

A step forward in productivity

VAN HOORN  **CARBIDE**

Workpiece material / Werkstoffe

Group / Gruppe Properties / Eigenschaften

P1.1 ≤ 800 N/mm²

Very soft low-carbon steels, Purely ferritic steels /
Kohlenstoffstahl, Ferritische Stähle.
Free-cutting steels / Automatenstähle.

P1.2 ≤ 1000 N/mm²

Steels (<0,5% C) / Stahl (<0,5% C).
Steels (>0,5% C), low-alloy steels /
Stahl (>0,5% C), Kohlenstoffstahl.

P1.3 ≤ 1400 N/mm²

Normal tool steel, High-alloy steels
with high hardness /
Werkzeugstähle, Härtere Vergütungsstähle,
Martensitische Stähle.
High-alloy steels, High strength
steels, Martensitic stainless steels /
Hochgelegierte Stähle, Gehärtete Stähle.

H2.1 42 < HRC < 50

> 42 - ≤ 50 HRC

H2.1 50 < HRC < 55

> 50 - ≤ 55 HRC

H2.1 55 < HRC < 70

> 55 - < 70 HRC

M3.1 ≤ 950 N/mm²

Stainless steel, Free-cutting stainless steel /
Rostfreie Stähle.

M3.2 ≤ 1250 N/mm²

Difficult stainless steel, Austenitic and
Duplex stainless steel /
Schwierige rostfreie Stähle, Austenit und Duplex.

K4.1 ≤ 800 N/mm²

Cast iron / Guss.

N5.1 Si < 5%

Aluminium Si < 0,5%

N5.2 Si > 5%

Aluminium Si > 0,5%

N5.3

Copper, Copper alloys / Kupfer, Kupfer legierungen.

N5.4

Synthetics / Kunststoffe.

N5.5

Composites CFRP - GFRP /
Verbundwerkstoffe CFK - GFK.

N5.6

Graphite / Graphit.

S6.1 ≤ 1500 N/mm²

Fe-Super alloys /
Fe-Superlegierungen.

S6.2 ≤ 1600 N/mm²

Co-Super alloys /
Co-Superlegierungen.

S6.3 ≤ 1600 N/mm²

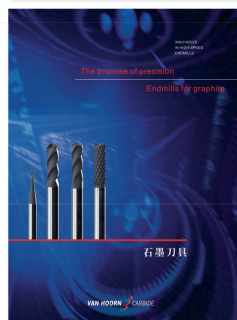
Ni-Super alloys /
Ni-Superlegierungen.

S6.4 ≤ 1250 N/mm²

Titanium Super alloys /
Titanium Superlegierungen.

For each application the perfect endmill!

Für jede Anwendung der perfekte Schaftfräser!



VAN HOORN  **CARBIDE**

Van Hoorn Carbide

Van Hoorn Carbide is committed to manufacture and provide the best solid carbide endmills, leading innovations and reliable support. Developments of materials, machine tools for milling applications and product demands challenge us every day to improve our endmills and optimize the combination between solid carbide grades, geometries, grinding technology and coating. Our goal is to improve your production processes and reduce your cost per product.

Van Hoorn Carbide sieht sich seinen Kunden gegenüber verpflichtet, neben der Herstellung von hochpräzisen Vollhartmetallfräsern, auch einen Innovationsvorsprung und einen zuverlässigen Service zu bieten. Die kontinuierliche Weiterentwicklung von Werkstoffen und Maschinen sowie wachsende Produktanforderungen motivieren uns täglich aufs Neue unsere Fräser, unter Berücksichtigung des Zusammenwirkens von Hartmetallsorte, Schneidengeometrie und Beschichtung, zu verbessern.

Unser Ziel ist es, Ihren Fertigungsprozess zu optimieren und damit Ihre Produkt- und Prozesskosten zu senken.

