**
5,00	2,5	4,6	10	25	70	6,0	**33,00**
6,00	3,0	5,5	12	35	80	6,0	**33,00**
8,00	4,0	7,4	16	35	80	8,0	**45,00**
10,00	5,0	9,2	20	45	90	10,0	**64,00**
12,00	6,0	11,0	24	50	100	12,0	**82,00**

VHM-Alu-Power-Schaftfräser 45°

E.7636.0

4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 4.6

VHM | WERKS-(COMPANY) NORM | POLIERT polished

ALU | λ≈45° | HSC TOOL

Z=3 | DIN 6535 HA | ALU



Solid carbide Alu Power end mills 45°

Frezy Power z węglika spiekanego trzyostrzowe 45° do aluminium

Frese MD Alu-Power 45°

Fresas de metal duro "Power" para aluminio de 45°

Artikel-Nr. *Article-No.*				E.7636.0 € Stück *piece*
d1	l2	l1	d2 h6	
6,00	16	60	6,0	**24,00**
8,00	25	78	8,0	**30,00**
10,00	28	78	10,0	**37,00**
12,00	32	89	12,0	**52,00**
14,00	32	89	14,0	**69,00**
16,00	36	96	16,0	**92,00**
20,00	45	111	20,0	**149,00**
25,00	50	126	25,0	**190,00**

VHM-Alu-Power-Schruppfräser 45° mit Eckenradius

E.7637.0

4.3 | 4.5 | 4.6

VHM | WERKS-(COMPANY) NORM | HSC TOOL

TYP WF | λ≈45° | ER

Z=3 | DIN 6535 HA | Kupfer/ Alu kurz



Solid carbideAlu Power roughing end mills 45° with corner radius

Frezy Power z węglika spiekanego trzyostrzowe 45° z promieniem na czole do obróbki zgrubnej

Frese con rompitruciolo MD e raggio d´angolo per Alu-Power 45°

Fresas de metal duro "Power" de desbaste para aluminio de 45° con radio lateral

Zum Bohren geeignet
Suitable for drilling

Artikel-Nr. *Article-No.*					E.7637.0 € Stück *piece*
d1	ER	l2	l1	d2 h6	
6,00	0,4	16	60	6,0	**37,00**
8,00	0,5	25	78	8,0	**47,00**
10,00	0,6	28	78	10,0	**64,00**
12,00	0,8	32	89	12,0	**80,00**
14,00	1,0	32	89	14,0	**101,00**
16,00	1,0	36	96	16,0	**121,00**
20,00	1,2	45	111	20,0	**180,00**
25,00	1,5	50	126	25,0	**210,00**

VHM-Alu-Schaftfräser 45° mit Innenkühlung

E.7715.0

4.1 4.2 4.3 4.4 4.5 4.6

VHM | WERKS-NORM (COMPANY) | POLIERT polished | ALU | λ≈45° | NE-METALLE | Z=4 | DIN 6535 HA



Solid carbide Alu end mills 45° with internal coolant

Frezy z węglika spiekanego czteroostrzowe 45° z chłodzeniem wewnętrznym do aluminium

Frese MD per Alu 45° con refrigerazione interna

Fresas de metal duro para aluminio de 45° con refrigeración interior

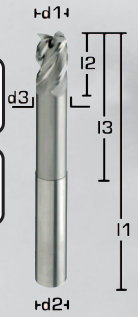
Artikel-Nr. *Article-No.*						E.7715.0 € Stück *piece*
d1	d3	l2	l3	l1	d2 h6	
3,00	2,8	11	18	57	6,0	**33,00**
4,00	3,6	12	21	57	6,0	**33,00**
5,00	4,5	15	21	57	6,0	**33,00**
6,00	5,5	15	21	57	6,0	**33,00**
8,00	7,5	21	28	63	8,0	**40,00**
10,00	9,5	22	32	72	10,0	**58,00**
12,00	11,5	28	38	83	12,0	**79,00**
14,00	13,5	30	42	83	14,0	**116,00**
16,00	15,5	35	45	92	16,0	**157,00**
20,00	19,5	41	55	104	20,0	**197,00**
25,00	24,0	51	65	110	25,0	**280,00**

VHM-Alu-Schaftfräser 40°

E.7646.0

4.1 4.2 4.3 4.4 4.5 4.6

VHM | WERKS-NORM (COMPANY) | ALU | λ≈40° | NE-METALLE | MEHR SCHNEIDER | DIN 6535 HA



Solid carbide Alu end mills 40°

Frezy z węglika spiekanego wieloostrzowe 40° do aluminium

Frese in MD ALU 40°

Fresas de metal duro para aluminio de 40°

Artikel-Nr. *Article-No.*							E.7646.0 € Stück *piece*
d1	d3	l2	l3	l1	d2 h6	Zähne *flutes*	
6,00	5,7	12	30	70	6,0	3	**38,00**
8,00	7,7	14	35	80	8,0	3	**52,00**
10,00	9,7	16	45	90	10,0	3	**70,00**
12,00	11,5	18	55	100	12,0	4	**99,00**
16,00	15,5	20	65	115	16,0	4	**165,00**
20,00	19,5	22	75	125	20,0	4	**212,00**

VHM-Alu-Schaftfräser 20°

E.7727.0

4.1 4.2 4.3 4.4 4.5 4.7

VHM · WERKS-(COMPANY)NORM · ALU · λ≈20° · NE-METALLE · MEHR SCHNEIDER · DIN 6535 HB · HSC TOOL



Solid carbide Alu end mills 20°

Frezy z węglika spiekanego wieloostrzowe 20° do aluminium

Frese in MD ALU 20°

Fresas de metal duro para aluminio de 20°

Artikel-Nr. *Article-No.*						E.7727.0 € Stück *piece*
d1	l2	l3	l1	d2	Zähne *flutes*	
4,00	13	16	54	4,0	2	**30,00**
5,00	15	18	54	5,0	2	**30,00**
6,00	16	21	64	6,0	2	**31,00**
8,00	22	27	70	8,0	2	**36,00**
10,00	22	32	72	10,0	2	**49,00**
12,00	28	38	83	12,0	3	**63,00**
14,00	30	42	83	14,0	3	**81,00**
16,00	36	44	92	16,0	3	**105,00**
18,00	36	50	92	18,0	3	**138,00**
20,00	41	54	104	20,0	4	**172,00**
25,00	43	63	110	25,0	4	**241,00**

VHM-Alu-Konturenfräser mit Diamantverzahnung

E.7755.0

4.2 4.5 4.7 4.8

VHM · WERKS-(COMPANY)NORM · MEHR SCHNEIDER · ALU · RH · NE-METALLE



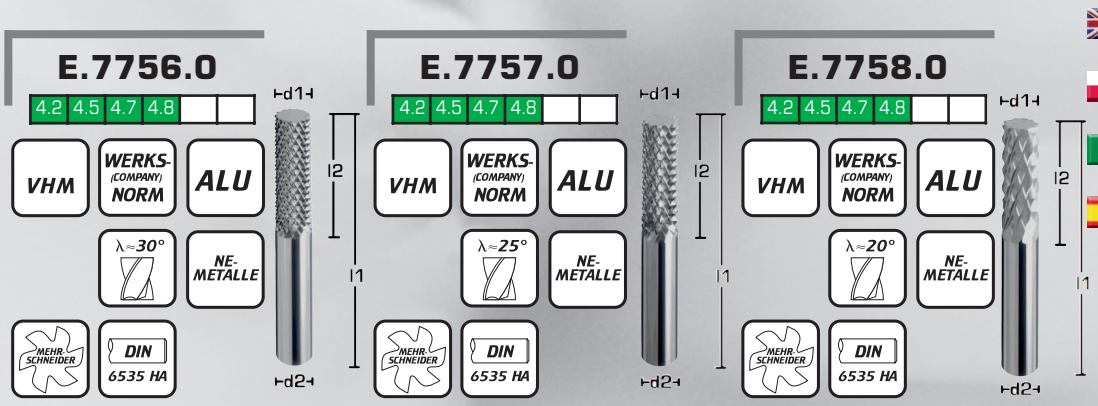
Solid carbide Alu end mill with diamont teeth

Frezy z węglika spiekanego wieloostrzowe z ostrzami diamentowymi do aluminium

Frese MD per scontornare Alu con denti diamantati

Fresas de metal duro para aluminio para contornear con dientes diamantados

Artikel-Nr. *Article-No.*				E.7755.0 € Stück *piece*	Artikel-Nr. *Article-No.*				E.7755.0 € Stück *piece*
d1	l2	l1	d2		d1	l2	l1	d2	
0,80	4,0	38	3,0		**2,00**	8,5	38	3,0	
0,90	4,0	38	3,0		**2,10**	8,5	38	3,0	
1,00	4,5	38	3,0		**2,20**	8,5	38	3,0	
1,10	4,5	38	3,0	**Auf Anfrage**	**2,30**	8,5	38	3,0	**Auf Anfrage**
1,20	4,5	38	3,0		**2,40**	8,5	38	3,0	
1,30	4,5	38	3,0		**2,50**	8,5	38	3,0	
1,40	4,5	38	3,0	*on demand*	**2,60**	8,5	38	3,0	*on demand*
1,50	6,5	38	3,0		**2,70**	8,5	38	3,0	
1,60	6,5	38	3,0		**2,80**	8,5	38	3,0	
1,70	6,5	38	3,0		**2,90**	8,5	38	3,0	
1,80	6,5	38	3,0		**3,00**	9,5	38	3,0	
1,90	6,5	38	3,0		**3,175**	9,5	38	3,0	



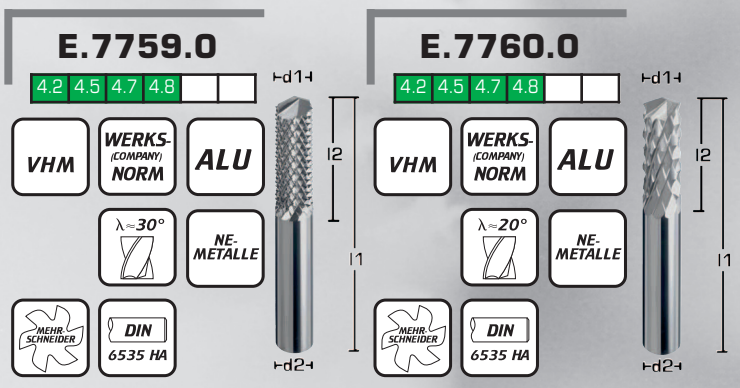
Solid carbide Alu end mills cross cut

Frezy z węglika spiekanego naprzemiennie skośne wieloostrzowe do aluminium

Frese MD per Alu denti incrociati

Fresas de metal duro para aluminio con diente cruzado

Artikel-Nr. *Article-No.*				E.7756.0 € Stück *piece*	E.7757.0 € Stück *piece*	E.7758.0 € Stück *piece*
d1 h10	l2	l1	d2 h6			
2,00	7	40	2,0	**12,00**	**12,00**	**12,00**
2,00	7	50	6,0	**26,00**	**26,00**	**26,00**
3,00	10	40	3,0	**12,00**	**12,00**	**12,00**
3,00	12	50	6,0	**26,00**	**26,00**	**26,00**
4,00	15	40	4,0	**17,00**	**17,00**	**17,00**
4,00	20	50	6,0	**26,00**	**26,00**	**26,00**
5,00	16	50	5,0	**21,00**	**21,00**	**21,00**
5,00	25	75	6,0	**38,00**	**38,00**	**38,00**
6,00	18	50	6,0	**24,00**	**24,00**	**24,00**
6,00	35	75	6,0	**35,00**	**35,00**	**35,00**
8,00	25	63	8,0	**36,00**	**36,00**	**36,00**
8,00	40	100	8,0	**52,00**	**52,00**	**52,00**
10,00	30	72	10,0	**52,00**	**52,00**	**52,00**
12,00	32	83	12,0	**72,00**	**72,00**	**72,00**
16,00	36	92	16,0	**170,00**	**170,00**	**170,00**
20,00	45	104	20,0	**240,00**	**240,00**	**240,00**



Solid carbide Aludrill milling cutter cross cut

Frezo-wiertła z węglika spiekanego naprzemiennie skośne wieloostrzowe do do aluminium

Frese-punte MD per Alu denti incrociati

Fresas-brocas de metal duro para aluminio con diente cruzado

Artikel-Nr. *Article-No.*				E.7759.0 € Stück *piece*	E.7760.0 € Stück *piece*
d1 h10	l2	l1	d2 h6		
2,00	7	40	2,0	**16,50**	**16,50**
2,00	7	50	6,0	**30,00**	**30,00**
3,00	10	40	3,0	**16,50**	**16,50**
3,00	12	50	6,0	**30,00**	**30,00**
4,00	15	40	4,0	**20,00**	**20,00**
4,00	20	50	6,0	**30,00**	**30,00**
5,00	16	50	5,0	**21,00**	**21,00**
5,00	25	75	6,0	**40,00**	**40,00**
6,00	18	50	6,0	**28,00**	**28,00**
6,00	35	75	6,0	**39,00**	**39,00**
8,00	25	63	8,0	**42,00**	**42,00**
8,00	40	100	8,0	**58,00**	**58,00**
10,00	30	72	10,0	**57,00**	**57,00**
12,00	32	83	12,0	**80,00**	**80,00**
16,00	36	92	16,0	**192,00**	**192,00**
20,00	45	104	20,0	**273,00**	**273,00**

VHM-Alu-Radiusfräser kreuzverzahnt

E.7761.0

4.2 | 4.5 | 4.7 | 4.8

VHM | WERKS-NORM (COMPANY) | ALU | R | λ≈30° | NE-METALLE | MEHR SCHNEIDER | DIN 6535 HA



Solid carbide Alu ball nose end mills cross cut

Frezy z węglika spiekanego naprzemiennie skośne wieloostrzowe z czołem kulistym do aluminium

Frese raggiate MD per Alu, denti incrociati

Fresas de radio de metal duro para aluminio con diente cruzado

Artikel-Nr. *Article-No.*					E.7761.0 € Stück *piece*
d1	R	l2	l1	d2 h6	
2,00	1,00	7	40	2,0	**20,00**
2,00	1,00	7	50	6,0	**36,00**
3,00	1,50	10	40	3,0	**20,00**
3,00	1,50	12	50	6,0	**36,00**
4,00	2,00	15	40	4,0	**24,00**
4,00	2,00	20	50	6,0	**36,00**
5,00	2,50	16	50	5,0	**31,00**
5,00	2,50	25	75	6,0	**48,00**
6,00	3,00	18	50	6,0	**34,00**
6,00	3,00	35	75	6,0	**47,00**
8,00	4,00	25	63	8,0	**50,00**
8,00	4,00	40	100	8,0	**69,00**
10,00	5,00	30	72	10,0	**68,00**
12,00	6,00	32	83	12,0	**97,00**
16,00	8,00	36	92	16,0	**230,00**
20,00	10,00	45	104	20,0	**330,00**

VHM-Alu-Bohrfräser mit gegenläufiger Spitzverzahnung

E.7762.0

4.2 | 4.5 | 4.7 | 4.8

VHM | WERKS-NORM (COMPANY) | ALU | HSC TOOL | NE-METALLE | MEHR SCHNEIDER | DIN 6535 HA



Solid carbide Alu milling cutters with counterwise point cut

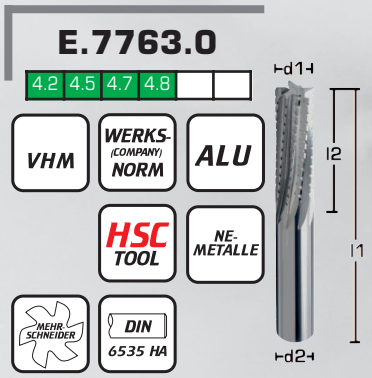
Frezo-wiertła wieloostrzowe z węglika spiekanego do aluminium

Frese-punte MD per Alu, denti affilati al contrario

Fresas-brocas de metal duro para aluminio con diente afilado en contracorriente

Artikel-Nr. *Article-No.*				E.7762.0 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	12	50	3,0	**44,00**
4,00	14	50	4,0	**54,00**
5,00	16	50	5,0	**60,00**
6,00	20	60	6,0	**87,00**
8,00	22	63	8,0	**107,00**
10,00	25	72	10,0	**96,00**
12,00	30	83	12,0	**122,00**
16,00	35	92	16,0	**256,00**
20,00	45	104	20,0	**360,00**

VHM-Alu-Schaftfräser mit großen Spannuten



Solid carbide Alu end mills with large chip flutes

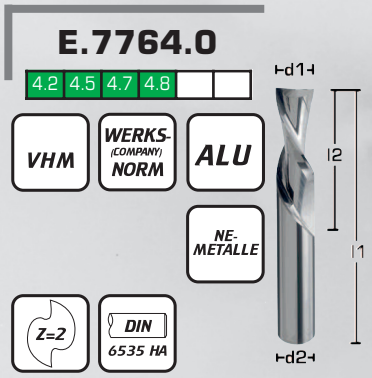
Frezy z węglika spiekanego wieloostrzowe do obróbki zgrubnej aluminium

Frese MD per Alu con scanalature profonde

Fresas de metal duro para aluminio con ranuras grandes

Artikel-Nr. *Article-No.*				E.7763.0 € Stück *piece*
d1	l2	l1	d2 h6	
2,00	6	40	6,0	**38,00**
3,00	12	40	3,0	**20,00**
3,00	12	50	6,0	**38,00**
4,00	14	40	6,0	**38,00**
5,00	16	50	5,0	**32,00**
6,00	18	50	6,0	**35,00**
8,00	20	63	8,0	**52,00**
10,00	25	72	10,0	**72,00**
12,00	30	83	12,0	**101,00**

VHM-Alu-Hochgeschwindigkeitsfräser



Solid carbide Alu high speed end mills

Frezy z węglika spiekanego dwuostrzowe do obróbki szybkościowej do aluminium

Frese MD alte prestazioni per Alu

Fresas de metal duro para aluminio para alta velocidad

Artikel-Nr. *Article-No.*				E.7764.0 € Stück *piece*
d1 h10	l2	l1	d2 h6	
3,00	12	40	3,0	**40,00**
4,00	14	40	4,0	**57,00**
5,00	16	50	5,0	**71,00**
6,00	18	50	6,0	**76,00**
8,00	20	63	8,0	**95,00**
10,00	25	72	10,0	**134,00**
12,00	30	83	12,0	**166,00**
16,00	35	92	16,0	**281,00**
20,00	45	104	20,0	**370,00**

E.7689.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY) NORM | Blue Cut

STAHL | λ≈30° | ≤65 HRC

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro end mills 30° with corner radius for moulds

Frezy miniaturowe z węglika spiekanego dwuostrzowe krótkie 30° do form

Microfrese MD con raggio d´angolo per stampi, 30°, serie corta

Microfresas de metal duro de 30° para moldes, serie corta

Artikel-Nr. *Article-No.*				E.7689.1 € Stück *piece*
d1	l2	l1	d2	
0,10	0,3	50	4,0	**55,00**
0,20	0,5	50	4,0	**55,00**
0,30	1,0	50	4,0	**55,00**
0,40	1,0	50	4,0	**55,00**
0,50	1,5	50	4,0	**55,00**
0,60	1,5	50	4,0	**55,00**
0,70	2,0	50	4,0	**55,00**
0,80	2,0	50	4,0	**55,00**
0,90	2,5	50	4,0	**55,00**
1,00	3,0	50	4,0	**55,00**
1,10	3,0	50	4,0	**55,00**
1,20	4,0	50	4,0	**55,00**
1,40	4,0	50	4,0	**55,00**
1,50	4,0	50	4,0	**55,00**
1,60	4,0	50	4,0	**55,00**
1,70	4,0	50	4,0	**55,00**
1,80	5,0	50	4,0	**55,00**
1,90	5,0	50	4,0	**55,00**
2,00	5,0	50	4,0	**55,00**
2,50	5,0	50	4,0	**55,00**
3,00	5,0	50	6,0	**60,00**
4,00	8,0	54	6,0	**60,00**
5,00	9,0	54	6,0	**60,00**
6,00	10,0	54	6,0	**60,00**
8,00	12,0	58	8,0	**68,00**
10,00	14,0	66	10,0	**88,00**
12,00	16,0	73	12,0	**114,00**
14,00	18,0	75	14,0	**132,00**
16,00	22,0	82	16,0	**160,00**
20,00	26,0	92	20,0	**243,00**

E.7642.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY)NORM | Blue Cut | STAHL | λ≈30° | LANG LONG | Z=2 | DIN 6535 HA



Solid carbide micro end mills 30° for moulds long

Frezy miniaturowez węglika spiekanego dwuostrzowe długie 30° do form

Microfrese MD 30° per stampi, serie lunga

Microfresas de metal duro de 30° para moldes, serie larga

Artikel-Nr. *Article-No.*					E.7642.1 € Stück *piece*
d1	l2	l3	l1	d2 h6	
0,80	1,2	6	45	4,0	**29,00**
0,90	1,4	6	45	4,0	**29,00**
1,00	1,5	6	45	4,0	**29,00**
1,00	1,5	12	45	4,0	**29,00**
1,20	1,8	8	45	4,0	**29,00**
1,20	1,8	12	45	4,0	**29,00**
1,40	2,1	12	45	4,0	**29,00**
1,50	2,3	14	50	4,0	**29,00**
1,60	2,4	16	50	4,0	**29,00**
1,80	2,7	16	50	4,0	**29,00**
2,00	3,0	8	45	4,0	**29,00**
2,00	3,0	12	45	4,0	**29,00**
2,00	3,0	16	50	4,0	**29,00**
2,00	3,0	20	55	4,0	**29,00**
2,50	3,7	14	50	4,0	**29,00**
3,00	4,5	12	45	6,0	**31,00**
3,00	4,5	20	60	6,0	**31,00**



VHM-Formenbau-Mikroschaftfräser 30° mit Eckenradius kurz

E.7719.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=2 | DIN 6535 HA | X



Solid carbide micro end mills 30° with corner radius for moulds short

Frezy miniaturowez węglika spiekanego dwuostrzowe krótkie 30° z promieniem na czole do form

Microfrese MD 30° per stampi, con raggio d´angolo, serie corta

Microfresas de metal duro de 30° para moldes, serie corta con radio lateral

Artikel-Nr. *Article-No.*					**E.7719.1** € Stück *piece*
d1	ER	l2	l1	d2	
0,30		0,45	50	6,0	**42,00**
0,40		0,60	50	6,0	**38,00**
0,50	0,05	0,70	50	6,0	**35,00**
0,60	0,05	0,90	50	6,0	**34,00**
0,80	0,05	1,20	50	6,0	**31,00**
1,00	0,10	1,50	50	6,0	**30,00**
1,20	0,10	1,80	50	6,0	**30,00**
1,50	0,15	2,20	50	6,0	**30,00**
2,00	0,15	2,20	50	6,0	**27,50**

VHM-Formenbau-Mikroschaftfräser 30° mit Eckenradius extra kurz

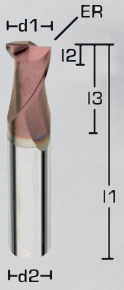
E.7720.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=2 | DIN 6535 HA | X



Solid carbide micro end mills 30° with corner radius for moulds extra short

Frezy miniaturowe z węglika spiekanego dwuostrzowe bardzo krótkie 30° z promieniem na czole do form

Microfrese MD 30° per stampi, con raggio d´angolo, serie extra corta

Microfresas de metal duro de 30° para moldes, serie extra corta con radio lateral

Artikel-Nr. *Article-No.*						**E.7720.1** € Stück *piece*
d1	ER	l2	l3	l1	d2	
0,30		0,45		40	3,0	**27,00**
0,40		0,60		40	3,0	**24,00**
0,50	0,05	0,70		40	3,0	**21,00**
0,60	0,05	0,90		40	3,0	**20,00**
0,80	0,05	1,20		40	3,0	**18,00**
1,00	0,10	1,50		40	3,0	**17,00**
1,50	0,10	2,20		40	3,0	**17,00**
2,00	0,10	3,00	1,9	40	3,0	**16,00**
2,50	0,10	4,00	2,4	40	3,0	**16,00**
3,00	0,10	4,00	2,9	45	6,0	**23,00**
3,50	0,10	5,00	3,3	45	6,0	**23,00**
4,00	0,10	5,00	3,8	45	6,0	**23,00**
4,50	0,10	6,00	4,3	45	6,0	**23,00**
5,00	0,20	6,00	4,8	50	6,0	**23,00**
6,00	0,20	7,00	5,8	50	6,0	**23,00**
8,00	0,20	9,00	7,8	60	8,0	**28,00**
10,00	0,20	12,00	9,7	75	10,0	**41,00**
12,00	0,30	15,00	11,7	75	12,0	**55,00**
16,00	0,30	18,00	15,7	90	16,0	**91,00**
20,00	0,30	24,00	19,7	100	20,0	**149,00**

E.7640.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro end mills 30° with corner radius for moulds

Frezy miniaturowe z węglika spoiekanego dwuostrzowe 30° z promieniem na czole do form

Microfrese MD 30° per stampi, con raggio d´angolo

Microfresas de metal duro de 30° para moldes con radio lateral

Frästiefe bis 30xd
Milling depth up to 30xd

Artikel-Nr. *Article-No.*						E.7640.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
0,30	0,05	0,45	1	55	6,0	**39,00**
0,30	0,05	0,45	2	55	6,0	**39,00**
0,30	0,05	0,45	3	55	6,0	**39,00**
0,30	0,05	0,45	5	55	6,0	**39,00**
0,40	0,05	0,60	2	55	6,0	**39,00**
0,40	0,05	0,60	4	55	6,0	**39,00**
0,40	0,05	0,60	6	55	6,0	**39,00**
0,50	0,05	0,70	2	55	6,0	**39,00**
0,50	0,05	0,70	4	55	6,0	**39,00**
0,50	0,05	0,70	6	55	6,0	**39,00**
0,60	0,06	0,90	2	55	6,0	**34,00**
0,60	0,06	0,90	4	55	6,0	**34,00**
0,60	0,06	0,90	6	55	6,0	**34,00**
0,60	0,06	0,90	8	55	6,0	**34,00**
0,80	0,08	1,20	2	55	6,0	**34,00**
0,80	0,08	1,20	4	55	6,0	**34,00**
0,80	0,08	1,20	6	55	6,0	**34,00**
0,80	0,08	1,20	8	55	6,0	**34,00**
0,80	0,08	1,20	10	55	6,0	**34,00**
1,00	0,10	1,60	3	55	6,0	**34,00**
1,00	0,10	1,60	4	55	6,0	**34,00**
1,00	0,10	1,60	5	55	6,0	**34,00**
1,00	0,10	1,60	6	55	6,0	**34,00**
1,00	0,10	1,60	8	55	6,0	**34,00**
1,00	0,10	1,60	10	65	6,0	**34,00**
1,00	0,10	1,60	12	65	6,0	**34,00**
1,00	0,10	1,60	15	65	6,0	**34,00**
1,00	0,10	1,60	20	65	6,0	**34,00**
1,00	0,10	1,60	25	70	6,0	**34,00**
1,00	0,10	1,60	30	75	6,0	**34,00**
1,20	0,12	1,90	4	55	6,0	**34,00**
1,20	0,12	1,90	6	55	6,0	**34,00**
1,20	0,12	1,90	8	55	6,0	**34,00**
1,20	0,12	1,90	10	65	6,0	**34,00**
1,20	0,12	1,90	12	65	6,0	**34,00**
1,20	0,12	1,90	15	65	6,0	**34,00**
1,20	0,12	1,90	20	65	6,0	**34,00**
1,20	0,12	1,90	25	70	6,0	**34,00**
1,50	0,15	2,40	5	55	6,0	**34,00**
1,50	0,15	2,40	6	55	6,0	**34,00**
1,50	0,15	2,40	8	55	6,0	**34,00**
1,50	0,15	2,40	10	65	6,0	**34,00**
1,50	0,15	2,40	12	65	6,0	**34,00**
1,50	0,15	2,40	15	65	6,0	**34,00**
1,50	0,15	2,40	20	65	6,0	**34,00**
1,50	0,15	2,40	25	70	6,0	**34,00**
1,50	0,15	2,40	30	75	6,0	**34,00**
2,00	0,20	2,80	6	55	6,0	**34,00**
2,00	0,20	2,80	8	55	6,0	**34,00**
2,00	0,20	2,80	10	65	6,0	**34,00**
2,00	0,20	2,80	12	65	6,0	**34,00**
2,00	0,20	2,80	15	65	6,0	**34,00**

Fortsetzung nächste Seite *to be continued*

E.7640.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro end mills 30° with corner radius for moulds

Frezy miniaturowe z węglka spiekanego dwuostrzowe 30° z promieniem na czole do form

Microfrese MD 30° per stampi, con raggio d´angolo

Microfresas de metal duro de 30° para moldes con radio lateral

Frästiefe bis 30xd
Milling depth up to 30xd

Artikel-Nr. *Article-No.*						E.7640.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
2,00	0,20	2,8	20	65	6,0	**34,00**
2,00	0,20	2,8	25	70	6,0	**34,00**
2,00	0,20	2,8	30	75	6,0	**34,00**
3,00	0,50	3,0	5	55	6,0	**34,00**
3,00	0,50	3,0	8	55	6,0	**34,00**
3,00	0,50	3,0	10	65	6,0	**34,00**
3,00	0,50	3,0	15	65	6,0	**34,00**
3,00	0,50	3,0	20	65	6,0	**34,00**
3,00	0,50	3,0	25	70	6,0	**34,00**
3,00	0,50	3,0	30	75	6,0	**34,00**
4,00	0,50	4,0	10	65	6,0	**34,00**
4,00	0,50	4,0	15	65	6,0	**34,00**
4,00	0,50	4,0	20	65	6,0	**34,00**
4,00	0,50	4,0	25	70	6,0	**34,00**
4,00	0,50	4,0	30	75	6,0	**34,00**
5,00	0,50	5,0	10	65	6,0	**34,00**
5,00	0,50	5,0	15	65	6,0	**34,00**
5,00	0,50	5,0	20	65	6,0	**34,00**
5,00	0,50	5,0	30	75	6,0	**34,00**
5,00	0,50	5,0	40	90	6,0	**34,00**
6,00	0,50	6,0	10	65	6,0	**34,00**
6,00	0,50	6,0	15	65	6,0	**34,00**
6,00	0,50	6,0	20	65	6,0	**34,00**
6,00	0,50	6,0	30	75	6,0	**34,00**
6,00	0,50	6,0	40	90	6,0	**34,00**
6,00	0,50	6,0	50	90	6,0	**34,00**

VHM-Formenbau-Schaftfräser 30° kurz

E.7731.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ≤65 HRC

Z=2 | DIN 6535 HA | X



Solid carbide end mills 30° for moulds short

Frezy z węglika spiekanego dwuostrzowe krótkie 30° do form

Frese MD 30° per stampi, serie corta

Fresas de metal duro de 30° para moldes, serie corta

Artikel-Nr. *Article-No.*				E.7731.1 € Stück *piece*
d1	l2	l1	d2	
1,00	2,5	40	6,0	**34,00**
1,50	4,0	40	6,0	**34,00**
2,00	6,0	40	6,0	**32,00**
2,50	8,0	40	6,0	**32,00**
3,00	8,0	40	6,0	**32,00**
4,00	11,0	45	6,0	**32,00**
6,00	13,0	50	6,0	**32,00**
7,00	16,0	60	8,0	**32,00**
8,00	19,0	60	8,0	**39,00**
10,00	19,0	70	10,0	**39,00**
12,00	22,0	75	12,0	**79,00**
14,00	26,0	85	14,0	**99,00**
16,00	32,0	100	16,0	**133,00**
20,00	38,0	105	20,0	**213,00**

VHM-Formenbau-Schaftfräser 30° lang

E.7732.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ≤65 HRC

Z=2 | DIN 6535 HA | X



Solid carbide end mills 30° for moulds long

Frezy z węglika spiekanego dwuostrzowe długie 30° do form

Frese MD 30° per stampi, serie lunga

Fresas de metal duro de 30° para moldes, serie larga

Artikel-Nr. *Article-No.*				E.7732.1 € Stück *piece*
d1	l2	l1	d2	
2,00	8	40	4,0	**26,00**
3,00	12	50	6,0	**38,00**
4,00	15	50	6,0	**38,00**
5,00	20	60	6,0	**38,00**
6,00	20	60	6,0	**38,00**
8,00	25	70	8,0	**48,00**
10,00	30	90	10,0	**70,00**
12,00	30	90	12,0	**94,00**
14,00	40	110	16,0	**136,00**
16,00	50	110	16,0	**176,00**
18,00	50	110	20,0	**238,00**
20,00	55	110	20,0	**290,00**
25,00	75	140	25,0	**470,00**

VHM-Formenbau-Kopierfräser 30° extra lang

E.7639.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide copying end mills 30° for moulds extra long

Frezy z węglika spiekanego dwuostrzowe bardzo długie 30° z promieniem na czole do kopiowania

Frese a copiare MD 30° per stampi, serie extra lunga

Fresas de metal duro de copiado de 30° para moldes, serie extra larga

Artikel-Nr. *Article-No.*						E.7639.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h6	
2,00	0,5	3,0	40	80	6,0	**52,00**
3,00	0,5	3,5	40	80	6,0	**52,00**
4,00	1,0	4,0	40	80	6,0	**52,00**
6,00	2,0	6,0	60	100	8,0	**66,00**
8,00	2,0	7,0	60	100	8,0	**90,00**
10,00	3,0	8,0	75	120	10,0	**145,00**
12,00	4,0	10,0	100	150	16,0	**240,00**

VHM-Formenbau-Torusfräser 30° mit Eckenradius

E.7610.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | R

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide torus end mills 30° with corner radius for moulds

Frezy z węglika spiekanego dwuostrzowe torusowe 30° z czołem kulistym do form

Frese toriche Md 30° per stampi, con raggio d´angolo

Fresas tóricas de metal duro de 30° para moldes, con radio lateral

Artikel-Nr. *Article-No.*					E.7610.1 € Stück *piece*
d1 h10	ER	l2	l1	d2 h6	
2,00	0,5	4	38	6,0	**20,00**
3,00	0,5	5	38	6,0	**20,00**
4,00	0,5	7	38	6,0	**20,00**
5,00	0,5	8	38	6,0	**20,00**
6,00	1,0	8	38	6,0	**20,00**
8,00	2,0	11	43	8,0	**26,00**
10,00	3,0	13	50	10,0	**34,00**
12,00	3,0	15	55	12,0	**46,00**

E.7730.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY) NORM | Blue Cut

STAHL | λ≈30° | R

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro ball nose end mills 30° for moulds short

Frezy miniaturowe z węglika spiekanego dwuostrzowe krótkie 30° z czołem kulistym do form

Microfrese raggiate MD 30° per stampi, serie corta

Microfresas de metal duro de 30° para moldes, con radio, serie corta

Artikel-Nr. *Article-No.*					E.7730.1 € Stück *piece*
d1	R	l2	l1	d2 h5	
0,25	0,125	0,5	50	4,0	**39,00**
0,30	0,150	1,0	50	4,0	**39,00**
0,40	0,200	1,0	50	4,0	**39,00**
0,50	0,250	1,5	50	4,0	**39,00**
0,60	0,300	1,5	50	4,0	**39,00**
0,70	0,350	2,0	50	4,0	**39,00**
0,80	0,400	2,0	50	4,0	**39,00**
0,90	0,450	2,5	50	4,0	**39,00**
1,00	0,500	3,0	50	4,0	**39,00**
1,10	0,550	3,0	50	4,0	**39,00**
1,20	0,600	3,0	50	4,0	**39,00**
1,40	0,700	4,0	50	4,0	**39,00**
1,50	0,750	4,0	50	4,0	**39,00**
1,60	0,800	5,0	50	4,0	**39,00**
1,80	0,900	5,0	50	4,0	**39,00**
2,00	1,000	5,0	50	4,0	**39,00**
2,50	1,250	5,0	50	4,0	**39,00**
3,00	1,500	6,0	50	6,0	**42,00**
4,00	2,000	8,0	54	6,0	**42,00**
5,00	2,500	9,0	54	6,0	**42,00**
6,00	3,000	10,0	54	6,0	**42,00**
8,00	4,000	12,0	58	8,0	**49,00**
10,00	5,000	14,0	66	10,0	**63,00**
12,00	6,000	16,0	73	12,0	**82,00**
14,00	7,000	18,0	75	14,0	**98,00**
16,00	8,000	20,0	82	16,0	**118,00**
20,00	10,000	24,0	92	20,0	**180,00**

E.7605.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | R

Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro ball nose end mills 30° for moulds

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do form

Microfrese raggiate MD 30° per stampi

Microfresas de metal duro de 30° para moldes, con radio

Artikel-Nr. *Article-No.*						E.7605.1 € Stück *piece*
d1	R	l2	l3	l1	d2	
0,30	0,15	0,25	1	55	6,0	**38,00**
0,30	0,15	0,25	2	55	6,0	**38,00**
0,30	0,15	0,25	3	55	6,0	**38,00**
0,30	0,15	0,25	5	55	6,0	**38,00**
0,40	0,20	0,30	2	55	6,0	**38,00**
0,40	0,20	0,30	4	55	6,0	**38,00**
0,40	0,20	0,30	6	55	6,0	**38,00**
0,50	0,25	0,40	2	55	6,0	**38,00**
0,50	0,25	0,40	4	55	6,0	**38,00**
0,50	0,25	0,40	6	55	6,0	**38,00**
0,60	0,30	0,50	2	55	6,0	**33,00**
0,60	0,30	0,50	4	55	6,0	**33,00**
0,60	0,30	0,50	6	55	6,0	**33,00**
0,60	0,30	0,50	8	55	6,0	**33,00**
0,80	0,40	0,60	4	55	6,0	**33,00**
0,80	0,40	0,60	6	55	6,0	**33,00**
0,80	0,40	0,60	8	55	6,0	**33,00**
0,80	0,40	0,60	10	55	6,0	**33,00**
1,00	0,50	0,80	4	55	6,0	**33,00**
1,00	0,50	0,80	6	55	6,0	**33,00**
1,00	0,50	0,80	8	55	6,0	**33,00**
1,00	0,50	0,80	10	65	6,0	**33,00**
1,00	0,50	0,80	12	65	6,0	**33,00**
1,00	0,50	0,80	15	65	6,0	**33,00**
1,00	0,50	0,80	20	65	6,0	**33,00**
1,00	0,50	0,80	25	70	6,0	**33,00**
1,00	0,50	0,80	30	75	6,0	**33,00**
1,20	0,60	1,00	5	55	6,0	**33,00**
1,20	0,60	1,00	6	55	6,0	**33,00**
1,20	0,60	1,00	8	55	6,0	**33,00**
1,20	0,60	1,00	10	65	6,0	**33,00**
1,20	0,60	1,00	12	65	6,0	**33,00**
1,20	0,60	1,00	15	65	6,0	**33,00**
1,20	0,60	1,00	20	65	6,0	**33,00**
1,20	0,60	1,00	25	70	6,0	**33,00**
1,50	0,75	1,20	6	55	6,0	**33,00**
1,50	0,75	1,20	8	55	6,0	**33,00**
1,50	0,75	1,20	10	65	6,0	**33,00**
1,50	0,75	1,20	12	65	6,0	**33,00**
1,50	0,75	1,20	15	65	6,0	**33,00**
1,50	0,75	1,20	20	65	6,0	**33,00**
1,50	0,75	1,20	25	65	6,0	**33,00**
1,50	0,75	1,20	30	70	6,0	**33,00**
2,00	1,00	1,50	6	55	6,0	**33,00**
2,00	1,00	1,50	8	55	6,0	**33,00**
2,00	1,00	1,50	10	65	6,0	**33,00**
2,00	1,00	1,50	12	65	6,0	**33,00**
2,00	1,00	1,50	15	65	6,0	**33,00**
2,00	1,00	1,50	20	65	6,0	**33,00**
2,00	1,00	1,50	25	70	6,0	**33,00**
2,00	1,00	1,50	30	75	6,0	**33,00**

Fortsetzung nächste Seite *to be continued*

E.7605.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY) NORM | Blue Cut | STAHL | λ≈30° | R | Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide micro ball nose end mills 30° for moulds

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do form

Microfrese raggiate MD 30° per stampi

Microfresas de metal duro de 30° para moldes, con radio

Artikel-Nr. *Article-No.*						E.7605.1 € Stück *piece*
d1	R	l2	l3	l1	d2	
3,00	1,50	2,50	5	55	6,0	**33,00**
3,00	1,50	2,50	10	65	6,0	**33,00**
3,00	1,50	2,50	15	65	6,0	**33,00**
3,00	1,50	2,50	20	65	6,0	**33,00**
3,00	1,50	2,50	25	70	6,0	**33,00**
3,00	1,50	2,50	30	75	6,0	**33,00**
4,00	2,00	3,20	10	65	6,0	**33,00**
4,00	2,00	3,20	15	65	6,0	**33,00**
4,00	2,00	3,20	20	65	6,0	**33,00**
4,00	2,00	3,20	25	70	6,0	**33,00**
4,00	2,00	3,20	30	75	6,0	**33,00**
5,00	2,50	4,00	10	65	6,0	**33,00**
5,00	2,50	4,00	15	65	6,0	**33,00**
5,00	2,50	4,00	20	65	6,0	**33,00**
5,00	2,50	4,00	25	70	6,0	**33,00**
5,00	2,50	4,00	30	75	6,0	**33,00**
5,00	2,50	4,00	40	90	6,0	**33,00**
6,00	3,00	5,00	10	65	6,0	**33,00**
6,00	3,00	5,00	15	65	6,0	**33,00**
6,00	3,00	5,00	20	65	6,0	**33,00**
6,00	3,00	5,00	25	70	6,0	**33,00**
6,00	3,00	5,00	30	75	6,0	**33,00**
6,00	3,00	5,00	40	90	6,0	**33,00**
6,00	3,00	5,00	50	90	6,0	**33,00**

VHM-Formenbau-Mikroradiusfräser 30° kurz

E.7729.1

1.3 | 6.1 | 6.2 | 6.3

VHM · WERKS-NORM (COMPANY) · Blue Cut · STAHL · λ≈30° · R · Z=2 · DIN 6535 HA · X



- Solid carbide micro ball nose end mills 30° with corner radius for moulds
- Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do form
- Microfrese raggiate MD 30° per stampi, serie corta
- Microfresas de metal duro de 30° para moldes, con radio, serie corta

Artikel-Nr. *Article-No.*					E.7729.1 € Stück *piece*
d1	R	l2	l1	d2	
0,40	0,20	0,4	50	6,0	**34,00**
0,50	0,25	0,5	50	6,0	**31,00**
0,60	0,30	0,6	50	6,0	**28,00**
0,80	0,40	0,8	50	6,0	**23,00**
1,00	0,50	1,0	50	6,0	**22,00**
1,20	0,60	1,2	50	6,0	**22,00**
1,50	0,75	1,5	50	6,0	**22,00**
2,00	1,00	2,0	50	6,0	**21,00**

VHM-Formenbau-Radiusfräser 30° kurz

E.7734.1

1.3 | 6.1 | 6.2 | 6.3

VHM · WERKS-NORM (COMPANY) · Blue Cut · STAHL · λ≈30° · R · Z=2 · DIN 6535 HA · HRC TOOL



- Solid carbide ball nose end mills 30° for moulds short
- Frezy z węglika spiekanego dwuostrzowe krótkie 30° z czołem kulistym do form
- Frese raggiate MD 30° per stampi, serie corta
- Fresas de metal duro de 30° para moldes, con radio, serie corta

Artikel-Nr. *Article-No.*					E.7734.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
1,00	0,50	1,5	50	6,0	**49,00**
1,50	0,75	2,5	50	6,0	**49,00**
2,00	1,00	3,0	50	6,0	**49,00**
2,50	1,25	4,0	50	6,0	**49,00**
3,00	1,50	6,0	75	6,0	**49,00**
4,00	2,00	8,0	75	6,0	**49,00**
5,00	2,50	10,0	75	6,0	**49,00**
6,00	3,00	12,0	100	6,0	**49,00**
8,00	4,00	14,0	100	8,0	**59,00**
10,00	5,00	18,0	100	10,0	**77,00**
12,00	6,00	22,0	150	12,0	**145,00**
14,00	7,00	26,0	150	14,0	**167,00**
16,00	8,00	30,0	150	16,0	**184,00**
18,00	9,00	34,0	150	18,0	**205,00**
20,00	10,00	38,0	150	20,0	**260,00**

VHM-Formenbau-Radiusfräser 30° lang

E.7735.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | R

Z=2 | DIN 6535 HA | HRC TOOL



- Solid carbide ball nose end mills 30° for moulds long
- Frezy z węglika spiekanego dwuostrzowe długie 30° z czołem kulistym do form
- Frese raggiate MD 30° per stampi, serie lunga
- Fresas de metal duro de 30° para moldes, con radio, serie larga

Artikel-Nr. *Article-No.*					E.7735.1 € Stück *piece*
d1	R	l2	l1	d2	
2,00	1,0	5	63	4,0	**27,00**
3,00	1,5	6	63	4,0	**27,00**
4,00	2,0	8	76	6,0	**33,00**
6,00	3,0	9	101	10,0	**56,00**
8,00	4,0	12	101	10,0	**56,00**
10,00	5,0	16	101	12,0	**56,00**
12,00	6,0	20	101	14,0	**74,00**

VHM-Formenbau-Radiusfräser 30° XL

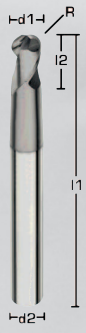
E.7737.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | R

Z=2 | DIN 6535 HA | HRC TOOL



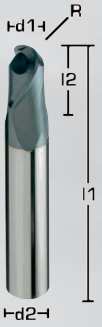
- Solid carbide ball nose end milld 30° for moulds XL
- Frezy z węglika spiekanego dwuostrzowe bardzo długie 30° z czołem kulistym do form
- Frese raggiate MD 30° per stampi, serie extra lunga
- Fresas de metal duro de 30° para moldes, con radio, serie extra larga

Artikel-Nr. *Article-No.*					E.7737.1 € Stück *piece*
d1	R	l2	l1	d2	
6,00	3,0	9	152	10,0	**83,00**
8,00	4,0	12	152	10,0	**83,00**
10,00	5,0	16	152	12,0	**83,00**
12,00	6,0	20	152	14,0	**105,00**

E.7643.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY)-NORM | SPEZIAL BESCHICHTUNG COATING | STAHL | λ≈30° | R | Z=2 | DIN 6535 HA | HRC TOOL



Solid carbide X-Tra ball nose end mills 30° for moulds short

Frezy z węglika spiekanego dwuostrzowe krótkie 30° z czołem kulistym do form

Frese raggiate MD "X-Tra" 30° per stampi, serie corta

Fresas de metal duro "X-Tra" de 30° para moldes, con radio, serie corta

Zum Bohren geeignet
Suitable for drilling

Artikel-Nr. *Article-No.*					E.7643.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
0,50	0,25	1,5	38	3,0	**27,70**
0,60	0,30	1,5	38	3,0	**29,40**
0,70	0,35	2,0	38	3,0	**27,70**
0,80	0,40	2,0	38	3,0	**27,70**
0,90	0,45	2,5	38	3,0	**27,70**
1,00	0,50	2,0	50	3,0	**23,40**
1,10	0,55	3,0	50	3,0	**30,70**
1,20	0,60	3,0	50	3,0	**27,70**
1,40	0,70	3,0	50	3,0	**27,70**
1,50	0,75	3,0	50	3,0	**23,40**
1,60	0,80	4,0	50	3,0	**27,70**
1,80	0,90	4,0	50	3,0	**27,70**
2,00	1,00	4,0	50	3,0	**23,40**
2,50	1,25	5,0	50	3,0	**27,70**
3,00	1,50	5,0	50	3,0	**30,60**
4,00	2,00	8,0	54	6,0	**33,30**
5,00	2,50	9,0	54	6,0	**33,30**
6,00	3,00	10,0	54	6,0	**32,80**
8,00	4,00	12,0	58	8,0	**40,80**
10,00	5,00	14,0	66	10,0	**55,20**
12,00	6,00	16,0	73	12,0	**74,60**
14,00	7,00	18,0	75	14,0	**99,80**
16,00	8,00	22,0	82	16,0	**124,20**
20,00	10,00	26,0	92	20,0	**194,70**



VHM-Formenbau X-Tra Radiusfräser 30° lang

E.7644.1

1.3 | 6.1 | 6.2 | 6.3

VHM · WERKS-NORM (COMPANY) · SPEZIAL BESCHICHTUNG COATING · STAHL · λ≈30° · R · Z=2 · DIN 6535 HA · HRC TOOL



Solid carbide X-Tra ball nose end mills 30° for moulds long

Frezy z węglika spiekanego dwuostrzowe długie 30° z czołem kulistym do form

Frese raggiate MD "X-Tra" 30° per stampi, serie lunga

Fresas de metal duro "X-Tra" de 30° para moldes, con radio, serie larga

Zum Bohren geeignet
Suitable for drilling

Artikel-Nr. *Article-No.*					E.7644.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
1,00	0,50	2	80	6,0	**47,00**
1,50	0,75	3	80	6,0	**47,00**
2,00	1,00	4	80	6,0	**47,00**
2,50	1,25	5	80	6,0	**47,00**
3,00	1,50	5	80	6,0	**47,00**
4,00	2,00	8	80	6,0	**47,00**
5,00	2,50	9	80	6,0	**47,00**
6,00	3,00	10	100	6,0	**47,00**
8,00	4,00	12	100	8,0	**57,50**
10,00	5,00	14	100	10,0	**78,40**
12,00	6,00	16	100	12,0	**88,00**
14,00	7,00	18	100	14,0	**129,00**
16,00	8,00	22	150	16,0	**185,00**
20,00	10,00	26	150	20,0	**255,00**

VHM-Formenbau-Kugelfräser 15°

E.7645.1

1.3 | 6.1 | 6.2 | 6.3

VHM · WERKS-NORM (COMPANY) · Blue Cut · STAHL · λ≈15° · R · Z=2 · DIN 6535 HA · HRC TOOL



Solid carbide ball nose end mill 15° for moulds

Frezy z węglika spiekanego dwuostrzowe 15° z czołem kulistym do form

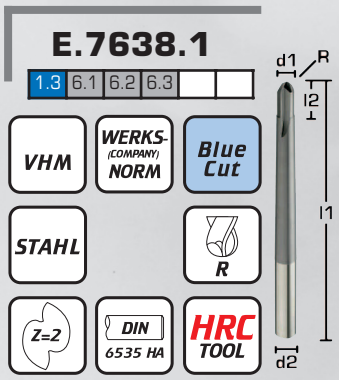
Frese raggiate MD 15° per stampi

Fresas de metal duro de 15° para moldes, con punta bola

Kugel bis 220° einsetzbar
Ball useable up to 220°

Artikel-Nr. *Article-No.*						E.7645.1 € Stück *piece*
d1	R	d3	l2	l1	d2 h6	
1,00	0,5	0,9	5	80	6,0	**62,00**
2,00	1,0	1,8	10	80	6,0	**62,00**
3,00	1,5	2,8	15	80	6,0	**62,00**
4,00	2,0	3,8	20	80	6,0	**62,00**
5,00	2,5	4,7	25	90	6,0	**62,00**
6,00	3,0	5,7	30	100	6,0	**62,00**
8,00	4,0	7,5	40	100	8,0	**78,00**
10,00	5,0	9,4	50	120	10,0	**115,00**
12,00	6,0	11,2	50	120	12,0	**149,00**
16,00	8,0	15,0	60	150	16,0	**158,00**

VHM-Formenbau-Radiuskopierfräser



Solid carbide ball nose copying end mills for moulds

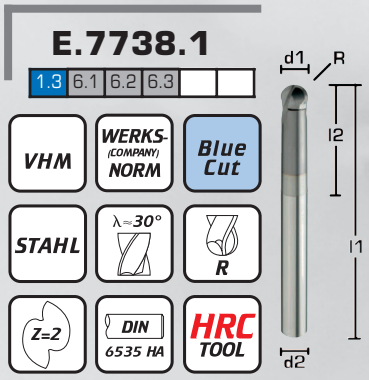
Frezy z węglika spiekanego dwuostrzowe z czołem kulistym do form i kopiowania

Frese raggiate a copiare MD per stampi

Fresas de metal duro para moldes con radio para copiado

Artikel-Nr. *Article-No.*					E.7638.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
3,00	1,5	5	75	6,0	**55,00**
4,00	2,0	6	75	6,0	**55,00**
5,00	2,5	8	75	6,0	**55,00**
6,00	3,0	10	75	6,0	**67,00**
8,00	4,0	12	85	10,0	**74,00**
10,00	5,0	18	100	12,0	**82,00**
		lang *long*			**E.7638.1L**
3,00	1,5	5	100	6,0	**59,00**
4,00	2,0	6	100	6,0	**59,00**
5,00	2,5	8	100	6,0	**59,00**
6,00	3,0	10	100	6,0	**71,00**
8,00	4,0	12	150	10,0	**79,00**
10,00	5,0	18	150	12,0	**87,00**

VHM-Formenbau-Kugelfräser 30°



Solid carbide ball nose end mills 30° for moulds

Frezy z węglika spiekanego dwuostrzowe 30° z czołem kulistym do form

Frese raggiate MD 30° per stampi

Fresas de metal duro de 30° para moldes con punta bola

Artikel-Nr. *Article-No.*					E.7738.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
3,00	1,50	7	60	6,0	**81,00**
4,00	2,00	9	60	6,0	**81,00**
5,00	2,50	12	60	6,0	**81,00**
6,00	3,00	15	70	8,0	**92,00**
8,00	4,00	21	70	10,0	**102,00**
10,00	5,00	25	70	12,0	**116,00**
12,00	6,00	30	90	12,0	**126,00**

VHM-Formenbau-Schaftfräser 38°

E.7739.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut | STAHL | X | Z=3 | DIN 6535 HA | HRC TOOL



Solid carbide end mills 38° for moulds

Frezy z węglika spiekanego trzyostrzowe 38° do form

Frese in MD 38° per stampi

Fresas de metal duro de 38° para moldes

Artikel-Nr. *Article-No.*				E.7739.1 € Stück *piece*
d1	l2	l1	d2	
1,00	2,5	38	3,0	**26,00**
1,50	5,0	50	4,0	**26,00**
2,50	7,0	38	3,0	**22,00**
3,00	10,0	38	3,0	**22,00**
3,00	10,0	50	6,0	**34,00**
3,50	12,0	50	6,0	**34,00**
4,00	12,0	50	4,0	**24,00**
5,00	14,0	50	5,0	**31,00**
6,00	16,0	57	6,0	**34,00**
8,00	20,0	63	8,0	**42,00**
10,00	22,0	72	10,0	**59,00**
12,00	25,0	73	12,0	**81,00**
14,00	25,0	75	14,0	**98,00**
16,00	32,0	82	16,0	**130,00**
18,00	32,0	92	18,0	**173,00**
20,00	38,0	92	20,0	**214,00**