Why Van Hoorn Carbide

Warum Van Hoorn Carbide

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Hardened steels 55-70 HRC	6	Composites and Synthetics	94	Para Tooling	134
Gehärtete Stähle 55-70 HRC		Verbundwerkstoffe und Kunststoffe		Para Tooling	
VHPK	8	VHDT	96	AS2	136
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Hardened steels < 55 HRC	22	VHGR	102	MS	141
Gehärtete Stähle < 55 HRC		VHGT	104	ST2	142
VHKF2	24	VHGTF	106	ST3	143
VHKF4	26	VHGKF	108	ST4	144
VHTF2	28	VHMG	110	STR2	145
VHTF4	30	VHMGK	112	STR4	146
VHDR	32			RS3	147
VHMF	34	Non Ferrous / Aluminium	114	RS4	148
VHMF4	36	NE-Metall / Aluminium		RV4	149
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VHRFF	80				
VHRS4	82				
VHRS5	86				
VHTR	90				
VHTS	92				

Reduce total cost of ownership is our goal!
Reduzieren kosten pro Produkt ist Unser Ziel!

		P1.1	P1.2	P1.3	H2.1	H2.2	H2.3	M3.1	M3.2	K4.1	N5.1	N5.2	N5.3	N5.4	N5.5	N5.6	S6.1	S6.2	S6.3	S6.4	Number of Flutes Coating Schneidanzahl Size range Beschichtung Page Seite
VHPK																					2 TiAIN+ 0,1 12,0 8
VHPT																					4 TiAIN+ 0,2 12,0 12
VHPM																					6-16 TiAIN+ 3,0 20,0 18
VHPMR																					6-16 TiAIN+ 3,0 20,0 20
VHKF2																					2 TiAIN 1,0 16,0 24
VHKF4																					4 TiAIN 6,0 16,0 26
VHTF2																					2 TiAIN 1,5 16,0 28
VHTF4																					4 TiAIN 1,5 16,0 30
VHDR																					4 TiAIN 2,0 12,0 32
VHMF																					6-8 TiAIN 3,0 20,0 34
VHMR																					6-8 TiAIN 3,0 20,0 36
VHMS																					2-4 TiAIN 0,1 3,0 38
VHMSR																					2-4 TiAIN 0,1 3,0 44
VHMSK																					2 TiAIN 0,1 3,0 50
VHVTR4																					4 TiAIN GOLD 3,0 25,0 58
VHVTR5																					5 TiAIN GOLD 3,0 25,0 62
HAM ^{EXL}																					6-8 TiAIN GOLD 6,0 20,0 66
HABM																					2 TiAIN 0,4 12,0 68
VHVFR																					3 TiAIN 2,0 16,0 72
VHVF																					3 TiAIN 2,0 16,0 74
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VHRFF																					3-4 TiAIN 6,0 20,0 80
VHRS4																					4 TiAIN 3,0 25,0 82
VHRS5																					5 TiAIN 3,0 25,0 86
VHTR																					4-7 TiAIN GOLD 3,0 20,0 90
VHTS																					4-7 TiAIN 3,0 20,0 92

It is all about productivity, quality and reliability!

Alles dreht um Produktivität, Qualität und Zuverlässigkeit!

		P1.1	P1.2	P1.3	H2.1	H2.2	H2.3	M3.1	M3.2	K4.1	N5.1	N5.2	N5.3	N5.4	N5.5	N5.6	S6.1	S6.2	S6.3	S6.4	Number of Flutes Schneidenanzahl Coating Beschichtung Size range Durchmesserbereich Page Seite			
VHDT																					 Diamond 3,0 12,0	96		
VHDB																					 Diamond 3,0 12,0	98		
VHGR																					 Diamond 4,0 16,0	102		
VHGT																					 Diamond 2,0 12,0	104		
VHGTf																					 Diamond 2,0 12,0	106		
VHGKF																					 Diamond 2,0 12,0	108		
VHMG																					 Diamond 0,3 1,5	110		
VHMGK																					 Diamond 0,3 1,5	112		
VHMA																					 Uncoated 0,3 3,0	116		
VHMAK																					 Uncoated 0,3 3,0	118		
VHKE																					 Uncoated 1,0 12,0	120		
VHRAW																					 Uncoated 6,0 25,0	122		
VHLA2																					 Uncoated 2,0 25,0	124		
VHLA3																					 Uncoated 2,0 25,0	126		
VHAE																					 Uncoated 0,5 16,0	128		
VHAD																					 Uncoated 2,0 20,0	130		

- Well suited / besonders geeignet
- Suited / geeignet

Van Hoorn Carbide is the solid carbide end mills specialist:
the highest quality standards, leading technology, technical
knowledge, experience and support.