VHM-Formenbau-Radiusfräser 30°

E.7697.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | SPEZIAL BESCHICHTUNG COATING | STAHL | λ≈30° | R | Z=3 | DIN 6535 HA | HRC TOOL



Solid carbide ball nose end mills 30° for moulds

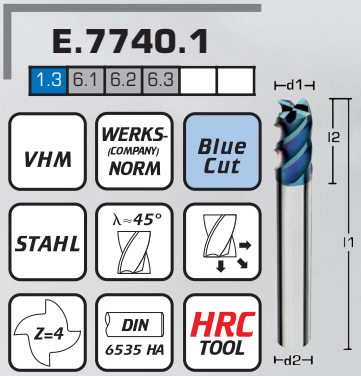
Frezy z węglika spieknego trzyostrzowe 30° z czołem kulistym do form

Frese in MD raggiate 30° per stampi

Fresas de metal duro de 30° para moldes con radio

Artikel-Nr. *Article-No.*					E.7697.1 € Stück *piece*
d1	R + - 0,015	l2	l1	d2 h6	
3,00	1,5	8	60	6,0	**37,00**
4,00	2,0	8	70	6,0	**38,70**
5,00	2,5	10	80	6,0	**40,60**
6,00	3,0	12	90	6,0	**42,60**
8,00	4,0	14	100	8,0	**66,60**
10,00	5,0	18	100	10,0	**110,80**
12,00	6,0	22	110	12,0	**138,00**
16,00	8,0	30	140	16,0	**234,00**
20,00	10,0	38	160	20,0	**261,00**

VHM-Formenbau-Schaftfräser 45° kurz



Solid carbide end mills 45° for moulds short

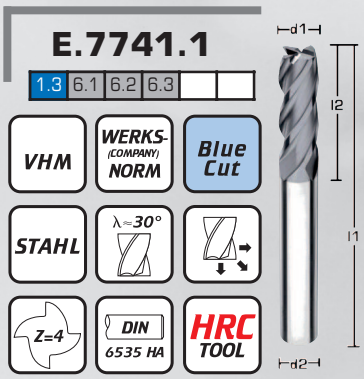
Frezy z węglika spiekanego czte-roostrzowe krótkie 45° do form

Frese in MD 45° per stampi, serie corta

Fresas de metal duro de 45° para moldes, serie corta

Artikel-Nr. *Article-No.*				E.7740.1 € Stück *piece*
d1	l2	l1	d2 h5	
1,00	3	54	6,0	**36,00**
2,00	4	54	6,0	**36,00**
3,00	5	54	6,0	**36,00**
4,00	6	54	6,0	**36,00**
5,00	7	54	6,0	**36,00**
6,00	10	54	6,0	**36,00**
8,00	12	58	8,0	**45,00**
10,00	15	66	10,0	**65,00**
12,00	18	73	12,0	**87,00**
16,00	24	82	16,0	**173,00**
20,00	32	92	20,0	**217,00**

VHM-Formenbau-Schaftfräser 30° kurz



Solid carbide end mills 30° for moulds short

Frezy z węglika spiekanego czte-roostrzowe krótkie 30° do form

Frese in MD 30° per stampi, serie corta

Fresas de metal duro de 30° para moldes, serie corta

Artikel-Nr. *Article-No.*				E.7741.1 € Stück *piece*
d1	l2	l1	d2	
2,00	6	40	6,0	**31,00**
2,50	8	40	6,0	**31,00**
3,00	8	45	6,0	**31,00**
3,50	10	45	6,0	**31,00**
4,00	11	45	6,0	**31,00**
5,00	13	50	6,0	**31,00**
6,00	13	50	6,0	**31,00**
7,00	16	60	8,0	**40,00**
8,00	19	60	8,0	**40,00**
9,00	19	70	10,0	**58,00**
10,00	22	70	10,0	**58,00**
11,00	22	75	12,0	**79,00**
12,00	26	75	12,0	**79,00**
14,00	26	85	14,0	**99,00**
16,00	32	100	16,0	**130,00**
18,00	32	100	18,0	**173,00**
20,00	38	105	20,0	**215,00**
25,00	45	120	25,0	**342,00**

VHM-Formenbau-Schaftfräser 30° lang

E.7742.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° |

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide end mills 30° for moulds long

Frezy z węglika spiekanego czteroostrzowe długie 30° do form

Frese in MD 30° per stampi, serie lunga

Fresas de metal duro de 30° para moldes, serie larga

Artikel-Nr. *Article-No.*				E.7742.1 € Stück *piece*
d1	l2	l1	d2	
2,00	8	40	4,0	**26,00**
3,00	12	50	6,0	**38,00**
4,00	15	50	6,0	**38,00**
5,00	20	60	6,0	**38,00**
6,00	20	60	6,0	**38,00**
8,00	25	70	8,0	**47,00**
10,00	30	90	10,0	**69,00**
12,00	30	90	12,0	**94,00**
14,00	40	110	16,0	**135,00**
16,00	50	110	16,0	**175,00**
18,00	50	110	20,0	**236,00**
20,00	55	110	20,0	**290,00**
25,00	75	140	25,0	**461,00**

VHM-Formenbau-Schaftfräser 30° mit Eckenradius

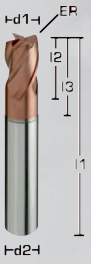
E.7699.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | SPEZIAL BESCHICHTUNG COATING

STAHL | λ≈30° | ER

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide end mills 30° with corner radius for moulds

Frezy z węglika spiekanego czteroostrzowe 30° z promieniem na czole do form

Frese MD 30° per stampi con raggio d´angolo

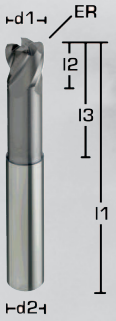
Fresas de metal duro de 30° para moldes, con radio lateral

Artikel-Nr. *Article-No.*						E.7699.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h6	
1,00	0,1	1,5	1,5	40	3,0	**20,00**
1,50	0,1	2,2	2,2	40	3,0	**20,00**
2,00	0,1	3,0	6,0	40	3,0	**18,10**
2,50	0,1	4,0	6,0	40	3,0	**18,10**
3,00	0,1	4,0	7,0	45	6,0	**26,50**
3,50	0,1	5,0	9,0	45	6,0	**26,50**
4,00	0,1	5,0	9,0	45	6,0	**26,50**
4,50	0,1	6,0	10,0	45	6,0	**26,50**
5,00	0,2	6,0	11,0	50	6,0	**26,50**
6,00	0,2	7,0	14,0	50	6,0	**26,50**
8,00	0,2	9,0	18,0	60	8,0	**33,60**
10,00	0,2	12,0	25,0	75	10,0	**50,30**
12,00	0,3	15,0	30,0	75	12,0	**69,40**
16,00	0,3	18,0	38,0	90	16,0	**115,80**
20,00	0,3	24,0	45,0	100	20,0	**191,60**

E.7654.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut | STAHL | λ≈30° | ER | Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide end mills 30° with corner radius for moulds

Frezy z węglika spiekanego czteroostrzowe 30° z promieniem na czole do form i kopiowania

Frese a copiare MD 30° con raggio d´angolo per stampi

Fresas de metal duro de 30° para moldes, con radio lateral para copiado

Artikel-Nr. *Article-No.*						E.7654.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
2,00	0,1	4	21	57	6,0	**33,00**
2,00	0,2	4	21	57	6,0	**33,00**
2,00	0,3	4	21	57	6,0	**33,00**
2,00	0,4	4	21	57	6,0	**33,00**
2,00	0,5	4	21	57	6,0	**33,00**
3,00	0,1	6	21	57	6,0	**33,00**
3,00	0,2	6	21	57	6,0	**33,00**
3,00	0,3	6	21	57	6,0	**33,00**
3,00	0,4	6	21	57	6,0	**33,00**
3,00	0,5	6	21	57	6,0	**33,00**
3,00	1,0	6	21	57	6,0	**33,00**
4,00	0,1	6	21	57	6,0	**33,00**
4,00	0,2	6	21	57	6,0	**33,00**
4,00	0,3	6	21	57	6,0	**33,00**
4,00	0,4	6	21	57	6,0	**33,00**
4,00	0,5	6	21	57	6,0	**33,00**
4,00	0,6	6	21	57	6,0	**33,00**
4,00	0,7	6	21	57	6,0	**33,00**
4,00	0,8	6	21	57	6,0	**33,00**
4,00	0,9	6	21	57	6,0	**33,00**
4,00	1,0	6	21	57	6,0	**33,00**
4,00	1,1	6	21	57	6,0	**33,00**
4,00	1,2	6	21	57	6,0	**33,00**
4,00	1,3	6	21	57	6,0	**33,00**
4,00	1,4	6	21	57	6,0	**33,00**
4,00	1,5	6	21	57	6,0	**33,00**
5,00	0,1	6	21	57	6,0	**33,00**
5,00	0,2	6	21	57	6,0	**33,00**
5,00	0,3	6	21	57	6,0	**33,00**
5,00	0,4	6	21	57	6,0	**33,00**
5,00	0,5	6	21	57	6,0	**33,00**
5,00	1,0	6	21	57	6,0	**33,00**
5,00	1,5	6	21	57	6,0	**33,00**
5,00	2,0	6	21	57	6,0	**33,00**
6,00	0,1	7	21	57	6,0	**33,00**
6,00	0,2	7	21	57	6,0	**33,00**
6,00	0,3	7	21	57	6,0	**33,00**
6,00	0,4	7	21	57	6,0	**33,00**
6,00	0,5	7	21	57	6,0	**33,00**
6,00	0,6	7	21	57	6,0	**33,00**
6,00	0,7	7	21	57	6,0	**33,00**
6,00	0,8	7	21	57	6,0	**33,00**
6,00	0,9	7	21	57	6,0	**33,00**
6,00	1,0	7	21	57	6,0	**33,00**
6,00	1,1	7	21	57	6,0	**33,00**
6,00	1,2	7	21	57	6,0	**33,00**
6,00	1,3	7	21	57	6,0	**33,00**
6,00	1,4	7	21	57	6,0	**33,00**
6,00	1,5	7	21	57	6,0	**33,00**
6,00	1,6	7	21	57	6,0	**33,00**
6,00	1,7	7	21	57	6,0	**33,00**

Fortsetzung nächste Seite *to be continued*

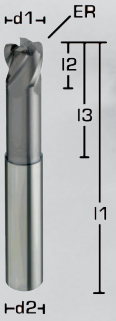
E.7654.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

STAHL | λ≈30° | ER

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide copying end mills 30° with corner radius for moulds

Frezy z węglika spiekanego czteroostrzowe 30° z promieniem na czole do form i kopiowania

Frese a copiare MD 30° con raggio d´angolo per stampi

Fresas de metal duro de 30° para moldes, con radio lateral para copiado

Artikel-Nr. *Article-No.*						E.7654.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
6,00	1,8	7	21	57	6,0	**33,00**
6,00	1,9	7	21	57	6,0	**33,00**
6,00	2,0	7	21	57	6,0	**33,00**
6,00	2,1	7	21	57	6,0	**33,00**
6,00	2,2	7	21	57	6,0	**33,00**
6,00	2,3	7	21	57	6,0	**33,00**
6,00	2,4	7	21	57	6,0	**33,00**
6,00	2,5	7	21	57	6,0	**33,00**
8,00	0,3	9	27	63	8,0	**39,00**
8,00	0,5	9	27	63	8,0	**39,00**
8,00	1,0	9	27	63	8,0	**39,00**
8,00	1,5	9	27	63	8,0	**39,00**
8,00	2,0	9	27	63	8,0	**39,00**
10,00	0,5	11	32	72	10,0	**52,00**
10,00	1,0	11	32	72	10,0	**52,00**
10,00	1,5	11	32	72	10,0	**52,00**
10,00	2,0	11	32	72	10,0	**52,00**
12,00	0,5	12	38	83	12,0	**67,00**
12,00	1,0	12	38	83	12,0	**67,00**
12,00	1,5	12	38	83	12,0	**67,00**
12,00	2,0	12	38	83	12,0	**67,00**
16,00	0,5	16	44	92	16,0	**118,00**
16,00	1,0	16	44	92	16,0	**118,00**
16,00	1,5	16	44	92	16,0	**118,00**
16,00	2,0	16	44	92	16,0	**118,00**

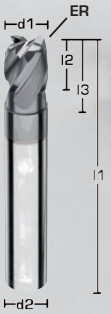
E.7733.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY) NORM | Blue Cut

X | λ≈30° | ER

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide copying end mills 30° with corner radius for moulds long

Frezy z węglika spiekanego czte-roostrzowe długie 30° z promieniem na czole do form i kopiowania

Frese a copiare MD 30° con raggio d´angolo per stampi, serie lunga

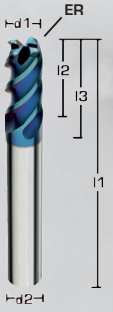
Fresas de metal duro de 30° para moldes, con radio lateral para copiado, serie larga

Artikel-Nr. *Article-No.*						E.7633.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
2,00	0,1	4	11	50	6,0	**31,00**
2,00	0,2	4	11	50	6,0	**31,00**
2,00	0,3	4	11	50	6,0	**31,00**
2,00	0,4	4	11	50	6,0	**31,00**
3,00	0,2	4	11	50	6,0	**31,00**
3,00	0,3	4	11	50	6,0	**31,00**
3,00	0,4	4	11	50	6,0	**31,00**
3,00	0,5	4	11	50	6,0	**31,00**
3,00	1,0	4	11	50	6,0	**31,00**
4,00	0,1	6	11	50	6,0	**31,00**
4,00	0,2	6	11	50	6,0	**31,00**
4,00	0,3	6	11	50	6,0	**31,00**
4,00	0,4	6	11	50	6,0	**31,00**
4,00	0,5	6	11	50	6,0	**31,00**
4,00	0,6	6	11	50	6,0	**31,00**
4,00	0,8	6	11	50	6,0	**31,00**
4,00	1,0	6	11	50	6,0	**31,00**
4,00	1,5	6	11	50	6,0	**31,00**
5,00	0,2	6	11	50	6,0	**31,00**
5,00	0,3	6	11	50	6,0	**31,00**
6,00	0,1	7	11	50	6,0	**31,00**
6,00	0,2	7	11	50	6,0	**31,00**
6,00	0,3	7	11	50	6,0	**31,00**
6,00	0,4	7	11	50	6,0	**31,00**
6,00	0,5	7	11	50	6,0	**31,00**
6,00	0,6	7	11	50	6,0	**31,00**
6,00	0,7	7	11	50	6,0	**31,00**
6,00	0,8	7	11	50	6,0	**31,00**
6,00	0,9	7	11	50	6,0	**31,00**
6,00	1,0	7	11	50	6,0	**31,00**
6,00	1,1	7	11	50	6,0	**31,00**
6,00	1,2	7	11	50	6,0	**31,00**
6,00	1,3	7	11	50	6,0	**31,00**
6,00	1,4	7	11	50	6,0	**31,00**
6,00	1,5	7	11	50	6,0	**31,00**
6,00	1,6	7	11	50	6,0	**31,00**
6,00	1,7	7	11	50	6,0	**31,00**
6,00	1,8	7	11	50	6,0	**31,00**
6,00	1,9	7	11	50	6,0	**31,00**
6,00	2,0	7	11	50	6,0	**31,00**
6,00	2,1	7	11	50	6,0	**31,00**
6,00	2,2	7	11	50	6,0	**31,00**
6,00	2,3	7	11	50	6,0	**31,00**
6,00	2,4	7	11	50	6,0	**31,00**
6,00	2,5	7	11	50	6,0	**31,00**
8,00	0,5	9	13	58	8,0	**35,00**
8,00	1,0	9	13	58	8,0	**35,00**
8,00	1,5	9	13	58	8,0	**35,00**
8,00	2,0	9	13	58	8,0	**35,00**
10,00	0,5	11	15	66	10,0	**35,00**
10,00	1,0	11	15	66	10,0	**35,00**
10,00	1,5	11	15	66	10,0	**35,00**
10,00	2,0	11	15	66	10,0	**35,00**

E.7743.1

1.3 | 6.1 | 6.2 | 6.3

VHM | HSC TOOL | Blue Cut | X | λ≈45° | ER | Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide end mills 30° with corner radius for moulds

Frezy z węglika spiekanego czteroostrzowe 30° z promieniem na czole do form

Frese MD per stampi con raggio d´angolo 30°

Fresas de metal duro de 30° para moldes, con radio lateral

Artikel-Nr. *Article-No.*						E.7743.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h5	
2,00	0,2	6	12	57	6,0	**54,00**
2,00	0,3	6	12	57	6,0	**44,00**
3,00	0,3	8	15	57	6,0	**44,00**
3,00	0,5	8	15	57	6,0	**44,00**
4,00	0,2	11	21	57	6,0	**44,00**
4,00	0,3	11	21	57	6,0	**44,00**
4,00	0,5	11	21	57	6,0	**44,00**
4,00	1,0	11	21	57	6,0	**44,00**
5,00	0,2	12	21	57	6,0	**44,00**
5,00	0,5	12	21	57	6,0	**44,00**
5,00	1,0	12	21	57	6,0	**44,00**
6,00	0,1	12	21	57	6,0	**44,00**
6,00	0,2	12	21	57	6,0	**44,00**
6,00	0,3	12	21	57	6,0	**44,00**
6,00	0,5	12	21	57	6,0	**44,00**
6,00	1,0	12	21	57	6,0	**44,00**
6,00	2,0	12	21	57	6,0	**44,00**
8,00	0,3	15	15	75	8,0	**54,00**
8,00	0,5	15	15	75	8,0	**54,00**
8,00	1,0	15	15	75	8,0	**54,00**
8,00	1,5	15	15	75	8,0	**54,00**
8,00	2,0	15	15	75	8,0	**54,00**
10,00	0,5	17	17	75	10,0	**73,00**
10,00	1,0	17	17	80	10,0	**76,00**
10,00	1,5	17	17	80	10,0	**76,00**
10,00	2,0	17	17	80	10,0	**76,00**
12,00	0,5	20	20	100	12,0	**98,00**
12,00	1,0	20	20	100	12,0	**98,00**
12,00	1,5	20	20	100	12,0	**98,00**
12,00	2,0	20	20	100	12,0	**98,00**
16,00	1,0	25	25	110	16,0	**192,00**
16,00	1,5	25	25	110	16,0	**192,00**
16,00	2,0	25	25	110	16,0	**192,00**
16,00	3,0	25	25	110	16,0	**192,00**
20,00	1,0	32	32	125	20,0	**253,00**

E.7655.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut

X | λ≈30° | ER

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide copying end mills 30° for moulds long

Frezy z węglika spiekanego czte-roostrzowe długie 30° z promieniem na czole do form i kopiowania

Frese MD a copiare 30° per stampi, serie lunga

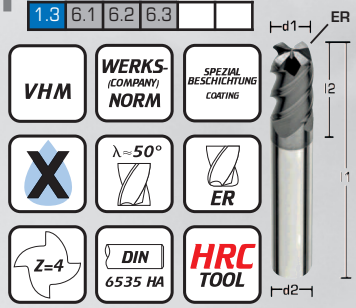
Fresas de metal duro de 30° para moldes para copiado, serie larga

Artikel-Nr. *Article-No.*						E.7655.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h6	
6,00	0,1	7	44	80	6,0	**42,00**
6,00	0,2	7	44	80	6,0	**42,00**
6,00	0,3	7	44	80	6,0	**42,00**
6,00	0,4	7	44	80	6,0	**42,00**
6,00	0,5	7	44	80	6,0	**42,00**
6,00	0,6	7	44	80	6,0	**42,00**
6,00	0,7	7	44	80	6,0	**42,00**
6,00	0,8	7	44	80	6,0	**42,00**
6,00	0,9	7	44	80	6,0	**42,00**
6,00	1,0	7	44	80	6,0	**42,00**
6,00	1,1	7	44	80	6,0	**42,00**
6,00	1,2	7	44	80	6,0	**42,00**
6,00	1,3	7	44	80	6,0	**42,00**
6,00	1,4	7	44	80	6,0	**42,00**
6,00	1,5	7	44	80	6,0	**42,00**
6,00	1,6	7	44	80	6,0	**42,00**
6,00	1,7	7	44	80	6,0	**42,00**
6,00	1,8	7	44	80	6,0	**42,00**
6,00	1,9	7	44	80	6,0	**42,00**
6,00	2,0	7	44	80	6,0	**42,00**
6,00	2,1	7	44	80	6,0	**42,00**
6,00	2,2	7	44	80	6,0	**42,00**
6,00	2,3	7	44	80	6,0	**42,00**
6,00	2,4	7	44	80	6,0	**42,00**
6,00	2,5	7	44	80	6,0	**42,00**
8,00	1,0	9	54	100	8,0	**62,00**
8,00	1,5	9	54	100	8,0	**62,00**
8,00	2,0	9	54	100	8,0	**62,00**
10,00	1,0	11	60	100	10,0	**79,00**
10,00	1,5	11	60	100	10,0	**79,00**
10,00	2,0	11	60	100	10,0	**79,00**
12,00	1,0	12	75	120	12,0	**108,00**
12,00	1,5	12	75	120	12,0	**108,00**
12,00	2,0	12	75	120	12,0	**108,00**
16,00	2,0	16	92	120	16,0	**175,00**

VHM-Formenbau-Stirn-Torusfräser

E.7744.1

1.3 | 6.1 | 6.2 | 6.3



Solid carbide face torus end mills for moulds

Frezy z węglika spiekanego czte-roostrzowe torusowe z promieniem na czole do form

Frese toriche frontali MD per stampi

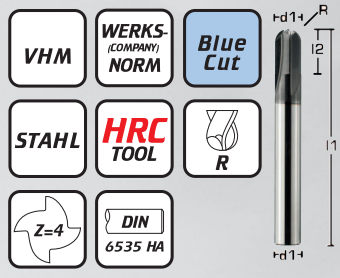
Fresas frontales tóricas de metal duro para moldes

Artikel-Nr. *Article-No.*						E.7744.1 € Stück *piece*
d1	ER	l2	l3	l1	d2	
6,00	1,0	9	16	54	6,0	**75,00**
8,00	1,0	12	20	58	8,0	**87,00**
10,00	1,5	15	24	66	10,0	**119,00**
12,00	1,5	18	26	73	12,0	**132,00**
16,00	2,0	24	32	82	16,0	**155,00**
20,00	2,0	30	40	92	20,0	**220,00**

VHM-Formenbau-Radiusfräser

E.7745.1

1.3 | 6.1 | 6.2 | 6.3



Solid carbide ball nose end mills for moulds

Frezy z węglika spiekanego czte-roostrzowe z czołem kulistym do form

Frese raggiate MD per stampi

Fresas de metal duro para moldes, con radio

Artikel-Nr. *Article-No.*					E.7745.1 € Stück *piece*
d1	R	l2	l1	d2	
3,00	1,5	6	60	6,0	**40,00**
4,00	2,0	8	60	6,0	**40,00**
5,00	2,5	10	70	6,0	**40,00**
6,00	3,0	12	70	6,0	**36,00**
8,00	4,0	12	75	8,0	**39,00**
10,00	5,0	16	80	10,0	**50,00**
12,00	6,0	16	120	12,0	**85,00**

E.7746.1

1.3 | 6.1 | 6.2 | 6.3

VHM | HSC TOOL | Blue Cut

X | λ≈15° | R

Z=4 | DIN 6535 HA | HRC TOOL



Solid carbide ball nose end mills 15° for moulds extra long

Frezy z węglika spiekanego czteroostrzowe bardzo długie 15° z czołem kulistym do form

Frese raggiate MD 15° per stampi, serie extra lunga

Fresas de metal duro de 15° para moldes con punta bola, serie extra larga

Artikel-Nr. *Article-No.*						E.7746.1 € Stück *piece*
d1	R	d3	l3	l1	d2	
5,00	2,5	4,7	25	80	6,0	**68,00**
6,00	3,0	5,7	30	100	6,0	**68,00**
8,00	4,0	7,5	40	100	8,0	**89,00**
10,00	5,0	9,4	50	100	10,0	**115,00**
12,00	6,0	11,2	50	100	12,0	**134,00**
16,00	8,0	15,0	60	150	16,0	**142,00**



E.7682.1

1.2 | 1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-NORM (COMPANY) | Blue Cut | STAHL | λ≈50° | MEHR SCHNEIDER | DIN 6535 HA | HRC TOOL



Solid carbide end mills 50° for moulds

Frezy z węglika spiekanego wieloostrzowe 50° do form

Frese MD 50° per stampi

Fresas de metal duro de 50° para moldes

Artikel-Nr. *Article-No.*					E.7682.1 € Stück *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
4,00	10	54	6,0	6	**21,50**
5,00	10	54	6,0	6	**21,50**
6,00	10	54	6,0	6	**21,00**
7,00	12	58	8,0	6	**26,30**
8,00	12	58	8,0	6	**26,30**
9,00	14	66	10,0	6	**40,20**
10,00	14	66	10,0	6	**40,20**
12,00	16	73	12,0	6	**53,20**
14,00	20	82	16,0	8	**82,00**
16,00	20	82	16,0	8	**89,00**
18,00	25	92	20,0	8	**104,00**
20,00	25	92	20,0	8	**122,00**
		lang *long*			**E.7682.1L**
6,00	18	57	6,0	6	**28,60**
8,00	24	63	8,0	6	**34,80**
10,00	30	75	10,0	6	**52,00**
12,00	36	83	12,0	6	**76,00**
12,00	53	110	12,0	6	**118,00**
16,00	48	104	16,0	8	**138,00**
16,00	63	123	16,0	8	**168,00**
20,00	55	110	20,0	8	**202,00**
20,00	75	141	20,0	10	**270,00**
		überlang *extended long*			**E.7682.1XL**
10,00	45	95	10,0	6	**84,00**
12,00	36	150	12,0	6	**118,00**
16,00	65	150	16,0	8	**180,00**
16,00	80	135	16,0	8	**190,00**
20,00	100	166	20,0	10	**336,00**
20,00	125	191	20,0	10	**460,00**
25,00	175	255	25,0	12	**590,00**

VHM-Formenbau-Spezial-Schaftfräser 45°

E.7619.1

1.2 | 1.3 | 6.1 | 6.2 | 6.3 | 6.4

VHM · WERKS-NORM (COMPANY) · Blue Cut · STAHL · λ≈45° · ≤70 HRC · MEHR SCHNEIDER · DIN 6535 HA · HRC TOOL



Solid carbide special end mills 45° for moulds

Frezy specjalne z węglika spiekanego wieloostrzowe 45° do form

Frese in MD speciali 45° per stampi

Fresas de metal duro especiales de 45° para moldes

Artikel-Nr. *Article-No.*					E.7619.1 € Stück *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
2,00	6	57	6,0	4	**27,00**
3,00	8	57	6,0	4	**27,00**
4,00	8	57	6,0	6	**27,00**
5,00	10	57	6,0	6	**27,00**
6,00	13	57	6,0	6	**27,00**
8,00	19	63	6,0	6	**30,00**
10,00	22	72	10,0	6	**54,00**
12,00	26	83	12,0	6	**78,00**
16,00	32	92	16,0	8	**130,00**
20,00	38	104	20,0	8	**190,00**
25,00	40	110	25,0	8	**325,00**
32,00	40	110	32,0	8	**450,00**

VHM-Formenbau-Schaftfräser 45° mit Eckenradius

E.7686.1

1.3 | 6.1 | 6.2 | 6.3

VHM · WERKS-NORM (COMPANY) · SPEZIAL BESCHICHTUNG COATING · STAHL · λ≈45° · ER · Z=6 · DIN 6535 HA · HRC TOOL



Solid carbide end mills 45° with corner radius for moulds

Frezy z węglika spiekanego sześcioostrzowe 45° z promieniem na czole do form

Frese MD 45° per stampi con raggio d´angolo

Fresas de metal duro de 45° para moldes con radio lateral

Artikel-Nr. *Article-No.*						E.7686.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h6	
6,00	0,5	6	14	50	6,0	**32,00**
6,00	0,5	13	13	70	6,0	**35,00**
6,00	0,5	26	26	70	6,0	**42,00**
8,00	0,5	8	24	60	8,0	**38,00**
8,00	0,5	19	19	90	8,0	**44,00**
8,00	0,5	36	36	90	8,0	**54,00**
10,00	0,5	22	22	100	10,0	**64,00**
10,00	1,0	22	22	100	10,0	**64,00**
10,00	1,0	46	46	100	10,0	**83,00**
10,00	1,0	10	30	70	10,0	**59,00**
12,00	0,5	26	26	110	12,0	**88,00**
12,00	1,0	26	26	110	12,0	**88,00**
12,00	1,0	56	56	110	12,0	**120,00**
12,00	1,0	12	30	75	12,0	**71,00**
16,00	1,0	32	32	130	16,0	**149,00**
16,00	1,5	66	66	130	16,0	**165,00**

E.7747.1

1.3 | 6.1 | 6.2 | 6.3

VHM | WERKS-(COMPANY)-NORM | Blue Cut | ER | X | | MEHR SCHNEIDER | DIN 6535 HA | HRC TOOL



Solid carbide torus end mills 45° with corner radius for moulds

Frezy z węglika spiekanego wieloostrzowe 45° z promieniem na czole do form

Frese toriche MD 45° per stampi con raggio d´angolo

Fresas tóricas de metal duro para moldes de 45° con radio lateral

Artikel-Nr. *Article-No.*						E.7747.1 € Stück *piece*
d1	ER	l2	l1	d2	Zähne *flutes*	
3,00	0,3	4	50	6,0	4	**28,00**
4,00	0,4	5	54	6,0	4	**28,00**
5,00	0,5	6	54	6,0	4	**28,00**
6,00	0,5	7	65	6,0	6	**36,00**
6,00	1,0	7	65	6,0	6	**36,00**
8,00	0,5	9	70	8,0	6	**45,00**
8,00	1,0	9	70	8,0	6	**45,00**
10,00	0,5	11	80	10,0	6	**61,00**
10,00	1,0	11	80	10,0	6	**61,00**
10,00	1,5	11	80	10,0	6	**61,00**
10,00	2,0	11	80	10,0	6	**61,00**
12,00	0,5	12	93	12,0	6	**79,00**
12,00	1,0	12	93	12,0	6	**79,00**
12,00	1,5	12	93	12,0	6	**79,00**
12,00	2,0	12	93	12,0	6	**79,00**



VHM-Formenbau-Schaftfräser 50° mit Eckenradius lang

E.7748.1

1.2 | 1.3 | 6.1 | 6.2 | 6.3



Solid carbide end mills 50° with corner radius for moulds long

Frezy z węglika spiekanego wieloostrzowe długie 45° z promieniem na czole do form

Frese MD per stampi con raggio d´angolo, serie lunga

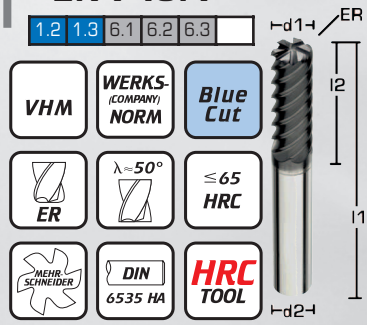
Fresas de metal duro de 50° para moldes con radio lateral, serie larga

Artikel-Nr. *Article-No.*						E.7748.1 € Stück *piece*
d1	ER	l2	l1	d2 h6	Zähne *flutes*	
6,00	0,5	13	57	6,0	6	**28,00**
6,00	1,0	13	57	6,0	6	**28,00**
8,00	0,5	19	63	8,0	6	**32,00**
8,00	1,0	19	63	8,0	6	**32,00**
10,00	0,5	22	72	10,0	6	**54,00**
10,00	1,0	22	72	10,0	6	**54,00**
12,00	0,5	26	83	12,0	6	**72,00**
12,00	1,0	26	83	12,0	6	**72,00**
12,00	1,5	26	83	12,0	6	**72,00**
12,00	2,0	26	83	12,0	6	**72,00**
12,00	2,5	26	83	12,0	6	**72,00**
16,00	0,5	32	92	16,0	8	**132,00**
16,00	1,0	32	92	16,0	8	**132,00**
16,00	1,5	32	92	16,0	8	**132,00**
16,00	2,0	32	92	16,0	8	**132,00**
16,00	2,5	32	92	16,0	8	**132,00**
16,00	3,0	32	92	16,0	8	**132,00**
20,00	2,0	38	104	20,0	8	**184,00**

VHM-Formenbau-Schaftfräser 50° mit Eckenradius XL

E.7749.1

1.2 | 1.3 | 6.1 | 6.2 | 6.3



Solid carbide end mills 50° with corner radius for moulds XL

Frezy z węglika spiekanego wieloostrzowe bardzo długie 50° z promieniem na czole do form

Frese MD 50° per stampi con raggio d´angolo, serie extra lunga

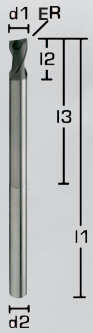
Fresas de metal duro de 50° para moldes con radio lateral, serie extra larga

Artikel-Nr. *Article-No.*						E.7749.1 € Stück *piece*
d1	ER	l2	l1	d2	Zähne *flutes*	
6,00	0,5	18	62	6,0	6	**31,00**
8,00	0,5	24	68	8,0	6	**35,00**
8,00	1,0	24	68	8,0	6	**35,00**
10,00	0,5	30	80	10,0	6	**62,00**
10,00	1,5	30	80	10,0	6	**62,00**
12,00	0,5	36	93	12,0	6	**85,00**
12,00	1,0	36	93	12,0	6	**85,00**
12,00	1,5	36	93	12,0	6	**85,00**
12,00	2,0	36	93	12,0	6	**85,00**
16,00	0,5	48	108	16,0	8	**160,00**
16,00	1,0	48	108	16,0	8	**160,00**
16,00	1,5	48	108	16,0	8	**160,00**
16,00	2,0	48	108	16,0	8	**160,00**
20,00	2,0	60	126	20,0	8	**216,00**

E.7696.1

4.9

VHM | WERKS-(COMPANY) NORM | DIAMANT BESCHICHTUNG COATING | ER | λ≈30° | GRAPHIT | Z=2 | DIN 6535 HA | X



Solid carbide graphite micro end mills 30° with corner radius

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z promieniem na czole do grafitu

Microfrese MD 30° per grafite con raggio d´angolo

Microfresas de metal duro de 30° para grafito con radio lateral

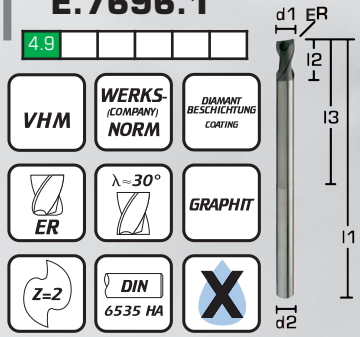
Frästiefe bis 25xd
Milling depth up to 25xd

Lieferzeit: 2 Wochen
Delivery time: 2 weeks

Artikel-Nr. *Article-No.*						E.7696.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h5	
0,20	0,05	0,2	1,0	55	3,0	**76,00**
0,30	0,05	0,3	1,0	55	3,0	**71,00**
0,30	0,05	0,3	3,0	55	3,0	**71,00**
0,40	0,05	0,4	2,0	55	3,0	**64,00**
0,40	0,05	0,4	4,0	55	3,0	**64,00**
0,40	0,05	0,4	8,0	55	3,0	**64,00**
0,50	0,05	0,5	2,0	55	3,0	**55,00**
0,50	0,05	0,5	5,0	55	3,0	**55,00**
0,50	0,05	0,5	10,0	55	3,0	**55,00**
0,60	0,06	0,8	3,0	55	3,0	**53,00**
0,60	0,06	0,8	6,0	55	3,0	**53,00**
0,60	0,06	0,8	9,0	55	3,0	**53,00**
0,60	0,06	0,8	12,0	55	3,0	**53,00**
0,80	0,08	1,0	4,0	55	3,0	**53,00**
0,80	0,08	1,0	8,0	55	3,0	**53,00**
0,80	0,08	1,0	12,0	55	3,0	**53,00**
0,80	0,08	1,0	16,0	55	3,0	**53,00**
1,00	0,10	1,0	5,0	55	3,0	**53,00**
1,00	0,10	1,0	10,0	55	3,0	**53,00**
1,00	0,10	1,0	15,0	55	3,0	**53,00**
1,00	0,10	1,0	20,0	55	3,0	**53,00**
1,00	0,10	1,0	25,0	55	3,0	**53,00**
1,20	0,12	1,5	5,0	55	3,0	**53,00**
1,20	0,12	1,5	10,0	55	3,0	**53,00**
1,20	0,12	1,5	15,0	55	3,0	**53,00**
1,50	0,15	2,0	5,0	55	3,0	**53,00**
1,50	0,15	2,0	7,5	55	3,0	**53,00**
1,50	0,15	2,0	10,0	55	3,0	**53,00**
1,50	0,15	2,0	15,0	55	3,0	**53,00**
1,50	0,15	2,0	20,0	55	3,0	**53,00**
1,50	0,15	2,0	25,0	55	3,0	**53,00**
1,80	0,18	2,0	10,0	55	3,0	**53,00**
1,80	0,18	2,0	20,0	55	3,0	**53,00**
2,00	0,20	2,0	10,0	65	3,0	**53,00**
2,00	0,20	2,0	15,0	65	3,0	**53,00**
2,00	0,20	2,0	20,0	65	3,0	**53,00**
2,00	0,20	2,0	25,0	65	3,0	**53,00**
2,00	0,50	2,0	10,0	65	3,0	**53,00**
2,00	0,50	2,0	15,0	65	3,0	**53,00**
2,00	0,50	2,0	20,0	65	3,0	**53,00**
2,00	0,50	2,0	25,0	65	3,0	**53,00**
3,00	0,30	3,0	15,0	65	4,0	**67,00**
3,00	0,30	3,0	25,0	75	4,0	**67,00**
3,00	0,50	3,0	10,0	65	4,0	**67,00**
3,00	0,50	3,0	15,0	65	4,0	**67,00**
3,00	0,50	3,0	20,0	65	4,0	**67,00**
3,00	0,50	3,0	25,0	75	4,0	**67,00**
3,00	0,50	3,0	30,0	75	4,0	**67,00**
4,00	0,40	4,0	15,0	65	5,0	**76,00**
4,00	0,40	4,0	25,0	75	5,0	**76,00**
4,00	0,50	4,0	20,0	65	5,0	**76,00**

Fortsetzung nächste Seite *to be continued*

E.7696.1



Solid carbide graphite micro end mills 30° with corner radius

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z promieniem na czole do grafitu

Microfrese MD 30° per grafite con raggio d´angolo

Microfresas de metal duro de 30° para grafito con radio lateral

Frästiefe bis 25xd
Milling depth up to 25xd

Lieferzeit: 2 Wochen
Delivery time: 2 weeks

Artikel-Nr. *Article-No.*						E.7696.1 € Stück *piece*
d1	ER	l2	l3	l1	d2 h5	
4,00	0,50	4,0	40,0	75	5,0	**76,00**
4,00	0,50	4,0	50,0	90	5,0	**76,00**
5,00	0,50	5,0	30,0	75	6,0	**86,00**
5,00	0,50	5,0	40,0	75	6,0	**86,00**
5,00	0,50	5,0	50,0	90	6,0	**86,00**
5,00	0,50	5,0	60,0	90	6,0	**86,00**
6,00	0,50	6,0	30,0	75	6,0	**95,00**
6,00	0,50	6,0	40,0	90	6,0	**95,00**
6,00	0,50	6,0	30,0	90	6,0	**95,00**
6,00	0,50	6,0	60,0	100	6,0	**95,00**
6,00	1,00	6,0	30,0	75	6,0	**95,00**
6,00	1,00	6,0	60,0	90	6,0	**95,00**
8,00	0,50	8,0	30,0	80	8,0	**124,00**
8,00	0,50	8,0	60,0	100	8,0	**124,00**
8,00	1,00	8,0	30,0	80	8,0	**124,00**
8,00	1,00	8,0	60,0	100	8,0	**124,00**
10,00	0,50	10,0	30,0	80	10,0	**149,00**
10,00	0,50	10,0	60,0	100	10,0	**156,00**
10,00	1,00	10,0	30,0	80	10,0	**149,00**
10,00	1,00	10,0	60,0	100	10,0	**156,00**
12,00	0,50	12,0	30,0	80	12,0	**199,00**
12,00	0,50	12,0	60,0	100	12,0	**217,00**
12,00	1,00	12,0	30,0	80	12,0	**199,00**
12,00	1,00	12,0	60,0	100	12,0	**220,00**

E.7692.1

4.9

VHM | WERKS-(COMPANY) NORM | DIAMANT BESCHICHTUNG COATING | R | λ≈30° | GRAPHIT | Z=2 | DIN 6535 HA | X



Solid carbide graphite micro ball nose end mills 30°

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do grafiitu

Microfrese raggiate MD 30° per grafite

Microfresas de metal duro de 30° con radio para grafito

Frästiefe bis 25xd
Milling depth up to 25xd

Lieferzeit: 2 Wochen
Delivery time: 2 weeks

Artikel-Nr. *Article-No.*						E.7692.1 € Stück *piece*
d1	R	l2	l3	l1	d2 h5	
0,20	0,10	0,2	1	55	3,0	**75,00**
0,30	0,15	0,3	1	55	3,0	**70,00**
0,30	0,15	0,3	3	55	3,0	**70,00**
0,30	0,15	0,3	5	55	3,0	**70,00**
0,30	0,15	0,3	8	55	3,0	**70,00**
0,40	0,20	0,4	4	55	3,0	**70,00**
0,40	0,20	0,4	6	55	3,0	**70,00**
0,40	0,20	0,4	8	55	3,0	**70,00**
0,50	0,25	0,5	5	55	3,0	**56,00**
0,50	0,25	0,5	10	55	3,0	**56,00**
0,60	0,30	0,8	6	55	3,0	**56,00**
0,60	0,30	0,8	9	55	3,0	**56,00**
0,60	0,30	0,8	12	55	3,0	**56,00**
0,70	0,35	0,9	7	55	3,0	**56,00**
0,70	0,35	0,9	14	55	3,0	**56,00**
0,80	0,40	1,0	8	55	3,0	**56,00**
0,80	0,40	1,0	12	55	3,0	**56,00**
0,80	0,40	1,0	16	55	3,0	**56,00**
1,00	0,50	1,0	5	55	3,0	**56,00**
1,00	0,50	1,0	10	55	3,0	**56,00**
1,00	0,50	1,0	15	55	3,0	**56,00**
1,00	0,50	1,0	20	55	3,0	**56,00**
1,00	0,50	1,0	25	55	3,0	**56,00**
1,00	0,50	1,0	30	55	3,0	**56,00**
1,20	0,60	1,5	5	55	3,0	**56,00**
1,20	0,60	1,5	10	55	3,0	**56,00**
1,20	0,60	1,5	15	55	3,0	**56,00**
1,50	0,75	2,0	5	55	3,0	**56,00**
1,50	0,75	2,0	10	55	3,0	**56,00**
1,50	0,75	2,0	15	55	3,0	**56,00**
1,50	0,75	2,0	20	55	3,0	**56,00**
1,50	0,75	2,0	25	55	3,0	**56,00**
1,80	0,90	2,0	10	55	3,0	**56,00**
1,80	0,90	2,0	20	55	3,0	**56,00**
2,00	1,00	2,0	10	55	3,0	**56,00**
2,00	1,00	2,0	15	55	3,0	**56,00**
2,00	1,00	2,0	20	55	3,0	**56,00**
2,00	1,00	2,0	25	65	3,0	**56,00**
2,00	1,00	2,0	30	65	3,0	**56,00**
3,00	1,50	3,0	10	65	4,0	**64,00**
3,00	1,50	3,0	15	65	4,0	**64,00**
3,00	1,50	3,0	20	65	4,0	**64,00**
3,00	1,50	3,0	25	75	4,0	**64,00**
3,00	1,50	3,0	30	75	4,0	**64,00**
4,00	2,00	4,0	20	65	5,0	**76,00**
4,00	2,00	4,0	30	75	5,0	**76,00**
4,00	2,00	4,0	40	90	5,0	**76,00**
5,00	2,50	5,0	20	65	6,0	**88,00**
5,00	2,50	5,0	30	75	6,0	**88,00**
5,00	2,50	5,0	40	90	6,0	**88,00**
5,00	2,50	5,0	50	90	6,0	**88,00**

Fortsetzung nächste Seite *to be continued*

VHM-Graphit-Mikroradiusfräser 30°

E.7692.1

4.9

VHM | WERKS-NORM (COMPANY) | DIAMANT BESCHICHTUNG COATING | R | λ≈30° | GRAPHIT | Z=2 | DIN 6535 HA | X



Solid carbide graphite micro ball nose end mills 30°

Frezy miniaturowe z węglika spiekanego dwuostrzowe 30° z czołem kulistym do grafiitu

Microfrese raggiate MD 30° per grafite

Microfresas de metal duro de 30° con radio para grafito

Frästiefe bis 25xd
Milling depth up to 25xd

Lieferzeit: 2 Wochen
Delivery time: 2 weeks

Artikel-Nr. *Article-No.*						E.7692.1 € Stück *piece*
d1	R	l2	l3	l1	d2 h5	
6,00	3,00	6,0	30	75	6,0	**94,00**
6,00	3,00	6,0	40	90	6,0	**98,00**
6,00	3,00	6,0	50	90	6,0	**98,00**
6,00	3,00	6,0	60	100	6,0	**98,00**
8,00	4,00	8,0	30	80	8,0	**125,00**
8,00	4,00	8,0	60	100	8,0	**125,00**
10,00	5,00	10,0	30	80	10,0	**150,00**
10,00	5,00	10,0	60	100	10,0	**156,00**
12,00	6,00	12,0	30	83	12,0	**198,00**
12,00	6,00	12,0	60	100	12,0	**218,00**

VHM-Graphit-Schaftfräser 30° XL mit Eckenradius

E.7765.1

4.9

VHM | WERKS-NORM (COMPANY) | DIAMANT BESCHICHTUNG COATING | ER | λ≈30° | GRAPHIT | Z=2 | DIN 6535 HA | X



Solid carbide graphite end mills 30° XL with corner radius

Frezy z węglika spiekanego dwuostrzowe bardzo długie 30° do grafitu z promieniem na czole

Microfrese MD 30° per grafite, serie extra lunga con raggio d´angolo

Fresas de metal duro de 30° para grafito, serie extra larga con radio lateral

Artikel-Nr. *Article-No.*						E.7765.1 € Stück *piece*
d1 h10	ER	l2	l3	l1	d2 h6	
2,00	0,5	10	20	100	3,0	**79,00**
3,00	0,5	12	24	100	3,0	**79,00**
4,00	0,5	15	30	100	4,0	**96,00**
5,00	0,5	15	30	100	5,0	**120,00**
6,00	0,5	25	50	100	6,0	**143,00**
6,00	1,0	30	60	150	6,0	**165,00**
8,00	1,0	25	50	100	8,0	**196,00**
8,00	1,0	30	60	150	8,0	**234,00**
10,00	1,0	30	60	150	10,0	**304,00**
12,00	1,0	40	80	150	12,0	**385,00**
16,00	1,5	40	80	150	16,0	**610,00**

E.7766.1

4.9

VHM | WERKS-(COMPANY)NORM | DIAMANT BESCHICHTUNG COATING | R | λ≈30° | GRAPHIT | DIN 6535 HA | HRC



Solid carbide graphite ball nose copy cutters 30°

Frezy z węglika spiekanego wieloostrzowe kopiowe 30° z czołem kulistym do grafitu

Frese raggiate a copiare MD 30° per grafite

Fresas de metal duro de 30° con radio para grafito, para copiado

Artikel-Nr. *Article-No.*						E.7766.1 € Stück *piece*
d1 h10	R	l2	l3	l1	d2	
1,00	0,50	2,0	4	57	6,0	**85,00**
1,50	0,75	2,5	5	57	6,0	**85,00**
2,00	1,00	3,0	6	57	6,0	**85,00**
2,50	1,25	3,5	7	57	6,0	**69,00**
3,00	1,50	4,0	8	80	6,0	**92,00**
4,00	2,00	5,0	10	57	6,0	**88,00**
4,00	2,00	6,0	12	80	6,0	**93,00**
5,00	2,50	7,0	14	57	6,0	**80,00**
5,00	2,50	7,0	14	80	6,0	**93,00**
6,00	3,00	9,0	18	100	10,0	**115,00**
6,00	3,00	10,0	20	120	10,0	**181,00**
8,00	4,00	12,0	24	120	10,0	**194,00**
8,00	4,00	12,0	24	150	12,0	**248,00**
10,00	5,00	14,0	28	150	12,0	**258,00**
10,00	5,00	14,0	28	150	14,0	**303,00**
12,00	6,00	16,0	32	150	14,0	**326,00**
12,00	6,00	16,0	32	150	16,0	**390,00**
16,00	8,00	20,0	40	150	20,0	**565,00**

VHM-Graphit-Radiusschaftfräser engverzahnt mit Spanteiler

E.7782.1

4.9

VHM | WERKS-NORM (COMPANY) | DIAMANT BESCHICHTUNG COATING | HSC TOOL | λ≈25° | GRAPHIT | DIN 6535 HA | X



Solid carbide graphite ball nose end mills fine cut with chip breaker

Frezy z węglika spiekanego wieloostrzowe z czołem kulistym i łamaczem wióra do grafitu

Frese raggiate MD 30° per grafite, dentature fine con rompitruciolo

Fresas de metal duro con radio para grafito, dentado apretado con rompevirutas

Artikel-Nr. *Article-No.*					E.7782.1 € Stück *piece*
d1	R	l2	l1	d2 h6	
3,00	1,50	10	40	3,0	**40,00**
3,50	1,75	10	40	3,5	**56,00**
4,00	2,00	11	40	4,0	**58,00**
4,50	2,25	11	50	4,5	**70,00**
5,00	2,50	13	50	5,0	**71,00**
6,00	3,00	16	50	6,0	**74,00**
7,00	3,50	16	60	7,0	**86,00**
8,00	4,00	19	63	8,0	**90,00**
9,00	4,50	19	63	9,0	**122,00**
10,00	5,00	22	72	10,0	**132,00**
11,00	5,50	22	72	11,0	**154,00**
12,00	6,00	26	83	12,0	**164,00**
14,00	7,00	26	83	14,0	**215,00**
16,00	8,00	32	92	16,0	**288,00**
18,00	9,00	32	92	18,0	**325,00**
20,00	10,00	38	104	20,0	**376,00**

VHM-Graphit-Schaftfräser 30°

E.7712.1

4.9

VHM | WERKS-NORM (COMPANY) | DIAMANT BESCHICHTUNG COATING | X | λ≈30° | GRAPHIT | MEHR SCHNEIDER | DIN 6535 HA | ⬇↘



Solid carbide graphite end mills 30°

Frezy z węglika spiekanego wieloostrzowe 30° do grafitu

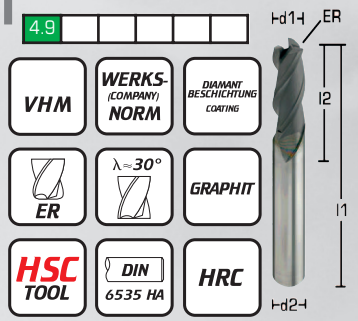
Frese in MD 30° per grafite

Fresas de metal duro de 30° para grafito

Artikel-Nr. *Article-No.*					E.7712.1 € Stück *piece*
d1	l2	l1	d2 h6	Zähne *flutes*	
1,00	3	38	1,0	2	**67,00**
1,50	4	38	1,5	2	**67,00**
2,00	7	40	2,0	2	**63,00**
3,00	10	40	3,0	3	**70,00**
4,00	11	40	4,0	3	**84,00**
5,00	13	50	5,0	3	**100,00**
6,00	16	50	6,0	3	**116,00**
8,00	20	63	8,0	3	**160,00**
10,00	22	72	10,0	4	**213,00**
12,00	26	83	12,0	4	**261,00**

VHM-Graphit-Torusfräser 30°

E.7767.1



Solid carbide graphite torus end mills 30°

Frezy z węglika spiekanego wieloostrzowe 30° torusowe do grafitu

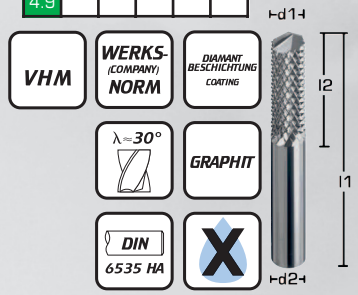
Frese in MD toriche 30° per grafite

Fresas tóricas de metal duro de 30° para grafito

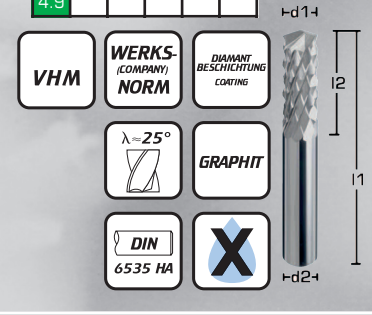
Artikel-Nr. *Article-No.*					E.7767.1 € Stück *piece*
d1 h10	ER	l2	l1	d2 h6	
2,00	0,5	6	50	3,0	**75,00**
3,00	0,5	8	60	3,0	**77,00**
4,00	0,5	10	60	4,0	**93,00**
5,00	0,5	12	60	5,0	**114,00**
6,00	0,5	20	75	6,0	**137,00**
8,00	1,0	20	75	8,0	**185,00**
10,00	1,0	25	100	10,0	**251,00**
12,00	1,0	25	100	12,0	**306,00**
16,00	1,5	25	100	16,0	**570,00**

VHM-Graphit-Nutenfräser mit spezieller Kreuzverzahnung

E.7778.1



E.7779.1



Solid carbide graphite slot milling cutters with special cross cut

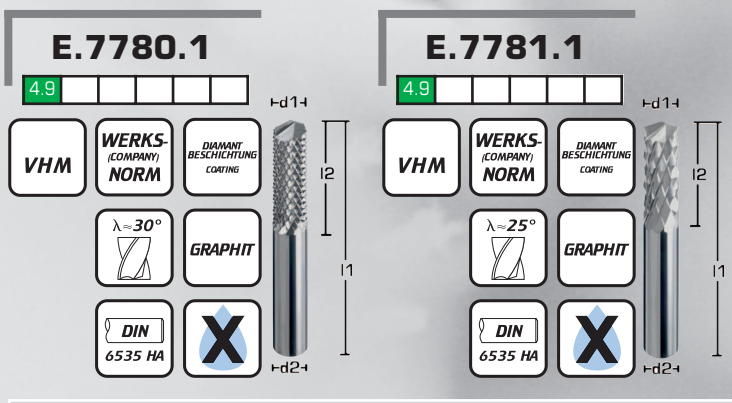
Frezy z węglika spiekanego wieloostrzowe do grafitu ze specjalnym ostrzem do rowkowania