Van Hoorn Carbide bietet als der Spezialist für Vollhartmetall
Fräswerkzeuge: höchste Qualitätsstandards, führende Technologien,
technisches Wissen, Erfahrung und Service.

Premium products
Premium Produkte

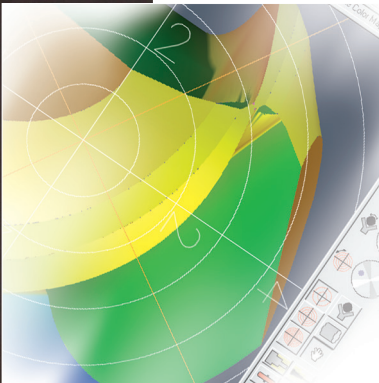
Research & Development
Forschung und Entwicklung

Demonstration & Test centre
Vorführ- und Testzentrum

Technical support
Technische Unterstützung



Highest level of production! Modernster Stand der Fertigungstechnik!



- Fully automated process
Voll automatisierter Fertigungsprozess
- New CNC grinding machines
Modernste CNC-Schleifmaschinen
- 24/7 production
24/7 Rund-um-die-Uhr-Produktion
- Climate controlled production
Klimatisierte Produktionsräume
- Cost reduction!
Kosten reduzieren!
- Knowledge about carbide, geometry (and coating)
Know-how über Hartmetall, Geometrien (und Beschichtungen)
- Global presence
Weltweit vertreten
- High accuracy tools!
Hohe genauigkeits- Fräser!
- Reliability!
Zuverlässigkeit!
- $\pm 1\mu$ tolerances possible!
 $\pm 1\mu$ Toleranz möglich!
- Optimizing production processes
Optimalisierung Produktionsprozesse
- 100% visual inspection
100% visuelle Kontrolle
- Analyzing and solving production problems
Analysieren en Lösen Produktions-Problemen
- Solving manufacturing challenges!
Lösen von Produktions-herausforderungen!



Milling hardened steels
from 55-70 HRC with VHC technology:

Fräsen in gehärtete Stähle 55-70 HRC mittels VHC Technologie:

Advantages / Vorteile:

1. No EDM is required
(milling is much faster).

Kein Errodieren nötig
(Fräsen deutlich zeitsparender).

2. Polishing can be minimized.

Aufwand für Nacharbeiten
kann minimiert werden.

3. One single clamping, so it is
easier to achieve accurate results.

Nur eine Aufspannung - erleichtert
das Erreichen von Zielvorgaben.

Several strategies are possible / Mehrere Strategien sind möglich

HPM (High Performance Machining)
Hochleistungsbearbeitung

- High cutting speed (Vc)
Hohe Schnittgeschwindigkeit (Vc)
- Large cutting depth (Ap)
Große Schnitttiefe (Ap)
- Small cutting width (Ae)
Geringe Schnittbreite (Ae)
- Medium feed per tooth (Fz)/ table feed (Vf)
Mittlere(r) Zahnvorschub (Fz) / Vorschubgeschwindigkeit (Vf)

HSM (High Speed Machining)
Hochgeschwindigkeitsbearbeitung

- High cutting speed (Vc)
Hohe Schnittgeschwindigkeit (Vc)
- Small cutting depth (Ap)
Geringe Schnitttiefe (Ap)
- Small cutting width (Ae)
Geringe Schnittbreite (Ae)
- High feed per tooth (Fz) / table feed (Vf)
Hohe(r) Zahnvorschub (Fz) / Vorschubgeschwindigkeit (Vf)

Depending on the workpiece different strategies can be chosen.
Chip removal and coolant in such applications are crucial.