Frese MD speciali per grafite con denti incrociati

Fresas de metal duro para ranurar grafito con diente cruzado especial

Artikel-Nr. *Article-No.*				E.7778.1 € Stück *piece*	E.7779.1 € Stück *piece*
d1	l2	l1	d2 h6		
2,00	7	40	2,0	**42,00**	**42,00**
2,00	7	50	6,0	**55,00**	**55,00**
3,00	10	40	3,0	**42,00**	**42,00**
3,00	12	50	6,0	**54,00**	**54,00**
4,00	15	40	4,0	**61,00**	**61,00**
4,00	20	50	6,0	**71,00**	**71,00**
5,00	16	50	5,0	**78,00**	**78,00**
5,00	25	75	6,0	**92,00**	**92,00**
6,00	18	50	6,0	**80,00**	**80,00**
6,00	35	75	6,0	**92,00**	**92,00**
8,00	25	63	8,0	**100,00**	**100,00**
8,00	40	100	8,0	**116,00**	**116,00**
10,00	30	72	10,0	**142,00**	**142,00**
12,00	32	83	12,0	**178,00**	**178,00**
16,00	36	92	16,0	**328,00**	**328,00**
20,00	40	104	20,0	**437,00**	**437,00**

VHM-Graphit-Bohrfräser



Solid carbide graphite drill milling cutter

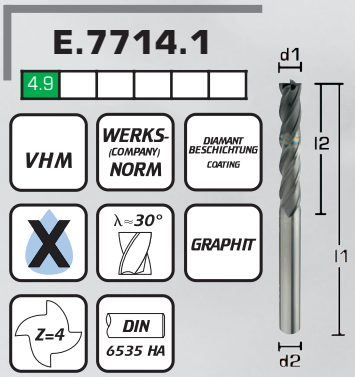
Frezy z węglika spiekanego wieloostrzowe do grafitu

Puntafrese in MD per grafite

Fresas-brocas de metal duro para grafito

Artikel-Nr. *Article-No.*				E.7780.1 € Stück *piece*	E.7781.1 € Stück *piece*
d1	l2	l1	d2 h6		
2,00	7	40	2,0	**40,00**	**40,00**
2,00	7	50	6,0	**54,00**	**54,00**
3,00	10	40	3,0	**40,00**	**40,00**
3,00	12	50	6,0	**54,00**	**54,00**
4,00	15	40	4,0	**61,00**	**61,00**
4,00	20	50	6,0	**71,00**	**71,00**
5,00	16	50	5,0	**77,00**	**77,00**
5,00	25	75	6,0	**81,00**	**81,00**
6,00	18	50	6,0	**79,00**	**79,00**
6,00	35	75	6,0	**90,00**	**90,00**
8,00	25	63	8,0	**108,00**	**108,00**
8,00	40	100	8,0	**124,00**	**124,00**
10,00	30	72	10,0	**141,00**	**141,00**
12,00	32	83	12,0	**176,00**	**176,00**
16,00	36	92	16,0	**321,00**	**321,00**
20,00	40	104	20,0	**427,00**	**427,00**

VHM-Graphit-Schaftfräser 30°



Solid carbide graphite end mills 30°

Frezy z węglika spiekanego czteroostrzowe 30° do grafitu

Frese in MD per grafite

Fresas de metal duro de 30° para grafito

Artikel-Nr. *Article-No.*				E.7714.1 € Stück *piece*
d1 h7	l2	l1	d2 h6	
6,00	45	80	6,0	**137,00**
8,00	50	100	8,0	**189,00**
10,00	50	100	10,0	**241,00**
12,00	70	150	12,0	**366,00**
14,00	75	150	14,0	**498,00**
16,00	75	150	16,0	**665,00**

VHM-Vollstäbe K40, geschliffen h6

E.7783.0

VHM



Solid carbide rods K40, ground to tolerance h6

Półwyroby okrągłe K40 z węglika spiekanego w tolerancji h6

Barrette MD K40, rettificate h6

Barras de metal duro integral K40, rectificadas h6

Artikel-Nr. *Article-No.*		E.7783.0 € Stück *piece*	Artikel-Nr. *Article-No.*		E.7783.0 € Stück *piece*
d1 h6	l1		d1 h6	l1	
3,00	330	**11,00**	**13,00**	330	**114,00**
3,50	330	**16,00**	**14,00**	330	**127,00**
4,00	330	**18,00**	**15,00**	330	**144,00**
4,50	330	**21,00**	**16,00**	330	**157,00**
5,00	330	**23,00**	**17,00**	330	**192,00**
5,50	330	**26,00**	**18,00**	330	**208,00**
6,00	330	**29,00**	**19,00**	330	**230,00**
6,50	330	**35,00**	**20,00**	330	**246,00**
7,00	330	**38,00**	**22,00**	330	**294,00**
7,50	330	**42,00**	**25,00**	330	**370,00**
8,00	330	**46,00**	**28,00**	330	**480,00**
8,50	330	**53,00**	**30,00**	330	**540,00**
9,00	330	**58,00**	**32,00**	330	**605,00**
9,50	330	**63,00**	**35,00**	330	**715,00**
10,00	330	**67,00**	**38,00**	330	**925,00**
12,00	330	**93,00**	**40,00**	330	**1.005,00**

VHM-Fixlängen K40, geschliffen h6

E.7784.0

VHM



Solid carbide rods K40, ground to tolerance h6

Pówyroby okrągłe K40 z węglika spiekanego w tolerancji h6

Barrette MD tagliate a misura K40, rettificate h6

Barras de metal duro integral K40, rectificadas h6, longitudes fijas

Artikel-Nr. *Article-No.*		E.7784.0 € Stück *piece*
d1 h6	l1	
3,00	100	**3,40**
4,00	100	**6,60**
5,00	100	**8,50**
6,00	100	**10,50**
7,00	100	**13,50**
8,00	100	**16,00**
9,00	100	**20,00**
10,00	100	**21,50**
11,00	100	**29,00**
12,00	100	**30,00**
13,00	100	**40,00**

VHM-Fräser-Rohlinge K40, geschliffen h6, mit einseitiger Fase

E.7752.0

VHM



Milling cutter blanks, ground to tolerance h6, chamfered one end

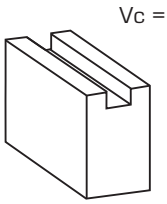
Półwyroby okrągłe z węglika spiekanego w tolerancji h6 z jednym skośnym

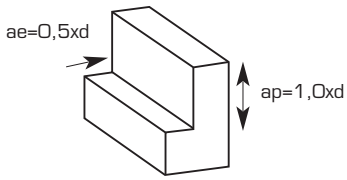
Barrette MD per frese K40, rettificate h6, con smusso unilaterale

Fresas semielaboradas en metal duro integral K40, rectificadas h6, con chaflán unilateral

Artikel-Nr. *Article-No.*		**E.7752.0** € **Stück** *piece*
d1 h6	l1	
2,00	32,5	**1,50**
3,00	39,5	**2,30**
4,00	40,5	**3,20**
4,00	51,0	**4,00**
4,50	51,2	**5,20**
5,00	51,2	**5,00**
5,50	58,2	**7,20**
6,00	51,2	**5,10**
6,00	55,0	**5,60**
6,00	58,2	**5,80**
6,50	62,0	**9,00**
7,00	62,0	**9,00**
7,50	65,0	**12,50**
8,00	59,0	**8,70**
8,00	64,2	**9,50**
8,50	69,0	**15,00**
9,00	69,0	**15,50**
9,50	74,0	**18,00**
10,00	67,2	**14,00**
10,00	73,2	**15,50**
11,00	85,0	**24,00**
12,00	74,2	**20,50**
12,00	84,2	**27,00**
13,00	85,0	**32,00**
14,00	76,2	**30,00**
14,00	84,2	**33,00**
15,00	94,0	**43,00**
16,00	83,2	**43,00**
16,00	93,2	**51,00**
18,00	85,0	**60,00**
18,00	93,0	**62,00**
20,00	93,2	**80,00**
20,00	105,0	**86,00**
25,00	123,0	**160,00**
25,00	151,2	**210,00**

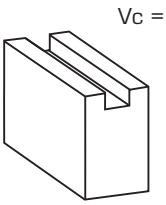
Einsatzrichtwerte für VHM-Superstar-Fräser "H" *Estimated values for use for VHM-Superstar-End mills "H"*

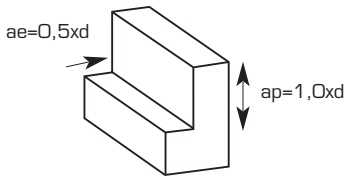




Materialgruppen *material groups*		**fz Vorschub pro Zahn** *fz feed per tooth*					
	Vc (m/min)	**< Ø 6 mm**	**< Ø 8 mm**	**< Ø 10 mm**	**< Ø 12 mm**	**< Ø 16 mm**	**< Ø 20 mm**
1.1							
1.2	210	0,03	0,04	0,05	0,06	0,07	0,09
1.3	160	0,03	0,04	0,05	0,06	0,07	0,08
2.1							
2.2							
3.1	210	0,05	0,06	0,07	0,09	0,11	0,13
3.2							
3.3	130	0,035	0,05	0,06	0,07	0,09	0,12
3.4	100	0,025	0,045	0,05	0,06	0,07	0,11
4.1							
4.2							
4.3	800	0,05	0,06	0,08	0,09	0,1	0,12
4.4							
4.5							
4.6							
4.7							
4.8							
4.9							
5.1							
5.2	80	0,02	0,025	0,035	0,04	0,045	0,055
6.1							
6.2							
6.3							
6.4							

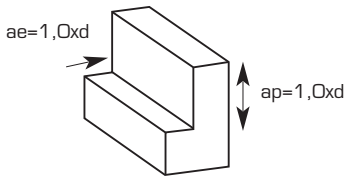
Einsatzrichtwerte für VHM-Superstar-Fräser "W" *Estimated values for use for VHM-Superstar-End mills "W"*





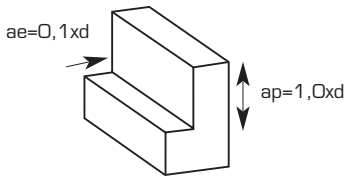
Materialgruppen *material groups*		**fz Vorschub pro Zahn** *fz feed per tooth*				
	Vc (m/min)	**< Ø 4 mm**	**< Ø 8 mm**	**< Ø 12 mm**	**< Ø 16 mm**	**< Ø 20 mm**
1.1	210	0,03	0,04	0,07	0,08	0,011
1.2						
1.3						
2.1	110	0,02	0,03	0,04	0,05	0,065
2.2	90	0,015	0,02	0,035	0,04	0,08
3.1						
3.2						
3.3						
3.4						
4.1	300	0,03	0,05	0,07	0,11	0,15
4.2	290	0,03	0,05	0,04	0,11	0,15
4.3						
4.4	300	0,03	0,05	0,07	0,11	0,15
4.5						
4.6						
4.7						
4.8						
4.9						
5.1	80	0,03	0,05	0,04	0,09	0,12
5.2						
6.1						
6.2						
6.3						
6.4						

Einsatzrichtwerte für VHM-Superstar-Fräser "HR" *Estimated values for use for VHM-Superstar-End mills "HR"*



Materialgruppen *material groups*	**beschichtet** *coated*	**fz Vorschub pro Zahn** *fz feed per tooth*					
	Vc (m/min)	**Ø 6 mm**	**Ø 8 mm**	**Ø 10 mm**	**Ø 12 mm**	**Ø 16 mm**	**Ø 20 mm**
1.1	180	0,04	0,05	0,06	0,07	0,08	0,1
1.2	180	0,03	0,04	0,05	0,06	0,07	0,08
1.3	160	0,02	0,035	0,05	0,06	0,065	0,07
2.1	150	0,02	0,03	0,04	0,05	0,06	0,07
2.2	120	0,015	0,02	0,03	0,04	0,05	0,06
3.1	200	0,04	0,05	0,07	0,08	0,1	0,12
3.2							
3.3	140	0,035	0,045	0,06	0,07	0,08	0,10
3.4	120	0,02	0,03	0,04	0,05	0,06	0,08
4.1							
4.2							
4.3	300	0,03	0,05	0,06	0,07	0,11	0,15
4.4							
4.5	290	0,03	0,05	0,06	0,07	0,11	0,15
4.6							
4.7							
4.8							
4.9							
5.1	80	0,03	0,04	0,05	0,06	0,07	0,08
5.2	50	0,02	0,03	0,04	0,05	0,06	0,07
6.1							
6.2							
6.3							
6.4							

Einsatzrichtwerte für VHM-Superstar-Schlichtfräser *Estimated values for use for VHM-Superstar-Finishing end mills*

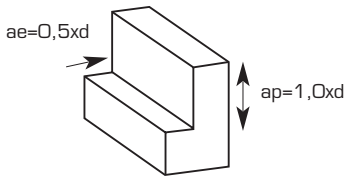


Materialgruppen *material groups*	beschichtet *coated*	fz Vorschub pro Zahn *fz feed per tooth*						
	Vc (m/min)	< Ø 3 mm	< Ø 6 mm	< Ø 8 mm	< Ø 10 mm	< Ø 12 mm	< Ø 16 mm	< Ø 20 mm
1.1	280		0,03	0,04	0,05	0,065	0,08	0,10
1.2	230		0,025	0,035	0,045	0,05	0,065	0,085
1.3	150		0,02	0,03	0,04	0,05	0,06	0,07
2.1	120		0,02	0,03	0,03	0,04	0,06	0,08
2.2	100		0,02	0,03	0,03	0,05	0,06	0,08
3.1	160		0,03	0,04	0,05	0,07	0,08	0,10
3.2	140		0,03	0,04	0,05	0,06	0,07	0,,10
3.3	150		0,04	0,05	0,06	0,08	0,10	0,11
3.4	120		0,03	0,04	0,06	0,07	0,09	0,10
4.1								
4.2								
4.3								
4.4								
4.5								
4.6								
4.7								
4.8								
4.9								
5.1	60		0,015	0,03	0,03	0,04	0,05	0,06
5.2								
6.1								
6.2								
6.3								
6.4								

Einsatzrichtwerte für VHM-Universal Fräser *Estimated values for use for VHM-Universal end mills*

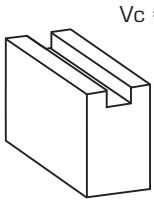
Korrekturfaktor *Factor of correction:*

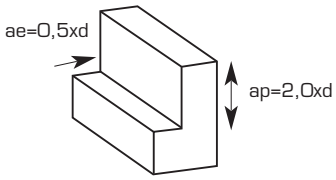
1. **lang** *long* = **Vf - 30%**
2. **Radiusfräsen** *Ball nose milling* = **Vc +30% - 40%**



Materialgruppen *material groups*	**blank** *uncoated*	**beschichtet** *coated*	**fz Vorschub pro Zahn** *fz feed per tooth*						
	Vc (m/min)	**Vc (m/min)**	**< Ø 3 mm**	**< Ø 6 mm**	**< Ø 8 mm**	**< Ø 10 mm**	**< Ø 12 mm**	**< Ø 16 mm**	**< Ø 20 mm**
1.1	35 - 65	50 - 90	0,03	0,04	0,05	0,06	0,07	0,08	0,10
1.2	35 - 55	50 - 80	0,02	0,03	0,04	0,05	0,06	0,06	0,08
1.3	28 - 42	40 - 60	0,01	0,02	0,03	0,04	0,05	0,06	0,08
2.1	14 - 35	20 - 50	0,01	0,02	0,03	0,04	0,05	0,06	0,08
2.2									
3.1	42 - 56	60 - 80	0,03	0,05	0,07	0,08	0,09	0,10	0,12
3.2									
3.3	42 - 77	60 - 110	0,02	0,03	0,04	0,05	0,06	0,07	0,08
3.4									
4.1	200 - 500		0,02	0,03	0,04	0,05	0,07	0,08	0,12
4.2	120 - 450		0,04	0,06	0,08	0,10	0,13	0,16	0,20
4.3	100 - 230		0,02	0,04	0,06	0,07	0,10	0,15	0,18
4.4									
4.5	56 - 100	80 - 160	0,02	0,03	0,04	0,05	0,06	0,09	0,11
4.6									
4.7	60 - 120		0,03	0,04	0,05	0,07	0,10	0,15	0,18
4.8									
4.9									
5.1		20 - 40	0,01	0,02	0,03	0,40	0,05	0,07	0,08
5.2									
6.1		30 - 50	0,01	0,02	0,03	0,04	0,05	0,06	0,07
6.2									
6.3									
6.4									

Einsatzrichtwerte für VHM-Schruppfräser *Estimated values for use for VHM-Roughing end mills*



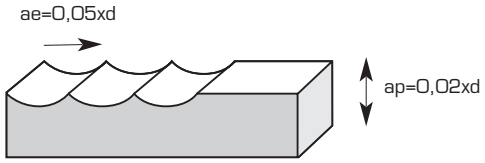


Materialgruppen *material groups*		**fz Vorschub pro Zahn** *fz feed per tooth*					
	Vc (m/min)	**< Ø 6 mm**	**< Ø 8 mm**	**< Ø 10 mm**	**< Ø 12 mm**	**< Ø 16 mm**	**< Ø 20 mm**
1.1	170	0,03	0,05	0,06	0,07	0,09	0,12
1.2	150	0,03	0,05	0,06	0,07	0,09	0,12
1.3	85	0,03	0,05	0,06	0,07	0,09	0,12
2.1	110	0,03	0,05	0,06	0,07	0,09	0,12
2.2	80	0,03	0,05	0,06	0,07	0,09	0,12
3.1	90	0,03	0,05	0,06	0,07	0,09	0,12
3.2	85	0,03	0,05	0,06	0,07	0,09	0,12
3.3	85	0,03	0,05	0,06	0,07	0,09	0,12
3.4	85	0,03	0,05	0,06	0,07	0,09	0,12
4.1							
4.2							
4.3							
4.4							
4.5							
4.6							
4.7							
4.8							
4.9							
5.1	80	0,06	0,07	0,08	0,10	0,15	0,18
5.2	70	0,03	0,05	0,06	0,07	0,12	0,15
6.1							
6.2							
6.3	35	0,005	0,006	0,008	0,01	0,01	0,01
6.4							

Einsatzrichtwerte für VHM-Mikro-Fräser *Estimated values for use for VHM-Micro-End mills*

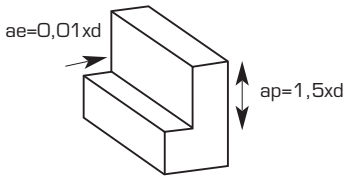
Materialgruppen *material groups*	blank *uncoated*	beschichtet *coated*	fz Vorschub pro Zahn *fz feed per tooth*				
	Vc (m/min)	Vc (m/min)	< Ø 0,5 mm	< Ø 1,0 mm	< Ø 1,5 mm	< Ø 2,0 mm	< Ø 3,0 mm
1.1	50 - 60	80 - 100	0,004	0,012	0,015	0,020	0,030
1.2	45 - 55	75 - 95	0,003	0,010	0,012	0,018	0,025
1.3	35 - 45	65 - 75	0,003	0,010	0,012	0,018	0,025
2.1	25 - 35	45 - 55	0,003	0,010	0,012	0,018	0,025
2.2	25 - 30	40 - 50	0,004	0,012	0,015	0,020	0,030
3.1	65 - 80	100 - 130	0,004	0,012	0,015	0,020	0,030
3.2							
3.3	55 - 65	90 - 110	0,004	0,012	0,015	0,020	0,030
3.4							
4.1	240 - 295	400 - 490	0,004	0,015	0,020	0,030	0,040
4.2	110 - 140	200 - 240	0,003	0,010	0,012	0,018	0,025
4.3	95 - 120	160 - 190	0,004	0,015	0,020	0,030	0,040
4.4							
4.5							
4.6							
4.7	60 - 80	100 - 130	0,004	0,012	0,015	0,020	0,030
4.8							
4.9							
5.1	25 - 30	40 - 50	0,004	0,012	0,015	0,020	0,030
5.2							
6.1	25 - 30	45 - 55	0,004	0,012	0,015	0,020	0,030
6.2		50	0,004	0,012	0,015	0,020	0,030
6.3		45	0,04	0,012	0,015	0,020	0,030
6.4		35	0,04	0,012	0,015	0,020	0,030

Einsatzrichtwerte für VHM-Radius-/Kopierfräser *Estimated values for use for VHM-Ball nose/copying end mills*



Materialgruppen *material groups*		fz Vorschub pro Zahn *fz feed per tooth*					
	Vc (m/min)	< Ø 4 mm	< Ø 6 mm	< Ø 8 mm	< Ø 10 mm	< Ø 12 mm	< Ø 16 mm
1.1							
1.2	150 - 400	0,015	0,030	0,040	0,05	0,08	0,10
1.3	110 - 300	0,015	0,030	0,040	0,05	0,08	0,10
2.1							
2.2							
3.1							
3.2	120 - 300	0,020	0,040	0,050	0,060	0,100	0,120
3.3							
3.4							
4.1							
4.2							
4.3							
4.4							
4.5							
4.6							
4.7							
4.8							
4.9							
5.1							
5.2							
6.1	90 - 220	0,020	0,040	0,050	0,060	0,080	0,120
6.2	50 - 100	0,015	0,040	0,050	0,060	0,100	0,120
6.3	30 - 100	0,015	0,030	0,040	0,050	0,080	0,100
6.4							

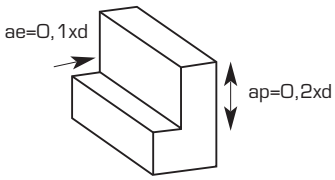
Einsatzrichtwerte für VHM-Hartfräser *Estimated values for use for VHM-End mills < 70 HRC*



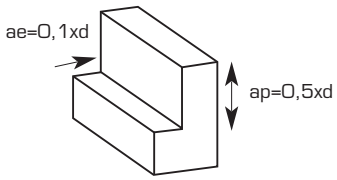
Materialgruppen *material groups*		fz Vorschub pro Zahn *fz feed per tooth*							
	Vc (m/min)	< Ø 2 mm	< Ø 4 mm	< Ø 6 mm	< Ø 8 mm	< Ø 10 mm	< Ø 12 mm	< Ø 16 mm	< Ø 20 mm
1.1									
1.2									
1.3									
2.1									
2.2									
3.1									
3.2									
3.3									
3.4									
4.1									
4.2									
4.3									
4.4									
4.5									
4.6									
4.7									
4.8									
4.9									
5.1									
5.2									
6.1	120	0,010	0,025	0,040	0,055	0,065	0,070	0,080	0,100
6.2	100	0,010	0,025	0,035	0,045	0,050	0,060	0,070	0,090
6.3	80	0,010	0,020	0,030	0,040	0,050	0,060	0,070	0,080
6.4	60	0,080	0,015	0,025	0,035	0,040	0,045	0,055	0,060

Einsatzrichtwerte für VHM-Diamant-Fräser *Estimated values for use for VHM-Diamond end mills*

Schlichten *Finishing*



Schruppen *Roughing*



Materialgruppen *material groups*	**Schlichten / Schruppen** *Finishing / Roughing*															
		fz Vorschub pro Zahn *fz feed per tooth*														
	Vc (m/min)	**Ø 0,4**	**Ø 0,5**	**Ø 0,6**	**Ø 0,7**	**Ø 0,8**	**Ø 0,9**	**Ø 1,0**	**Ø 1,5**	**Ø 2,0**	**Ø 3,0**	**Ø 4,0**	**Ø 5,0**	**Ø 6,0**	**Ø 8,0**	**Ø 10**	**Ø 12**
1.1																	
1.2																	
1.3																	
2.1																	
2.2																	
3.1																	
3.2																	
3.3																	
3.4																	
4.1																	
4.2																	
4.3																	
4.4																	
4.5																	
4.6																	
4.7																	
4.8																	
4.9	400 450	0,003 0,004	0,003 0,005	0,004 0,007	0,005 0,007	0,006 0,010	0,007 0,010	0,010 0,015	0,012 0,020	0,015 0,025	0,020 0,030	0,030 0,040	0,040 0,050	0,050 0,060	0,060 0,080	0,080 0,100	0,10 0,12
5.1																	
5.2																	
6.1																	
6.2																	
6.3																	
6.4																	

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
BOHREN *DRILLING*													
				E.3661.0	3 - 4								
				E.3662.0	3 - 4								
	VHM	STAHL	Blue Cut	E.3664.2	4								
	HSSE/ PM	STAHL	TIN	E.3664.3	4								
	HSSE/ PM	STAHL	Blue Cut	E.3664.4	4								
	VHM	NE-METALLE		E.3664.5	4								
				E.8682.0	5								
				E.8683.0	5								
				E.8684.0	5								
SENKEN *SINKING*													
				E.8626.0	6								
				E.8628.0	7								
				E.8632.0	8								
				SET.8632	8								
				E.8631.0	9								
				SET.8631	9								
				E.8630.0	10								
				E.8633.0	11								
FRÄSEN *MILLING*													
				E.8678.0	12								
				E.8679.0	12								
				E.8687.0	13								

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION	ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
		E.8688.0	13								
		E.8680.0	14								
		E.8681.0	14								
		E.8685.0	15								
		E.8686.0	15								
		E.8635.0	17								
		SET.8600	17								
		E.8638.0	18								
		E.8639.0	18								
		E.8643.0	19								
DREHEN *TURNING*											
		E.8665.0	20								
		SET.8665	20								
		E.8663.0	21								
		SET.8663	21								
		E.8656.0	22								
		E.8657.0	22								
		E.8677.0	23								
		E.8661.0	23								
		E.8666.0	24								
		E.8658.0	24								
		E.8659.0	25								
		SET.8677	25								

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION	ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
		SET.8664	26								
		WP`s	26 - 27								
		E.8689.0	28								
		WP`s	28								
REIBEN *REAMING*											
		E.8671.0	29								
		E.8672.0	29								
		E.8673.0	30								
ENTGRATEN *DEBURRING*											
		E.8690.0	31								

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!
The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

E.3661.0



E.3662.0



Insert drill straight fluted 3xd-20xd

Wiertła składane proste 3xD-20xD pod płytki wymienne

Punte con inserto intercambiabile, denti dritti, 3xd-20xd

Broca con plaquitas intercambiables, ranuras rectas, para 3xd hasta 20xd

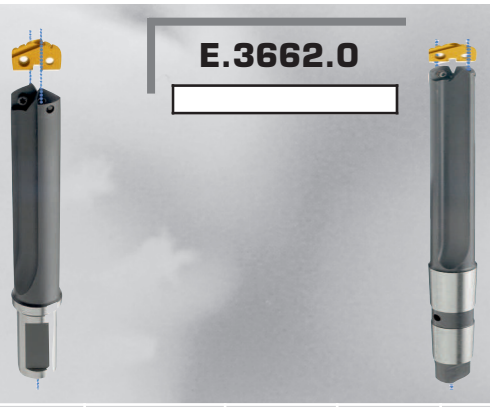
ø	Artikel-Nr. Article-No.	Bohrtiefe *drill depth*	Nutlänge *flute length*	l1	d2	WP-Stärke *insert thickness*	ohne Platte ***without insert*** € Stück *piece*	Torx-Schraube Torx-Screw € Stück *piece*
10,00 - 11,75	**E.3661.0 + Drm. *dia.* + Bohrtiefe *drill depth***	45	75,0	115,0	20,0	2,50	**256,00**	**3,50**
		90	119,0	159,0	20,0	2,50	**273,00**	**3,50**
11,80 - 14,00		45	75,0	115,0	20,0	2,50	**256,00**	**3,50**
		110	139,0	179,0	20,0	2,50	**298,00**	**3,50**
13,50 - 16,50		55	85,0	125,0	20,0	3,50	**281,00**	**3,50**
		130	158,5	198,5	20,0	3,50	**314,00**	**3,50**
		170	198,5	238,5	20,0	3,50	**380,00**	**3,50**
		250	278,5	318,5	20,0	3,50	**496,00**	**3,50**
15,00 - 17,50		55	85,0	125,0	20,0	3,50	**281,00**	**3,50**
		130	158,5	198,5	20,0	3,50	**314,00**	**3,50**
		170	198,5	238,5	20,0	3,50	**380,00**	**3,50**
		330	258,5	398,5	20,0	3,50	**562,00**	**3,50**
16,50 - 20,00		65	95,0	135,0	20,0	3,50	**281,00**	**3,50**
		150	180,5	220,5	20,0	3,50	**394,00**	**3,50**
		225	255,5	295,5	20,0	3,50	**480,00**	**3,50**
		340	370,5	410,5	20,0	3,50	**572,00**	**3,50**
18,95 - 22,50		70	105,0	145,0	20,0	4,00	**298,00**	**3,90**
		180	214,0	254,0	20,0	4,00	**331,00**	**3,90**
		270	304,0	344,0	20,0	4,00	**480,00**	**3,90**
		390	424,0	464,0	20,0	4,00	**620,00**	**3,90**
22,50 - 26,00		137	172,0	212,0	20,0	4,00	**306,00**	**3,90**
		270	305,0	345,0	20,0	4,00	**447,00**	**3,90**
		460	495,0	535,0	20,0	4,00	**695,00**	**3,90**
24,00 - 29,00		125	163,0	225,0	32,0	5,00	**331,00**	**4,00**
		240	283,0	343,0	32,0	5,00	**398,00**	**4,00**
		400	443,0	503,0	32,0	5,00	**612,00**	**4,00**
		580	623,0	683,0	32,0	5,00	**745,00**	**4,00**
29,00 - 36,00		125	163,0	225,0	32,0	5,00	**331,00**	**4,00**
		290	333,0	393,0	32,0	5,00	**447,00**	**4,00**
		450	493,0	553,0	32,0	5,00	**661,00**	**4,00**
		660	703,0	763,0	32,0	5,00	**876,00**	**4,00**
34,00 - 40,50		125	163,0	223,0	32,0	5,00	**348,00**	**4,00**
		290	333,0	393,0	32,0	5,00	**480,00**	**4,00**
		500	543,0	603,0	32,0	5,00	**727,00**	**4,00**
		720	763,0	823,0	32,0	5,00	**945,00**	**4,00**
35,00 - 46,00		110	157,0	217,0	32,0	7,00	**380,00**	**4,50**
		215	262,0	322,0	32,0	7,00	**438,00**	**4,50**
		350	397,0	457,0	32,0	7,00	**680,00**	**4,50**
		500	547,0	607,0	32,0	7,00	**828,00**	**4,50**
45,00 - 56,00		215	262,0	332,0	40,0	7,00	**465,00**	**4,50**
		350	397,0	467,0	40,0	7,00	**703,00**	**4,50**
		500	547,0	617,0	40,0	7,00	**860,00**	**4,50**
55,00 - 66,00		215	262,0	332,0	40,0	7,00	**496,00**	**4,50**
		350	397,0	467,0	40,0	7,00	**761,00**	**4,50**
		500	547,0	617,0	40,0	7,00	**960,00**	**4,50**
65,00 - 80,00		220	270,0	340,0	40,0	9,00	**612,00**	**4,80**
		500	550,0	620,0	40,0	9,00	**976,00**	**4,80**
78,00 - 91,00		220	270,0	350,0	50,0	9,00	**695,00**	**4,80**
		500	550,0	630,0	50,0	9,00	**1.140,00**	**4,80**

Fortsetzung nächste Seite *to be continued*

Wendeplattenbohrer gerade genutet 3xd - 20xd

E.3661.0

E.3662.0



- Insert drill straight fluted 3xd-20xd
- Wiertła składane proste 3xD-20xD pod płytki wymienne
- Punte con inserto intercambiabile, denti dritti, 3xd-20xd
- Broca con plaquitas intercambiables, ranuras rectas, para 3xd hasta 20xd

ø	Artikel-Nr. Article-No.	Bohrtiefe *drill depth*	Nutlänge *flute length*	l1	d2	WP-Stärke *insert thickness*	**ohne Platte** *without insert* € Stück *piece*	**Torx-Schraube** *Torx-Screw* € Stück *piece*
90,00 - 120,00		220	270,0	350,0	50,0	9,00	**777,00**	**4,80**
		500	550,0	630,0	50,0	9,00	**1.306,00**	**4,80**
		mit Morsekegel *with morse taper*						
35,00 - 46,00	**E.3662.0 + Drm. *dia.* + Bohrtiefe *drill depth***	215	262,0	431,0	MK 4	7,00	**515,00**	**4,50**
		500	535,0	716,0	MK 4	7,00	**910,00**	**4,50**
45,00 - 56,00		215	262,0	431,0	MK 4	7,00	**530,00**	**4,50**
		500	535,0	716,0	MK 4	7,00	**945,00**	**4,50**
55,00 - 66,00		215	262,0	431,0	MK 4	7,00	**580,00**	**4,50**
		500	535,0	716,0	MK 4	7,00	**1.042,00**	**4,50**
65,00 - 80,00		270	320,0	536,0	MK 5	9,00	**695,00**	**4,80**
		500	550,0	766,0	MK 5	9,00	**1.060,00**	**4,80**
78,00 - 91,00		270	320,0	536,0	MK 5	9,00	**795,00**	**4,80**
		500	550,0	766,0	MK 5	9,00	**1.240,00**	**4,80**

Wendeplatten mit Fase für Halter E.3661 - E.3662.0

E.3664.2

VHM

Blue Cut

STAHL



E.3664.3

HSSE/ PM

TIN

STAHL



E.3664.4

HSSE/ PM

Blue Cut

STAHL



E.3664.5

VHM

NE-METALLE



- Insert with margin for holder E.3661-E.3662
- Płytki wymienne do wierteł składanych E.3661.0-E.3662.0
- Inserti intercambiabili con smussi per mandrini
- Plaquitas intercambiables con margen para porta-herramientas E.3661-E.3662

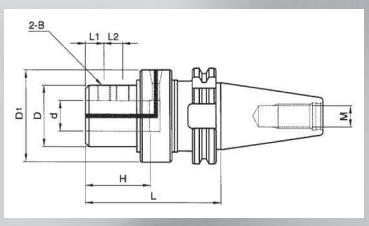
Artikel-Nr. *Article-No.* d1 0,05 stg.	WP-Stärke *insert-thickness*	E.3664.2 € Stück *piece*	E.3664.3 € Stück *piece*	E.3664.4 € Stück *piece*	E.3664.5 € Stück *piece*
10,00 - 14,00	2,5	**51,00**	**38,00**	**38,00**	**48,00**
13,50 - 20,00	3,5	**67,00**	**36,00**	**38,00**	**65,00**
18,95 - 26,00	4,0	**85,00**	**43,00**	**45,00**	**82,00**
24,00 - 29,00	5,0	**102,00**	**49,00**	**56,00**	**98,00**
29,10 - 36,00	5,0	**108,00**	**52,00**	**58,00**	**104,00**
36,10 - 40,50	5,0	**115,00**		**63,00**	**110,00**
35,00 - 45,50	7,0	**140,00**	**61,00**	**69,00**	**134,00**
46,00 - 55,50	7,0	**172,00**	**70,00**	**80,00**	**165,00**
56,00 - 66,00	7,0	**204,00**	**78,00**	**88,00**	**197,00**
65,00 - 75,00	9,0		**104,00**	**109,00**	
76,00 - 90,00	9,0		**116,00**	**122,00**	
91,00 - 102,00	9,0		**133,00**	**140,00**	
103,00 - 130,00	9,0		**152,00**	**159,00**	

Bohrmesser für System “Hartner” und “Stellram” auf Anfrage lieferbar (Bohrmesserstärke angeben!)
Inserts for system “Hartner” and “Stellram” can be supplied on demand (please state insert-thickness!)

Kühlmittelzuführung SK40/SK50 DIN 69871 mit zylindrischer Bohrung

E.8682.0





Axial coolant holes

Oprawki zaciskowe SK40/SK50 DIN 69871 z chłodzeniem wew. do narzędzi z chwytem Weldon'a

Coni di attacco SK40/SK50 DIN 69871 con fori interni assiali

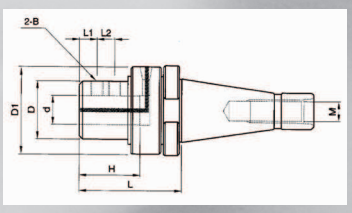
Conos SK40/SK50 DIN 69871 con refrigeración interior axial

Artikel-Nr. *Article-No.*									**E.8682.0** € Stück *piece*
d	**L**	**D**	**D1**	**H**	**L1**	**L2**	**B**	**M**	
20	110	50	78	50	20		M12	M16	**967,00**
32	130	65	88	70	20	20	M14	M16	**967,00**
40	135	65	98	80	20	25	M16	M24	**1.130,00**
50	165	90	123	90	35	35	M20	M24	**1.435,00**

Kühlmittelzuführung SK40/SK50 DIN 2080 mit zylindrischer Bohrung

E.8683.0





Axial coolant holes

Oprawki zaciskowe SK 40/SK50 DIN 2080 z chłodzeniem zew. do narzędzi z chwytem Weldon'a

Coni di attacco SK40/SK50 DIN 2080 con fori interni assiali

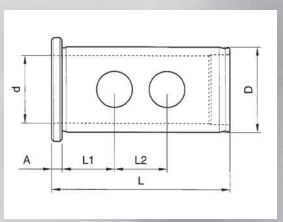
Conos SK40/SK50 DIN 2080 con refrigeración interior axial

Artikel-Nr. *Article-No.*									**E.8683.0** € Stück *piece*
d	**L**	**D**	**D1**	**H**	**L1**	**L2**	**B**	**M**	
20	90	50	78	50	20		M12	M16	**835,00**
32	110	65	88	70	20	20	M14	M16	**835,00**
40	120	65	98	80	20	25	M16	M24	**1.080,00**
50	145	90	123	90	35	35	M20	M24	**1.355,00**

Reduzierhülse mit zylindrischer Bohrung

E.8684.0





Axial sleeve

Tuleje redukcyjne do oprawek zaciskowych do narzędzi z chwytem Weldon'a

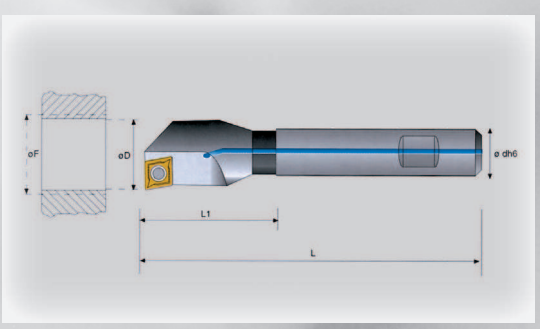
Bussola di riduzione cilindrica

Casquillo de reducción con agujeros cilíndricos

Artikel-Nr. *Article-No.*						**E.8684.0** € Stück *piece*
D	**d**	**L**	**L1**	**L2**	**A**	
32	20	65	20		5	**80,00**
32	25	65	20	20	5	**80,00**
40	20	75	20		5	**86,00**
40	25	75	20	25	5	**86,00**
40	32	75	20	25	5	**86,00**
50	32	95	35	35	5	**110,00**
50	40	95	35	35	5	**110,00**

E.8626.0





Spot facing milling cutter Z=1 with undersize and internal coolant

Wytaczadło-pogłębiacze czołowe 1-ostrzowe z chłodz wew pod płytki CCMT

Allargatori Z=1 con sottomisura e refrigerazione interna

Barras de mandrinar Z=1 en medidas inferiores y refrigeración interior

Artikel-Nr. *Article-No.*						E.8626.0 € Stück *piece*	Wendeplatten inserts
Ø D	Ø F	L1	L	d h6	Zähne *flutes*		
9,80	10	23	90	8	1	72,00	CCMT 060204
10,80	11	24	105	10	1	73,00	
11,80	12	25	105	10	1	73,00	
12,80	13	25	105	10	1	76,00	
13,80	14	27	110	12	1	76,00	
14,80	15	28	120	12	1	81,00	
15,80	16	29	125	12	1	81,00	
16,80	17	30	140	16	1	85,00	
17,80	18	31	140	16	1	85,00	
18,80	19	31	150	16	1	85,00	
19,80	20	33	150	16	1	85,00	
20,80	21	34	160	20	1	96,00	CCMT 09T304
21,80	22	35	160	20	1	96,00	
22,80	23	36	165	20	1	103,00	
23,80	24	37	170	20	1	110,00	
24,80	25	38	180	20	1	110,00	
25,80	26	39	185	20	1	116,00	
26,80	27	40	190	20	1	116,00	
27,80	28	40	190	20	1	122,00	
28,80	29	43	200	20	1	139,00	
29,80	30	43	200	25	1	139,00	
30,80	31	44	200	25	1	150,00	
31,80	32	45	200	25	1	150,00	



Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Aufbohrer Z=2 mit Vollmaß und Innenkühlung

Spot facing milling cutter Z=2 with fullsize and with internal coolant

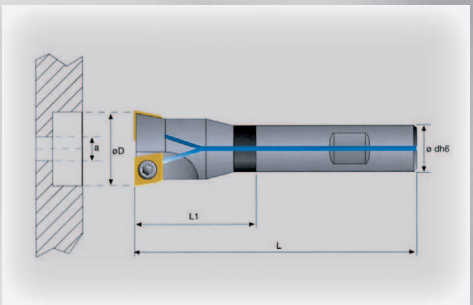
Pogłębiacze czołowe2-ostrzowe z chł-odz. wew, pod pytki CCMT 0602/09T3

Allargatori Z=2 con con misura piena e refrigerazione interna

Barras de mandrinar Z=2 en madidas enteras y refrigeración interior

E.8628.0



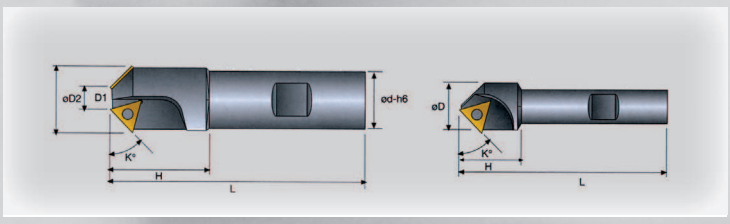


Artikel-Nr. *Article-No.*						ohne WP *without inserts* E.8628.0 € Stück *piece*	Wendeplatten inserts
Ø D	a	L1	L	d h6	Zähne *flutes*		
16,00	5,0	30	92	12	2	**81,00**	**CCMT 0602**
17,00	6,0	32	94	16	2	**82,00**	
17,50	6,5	40	96	16	2	**89,00**	
18,00	7,0	41	97	16	2	**89,00**	
19,00	8,0	41	100	16	2	**89,00**	
20,00	9,0	41	102	16	2	**89,00**	
21,00	10,0	41	105	16	2	**91,00**	
22,00	11,0	41	110	16	2	**92,00**	
23,00	12,0	41	112	16	2	**96,00**	
24,00	13,0	41	115	16	2	**97,00**	
25,00	8,0	40	120	16	2	**97,00**	**CCMT 09T3**
26,00	9,0	55	125	20	2	**106,00**	
27,00	10,0	55	128	20	2	**111,00**	
28,00	11,0	55	130	20	2	**114,00**	
29,00	12,0	55	132	20	2	**117,00**	
30,00	13,0	55	134	20	2	**122,00**	
31,00	14,0	55	136	20	2	**128,00**	
32,00	15,0	55	138	20	2	**129,00**	
33,00	16,0	55	140	20	2	**133,00**	
34,00	16,0	60	140	25	2	**157,00**	
35,00	17,0	60	140	25	2	**161,00**	
36,00	18,0	60	140	25	2	**161,00**	
37,00	19,0	60	140	25	2	**161,00**	
38,00	20,0	60	140	25	2	**167,00**	
39,00	21,0	60	140	25	2	**167,00**	
40,00	22,0	60	140	25	2	**172,00**	
41,00	23,0	60	140	25	2	**172,00**	
42,00	24,0	60	140	25	2	**172,00**	

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

E.8632.0





Countersink 30° - 45° - 60°

Fazowniki-pogłębiacze składane 30° - 45° - 60° pod płytki TCMT 1102-TCMT 16T3

Svasatori con inserti 30° - 45° - 60°

Avellanadores con plaquitas de 30° - 45° - 60°

ohne WP
without inserts

Artikel-Nr. *Article-No.*							E.8632.0 € Stück *piece*	Wendeplatten inserts
K°	Ø D1	Ø D2	H	L	d h6	Zähne *flutes*		
45°	1,2	16,0	20	70	12	1	**57,00**	**TCMT 1102**
45°	6,2	21,0	35	90	20	2	**76,00**	
45°	10,4	32,5	39	95	25	2	**117,00**	**TCMT 16T3**
60°	5,4	16,0	20	70	12	1	**58,00**	**TCMT 1102**
60°	15,8	26,0	35	90	20	2	**80,00**	
60°	20,0	35,0	39	95	25	2	**120,00**	**TCMT 16T3**
30°	6,0	32,0	39	95	20	2	**122,00**	**TCMT 16T3**

Senker 45° im Set



Set of countersinks 45°

Zestaw fazowników-pogłębiaczy 45°

Set di svasatori a 45°

Juegos de avellanadores con plaquitas de 45°

SET.8632
(ohne WP *without inserts*)

Senker 45°
Countersinks 45°

Ø 16 mm x 70 mm, Schaft / shank 12 mm
Ø 21 mm x 90 mm, Schaft / shank 20 mm **130,00 €**

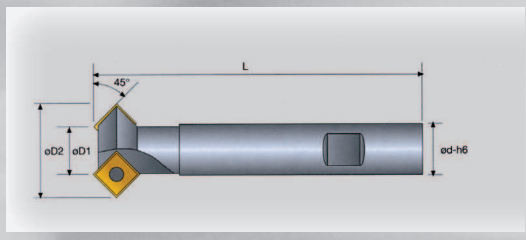
passende Wendeplatten: TCMT 1102 ...
suitable inserts: TCMT 1102 ...

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Vor- und Rückwärtsentgrater 45°

E.8631.0





Forwards and backwards deburring tool 45°

Fazowniki 45 od czoła i od spodu pod płytki SCMT 0602 i SCMT 09T3

Sbavatori a 45° in avanti e indietro

Rebabadores hacia delante y atrás de 45°

Artikel-Nr. *Article-No.*					ohne WP *without inserts* E.8631.0 € Stück *piece*	Wendeplatten inserts
Ø D1	Ø D2	L	d h6	Zähne *flutes*		
4,00	10,0	80	12	1	**72,00**	**SCMT 0602**
11,00	20,0	80	12	2	**94,00**	
12,00	23,7	100	20	1	**72,00**	**SCMT 09T3**
16,00	28,8	100	16	2	**91,00**	
30,00	42,3	100	20	3	**150,00**	
		lang *long*			**E.8631.0L**	
12,00	23,7	200	20	1	**100,00**	**SCMT 09T3**
16,00	28,8	200	16	2	**122,00**	
30,00	42,3	200	20	3	**167,00**	

Vor- und Rückwärtsentgrater 45° im Set



Set of forwards and backwards deburring tool 45°

Zestaw fazowników 45° od czoła i od spodu

Set di sbavatori a 45°

Juegos de rebabadores hacia delante y atrás de 45°

Set.8631

(mit WP *with inserts*)

Vor- und Rückwärtsentgrater 45°
Forwards and backwards deburring tool 45°

Ø 10 mm x 80 mm, Schaft *shank 12 mm*
Ø 20 mm x 80 mm, Schaft *shank 12 mm*
10 Stück Wendeplatten *10 pieces inserts*

270,00 €

passende Wendeplatten: SCMT 060204 ...
suitable inserts: SCMT 060204 ...

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Backwards deburring tool 180° with internal coolant

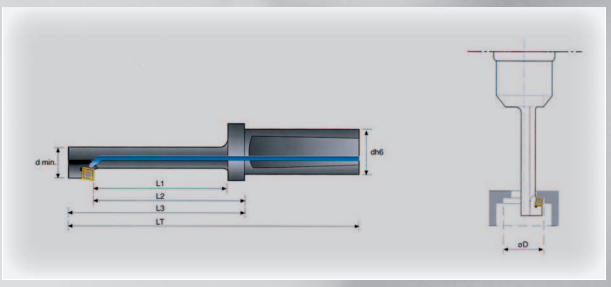
Frezy do fazowania od spodu 180° z chłodzeniem wew. pod płytki CPMT 0902, CCMT 0602 lub CCMT 09T3

Svasatori indietro a 180° con refrigerazione interna

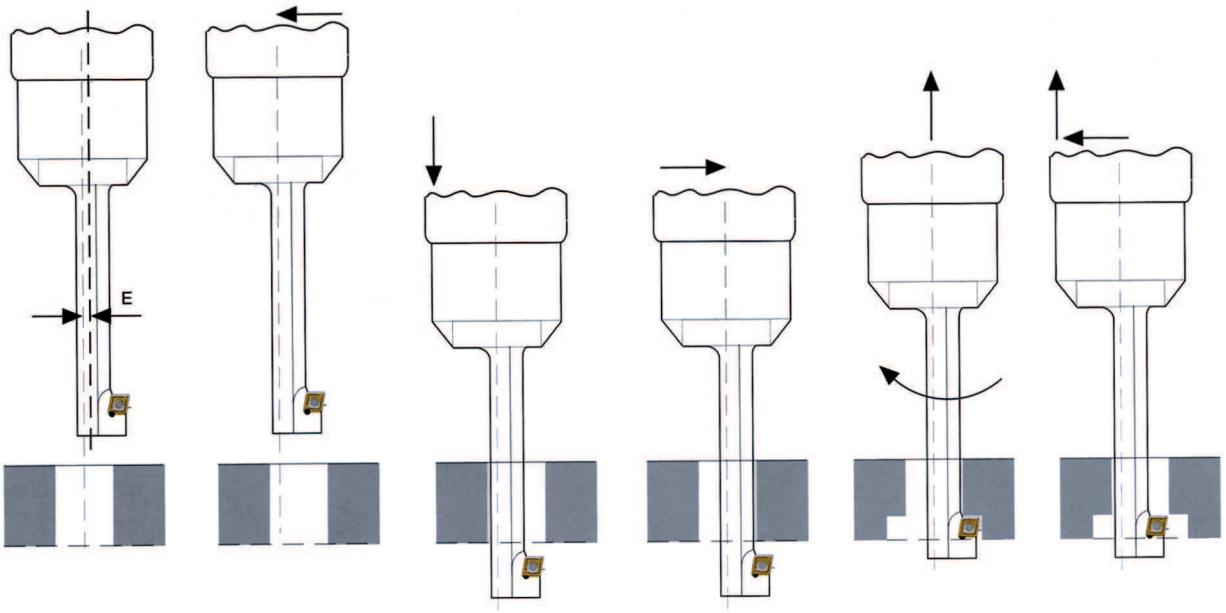
Avellanador hacia atrás de 180° con refrigeración interior

E.8630.0





Artikel-Nr. *Article-No.*								ohne WP *without inserts* E.8630.0 € Stück *piece*	Wendeplatten inserts
Ø D	d min	L1	L2	L3	LT	d h6	E		
15,00	8,5	35	42	55	105	20	3,50	**122,00**	**CPMT 0502**
18,00	10,5	40	47	62	112	20	4,00	**122,00**	
20,00	13,0	45	52	67	117	20	3,75	**128,00**	
24,00	15,0	50	57	72	122	20	4,75	**133,00**	**CCMT 060204**
26,00	17,0	60	67	82	132	20	5,00	**144,00**	
30,00	19,0	65	77	92	142	20	6,00	**161,00**	
33,00	21,0	75	82	102	152	20	6,50	**178,00**	**CCMT 09T304**



Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

CNC-5-fold tool

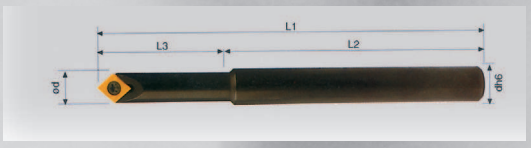
Fazowniki 5-funkcyjne do maszyn CNC pod płytki CGX 622/0932/1242

Utensili con placchette per 5 applicazioni

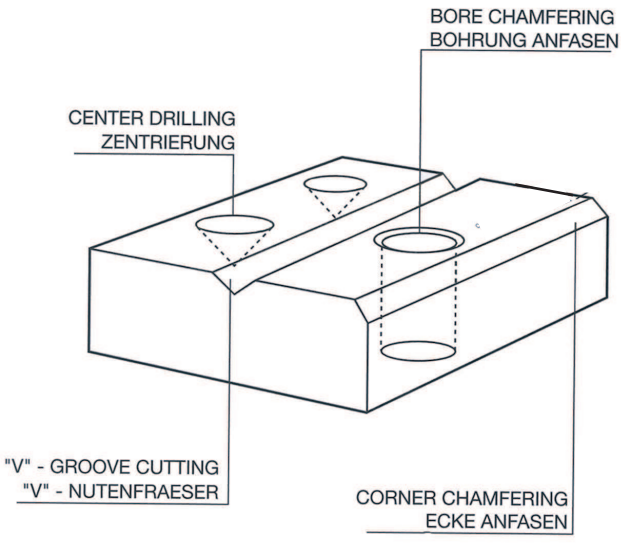
Herramienta con plaquitas para cinco aplicaciones CNC

E.8633.0





Artikel-Nr. *Article-No.*								ohne WP *without inserts* E.8633.0 € Stück *piece*	Wendeplatten *inserts*
D min	**D max**	**°**	**d**	**L3**	**L2**	**L1**	**d h6**		
0,6	7,6	90°	8,0	34	71	105	10	**84,00**	**CGX 0622**
0,6	7,6	90°	8,0	34	111	145	10	**111,00**	
0,6	8,5	118°	10,0	30	97	105	10	**94,00**	
0,6	8,5	118°	10,0	30	137	145	10	**117,00**	
0,6	12,0	90°	12,5	34	76	110	16	**117,00**	**CGX 0932**
0,6	12,0	90°	12,5	34	131	165	16	**150,00**	
0,6	14,0	118°	16,5	28	82	110	16	**128,00**	
0,6	14,0	118°	16,5	28	137	165	16	**156,00**	
0,7	16,0	90°	16,5	45	90	135	20	**140,00**	**CGX 1242**
0,7	16,0	90°	16,5	45	135	180	20	**172,00**	
0,7	20,0	118°	22,0	38	97	135	20	**156,00**	
0,7	20,0	118°	22,0	38	142	180	20	**184,00**	

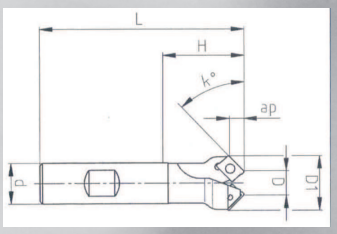


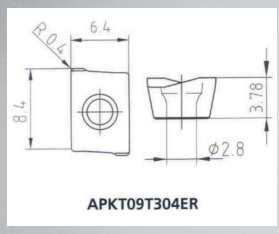
Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Fasfräser mit Zylinderschaft DIN 1835B

E.8678.0







Chamfering cutter with straight shank according to DIN 1835B

Frezy składane trzpieniowe z chłodzeniem wewnętrznym do obróbki kopiowej

Frese per smussare con gambo cilindrico DIN 1835B

Fresas de achaflanar con mango cilíndrico DIN 1835B

ohne WP
without insert

Artikel-Nr. *Article-No.*								E.8678.0 € Stück *piece*	Wendeplatte *insert*
Ø D	D1	d	ap	L	H	k°	Z		
6,00	17,7	12	5,9	75	30	45	1	245,00	APKT09T304ER
9,50	21,4	16	5,8	80	32	45	2	245,00	
9,80	24,4	16	4,1	80	32	30	2	245,00	
12,50	21,1	16	7,4	80	32	60	2	245,00	

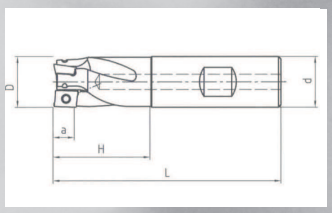
Wendeplatten *inserts*

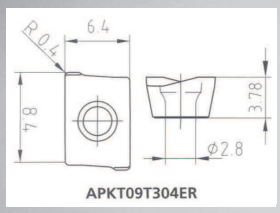
Artikel-Nr. *Article-No.* Ø	E.8678.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8678.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8678.4 InoxTi € / Stück *piece*	E.8678.5 1400 N/mm² € / Stück *piece*	E.8678.6 Guss *Cast* € / Stück *piece*
6,00 - 12,50	8,20	10,80	11,80	12,80	10,80

Schaftfräser mit Innenkühlung

E.8679.0







End mill with internal coolant

Frezy składane z chłodzeniem wewnętrznym

Frese con refrgerazione interna

Fresas de mango con refrigeración interior

ohne WP
without insert

Artikel-Nr. *Article-No.*						E.8679.0 € Stück *piece*	Wendeplatte *insert*
Ø D	d	a	L	H	Z		
15,50	16	8,4	80	28	2	229,00	APKT09T304ER
16,00	16	8,4	80	26	2	229,00	
17,50	20	8,4	85	33	2	229,00	
18,00	20	8,4	85	33	2	229,00	
19,50	20	8,4	90	38	3	285,00	
20,00	20	8,4	90	38	3	285,00	
20,00	20	8,4	125	73	2	277,00	
25,00	25	8,4	100	42	3	315,00	
32,00	32	8,4	100	38	4	325,00	

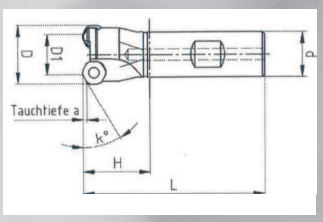
Wendeplatten *inserts*

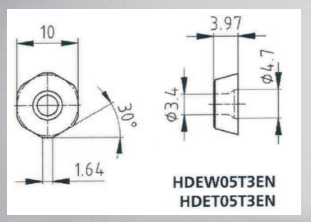
Artikel-Nr. *Article-No.* Ø	E.8679.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8679.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8679.4 InoxTi € / Stück *piece*	E.8679.5 1400 N/mm² € / Stück *piece*	E.8679.6 Guss *Cast* € / Stück *piece*
15,50 - 32,00	8,20	10,80	11,80	12,80	10,80

Kopierfräser mit Innenkühlung

E.8687.0







Copy end mill with internal coolant

Frezy składane z chłodzeniem wewnętrznym do kopiowania

Frese a copiare con refrigerazione interna

Fresas de copiado con refrigeración interior

ohne WP
without insert

Artikel-Nr. *Article-No.*							E.8687.0 € Stück *piece*	Wendeplatte *insert*
Ø D	D1	d	H	k°	Z	a		
18,00	26	20	30	30	2	3	**268,00**	**HDEW05T3EN HDET05T3EN**

Wendeplatten *inserts*

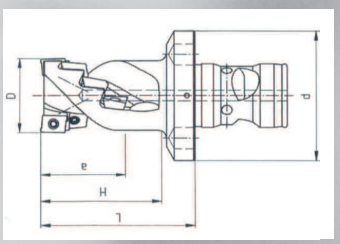
Artikel-Nr. *Article-No.* Ø	E.8687.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8687.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8687.4 InoxTi € / Stück *piece*	E.8687.5 1400 N/m² € / Stück *piece*	E.8687.6 Guss *Cast* € / Stück *piece*
18,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

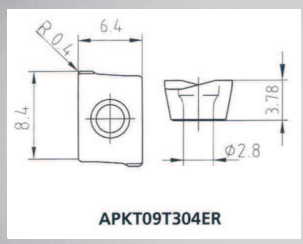
Walzenstirnfräser mit Innenkühlung

E.8688.0

Universal







Shell end mill with internal coolant

Frezy składane walcowo-czołowe z długą częścią skrawającą i z chłodzeniem wewnętrznym

Frese di sgrossatura con refrigerazione interna

Fresas de desbaste con refrigeración interior

ohne WP
without insert

Artikel-Nr. *Article-No.*						E.8688.0 € Stück *piece*	Wendeplatte *insert*
Ø D	d	L	H	a	Z		
25,00	49	52	39	23	6	**661,00**	**APKT09T304ER**
28,00	49	58	45	31	8	**745,00**	
32,00	49	58	45	31	12	**1.005,00**	
32,00	49	73	60	46	12	**1.005,00**	

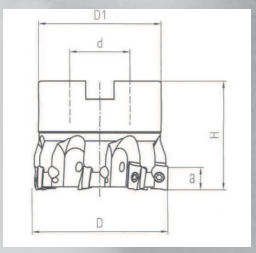
Wendeplatten *inserts*

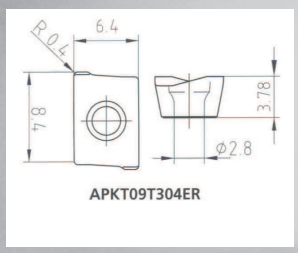
Artikel-Nr. *Article-No.* Ø	E.8688.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8688.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8688.4 InoxTi € / Stück *piece*	E.8688.5 1400 N/m² € / Stück *piece*	E.8688.6 Guss *Cast* € / Stück *piece*
25,00 - 32,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

Eckfräser mit Innenkühlung

E.8680.0







Shoulder milling cutter with internal coolant

Frezy składane nasadzane walcowo-czołowe z chłodzeniem wewnętrznym

Frese per periferiche con refrigerazione interna

Fresas de escuadrar con refrigeración interior

Artikel-Nr. *Article-No.*						ohne WP *without insert*	
Ø D	D1	d	H	a	Z	E.8680.0 € Stück *piece*	Wendeplatte *insert*
32,00	30	16	32	8,4	4	**370,00**	**APKT09T304ER**
32,00	30	16	32	8,4	5	**383,00**	
40,00	38	22	40	8,4	6	**421,00**	
50,00	45	22	40	8,4	7	**465,00**	
63,00	52	22	40	8,4	8	**556,00**	
80,00	64	27	50	8,4	10	**533,00**	

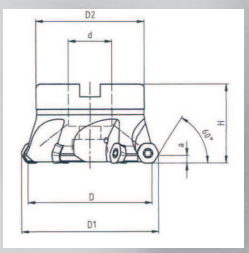
Wendeplatten *inserts*

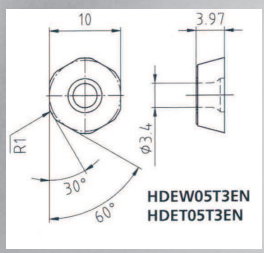
Artikel-Nr. *Article-No.* Ø	E.8680.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8680.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8680.4 InoxTi € / Stück *piece*	E.8680.5 1400 N/m² € / Stück *piece*	E.8680.6 Guss *Cast* € / Stück *piece*
32,00 - 80,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

Planfräser mit Innenkühlung

E.8681.0







Face milling cutter with internal coolant

Frezy składane nasadzane czołowe z chłodzeniem wew. do planowania

Frese per superfici con refrigerazione interna

Fresas de planear con refrigeración interior

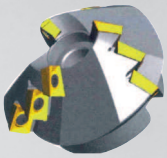
Artikel-Nr. *Article-No.*							ohne WP *without insert*	
Ø D	D1	D2	d	H	a	Z	E.8681.0 € Stück *piece*	Wendeplatte *insert*
40,00	47,0	36	16	32	3,9	4	**345,00**	**HDEW05T304EN HDET05T304EN**
50,00	57,0	45	22	40	3,9	5	**385,00**	
63,00	69,6	55	22	40	3,9	6	**475,00**	
80,00	87,0	70	27	50	3,9	7	**550,00**	

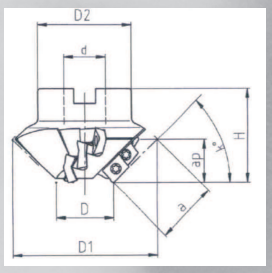
Wendeplatten *inserts*

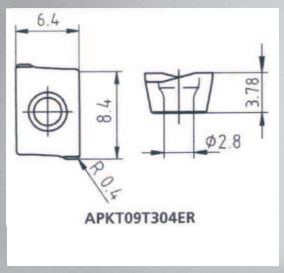
Artikel-Nr. *Article-No.* Ø	E.8681.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8681.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8681.4 InoxTi € / Stück *piece*	E.8681.5 1400 N/m² € / Stück *piece*	E.8681.6 Guss *Cast* € / Stück *piece*
40,00 - 80,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

Fasfräser volleffektiv DIN 8030

E.8685.0







Fully efficient chamfering cutter DIN 8030

Frezy składane nasadzane do ukoso-wania krawędzi

Frese per smussare superefficienti DIN 8030

Fresas de achaflanar supereficientes DIN 8030

ohne WP
without insert

Artikel-Nr. *Article-No.*									E.8685.0 € Stück *piece*	Wendeplatte insert
Ø D	D1	d	D2	H	k°	Z	ap	a		
17,00	48,8	16	36	36	15	3	4,2	16,4	**598,00**	**APKT09T304ER**
22,00	55,6	16	36	36	45	3	16,7	23,7	**690,00**	
22,00	49,8	16	36	36	30	3	8,0	16,1	**598,00**	
25,00	48,7	16	34	36	60	3	20,5	23,7	**690,00**	
26,00	38,4	16	32	36	75	3	22,0	23,0	**690,00**	

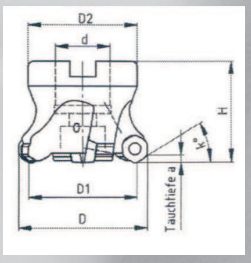
Wendeplatten *inserts*

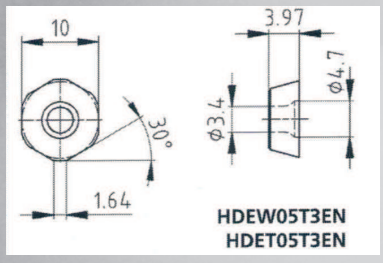
Artikel-Nr. *Article-No.* Ø	E.8685.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8685.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8685.4 InoxTi € / Stück *piece*	E.8685.5 1400 N/m² € / Stück *piece*	E.8685.6 Guss *Cast* € / Stück *piece*
17,00 - 26,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

Kopierfräser mit Innenkühlung

E.8686.0







Copy end mill with internal coolant

Frezy składane nasadzane z chłodze-niem wewnętrznym do kopiowania

Frese a copiare con refrigerazione interna

Fresas de copiado con refrigeración interior

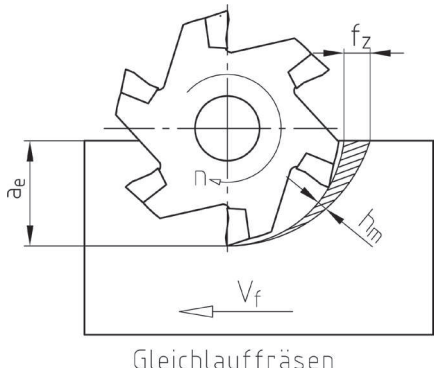
ohne WP
without insert

Artikel-Nr. *Article-No.*								E.8686.0 € Stück *piece*	Wendeplatte insert
Ø D	D1	d	D2	H	k°	Z	a		
40,00	31,7	16	34	35	30	3	3	**301,00**	**HDEW05T3EN HDET05T3EN**
42,00	33,7	16	34	35	30	3	3	**301,00**	
50,00	41,7	22	44	40	30	4	3	**338,00**	
52,00	43,7	22	44	40	30	4	3	**338,00**	
63,00	54,6	22	54	40	30	6	3	**489,00**	
66,00	57,6	22	54	40	30	6	3	**489,00**	
80,00	71,4	27	64	50	30	7	3	**561,00**	

Wendeplatten *inserts*

Artikel-Nr. *Article-No.* Ø	E.8686.2 blank - unleg. Stahl *uncoated - unalloyed steel* € / Stück *piece*	E.8686.3 Inox - Werkzeugstahl *Stainless steels - tool steel* € / Stück *piece*	E.8686.4 InoxTi € / Stück *piece*	E.8686.5 1400 N/m² € / Stück *piece*	E.8686.6 Guss *Cast* € / Stück *piece*
40,00 - 80,00	**8,20**	**10,80**	**11,80**	**12,80**	**10,80**

Berechnung Gleichlauf- (Umfangs-) Fräsen
Calculation for parallel (contour) milling



$$f_z = h_m \cdot \sqrt{D/a_e}$$

$$n = \frac{V_c \cdot 1000}{D \cdot \pi}$$

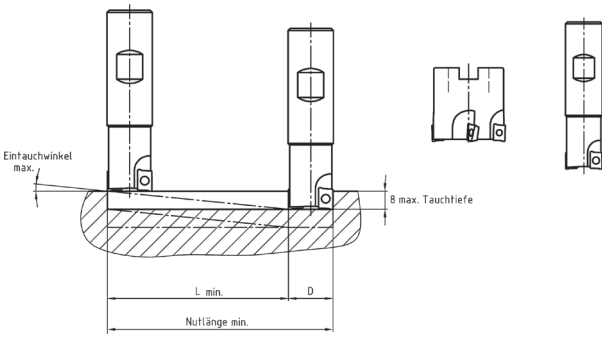
$$f_z = \frac{V_f}{Z \cdot n}$$

$$V_f = f_z \cdot Z \cdot n$$

h_m	mittlere Spanungsdicke [mm]
a_e	Schnitteingriff [mm]
n	Drehzahl [U/mm]
f_z	Vorschub pro Zahn [mm]
V_c	Schnittgeschwindigkeit [m/min]
V_f	Tischvorschub [mm/min]
Z	Anzahl der Schneiden

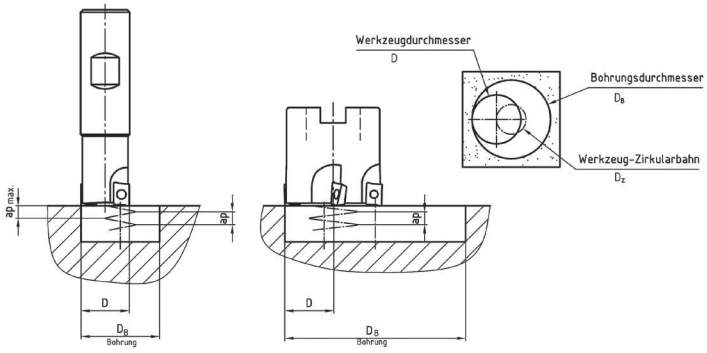
Tauchen mit Schaft- und Eckfräser für WP APKT09T304ER *Plunging with end mill and side milling cutter for indexable insert*

Einmalig schräges Eintauchen
One time diagonal plunging



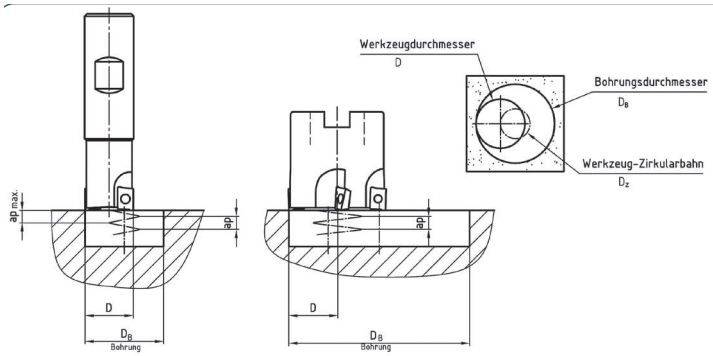
D	Eintauchwinkel	L
	max.	min.
16	6,5°	70
18	4°	114,5
20	3°	152,5
25	2°	229
28	1,8°	254,5
32	1,5°	305,5
40	1,2°	382

Mehrmalig schräges Eintauchen
Repeatedly diagonal plunging



D	$D_{Bohrung}$		Eintauchwinkel	Eintauchen pro Umdrehung
	min.	max.	α max.	mm/U
16	22	30	6,5°	2,1 – 5
18				
20	30	38	3°	1,6 – 2,8
25	39	48	2°	1,5 – 2,5
28				
32	53	62	1,5°	1,7 – 2,4
40	69	78	1,2°	1,9 – 2,5

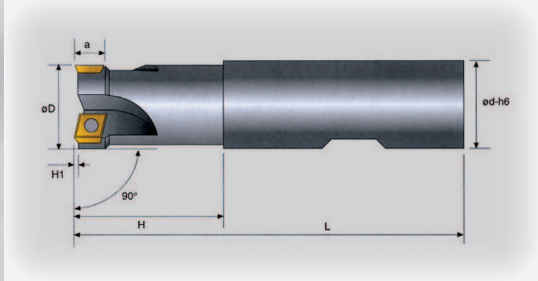
Zirkulares Eintauchen
Circular plunging



D	$D_{Bohrung}$		Eintauchwinkel	Eintauchen pro Umdrehung
	min.	max.	α max.	mm/U
16	22	30	6,5°	2,1 – 5
18				
20	30	38	3°	1,6 – 2,8
25	39	48	2°	1,5 – 2,5
28				
32	53	62	1,5°	1,7 – 2,4
40	69	78	1,2°	1,9 – 2,5

Fräser zur Konturbearbeitung 90° lang

E.8635.0



Cutter for machining contours 90° long

Frezy składane trzpieniowe długie do obróbki konturowej 90° pod płytki CCMT 0602 i CCMT 09T3

Frese per scontonare a 90°, serie lunga

Fresas de contornear de 90°, serie larga

Artikel-Nr. *Article-No.*							**ohne WP** *without inserts* **E.8635.0** € **Stück** *piece*	**Wendeplatten inserts**
Ø D	**H1**	**a**	**H**	**L**	**d h6**	**Zähne** *flutes*		
10,00	0,9	6	55	180	16	1	**67,00**	**CCMT 0602**
12,00	0,9	6	55	180	16	1	**72,00**	
16,00	0,9	6	35	180	16	2	**100,00**	
20,00	0,9	6	35	180	20	3	**133,00**	
25,00	1,5	9	35	180	25	2	**156,00**	**CCMT 09T3**
32,00	1,5	9	35	180	25	3	**178,00**	

Winkelfräser im Set



Set of insert angle milling cutters

Zestaw frezów składanych nastawnych do fazowania w zakresie od 10° do 80° pod płytki TCMT 1102/TCMT 16T3

Set di frese ad angolo per inserti

Juego de fresas angulares

Set.8600
(ohne WP *without inserts*)

Fasenfräser winkelverstellbar von 10° bis 80°
Milling cutter for chamfering-flaring 10° to 80°

445,00 €

Ø 5-34 mm x 100 mm, Schaft *shank 20 mm*
Ø 5-27 mm x 100 mm, Schaft *shank 16 mm*

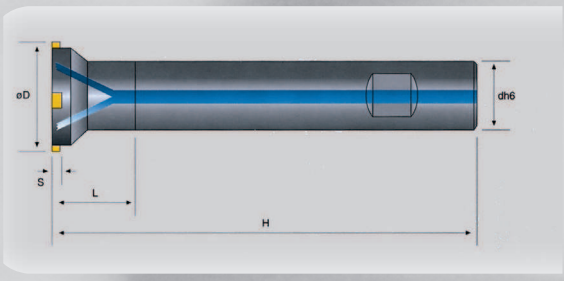
Wendeplatten: TCMT 1102/ TCMT 16T3
inserts: TCMT 1102 / TCMT 16T3

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Nutenfräser (Seegerringe) mit IK

E.8638.0





Milling cutter for seeger grooving with internal coolant

Frezy składane trzpieniowe z chłodz. wew. do frezowania rowków pod pierścienie Seegera

Frese simile Seeeger con refrigerazione interna

Fresas de ranurar (anillos Seeger) con refrigeración interior

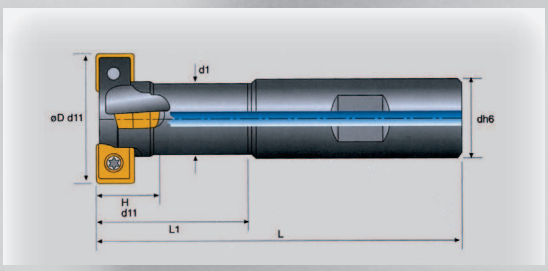
ohne WP
without inserts

Artikel-Nr. *Article-No.*						E.8638.0 € Stück *piece*	Wendeplatten inserts
Ø D	**S**	**L**	**H**	**d h6**	**Zähne** *flutes*		
19,00	1,1 / 1,3	20	100	16	1	**133,00**	**E.8638W**
34,00	1,6 / 1,85 / 2,15	25	125	20	3	**220,00**	

T-Nuten-Fräser mit Innenkühlung

E.8639.0





T-Slot milling cutter with internal coolant

Frezy składane trzpieniowe z chłodz. wew. do frezowania rowków teowych

Frese a T con refrigerazione interna

Fresas de ranurar en T con refrigeración interior

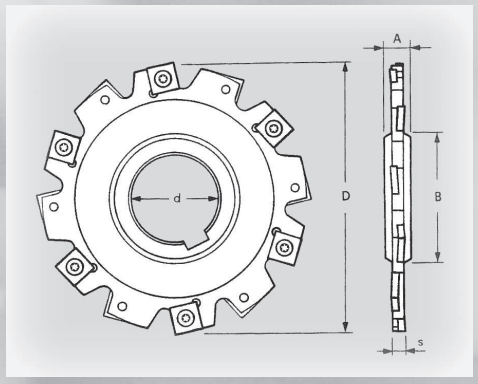
ohne WP
without inserts

Artikel-Nr. *Article-No.*							E.8639.0 € Stück *piece*	Wendeplatten inserts
Ø D	**H**	**L1**	**L**	**d1**	**d h6**	**Zähne** *flutes*		
21,00	9	25	76	11	16	2	**150,00**	**SPMT 060304**
25,00	11	31	82	13	16	4	**184,00**	
30,00	11	25	82	13	16	4	**206,00**	**SPMT 09T308**
32,00	14	36	88	17	20	4	**228,00**	
40,00	17	50	108	21	25	4	**290,00**	
50,00	22	56	120	27	32	4	**340,00**	**SPMT 120408**

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

E.8643.0





Side and face cutter

Frezy tarczowe na płytki wymienne

Frese a disco

Fresas de disco

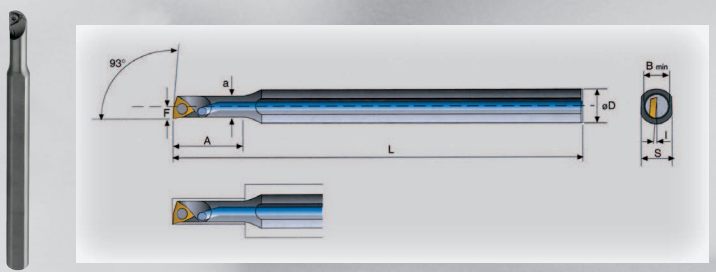
Artikel-Nr. Article-No.						E.8643.0 € Stück *piece* ohne WP *without inserts*	Wendeplatten inserts
Ø D	ST-B	B	d	ae	Z		
80,00	1,6	1,2	16	22	4		**FMRC-1,6..**
80,00	2,2	1,8	16	22	4		**FMRC-2,2..**
80,00	3,0	2,4	16	22	4		**FMRC-3,0..**
80,00	4,0	3,0	16	22	4		**FMRC-4,0..**
80,00	5,0	4,4	16	22	4		**FMRC-5,0..**
80,00	6,0	4,4	16	22	4		**FMRC-6,0..**
100,00	1,6	1,2	22	28	8		**FMRC-1,6..**
100,00	2,2	1,8	22	28	8		**FMRC-2,2..**
100,00	3,0	2,4	22	28	8		**FMRC-3,0..**
100,00	4,0	3,0	22	28	8		**FMRC-4,0..**
100,00	5,0	4,4	22	28	8		**FMRC-5,0..**
100,00	6,0	4,4	22	28	8	**Auf Anfrage**	**FMRC-6,0..**
125,00	1,6	1,2	22	40	10		**FMRC-1,6..**
125,00	2,2	1,8	22	40	10	*on demand*	**FMRC-2,2..**
125,00	3,0	2,4	22	40	10		**FMRC-3,0..**
125,00	4,0	3,0	22	40	10		**FMRC-4,0..**
125,00	5,0	4,4	22	40	10		**FMRC-5,0..**
125,00	6,0	4,4	22	40	10		**FMRC-6,0..**
160,00	3,0	2,4	32	49	15		**FMRC-3,0..**
160,00	4,0	3,0	32	49	15		**FMRC-4,0..**
160,00	5,0	4,4	32	49	15		**FMRC-5,0..**
160,00	6,0	4,4	32	49	15		**FMRC-6,0..**
200,00	3,0	2,4	40	63	20		**FMRC-3,0..**
200,00	4,0	3,0	40	63	20		**FMRC-4,0..**
200,00	5,0	4,4	40	63	20		**FMRC-5,0..**
200,00	6,0	4,4	40	63	20		**FMRC-6,0..**
250,00	3,0	2,4	40	88	24		**FMRC-3,0..**
250,00	4,0	3,0	40	88	24		**FMRC-4,0..**
250,00	5,0	4,4	40	88	24		**FMRC-5,0..**
250,00	6,0	4,4	40	88	24		**FMRC-6,0..**

Passende Wendeplatten für Stahl, Inox, Guss und NE-Metalle auf Anfrage
Suitable inserts for steels, stainless steels, cast iron and non-ferrous metals on demand

Verpackungseinheit für Wendeplatten: 10 Stück
Unit package for inserts: 10 pieces

Stahl-Mini-Bohrstangen mit Innenkühlung

E.8665.0



Steel mini boring bars with internal coolant

Stalowe wytaczaki miniaturowe z chł-odz. wew. do toczenia wew. pod płytki WCMT 02

Mini barre in acciaio con refrigerazione interna

Mini barras de mandrinar de acero con refrigeración interior

ohne WP
without inserts

Artikel-Nr. *Article-No.*								E.8665.0 € Stück *piece*	Wendeplatten inserts
Ø D	**F**	**l**	**S**	**B**	**A**	**a**	**L**		
8,00	2,9	17°	7	5,8	18	5	100	**63,00**	**WCMT 02**
8,00	3,9	12°	7	8,0	24	6	100	**63,00**	
			links *left hand*					**E.8665.0LH**	
8,00	2,9	17°	7	5,8	18	5	100	**63,00**	**WCMT 02**
8,00	3,9	12°	7	8,0	24	6	100	**63,00**	

Stahl-Mini-Bohrstangen im Set



Set of steel mini boring bars

Zestaw stalowych wytaczaków miniaturowych

Set di mini barre in acciaio

Juego de mini barras de mandrinar de acero con refrigeración interior

Set.8665
(ohne WP *without inserts*)

Bohrstangen (rechts) mit und ohne Innenkühlung
Boring bars (right hand) with or without internal coolant

Ø 5,8 mm x 100 mm, Schaft *shank 8 mm*
Ø 8,0 mm x 100 mm, Schaft *shank 8 mm*
Ø 5,8 mm x 100 mm, Schaft *shank 8 mm*
Ø 8,0 mm x 100 mm, Schaft *shank 8 mm*

240,00 €

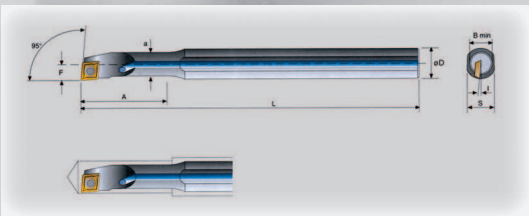
passende Wendeplatten: WCGT 020102 ...
suitable inserts: WCGT 020102 ...

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Stahl-Mini-Bohrstangen mit Innenkühlung

E.8663.0





Steel mini boring bars with internal coolant

Stalowe wytaczaki miniaturowe z chłodzeniem wew. pod płytki CCMT 0602

Mini barre in acciaio con refrigerazione interna

Juego de mini barras de mandrinar de acero con refrigeración interior

Artikel-Nr. *Article-No.*								ohne WP *without inserts* E.8663.0 € Stück *piece*	Wendeplatten inserts
Ø D	F	I	S	B	A	a	L		
8,00	4	18°	7	8	25	6	100	58,00	CCMT 0602
10,00	6	15°	9	12	32	8	110	60,00	
12,00	7	13°	11	14	38	10	125	62,00	
16,00	9	10°	15	18	50	12	150	67,00	
links *left hand*								E.8663.0LH	
8,00	4	18°	7	8	25	6	100	58,00	CCMT 0602
10,00	6	15°	9	12	32	8	110	60,00	
12,00	7	13°	11	14	38	10	125	62,00	
16,00	9	10°	15	18	50	12	150	67,00	

Stahl-Mini-Bohrstangen mit Innenkühlung im Set



Set of steel mini boring bars with internal coolant

Zestaw stalowych wytaczaków miniaturowych z chłodzeniem wewnętrznym

Set di mini barre in acciaio con refrigerazione interna

Juego de mini barras de mandrinar de acero con refrigeración interior

Set.8663

(ohne WP *without inserts*)

Stahl-Bohrstangen (rechts) mit Innenkühlung
Steel boring bars (right hand) with internal coolant

Ø 8 mm x 100 mm, Schaft *shank 8 mm*
Ø 12 mm x 110 mm, Schaft *shank 10 mm*
Ø 14 mm x 125 mm, Schaft *shank 12 mm*
Ø 18 mm x 150 mm, Schaft *shank 16 mm*

235,00 €

passende Wendeplatten: CCMT 0602 ...
suitable inserts: CCMT 0602 ...

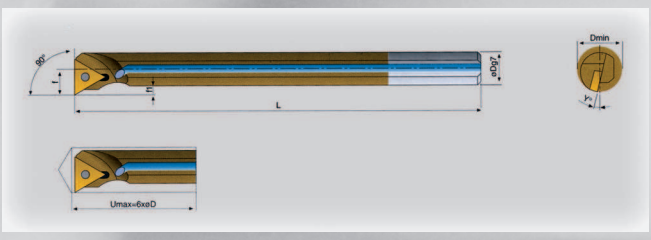
Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Schwermetall-Bohrstangen schwingungsdämpfend mit IK

E.8656.0

Zum Feinschlichten
For fine finishing





Densimet boring bars vibration damping with internal coolant

Wzmocniona oprawka do toczenia wew. z tłumikiem drgań i chłodzeniem wewnętrznym

Barre per superfiniture di metalli pesanti con refrigerazione interna

Barras de mandrinar de acero pesado antivibratorios con refrigeración interior

ohne WP
without inserts

Artikel-Nr. *Article-No.*						E.8656.0 € Stück *piece*	Wendeplatten inserts
f	Ø Dmin	Y°	f1	L	Ø D g7		
4,50	9	15	0,5	100	8	**156,00**	**TCMT 0802**
5,50	11	13	0,5	125	10	**195,00**	**TCMT 1102**
6,50	13	10	0,5	150	12	**234,00**	
8,50	17	7	0,5	200	16	**345,00**	
10,50	21	7	0,5	220	20	**535,00**	**TCMT 16T3**
		links *left hand*				**E.8656.0LH**	
4,50	9	15	0,5	100	8	**156,00**	**TCMT 0802**
5,50	11	13	0,5	125	10	**195,00**	**TCMT 1102**
6,50	13	10	0,5	150	12	**234,00**	
8,50	17	7	0,5	200	16	**345,00**	
10,50	21	7	0,5	220	20	**535,00**	**TCMT 16T3**

Hartmetall-Bohrstangen mit Innenkühlung

E.8657.0





Carbide boring bars with internal coolant

Wytaczaki miniaturowe z węg. spiekanego z chłodz wew. pod płytki DCMT 0702 i DCMT 11T3

Barre in MD con refrigerazione interna

Barras de mandrinar de metal duro con refrigeración interior

ohne WP
without inserts

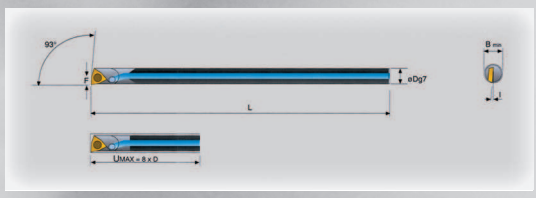
Artikel-Nr. *Article-No.*								E.8657.0 € Stück *piece*	Wendeplatten inserts
Ø Dmin	Y°	h1	f	f1	L1	h	Ø D g7		
14,00	13	4,5	7	2	150	9,5	10	**223,00**	**DCMT 0702**
18,00	10	5,5	9	3	180	11,5	12	**267,00**	
22,00	7	7,0	11	3	200	15,5	16	**400,00**	
26,00	7	9,0	13	3	250	19,5	20	**635,00**	**DCMT 11T3**
			links *left hand*					**E.8657.0LH**	
14,00	13	4,5	7	2	150	9,5	10	**223,00**	**DCMT 0702**
18,00	10	5,5	9	3	180	11,5	12	**267,00**	
22,00	7	7,0	11	3	200	15,5	16	**400,00**	
26,00	7	9,0	13	3	250	19,5	20	**635,00**	**DCMT 11T3**

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Hartmetall-Mini-Bohrstangen mit Innenkühlung

E.8677.0





Carbide mini boring bars with internal coolant

Wytaczaki miniaturowe z węg. spiekanego z chłodzeniem wew. pod płytki WCMT 02

Mini barre in MD con refrigerazione interna

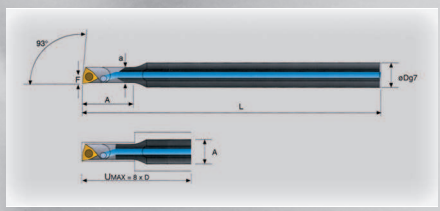
Mini barras de mandrinar de metal duro con refrigeración interior

Artikel-Nr. *Article-No.*					ohne WP *without inserts* E.8677.0 € Stück *piece*	Wendeplatten inserts
Ø Bmin	l	F	L	Ø D g7		
6,20	17°	3,1	115	6	161,00	WCMT 02
		links *left hand*			E.8677.0LH	
6,20	17°	3,1	115	6	161,00	WCMT 02

Hartmetall-Mini-Bohrstangen mit Innenkühlung

E.8661.0





Carbide mini boring bars with internal coolant

Wytaczaki miniaturowe z węg. spiekanego z chłodzeniem wew. pod płytki WCMT 02, str. 8.26/8.27

Mini barre in MD con refrigerazione interna

Juego de barras de mandrinar con refrigeración interior

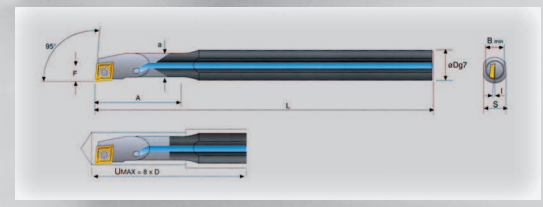
Artikel-Nr. *Article-No.*								ohne WP *without inserts* E.8661.0 € Stück *piece*	Wendeplatten inserts
Ø Bmin	l	S	F	a	A	L	Ø D g7		
5,80	17°	7	2,9	5	18	100	8	63,00	WCMT 02
8,00	12°	7	3,9	6	24	100	8	63,00	
			links *left hand*					E.8661.0LH	
5,80	17°	7	2,9	5	18	100	8	63,00	WCMT 02
8,00	12°	7	3,9	6	24	100	8	63,00	

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Hartmetall-Mini-Bohrstangen mit Innenkühlung

E.8666.0





Carbide mini boring bars with internal coolant

Wytaczaki miniaturowe z węg. spiekanego z chłodzeniem wew. pod płytki CCMT 0602

Mini barre in MD con refrigerazione interna

Mini barras de mandrinar de metal duro con refrigeración interior

ohne WP *without inserts*

Artikel-Nr. *Article-No.*								E.8666.0 € Stück *piece*	Wendeplatten inserts
Ø Bmin	l	S	F	a	A	L	Ø D g7		
8,20	18°	7	4,10	6	25	100	8	**58,00**	**CCMT 0602**
12,00	15°	9	6,00	8	32	110	10	**60,00**	
14,00	13°	11	7,00	10	38	125	12	**62,00**	
18,00	10°	15	9,00	12	50	150	16	**67,00**	
			links *left hand*					**E.8666.0LH**	
8,20	18°	7	4,10	6	25	100	8	**58,00**	**CCMT 0602**
12,00	15°	9	6,00	8	32	110	10	**60,00**	
14,00	13°	11	7,00	10	38	125	12	**62,00**	
18,00	10°	15	9,00	12	50	150	16	**67,00**	

Hartmetall-Bohrstangen mit Innenkühlung

E.8658.0





Carbide boring bars with internal coolant

Wytaczaki z węglika spiekanego z chłodzeniem wew. pod płyki CCMT 0602 i CCMT 09T3

Barre in MD con refrigerazione interna

Mini barras de mandrinar de metal duro con refrigeración interior

ohne WP *without inserts*

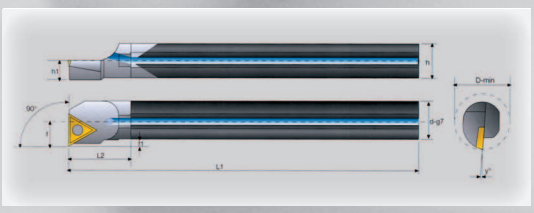
Artikel-Nr. *Article-No.*								E.8658.0 € Stück *piece*	Wendeplatten inserts
Ø Dmin	Y°	h1	f	f1	L1	h	Ø D g7		
10,00	15	3,5	5	1	125	7,5	8	**189,00**	**CCMT 0602**
12,00	13	4,5	6	1	150	9,5	10	**223,00**	
16,00	10	5,5	8	2	180	11,5	12	**267,00**	
20,00	7	7,0	10	2	200	15,5	16	**400,00**	**CCMT 09T3**
24,00	7	9,0	12	2	250	19,5	20	**635,00**	
			links *left hand*					**E.8658.0LH**	
10,00	15	3,5	5	1	125	7,5	8	**189,00**	**CCMT 0602**
12,00	13	4,5	6	1	150	9,5	10	**223,00**	
16,00	10	5,5	8	2	180	11,5	12	**267,00**	
20,00	7	7,0	10	2	200	15,5	16	**400,00**	**CCMT 09T3**
24,00	7	9,0	12	2	250	19,5	20	**634,00**	

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Hartmetall-Bohrstangen mit Innenkühlung

E.8659.0





Carbide boring bars with internal coolant

Wytaczaki z węg. spiekanego z chłodzeniem wew. pod płytki TCMT 1102 i TCMT 16T3

Barre in MD con refrigerazione interna

Mini barras de mandrinar de metal duro con refrigeración interior

ohne WP
without inserts

Artikel-Nr. *Article-No.*								E.8659.0 € Stück *piece*	Wendeplatten inserts
Ø Dmin	Y°	h1	f	f1	L1	h	Ø D g7		
12,00	13	4,5	6	1	150	9,5	10	**223,00**	**TCMT 1102**
16,00	10	5,5	8	1	180	11,5	12	**267,00**	
20,00	7	7,0	10	2	200	15,5	16	**400,00**	
24,00	7	9,0	12	2	250	19,5	20	**635,00**	**TCMT 16T3**

Bohrstangen mit Innenkühlung im Set



Set of boring bars with internal coolant

Zestaw wytaczaków z chłodzeniem wewnętrznym pod płytki TCMT 1102 i TCMT 16T3

Set di barre con refrigerazione interna

Juegos de barras de mandrinar con refrigeración interior

Set.8677
(mit WP *with inserts*)

Bohrstangen mit Innenkühlung (rechts) und HM-Schaft
Boring bars with internal coolant (right hand) and carbide shank

Ø 6,2 mm x 115 mm, Schaft *shank 6 mm*
10 Stück Wendeplatten *10 pieces inserts*

passende Wendeplatten: WCMT 020102 ... **270,00 €**
suitable inserts: WCMT 020102 ...

Die passenden Standard- und Sonderwendeplatten finden Sie auf den Seiten 8.26 und 8.27
The suitable standard and special inserts you will find on pages 8.26 and 8.27

Stahl-Bohrstangen mit Innenkühlung im Set



Set of steel boring bars with internal coolant

Zestaw stalowych wytaczaków z chłodzeniem wewnętrznym pod płytki WCMT 020102

Set di barre in acciaio con refrigerazione interna

Juegos de barras de mandrinar de acero con refrigeración interior

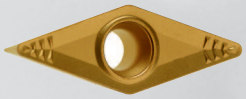
Set.8664
(mit WP *with inserts*)

Stahl-Bohrstangen (rechts) mit Innenkühlung
Steel boring bars (right hand) with internal coolant

Ø 5,8 mm x 100 mm, Schaft *shank 8 mm*
Ø 8,0 mm x 100 mm, Schaft *shank 8 mm*
10 Stück Wendeplatten *10 pieces inserts* **190,00 €**

passende Wendeplatten: WCMT 020102 ...
suitable inserts: WCMT 020102 ...

VHM-Standard-Wendeplatten



Solid carbide stadard inserts

Standardowe płytki wymienne z węglika spiekanego

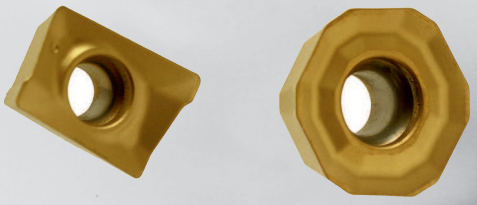
Placcette intercambiabili in MD, standard

Plaquitas intercambiables de metal duro standard

Artikel-Nr. *Article-No.*	**für Stahl** *for steel* € **Stück** *piece*	**für Inox** *for stainless steels* € **Stück** *piece*	**für Guss** *for cast iron* € **Stück** *piece*	**für NE-Metalle** *for non-ferrous m.* € **Stück** *piece*
CCMT/CCGT 0602				
CCMT/CCGT 09T304				
TCMT/TCGT 1102				
TCMT/TCGT 16T3				
SCMT 0602				
SCMT/SCGT 09T3				
TCMT 0802		Auf Anfrage		
TCMT 1102				
CPMT 0502		*on demand*		
APKT 1003				
SEHT 1204				
SEKN 1203				
WCMT/WCGT 02				
DCMT/DCGT 0702				
DCMT/DCGT 11T3				
VCMT/VCGT 1103				
VCMT/VCGT 1604				

Bei Bestellung muß der Radius immer mit angegeben werden
In case of order please always state the size of the radius

Verpackungseinheit für Wendeplatten: 10 Stück *Unit package for inserts: 10 pieces*



Solid carbide special inserts

Specjalne płytki wymienne z węglika spiekanego

Placchetre intercambiabili in MD, speciali

Plaquitas intercambiables de metal duro, especiales

Artikel-Nr. *Article-No.*	**Wendeplatte** *inserts*	**Qualität** *quality*	€ **Stück** *piece*
E.8633.0	CGX 0622	M20TIN	
	CGX 0932	M20TIN	
	CGX 1242	M20TIN	
	CGX 0622	HT10	
	CGX 0932	HT10	
	CGX 1242	HT10	
E.8660	CCMX 060204	T25	
E.8637	XDCW 1503FR10 R=1,0	M20TIN	
	XDCW 1503FR15 R=1,5	M20TIN	
	XDCW 1503FR20 R=2,0	M20TIN	
	XDCW 1503FR25 R=2,5	M20TIN	
	XDCW 1503FR30 R=3,0	M20TIN	
	XDCW 1503FR35 R=3,5	M20TIN	
	XDCW 1503FR40 R=4,0	M20TIN	
	XPCW2004FR45 R=4,5	M20TIN	
	XPCW2004FR50 R=5,0	M20TIN	
	XPCW2004FR55 R=5,5	M20TIN	**Auf Anfrage**
	XPCW2004FR60 R=6,0	M20TIN	
	XPCW2004FR65 R=6,5	M20TIN	*on demand*
	XPCW2004FR70 R=7,0	M20TIN	
E.8636	XDCW1503MR10 R=1,0	M20TIN	
	XDCW1503MR15 R=1,5	M20TIN	
	XDCW1503MR20 R=2,0	M20TIN	
	XDCW1503MR25 R=2,5	M20TIN	
	XDCW1503MR30 R=3,0	M20TIN	
	XDCW1503MR35 R=3,5	M20TIN	
	XDCW1503MR40 R=4,0	M20TIN	
	XPCW2004MR45 R=4,5	M20TIN	
	XPCW2004MR50 R=5,0	M20TIN	
	XPCW2004MR55 R=5,5	M20TIN	
	XPCW2004MR60 R=6,0	M20TIN	
	XPCW2004MR65 R=6,5	M20TIN	
	XPCW2004MR70 R=7,0	M20TIN	
E.8638	154.15 - 16.110	M20TIN	
	154.15 - 16.130	M20TIN	
	154.15 - 16.160	M20TIN	
	154.15 - 16.185	M20TIN	
	154.15 - 16.215	M20TIN	
	154.15 - 16.265	M20TIN	
	154.15 - 16.315	M20TIN	
	154.15 - 16.415	M20TIN	
E.8639	SPMT 060304	M20TIN	
	SPMT 09T308	M20TIN	
	SPMT 120408	M20TIN	

Verpackungseinheit für Wendeplatten: 10 Stück *Unit package for inserts: 10 pieces*

Einstellbare Feinbohrstangen kurz

E.8689.0



Adjustable precision drillbars short

Wytaczak precyzyjny nastawny

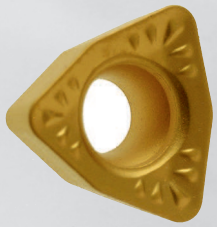
Barre di precisione regolabili, serie corta

Barras de mandrinar de precisión ajustables, serie corta

ohne WP
without insert

Artikel-Nr. *Article-No.*				E.8689.0 € Stück *piece*	Wendeplatte *insert*
d1	l2	l1	d2 h9		
6,00 - 7,00	20	85	8,0	**210,00**	**WCMT 0201**
7,00 - 8,00	25	90	8,0	**210,00**	**TPGX 0601..L**
8,00 - 10,00	25	90	8,0	**210,00**	
10,00 - 12,00	30	100	10,0	**210,00**	**TPGX 0802..L**
12,00 - 15,00	30	105	12,0	**225,00**	
15,00 - 20,00	50	110	16,0	**240,00**	
20,00 - 25,00	60	120	20,0	**244,00**	**TCMT 1102**
25,00 - 30,00	70	140	25,0	**258,00**	**TCMT 16T3**
30,00 - 35,00	90	160	25,0	**272,00**	
35,00 - 40,00	100	170	32,0	**310,00**	
40,00 - 45,00	120	190	32,0	**340,00**	
45,00 - 50,00	150	220	40,0	**345,00**	

VHM-Wendeplatten



Solid carabide inserts

Płytki wymienne z węglka spiekanego

Placchette intercambiabili in MD

Plaquitas intercambiables de metal duro

Artikel-Nr. *Article-No.*	für Stahl *for steel* € Stück *piece*	für Inox *for stainless steels* € Stück *piece*	für Guss *for cast iron* € Stück *piece*	für NE-Metalle *for non-ferrous m.* € Stück *piece*
WCMT 0201				
TPGX 0601..L		Auf Anfrage		
TPGX 0802..L				
TCMT 1102		*on demand*		
TCMT 16T3				

Verpackungseinheit für Wendeplatten: 10 Stück *Unit package for inserts: 10 pieces*

Einschneiden-Reibahlen mit 2 Führungsleisten

E.8671.0



One flute cutting reamer with two carbide guide pads

Rozwiertaki składane 1-ostrzowe z dwoma wkładkami prowadzącymi z węglika spiekanego

Alesatori monotaglienti con doppia guida

Escariadores de un labio con doble guía

Artikel-Nr. *Article-No.*				ohne WP *without insert*	
d1	l2	l1	d2 h9	**E.8671.0** € Stück *piece*	**Wendeplatte** *Insert* € Stück *piece*
10,00	108	140	10,0	**365,00**	2° / 7° / 15° TIN
11,00	109	145	10,0	**355,00**	
12,00	115	155	10,0	**342,00**	
13,00	115	160	11,0	**365,00**	

Einschneiden-Reibahlen mit 3 Führungsleisten

E.8672.0



One flute cutting reamer with three carbide guide pads

Rozwiertaki składane 1-ostrzowe z trzema wkładkami prowadzącymi z węglika spiekanego

Alesatori monotaglienti con tripla guida

Escariadores de un labio con triple guía

Artikel-Nr. *Article-No.*				ohne WP *without insert*	
d1	l2	l1	d2 h9	**E.8672.0** € Stück *piece*	**Wendeplatte** *insert* € Stück *piece*
10,00	75	120	16,0	**602,00**	2° / 7° / 15° TIN
11,00	75	120	16,0	**585,00**	
12,00	75	120	16,0	**585,00**	
13,00	75	120	16,0	**585,00**	
14,00	75	120	16,0	**606,00**	2° / 7° / 15° TIN
15,00	75	130	20,0	**624,00**	
16,00	75	130	20,0	**658,00**	
17,00	75	130	20,0	**677,00**	
18,00	75	130	20,0	**720,00**	
19,00	75	130	20,0	**745,00**	
20,00	95	150	20,0	**765,00**	
21,00	95	150	20,0	**787,00**	
22,00	95	150	20,0	**806,00**	
23,00	95	150	20,0	**821,00**	
24,00	95	150	20,0	**835,00**	
25,00	95	150	20,0	**850,00**	
26,00	95	150	20,0	**867,00**	
27,00	95	160	25,0	**890,00**	
28,00	95	160	25,0	**940,00**	
29,00	95	160	25,0	**950,00**	
30,00	95	160	25,0	**980,00**	
31,00	95	160	25,0	**1.015,00**	
32,00	95	160	25,0	**1.065,00**	

E.8673.0



Two flute cutting reamer with two carbide guide pads

Rozwiertaki składane nastawne 2-ostrzowe z dwoma wkładkami prowadzącymi z węglika spiekanego

Alesatori Z=2 con doppia guida

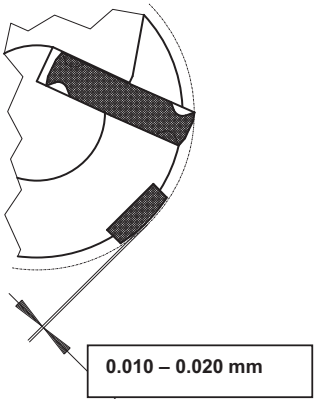
Escariadores de dos labios con doble guía

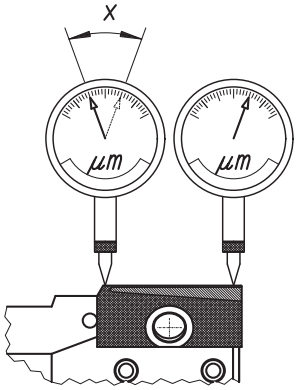
ohne WP
without insert

Artikel-Nr. *Article-No.*				E.8673.0 € Stück *piece*	Wendeplatte *Insert* € Stück *piece*
d1	l2	l1	d2 h9		
9,80 - 10,50	32	92	12,0	**588,00**	2° / 7° / 15° TIN
10,50 - 11,20	34	94	12,0	**588,00**	
11,20 - 11,90	36	96	12,0	**588,00**	
11,90 - 12,60	38	98	12,0	**600,00**	
12,60 - 13,30	40	100	14,0	**612,00**	
13,30 - 14,00	43	103	14,0	**638,00**	2° / 7° / 15° TIN
14,00 - 15,00	46	106	16,0	**650,00**	
15,00 - 16,00	49	109	16,0	**662,00**	
16,00 - 17,00	52	112	16,0	**701,00**	
17,00 - 18,00	55	115	18,0	**740,00**	
18,00 - 19,00	58	118	18,0	**753,00**	
19,00 - 20,00	61	121	20,0	**766,00**	
20,00 - 21,00	64	124	20,0	**777,00**	
21,00 - 22,00	67	127	25,0	**791,00**	
22,00 - 23,00	70	130	25,0	**804,00**	
23,00 - 24,00	73	133	25,0	**816,00**	
24,00 - 25,00	76	136	25,0	**830,00**	
25,00 - 26,00	79	139	25,0	**858,00**	
26,00 - 27,00	82	142	25,0	**902,00**	
27,00 - 28,00	85	145	25,0	**912,00**	
28,00 - 29,00	88	148	25,0	**935,00**	
29,00 - 30,00	91	151	25,0	**970,00**	
30,00 - 31,00	94	154	25,0	**1.010,00**	
31,00 - 32,00	97	157	25,0	**1.060,00**	

Handhabung und Einstellung *Handling and adjustment*

1. Lösen der 2 (twinpoint = 4) Justierschrauben mit 1 Umdrehung. *Loosen the 2 (twinpoint = 4) adjusting screws by 1 turn.*
2. Lösen der WSP-Spannschraube(n). *Loosen the clamping screw(s) of insert(s).*
3. WSP und Spannschraube(n) herausnehmen, Wendeplattensitz gut reinigen.
   Keep away the insert(s) and screw(s), clean the pocket and blade seat thoroughly.
4. Gewindete oder neue WSP in den Sitz einlegen, Spannschraube(n) locker anziehen.
   Index or replace the insert(s), tighten the clamping screw(s) softly.
5. WSP kräftig radial nach innen drücken, Spannschraube(n) anziehen.
   Push the insert(s) firmly radial into the blade seat. Tighten the clamping screw(s) well.
6. Reibahlendurchmesser mit Hilfe eines Einstellgeräts einstellen. Nullen der Messuhren an der schneidennahen Führungsleiste, (twinpoint = mit einem Messdorn o. am Werkzeug-Kopfdrm.). Abstand stufenweise einstellen.
   For setting the nominal diameter, use a Presetter. Reset the dial gauge on the guide pad nearest the cutting edge, (twinpoint = with a plug or on the diam. of tool-head). Set the two dial gauge pin to both end of insert. Adjust the nominal diam. of tool and back taper with the two adjustment screws alternate and step by step.

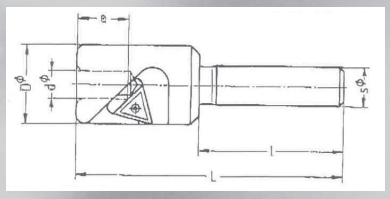




WSP-Grösse *Insert size* Gr.plaquette	1	2
X mm =	- 0.005 – 0.015	- 0.010 – 0.025
Grundregel / *Ground rule* / Principe Verjüngung: *Back taper*: Contracture:	**= 0.010 / 10 mm**	Schneidenlänge *length of Insert* Long. de tranch.