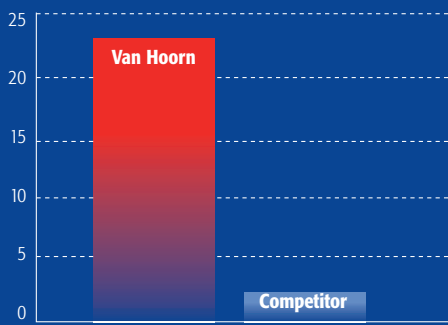
Abhängig vom Werkstück können unterschiedliche Strategien
eingesetzt werden.
Spänefluss und Kühlung spielen bei diesen Anwendungen die
entscheidende Rolle.



Workpiece Material: 1.2379
Hardness: 62HRC

	Van Hoorn	Competitor
v_c	100 m/min	100 m/min
n	3180 rpm	3180 rpm
F_z	0,60 mm/t	0,05 mm/t
Z	6	6
v_f	11.500 mm/min	1.000 mm/min
a_p	20 mm	20 mm
a_e	0,1 mm	0,1 mm
Coolant	air	air
Q	23 cm ³ /min	2 cm ³ /min

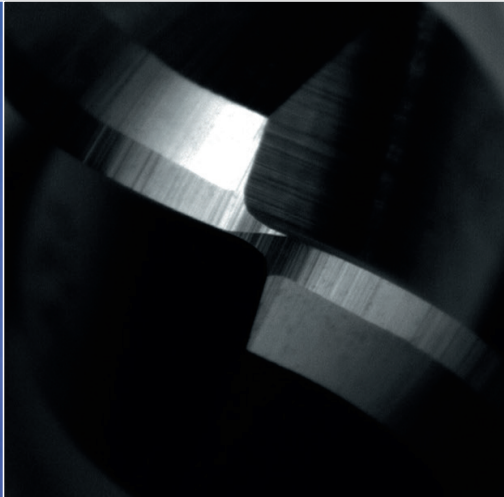
VHPM Material removal rate



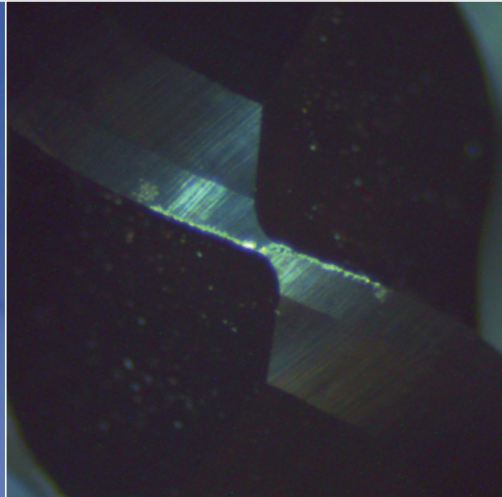
Van Hoorn Carbide's leading technology for hardened materials (55-70 HRc):

Van Hoorn Carbide's Technologievorsprung für gehärtete
Werkstoffe (55-70 HRc):

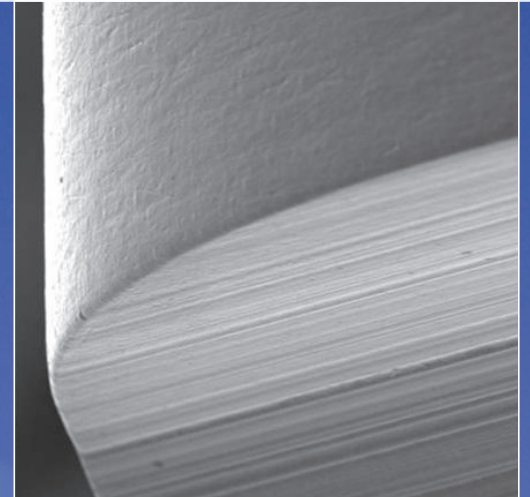
- 2 Flute Ballnose geometry VHPK
2 Schneiden Radiusfräser VHPK
- 4 Flute Torus Geometry VHPT
4 Schneiden Torusfräser VHPT
- New! Micro program shank 4 mm
Neu! Mikro Program schaft 4 mm
- Multiple flute VHPM
Mehrschneidenfräser VHPM
- Multiple flute with corner radius VHPMR
Mehrschneidenfräser mit Eckenradius VHPMR