E.8690.0





External deburrer Type AWP 90° with carbide insert

Fazowniki zewnętrzne typ AWP 90° z obrotową wkładką z metalu twardego

Sbavatori esterni tipo AWP 90° con placchette in MD

Rebabador exterior tipo AWP 90° con plaquitas de metal duro

Artikel-Nr. *Article-No.*						E.8690.0 € Stück *piece*	Wendeplatte *Insert* € Stück *piece*
D	d	e	L	l	S		
20	2,3	16,0	70	40	10	**183,00**	**Auf Anfrage** *on demand*
20	3,3	15,5	70	40	10	**183,00**	
20	4,3	15,0	70	40	10	**183,00**	
20	5,4	14,5	70	40	10	**183,00**	
20	6,4	14,0	70	40	10	**183,00**	
20	8,5	13,0	70	40	10	**183,00**	
20	9,5	12,5	70	40	10	**183,00**	
20	10,5	12,0	70	40	10	**183,00**	
25	12,6	13,0	74	40	12	**183,00**	
25	14,6	12,0	74	40	12	**183,00**	
25	15,6	11,5	74	40	12	**183,00**	
25	16,6	11,0	74	40	12	**183,00**	
30	18,6	14,5	85	45	12	**200,00**	
30	20,8	13,5	85	45	12	**200,00**	
35	22,8	14,5	90	50	15	**232,00**	
35	24,8	13,5	90	50	15	**232,00**	
35	25,8	13,0	90	50	15	**232,00**	
35	26,8	12,5	90	50	15	**232,00**	

Werkzeug zum Entgraten und Anfasen von Stangen und anderen runden Werkstücken. Einfach zu handhaben, effizient und wirtschaftlich.

Funktionsweise:
Der Grundkörper besteht aus einem gehärteten Führungskegel. In diesem Kegel befindet sich ein Rundmeser, welches durch zwei Schrauben fixiert wird.

Vorteile:
- Werkzeug ist auf einfachen Maschinen einsetzbar (Bohrmaschinen, Entgratmaschinen)
- Ratterfreies Arbeiten durch einstellbare Spantiefe
- Einfaches Nachschärfen der Messer
- Großer Arbeitsbereich

Verschiede Anfaswinkel:
Der Außenentgrater Typ AE gibt es in Winkel 90°, 60° und 120°. Daraus ergeben sich die Fasen des Werkstückes mit 45°, 30° und 60°.

Außenentgrater mit zwei oder drei Schneiden:
Dieses Werkzeug wird dort eingesetzt wo eine erhöhte Zerspanungsleistung gefordert ist, oder für Werkstücke die zu Kaltaufschweißungen neigen (Alu, Weicheisen, Kupfer).

Tool to chamfer and deburring of round workpieces. Simply to handle, economically and efficiently.

Method of working:
The main body contains a hardened hollow cone. In this cone is a curved knife adjusted by a regulating screw.

Advantages:
- Can be used on simple machines (drilling machine, deburring machine)
- No chatter because of adjustable depth of chip
- Simple regrinding of the blades
Large working range

Different angels:
The external deburring tool is offered with 90°, 60° and 120°. So the chamfer at the workpieces are 45°, 30° and 60°.

External deburrer with two or three knives:
These tools are used for increased metal cutting or materials which tend more towards cold pick up (Aluminium, soft iron, copper).

Einsatzrichtwerte für Artikel E.3664 *Estimated values for use for article E.3664*

VR	Vorschub (mm/U) *feed*									
	< Ø 12	< Ø 16	< Ø 20	< Ø 25	< Ø 32	< Ø 40	< Ø 50	< Ø 63	< Ø 180	< Ø 100
1	0,08	0,06	0,11	0,13	0,16	0,19	0,23	0,26	0,32	0,40
2	0,10	0,11	0,13	0,16	0,18	0,22	0,26	0,32	0,38	0,48
3	0,12	0,13	0,16	0,20	0,23	0,28	0,33	0,40	0,47	0,60
4	0,15	0,17	0,21	0,25	0,30	0,35	0,42	0,50	0,60	0,75
5	0,19	0,22	0,27	0,32	0,38	0,45	0,54	0,64	0,77	0,85
6	0,24	0,28	0,34	0,40	0,48	0,57	0,69	0,82	0,98	0,18
7	0,30	0,35	0,42	0,50	0,60	0,72	0,86	1,02	1,25	1,15
8	0,40	0,45	0,55	0,60	0,75	0,90	1,05	1,25	1,50	1,50
9	0,45	0,55	0,65	0,75	0,90	1,07	1,30	1,55	1,85	1,85

1. **Bohren ohne externe Zentrierung**
   Drilling wihtout external centering
2. **Für Querbohrungen nicht geeignet**
   Not possible in case there is already a crosswise drill hole
3. **Abweichung des Bohrers bei 8xd unter 0,2 mm**
   Deviation of the drill below 0,2 mm in case of 8xd
4. **Selbstzentrierung**
   Self centering

Materialgruppe *material group*	E.3664.3		E.3664.4		E.3664.5		E.3664.2	
	Vc (m/min)	VR	Vc (m/min)	VR	Vc (m/min)	VR	Vc (m/min)	VR
1.1	40	4	48	4	60	5	70	5
1.2	40	5	50	5	80	4	100	4
1.3	25	2	28	2	60	3	75	3
2.1	15	2	20	2	35	2	45	2
2.2	15	2	18	2				
3.1	35	4	40	4	90	5	100	5
3.2	35	4	40	4	90	5	100	5
3.3	35	4	40	4	75	4	85	4
3.4	25	4	30	4	60	3	75	3
4.1	80	5	85	5	160	5	180	5
4.2	80	5	80	5	140	5	160	5
4.3	65	5	65	5	120	5	140	5
4.4								
4.5	35	3	40	3	45	4	50	4
4.6								
4.7	20	3	25	3	65	3	80	3
4.8							80	3
4.9								
5.1								
5.2								
6.1							30	1
6.2								
6.3								
6.4							28	1

Materialgruppe *material group*	**Vc (m/min)**	**fz Vorschub pro Zahn** *feed per tooth*
1.1	80-120	0,08-0,12
1.2	80-120	0,08-0,12
1.3	100-140	0,08-0,10
2.1	50-80	0,08-0,12
2.2	50-80	0,08-0,12
3.1	80-150	0,08
3.2	80-150	0,08
3.3		
3.4		
4.1		
4.2		
4.3		
4.4		
4.5		
4.6		
4.7		
4.8		
4.9		
5.1		
5.2		
6.1		
6.2		
6.3		
6.4		

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
1-SCHNEIDER *1-FLUTE END MILLS*													
	HSS-E	Z=1	TYP W	E.6601.0	3			✔					
2-SCHNEIDER *2-FLUTES END MILLS*													
	HSS-E	Z=2	TYP N	E.9601.0	3	✔	✔	✔	✔				
	HSS-E	Z=2	TYP N	E.9602.0	4	✔	✔	✔	✔				
	HSS-E	Z=2	TYP N	E.9669.0	5	✔	✔	✔	✔				
	HSS-E	Z=2	TYP N	E.9605.0	6	✔	✔	✔	✔				
	HSS-E	Z=2	TYP N	E.9606.0	7	✔	✔	✔	✔				
	HSS-E	Z=2		E.9674.0	7	✔	✔	✔	✔				
	HSS-E	Z=2	TYP W	E.9673.0	8	✔	✔	✔	✔				
3-SCHNEIDER *3-FLUTES END MILLS*													
	HSS-E	Z=3	TYP N	E.9607.1	9	✔	✔	✔	✔				
	HSS-E	Z=3	TYP N	E.9608.1	10	✔	✔	✔	✔				
	HSS-E	Z=3	TYP N	E.9609.0	11	✔	✔	✔	✔				
	HSS-E	Z=3	TYP N	E.9675.0	11	✔	✔	✔	✔				
	HSS-E	Z=3	TYP W	E.9676.0	12	✔	✔	✔	✔				
	HSS-E	Z=3	TYP W	E.9670.0	12	✔	✔	✔	✔				
4- UND MEHRSCHNEIDER *4- AND MULTIFLUTE END MILLS*													
	HSS-E	MEHR SCHNEIDER	TYP W	E.9677.0	13	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9678.0	14	✔	✔	✔	✔				
	HSS-E	Z=4	TYP N	E.9680.0	15	✔	✔	✔	✔				
	HSS-E	Z=4		E.9681.0	15	✔	✔	✔	✔				
	HSS-E	Z=4	TYP N	E.9671.0	16	✔		✔	✔				

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	HSS-E	Z=4	TYP N	E.9672.0	16	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9682.0	17	✔	✔	✔	✔				
	HSS-E	Z=4	TYP N	E.9614.0	18	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9646.0	18	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9683.0	19	✔	✔	✔	✔				
SCHRUPPFRÄSER *ROUGHING END MILLS*													
	HSS-E	MEHR SCHNEIDER	TYP HR	E.9684.1	19	✔	✔	✔	✔				
	PM	MEHR SCHNEIDER	TYP HR	E.9617.1	20	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP HR	E.9618.1	20	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NR	E.9615.1	21	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NF	E.9616.1	21	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NR	E.9619.0	22	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NF	E.9685.0	22	✔	✔	✔	✔				
SCHLITZ- UND T-NUTENFRÄSER *WOODRUFT KEYSEAT AND T-SLOT CUTTERS*													
	HSS-E	MEHR SCHNEIDER	TYP N	E.9620.0	23	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9621.0	24	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NR	E.9622.0	24	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NF	E.9686.0	25	✔	✔	✔	✔				
WINKELFRÄSER *ANGLE CUTTERS*													
	HSS-E	MEHR SCHNEIDER	TYP NF	E.9623.0	25	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9624.0	26	✔	✔	✔	✔				
SCHAFT-PROFILFRÄSER *SHANK-PROFILE MILLING CUTTER*													
	HSS-E	MEHR SCHNEIDER	TYP N	E.9625.0	27	✔	✔	✔	✔				

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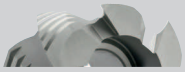
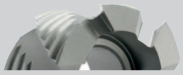
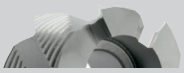
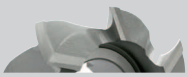
	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
WALZENSTIRNFRÄSER *SHELL END MILLS*													
	HSS-E	MEHR SCHNEIDER	TYP N	E.9628.0	28	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NF	E.9629.0	28	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP NR	E.9630.0	29	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP HR	E.9631.0	29	✔	✔		✔				
	HSS-E	MEHR SCHNEIDER	TYP HR	E.9631.1	29	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP W	E.9632.0	30			✔		✔			
BOHRUNGSFRÄSER *BORE END MILLS*													
	HSS-E	MEHR SCHNEIDER	TYP N	E.9687.0	30	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER	TYP N	E.9633.0	31	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER		E.9634.0	32-33	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER		E.9644.0	32-33	✔	✔	✔	✔				
	HSS	MEHR SCHNEIDER		E.9688.0	34	✔	✔	✔	✔				
	HSS	MEHR SCHNEIDER		E.9689.0	35	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER		E.9690.0	36	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER		E.9691.0	36	✔	✔	✔	✔				
	HSS-E	MEHR SCHNEIDER		E.9692.0	37	✔	✔	✔	✔				
	HSS	MEHR SCHNEIDER	TYP N	E.9635.0	37	✔	✔	✔	✔				
	HSS	MEHR SCHNEIDER	TYP N	E.9636.0	38	✔	✔	✔	✔				
ROHLINGE *TOOL BITS*													
	PM			E.9693.0	39								
	PM			E.9694.0	39								

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!

The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

HSSE-Einzahnfräser für Aluminium

Z=1

E.6601.0

4.1 4.2 4.7

HSS-E | WERKS-NORM (COMPANY)

TYP W | DIN 1835 A

Z=1



HSSE-1 flute end mills for aluminium

Frezy jednoostrzowe HSS-E do aluminium

Frese monotaglienti HSSE per alluminio

Fresas HSSE de un diente para aluminio

Artikel-Nr. *Article-No.*				E.6601.0 € Stück *piece*
d1	l2	l1	d2 h6	
3,00	12	60	8,0	**6,70**
4,00	12	60	8,0	**6,70**
5,00	14	60	8,0	**6,70**
5,00	40	100	8,0	**13,50**
6,00	14	60	8,0	**7,50**
8,00	14	80	8,0	**7,50**
10,00	14	80	8,0	**10,00**

HSSE-Universal-Mikro-Bohrnutenfräser

Z=1

E.9601.0

Universal

HSS-E | WERKS-NORM (COMPANY)

TYP N | λ=30° | KURZ SHORT

Z=2 | DIN 1835 A



HSSE-Universal-Micro-Center cut end mills

Frezy miniaturowe dwuostrzowe HSS-E centrujące uniwersalne

Microfrese universali, HSSE

Microfresas de ranurar en HSSE, uso universal

Artikel-Nr. *Article-No.*				E.9601.0 € Stück *piece*
d1	l2	l1	d2	
0,30 - 0,40	1	37	3,0	**23,50**
0,50 - 0,60	1	37	3,0	**23,50**
0,70 - 0,90	2	37	4,0	**23,50**
1,00 - 1,10	3	37	4,0	**22,00**
1,20 - 1,40	4	37	4,0	**22,00**
1,50 - 1,60	4	37	4,0	**22,00**
1,70 - 1,90	5	37	4,0	**22,00**
2,00 - 2,20	5	37	4,0	**22,00**
2,30 - 2,70	7	40	4,0	**22,00**
2,80 - 2,90	8	44	5,0	**20,50**
3,00 - 3,20	8	44	5,0	**20,50**
3,30 - 3,70	10	44	5,0	**20,50**
3,80 - 4,70	12	51	6,0	**23,00**
4,80 - 5,70	14	52	6,0	**23,00**
5,80 - 7,70	16	60	8,0	**26,60**
7,80 - 8,00	18	61	8,0	**26,60**
8,10 - 9,70	18	69	10,0	**31,50**
9,80 - 10,00	20	69	10,0	**31,50**
10,10 - 11,00	22	70	12,0	**38,30**
11,10 - 12,00	26	79	12,0	**38,30**
12,10 - 14,00	26	83	12,0	**49,00**

E.9602.0

Universal

HSS-E | DIN 327 | TYP N | λ≈25° | KURZ SHORT | Z=2 | DIN 1835 B



HSSE-Slot drill end mills short

Frezy dwuostrzowe krótkie HSS-E do rowkowania

Frese per cave, HSSE

Fresas de dos labios, serie corta, HSSE

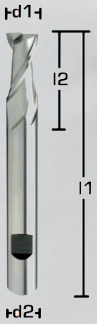
*= nach Werksnorm
*= *according company norm*

Artikel-Nr. *Article-No.*				E.9602.0 € Stück *piece*
d1e8	l2	l1	d2 h6	
2,00	4	48	6,0	**6,40**
2,50	5	49	6,0	**6,70**
3,00	5	49	6,0	**6,40**
3,50	6	50	6,0	**6,70**
4,00	7	51	6,0	**6,40**
4,50	7	51	6,0	**6,70**
5,00	8	52	6,0	**6,40**
5,50	8	52	6,0	**6,70**
6,00	8	52	10,0	**6,40**
6,50	10	60	10,0	**7,60**
7,00	10	60	10,0	**7,40**
7,50	10	60	10,0	**8,80**
8,00	11	61	10,0	**7,80**
8,50	11	61	10,0	**9,30**
9,00	11	61	10,0	**8,90**
9,50	11	61	10,0	**10,70**
10,00	13	63	10,0	**9,10**
10,50	13	70	12,0	**11,00**
11,00	13	70	12,0	**10,50**
11,50	13	70	12,0	**12,60**
12,00	16	73	12,0	**10,50**
13,00	16	73	12,0	**12,10**
14,00	16	73	12,0	**13,10**
15,00	16	73	12,0	**15,10**
16,00	19	79	16,0	**15,20**
17,00	19	79	16,0	**17,50**
18,00	19	79	16,0	**18,80**
19,00	19	79	16,0	**21,50**
20,00	22	88	20,0	**23,50**
22,00	22	88	20,0	**27,50**
24,00	26	102	25,0	**32,20**
25,00	26	96	25,0	**33,00**
25,00	26	102	20,0*	**33,00**
26,00	26	102	25,0	**36,00**
28,00	26	96	25,0	**41,00**
28,00	26	102	20,0*	**41,00**
30,00	26	102	25,0	**45,00**
32,00	32	112	32,0	**52,00**
36,00	32	112	32,0	**67,00**
40,00	38	118	32,0*	**85,00**

E.9669.0

Universal

HSS-E | DIN 844 | TYP N | λ≈25° | XLANG XLONG | Z=2 | DIN 1835 B



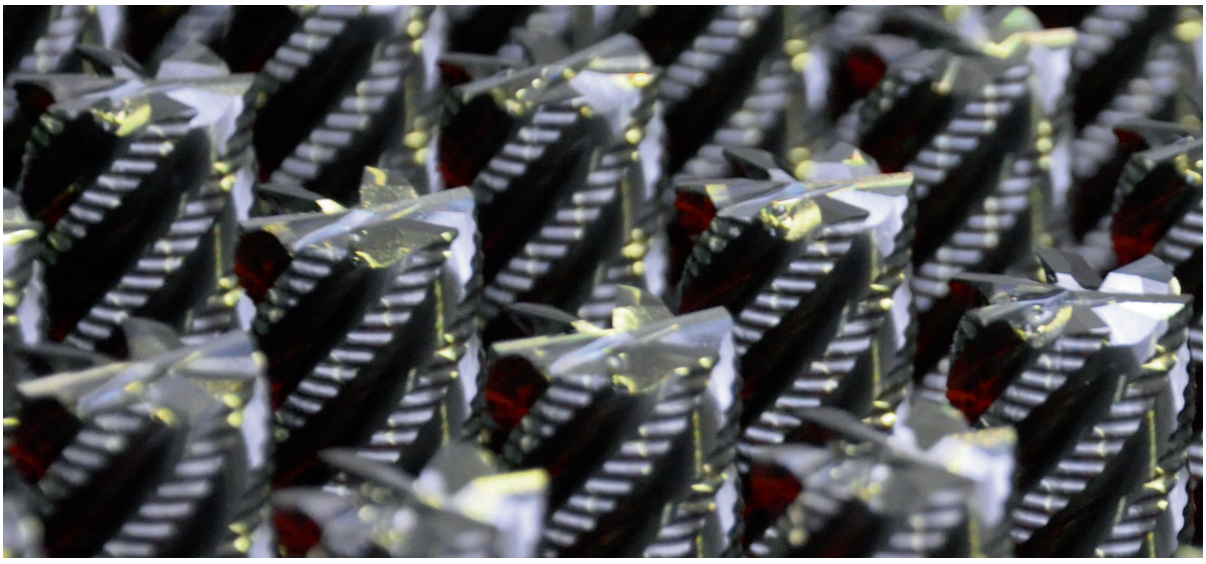
HSSE-Slot drill end mills extra long

Frezy dwuostrzowe bardzo długie HSS-E do rowkowania

Frese per cave HSSE, serie lunga

Fresas de dos labios, serie extra larga, HSSE

Artikel-Nr. *Article-No.*				E.9669.0 € Stück *piece*
d1e8	l2	l1	d2 h6	
4,00	11	63	6,0	**8,30**
5,00	13	68	6,0	**8,30**
6,00	13	68	6,0	**8,30**
7,00	16	80	10,0	**9,50**
8,00	19	88	10,0	**10,00**
9,00	19	88	10,0	**11,50**
10,00	22	95	10,0	**11,80**
11,00	22	102	12,0	**13,60**
12,00	26	110	12,0	**13,60**
13,00	26	110	12,0	**15,70**
14,00	26	110	12,0	**17,00**
15,00	26	110	12,0	**19,50**
16,00	32	123	16,0	**19,50**
18,00	32	123	16,0	**24,50**
20,00	38	141	20,0	**30,20**
22,00	38	141	20,0	**39,00**
24,00	45	166	25,0	**50,00**
25,00	45	166	25,0	**55,00**
28,00	45	166	25,0	**60,00**
30,00	45	166	25,0	**80,00**
32,00	53	186	32,0	**92,00**



Z=2

E.9605.0

Universal

HSS-E | WERKS-(COMPANY) NORM | R | TYP N | λ≈25° | KURZ SHORT | Z=2 | DIN 1835 B



HSSE-Ball nose end mills short

Frezy dwuostrzowe krótkie HSS-E z czołem kulistym

Frese raggiate HSSE, serie corta

Fresas con punta semiésférica, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9605.0 € Stück *piece*
d1 h10	R	l2	l1	d2 h6	
4,00	2,00	7	51	6,0	**10,40**
5,00	2,50	8	52	6,0	**10,40**
6,00	3,00	8	52	6,0	**10,40**
7,00	3,50	10	60	10,0	**11,90**
8,00	4,00	11	61	10,0	**13,00**
9,00	4,50	11	61	10,0	**14,50**
10,00	5,00	13	63	10,0	**14,80**
11,00	5,50	13	70	12,0	**17,00**
12,00	6,00	16	73	12,0	**17,00**
13,00	6,50	16	73	12,0	**19,80**
14,00	7,00	16	73	12,0	**21,20**
15,00	7,50	16	73	12,0	**24,50**
16,00	8,00	19	79	16,0	**24,50**
18,00	9,00	19	79	16,0	**30,30**
20,00	10,00	22	88	20,0	**38,00**
22,00	11,00	22	88	20,0	**45,00**
24,00	12,00	26	102	25,0	**52,00**
25,00	12,50	26	102	25,0	**53,50**
28,00	14,00	26	102	25,0	**66,00**
30,00	15,00	26	102	25,0	**73,00**
32,00	16,00	32	112	32,0	**84,00**

HSSE-Radius-Schaftfräser lang

Z=2

E.9606.0

Universal

HSS-E | WERKS-NORM (COMPANY) | R | TYP N | λ≈25° | LANG LONG | Z=2 | DIN 1835 B



- HSSE-Ball nose end mills long
- Frezy dwuostrzowe długie HSS-E z czołem kulistym
- Frese raggiate lunghe, HSSE
- Fresas con punta semiésférica, serie larga, HSSE

Artikel-Nr. *Article-No.*					E.9606.0 € Stück *piece*
d1 h10	R	l2	l1	d2 h6	
4,00	2,00	11	63	6,0	**13,40**
5,00	2,50	13	68	6,0	**13,40**
6,00	3,00	13	68	6,0	**13,40**
7,00	3,50	16	80	10,0	**15,40**
8,00	4,00	19	88	10,0	**16,30**
9,00	4,50	19	88	10,0	**18,70**
10,00	5,00	22	95	10,0	**19,30**
11,00	5,50	22	102	12,0	**22,10**
12,00	6,00	26	110	12,0	**22,30**
13,00	6,50	26	110	12,0	**26,00**
14,00	7,00	26	110	12,0	**27,60**
15,00	7,50	26	110	12,0	**32,00**
16,00	8,00	32	123	16,0	**32,00**
18,00	9,00	32	123	16,0	**40,00**
20,00	10,00	38	141	20,0	**50,00**
22,00	11,00	38	141	20,0	**64,00**
24,00	12,00	45	166	25,0	**81,00**
25,00	12,50	45	166	25,0	**89,00**
28,00	14,00	45	166	25,0	**113,00**
30,00	15,00	45	166	25,0	**128,00**
32,00	16,00	53	186	32,0	**148,00**

HSSE-Schaftfräser für Schmiernuten

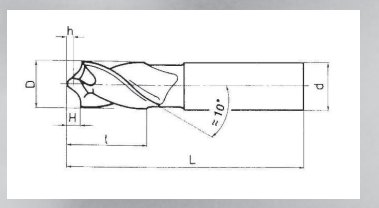
Z=2

E.9674.0

Universal

HSS-E | WERKS-NORM (COMPANY) | DIN 1835 A | Z=2





- HSSE-End mills for oil grooves
- Frezy dwuostrzowe HSS-E do rowków smarnych
- Frese per filtri olio, HSSE
- Fresas para ranuras de engrase, HSSE

Artikel-Nr. *Article-No.*						E.9674.0 € Stück *piece*
h	H	D js16	S js16	L js16	d H8	
0,8	1,0	8	11	61	10,0	**39,00**
1,2	1,6	12	16	73	12,0	**42,00**
2,0	2,5	16	19	79	16,0	**47,00**
3,0	4,0	22	22	88	20,0	**61,00**
5,0	6,0	28	26	96	20,0	**75,00**

Z=2

E.9673.0

Universal

HSS-E | WERKS-NORM (COMPANY) | TYP W | λ≈40° | KURZ SHORT | Z=2 | DIN 1835 B



HSSE-Center cut end mills short

Frezy dwuostrzowe krótkie centrujące HSS-E

Frese per cave, HSSE

Fresas, serie corta, HSSE

Artikel-Nr. *Article-No.*				E.9673.0 € Stück *piece*
d1e8	l2	l1	d2 h6	
2,00	7	51	6,0	**9,20**
2,50	8	52	6,0	**9,20**
3,00	8	52	6,0	**9,20**
3,50	10	54	6,0	**9,20**
4,00	11	55	6,0	**9,20**
4,50	11	55	6,0	**9,20**
5,00	13	57	6,0	**9,20**
5,50	13	57	6,0	**9,20**
6,00	13	57	6,0	**9,20**
6,50	16	66	10,0	**12,50**
7,00	16	66	10,0	**12,50**
7,50	16	66	10,0	**12,50**
8,00	19	69	10,0	**12,50**
8,50	19	69	10,0	**12,50**
9,00	19	69	10,0	**12,50**
9,50	19	69	10,0	**12,50**
10,00	22	72	10,0	**12,50**
11,00	22	79	12,0	**16,50**
12,00	26	83	12,0	**16,50**
13,00	26	83	12,0	**18,30**
14,00	26	83	12,0	**18,30**
15,00	26	83	12,0	**22,30**
16,00	32	92	16,0	**22,30**
17,00	32	92	16,0	**27,50**
18,00	32	92	16,0	**27,50**
19,00	32	92	16,0	**32,80**
20,00	38	104	20,0	**32,80**
21,00	38	104	20,0	**52,50**
22,00	38	104	20,0	**52,50**
23,00	38	104	20,0	**52,50**
24,00	45	121	25,0	**52,50**
25,00	45	121	25,0	**52,50**
26,00	45	121	25,0	**70,00**
28,00	45	121	25,0	**83,00**
30,00	45	121	25,0	**89,00**
32,00	53	133	32,0	**99,00**

E.9607.1

Universal

HSS-E | WERKS-(COMPANY) NORM | Blue Cut | TYP N | λ≈30° | KURZ SHORT | Z=3 | DIN 1835 B



HSSE-Throw away center cut end mills short

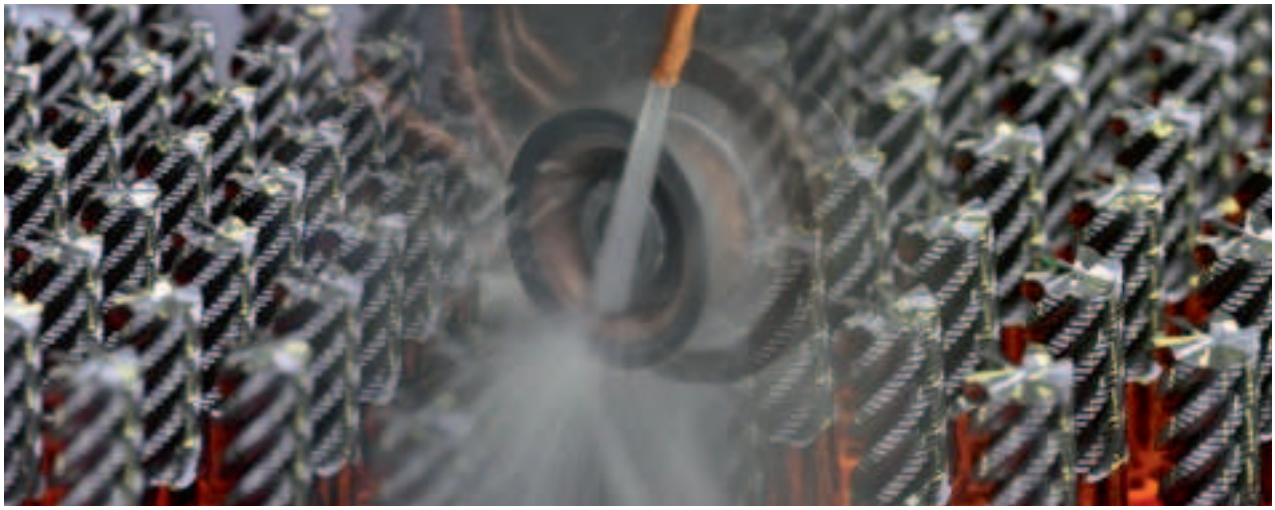
Frezy trzyostrowe krótkie HSS-E z ostrzem centralnym na czole

Frese a gettare, serie corta, HSSE

Fresas para chaveteros de un solo uso, serie corta, HSSE

*=Auslaufartikel
*=no future article anymore

Artikel-Nr. *Article-No.*				E.9607.1 € Stück *piece*
d1k12	l2	l1	d2 h6	
1,00*	2	34	6,0	**9,00**
1,50*	3	34	6,0	**9,00**
1,80*	3	34	6,0	**9,00**
2,00	4	35	6,0	**6,50**
2,30*	4	35	6,0	**9,00**
2,50	5	36	6,0	**6,50**
2,80*	5	36	6,0	**9,00**
3,00	5	36	6,0	**6,60**
3,50	6	37	6,0	**6,90**
4,00	7	38	6,0	**7,10**
4,50	7	38	6,0	**7,50**
5,00	8	39	6,0	**7,60**
5,50	8	39	6,0	**7,80**
5,75*	8	39	6,0	**8,20**
6,00	8	39	6,0	**8,20**
6,50*	10	42	8,0	**12,50**
7,00*	10	42	8,0	**12,50**
7,75*	10	42	8,0	**14,50**
9,50*	11	48	10,0	**14,50**
10,00*	13	50	10,0	**14,50**
12,00*	16	58	12,0	**17,00**



E.9608.1

Universal

HSS-E | WERKS-(COMPANY) NORM | Blue Cut

TYP N | λ≈30° | LANG (LONG)

Z=3 | DIN 1835 B



HSSE-Throw away center cut end mills long

Frezy trzyostrzowe długie HSS-E z ostrzem centralnym na czole

Frese a gettare, serie lunga, HSSE

Fresas para chaveteros de un solo uso, serie larga, HSSE

Artikel-Nr. *Article-No.*				E.9608.1 € Stück *piece*
d1e8	l2	l1	d2 h6	
1,50	5	36	6,0	**5,50**
2,00	7	38	6,0	**5,50**
2,50	8	39	6,0	**5,50**
3,00	8	39	6,0	**5,50**
3,50	10	41	6,0	**5,50**
4,00	11	42	6,0	**5,50**
4,50	11	42	6,0	**5,50**
5,00	13	44	6,0	**5,50**
5,50	13	44	6,0	**5,50**
6,00	13	44	6,0	**5,50**
6,50	16	48	8,0	**6,00**
7,00	16	48	8,0	**6,00**
7,50	16	48	8,0	**6,00**
8,00	19	51	8,0	**6,50**
8,50	19	56	10,0	**8,00**
9,00	19	56	10,0	**8,00**
9,50	19	56	10,0	**8,00**
10,00	22	59	10,0	**8,00**

HSSE-Bohrnutenfräser kurz

E.9609.0

Universal

HSS-E | DIN 327 | TYP N | λ≈30° | KURZ SHORT | Z=3 | DIN 1835 B



HSSE-Center cut end mills short

Frezy trzyostrzowe centrujące krókie HSS-E

Frese HSSE, serie corta

Fresas para chaveteros, serie corta, HSSE

*=Auslaufartikel
*=no future production anymore

Artikel-Nr. *Article-No.*				E.9609.0 € Stück *piece*
d1e8	l2	l1	d2 h6	
3,00	5	49	6,0	**6,70**
4,00	7	51	6,0	**6,70**
5,00	8	52	6,0	**6,70**
5,50*	8	52	6,0	**6,70**
6,00	8	52	6,0	**6,70**
7,00	10	60	10,0	**7,80**
8,00	11	61	10,0	**8,20**
10,00	13	63	10,0	**9,60**
12,00	16	73	12,0	**11,00**
14,00	16	73	12,0	**14,00**
16,00	19	79	16,0	**16,00**
18,00	19	79	16,0	**20,00**
20,00	22	88	20,0	**24,50**

HSSE-Bohrnutenfräser lang

E.9675.0

Universal

HSS-E | DIN 327 | TYP N | λ≈30° | LANG LONG | Z=3 | DIN 1835 B



HSSE-Center cut end mills long

Frezy trzyostrzowe długie centrujące HSS-E

Frese HSSE, serie lunga

Fresas para chaveteros, serie larga, HSSE

Artikel-Nr. *Article-No.*				E.9675.0 € Stück *piece*
d1e8	l2	l1	d2 h6	
3,00	8	52	6,0	**8,70**
4,00	11	55	6,0	**8,70**
5,00	13	57	6,0	**8,70**
6,00	13	57	6,0	**8,70**
7,00	16	66	10,0	**10,00**
8,00	19	69	10,0	**10,60**
10,00	22	72	10,0	**12,50**
12,00	26	83	12,0	**14,40**
14,00	26	83	12,0	**18,00**
16,00	32	92	16,0	**21,00**
18,00	32	92	16,0	**26,00**
20,00	38	104	20,0	**32,00**

HSSE-Bohrnutenfräser kurz

Z=3

E.9676.0

Universal

HSS-E | DIN 844 L | TYP W | λ≈40° | KURZ SHORT | Z=3 | DIN 1835 B



- HSSE-Center cut end mills short
- Frezytrzyostrzowe krótkie centrujące HSS-E
- Frese HSSE, serie corta
- Fresas para chaveteros, serie corta, HSSE

Artikel-Nr. *Article-No.*				E.9676.0 € Stück *piece*
d1k10	l2	l1	d2 h6	
6,00	13	57	6,0	**6,60**
7,00	16	66	10,0	**7,50**
8,00	19	69	10,0	**8,20**
9,00	19	69	10,0	**9,50**
10,00	22	72	10,0	**9,50**
12,00	26	83	12,0	**11,50**
14,00	26	83	12,0	**13,50**
16,00	32	92	16,0	**16,00**
18,00	32	92	16,0	**20,00**
20,00	38	104	20,0	**25,00**

HSSE-Bohrnutenfräser lang

Z=3

E.9670.0

Universal

HSS-E | DIN 844 L | TYP W | λ≈40° | LANG LONG | Z=3 | DIN 1835 B



- HSSE-Center cut end mills long
- Frezy trzyostrzowe długie centrujące HSS-E
- Frese HSSE, serie lunga
- Fresas de chaveteros, serie larga, HSSE

Artikel-Nr. *Article-No.*				E.9670.0 € Stück *piece*
d1k10	l2	l1	d2 h6	
6,00	24	68	6,0	**8,50**
7,00	30	80	10,0	**9,80**
8,00	38	88	10,0	**10,50**
9,00	38	88	10,0	**12,10**
10,00	45	95	10,0	**12,50**
12,00	53	110	12,0	**15,00**
14,00	53	110	12,0	**17,30**
16,00	63	123	16,0	**20,50**
18,00	63	123	16,0	**23,50**
20,00	75	141	20,0	**29,00**

E.9677.0

Universal

HSS-E | DIN 844 | TYP W | λ≈40° | KURZ SHORT | MEHR SCHNEIDER | DIN 1835 B



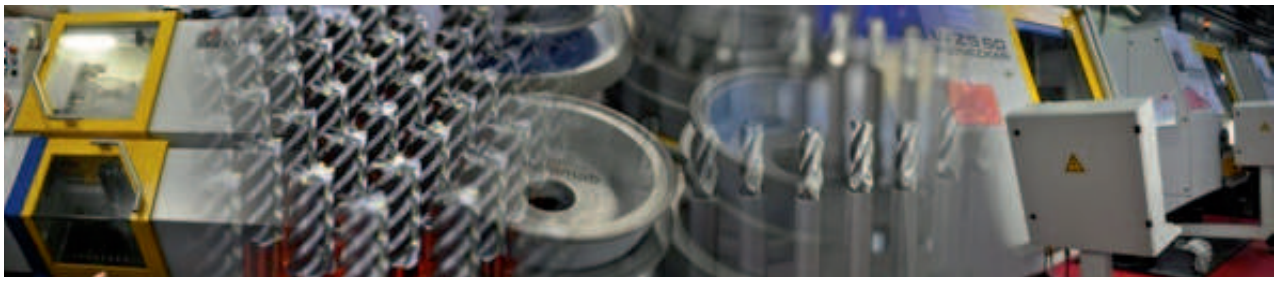
HSSE-End mills short

Frezy wieloostrzowe krókie HSS-E ekonomiczne

Frese a finire, HSSE, serie corta

Fresas de mango, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9677.0 € Stück *piece*
d1k10	l2	l1	d2 h6	Zähne *flutes*	
2,00	7	51	6,0	3	**6,80**
2,50	8	52	6,0	3	**7,20**
3,00	8	52	6,0	4	**6,80**
3,50	10	54	6,0	4	**7,20**
4,00	11	55	6,0	4	**6,80**
4,50	11	55	6,0	4	**7,20**
5,00	13	57	6,0	4	**6,80**
6,00	13	57	6,0	4	**6,80**
7,00	16	66	10,0	4	**8,00**
8,00	19	69	10,0	4	**8,50**
9,00	19	69	10,0	4	**9,80**
10,00	22	72	10,0	4	**10,00**
11,00	22	79	12,0	4	**11,40**
12,00	26	83	12,0	4	**11,90**
13,00	26	83	12,0	4	**13,70**
14,00	26	83	12,0	4	**14,00**
15,00	26	83	12,0	4	**16,00**
16,00	32	92	16,0	4	**16,50**
18,00	32	92	16,0	4	**20,50**
20,00	38	104	20,0	4	**25,50**
22,00	38	104	20,0	4	**32,00**
24,00	45	121	25,0	5	**37,00**
25,00	45	121	25,0	5	**40,00**



E.9678.0

Universal

HSS-E | DIN 844 | TYP N | λ≈30° | KURZ SHORT | MEHR SCHNEIDER | DIN 1835 B



HSSE-End mills short

Frezy wieloostrzowe krótkie HSS-E

Frese a finire, HSSE, serie corta

Fresas de mango, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9678.0 € Stück *piece*
d1k10	l2	l1	d2 h6	Zähne *flutes*	
3,00	8	52	6,0	4	**7,50**
4,00	11	55	6,0	4	**7,50**
5,00	13	57	6,0	4	**7,50**
6,00	13	57	6,0	4	**7,50**
7,00	16	66	10,0	4	**8,50**
8,00	19	69	10,0	4	**9,30**
9,00	19	69	10,0	4	**11,00**
10,00	22	72	10,0	4	**11,00**
11,00	22	79	12,0	4	**13,00**
12,00	26	83	12,0	4	**13,00**
13,00	26	83	12,0	4	**15,00**
14,00	26	83	12,0	4	**15,00**
15,00	26	83	12,0	4	**18,00**
16,00	32	92	16,0	4	**18,00**
18,00	32	92	16,0	4	**22,50**
20,00	38	104	20,0	4	**28,00**
22,00	38	104	20,0	5	**34,00**
24,00	45	121	25,0	5	**43,00**
25,00	45	121	25,0	5	**45,00**
26,00	45	121	25,0	5	**51,00**
28,00	45	121	25,0	5	**51,00**
30,00	45	121	25,0	5	**57,00**
32,00	53	133	32,0	6	**59,00**

HSSE-Schaftfräser linksschneidend

Z=4

E.9680.0

Universal

HSS-E | DIN 844 | TYP N | LH | KURZ SHORT | Z=4 | DIN 1835 A



HSSE-End mills left hand cutting

Frezy czteroostrzowe lewe HSS-E

Frese a finire elica sx, HSSE

Fresas de mango, corte izquierdo, HSSE

Artikel-Nr. *Article-No.*				E.9680.0 € Stück *piece*
d1 js14	l2	l1	d2 h8	
4,00	11	55	6,0	**11,00**
5,00	13	57	6,0	**11,00**
6,00	13	57	6,0	**11,00**
8,00	19	69	10,0	**14,00**
10,00	22	72	10,0	**17,00**
12,00	26	83	12,0	**22,00**
16,00	32	92	16,0	**33,00**

HSSE-Gesenkfräser konisch

Z=4

E.9681.0

Universal

HSS-E | WERKS-(COMPANY) NORM | DIN 1835 B | λ≈25° | Z=4



HSSE-Taper end mill

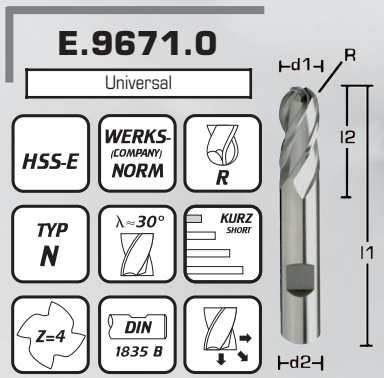
Frezy czteroostrowe zbieżne HSS-E

Frese coniche, HSSE

Fresas cónicas, HSSE

Artikel-Nr. *Article-No.*					E.9681.0 € Stück *piece*
Grad *degree*	d1 js14	l2	l1	d2 h6	
1°	5	20	73	10,0	**36,00**
1°	8	32	95	12,0	**42,00**
1°	12	50	118	16,0	**47,00**
1°	20	80	155	20,0	**52,00**
2°	5	20	74	10,0	**36,00**
2°	8	32	95	12,0	**42,00**
2°	12	50	118	16,0	**47,00**
2°	20	80	160	25,0	**60,00**
3°	5	20	74	10,0	**36,00**
3°	8	32	95	12,0	**42,00**
3°	12	50	120	20,0	**49,00**
3°	20	80	160	25,0	**60,00**
5°	5	20	74	10,0	**36,00**
5°	8	32	98	16,0	**48,00**
5°	12	50	120	20,0	**52,00**
5°	20	80	165	32,0	**74,00**
7°	5	20	80	12,0	**40,00**
7°	8	32	98	16,0	**48,00**
7°	12	50	130	25,0	**59,00**
7°	20	80	165	32,0	**74,00**
10°	5	20	80	12,0	**40,00**
10°	8	32	100	20,0	**50,00**
10°	12	50	130	25,0	**59,00**

HSSE-Radius-Schaftfräser kurz



HSSE-Ball nose end mills short

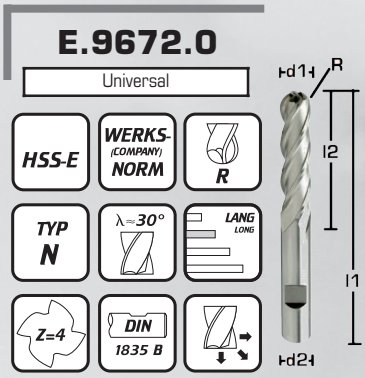
Frezy czteroostrzowe krótkie HSS-E z czołem kulistym

Frese 4 tagli raggiate serie corta, HSSE

Fresas con punta semiésférica, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9671.0 € Stück *piece*
d1 k12	R	l2	l1	d2 h6	
4,00	2,00	11	55	6,0	**11,80**
5,00	2,50	13	57	6,0	**12,00**
6,00	3,00	13	57	6,0	**12,00**
8,00	4,00	19	69	10,0	**14,50**
10,00	5,00	22	72	10,0	**18,00**
12,00	6,00	26	83	12,0	**22,00**
16,00	8,00	32	92	16,0	**31,00**
20,00	10,00	38	104	20,0	**45,00**

HSSE-Radius-Schaftfräser lang



HSSE-Ball nose end mills long

Frezy 4-ostrzowe długie HSS-E z czołem kulistym

Frese 4 tagli raggiate serie lunga, HSSE

Fresas con punta semiésférica, serie larga, HSSE

Artikel-Nr. *Article-No.*					E.9672.0 € Stück *piece*
d1 k12	R	l2	l1	d2 h6	
4,00	2,00	19	63	6,0	**12,70**
5,00	2,50	24	68	6,0	**13,50**
6,00	3,00	24	68	6,0	**14,30**
8,00	4,00	38	88	10,0	**16,70**
10,00	5,00	45	95	10,0	**20,50**
12,00	6,00	53	110	12,0	**25,00**
16,00	8,00	63	123	16,0	**35,00**
20,00	10,00	75	141	20,0	**50,00**

E.9682.0

Universal

HSS-E | DIN 845 | TYP N | λ≈35° | KURZ SHORT | MEHR SCHNEIDER | MK



HSSE-End mills short

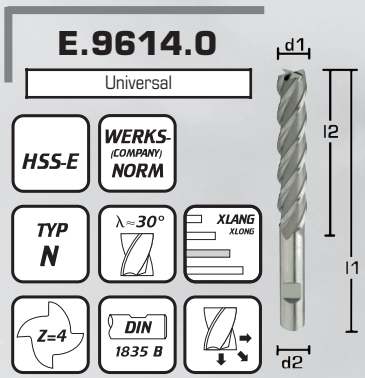
Frezy wieloostrzowe krótkie HSS-E

Frese a finire, gambo MK, serie corta, HSSE

Fresas de mango, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9682.0 € Stück *piece*
d1k10	l2	l1	d2 MK	Zähne *flutes*	
10,00	22	92	1	4	**17,30**
12,00	26	111	2	4	**17,60**
14,00	26	111	2	4	**21,70**
16,00	32	117	2	4	**24,70**
18,00	32	117	2	4	**28,80**
20,00	38	123	2	4	**31,20**
22,00	38	123	2	5	**35,60**
25,00	45	147	3	5	**43,20**
28,00	45	147	3	5	**46,20**
30,00	45	147	3	6	**50,00**
32,00	53	178	4	6	**57,00**
36,00	53	178	4	6	**72,00**
40,00	63	188	4	6	**88,00**
45,00	63	188	4	6	**111,00**
50,00	75	233	5	6	**135,00**
56,00	75	233	5	8	**189,00**
63,00	90	248	5	8	**243,00**

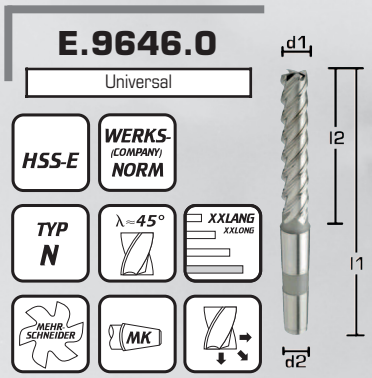
HSSE-Schaftfräser XL



- HSSE-End mills extra long
- Frezy czteroostrzowe bardzo długie HSS-E
- Frese a finire serie extra lunga, HSSE
- Fresas de mango, serie extra larga, HSSE

Artikel-Nr. *Article-No.*				E.9614.0 € Stück *piece*
d1js14	l2	l1	d2 h6	
6,00	56	106	10,0	**43,00**
8,00	63	113	10,0	**42,00**
10,00	70	120	10,0	**38,30**
12,00	80	137	12,0	**51,00**
14,00	80	137	12,0	**57,00**
16,00	90	150	16,0	**71,00**
18,00	100	166	20,0	**87,00**
20,00	110	176	20,0	**108,00**
22,00	110	176	20,0	**121,00**

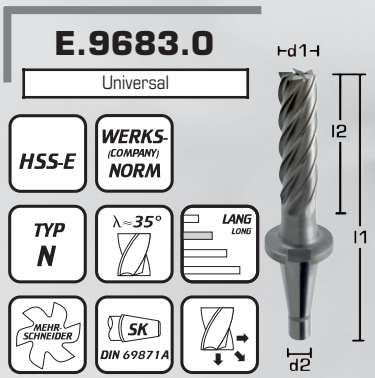
HSSE-Schaftfräser XXL



- HSSE-End mills extra long
- Frezy wieloostrzowe bardzo długie HSS-E
- Frese a finire serie extra lunga, HSSE
- Fresas de mango, serie extra larga, HSSE

Artikel-Nr. *Article-No.*					E.9646.0 € Stück *piece*
d1 js14	l2	l1	d2 MK	Zähne *flutes*	
16,00	90	170	2	4	**83,00**
18,00	100	200	3	4	**126,00**
20,00	110	210	3	4	**138,00**
22,00	110	210	3	4	**145,00**
25,00	125	225	3	5	**207,00**
28,00	140	265	4	5	**270,00**
30,00	140	265	4	5	**294,00**
32,00	160	285	4	5	**316,00**
35,00	180	305	4	5	**417,00**
40,00	200	335	4	5	**490,00**

HSSE-Schaftfräser lang



HSSE-End mills long

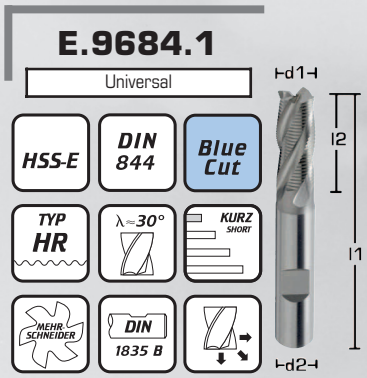
Frezy wieloostrzowe długie HSS-E

Frese a finire, gambo MK, serie lunga, HSSE

Fresas de mango, serie larga, HSSE

Artikel-Nr. *Article-No.*					E.9683.0 € Stück *piece*
d1 z13	l2	l1	d2 SK	Zähne *flutes*	
25,00	80	195	30	4	**156,00**
28,00	90	205	30	6	**161,00**
32,00	100	240	40	6	**200,00**
36,00	110	255	40	6	**250,00**
40,00	125	270	40	6	**278,00**
45,00	130	275	40	6	**388,00**
50,00	140	290	40	6	**499,00**
56,00	150	340	50	8	**555,00**
63,00	160	350	50	8	**666,00**

HSSE-Schruppfräser kurz



HSSE-Roughing end mills short

Frezy wieloostrzowe krótkie HSS-E do obróbki zgrubnej

Frese con rompitruciolo, a sgrossare, serie corta, HSSE

Fresas de desbaste, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9684.1 € Stück *piece*
d1k12	l2	l1	d2 h6	Zähne *flutes*	
6,00	13	57	6,0	4	**21,50**
7,00	16	66	10,0	4	**23,80**
8,00	19	69	10,0	4	**24,30**
9,00	19	69	10,0	4	**27,60**
10,00	22	72	10,0	4	**28,10**
11,00	22	79	12,0	4	**37,20**
12,00	26	83	12,0	4	**33,10**
13,00	26	83	12,0	4	**39,00**
14,00	26	83	12,0	4	**39,00**
15,00	26	83	12,0	4	**46,00**
16,00	32	92	16,0	4	**46,00**
17,00	32	92	16,0	4	**54,80**
18,00	32	92	16,0	4	**54,80**
20,00	38	104	20,0	4	**66,80**
22,00	38	104	20,0	5	**77,00**
25,00	45	121	25,0	5	**94,00**
26,00	45	121	25,0	5	**116,00**
28,00	45	121	25,0	5	**116,00**
30,00	45	121	25,0	5	**134,00**
32,00	53	133	32,0	6	**150,00**

PM-Schruppfräser

E.9617.1

Universal

PM | DIN 844 | Blue Cut | TYP HR | λ≈30° | KURZ SHORT | MEHR SCHNEIDER | DIN 1835 B



PM-Roughing end mills

Frezy wieloostrzowe PM do obróbki zgrubnej

Frese con rompitruciolo, a sgrossare, PM

Fresas de desbaste, PM

Artikel-Nr. *Article-No.*					E.9617.1 € Stück *piece*
d1 js12	l2	l1	d2 h6	Zähne *flutes*	
6,00	13	57	6,0	4	**23,50**
7,00	16	66	10,0	4	**31,00**
8,00	19	69	10,0	4	**27,00**
9,00	19	69	10,0	5	**32,00**
10,00	22	72	10,0	5	**26,00**
11,00	22	79	12,0	5	**40,00**
12,00	26	83	12,0	5	**33,50**
13,00	26	83	12,0	5	**45,00**
14,00	26	83	12,0	5	**40,00**
15,00	26	83	12,0	5	**58,00**
16,00	32	92	16,0	5	**49,00**
18,00	32	92	16,0	5	**54,00**
20,00	38	104	20,0	5	**67,00**
25,00	45	121	25,0	5	**90,00**
30,00	45	121	25,0	5	**136,00**

HSSE-Schruppfräser lang

TYP HR

E.9618.1

Universal

HSS-E | DIN 844 L | Blue Cut | TYP HR | λ≈30° | LANG LONG | MEHR SCHNEIDER | DIN 1835 B



HSSE-Roughing end mills long

Frezy wieloostrzowe długie HSS-E do obróbki zgrubnej

Frese con rompitruciolo, a sgrossare, HSSE, serie lunga

Fresas de desbaste, serie larga, HSSE

Artikel-Nr. *Article-No.*					E.9618.1 € Stück *piece*
d1 k12	l2	l1	d2 h6	Zähne *flutes*	
6,00	24	68	6,0	4	**25,00**
8,00	38	88	10,0	4	**28,50**
10,00	45	95	10,0	4	**32,20**
12,00	53	110	12,0	4	**38,00**
14,00	53	110	12,0	4	**45,00**
16,00	63	123	16,0	4	**53,20**
18,00	63	123	16,0	4	**63,20**
20,00	75	141	20,0	4	**77,00**
22,00	75	141	20,0	5	**89,50**
24,00	90	166	25,0	5	**110,00**
25,00	90	166	25,0	5	**109,00**
26,00	90	166	25,0	5	**135,00**
28,00	90	166	25,0	5	**135,00**
30,00	90	166	25,0	5	**156,00**
32,00	106	186	32,0	6	**175,00**

E.9615.1

Universal

HSS-E | DIN 844 | Blue Cut | TYP NR | λ≈30° | KURZ SHORT | MEHR SCHNEIDER | DIN 1835 B



E.9616.1

Universal

HSS-E | DIN 844 | Blue Cut | TYP NF | λ≈30° | KURZ SHORT | MEHR SCHNEIDER | DIN 1835 B



HSSE-Roughing- and roughing finishing end mills short

Frezy wieloostrzowe krótkie HSS-E do obróbki zgrubnej i półwykańczającej

Frese con rompitruciolo a sgrossare e a finire, serie corta, HSSE

Fresas de desbaste y desbaste fino, serie corta, HSSE

Artikel-Nr. *Article-No.*					E.9615.1 € Stück *piece*	E.9616.1 € Stück *piece*
d1 k12	l2	l1	d2 h6	Zähne *flutes*		
6,00	13	57	6,0	4	**20,50**	**20,50**
7,00	16	66	10,0	4	**23,00**	**23,00**
8,00	19	69	10,0	4	**23,50**	**23,50**
9,00	19	69	10,0	4	**26,50**	**26,50**
10,00	22	72	10,0	4	**27,00**	**27,00**
11,00	22	79	12,0	4	**36,00**	**36,00**
12,00	26	83	12,0	4	**32,00**	**32,00**
13,00	26	83	12,0	4	**38,00**	**38,00**
14,00	26	83	12,0	4	**37,50**	**37,50**
15,00	26	83	12,0	4	**44,50**	**44,50**
16,00	32	92	16,0	4	**44,50**	**44,50**
17,00	32	92	16,0	4	**52,80**	**52,80**
18,00	32	92	16,0	4	**52,80**	**52,80**
20,00	38	104	20,0	4	**64,00**	**64,00**
22,00	38	104	20,0	5	**74,00**	**74,00**
24,00	45	121	25,0	5	**91,00**	**91,00**
25,00	45	121	25,0	5	**90,00**	**90,00**
26,00	45	121	25,0	5	**112,00**	**112,00**
28,00	45	121	25,0	5	**112,00**	**112,00**
30,00	45	121	25,0	5	**130,00**	**130,00**
32,00	53	133	32,0	6	**145,00**	**145,00**

HSSE-Schruppfräser

E.9619.0

Universal

HSS-E | LANG LONG | TYP NR | λ≈30° | MEHR SCHNEIDER | MK



HSSE-Roughing end mills

Frezy wieloostrzowe krótkie HSS-E do obróbki zgrubnej

Frese con rompitruciolo a sgrossare, gambio MK, HSSE

Fresas de desbaste, HSSE

Artikel-Nr. *Article-No.*					E.9619.0 € Stück *piece*
d1 k10	l2	l1	d2 MK	Zähne *flutes*	
25,00	45	147	3	5	**50,00**
28,00	45	147	3	5	**53,00**
32,00	53	178	4	6	**66,00**
36,00	53	178	4	6	**83,00**
40,00	63	188	4	6	**102,00**
45,00	63	188	4	6	**128,00**
50,00	75	233	5	6	**155,00**
63,00	90	248	5	8	**280,00**
		lang *long*			**E.9619.0L**
32,00	106	231	4	6	**105,00**
36,00	106	231	4	6	**117,00**
40,00	125	250	4	6	**130,00**
45,00	125	250	4	6	**178,00**
50,00	150	308	5	6	**230,00**
63,00	180	338	5	8	**390,00**
		überlang *extended long*			**E.9619.0XL**
32,00	150	275	4	6	**335,00**
35,00	150	275	4	6	**382,00**
40,00	180	305	4	6	**518,00**
45,00	190	315	4	7	**648,00**
50,00	200	360	5	7	**935,00**

HSSE-Schruppschlichtfräser

E.9685.0

Universal

HSS-E | DIN 845 | TYP NF | λ≈35° | MEHR SCHNEIDER | SK DIN 69871A



HSSE-Roughing finishing end mills

Frezy wieloostrzowe HSS-E do obróbki zgrubnej i półwykańczającej

Frese con rompitruciolo a finire, HSSE

Fresas de desbaste fino, HSSE

Artikel-Nr. *Article-No.*					E.9685.0 € Stück *piece*
d1 z13	l2	l1	d2 SK	Zähne *flutes*	
25,00	80	195	30	4	**161,00**
28,00	90	205	30	6	**170,00**
32,00	100	240	40	6	**199,00**
36,00	110	255	40	6	**249,00**
40,00	125	270	40	6	**277,00**
45,00	130	275	40	6	**388,00**
50,00	140	290	40	6	**498,00**
56,00	150	340	50	8	**554,00**
63,00	160	350	50	8	**665,00**

E.9620.0

Universal

HSS-E | DIN 1833 | TYP N | DIN 1835 B

MEHR SCHNEIDER **kreuzverzahnt** *staggered tooth*



HSSE-Woodruft keyseat cutters

Frezy wieloostrzowe HSS-E do rowków Woodrufta

Frese per chiavette, HSSE

Fresas de ranurar Woodruff, HSSE

***= nicht nach DIN**
**= not according DIN*

Artikel-Nr. *Article-No.*					**E.9620.0** € **Stück** *piece*
d1 h12	**b** e8	**l1**	**d2** h6	**Zähne** *flutes*	
4,50	1,0	50	6,0	6	**25,00**
7,50	1,5	50	6,0	6	**20,00**
7,50	2,0	50	6,0	6	**20,00**
10,50	2,0	50	6,0	6	**23,00**
10,50	2,5	50	6,0	6	**23,00**
10,50	3,0	50	6,0	6	**23,00**
13,50*	2,0	56	10,0	6	**24,00**
13,50	3,0	56	10,0	6	**24,00**
13,50	4,0	56	10,0	6	**24,00**
16,50	3,0	56	10,0	6	**28,50**
16,50	4,0	56	10,0	6	**28,50**
16,50	5,0	56	10,0	6	**28,50**
19,50*	3,0	63	10,0	8	**34,50**
19,50	4,0	63	10,0	8	**34,50**
19,50	5,0	63	10,0	8	**34,50**
19,50	6,0	63	10,0	8	**34,50**
22,50*	4,0	63	10,0	8	**39,50**
22,50	5,0	63	10,0	8	**39,50**
22,50	6,0	63	10,0	8	**39,50**
22,50	8,0	63	10,0	8	**39,50**
25,50*	5,0	63	10,0	10	**43,80**
25,50	6,0	63	10,0	10	**43,80**
28,50	6,0	63	10,0	10	**43,80**
28,50	8,0	63	10,0	10	**43,80**
28,50	10,0	71	12,0	10	**43,80**
32,50*	6,0	71	12,0	10	**46,00**
32,50*	7,0	71	12,0	10	**46,00**
32,50	8,0	71	12,0	10	**46,00**
32,50	10,0	71	12,0	10	**46,00**
38,50*	8,0	71	12,0	10	**56,00**
45,50*	8,0	71	12,0	12	**67,00**
45,50	10,0	71	12,0	12	**67,00**

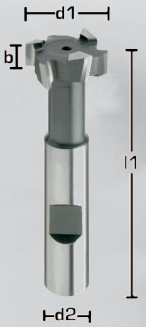
HSSE-T-Nuten-Fräser

E.9621.0

Universal

HSS-E | DIN 851 | TYP N | DIN 1835 B

MEHR SCHNEIDER kreuzverzahnt *staggered tooth*



HSSE-T-Slot-Cutters

Frezy wieloostrzowe HSS-E do rowków teowych

Frese a T, HSSE

Fresas para ranurar en T, HSSE

Artikel-Nr. *Article-No.*					E.9621.0 € Stück *piece*
d1 d11	b d11	l1	d2 h6	Zähne *flutes*	
11,00	4	54	10,0	6	**37,00**
12,50	6	57	10,0	6	**37,00**
16,00	8	62	10,0	6	**38,00**
18,00	8	70	12,0	6	**39,00**
19,00	9	71	12,0	6	**40,00**
21,00	9	74	12,0	6	**41,00**
22,00	10	75	12,0	6	**43,00**
25,00	11	82	16,0	8	**45,00**
28,00	12	85	16,0	8	**55,00**
32,00	14	90	16,0	8	**58,00**
36,00	16	103	25,0	8	**78,00**
40,00	18	108	25,0	10	**101,00**
45,00	20	113	25,0	10	**125,00**
50,00	22	124	32,0	10	**147,00**
60,00	28	139	32,0	10	**180,00**

HSSE-T-Nuten-Fräser

E.9622.0

Universal

HSS-E | DIN 851 | TYP NR | DIN 1835 B

MEHR SCHNEIDER kreuzverzahnt *staggered tooth*



HSSE-T-Slot-Cutters

Frezy wieloostrzowe HSS-E do rowków teowych

Frese a T a sgrossare, HSSE

Fresas ranurar en T, HSSE

Artikel-Nr. *Article-No.*					E.9622.0 € Stück *piece*
d1	b	l1	d2 h6	Zähne *flutes*	
12,50	6	57	10,0	4	**52,00**
16,00	8	62	10,0	5	**58,00**
18,00	8	70	12,0	5	**66,00**
19,00	9	70	12,0	5	**70,00**
21,00	9	74	12,0	5	**73,50**
22,00	10	74	12,0	5	**80,50**
25,00	11	82	16,0	5	**92,50**
28,00	12	85	16,0	6	**112,00**
32,00	14	90	16,0	6	**124,00**
36,00	16	108	25,0	6	**171,00**
40,00	18	108	25,0	8	**187,00**

HSSE-T-Nuten-Fräser

E.9686.0

Universal

HSS-E | DIN 851 | TYP NF | DIN 1835 B

MEHR SCHNEIDER kreuzverzahnt *staggered tooth*



HSSE-T-Slot-Cutters

Frezy wieloostrzowe HSS-E do rowków teowych

Frese a T a finire, HSSE

Fresas ranurar en T, HSSE

Artikel-Nr. *Article-No.*					E.9686.0 € Stück *piece*
d1 d11	b d11	l1	d2 h6	Zähne *flutes*	
21,00	9	74	12,0	6	**55,00**
25,00	11	82	16,0	6	**61,00**
32,00	14	90	16,0	6	**77,00**
40,00	18	108	25,0	8	**134,00**

HSSE-Winkelfräser

E.9623.0

Universal

HSS-E | DIN 1833 | TYP N | DIN 1835 B

MEHR SCHNEIDER



HSSE-Angle cutters

Frezy wieloostrzowe HSS-E kątowe

Frese per scanalature ad angolo, HSSE

Fresas angulares, HSSE

Artikel-Nr. *Article-No.*						E.9623.0 € Stück *piece*
d1 js16	Winkel + - 30` *angle + - 30`*	b js14	l1	d2 h6	Zähne *flutes*	
16,00	45°	4,0	60	12,0	6	**26,00**
16,00	60°	6,3	60	12,0	6	**26,00**
20,00	45°	5,0	63	12,0	6	**32,00**
20,00	60°	8,0	63	12,0	6	**32,00**
25,00	45°	6,3	67	16,0	8	**39,00**
25,00	60°	10,0	67	16,0	8	**39,00**
32,00	45°	8,0	71	16,0	10	**50,00**
32,00	60°	12,5	71	16,0	10	**50,00**
38,00	45°	10,0	80	16,0	12	**67,00**
38,00	60°	16,0	80	16,0	12	**67,00**
40,00	60°	13,0	85	25,0	12	**78,00**
50,00	60°	16,0	100	25,0	16	**158,00**

E.9624.0

Universal

HSS-E | DIN 1833 | TYP N | DIN 1835 B | MEHR SCHNEIDER



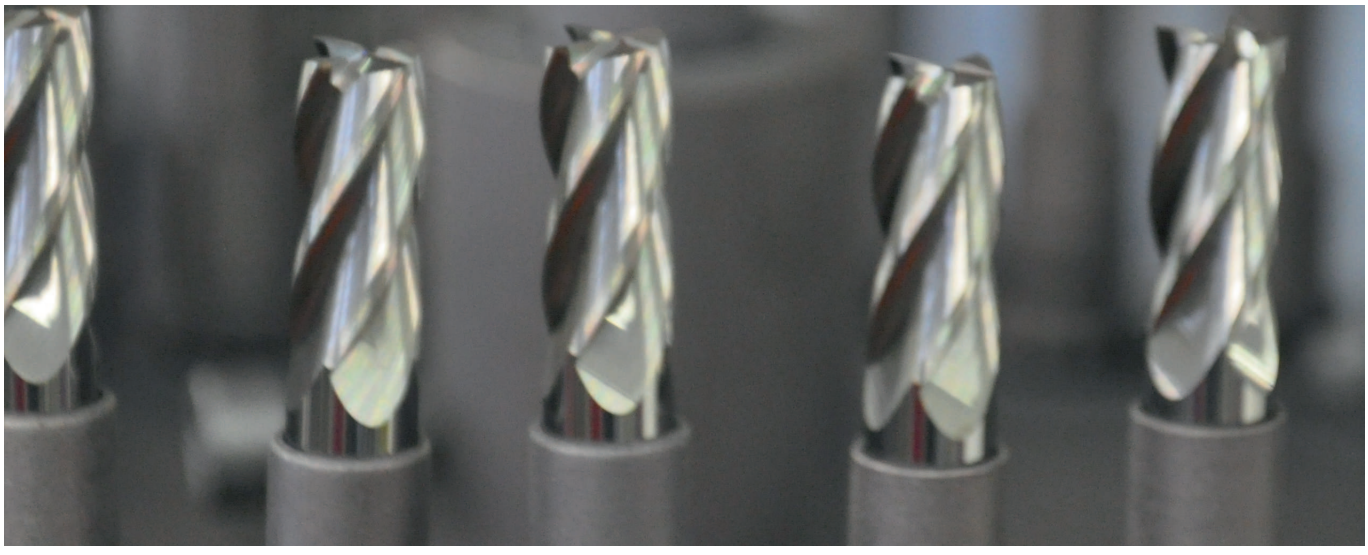
HSSE-Single angle shell end mills

Frezy wieloostrzowe nasadzane HSS-E pojedyncze kątowe

Frese per scanalature ad angolo, HSSE

Fresas angulares frontales, HSSE

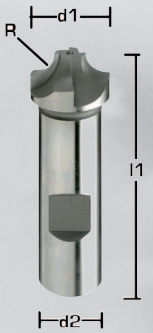
Artikel-Nr. *Article-No.*						E.9624.0 € Stück *piece*
d1 js16	Winkel + - 30` *angle + - 30`*	b js14	l1	d2 h6	Zähne *flutes*	
16,00	45°	4,0	60	12,0	10	**25,00**
16,00	50°	5,0	60	12,0	12	**25,00**
16,00	55°	5,6	60	12,0	10	**25,00**
16,00	60°	6,3	60	12,0	10	**25,00**
16,00	65°	6,3	60	12,0	10	**25,00**
16,00	70°	7,0	60	12,0	10	**25,00**
16,00	75°	8,0	60	12,0	10	**25,00**
20,00	45°	5,0	63	12,0	10	**32,00**
20,00	50°	6,3	63	12,0	12	**32,00**
20,00	55°	7,1	63	12,0	10	**32,00**
20,00	60°	8,0	63	12,0	10	**32,00**
20,00	70°	9,0	63	12,0	10	**32,00**
25,00	45°	6,3	67	12,0	10	**40,00**
25,00	50°	8,0	67	12,0	12	**40,00**
25,00	55°	9,0	67	12,0	12	**40,00**
25,00	60°	10,0	67	12,0	10	**40,00**
25,00	65°	10,0	67	12,0	12	**40,00**
25,00	70°	11,0	67	16,0	10	**40,00**
25,00	75°	10,0	67	12,0	12	**40,00**
32,00	45°	8,0	71	16,0	12	**52,00**
32,00	60°	12,5	71	16,0	12	**52,00**



E.9625.0

Universal

HSS-E | DIN 6518 | TYP N | DIN 1835 B | MEHR SCHNEIDER



HSSE-Corner rounding and profile milling cutters

Frezy kształtowe wieloostrzowe HSS-E do frezowania krawędzi oraz profilowania

Frese per profilo 1/4 di raggio, HSSE

Fresas de perfil de un cuarto radio, HSSE

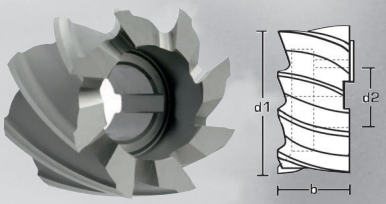
Artikel-Nr. *Article-No.*					E.9625.0 € Stück *piece*
R H11	d1 js16	l1	d2 h6	Zähne *flutes*	
1,00	8	60	10,0	4	**34,00**
1,50	10	60	10,0	4	**38,00**
1,60	10	60	10,0	4	**38,00**
2,00	10	60	10,0	4	**38,00**
2,50	10	60	10,0	4	**38,00**
3,00	12	60	12,0	4	**39,00**
3,50	14	60	12,0	4	**43,00**
4,00	14	60	12,0	4	**41,00**
4,50	15	60	12,0	4	**46,00**
5,00	16	60	12,0	4	**46,00**
5,50	21	67	16,0	4	**48,50**
6,00	21	67	16,0	4	**48,50**
6,50	24	71	16,0	4	**59,50**
7,00	24	71	16,0	4	**59,50**
7,50	24	71	16,0	4	**59,50**
8,00	24	71	16,0	4	**59,50**
8,50	28	85	25,0	4	**72,00**
9,00	28	85	25,0	4	**72,00**
9,50	28	85	25,0	4	**72,00**
10,00	28	85	25,0	4	**72,00**
10,50	35	90	25,0	4	**79,50**
11,00	35	90	25,0	4	**79,50**
12,00	35	90	25,0	4	**79,50**
12,50	42	100	25,0	4	**110,00**
13,00	42	100	25,0	4	**110,00**
14,00	42	100	25,0	4	**110,00**
15,00	48	100	25,0	6	**127,00**
16,00	48	100	25,0	6	**127,00**
18,00	54	112	32,0	6	**143,00**
20,00	58	112	32,0	6	**159,00**

HSSE-Walzenstirnfräser

E.9628.0

Universal

HSS-E | DIN 1880 | TYP N | λ≈30° | MEHR SCHNEIDER



HSSE-Shell end mills

Frezy wieloostrzowe nasadzane HSS-E

Frese a manicotto, HSSE

Fresas frontales de dos cortes, HSSE

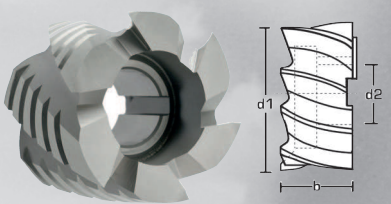
Artikel-Nr. *Article-No.*					E.9628.0 € Stück *piece*
d1 js16	b k16	d2 H7	DIN	Zähne *flutes*	
40,00	32	16	1880	8	**59,00**
50,00	36	22	1880	8	**82,00**
63,00	40	27	1880	8	**113,00**
80,00	45	27	1880	10	**172,00**
100,00	50	32	1880	12	**274,00**
125,00	56	40	1880	14	**385,00**
30,00	30	13	841	6	**53,00**
35,00	35	16	841	6	**63,00**
40,00	20	16	841	8	**55,00**
40,00	40	16	841	8	**76,00**
50,00	25	22	841	8	**74,00**
50,00	50	22	841	8	**112,00**
60,00	30	27	841	8	**100,00**
60,00	60	27	841	8	**158,00**
75,00	35	27	841	10	**144,00**
75,00	75	27	841	10	**250,00**
90,00	35	27	841	10	**190,00**
110,00	35	32	841	10	**265,00**

HSSE-Schruppschlicht-Walzenstirnfräser

E.9629.0

Universal

HSS-E | DIN 1880 | TYP NF | λ≈30° | MEHR SCHNEIDER



HSSE-Roughing-Finishing shell end mills

Frezy wieloostrzowe nasadzane HSS-E do obróbki zgrubno-wykańczającej

Frese a manicotto a finire, HSSE

Fresas frontales de dos cortes de desbaste fino, HSSE

Artikel-Nr. *Article-No.*				E.9629.0 € Stück *piece*
d1 js16	b k16	d2 H7	Zähne *flutes*	
40,00	32	16	6	**83,00**
50,00	36	22	6	**110,00**
63,00	40	27	8	**150,00**
80,00	45	27	8	**238,00**
100,00	50	32	10	**370,00**

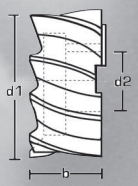
HSSE-Schrupp-Walzenstirnfräser

E.9630.0

Universal

HSS-E | DIN 1880 | TYP NR | λ≈30° | MEHR SCHNEIDER





HSSE-Roughing shell end mills

Frezy wieloostrzowe nasadzane HSS-E do obróki zgrubnej

Frese a manicotto a sgrossare, HSSE

Fresas frontales de dos cortes de desbaste, HSSE

Artikel-Nr. *Article-No.*				E.9630.0 € Stück *piece*
d1 js16	b k16	d2 H7	Zähne *flutes*	
40,00	32	16	6	**78,00**
50,00	36	22	6	**103,00**
63,00	40	27	8	**145,00**
80,00	45	27	8	**220,00**
100,00	50	32	10	**340,00**

HSSE-Schrupp-Walzenstirnfräser

E.9631.0

Universal

HSS-E | DIN 1880 | TYP HR | λ≈30° | MEHR SCHNEIDER

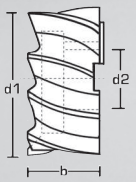


E.9631.1

Universal

HSS-E | DIN 1880 | TYP HR | λ≈30° | MEHR SCHNEIDER | Blue Cut





HSSE-Roughing shell end mills

Frezy wieloostrzowe nasadzane HSS-E do obróbki zgrubnej

Frese a manicotto sgrossare, HSSE

Fresas frontales de dos cortes de desbaste, HSSE

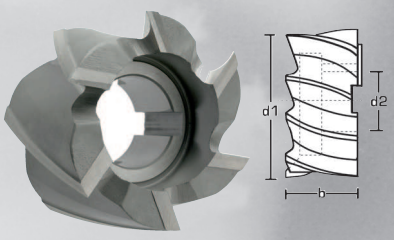
Artikel-Nr. *Article-No.*				E.9631.0 € Stück *piece*	E.9631.1 € Stück *piece*
d1 js16	b k16	d2 H7	Zähne *flutes*		
40,00	32	16	6	**98,00**	**115,00**
50,00	36	22	8	**125,00**	**138,00**
63,00	40	27	8	**160,00**	**180,00**
80,00	45	27	10	**220,00**	**245,00**
100,00	50	32	10	**348,00**	**380,00**

HSSE-Walzenstirnfräser für Aluminium

E.9632.0

4.1 | 4.2 | 4.3 | 4.4

HSS-E | DIN 1880 | TYP W | λ≈40° | MEHR SCHNEIDER | ALU



HSSE-Shell end mills for aluminium

Frezy wieloostrzowe nasadzane HSS-E do aluminium

Frese a manicotto a finire per alluminio, HSSE

Fresas frontales de dos cortes, HSSE, para aluminio

Artikel-Nr. *Article-No.*				E.9632.0 € Stück *piece*
d1 js16	b k16	d2 H7	Zähne *flutes*	
50,00	36	22	6	**70,00**
63,00	40	27	6	**98,00**
80,00	45	27	6	**128,00**
100,00	50	32	6	**165,00**

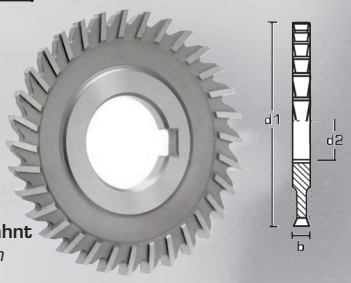
HSSE-Metallkreisfräser

E.9687.0

Universal

HSS-E | TYP N | MEHR SCHNEIDER

gerade verzahnt
straight tooth



HSSE-Side and face cutters

Frezy wieloostrzowe tarczowe HSS-E

Frese a disco, taglio laterale e frontale, HSSE

Fresas circulares para metales, HSSE

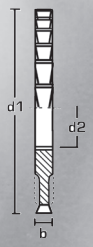
Artikel-Nr. *Article-No.*				E.9687.0 € Stück *piece*
d1 js16	b k11	d2 H7	Zähne *flutes*	
63,00	1,6	22	32	**66,00**
63,00	2,0	22	32	**58,00**
63,00	2,5	22	32	**59,00**
63,00	3,0	22	32	**61,00**
63,00	4,0	22	32	**67,00**
80,00	1,6	27	36	**70,00**
80,00	2,0	27	36	**68,00**
80,00	2,5	27	36	**69,00**
80,00	3,0	27	36	**71,00**
80,00	4,0	27	36	**76,00**
100,00	1,6	32	40	**84,00**
100,00	2,0	32	40	**83,00**
100,00	2,5	32	40	**83,00**
100,00	3,0	32	40	**85,00**
100,00	4,0	32	40	**91,00**
125,00	1,6	32	44	**106,00**
125,00	2,0	32	44	**102,00**
125,00	2,5	32	44	**104,00**
125,00	3,0	32	44	**107,00**
125,00	4,0	32	44	**114,00**
160,00	2,0	40	52	**165,00**
160,00	2,5	40	52	**158,00**
160,00	3,0	40	52	**161,00**

E.9633.0

Universal

HSS-E | DIN 1834A | TYP N





MEHR SCHNEIDER

kreuzverzahnt,
mit Längs- und Quernut
staggered tooth,
with standard keyway and drive slot

HSSE-Side and face cutters

Frezy wieloostrzowe tarczowe trójstronne naprzemiennie skośne HSS-E

Frese a disco, taglio laterale e frontale, HSSE

Fresas circulares para metales, HSSE

Artikel-Nr. *Article-No.*				E.9633.0 € Stück *piece*
d1 js16	b k11	d2 H7	Zähne *flutes*	
63,00	1,6	22	28	**75,00**
63,00	2,0	22	28	**75,00**
63,00	2,5	22	28	**75,00**
63,00	3,0	22	28	**75,00**
63,00	4,0	22	28	**80,00**
63,00	5,0	22	28	**80,00**
63,00	6,0	22	28	**80,00**
80,00	1,6	27	32	**85,00**
80,00	2,0	27	32	**85,00**
80,00	2,5	27	32	**85,00**
80,00	3,0	27	32	**85,00**
80,00	4,0	27	32	**90,00**
80,00	5,0	27	32	**90,00**
80,00	6,0	27	32	**90,00**
100,00	1,6	32	32	**102,00**
100,00	2,0	32	36	**102,00**
100,00	2,5	32	36	**102,00**
100,00	3,0	32	36	**102,00**
100,00	4,0	32	36	**110,00**
100,00	5,0	32	36	**110,00**
100,00	6,0	32	36	**110,00**
100,00	8,0	32	28	**125,00**
125,00	1,6	32	40	**140,00**
125,00	2,0	32	40	**140,00**
125,00	2,5	32	40	**140,00**
125,00	3,0	32	40	**140,00**
125,00	4,0	32	40	**160,00**
125,00	5,0	32	40	**160,00**
125,00	6,0	32	40	**160,00**
125,00	8,0	32	32	**175,00**
125,00	10,0	32	32	**190,00**
160,00	2,0	40	48	**180,00**
160,00	2,5	40	48	**180,00**
160,00	3,0	40	48	**180,00**
160,00	4,0	40	48	**201,00**
160,00	5,0	40	48	**201,00**
160,00	6,0	40	48	**201,00**
160,00	8,0	40	36	**230,00**
160,00	10,0	40	36	**230,00**
160,00	12,0	40	36	**251,00**
200,00	2,0	40	52	**280,00**
200,00	2,5	40	52	**280,00**
200,00	3,0	40	52	**280,00**
200,00	4,0	40	52	**301,00**
200,00	5,0	40	52	**326,00**
200,00	6,0	40	52	**340,00**

E.9634.0

Universal

HSS-E | DIN 885 | TYP N



kreuzverzahnt (kv)
staggered tooth (kv)

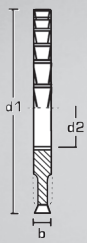
E.9644.0

Universal

HSS-E | DIN 885 | Typ H



gerade verzahnt (gv)
straight tooth (gv)



HSSE-Side and face cutters

Frezy tarczowe HSS-E, ząb naprzemiennie skośny. / ząb prosty

Frese a disco, taglio laterale e frontale, HSSE

Fresas de tres cortes, HSSE

Artikel-Nr. *Article-No.*				E.9634.0 € Stück *piece*	E.9644.0 € Stück *piece*
d1 js16	b k11	d2 H7	Zähne *flutes* kv / gv		
50,00	4	16	16	**57,00**	**60,00**
50,00	5	16	16	**57,00**	**62,00**
50,00	6	16	16	**60,00**	**63,00**
50,00	8	16	16	**62,00**	**72,00**
50,00	10	16	16	**68,00**	**79,00**
63,00	4	22	18	**59,00**	**79,00**
63,00	5	22	18	**61,00**	**75,00**
63,00	6	22	18	**63,00**	**71,00**
63,00	8	22	18	**69,00**	**75,00**
63,00	10	22	18	**76,00**	**79,00**
63,00	12	22	18	**88,00**	**92,00**
63,00	14	22	18	**99,00**	**110,00**
63,00	16	22	18	**105,00**	**115,00**
80,00	4	27	20	**78,00**	
80,00	5	27	20	**81,00**	**89,00**
80,00	6	27	20	**83,00**	**90,00**
80,00	8	27	20	**86,00**	**93,00**
80,00	10	27	18/20	**88,00**	**102,00**
80,00	12	27	18/20	**99,00**	**112,00**
80,00	14	27	18/20	**120,00**	**108,00**
80,00	16	27	18/20	**129,00**	**138,00**
80,00	18	27	18/20	**145,00**	**149,00**
80,00	20	27	18/20	**145,00**	**151,00**
100,00	4	32	20/24	**105,00**	
100,00	5	32	20/24	**112,00**	
100,00	6	32	20/24	**118,00**	**108,00**
100,00	8	32	20/24	**118,00**	**119,00**
100,00	10	32	20/24	**127,00**	**131,00**
100,00	12	32	20/24	**136,00**	**145,00**
100,00	14	32	20/24	**151,00**	**168,00**
100,00	16	32	20/24	**160,00**	**178,00**
100,00	18	32	20/24	**190,00**	**206,00**
100,00	20	32	20/24	**195,00**	**217,00**
100,00	25	32	20/24	**240,00**	**232,00**
125,00	5	32	24	**135,00**	
125,00	6	32	24	**145,00**	
125,00	8	32	24	**160,00**	**169,00**
125,00	10	32	22/24	**170,00**	**174,00**
125,00	12	32	22/24	**185,00**	**183,00**
125,00	14	32	22/24	**210,00**	**213,00**
125,00	16	32	22/24	**217,00**	**226,00**

Fortsetzung nächste Seite *to be continued*

E.9634.0

Universal

HSS-E | DIN 885 | TYP N

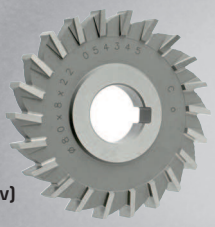


kreuzverzahnt (kv)
staggered tooth (kv)

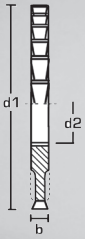
E.9644.0

Universal

HSS-E | DIN 885 | Typ H



gerade verzahnt (gv)
straight tooth (gv)



HSSE-Side and face cutters

Frezy tarczowe HSS-E, ząb naprzemiennie skośny. / ząb prosty

Frese a disco, taglio laterale e frontale, HSSE

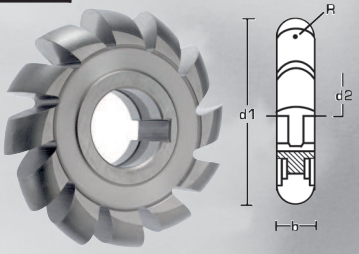
Fresas de tres cortes, HSSE

Artikel-Nr. *Article-No.*				E.9634.0 € Stück *piece*	E.9644.0 € Stück *piece*
d1 js16	b k11	d2 H7	Zähne *flutes* kv / gv		
125,00	18	32	22/24	**250,00**	**246,00**
125,00	20	32	22/24	**255,00**	**250,00**
125,00	25	32	22/24	**305,00**	**298,00**
125,00	28	32	22/24	**330,00**	
160,00	6	40	26/24	**214,00**	
160,00	8	40	26/24	**235,00**	
160,00	10	40	26/24	**257,00**	**258,00**
160,00	12	40	26/24	**280,00**	**288,00**
160,00	14	40	26/24	**300,00**	**321,00**
160,00	16	40	26/24	**324,00**	**348,00**
160,00	18	40	26/24	**355,00**	**376,00**
160,00	20	40	26/24	**355,00**	**393,00**
160,00	25	40	26/24	**444,00**	
160,00	32	40	26/24	**557,00**	
200,00	8	40	32	**332,00**	
200,00	10	40	32	**358,00**	**359,00**
200,00	12	40	32	**404,00**	**416,00**
200,00	14	40	32	**457,00**	**488,00**
200,00	16	40	32	**468,00**	**504,00**
200,00	18	40	32	**512,00**	**541,00**
200,00	20	40	32	**523,00**	**578,00**
200,00	25	40	32	**634,00**	
200,00	32	40	32	**802,00**	
250,00	8	40	38	**457,00**	
250,00	10	40	38	**484,00**	
250,00	12	40	38	**530,00**	

E.9688.0

Universal

HSS | WERKS-(COMPANY)NORM | MEHR SCHNEIDER



HSS-half circle milling cutters convex

Frezy tarczowe półokrągłe wypukłe HSS-E

Frese a disco convesse, HSS

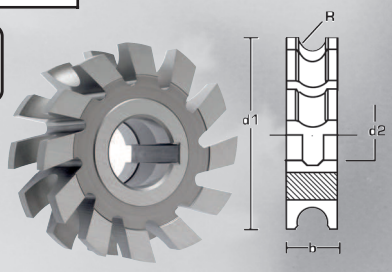
Fresas convexas de semi-círculo, HSS

Artikel-Nr. *Article-No.*					E.9688.0 € Stück *piece*
R k11	d1 js16	b	d2 H7	Zähne *flutes*	
1,00	50	2,0	16	14	**40,00**
1,25	50	2,5	16	14	**40,00**
1,50	50	3,0	16	14	**40,00**
1,60	50	3,2	16	14	**40,00**
2,00	50	4,0	16	14	**40,00**
2,50	63	5,0	22	12	**41,00**
3,00	63	6,0	22	12	**42,00**
3,15	63	6,3	22	12	**44,00**
3,50	63	7,0	22	12	**44,00**
4,00	63	8,0	22	12	**45,00**
4,50	63	9,0	22	12	**51,00**
5,00	63	10,0	22	12	**60,00**
5,50	80	11,0	27	12	**64,00**
6,00	80	12,0	27	12	**70,00**
6,30	80	12,6	27	12	**76,00**
6,50	80	13,0	27	12	**76,00**
7,00	80	14,0	27	12	**78,00**
7,50	80	15,0	27	12	**79,00**
8,00	80	16,0	27	12	**85,00**
8,50	100	17,0	32	12	**93,00**
9,00	100	18,0	32	12	**102,00**
9,50	100	19,0	32	12	**110,00**
10,00	100	20,0	32	12	**122,00**
11,00	100	22,0	32	12	**131,00**
12,00	100	24,0	32	12	**140,00**
12,50	100	25,0	32	12	**171,00**
14,00	125	28,0	32	12	**240,00**
15,00	125	30,0	32	12	**260,00**
16,00	125	32,0	32	12	**270,00**
18,00	125	36,0	40	12	**300,00**
20,00	125	40,0	32	12	**340,00**
25,00	160	50,0	40	12	**400,00**

E.9689.0

Universal

HSS | WERKS-NORM (COMPANY) | MEHR SCHNEIDER



HSS-half circle milling cutters concave

Frezy tarczowe półokrągłe wklęsłe HSS-E

Frese a disco concave, HSS

Fresas cóncavas de semi-círculo, HSS

Artikel-Nr. *Article-No.*					E.9689.0 € Stück *piece*
R H11	d1 js16	b	d2 H7	Zähne *flutes*	
1,00	50	6	16	14	**44,00**
1,25	50	6	16	14	**44,00**
1,60	50	8	16	14	**44,00**
2,00	50	9	16	14	**44,00**
2,50	63	10	22	12	**45,00**
3,00	63	12	22	12	**46,00**
3,15	63	12	22	12	**48,00**
3,50	63	16	22	12	**48,00**
4,00	63	16	22	12	**49,00**
4,50	63	18	22	12	**55,00**
5,00	63	20	22	12	**66,00**
6,00	80	24	27	12	**76,00**
6,30	80	24	27	12	**84,00**
7,00	80	24	27	12	**84,00**
8,00	80	32	27	12	**93,00**
9,00	100	32	32	12	**111,00**
10,00	100	36	32	12	**133,00**
12,00	100	40	32	12	**173,00**
12,50	100	40	32	12	**193,00**
16,00	125	50	32	10	**295,00**
20,00	125	60	32	10	**372,00**

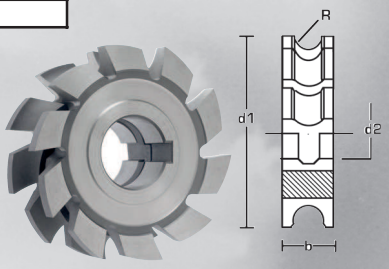


HSSE-Halbrund-Profilfräser konkav gekuppelt

E.9690.0

Universal

HSS-E | WERKS-(COMPANY) NORM | MEHR SCHNEIDER



HSS-half circle milling cutters concave coupled

Frezy tarczowe półokrągłe wklęsłe HSS-E o zawężonej tolerancji do pracy w układzie sprzężonym

Frese a disco accoppiate concave, HSS

Fresas de perfil cóncavas acopladas, HSS

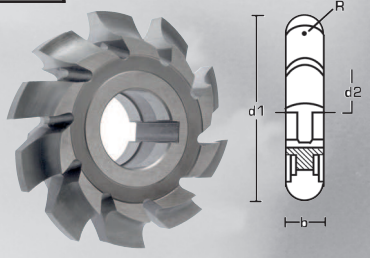
Artikel-Nr. *Article-No.*						E.9690.0 € Stück *piece*
R	Toleranz *tolerance*	d1 js16	b js16	d2 H7	Zähne *flutes*	
11,00	+- 0,12	100	36	32	10	**119,00**
12,00	+- 0,12	100	38	32	10	**121,00**
12,50	+- 0,12	100	40	32	10	**123,00**
14,00	+- 0,12	125	44	40	10	**174,00**
16,00	+- 0,12	125	48	40	10	**178,00**
18,00	+- 0,12	125	52	40	10	**184,00**
20,00	+- 0,12	125	58	40	10	**188,00**
22,50	+- 0,20	160	63	40	12	**306,00**
25,00	+- 0,20	160	68	40	12	**317,00**

HSSE-Viertelrund-Profilfräser konvex

E.9691.0

Universal

HSS-E | WERKS-(COMPANY) NORM | MEHR SCHNEIDER



HSSE-corner rounding milling cutters concave

Frezy tarczowe wklęsłe HSS-E o zawężonej tolerancji do pracy w układzie sprzężonym

Frese a disco concave di un quarto di giro HSS

Fresas cóncavas de cuarto-círculo, HSS

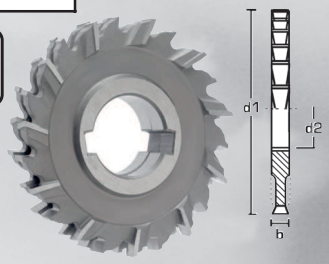
Artikel-Nr. *Article-No.*						E.9691.0 € Stück *piece*
R	Toleranz *tolerance*	d1 js16	b js16	d2 H7	Zähne *flutes*	
1,00	+- 0,05	63	4	22	20	**30,00**
1,60	+- 0,05	63	5	22	18	**30,00**
2,00	+- 0,05	63	6	22	16	**30,00**
2,50	+- 0,05	63	8	22	14	**31,00**
3,00	+- 0,08	63	10	22	12	**32,00**
4,00	+- 0,08	63	12	22	12	**34,00**
5,00	+- 0,08	80	14	27	12	**45,00**
6,00	+- 0,08	80	16	27	12	**53,00**
8,00	+- 0,12	80	22	27	12	**64,00**
10,00	+- 0,12	100	26	32	12	**92,00**
12,00	+- 0,12	100	32	32	10	**121,00**
14,00	+- 0,12	125	36	40	10	**173,00**
16,00	+- 0,12	125	40	40	10	**204,00**
18,00	+- 0,12	125	45	40	10	**223,00**
20,00	+- 0,12	125	50	40	10	**258,00**
25,00	+- 0,20	160	60	40	12	**271,00**

HSSE-Scheibenfräser feinverzahnt gekuppelt

E.9692.0

Universal

HSS-E | WERKS-(COMPANY) NORM | MEHR SCHNEIDER | Typ H



HSSE-side and face milling cutters fine-teeth coupled

Frezy tarczowe HSS-E drobne zęby

Frese a disco, dentatura fine, HSSE

Fresas de tres cortes, dentado fino, acopladas, HSSE

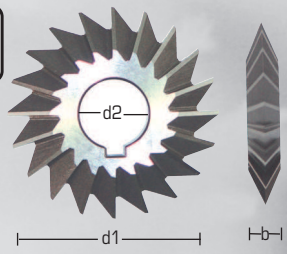
Artikel-Nr. *Article-No.*				E.9692.0 € Stück *piece*
d1 js16	b s10	d2 H7	Zähne *flutes*	
80,00	16	27	22	**106,00**
80,00	18	27	22	**110,00**
80,00	20	27	22	**139,00**
100,00	20	27	24	**155,00**
100,00	22	27	24	**166,00**
125,00	22	32	26	**172,00**
125,00	25	32	26	**238,00**
125,00	28	32	26	**222,00**
160,00	25	40	28	**244,00**
160,00	28	40	28	**277,00**
160,00	32	40	28	**333,00**

HSS-Prismenfräser

E.9635.0

Universal

HSS | DIN 847 | TYP N | MEHR SCHNEIDER



HSS-Prism cutters

Frezy tarczowe kątowe symetryczne HSS-E

Frese a disco prismatiche, HSS

Fresas angulares isosceles, HSS

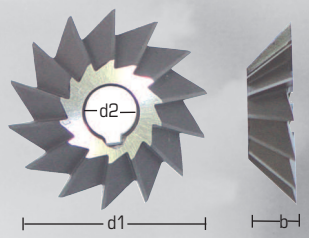
***= nicht nach DIN**
**= not according DIN*

Artikel-Nr. *Article-No.*					E.9635.0 € Stück *piece*
Winkel + - 30` *angle + - 30`*	d1 js16	b js16	d2 H7	Zähne *flutes*	
45°	50	8	16	22	**41,00**
45°	63	10	22	24	**50,00**
45°	80	12	27	26	**58,00**
45°	100	18	32	28	**101,00**
60°	50	10	16	18	**43,00**
60°	63	14	22	20	**52,00**
60°	80	18	27	22	**61,00**
60°	100	25	32	24	**104,00**
90°	50	14	16	16	**45,00**
90°	63	20	22	18	**54,00**
90°	80	22	27	20	**64,00**
90°	100	32	32	24	**107,00**
120° *	50	14	16	16	**47,00**
120° *	63	20	22	16	**56,00**
120° *	80	25	27	20	**64,00**
120° *	100	36	32	24	**110,00**

E.9636.0

Universal

HSS | DIN 842 | TYP N | MEHR SCHNEIDER



HSS-Angle cutters

Frezy tarczowe kątowe jednostronne HSS-E

Frese a disco ad angolo, HSS

Fresas angulares, HSS

Artikel-Nr. *Article-No.*					E.9636.0 € Stück *piece*
Winkel + - 25` *angle + - 25`*	d1 js16	b js14	d2 H7	Zähne *flutes*	
45°	40	10	10	14	**39,00**
45°	50	13	13	16	**40,00**
45°	63	18	16	18	**43,00**
45°	80	22	22	20	**68,00**
45°	100	28	27	22	**112,00**
45°	125	36	32	24	**195,00**
45°	160	45	40	28	**330,00**
50°	40	13	10	14	**39,00**
50°	50	16	13	16	**40,00**
50°	63	20	16	18	**43,00**
50°	80	25	22	20	**68,00**
50°	100	32	27	22	**112,00**
50°	125	40	32	24	**195,00**
50°	160	50	40	28	**330,00**
55°	40	13	10	14	**39,00**
55°	50	16	13	16	**40,00**
55°	63	20	16	18	**43,00**
55°	80	25	22	20	**68,00**
55°	100	32	27	22	**112,00**
55°	125	40	32	24	**195,00**
60°	40	13	10	14	**39,00**
60°	50	16	13	16	**40,00**
60°	63	20	16	18	**43,00**
60°	80	25	22	20	**68,00**
60°	100	32	27	22	**112,00**
60°	125	40	32	26	**195,00**
60°	160	50	40	28	**330,00**

PM-Drehlinge zum Drehen, Ausbohren, Fräsen, behandelt - rund

E.9693.0

PM



PM-Tool bits treated to be turned, bored, milled, round

PM-półfabrykat, do toczenia, wytaczania, frezowania, okrągły

Barrette trattate PM per tornitura, barenatura, fresatura, tonde

Barras en PM, tratadas, para tornear, taladrar y fresar redondas

Artikel-Nr. *Article-No.*		E.9693.0 € Stück *piece*
d1 h8	l1	
4,00	100	**8,00**
6,00	57	**7,50**
6,00	100	**10,00**
6,00	200	**18,00**
8,00	69	**4,00**
8,00	100	**14,00**
8,00	200	**23,50**
10,00	72	**4,50**
10,00	100	**16,50**
10,00	200	**29,00**
12,00	83	**6,00**
12,00	100	**20,50**
12,00	200	**35,50**
14,00	83	**7,50**
14,00	200	**51,00**
16,00	92	**10,00**
16,00	200	**66,00**
18,00	92	**12,00**
18,00	200	**69,00**
20,00	104	**15,00**
20,00	200	**90,00**
22,00	104	**18,00**
25,00	121	**28,00**
30,00	121	**38,00**

PM-Drehlinge zum Drehen, Ausbohren, Fräsen, behandelt - eckig

E.9694.0

PM



PM-Tool bits treated to be turned, bored, milled, square

PM-półfabrykat, do toczenia, wytaczania, frezowania, kwadratowy

Barrette trattate PM per tornitura, barenatura, fresatura, quadrate

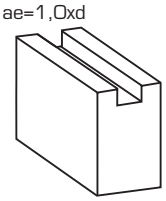
Barras en PM, tratadas, para tornear, taladrar y fresar cuadradas

Artikel-Nr. *Article-No.*		E.9694.0 € Stück *piece*
d1 h8	l1	
8 x 8	100	**21,00**
8 x 8	200	**40,00**
10 x 10	100	**26,00**
10 x 10	200	**53,00**
12 x 12	100	**45,00**
12 x 12	200	**64,00**
14 x 14	200	**84,00**
16 x 16	200	**90,00**
18 x 18	200	**77,00**
20 x 20	200	**150,00**

Einsatzrichtwerte für Bohrnuten- und Radiusfräser *Estimated values for use for center cut and ball nose end mills*

Korrekturfaktor *Factor of correction:*

1. **lang** *long* = **Vf - 30%**
2. **PM** *PM* = **Vc + 30% - 40%**
3. **Bohren** *drilling* = **Vf - 50%**
4. **Radiusfräsen** *Ball nose milling* = **Vc + 30% - 40%**

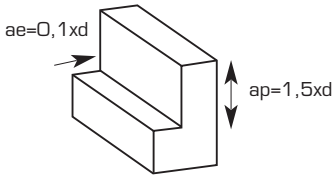


Materialgruppen *material groups*	**Bohrnutenfräser und Radiusfräser** *Center cut end mills and ball nose end mills*									
	blank *uncoated*	**beschichtet** *coated*	**fz Vorschub pro Zahn** *fz feed per tooth*							
	Vc (m/min)	**Vc (m/min)**	**< Ø 4 mm**	**< Ø 6 mm**	**< Ø 8 mm**	**< Ø 10 mm**	**< Ø 12 mm**	**< Ø 16 mm**	**< Ø 20 mm**	**< Ø 25 mm**	**< Ø 32 mm**
1.1	32 - 36	55 - 65	0,018	0,028	0,041	0,046	0,055	0,063	0,074	0,087	0,103
1.2	30 - 34	50 - 60	0,018	0,026	0,041	0,049	0,053	0,063	0,074	0,080	0,094
1.3	16 - 20	30 - 34	0,014	0,021	0,033	0,038	0,041	0,050	0,057	0,063	0,072
2.1	18 - 22	30 - 34	0,010	0,022	0,033	0,043	0,054	0,067	0,075	0,090	0,108
2.2	16 - 22	28 - 32	0,010	0,022	0,033	0,043	0,054	0,067	0,075	0,090	0,108
3.1	34 - 38	60 - 70	0,020	0,034	0,045	0,054	0,059	0,068	0,081	0,095	0,115
3.2											
3.3	20 - 24	38 - 42	0,020	0,034	0,045	0,054	0,059	0,068	0,081	0,095	0,115
3.4											
4.1	150 - 200	200 - 250	0,025	0,038	0,052	0,059	0,066	0,085	0,091	0,098	0,130
4.2	100 - 150	150 - 200	0,028	0,041	0,057	0,065	0,073	0,093	0,100	0,108	0,143
4.3	60 - 100	80 - 120	0,030	0,046	0,063	0,071	0,080	0,103	0,110	0,119	0,157
4.4											
4.5	50 - 70	80 - 120	0,011	0,019	0,031	0,039	0,053	0,071	0,079	0,086	0,094
4.6											
4.7											
4.8											
4.9											
5.1	12 - 16	22 - 26	0,011	0,018	0,029	0,038	0,048	0,057	0,067	0,079	0,090
5.2											
6.1											
6.2											
6.3											
6.4											

Einsatzrichtwerte für Schlichtfräser *Estimated values for use for finishing end mills*

Korrekturfaktor *Factor of correction:*

1. **lang** *long* = **Vf - 30%**
2. **PM** *PM* = **Vc + 30% - 40%**
3. **Bohren** *drilling* = **Vf - 50%**
4. **Radiusfräsen** *Ball nose milling* = **Vc +30% - 40%**

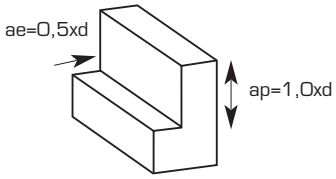


Materialgruppen *material groups*	Schlichtfräser *Finishing end mills*									
	blank *uncoated*	beschichtet *coated*	fz Vorschub pro Zahn *fz feed per tooth*							
	Vc (m/min)	Vc (m/min)	< Ø 4 mm	< Ø 6 mm	< Ø 8 mm	< Ø 10 mm	< Ø 12 mm	< Ø 16 mm	< Ø 20 mm	< Ø 25 mm
1.1	34 - 38	60 - 70	0,023	0,035	0,051	0,058	0,069	0,079	0,092	0,108
1.2	24 - 28	45 - 50	0,017	0,033	0,047	0,052	0,063	0,071	0,079	0,090
1.3	18 - 22	32 - 36	0,017	0,026	0,041	0,047	0,052	0,063	0,071	0,079
2.1	20 - 24	32 - 36	0,013	0,027	0,042	0,054	0,067	0,084	0,093	0,112
2.2	18 - 22	30 - 34	0,013	0,027	0,042	0,054	0,067	0,084	0,093	0,112
3.1	36 - 40	65 - 70	0,025	0,042	0,056	0,067	0,074	0,085	0,101	0,119
3.2										
3.3	22 - 26	40 - 44	0,025	0,042	0,056	0,067	0,074	0,085	0,101	0,119
3.4										
4.1	150 - 200	250 - 300	0,031	0,047	0,065	0,074	0,082	0,106	0,114	0,123
4.2	100 - 150	150 - 200	0,035	0,052	0,071	0,081	0,091	0,117	0,125	0,135
4.3	60 - 100	80 - 120	0,038	0,057	0,078	0,089	0,100	0,128	0,138	0,148
4.4										
4.5	55 - 75	80 - 120	0,013	0,024	0,039	0,049	0,066	0,088	0,098	0,107
4.6										
4.7										
4.8										
4.9										
5.1										
5.2										
6.1										
6.2										
6.3										
6.4										

Einsatzrichtwerte für Schruppfräser *Estimated values for use for roughing end mills*

Korrekturfaktor *Factor of correction:*

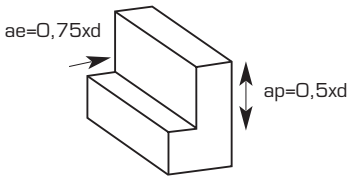
1. **lang** *long* = **Vf - 30%**
2. **PM** *PM* = **Vc + 30% - 40%**
3. **Bohren** *drilling* = **Vf - 50%**
4. **Radiusfräsen** *Ball nose milling* = **Vc +30% - 40%**



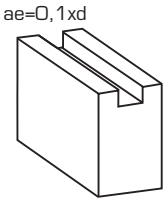
Materialgruppen *material groups*	Schruppfräser *Roughing end mills*									
	blank *uncoated*	beschichtet *coated*	fz Vorschub pro Zahn *fz feed per tooth*							
	Vc (m/min)	Vc (m/min)	< Ø 4 mm	< Ø 6 mm	< Ø 8 mm	< Ø 10 mm	< Ø 12 mm	< Ø 16 mm	< Ø 20 mm	< Ø 25 mm
1.1	32 - 36	55 - 65	0,016	0,024	0,036	0,041	0,050	0,055	0,065	0,080
1.2	30 - 34	50 - 60	0,016	0,023	0,036	0,045	0,050	0,060	0,070	0,070
1.3	16 - 20	30 - 34	0,012	0,020	0,030	0,033	0,035	0,050	0,050	0,060
2.1	18 - 22	30 - 34	0,010	0,020	0,030	0,040	0,050	0,060	0,065	0,080
2.2	16 - 20	28 - 32	0,010	0,020	0,030	0,040	0,050	0,060	0,065	0,080
3.1	34 - 38	60 - 70	0,017	0,030	0,040	0,050	0,055	0,060	0,070	0,085
3.2										
3.3	20 - 24	38 - 42	0,017	0,030	0,040	0,050	0,055	0,060	0,070	0,085
3.4										
4.1	150 - 200	200 - 250	0,025	0,035	0,050	0,050	0,060	0,080	0,080	0,090
4.2	100 - 150	150 - 200	0,025	0,040	0,050	0,060	0,065	0,085	0,090	0,100
4.3	60 -100	80 - 120	0,030	0,040	0,055	0,065	0,070	0,090	0,100	0,104
4.4										
4.5	50 - 70	80 - 120	0,010	0,020	0,030	0,035	0,050	0,060	0,070	0,080
4.6										
4.7										
4.8										
4.9										
5.1										
5.2										
6.1										
6.2										
6.3										
6.4										

Einsatzrichtwerte für Bohrungsfräser *Estimated values for use for bore end mills*

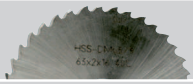
Walzenstirnfräser



Scheibenfräser



Materialgruppen *material groups*	**Bohrungsfräser** *Bore end mills*							
	blank *uncoated*	**fz Vorschub pro Zahn** *fz feed per tooth*						
	Vc (m/min)	**< Ø 63 mm**	**< Ø 80 mm**	**< Ø 100 mm**	**< Ø 125 mm**	**< Ø 160 mm**	**< Ø 200 mm**	**< Ø 250 mm**
1.1	28 - 32	0,061	0,069	0,080	0,095	0,114	0,114	0,114
1.2	24 - 28	0,060	0,070	0,080	0,090	0,105	0,105	0,105
1.3								
2.1								
2.2								
3.1	26 - 30	0,065	0,080	0,090	0,105	0,130	0,130	0,130
3.2								
3.3	16 - 20	0,065	0,080	0,090	0,105	0,130	0,130	0,130
3.4								
4.1								
4.2								
4.3								
4.4								
4.5	50 - 70	0,060	0,080	0,090	0,1	0,104	0,104	0,104
4.6								
4.7								
4.8								
4.9								
5.1								
5.2								
6.1								
6.2								
6.3								
6.4								

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	VHM	DIN 1837 A	FORM A	E.1061.0	1	✔			✔		✔		
	VHM	DIN 1838 B	FORM B	E.1062.0	1	✔	✔			✔			
Zähnezahl-Tabellen *Table for numbers of teeth*					2								
	HSS	DIN 1837 A	FORM A	E.1064.0	3	✔			✔				
	HSS	DIN 1838 B	FORM B	E.1065.0	3	✔	✔						
	HSS	DIN 1838C	FORM C	E.1066.0	3			✔					

Die angegebenen Einsatzgebiete sind Richtlinien. Die genauen Einsatzdaten finden Sie im jeweiligen Artikel!
The indicated operational areas are estimated guide lines. The exact dates of use please find at the specified articles!