Optimized center
Optimiertes Zentrum

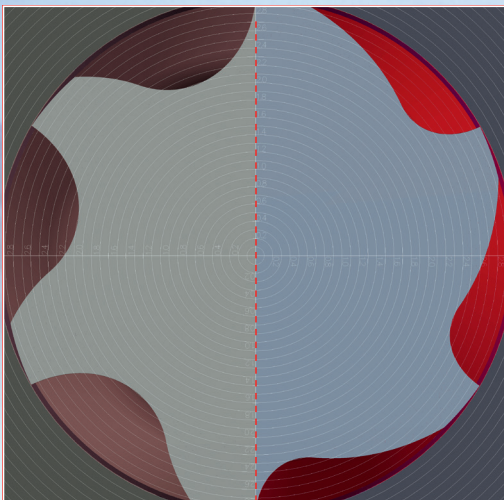


Wear
Verschleiß



Edge preparation
Kantenverrundung

VHPM(R)



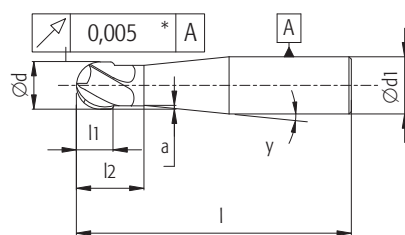
old | new geometry
alte | neue Geometrie



**± 0,005 mm radius
tolerance/ Radiustoleranz**

**± 0,005 mm corner
radius tolerance/
Eckenradiustoleranz**

Standard



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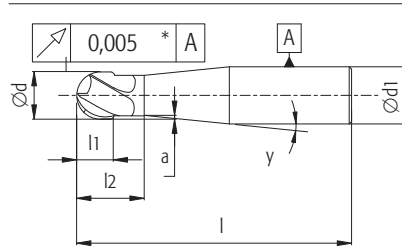
Now available in micro!
Jetzt lieferbar in Mikro!