E.1061.0

Universal

VHM | DIN 1837 A | FORM A | UNIVERSAL TOOL



E.1062.0

Universal

VHM | DIN 1838 B | FORM B | UNIVERSAL TOOL



Solid carbide metal slitting saws

Frezy tarczowe z węglika spiekanego do metalu

Frese circolari MD

Sierras circulares de metal duro integral

d1	15	20	25	30	40	50	63	80	100	125	150	160	200
Bohrung *hole*	5	5	8	8	10	13	16	22	22	22	32	32	32
Stärke *thickness*	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.
0,10	17,60	18,60	22,00	26,00	29,00								
0,20	10,00	11,60	12,60	16,60	21,00	34,00	52,00						
0,30	10,00	11,60	11,60	16,60	21,00	28,00	46,00	92,00					
0,40	10,00	11,60	13,00	16,60	22,00	28,00	40,00	86,00					
0,45	11,60	12,60	15,00	17,60	24,00	29,00	39,00	65,00					
0,50	11,60	12,60	15,00	17,60	24,00	29,00	39,00	65,00	118,00				
0,60	11,60	12,60	15,00	17,60	24,00	29,00	40,00	63,50	114,00	174,00			
0,70	13,60	14,60	16,60	21,00	27,60	31,00	44,50	68,00	109,00	170,00			
0,80	13,60	14,60	18,60	23,00	28,60	33,00	49,00	68,00	99,00	168,00			
0,90	14,00	15,00	20,00	25,00	28,60	34,00	50,00	71,00	98,00	165,00			
1,00	14,60	16,60	20,00	25,00	29,60	35,00	51,00	71,00	91,00	145,00	234,00	270,00	
1,10	15,00	17,60	23,00	28,00	30,60	36,00	53,00	73,00	95,00	150,00			
1,20	15,00	17,60	23,00	28,60	31,60	37,00	55,00	76,00	100,00	159,00	234,00	270,00	
1,30	15,60	18,60	24,00	29,60	32,00	41,50	56,00	79,00	106,00	178,00			
1,40	15,60	20,00	25,00	32,00	34,00	42,50	57,00	82,00	110,00	176,00			
1,50	16,60	20,00	25,00	32,00	35,00	44,50	58,00	84,00	114,00	183,00	234,00	270,00	517,00
1,60	17,60	21,00	27,60	34,00	36,00	45,50	61,00	86,00	120,00	190,00	234,00	270,00	517,00
1,70	19,00	22,00	27,60	34,00	38,00	46,00	64,00	93,00	126,00	207,00			
1,80	19,00	22,00	28,60	35,00	39,00	49,00	65,00	94,00		205,00			
1,90	20,00	23,00	30,60	36,00	40,00	49,00	68,00	96,00		224,00			
2,00	20,00	23,00	31,60	37,00	40,00	51,00	70,00	99,00		222,00	316,00	367,00	623,00
2,50	27,60	29,00	38,00	43,50	52,00	62,00	84,00	117,00		261,00	356,00	416,00	723,00
3,00	31,00	33,00	50,00	52,00	60,00	72,00	95,00	140,00		308,00	396,00	450,00	819,00
3,50	35,00	37,00	55,00	59,00	67,00	82,00	109,00	155,00		354,00			
4,00	43,00	44,00	62,00	66,00	74,00	87,0,0	119,00	168,00		403,00	511,00	590,00	1023,00
5,00	53,00	55,00	75,00	80,00	89,00	106,00	142,00	204,00		466,00			
6,00	65,00	66,00	89,00	94,00	105,00	123,00	165,00	232,00		570,00			

Technische Information *Technical information:*

nur in Form A lieferbar *only available in Form A*

Werkstoff *material*	**Kühl-/Schmierstoff** *coolant / lubrication*	**Schnittgeschw.** *cutting-speed*	**Vorschub S2 (mm/Zahn)** *feed S2 (mm/tooth)*
Stähle bis 600 N/mm² (Automatenstahl) *steels up to 600 N/mm² (free cutting steel)*	**Emulsion Mischung 1:20** *Emulsion mixture 1:20*	150 m/min	0,010 - 0,030 mm
Stähle von 600 - 1000 N/mm² (Baustahl) *steels from 600 - 1000 N/mm² (constr. st.)*	**Emulsion** *emulsion*	120 m/min	0,005 - 0,020 mm
Rostfreie Stähle *stainless steels*	Emulsion Mischung 1:10	80 m/min	0,005 - 0,015 mm
Hochlegierte Stähle *high alloyed steels*	Emulsion Mischung 1:10	70 m/min	0,005 - 0,010 mm
Titan *titanium*	**Schneidöl** *cutting oil*	60 m/min	0,003 - 0,005 mm
Grauguß über 220HB *grey cast iron above 220 HB*	**Trocken** *dry*	100 m/min	0,005 - 0,010 mm
Kupferlegierungen *copper alloys*	**Sprühölkühlung** *emulsion sparkling oil coolant*	300 m/min	0,020 - 0,040 mm
Messinglegierungen *brass alloys*	**dto.** *same*	500 m/min	0,010 - 0,040 mm
Aluminium *aluminium*	**dto.** *same*	1000 - 2000 m/min	0,010 - 0,040 mm

Vorschub: *Feed:*

S_Z= Vorschub pro Zahn
S_Z= feed per tooth

$S = S_Z \times Z \times n$

S = Vorschub (mm/min) (mm/Zahn)
S = feed (mm/min) (mm/teeth)

Z = Zähnezahl
Z = Number of teeth

n = Drehzahl (1/min)
n = speed (1/min)

Zähnezahl-Tabelle für DIN 1837 A *Table for numbers of teeth for DIN 1837A*

Ø	15	20	25	30	40	50	63	80	100	125	150	160	200
Bohrung *hole*	5	5	8	8	10	13	16	22	22	22	32	32	32
Stärke *thickness*	**Anzahl der Zähne** *Number of teeth*												
0,10	64	80	80	100	128								
0,20	64	80	80	100	128	128	160						
0,30	64	64	80	80	100	128	128	160					
0,40	64	64	64	80	100	100	128	160					
0,45	48	48	64	80	80	80	100	128	128				
0,50	48	48	64	80	80	100	128	128	160				
0,60	48	48	64	64	80	100	100	128	160	160			
0,70	48	48	48	64	80	80	100	128	128	160			
0,80	40	40	48	64	80	80	100	128	128	160			
0,90	40	40	48	64	64	80	100	100	128	160			
1,00	40	40	48	64	64	80	100	100	128	160	150	160	
1,10	40	40	48	64	64	80	80	100	128	128			
1,20	40	40	48	48	64	80	80	100	128	128	150	160	200
1,30	40	40	40	48	64	64	80	100	100				
1,40	40	40	40	48	64	64	80	100	100	128			
1,50	40	40	40	48	64	64	80	100	100	128	150	160	160
1,60	40	40	40	48	64	64	80	100	100	128	150	160	160
1,70	40	40	40	48	48	64	80	80	100				
1,80	40	32	40	48	48	64	80	80	100	128	128	128	160
1,90	40	32	40	48	48	64	80	80	100				
2,00	40	32	40	48	48	64	80	80	100	128	128	128	160
2,50	40	32	40	40	48	64	64	80	100	100	128	128	160
3,00	40	32	32	40	48	48	64	80	80	100	128	128	128
3,50	40	24	32	40	48	48	64	64	80	100			
4,00	40	24	32	40	40	48	64	64	80	100	100	100	128
5,00	40	24	32	32	40	48	48	64	80	80			
6,00	40	24	24	32	40	40	48	64	64	80			

Zähnezahl-Tabelle für DIN 1838 B *Table for Numbers of teeth for DIN 1838B*

Ø	15	20	25	30	40	50	63	80	100	125
Bohrung *hole*	5	5	8	8	10	13	16	22	22	22
Stärke *thickness*	**Anzahl der Zähne** *Number of teeth*									
0,20	20	20	20	30	40					
0,30	20	20	20	30	40					
0,40	20	20	20	30	40	48	64			
0,50	20	20	20	30	40	48	64			
0,60	20	20	20	30	40	48	48	64	80	
0,70	20	20	20	30	40	40	48	64	80	
0,80	20	20	20	24	32	40	48	64	64	80
0,90	20	20	20	24	32	40	48	48	64	80
1,00	20	20	20	24	32	40	48	48	64	80
1,20	20	20	20	24	32	40	40	48	64	64
1,50	20	20	20	24	32	32	40	48	48	64
1,60	20	20	20	24	32	32	40	48	48	64
1,80	20	20	20	24	24	32	40	40	48	64
2,00	20	20	20	24	24	32	40	40	48	64
2,50	20	20	20	24	24	32	32	40	48	48
3,00	20	20	20	24	24	24	32	40	40	48
4,00	20	20	20	24	32	24	32	32	40	48
5,00	20	20	20	24	32	24	24	32	40	40
6,00	20	20	20	24	32	20	24	32	32	40

E.1064.0

Universal

HSS | DIN 1837 A | FORM A | UNIVERSAL TOOL



E.1065.0

Universal

HSS | DIN 1838 B | FORM B | UNIVERSAL TOOL



E.1066.0

Universal

HSS | DIN 1838C | FORM C | UNIVERSAL TOOL



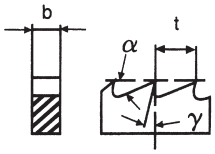
HSS-Metal slitting saws

Frezy tarczowe HSS do metalu

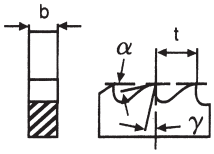
Frese circolari HSS

Sierras circulares para metales en HSS

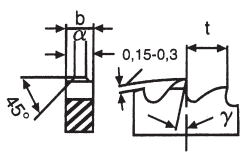
d1	20	25	32	40	50	63	80	100	125	160	200	250	315
Bohrung *hole*	5	8	8	10	13	16	22	22	22	32	32	32	40
Stärke *thickness*	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.	€ / St.
Form A *Form A*													
0,20	12,20	12,60	13,50	14,30	17,00								
0,25	12,20	12,60	13,50	14,30	17,00	18,60							
0,30	11,00	11,70	12,20	13,80	15,60	17,90	20,70						
0,40	11,00	11,70	12,20	13,80	15,60	17,90	20,70						
0,50	10,50	11,20	11,70	12,90	14,90	17,00	20,20	23,70					
0,60	10,50	11,20	11,70	12,90	14,90	17,00	20,20	23,70	32,90				
0,80	10,50	11,20	11,70	12,90	14,90	17,00	20,20	23,70	32,90				
1,00	10,50	11,20	11,70	12,90	14,90	17,00	20,20	23,70	32,90	44,50	58,80		
1,20	12,20	12,70	13,50	13,80	15,60	17,90	20,70	24,40	32,90	44,50	58,80		
1,60	13,50	13,50	14,00	14,90	17,00	19,60	21,90	29,70	34,30	46,10	62,80	84,90	
2,00	13,80	14,30	15,40	15,90	18,40	21,20	24,40	32,30	36,00	47,70	67,10	93,00	
2,50	14,90	15,60	16,60	17,90	19,60	22,30	29,20	36,60	38,00	53,30	76,10	106,20	165,30
3,00	15,90	17,00	17,90	20,50	22,30	24,60	31,60	39,20	42,70	60,40	84,90	117,00	186,90
4,00	18,40	20,50	22,30	24,00	26,00	31,30	38,50	49,10	63,20	84,90	110,00	170,10	241,40
5,00	21,40	23,70	25,10	30,20	33,9	39,20	43,80	54,90	74,80	100,10	143,10	201,10	290,40
6,00	24,40	26,50	27,60	32,90	38,50	43,80	49,10	63,70	82,80	114,40	164,40	237,,00	348,60
Form B *Form B*													
0,20					17,00								
0,25					17,00	18,60							
0,30					15,60	17,90	20,70						
0,40					15,60	17,90	20,70						
0,50					14,90	17,00	20,20	23,70					
0,60					14,90	17,00	20,20	23,70	32,90				
0,80					14,90	17,00	20,20	23,70	32,90				
1,00					14,90	17,00	20,20	23,70	32,90	44,50	58,80		
1,20					15,60	17,90	20,70	24,40	32,90	44,50	58,80		
1,60					17,00	19,60	21,90	29,70	34,30	46,10	62,80	84,90	
2,00					18,40	21,20	24,40	32,30	36,00	47,70	67,10	93,00	
2,50					19,60	22,30	29,20	36,60	38,00	53,30	76,10	106,20	165,00
3,00					22,30	24,60	31,60	39,20	42,70	60,40	84,90	117,00	186,90
4,00					26,00	31,30	38,50	49,10	63,20	84,90	120,00	170,10	241,40
5,00					33,90	39,20	43,80	54,90	73,80	100,10	143,10	201,10	290,40
6,00					55,00	43,80	49,10	63,70	82,80	114,40	164,40	237,00	348,60
Form C *Form C*													
1,00					18,70	21,40	24,60	27,60	38,00	47,10	63,40		
1,20					19,60	21,70	27,00	29,70	39,00	47,10	63,40		
1,60					21,40	24,60	27,60	34,30	39,60	50,10	69,00	89,50	
2,00					22,30	25,10	28,60	36,60	40,60	50,70	70,60	98,70	
2,50					23,90	26,50	34,30	38,50	41,10	56,80	80,80	110,80	175,20
3,00					24,60	29,20	37,40	42,60	47,00	34,60	91,60	123,70	197,60
4,00					31,30	36,90	44,90	53,80	70,10	91,10	127,60	175,20	250,20
5,00					38,50	43,80	48,60	59,10	77,50	103,20	152,10	209,40	299,00
6,00					42,40	49,10	55,40	68,10	88,60	121,60	173,60	245,60	357,30



Winkelzahn: A
Angular tooth: A



Bogenzahn: B
Rounded tooth: B



Bogenzahn: C (HZ)
Rounded tooth: C (HZ)

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	LEHRENSTAHL GAUGE STEEL	TOL. H 7		E.1188.0	3								
	LEHRENSTAHL GAUGE STEEL	TOL. H 7	TIN	E.1188.1	3								
	LEHRENSTAHL GAUGE STEEL			E.1188Z.0	4								
	LEHRENSTAHL GAUGE STEEL	TOL. H 7		SET.1188.0	4								
	VHM			E.1101.0	5								
	LEHRENSTAHL GAUGE STEEL			E.1189.0	6								
	LEHRENSTAHL GAUGE STEEL			SET.1189	6								
	HM			E.1190.0	7								
				E.1102.0	7								
	LEHRENSTAHL GAUGE STEEL			E.1194.0	8								
	LEHRENSTAHL GAUGE STEEL			E.1193.0	8								
				E.1103.0	8								
	LEHRENSTAHL GAUGE STEEL			E.1110.0	9								
	LEHRENSTAHL GAUGE STEEL		TICN	E.1110.1	9								
	LEHRENSTAHL GAUGE STEEL	„M"		E.1153.0	10								
	LEHRENSTAHL GAUGE STEEL	„M"		E.1104.0	10								
	LEHRENSTAHL GAUGE STEEL	„M"		E.1154.0	10								
	LEHRENSTAHL GAUGE STEEL	„M"	TIN	E.1153.1	11								
	LEHRENSTAHL GAUGE STEEL	„M"	TIN	E.1154.1	11								
	LEHRENSTAHL GAUGE STEEL	„M"		SET.1153.0	11								
	LEHRENSTAHL GAUGE STEEL	„M"		SET.1154.0	11								
	LEHRENSTAHL GAUGE STEEL	„MF"		E.1155.0	12-15								
	LEHRENSTAHL GAUGE STEEL	„MF"		E.1105.0	12-15								

	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	LEHRENSTAHL GAUGE STEEL	„MF"		E.1156.0	12-15								
	LEHRENSTAHL GAUGE STEEL	„G"		E.1157.0	16								
	LEHRENSTAHL GAUGE STEEL	„G"		E.1158.0	16								
	LEHRENSTAHL GAUGE STEEL	Rp		E.1197.0	16								
	LEHRENSTAHL GAUGE STEEL	R		E.1198.0	16								
	LEHRENSTAHL GAUGE STEEL	„UNC"		E.1165.0	17								
	LEHRENSTAHL GAUGE STEEL	„UNC"		E.1166.0	17								
	LEHRENSTAHL GAUGE STEEL	„UNF"		E.1167.0	17								
	LEHRENSTAHL GAUGE STEEL	„UNF"		E.1168.0	17								
	LEHRENSTAHL GAUGE STEEL	UNEF		E.1169.0	18								
	LEHRENSTAHL GAUGE STEEL	UNEF		E.1170.0	18								
	LEHRENSTAHL GAUGE STEEL	EG	„M"	E.1171.0	19								
	LEHRENSTAHL GAUGE STEEL	EG	„MF"	E.1171.0	19								
	LEHRENSTAHL GAUGE STEEL	EG	„UNC"	E.1171.0	19								
	LEHRENSTAHL GAUGE STEEL	EG	„UNF"	E.1171.0	19								
	LEHRENSTAHL GAUGE STEEL	NPT		E.1174.0	20								
	LEHRENSTAHL GAUGE STEEL	NPT		E.1175.0	20								
	LEHRENSTAHL GAUGE STEEL	NPTF		E.1176.0	20								
	LEHRENSTAHL GAUGE STEEL	NPTF		E.1177.0	20								
	LEHRENSTAHL GAUGE STEEL	BSW		E.1778.0	21								
	LEHRENSTAHL GAUGE STEEL	BSW		E.1179.0	21								
	LEHRENSTAHL GAUGE STEEL	„BSF"		E.1106.0	21								
	LEHRENSTAHL GAUGE STEEL	„BSF"		E.1107.0	21								

	Artikel-Beschreibung Article-Description			Artikel-Nr. Article-no.	Seite Page	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
	LEHRENSTAHL GAUGE STEEL	Pg		E.1180.0	22								
	LEHRENSTAHL GAUGE STEEL	Pg		E.1181.0	22								
	LEHRENSTAHL GAUGE STEEL	Pg		E.1182.0	22								
	LEHRENSTAHL GAUGE STEEL	Tr		E.1108.0	22								
	LEHRENSTAHL GAUGE STEEL	Tr		E.1109.0	22								
				E.1111.0	23								
Prüfzertifikate *Test certificates*					23								





Plug gauges

Sprawdziany trzpieniowe gwintu ze stali

Tamponi cilindrici

Tampones cilíndricos

Artikel-Nr. *Article-No.* Ø H7	E.1188.0 € Stück *piece*	E.1188.1 € Stück *piece*	Artikel-Nr. *Article-No.* Ø H7	E.1188.0 € Stück *piece*	E.1188.1 € Stück *piece*	Artikel-Nr. *Article-No.* Ø H7	E.1188.0 € Stück *piece*	E.1188.1 € Stück *piece*
0,20 - 0,41	136,00		19,00	26,00	141,00	48,00	53,00	300,00
0,41 - 1,99	91,00		20,00	26,00	141,00	50,00	53,00	310,00
2,00	21,00		21,00	26,00	149,00	52,00	62,00	
2,20	29,00		22,00	26,00	153,00	55,00	62,00	
2,50	29,00		23,00	26,00	156,00	58,00	63,00	
2,80	26,00		24,00	26,00	160,00	60,00	63,00	
3,00	21,00		25,00	31,00	163,00	62,00	73,00	
3,50	23,00		26,00	31,00	167,00	65,00	73,00	
4,00	21,00	125,00	27,00	31,00	170,00	68,00	77,00	
4,50	23,00	125,00	28,00	31,00	174,00	70,00	77,00	
5,00	21,00	125,00	30,00	31,00	177,00	72,00	90,00	
6,00	21,00	125,00	32,00	33,00	208,00	75,00	90,00	
7,00	21,00	99,00	33,00	33,00	216,00	78,00	93,00	
8,00	21,00	102,00	34,00	33,00	220,00	80,00	93,00	
9,00	21,00	106,00	35,00	33,00	224,00	82,00	99,00	
10,00	21,00	109,00	36,00	33,00	228,00	85,00	99,00	
11,00	21,00	114,00	37,00	33,00	231,00	88,00	99,00	
12,00	21,00	116,00	38,00	33,00	240,00	90,00	102,00	
13,00	21,00	121,00	40,00	42,00	248,00	92,00	112,00	
14,00	21,00	124,00	42,00	42,00	255,00	95,00	112,00	
15,00	22,00	128,00	44,00	42,00	270,00	98,00	115,00	
16,00	22,00	131,00	45,00	53,00	278,00	100,00	115,00	
17,00	22,00	134,00	46,00	53,00	286,00			
18,00	22,00	138,00	47,00	53,00	293,00			

Information für Grenzlehrdorne aus HM und LS:

Man unterscheidet grundsätzlich Arbeitslehren und Prüf- bzw. Abnahmelehren.
Bei einer Abnahmelehre nach DIN 7160, 7161 und 7162 wird an der Gutseite das Aufmaß "z" als Abnutzungszugabe hinzugerechnet. Dies ist ersichtlich aus der hier zutreffenden DIN-Norm 7162 "Arbeits- und Prüflehren für Längenmaße, Herstelltoleranz und zulässige Abnutzung". Bei Abnahme- bzw. Prüflehren entfällt dieses Aufmaß.
Wir bitten Sie, darauf zu achten, dass bei einer Bestellung ohne den ausdrücklichen Zusatz "Abnahmelehre" in jedem Fall eine Arbeitslehre mit dem Aufmaß "z" geliefert wird.

Information regarding plug gauges from carbide and from gauge steel:

There is a fundamental difference between working gauges and test-resp. inspection gauges. At an inspection gauge as per DIN 7160, 7161 and 7162 the oversize value "z" will be added to the GO-side as a wear off addition. This can be seen out of the relevant DIN-Standard 7162 "working gauges and inspection gauges for linear measures, manufacturing tolerance and permissable wear off". This oversize value is not needed at the test-resp. inspection gauges.

*We would like to point out that when ordering without mentioning "inspection gauges" we will supply a working gauge with o*versize value "z".

Lehrenstahl-Grenzlehrdorne mit Zwischenmaß

E.1188Z.0



Steel plug gauges with intermediate sizes

Sprawdziany trzpieniowe gwintu ze stali - wymiary pośrednie

Tamponi cilindrici in acciaio con misure intermedie

Tampones cilíndricos en acero para calibres y medidas intermedias

Artikel-Nr. *Article-No.* Ø	E.1188Z.0 € 1-2 Stück *1-2 piece*	E.1188Z.0 € ab 3 Stück *> 3 pieces*	Artikel-Nr. *Article-No.* Ø	E.1188Z.0 € 1-2 Stück *1-2 piece*	E.1188Z.0 € ab 3 Stück *> 3 pieces*
2 / 2,2 / 2,5 / 2,8	45,00	38,00	24,1 - 30,0	60,00	49,00
3,0	39,00	32,00	31,1 - 40,0	77,00	64,00
3,5	39,00	32,00	40,1 - 50,0	93,00	78,00
4,0	39,00	32,00	50,1 - 60,0	115,00	96,00
4,5	39,00	32,00	60,1 - 70,0	138,00	118,00
5,0 - 10,0	39,00	32,00	70,1 - 80,0	154,00	129,00
10,1 - 14,0	43,00	35,00	80,1 - 90,0	170,00	140,00
14,1 - 18,0	48,00	40,00	90,1 - 100,0	188,00	150,00
18,1 - 24,0	55,00	45,00			

Lehrenstahl Grenzlehrdorne im Satz

SET.1188.0



Set of steel plug gauges

Sprawdziany trzpieniowe gwintu ze stali w zestawie

Set temponi cilindrici in acciaio

Juego de tampones cilíndricos en acero para calibres

Artikel-Nr. *Article-No.*		SET.1188.0 € Stück *piece*
Ø H7	Anzahl *pieces*	
3 / 4 / 5 / 6 / 8 / 10 / 12	7	Auf Anfrage *on demand*

E.1101.0

VHM

WERKS-(COMPANY) NORM



Gauge steel test pins with shank

Wałeczki pomiarowe z węglika spiekanego z chwytem

Test pin con gambo rinforzato

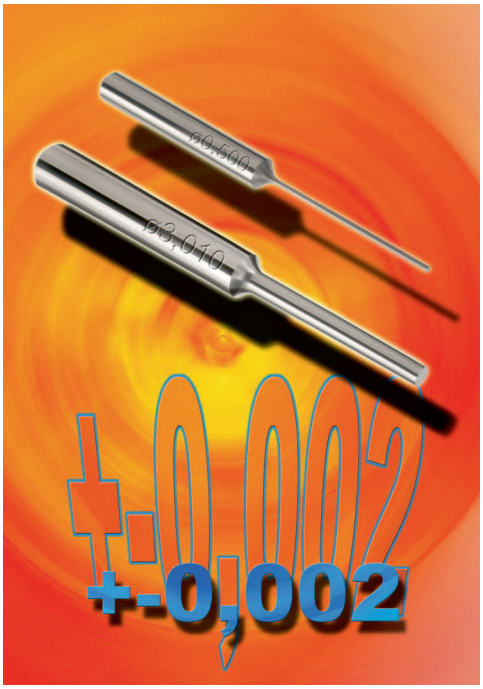
Espigas de comprobación en metal duro con mango

Lieferzeit: 1-2 Arbeitswochen
Delivery time: 1-2 working weeks

Artikel-Nr. *Article-No.*				**E.1101.0** € **1-2 Stück** 1-2 *piece*	**E.1101.0** € **ab 3 Stück** > 3 *pieces*
Ø +-0,002	**Prüfstiftlänge** *length of test pins*	**Gesamtlänge + -1** *total length + -1*	**Schaft h6** *shank h6*		
0,30 - 0,99	20	40	1,0	**38,00**	**23,00**
1,00 - 1,99	20	40	2,0	**38,00**	**23,00**
2,00 - 2,99	20	40	3,0	**38,00**	**23,00**
3,00 - 3,99	30	60	4,0	**34,00**	**23,00**
4,00 - 4,99	30	60	5,0	**34,00**	**23,00**
5,00 - 5,99	30	60	6,0	**34,00**	**23,00**
6,00 - 6,99	30	60	7,0	**43,00**	**28,00**
7,00 - 7,99	30	60	8,0	**43,00**	**28,00**
8,00 - 8,99	50	80	9,0	**48,00**	**38,00**
9,00 - 9,99	50	80	10,0	**48,00**	**38,00**
10,00 - 10,99	50	80	11,0	**77,00**	**60,00**
11,00 - 11,99	50	80	12,0	**77,00**	**60,00**
12,00 - 20,00	50	100	12,0 - 20,0	**Auf Anfrage**	*on demand*

Allgemeine Verwendung von Prüfstiften:
Messen von Bohrungen und Bohrungsabständen, zum Prüfen von Messwerkzeugen, Innen- bzw. Außenverzahnungen, zur Messung von Keilen, Keilwellen und Prismen. Die Länge der Prüfstifte ermöglicht eine gleichzeitige Überprüfung von tiefen Bohrungen auf Maßhaltigkeit und Geradheit. Sie bestimmen die Breite und Parallelität von profilierten Führungen. Darüber hinaus dienen Prüfstifte als Kalibriernormale für anzeigende Messgeräte.

General application from test pins:
Measuring bores and bore pitches, for inspecting measuring instruments, internal as well as external toothing, for measuring wedges, splined shafts and prisms. Length of the test pins enables simultaneous checking of deep bores for dimensional accuracy and straightness. The width and parallelism of profiled guides are determined. In addition to this, test pins can be used as calibration standards for indicator gauges.



Lehrenstahl-Prüfstifte

E.1189.0



Gauge steel test pins

Wałeczki pomiarowe ze stali

Test pin in acciaio

Espigas de comprobación en acero para calibres

Artikel-Nr. *Article-No.*			**E.1189.0** €
ø	**Gesamt-L.** *total l.*	**Toleranz** *tolerance*	**Stück** *piece*
0,10 - 0,14	40	0,001	**Auf Anfrage**
0,15 - 0,30	40	0,001	*on demand*
0,31 - 0,50	40	0,001	**20,50**
0,51 - 0,99	40	0,001	**20,00**
1,00 - 3,00	70	0,001	**12,80**
3,01 - 6,00	70	0,001	**13,30**
6,01 - 10,20	70	0,001	**17,00**
10,00 - 12,00	50	0,002	**15,50**
12,01 - 14,00	50	0,002	**18,00**
14,01 - 16,00	50	0,002	**20,50**
16,01 - 18,00	50	0,002	**25,00**
18,01 - 20,05	50	0,002	**30,00**

Lehrenstahl Prüfstiftsätze im Etui

SET.1189. ...



Gauge steel test pins with etui

Wałeczki pomiarowe ze stali w etui

Set di test pins in acciaio

Estuche con juego de espigas de comprobación en acero para calibres

Artikel-Nr. *Article-No.*					**SET.1189. ...** €
ø	**Anzahl** *pieces*	**Stufung** *in steps*	**Gesamtlänge** *total length*	**Toleranz** *tolernace*	**Stück** *piece*
... 0,10 - 0,3	21	0,01	40	0,001	**Auf Anfrage** *on demand*
... 0,30 - 0,5	21	0,01	40	0,001	**425,00**
... 0,50 - 1,0	51	0,01	40	0,001	**800,00**
... 1,00 - 2,0	101	0,01	70	0,001	**1.390,00**
... 2,00 - 3,0	101	0,01	70	0,001	**1.390,00**
... 3,00 - 4,0	101	0,01	70	0,001	**1.440,00**
... 4,00 - 5,0	101	0,01	70	0,001	**1.440,00**
... 5,00 - 6,0	101	0,01	70	0,001	**1.440,00**
... 6,00 - 7,0	101	0,01	70	0,001	**1.795,00**
... 7,00 - 8,0	101	0,01	70	0,001	**1.795,00**
... 8,00 - 9,0	101	0,01	70	0,001	**1.795,00**
... 9,00 - 10,0	101	0,01	70	0,001	**1.795,00**
... 10,01 - 11,0	100	0,01	50	0,002	**1.680,00**
... 11,01 - 12,0	100	0,01	50	0,002	**1.680,00**
... 1,00 - 5,0	41	0,10	70	0,001	**670,00**
... 5,10 - 10,0	50	0,10	70	0,001	**980,00**
... 1,00 - 6,0	51	0,10	70	0,001	**835,00**
... 1,00 - 10,0	91	0,10	70	0,001	**1.460,00**

Prüfzeugnisse und Beschriftungen gegen Mehrpreis *Extra charge for certificates and markings*

Hartmetall-Prüfstifte

E.1190.0

HM



Carbide test pins

Wałeczki pomiarowe z węglika spiekanego

Test pin in MD

Espigas de comprobación en metal duro

Artikel-Nr. *Article-No.* Ø + - 0,001	E.1190.0 € Stück *piece*	E.1190.0 € Stück *piece*	E.1190.0 € Stück *piece*	E.1190.0 € Stück *piece*	E.1190.0 € Stück *piece*	E.1190.0 € Stück *piece*
	GL *OAL* 12	GL *OAL* 20	GL *OAL* 25	GL *OAL* 30	GL *OAL* 40	GL *OAL* 50
0,80 - 0,999	40,00	44,00	48,00	56,00		
1,00 - 1,499	41,00	48,00	51,00	59,00	66,00	83,00
1,50 - 1,999	43,00	52,00	57,00	65,00	71,00	90,00
2,00 - 2,499	44,00	56,00	61,00	69,00	77,00	97,00
2,50 - 2,999		59,00	64,00	73,00	83,00	104,00
3,00 - 3,499		60,00	66,00	74,00	89,00	107,00
3,50 - 3,999		63,00	69,00	80,00	94,00	115,00
4,00 - 4,499		67,00	73,00	82,00	101,00	122,00
4,50 - 4,999		70,00	75,00	88,00	108,00	128,00
5,00 - 5,499		74,00	80,00	93,00	115,00	134,00
5,50 - 5,999		80,00	82,00	96,00	123,00	142,00
6,00 - 6,999				94,00	125,00	139,00
7,00 - 7,999				103,00	130,00	153,00
8,00 - 8,999				116,00	137,00	167,00
9,00 - 9,999				127,00	147,00	178,00
10,00 - 10,999						182,00
11,00 - 11,999						201,00
12,00 - 12,999						219,00
13,00 - 13,999						237,00
14,00 - 14,999						255,00
15,00 - 15,999						273,00
16,00 - 16,999						292,00
17,00 - 17,999						310,00
18,00 - 18,999						330,00
19,00 - 19,999						340,00
20,00						350,00

Prüfstifte-Halter

E.1102.0



Test pin holder

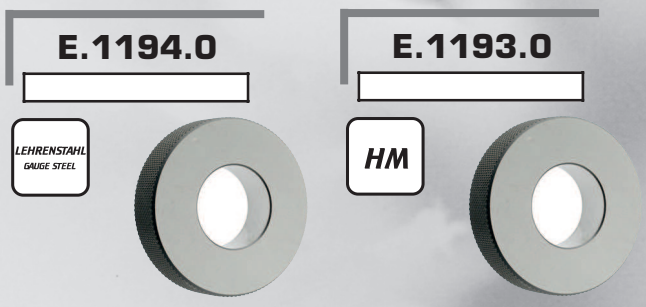
Oprawki wałeczków pomiarowych w zestawach

Portautensili per test pin

Portaespigas de comprobación

Artikel-Nr. *Article-No.* für Prüfstifte *for test pins*	E.1102.0 € Stück *piece*
... 1 - 2 mm	17,00
... 3 - 4 mm	18,00
... 4 - 6 mm	29,00
... 6 - 8 mm	38,00
... 8 - 10 mm	42,00

Einstellringe DIN 2250/2254



Adjusting rings DIN 2250/2254

Sprawdziany nastawcze pierścieniowe gwintu DIN 2250/2254

Anelli di metrologia DIN 2250/2254

Anillos de ajuste DIN 2250/2254

Artikel-Nr. *Article-No.* Ø	E.1194.0 € Stück *piece*	E.1193.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø	E.1194.0 € Stück *piece*	E.1193.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø	E.1194.0 € Stück *piece*	E.1193.0 € Stück *piece*
1,00	110,00	240,00	24,00	48,00	317,00	55,00	110,00	
1,20	105,00		25,00	50,00	330,00	56,00	110,00	
1,50	101,00		26,00	51,00	353,00	58,00	110,00	
1,80	97,00		27,00	51,00	366,00	60,00	110,00	
2,00	94,00	213,00	28,00	52,00	378,00	62,00	125,00	
2,20	90,00		29,00	52,00	393,00	64,00	135,00	
2,50	87,00		30,00	53,00	410,00	65,00	135,00	
2,80	84,00		31,00	53,00	415,00	66,00	135,00	
3,00	47,00	193,00	32,00	54,00	425,00	68,00	135,00	
4,00	41,00	190,00	33,00	55,00	454,00	70,00	135,00	
5,00	40,00	190,00	34,00	56,00	475,00	72,00	158,00	
6,00	39,00	183,00	35,00	56,00	490,00	74,00	158,00	
7,00	39,00	188,00	36,00	57,00	510,00	75,00	158,00	
8,00	39,00	190,00	37,00	58,00	530,00	76,00	158,00	
9,00	39,00	190,00	38,00	59,00	545,00	78,00	158,00	
10,00	39,00	195,00	39,00	72,00		80,00	158,00	
11,00	40,00	200,00	40,00	72,00		82,00	200,00	
12,00	41,00	210,00	41,00	78,00		84,00	200,00	
13,00	42,00	217,00	42,00	81,00		85,00	200,00	
14,00	42,00	223,00	43,00	83,00		86,00	200,00	
15,00	43,00	229,00	44,00	88,00		88,00	200,00	
16,00	44,00	241,00	45,00	88,00		90,00	200,00	
17,00	45,00	248,00	46,00	88,00		92,00	232,00	
18,00	45,00	255,00	47,00	88,00		94,00	232,00	
19,00	45,00	263,00	48,00	88,00		95,00	232,00	
20,00	46,00	274,00	49,00	88,00		96,00	232,00	
21,00	47,00	278,00	50,00	88,00		98,00	232,00	
22,00	47,00	290,00	52,00	102,00		100,00	232,00	
23,00	48,00	307,00	54,00	110,00				

Grenzrachenlehren doppelseitig



Double-sided caliper gauge

Frezy tarczowe do metalu

Calibri doppi

Calibres de herradura doble

Artikel-Nr. *Article-No.* Ø	E.1103.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø	E.1103.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø	E.1103.0 € Stück *piece*
2,0 - 3,0	47,00	18,0 - 22,0	128,00	43,0 - 49,0	155,00
3,0 - 6,0	45,00	22,0 - 27,0	128,00	49,0 - 56,0	166,00
6,0 - 10,0	41,00	27,0 - 32,0	130,00	56,0 - 63,0	180,00
10,0 - 14,0	44,00	32,0 - 38,0	137,00	63,0 - 70,0	198,00
14,0 - 18,0	46,00	38,0 - 43,0	145,00	70,0 - 84,0	215,00

Prüfzeugnisse und Beschriftungen gegen Mehrpreis *Extra charge for certificates and markings*

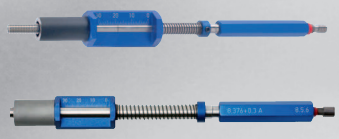
Gewindelehrdorn mit Tiefenmessung

E.1110.0

LEHRENSTAHL GAUGE STEEL

E.1110.1

LEHRENSTAHL GAUGE STEEL | TICN



Thread gauges with depth measuring

Sprawdziany trzpieniowe gwintu ze stali

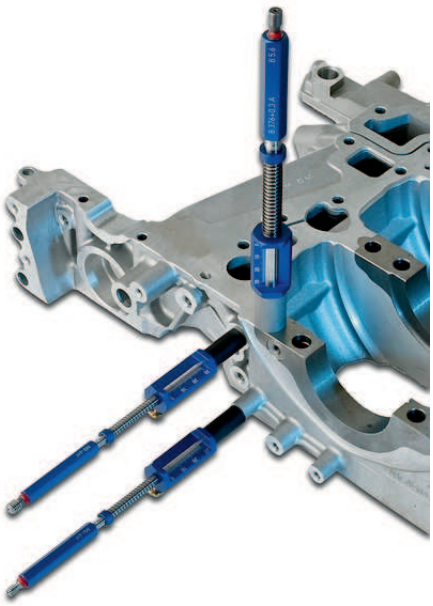
Tamponi per misurazioni profonde

Tampón de roscas con medición de profundidades

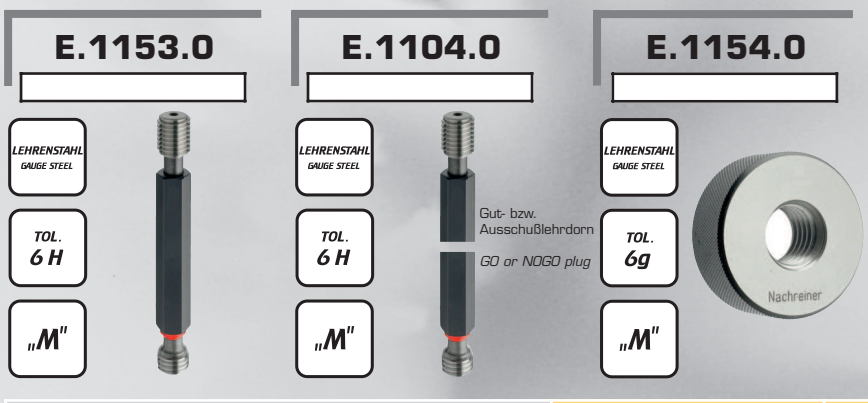
Artikel-Nr. *Article-No.*			E.1110.0 €	E.1110.1 €
Ø (M)	Steigung *pitch*	Messtiefe	Stück *piece*	Stück *piece*
M 3,0	0,50	20	**432,00**	**538,00**
M 4,0	0,70	20	**432,00**	**538,00**
M 5,0	0,80	20	**432,00**	**538,00**
M 6,0	1,00	30	**442,00**	**553,00**
M 7,0	1,00	30	**442,00**	**553,00**
M 8,0	1,25	30	**442,00**	**553,00**
M 9,0	1,25	30	**442,00**	**553,00**
M 10,0	1,50	40	**567,00**	**708,00**
M 11,0	1,50	40	**567,00**	**708,00**
M 12,0	1,75	40	**567,00**	**708,00**
M 14,0	2,00	50	**672,00**	**841,00**
M 16,0	2,00	50	**672,00**	**841,00**
M 18,0	2,50	50	**672,00**	**841,00**
M 20,0	2,50	50	**672,00**	**841,00**

Gleichzeitiges Prüfen des Gewindes und Messen der Gewindetiefe
Direkte Messblendenablesung = 0,5 mm
Gewindeeinsätze austauschbar - aus Lehrenstahl geschliffen und gehärtet
Leichtes Einführen in den ersten Gewindegang durch unverdeckten Gewindeanfang
Lieferbar für Gewinde M, MF, G, UNC, UNF, auch Sondertoleranzen Z. B. 6G
Auch als glatte Grenzlehrdorne lieferbar, z. B. Kernlochdurchmesser + Kernlochtiefe

Checking of thread and measuring of thread length at the same time
Direct reading from the measuring screen = 0,5 mm
Interchangeable thread inserts - made of gauge steel, ground and tempered
Easy introducing into the first thread due to unhindered thread start
Available for M, MF, G, UNC and UNF threads, also for special tolerances like 6G
Also available as plain plug gauges, e.g. for prehole diameter and prehole depth







Thread gauges “M”

Sprawdziany gwintu ze stali - gwint metryczny “M”

Calibri filettati “M”

Calibres de rosca “M”

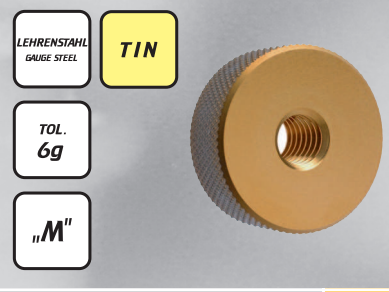
Artikel-Nr. *Article-No.*		E.1153.0 €	E.1104.0 €	E.1154.0 €
Ø (M)	Steigung *pitch*	Stück *piece*	Stück *piece*	Stück *piece*
M 1,0	0,25	98,00	54,00	99,00
M 1,2	0,25	93,00	51,00	94,00
M 1,4	0,30	83,00	46,00	87,00
M 1,6	0,35	78,00	43,00	76,00
M 1,7	0,35	78,00	43,00	76,00
M 1,8	0,35	68,00	38,00	67,00
M 2,0	0,40	68,00	38,00	67,00
M 2,2	0,45	62,00	34,00	59,00
M 2,3	0,40	62,00	34,00	59,00
M 2,5	0,45	59,00	33,00	51,00
M 2,6	0,45	59,00	33,00	51,00
M 3,0	0,50	54,00	30,00	48,00
M 3,5	0,60	56,00	31,00	44,00
M 4,0	0,70	53,00	30,00	43,00
M 4,5	0,75	53,00	30,00	43,00
M 5,0	0,80	52,00	28,00	43,00
M 6,0	1,00	50,00	27,00	43,00
M 7,0	1,00	51,00	28,00	43,00
M 8,0	1,25	52,00	28,00	44,00
M 9,0	1,25	53,00	30,00	47,00
M 10,0	1,50	55,50	31,00	52,00
M 11,0	1,50	57,00	32,00	55,00
M 12,0	1,75	60,00	33,00	60,00
M 14,0	2,00	64,00	35,00	66,00
M 16,0	2,00	68,00	37,00	73,00
M 18,0	2,50	74,00	40,00	83,00
M 20,0	2,50	79,00	44,00	93,00
M 22,0	2,50	84,00	46,00	101,00
M 24,0	3,00	94,00	52,00	108,00
M 27,0	3,00	105,00	58,00	120,00
M 30,0	3,50	116,00	64,00	132,00
M 33,0	3,50	137,00	76,00	150,00
M 36,0	4,00	148,00	82,00	161,00
M 39,0	4,00	163,00	90,00	175,00
M 42,0	4,50		99,00	
M 45,0	4,50		105,00	
M 48,0	5,00		114,00	
M 52,0	5,00		123,00	
M 56,0	5,50		136,00	
M 60,0	5,50		144,00	
M 64,0	6,00		158,00	
M 68,0	6,00		169,00	

Gewindelehren “M”

E.1153.1



E.1154.1



Thread gauges “M”

Sprawdziany gwintu ze stali - gwint metryczny “M”

Calibri filettati “M”

Calibres de rosca “M”

Artikel-Nr. *Article-No.*		E.1153.1 € Stück *piece*	E.1154.1 € Stück *piece*
Ø (M)	Steigung *pitch*		
M 3,0	0,50	115,00	102,00
M 4,0	0,70	108,00	93,00
M 5,0	0,80	105,00	93,00
M 6,0	1,00	102,00	93,00
M 8,0	1,25	105,00	95,00
M 10,0	1,50	113,00	111,00
M 12,0	1,75	121,00	129,00

Lehrenstahl Gewindelehren im Satz

SET.1153.0



SET.1154.0



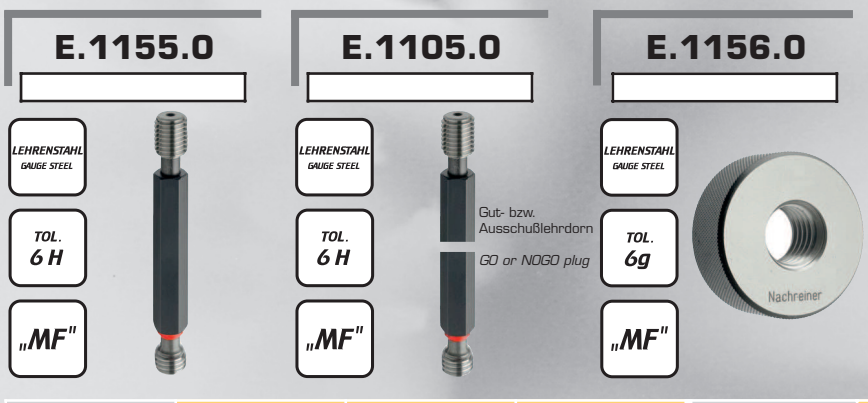
Sets of thread gauges

Sprawdziany gwintu ze stali w zestawach - gwint metryczny “M”

Set calibri filettati “M”

Juego de calibres de rosca en acero para calibres

Artikel-Nr. *Article-No.*		SET.1153.0 € Stück *piece*	SET.1154.0 € Stück *piece*
Ø	Anzahl *pieces*		
M3 / M4 / M5 / M6 / M8 / M10 / M12	7	Auf Anfrage	*on demand*



Thread gauges “MF”

Sprawdziany gwintu ze stali - gwint metryczny drobnozwojny “MF”

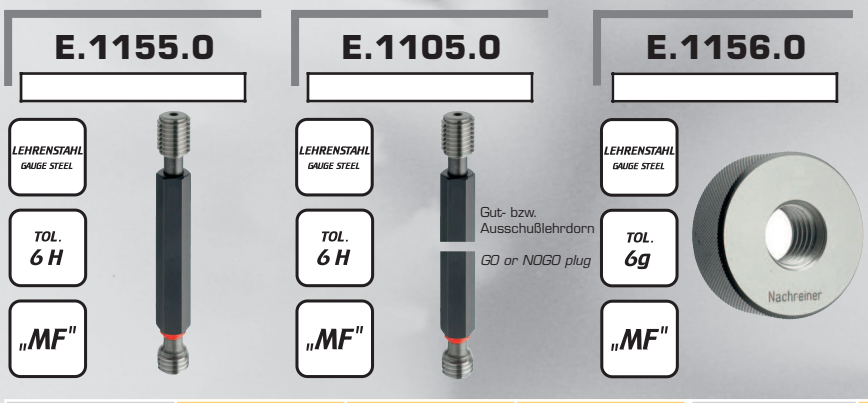
Calibri filettati “MF”

Calibres de rosca “MF”

Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*
Steigung *pitch* 0,20			
M 1,0 x 0,20			
M 1,2 x 0,20			
M 1,4 x 0,20			
M 1,6 x 0,20			
M 1,8 x 0,20		Auf Anfrage	
M 2,0 x 0,20			
M 2,2 x 0,20			
M 2,5 x 0,20		*on demand*	
M 3,0 x 0,20			
M 3,5 x 0,20			
M 4,0 x 0,20			
M 4,5 x 0,20			
M 5,0 x 0,20			
M 6,0 x 0,20			
Steigung *pitch* 0,25			
M 2,0 x 0,25			
M 2,2 x 0,25		Auf Anfrage	
M 2,3 x 0,25			
M 2,5 x 0,25			
M 2,6 x 0,25		*on demand*	
M 3,0 x 0,25			
M 3,5 x 0,25			
M 4,0 x 0,25			
M 5,0 x 0,25			
M 6,0 x 0,25			
Steigung *pitch* 0,35			
M 2,0 x 0,35			
M 2,2 x 0,35			
M 2,5 x 0,35			
M 2,6 x 0,35		Auf Anfrage	
M 3,0 x 0,35			
M 4,0 x 0,35			
M 4,5 x 0,35		*on demand*	
M 5,0 x 0,35			
M 6,0 x 0,35			
M 7,0 x 0,35			
M 8,0 x 0,35			
M 9,0 x 0,35			
M 10,0 x 0,35			
Steigung *pitch* 0,50			
M 3,5 x 0,50			
M 4,0 x 0,50			
M 4,5 x 0,50		Auf Anfrage	
M 5,0 x 0,50			
M 6,0 x 0,50			
M 7,0 x 0,50		*on demand*	
M 8,0 x 0,50			
M 9,0 x 0,50			
M 10,0 x 0,50			
M 11,0 x 0,50			

Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*
M 12,0 x 0,50			
M 13,0 x 0,50			
M 14,0 x 0,50		Auf Anfrage	
M 15,0 x 0,50			
M 16,0 x 0,50			
M 17,0 x 0,50		*on demand*	
M 18,0 x 0,50			
M 19,0 x 0,50			
M 20,0 x 0,50			
Steigung *pitch* 0,75			
M 5,0 x 0,75			
M 6,0 x 0,75			
M 7,0 x 0,75			
M 8,0 x 0,75			
M 9,0 x 0,75			
M 10,0 x 0,75			
M 11,0 x 0,75			
M 12,0 x 0,75			
M 13,0 x 0,75			
M 14,0 x 0,75		Auf Anfrage	
M 15,0 x 0,75			
M 16,0 x 0,75			
M 17,0 x 0,75		*on demand*	
M 18,0 x 0,75			
M 19,0 x 0,75			
M 20,0 x 0,75			
M 21,0 x 0,75			
M 22,0 x 0,75			
M 23,0 x 0,75			
M 24,0 x 0,75			
M 25,0 x 0,75			
M 26,0 x 0,75			
M 27,0 x 0,75			
M 28,0 x 0,75			
M 30,0 x 0,75			
Steigung *pitch* 1,00			
M 8,0 x 1,00			
M 9,0 x 1,00			
M 10,0 x 1,00			
M 11,0 x 1,00			
M 12,0 x 1,00			
M 13,0 x 1,00		Auf Anfrage	
M 14,0 x 1,00			
M 15,0 x 1,00			
M 16,0 x 1,00		*on demand*	
M 17,0 x 1,00			
M 18,0 x 1,00			
M 19,0 x 1,00			
M 20,0 x 1,00			
M 21,0 x 1,00			
M 22,0 x 1,00			

Prüfzeugnisse und Beschriftungen gegen Mehrpreis *Extra charge for certificates and markings*



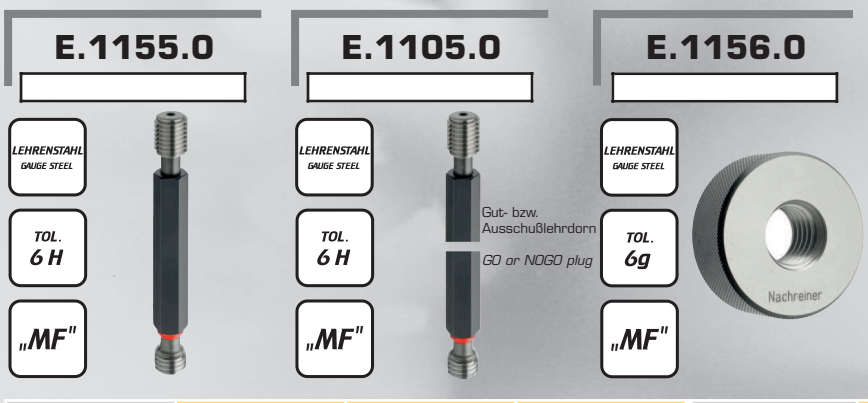
Thread gauges “MF”

Sprawdziany gwintu ze stali - gwint metryczny drobnozwojny “MF

Calibri filettati “MF”

Calibres de rosca “MF”

Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*
Steigung *pitch* 1,00				M 24 x 1,50			
M 24,0 x 1,00				M 25 x 1,50			
M 25,0 x 1,00				M 26 x 1,50			
M 26,0 x 1,00				M 27 x 1,50			
M 27,0 x 1,00				M 28 x 1,50			
M 28,0 x 1,00				M 29 x 1,50			
M 30,0 x 1,00				M 30 x 1,50			
M 32,0 x 1,00				M 32 x 1,50			
M 33,0 x 1,00				M 33 x 1,50			
M 34,0 x 1,00				M 34 x 1,50			
M 35,0 x 1,00				M 35 x 1,50			
M 36,0 x 1,00				M 36 x 1,50			
M 38,0 x 1,00				M 38 x 1,50			
M 39,0 x 1,00				M 39 x 1,50			
M 40,0 x 1,00				M 40 x 1,50			
M 42,0 x 1,00		Auf Anfrage		M 42 x 1,50			
M 45,0 x 1,00				M 45 x 1,50			
M 48,0 x 1,00				M 48 x 1,50			
M 50,0 x 1,00		*on demand*		M 50 x 1,50			
M 52,0 x 1,00				M 52 x 1,50			
M 55,0 x 1,00				M 55 x 1,50			
M 56,0 x 1,00				M 56 x 1,50			
M 58,0 x 1,00				M 58 x 1,50		Auf Anfrage	
M 60,0 x 1,00				M 60 x 1,50			
M 62,0 x 1,00				M 62 x 1,50			
M 64,0 x 1,00				M 64 x 1,50		*on demand*	
M 65,0 x 1,00				M 65 x 1,50			
M 68,0 x 1,00				M 68 x 1,50			
M 70,0 x 1,00				M 70 x 1,50			
M 72,0 x 1,00				M 72 x 1,50			
M 75,0 x 1,00				M 75 x 1,50			
M 76,0 x 1,00				M 76 x 1,50			
M 78,0 x 1,00				M 78 x 1,50			
M 80,0 x 1,00				M 80 x 1,50			
Steigung *pitch* 1,25				M 82 x 1,50			
M 10,0 x 1,25				M 85 x 1,50			
M 12,0 x 1,25				M 88 x 1,50			
M 14,0 x 1,25				M 90 x 1,50			
Steigung *pitch* 1,50				M 92 x 1,50			
M 12,0 x 1,50				M 95 x 1,50			
M 13,0 x 1,50				M 98 x 1,50			
M 14,0 x 1,50				M 100 x 1,50			
M 15,0 x 1,50		Auf Anfrage		M 105 x 1,50			
M 16,0 x 1,50				M 110 x 1,50			
M 17,0 x 1,50				M 115 x 1,50			
M 18,0 x 1,50		*on demand*		M 120 x 1,50			
M 19,0 x 1,50				M 125 x 1,50			
M 20,0 x 1,50				M 130 x 1,50			
M 21,0 x 1,50				M 135 x 1,50			
M 22,0 x 1,50				M 140 x 1,50			
M 23,0 x 1,50				M 150 x 1,50			



Thread gauges “MF”

Sprawdziany gwintu ze stali - gwint metryczny drobnozwojny “MF

Calibri filettati “MF”

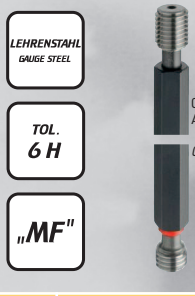
Calibres de rosca “MF”

Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*
Steigung *pitch* 2,00				M 140 x 2,00			
M 18 x 2,00				M 145 x 2,00			
M 20 x 2,00				M 150 x 2,00			
M 22 x 2,00				Steigung *pitch* 3,00			
M 24 x 2,00				M 30 x 3,00			
M 25 x 2,00				M 33 x 3,00			
M 26 x 2,00				M 36 x 3,00			
M 27 x 2,00				M 39 x 3,00			
M 28 x 2,00				M 40 x 3,00			
M 30 x 2,00				M 42 x 3,00			
M 32 x 2,00				M 45 x 3,00			
M 33 x 2,00				M 48 x 3,00			
M 34 x 2,00				M 50 x 3,00			
M 35 x 2,00				M 52 x 3,00			
M 36 x 2,00				M 55 x 3,00			
M 38 x 2,00				M 56 x 3,00			
M 39 x 2,00				M 58 x 3,00			
M 40 x 2,00				M 60 x 3,00		Auf Anfrage	
M 42 x 2,00				M 62 x 3,00			
M 45 x 2,00				M 64 x 3,00			
M 48 x 2,00		Auf Anfrage		M 65 x 3,00		*on demand*	
M 50 x 2,00				M 68 x 3,00			
M 52 x 2,00				M 70 x 3,00			
M 55 x 2,00		*on demand*		M 72 x 3,00			
M 56 x 2,00				M 75 x 3,00			
M 58 x 2,00				M 76 x 3,00			
M 60 x 2,00				M 80 x 3,00			
M 62 x 2,00				M 85 x 3,00			
M 64 x 2,00				M 90 x 3,00			
M 65 x 2,00				M 95 x 3,00			
M 68 x 2,00				M 100 x 3,00			
M 70 x 2,00				M 105 x 3,00			
M 72 x 2,00				M 110 x 3,00			
M 75 x 2,00				M 115 x 3,00			
M 76 x 2,00				M 120 x 3,00			
M 78 x 2,00				M 125 x 3,00			
M 80 x 2,00				M 130 x 3,00			
M 82 x 2,00				M 135 x 3,00			
M 85 x 2,00				Steigung *pitch* 4,00			
M 88 x 2,00				M 40 x 4,00			
M 90 x 2,00				M 42 x 4,00			
M 92 x 2,00				M 45 x 4,00			
M 95 x 2,00				M 48 x 4,00		Auf Anfrage	
M 98 x 2,00				M 52 x 4,00			
M 100 x 2,00				M 55 x 4,00			
M 105 x 2,00				M 56 x 4,00		*on demand*	
M 110 x 2,00				M 58 x 4,00			
M 115 x 2,00				M 60 x 4,00			
M 120 x 2,00				M 62 x 4,00			
M 130 x 2,00				M 64 x 4,00			
M 135 x 2,00				M 65 x 4,00			

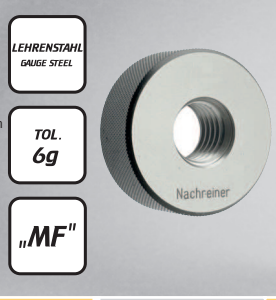
E.1155.0



E.1105.0



E.1156.0



Thread gauges “MF”

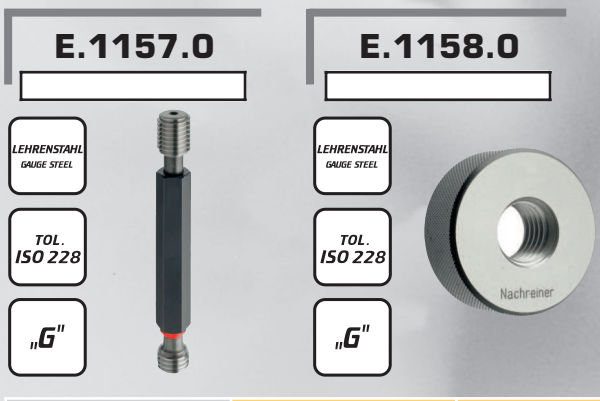
Sprawdziany gwintu ze stali - gwint metryczny drobnozwojny “MF

Calibri filettati “MF”

Calibres de rosca “MF”

Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (MF)	E.1155.0 € Stück *piece*	E.1105.0 € Stück *piece*	E.1156.0 € Stück *piece*
Steigung *pitch* 4,00							
M 68 x 4,00							
M 70 x 4,00							
M 72 x 4,00							
M 75 x 4,00							
M 76 x 4,00							
M 80 x 4,00							
M 85 x 4,00							
M 90 x 4,00		Auf Anfrage					
M 95 x 4,00							
M 100 x 4,00							
M 105 x 4,00		*on demand*					
M 110 x 4,00							
M 115 x 4,00							
M 120 x 4,00							
M 125 x 4,00							
M 130 x 4,00							
M 135 x 4,00							
M 140 x 4,00							
M 145 x 4,00							
M 150 x 4,00							
Steigung *pitch* 6,00							
M 70 x 6,00							
M 72 x 6,00							
M 76 x 6,00							
M 80 x 6,00							
M 85 x 6,00							
M 90 x 6,00		Auf Anfrage					
M 95 x 6,00							
M 100 x 6,00							
M 105 x 6,00		*on demand*					
M 110 x 6,00							
M 115 x 6,00							
M 120 x 6,00							
M 125 x 6,00							
M 130 x 6,00							
M 135 x 6,00							
M 140 x 6,00							
M 145 x 6,00							
M 150 x 6,00							

Lehrenstahl-Gewindelehren “G” DIN/ISO 228



Gauge steel thread gauges “G” DIN/ISO 228

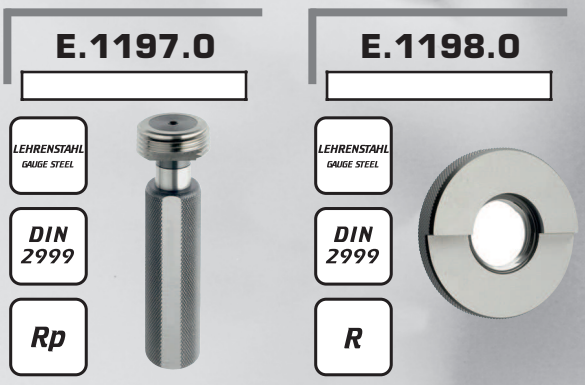
Sprawidziany gwintu ze stali - gwint rurowy walcowy “G” DIN/ISO 228

Calibri filettati in acciaio “G” DIN/ISO 228

Calibres de rosca en acero para calibres “G” DIN/ISO 228

Artikel-Nr. *Article-No.* Ø (G)	E.1157.0 € Stück *piece*	E.1158.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (G)	E.1157.0 € Stück *piece*	E.1158.0 € Stück *piece*
G 1/8”	69,00	60,00	G 1 1/4”	178,00	180,00
G 1/4”	76,00	71,00	G 1 1/2”	206,00	198,00
G 3/8”	87,00	85,00	G 1 3/4”	232,00	225,00
G 1/2”	100,00	101,00	G 2”	258,00	240,00
G 5/8”	108,00	111,00	G 2 1/4”	280,00	282,00
G 3/4”	115,00	119,00	G 2 1/2”		322,00
G 7/8”	136,00	138,00	G 2 3/4”		347,00
G 1”	138,00	145,00	G 3”		375,00
G 1 1/8”	163,00	170,00			

Lehrenstahl-Gewindelehren “R” DIN 2999



Gauge steel thread gauges “R” DIN 2999

Sprawidziany gwintu ze stali - gwint walcowy stożkowy zewnętrzny “R” DIN 2999

Calibri fissi “R” DIN 2999

Calibres de rosca en acero para calibres “R” DIN 2999

Artikel-Nr. *Article-No.* Ø (R)	E.1197.0 € Stück *piece*	E.1198.0 € Stück *piece*
Rp/R 1/8”		
Rp/R 1/4”		
Rp/R 3/8”		
Rp/R 1/2”		
Rp/R 3/4”	Auf Anfrage	Auf Anfrage
Rp/R 1”		
Rp/R 1 1/4”		
Rp/R 1 1/2”	*on demand*	*on demand*
Rp/R 2”		
Rp/R 2 1/2”		
Rp/R 3”		
Rp/R 4”		

Lehrenstahl-Gewindelehren “UNC”

E.1165.0



E.1166.0



Gauge steel thread gauges “UNC”

Sprawdziany gwintu ze stali - gwint amerykański zunifikowany “UNC”

Calibri filettati in acciaio “UNC”

Calibres de rosca en acero para calibres “UNC”

Artikel-Nr. *Article-No.* Ø (UNC)	E.1165.0 € Stück *piece*	E.1166.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (UNC)	E.1165.0 € Stück *piece*	E.1166.0 € Stück *piece*
Nr. 1 - 64	102,00		9/16” - 12	77,00	
Nr. 2 - 56	90,00		5/8” - 11	80,00	
Nr. 3 - 48	88,00		3/4” - 10	92,00	
Nr. 4 - 40	80,00		7/8” - 9	106,00	
Nr. 5 - 40	73,00	Auf Anfrage	1” - 8	120,00	Auf Anfrage
Nr. 6 - 32	69,00		1 1/8” - 7	135,00	
Nr. 8 - 32	65,00		1 1/4” - 7	145,00	
Nr. 10 - 24	64,00	*on demand*	1 3/8” - 6	170,00	*on demand*
Nr. 12 - 24	65,00		1 1/2” - 6	189,00	
1/4” - 20	63,00		1 3/4” - 5	141,00	
5/16” - 18	63,00		2” - 4	160,00	
3/8” - 16	65,00		2 1/4” - 4	174,00	
7/16” - 14	70,00		2 1/2” - 4	195,00	
1/2” - 13	72,00		3” - 4		

Lehrenstahl-Gewindelehren “UNF”

E.1167.0



E.1168.0



Gauge steel thread gauges “UNF”

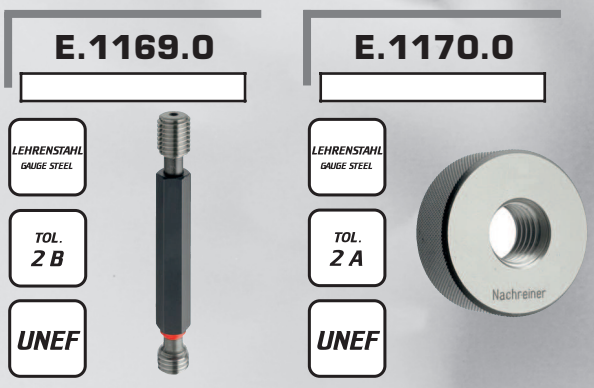
Sprawdziany gwintu ze stali - gwint amerykański zunifikowany drobnozwojny “UNF”

Calibri filettati in acciaio “UNF”

Calibres de rosca en acero para calibres “UNF”

Artikel-Nr. *Article-No.* Ø (UNC)	E.1167.0 € Stück *piece*	E.1168.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (UNC)	E.1167.0 € Stück *piece*	E.1168.0 € Stück *piece*
Nr. 0 - 80			3/8” - 24		
Nr. 1 - 72			7/16” - 20		
Nr. 2 - 64			1/2” - 20		
Nr. 3 - 56			9/16” - 18		
Nr. 4 - 48	Auf Anfrage	Auf Anfrage	5/8” - 18	Auf Anfrage	Auf Anfrage
Nr. 5 - 44			3/4” - 16		
Nr. 6 - 40			7/8” - 14		
Nr. 8 - 36	*on demand*	*on demand*	1” - 12	*on demand*	*on demand*
Nr. 10 - 32			1 1/8” - 12		
Nr. 12 - 28			1 1/4” - 12		
1/4” - 28			1 3/8” - 12		
5/16” - 24			1 1/2” - 12		

Lehrenstahl-Gewindelehren “UNEF”



Gauge steel thread gauges “UNEF”

Sprawdziany gwintu ze stali - gwint amerykański bardzo drobnozwojny “UNEF”

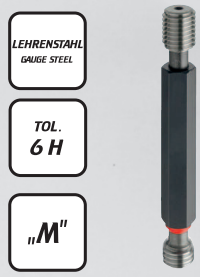
Calibri filettati in acciaio “UNEF”

Calibres de rosca en acero para calibres “UNEF”

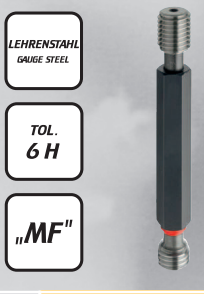
Artikel-Nr. *Article-No.* **Ø** (UNEF)	**E.1169.0** € **Stück** *piece*	**E.1170.0** € **Stück** *piece*
Nr. 12 - 32		
1/4” - 32		
5/16” - 32		
3/8” - 32		
7/16” - 28		
1/2” - 28		
9/16” - 24		
5/8” - 24		
11/16” - 20	**Auf Anfrage**	**Auf Anfrage**
3/4” - 20		
13/16” - 20		
7/8” - 20	*on demand*	*on demand*
15/16” - 20		
1” - 20		
1 1/16” - 18		
1 1/8” - 18		
1 3/16” - 18		
1 1/4” - 18		
1 5/16” - 18		
1 3/8” - 18		
1 7/16” - 18		
1 1/2” - 18		
1 9/16” - 18		
1 5/8” - 18		
1 11/16”- 18		

Lehrenstahl-Einsatz-Gewindelehrdorne “EG”

E.1171.0M



E.1171.0MF



Gauge steel thread gauges for wire thread inserts “EG”

Sprawdziany gwintu ze stali do wkładek gwintowych V-coil “EG”

Calibri filettati in acciaio per utilizzo “EG”

Calibres de rosca Helicoil en acero para calibres “EG”

Artikel-Nr. *Article-No.* Ø (Eg)	E.1171.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (Eg)	E.1171.0 € Stück *piece*
Eg-M		Eg-MF	
M 2,0		M 8 x 1,00	
M 2,5		M 10 x 1,00	
M 3,0		M 10 x 1,25	
M 4,0		M 12 x 1,25	
M 5,0		M 12 x 1,50	
M 6,0	Auf Anfrage	M 14 x 1,50	Auf Anfrage
M 7,0		M 16 x 1,50	
M 8,0		M 18 x 1,50	
M 10,0	*on demand*	M 20 x 1,50	*on demand*
M 12,0		M 22 x 1,50	
M 14,0		M 24 x 1,50	
M 16,0			
M 18,0			
M 20,0			
M 24,0			

Lehrenstahl-Einsatz-Gewindelehrdorne “EG”

E.1171.0UNC



E.1171.0UNF



Gauge steel thread gauges for wire thread inserts “EG”

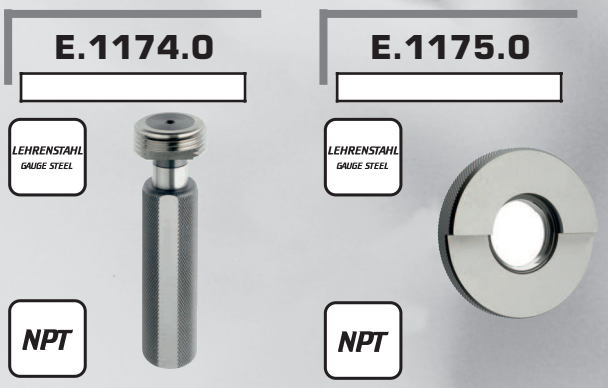
Sprawdziany gwintu ze stali do wkładek gwintowych V-coil “EG”

Calibri filettati in acciaio per utilizzo “EG”

Calibres de rosca Helicoil en acero para calibres “EG”

Artikel-Nr. *Article-No.* Ø (Eg)	E.1171.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (Eg)	E.1171.0 € Stück *piece*
Eg-UNC		Eg-UNF	
Nr. 2 - 56		Nr. 4 - 48	
Nr. 4 - 40		Nr. 6 - 40	
Nr. 5 - 40		Nr. 8 - 36	
Nr. 6 - 32		Nr. 10 - 32	
Nr. 8 - 32	Auf Anfrage	1/4” - 28	Auf Anfrage
Nr. 10 - 24		5/16” - 24	
Nr. 12 - 24		3/8” - 24	
1/4” - 20	*on demand*	7/16” - 20	*on demand*
5/16” - 18		1/2 - 20	
3/8” - 16		5/8” - 18	
1/2” - 13			
5/8” - 11			

Lehrenstahl-Gewindelehren “NPT”



Gauge steel thread gauges “NPT/NPTF”

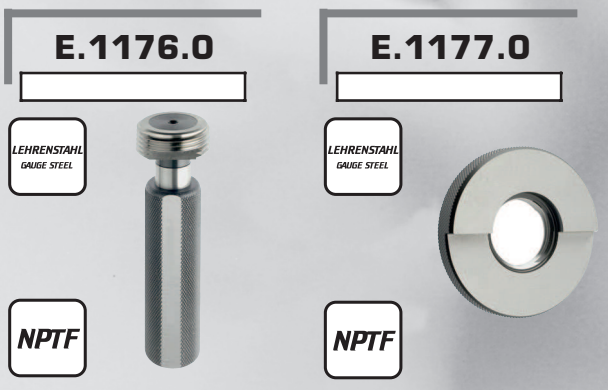
Sprawdziany gwintu ze stali - gwint amerykański rurowy stożkowy zwykły/drobnozwojny “NPT”

Calibri fissi in acciaio per “NPT”

Calibres de rosca en acero para calibres “NPT”

Artikel-Nr. *Article-No.* **Ø (NPT)**	**E.1174.0** € **Stück** *piece*	**E.1175.0** € **Stück** *piece*
1/16 - 27		
1/8 - 27		
1/4 - 18		
3/8 - 18		
1/2 - 14	**Auf Anfrage**	**Auf Anfrage**
3/4 - 14		
1 - 11 1/2		
1 1/4 - 11 1/2	*on demand*	*on demand*
1 1/2 - 11 1/2		
2 - 11 1/2		
2 1/2 - 8		
3 - 8		

Lehrenstahl-Gewindelehren “NPTF”



Gauge steel thread gauges “NPTF”

Sprawdziany gwintu ze stali - gwint amerykański rurowy stożkowy zwykły/drobnozwojny “NPTF”

Calibri fissi in acciaio per “NPTF”

Calibres de rosca en acero para calibres “NPTF”

Artikel-Nr. *Article-No.* **Ø (NPTF)**	**E.1176.0** € **Stück** *piece*	**E.1177.0** € **Stück** *piece*
1/16 - 27		
1/8 - 27		
1/4 - 18		
3/8 - 18		
1/2 - 14	**Auf Anfrage**	**Auf Anfrage**
3/4 - 14		
1 - 11 1/2		
1 1/4 - 11 1/2	*on demand*	*on demand*
1 1/2 - 11 1/2		
2 - 11 1/2		
2 1/2 - 8		
3 - 8		

Lehrenstahl-Gewindelehren “BSW”

E.1178.0



E.1179.0



Gauge steel thread gauges “BSW”

Sprawdziany gwintu ze stali - gwint rurowy calowy Withwortha “BSW”

Calibri filettati in acciaio per “BSW”

Calibres de rosca en acero para calibres “BSW”

Artikel-Nr. *Article-No.* **Ø (BSW)**	**E.1178.0** € **Stück** *piece*	**E.1179.0** € **Stück** *piece*	**Artikel-Nr.** *Article-No.* **Ø (BSW)**	**E.1178.0** € **Stück** *piece*	**E.1179.0** € **Stück** *piece*
1/8”			15/16”		
3/16”			1”		
1/4”			1 1/8”		
5/16”	Auf Anfrage	Auf Anfrage	1 1/4”	Auf Anfrage	Auf Anfrage
3/8”			1 1/2”		
7/16”			1 3/4”		
1/2”	*on demand*	*on demand*	2”	*on demand*	*on demand*
9/16”			2 1/4”		
5/8”			2 1/2”		
11/16”			2 3/4”		
3/4”			3”		
7/8”					

Lehrenstahl-Gewindelehren “BSF”

E.1106.0



E.1107.0



Gauge steel thread gauges “BSF”

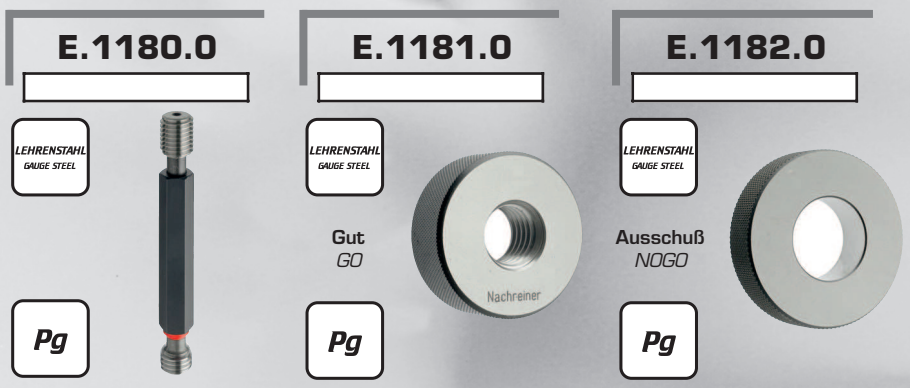
Sprawdziany gwintu ze stali - gwint calowy drobnozwojny Withwortha “BSF”

Calibri filettati in acciaio per “BSF”

Calibres de rosca en acero para calibres “BSF”

Artikel-Nr. *Article-No.* **Ø (BSF)**	**E.1106.0** € **Stück** *piece*	**E.1107.0** € **Stück** *piece*	**Artikel-Nr.** *Article-No.* **Ø (BSF)**	**E.1106.0** € **Stück** *piece*	**E.1107.0** € **Stück** *piece*
3/16” - 32			1” - 10		
7/32” - 28			1 1/8” - 9		
1/4” - 26			1 1/4” - 9		
9/32” - 26			1 3/8” - 8		
5/16” - 22			1 1/2” - 8		
3/8” - 20	Auf Anfrage	Auf Anfrage	1 5/8” - 8	Auf Anfrage	Auf Anfrage
7/16” - 18			1 3/4” - 7		
1/2” - 16			2” - 7		
9/16” - 16	*on demand*	*on demand*	2 1/4” - 6	*on demand*	*on demand*
5/8” - 14			2 1/2” - 6		
11/16” - 14			2 3/4” - 6		
3/4” - 12			3” - 5		
7/8” - 11					

LS-Stahlpanzerrohr-Gewindelehren “Pg” DIN 40430



Gauge steel thread gauges for steel conduit thread “Pg” DIN 40430

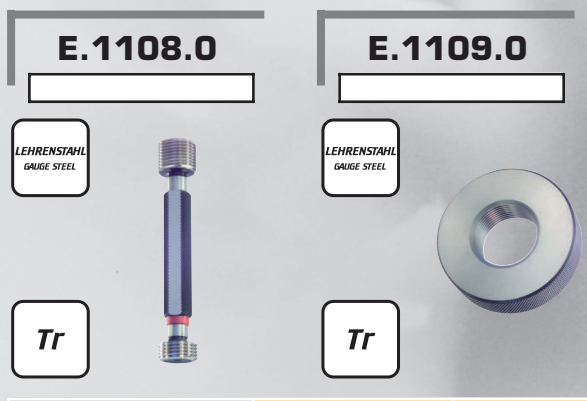
Sprawdziany gwintu ze stali - gwint do rurek instalacyjnych stalowych “Pg”

Calibri filettati in acciaio per calibrare filettature “Pg” DIN 40430

Calibres de rosca en acero para calibres para rosca “Pg” DIN 40430

Artikel-Nr. *Article-No.* Ø (Pg)	E.1180.0 € Stück *piece*	E.1181.0 € Stück *piece*	E.1182.0 € Stück *piece*
Pg 7,0			
Pg 9,0			
Pg 11,0	Auf Anfrage	Auf Anfrage	Auf Anfrage
Pg 13,5			
Pg 16,0			
Pg 21,0	*on demand*	*on demand*	*on demand*
Pg 29,0			
Pg 36,0			
Pg 42,0			

Lehrenstahl-Trapez-Gewindelehren “Tr”



Gauge steel thread gauges “Tr”

Sprawdziany gwintu ze stali - gwint do wkładek gwintowych trapezowych “Tr”

Calibri filettati in acciaio trapezoidali per “Tr”

Calibres de roscas trapezoidales en acero para calibres “Tr”

Artikel-Nr. *Article-No.* Ø (Tr)	E.1108.0 € Stück *piece*	E.1109.0 € Stück *piece*	Artikel-Nr. *Article-No.* Ø (Tr)	E.1108.0 € Stück *piece*	E.1109.0 € Stück *piece*
Tr 8 x 1,5			Tr 32 x 6,0		
Tr 9 x 2,0			Tr 34 x 6,0		
Tr 10 x 2,0			Tr 36 x 6,0		
Tr 11 x 2,0			Tr 38 x 7,0		
Tr 12 x 3,0			Tr 40 x 7,0		
Tr 14 x 3,0	Auf Anfrage	Auf Anfrage	Tr 42 x 7,0	Auf Anfrage	Auf Anfrage
Tr 16 x 4,0			Tr 44 x 7,0		
Tr 18 x 4,0			Tr 46 x 8,0		
Tr 20 x 4,0	*on demand*	*on demand*	Tr 48 x 8,0	*on demand*	*on demand*
Tr 22 x 5,0			Tr 50 x 8,0		
Tr 24 x 5,0			Tr 52 x 8,0		
Tr 26 x 5,0			Tr 55 x 8,0		
Tr 28 x 5,0			Tr 60 x 9,0		
Tr 30 x 6,0					

ISO-Toleranzschlüssel “Tolerator”

E.1111.0



€ 72,00

Tolerance indicator “tolerator”

Wskaźnik tolerancji ISO “Tolerator”

Tollerometro ISO

Convertidor para tolerancias ISO “Tolerator”

Zum direkten Ablesen aller Toleranzwerte nach ISO-Empfehlung R286 - 1962, enthält die vollständige Liste sämtlicher im In- und Ausland verwendeten ISO-Toleranzen bis Nennmaß 500 mm = über 6400 Toleranzwertpaare, im staubeschützen Kusnststoffgehäuse

For all direct reading of all tolerance values acc. to ISO-recommendation R 286 - 1962, including complete table of all ISO-tolerances up to nominal dimension 500 mm = more than 6400 pairs of tol.-values, dust-proof plastic-case

Prüfzertifikate für Neulehren *Test certificates for new gauges:*

Prüfzertifikate Test *certificates*			€ **netto** *net* **Stück** *piece*
Grenzlehrdorne *Plug gauges*		< Ø 50 mm	**7,00**
		Ø 50 - 100 mm	**10,00**
		> Ø 100 mm	**14,00**
Prüfstifte *Testing pins*			**4,00**
Gewindelehren *Thread gauges*	**Gewindelehrdorn (Gut/Ausschuß und Grenzlehrdorn)** *Thread plug gauges (GO/NOGO and plug gauge)*	Ø 1 - 2,9 mm	**14,00**
		Ø 3 - 40 mm	**12,00**
		Ø 41 - 100 mm	**12,00**
		> Ø 100 mm	**18,00**
	Gut/Ausschuß Lehrring *GO/NOGO Ring*	Ø 1 - 2,9 mm	**16,00**
		Ø 3 - 40 mm	**14,00**
		Ø 41 - 100 mm	**16,00**
		> Ø 100 mm	**20,00**
	Gewindelehren für konische Gewinde *Thread gauges for konical threads*	**Dorne** *Plugs*	**19,00**
		Ringe *Rings*	**22,00**
Einstellringe *Adjusting rings*		< Ø 30 mm	**10,00**
		Ø 31 - 100 mm	**12,00**
		> Ø 100 mm	**16,00**



VHM-HPC-Superstar-Fräser (ungleiche Teilung) incl. Beschichtung



Größe Ø mm	Schaftfräser kurz + lang € / Stück	Schaftfräser abgesetzt € / Stück	Schruppfräser € / Stück	Schaftfräser extra lang € / Stück	Schaftfräser mit Eckenradius € / Stück	Radiusfräser € / Stück	Schaftfräser mit IK € / Stück
- 6 mm	unrentabel	**19,80**	verschleißbedingt	**16,00**	**26,30**	**18,40**	**13,90**
- 8 mm	unrentabel	**21,60**	verschleißbedingt	**18,20**	**26,90**	**18,90**	**15,20**
- 10 mm	**15,20**	**21,60**	verschleißbedingt	**18,20**	**27,20**	**19,10**	**15,20**
- 12 mm	**19,90**	**26,10**	verschleißbedingt	**22,00**	**37,60**	**26,40**	**19,90**
- 14 mm	**19,90**	**35,80**	verschleißbedingt	**25,30**	**40,40**	**28,30**	**19,90**
- 16 mm	**26,90**	**35,80**	verschleißbedingt	**30,10**	**51,70**	**36,20**	**26,90**
- 18 mm	**26,90**	**41,40**	verschleißbedingt	**32,20**	**56,30**	**39,40**	**26,90**
- 20 mm	**31,10**	**41,40**	verschleißbedingt	**34,80**	**56,60**	**39,70**	**31,10**

VHM-Fräser / HM-bestückte Fräser



Größe Ø mm	Schaftfräser 2 - 4 Zähne € / Stück	Schaftfräser > 6 Zähne € / Stück	Schruppfräser 4 - 6 Zähne € / Stück	Schaftfräser 2 - 4 Zähne überlang € / Stück	Schaftfräser > 6 Zähne überlang € / Stück	Radiusfräser 2 - 4 Zähne € / Stück	konische Fräser € / Stück
- 10 mm	**9,70**	**8,10**	**11,20**	**12,60**	**10,20**	**19,40**	**13,60**
- 15 mm	**13,70**	**11,50**	**15,80**	**17,80**	**14,40**	**27,40**	**20,60**
- 20 mm	**18,60**	**15,60**	**21,40**	**24,20**	**19,50**	**37,20**	**28,00**
- 30 mm	**28,00**	**23,50**	**32,20**	**36,40**	**29,40**	**56,00**	**42,00**
- 40 mm	**41,70**	**35,00**	**47,90**	**54,20**	**43,80**	**83,30**	**62,50**
- 50 mm	**60,90**	**51,20**	**70,10**	**79,20**	**63,90**	**121,80**	**91,40**
- 60 mm	**70,70**	**59,40**	**81,30**	**91,90**	**74,20**	**141,30**	**106,00**
- 63 mm	**73,80**	**62,10**	**84,90**	**96,00**	**77,60**	**147,60**	**110,80**
- 75 mm	**79,90**	**67,10**	**91,90**	**103,90**	**83,90**	**159,80**	**119,90**
- 100 mm	**113,80**	**95,60**	**130,80**	**147,90**	**119,50**	**227,50**	**170,60**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

HSS-Fräser



Größe Ø mm	Schaftfräser 2 - 4 Zähne € / Stück	Schaftfräser > 6 Zähne € / Stück	Schruppfräser 4 - 6 Zähne € / Stück	Schaftfräser 2 - 4 Zähne überlang € / Stück	Schaftfräser > 6 Zähne überlang € / Stück	Radiusfräser 2 - 4 Zähne € / Stück	konische Fräser € / Stück
- 10 mm	**6,50**	**5,50**	**7,40**	**8,40**	**6,80**	**13,00**	**9,70**
- 15 mm	**9,20**	**7,70**	**10,50**	**11,90**	**9,60**	**18,30**	**13,70**
- 20 mm	**12,50**	**10,50**	**14,30**	**16,20**	**13,10**	**24,80**	**18,60**
- 30 mm	**18,70**	**15,70**	**21,50**	**24,30**	**19,60**	**37,30**	**28,00**
- 40 mm	**27,80**	**23,40**	**32,00**	**36,20**	**29,20**	**55,60**	**41,70**
- 50 mm	**40,70**	**34,20**	**46,80**	**52,90**	**25,90**	**81,30**	**60,90**
- 60 mm	**47,20**	**39,70**	**54,20**	**61,20**	**49,60**	**94,20**	**70,70**
- 63 mm	**49,30**	**41,40**	**56,60**	**63,90**	**51,70**	**98,40**	**73,90**
- 75 mm	**53,30**	**44,80**	**61,30**	**69,30**	**55,90**	**106,50**	**79,90**
- 100 mm	**75,90**	**63,80**	**87,20**	**98,50**	**79,70**	**151,60**	**113,80**

Walzenstirnfräser DIN 1880



Größe Ø mm	Zähne	Schlichtfräser € / Stück	Schruppfräser € / Stück	Hartmetall € / Stück
- 40 mm	6	**19,00**	**21,90**	**28,60**
- 50 mm	8	**22,80**	**26,20**	**34,20**
- 63 mm	8	**26,40**	**30,40**	**39,60**
- 80 mm	10	**30,30**	**34,90**	**73,30**
- 100 mm	10	**44,90**	**51,60**	**67,30**
- 125 mm	12	**55,90**	**64,50**	**83,80**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

Scheiben- und Prismenfräser bis Breite 14 mm



Größe Ø mm	Nachschleifen € / Stück	paarweise geschliffen € / Stück
- 63 mm	**28,70**	**32,90**
- 80 mm	**38,20**	**43,90**
- 100 mm	**41,50**	**47,80**
- 125 mm	**51,70**	**64,60**
- 160 mm	**60,00**	**69,00**
- 200 mm	**65,50**	**75,30**
- 250 mm	**84,40**	**97,00**

Nuten- und Winkelfräser



Größe Ø mm	Nachschleifen € / Stück
- 16 mm	**12,50**
- 25 mm	**21,10**
- 32 mm	**27,60**
- 40 mm	**38,70**
- 50 mm	**51,60**

HSS-Spiralbohrer DIN 1897/338



Größe Ø mm	Nachschleifen 2 Zähne € / Stück	Neuanschleifen starker Verschleiß € / Stück	Abtrennen und Spitze anschleifen € / Stück
- 10 mm	unrentabel - neu günstiger	unrentabel - neu günstiger	unrentabel - neu günstiger
- 20 mm	**5,20**	**7,70**	**10,20**
- 30 mm	**7,90**	**12,00**	**15,90**
- 40 mm	**12,00**	**18,00**	**24,00**
- 50 mm	**13,70**	**20,50**	**27,40**
- 60 mm	**18,70**	**28,00**	**37,20**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

VHM-Spiralbohrer DIN 1897/338



Größe Ø mm	Nachschleifen 2 Zähne € / Stück	Neuanschleifen starker Verschleiß € / Stück	Abtrennen und Spitze anschleifen € / Stück
- 10 mm	**5,10**	**7,60**	**10,10**
- 20 mm	**7,80**	**11,60**	**15,50**
- 30 mm	**12,00**	**17,80**	**23,80**
- 40 mm	**18,00**	**27,00**	**36,00**
- 50 mm	**20,50**	**30,70**	**40,90**
- 60 mm	**28,10**	**42,00**	**56,00**

VHM-Hochleistungsbohrer mit und ohne Innenkühlung 3xd, 5xd und 8xd



Größe Ø mm	Nachschleifen 2 Zähne € / Stück	Abtrennen + neue Spitze € / Stück	Nachschleifen + Beschichten TIN / BlueCut € / Stück	Abtrennen + neue Spitze + Beschichten € / Stück
- 6 mm	**12,80**	**25,50**	**19,30**	**32,00**
- 8 mm	**14,00**	**28,10**	**22,70**	**36,70**
- 10 mm	**15,80**	**31,50**	**26,00**	**41,70**
- 12 mm	**16,80**	**33,50**	**27,90**	**44,60**
- 14 mm	**17,80**	**35,50**	**29,80**	**47,60**
- 15 mm	**19,30**	**38,70**	**36,20**	**55,50**
- 16 mm	**21,00**	**42,00**	**37,70**	**58,80**
- 18 mm	**22,60**	**45,20**	**41,90**	**64,50**
- 20 mm	**24,30**	**48,50**	**44,80**	**69,10**
- 22 mm	**26,20**	**52,40**	**49,30**	**75,50**
- 25 mm	**28,20**	**56,30**	**51,20**	**79,30**
- 30 mm	**45,50**	**90,80**	**73,30**	**118,70**

Nachschleifen von12xd und 15xd: + 20%

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

Kegelsenker 60°/90°



Größe Ø mm	Schaft	HSS € / Stück	VHM € / Stück
- 20 mm	zylindrisch	**7,80**	**11,60**
- 30 mm	zylindrisch	**11,90**	**17,80**
- 40 mm	MK	**20,60**	**30,80**
- 50 mm	MK	**24,80**	**37,20**
- 60 mm	MK	**28,10**	**42,10**
- 70 mm	MK	**38,90**	**58,30**

Gewindebohrer DIN 371, 376 und 374 ab Drm. 6,0 mm



Größe Ø mm	Nachschleifen € / Stück	Anschnitt + Spiralschleifen € / Stück
- 10 mm	**7,30**	**12,90**
- 14 mm	**9,90**	**13,50**
- 20 mm	**14,20**	**19,30**
- 24 mm	**17,30**	**24,50**
- 30 mm	**21,50**	**27,60**
- 40 mm	**30,50**	**38,70**
- 50 mm	**45,10**	**55,90**

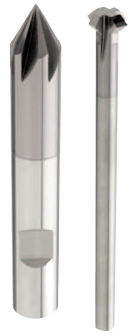
NC-Anbohrer



Größe Ø mm	HSS € / Stück	VHM € / Stück
- 16 mm	unrentabel - neu günstiger	**10,90**
- 30 mm	**11,00**	**16,50**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

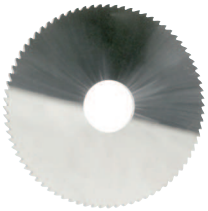
VHM-Entgrater / VHM-Vor- und Rückwärtsentgrater (Nachreiner-Norm)



Größe Ø mm	Nachschleifen € / Stück
- 10 mm	**7,80**
- 20 mm	**11,60**

VHM-Metallkreissägeblätter DIN 1837/1838

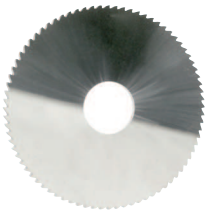
Für Sägeblätter mit normalem Verschleiß Form A oder B



Größe Ø mm	Nachschleifen Breite < 1 mm € / Stück	Nachschleifen Breite < 3 mm € / Stück	Nachschleifen Breite < 6 mm € / Stück
- 50 mm	**18,70**	**24,20**	**31,80**
- 63 mm	**24,70**	**32,10**	**41,50**
- 100 mm	**43,40**	**56,30**	**73,10**
- 200 mm	**77,60**	**100,80**	**121,20**

HSS-Metallkreissägeblätter DIN 1837/1838

Für Sägeblätter mit normalem Verschleiß Form A oder B



Größe Ø mm	Nachschleifen Form A / B € / Stück	Neuverzahnen Form A / B € / Stück	Rundschleifen + Neuverzahnen € / Stück
- 100 mm	**9,90**	**13,90**	**17,80**
- 150 mm	**13,60**	**18,90**	**24,50**
- 200 mm	**15,10**	**21,10**	**27,20**
- 315 mm	**17,50**	**24,50**	**31,50**
- 350 mm	**22,90**	**32,20**	**41,30**
- 400 mm	**29,30**	**40,90**	**52,60**
- 500 mm	**31,70**	**44,30**	**56,90**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

Beschichtung incl. Vorarbeit bis Länge 200 mm

Beschichten von nachgeschliffenen HSS und VHM Werkzeugen

Größe Ø mm	TIN / BlueCut € / Stück	Hartbearbeitung € / Stück
- 4 mm	**4,10**	**5,40**
- 6 mm	**6,00**	**7,10**
- 8 mm	**6,60**	**7,90**
- 10 mm	**6,80**	**8,10**
- 12 mm	**7,80**	**9,00**
- 14 mm	**10,30**	**11,80**
- 16 mm	**11,10**	**12,60**
- 18 mm	**15,40**	**17,50**
- 20 mm	**15,70**	**17,90**
- 25 mm	**17,40**	**19,80**
- 30 mm	**30,10**	**33,00**
- 40 mm	**42,90**	**45,00**

Überlängenzuschläge: 201 - 300 mm + 50 %
301 - 400 mm + 100 %

Weldon anschleifen

Größe Ø mm	1-4 Stück € / Stück	5-9 Stück € / Stück	> 10 Stück € / Stück
- 6 mm	**2,00**	**1,80**	**1,40**
- 8 mm	**2,80**	**2,40**	**2,00**
- 10 mm	**3,60**	**3,10**	**2,70**
- 12 mm	**4,50**	**3,80**	**3,30**
- 16 mm	**6,00**	**5,00**	**4,00**
- 20 mm	**7,00**	**6,30**	**5,40**
- 25 mm	**18,00**	**15,90**	**14,80**
- 32 mm	**22,00**	**19,80**	**18,00**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

Whistle-Notch anschleifen

Größe Ø mm	1-4 Stück € / Stück	5-9 Stück € / Stück	> 10 Stück € / Stück
- 6 mm	**6,00**	**5,00**	**4,50**
- 8 mm	**7,00**	**6,00**	**5,10**
- 10 mm	**8,00**	**7,00**	**5,80**
- 12 mm	**9,00**	**8,00**	**7,20**
- 16 mm	**11,00**	**10,00**	**9,00**
- 20 mm	**13,00**	**12,00**	**11,00**

Eckenradius anschleifen

Größe Ø mm	1-2 Stück € / Stück	3-4 Stück € / Stück	5-9 Stück € / Stück	> 10 Stück € / Stück
bis 0,5 mm	**6,00**	**5,00**	**4,50**	**3,80**
über 0,5 mm	**7,20**	**6,00**	**5,10**	**4,80**

Laserbeschriftung (je Zeile)

1-9 Stück € / Stück	10-49 Stück € / Stück	> 50 Stück € / Stück
2,80	**2,50**	**2,20**

Nicht aufgeführte Werkzeuge werden nach Aufwand berechnet!

Besonderheiten:

Besonderheiten wie zum Beispiel:

- Durchmesser nicht verkleinern
- nur Brust schleifen

müssen extra angegeben werden!

Preise:

Die Preise sind nur für normalen Verschleiß berücksichtigt, zum Beispiel

- tiefe Ausbrüche
- externer Verschleiß

werden nach Aufwand abgerechnet!

Haftung:

Für nachgeschliffene und umgearbeitete Werkzeuge wird nur bis zu der Höhe der bei uns angefallenen Kosten gehaftet!

Lieferzeiten:

Nachschleifen und Beschichten ca. 1-2 Wochen



	ARTIKEL-BESCHREIBUNG ARTICLE-DESCRIPTION			ARTIKEL-NR. ARTICLE-NO.	SEITE PAGE	STAHL	INOX	NE-METALLE	GUSS	TITAN	HRC	GRAPHIT	
Werkzeugschränke *Tool Managment System*					**1 - 2**								
Sonderfräswerkzeuge *Special milling tools*					**3**								
Sonderstufenwerkzeuge *Special step tools*					**4**								
Einsatzdaten-Berechnung *Word data calculation*					**5**								



PREIS
INCL. SOFTWARE

AB
NETTO
€ 6 500,-

Vorab-Zuordnung zu Aufträgen

Zuspielung von kompletten Auftragslisten aus Ihrem Warenwirtschaftssystem

Spezielle Auswertung in Kombination mit vorhandenen Daten in Ihrem ERP-System

Ein PC-Modul für mehrere Schränke geeignet

sofort voll funktionsfähig

komplette Verwaltung direkt und einfach am Gerät

Vielzahl von Integrationsmöglichkeiten

verschiedene Containerarten

erweiterbar bis zu 10 Schränken mit einem System





Schubladenschränke
bestens geeignet für:

- Einzelne, lose Artikel (Bohrer, Fräser etc.)
- Meßgeräte
- Platinen, Baugruppen
- Bauelemente mit Seriennummern
- Kleinmaschinen und -Geräte
- Medikamente u. v. m.



Wertfachschränke
Wertvolles sicher aufbewahrt:

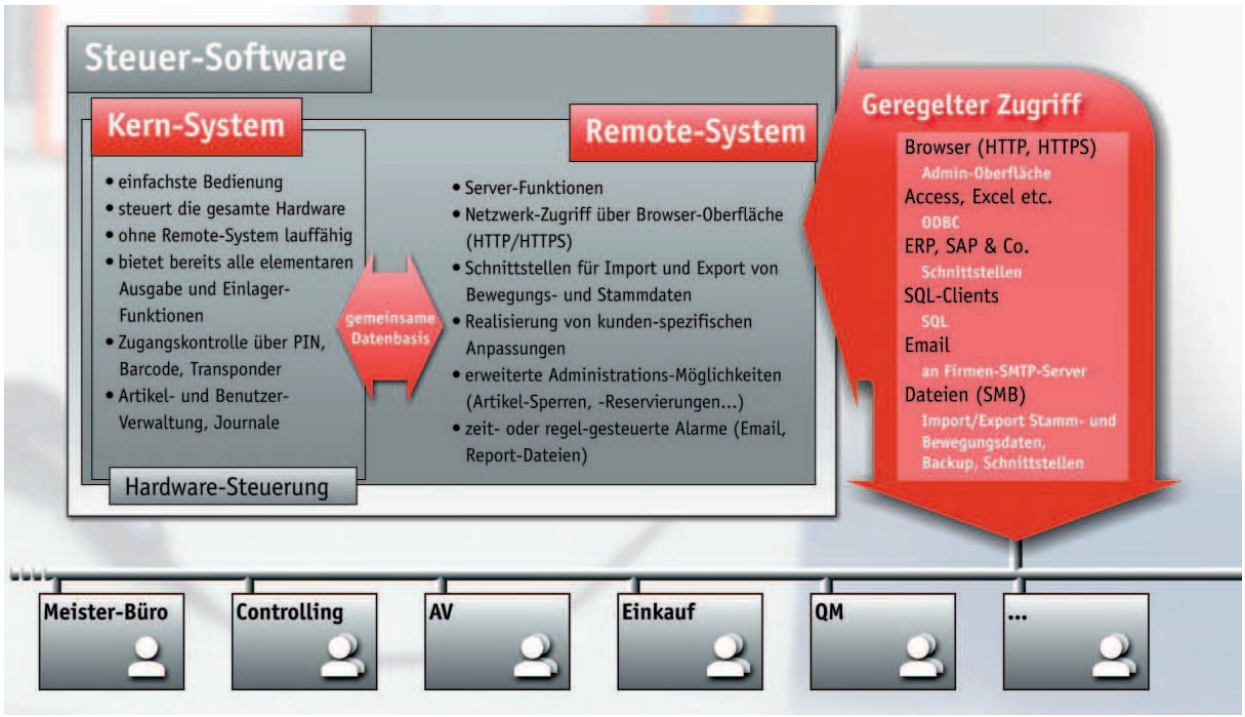
- Kommisionsware für den Außendienst.
- Seltene Werkzeuge.
- Musterkoffer.
- Hochwertige Materialien.
- Übergabepunkt für vorkommisionierte Ware.

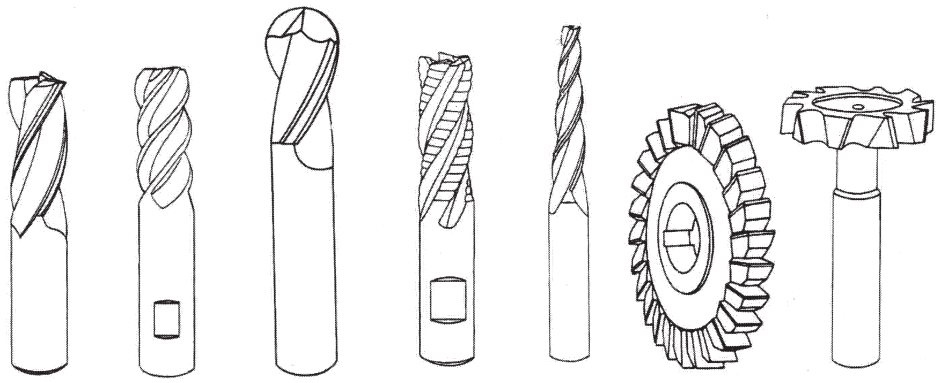


Spiralschränke ideal für:

- Einzeln verpackte Artikel bzw. Kleinpackungen.
- Verbrauchsmaterial und Sicherheitsartikel.
- Allgemeine Betriebsmittel.
- Instandhaltungsmaterial.
- Salben und Medikamente.







BITTE GEWÜNSCHTE AUSFÜHRUNG ANKREUZEN

☐ ☐ ☐ ☐ ☐ ☐ ☐

❑ **Anfrage** *inquiry* ❑ **Bestellung** order

zu bearbeitender Werkstoff *material to be machined:* _____

aus Material *material:* ❑ **HSS** ❑ **HSSE** ❑ **PM** ❑ **VHM** *Solid carbide*

Zentrumschnitt *center cutting:* ❑ **Ja** *Yes* ❑ **Nein** *No*

Spirale *helix:* ❑ **30°** ❑ **45°** ❑ _____

Schaft *shank:* ❑ **HA (DIN 6535)** ❑ **HB (DIN 6535)** ❑ **HE (DIN 6535)**

Beschichtung *coating:* ❑ _____

Schnittrichtung *cutting direction:* ❑ **rechts** *right hand* ❑ **links** *left hand*

nur für Radius- und Kopierfräser: ❑ **Vollradius** ____ ❑ **Eckenradius** ____
only for ball nose and copying end mills: ❑ *radius* ____ ❑ *corner radius* ____

nur für Schlitz- und Scheibenfräser: **Breite** ____ ❑ **gerade verzahnt** ❑ **kreuzverzahnt**
only for woodruft keyseat and side and face cutters: width ____ ❑ *straight tooth* ❑ *staggered tooth*

nur für konische Fräser *only for tapered end mills:* **Winkel** *degree* ____ **Schneiden-L.** *cutting-l.* ____

Stück *piece*	**Fräs-ø** *Milling-ø* **mm**	**Schneidenlänge** *cutting length* **mm**	**Gesamtlänge** *total length* **mm**	**Schaft-ø** *shank-ø* **mm**	**Zähne** *flutes*	

Ihr Firmenstempel:
Your company stamp:

Ihre Fax-Nr.: _____
Your Fax-No.

❑ **Anfrage** *inquiry* ❑ **Bestellung** *order*

zu bearbeitender Werkstoff *material to be machined:* _____

Schneidenzahl *number of flutes:* ❑ **2-Schneiden** *2 flutes* ❑ **3-Schneiden** *3 flutes*

aus Material *material:* ❑ **VHM** *Solid carbide* ❑ _____

Senkwinkel *sinking angle:* ❑ **90°** ❑ **180°** ❑ _____

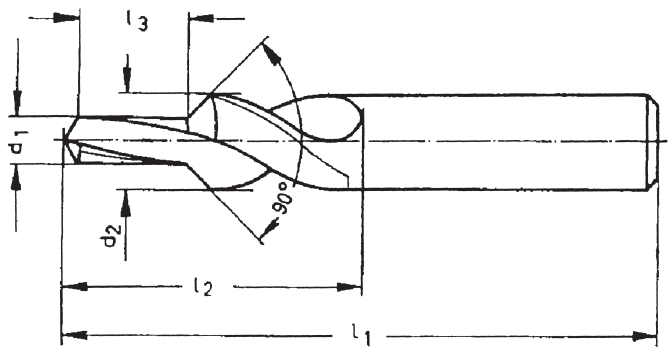
Spitzenwinkel *Split point angle:* ❑ _____

Beschichtung *coating:* ❑ _____

Schnittrichtung *cutting direction:* ❑ **rechts** *right hand* ❑ **links** *left hand*

Innenkühlung *internal coolant:* ❑

Schneide *cut:* ❑ **gerade genutet** *straight fluted* ❑ **spiral genutet** *spiral fluted*



Rundlauftoleranzen: **HSSE +-0,05 mm; VHM +-0,02 mm**
True running tolerances: **Ø-Toleranzen +-0,02 mm**

Stück *piece*	**Bohrer-ø** *drill-ø* **d1 mm**	**Stufenlänge** *step length* **l3 mm**	**Senk-ø** *Sinking-ø* **d2 mm**	**Schneidenlänge** *cutting length* **L2 mm**	**Gesamtlänge** *total length* **L1 mm**	**Schaft-ø** *shank-ø*	

Ihr Firmenstempel:
Your company stamp:

Ihre Fax-Nr.: _____
Your Fax-No.

Drehzahl *speed:*

$$n = \frac{v_c \times 1000}{d1 \times \pi} \quad [min^{-1}]$$

Schnittgeschwindigkeit *Cutting speed:*

$$\mathbf{Vc} = \frac{d \times \pi \times n}{1000} \quad [m / min]$$

Vorschub pro Zahn *Feed per tooth:*

$$f_z = \frac{v_f}{Z \times n} \quad [mm]$$

Vorschub pro Umdrehung *Feed per revolution:*

$$f = f_z \times Z \quad [mm]$$

Vorschubgeschwindigkeit *Feed speed:*

$$V_f = f_z \times Z \times n \quad [mm / min]$$

Mittenspandicke *Chip thickness:*

$$h_m = fz \times \sqrt{\frac{a_e}{d_1}} \quad [mm]$$

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