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
Shank ø4														
VHPK 2 001 051 04 L015	0,10	0,05	4	51	0,15	-	-	2	15	0,684	0,706	0,755	0,812	new/neu
VHPK 2 001 051 04 L020	0,10	0,05	4	51	0,15	2,00	0,005	2	15	2,357	2,437	2,616	2,825	new/neu
VHPK 2 002 051 04 L003	0,20	0,10	4	51	0,30	-	-	2	15	0,786	0,810	0,863	0,925	new/neu
VHPK 2 002 051 04 L020	0,20	0,10	4	51	0,30	2,00	0,005	2	15	2,355	2,434	2,609	2,812	new/neu
VHPK 2 002 051 04 L040	0,20	0,10	4	51	0,30	4,00	0,005	2	15	4,423	4,573	4,909	5,299	new/neu
VHPK 2 002 051 04 L060	0,20	0,10	4	51	0,30	6,00	0,005	2	15	6,490	6,713	7,208	7,785	new/neu
VHPK 2 004 051 04 L005	0,40	0,20	4	51	0,50	-	-	2	15	1,299	1,337	1,423	1,522	new/neu
VHPK 2 004 051 04 L020	0,40	0,20	4	51	0,50	2,00	0,010	2	15	2,371	2,447	2,615	2,811	new/neu
VHPK 2 004 051 04 L040	0,40	0,20	4	51	0,50	4,00	0,010	2	15	4,439	4,586	4,915	5,298	new/neu
VHPK 2 004 051 04 L060	0,40	0,20	4	51	0,50	6,00	0,010	2	15	6,506	6,726	7,215	7,784	new/neu
VHPK 2 004 051 04 L080	0,40	0,20	4	51	0,50	8,00	0,010	2	15	8,573	8,865	9,515	10,270	new/neu
VHPK 2 005 051 04 L007	0,50	0,25	4	51	0,70	-	-	2	15	1,504	1,548	1,645	1,758	new/neu
VHPK 2 005 051 04 L020	0,50	0,25	4	51	0,70	2,00	0,020	2	15	2,408	2,483	2,651	2,846	new/neu
VHPK 2 005 051 04 L040	0,50	0,25	4	51	0,70	4,00	0,020	2	15	4,476	4,623	4,951	5,332	new/neu
VHPK 2 005 051 04 L060	0,50	0,25	4	51	0,70	6,00	0,020	2	15	6,543	6,762	7,250	7,818	new/neu
VHPK 2 005 051 04 L080	0,50	0,25	4	51	0,70	8,00	0,020	2	15	8,610	8,902	9,550	10,304	new/neu
VHPK 2 006 051 04 L008	0,60	0,30	4	51	0,80	-	-	2	15	2,259	2,327	2,479	2,656	new/neu
VHPK 2 006 051 04 L020	0,60	0,30	4	51	0,80	2,00	0,020	2	15	2,543	2,621	2,795	2,997	new/neu
VHPK 2 008 051 04 L010	0,80	0,40	4	51	1,00	-	-	2	15	2,462	2,534	2,694	2,880	new/neu
VHPK 2 010 051 04 L012	1,00	0,50	4	51	1,20	-	-	2	15	2,665	2,741	2,909	3,104	new/neu
VHPK 2 010 051 04 L022	1,00	0,50	4	51	1,20	2,20	0,020	2	15	2,743	2,821	2,995	3,197	new/neu
VHPK 2 010 051 04 L040	1,00	0,50	4	51	1,20	4,00	0,020	2	15	4,603	4,746	5,064	5,435	new/neu
VHPK 2 010 051 04 L060	1,00	0,50	4	51	1,20	6,00	0,020	2	15	6,671	6,886	7,364	7,921	new/neu
VHPK 2 010 051 04 L080	1,00	0,50	4	51	1,20	8,00	0,020	2	15	8,738	9,025	9,664	10,407	new/neu
VHPK 2 010 051 04 L100	1,00	0,50	4	51	1,20	10,00	0,020	2	15	10,805	11,164	11,964	12,894	new/neu
VHPK 2 015 051 04 L018	1,50	0,75	4	51	1,80	-	-	2	15	4,066	4,182	4,439	4,738	new/neu
VHPK 2 015 051 04 L033	1,50	0,75	4	51	1,80	3,30	0,025	2	15	4,163	4,282	4,546	4,854	new/neu
VHPK 2 015 051 04 L040	1,50	0,75	4	51	1,80	4,00	0,025	2	15	4,886	5,030	5,351	5,725	new/neu
VHPK 2 015 051 04 L060	1,50	0,75	4	51	1,80	6,00	0,025	2	15	6,954	7,170	7,651	8,211	new/neu
VHPK 2 015 051 04 L080	1,50	0,75	4	51	1,80	8,00	0,025	2	15	9,021	9,309	9,951	10,697	new/neu
VHPK 2 015 051 04 L100	1,50	0,75	4	51	1,80	10,00	0,025	2	15	11,088	11,448	12,250	13,183	new/neu
VHPK 2 020 051 04 L025	2,00	1,00	4	51	2,50	-	-	2	15	4,781	4,913	5,206	5,548	new/neu
VHPK 2 020 051 04 L040	2,00	1,00	4	51	2,50	4,00	0,050	2	15	4,974	5,113	5,421	5,780	new/neu
VHPK 2 020 051 04 L060	2,00	1,00	4	51	2,50	6,00	0,050	2	15	7,042	7,252	7,721	8,266	new/neu
VHPK 2 020 051 04 L080	2,00	1,00	4	51	2,50	8,00	0,050	2	15	9,109	9,392	10,020	10,752	new/neu
VHPK 2 020 051 04 L100	2,00	1,00	4	51	2,50	10,00	0,050	2	15	11,176	11,531	12,320	13,239	new/neu

Standard



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For an extra charge we offer
an inspection report of the
tool geometry.

Auf Wunsch erhalten Sie
zu jedem Werkzeug ein
separates Prüfprotokoll
(aufpreispflichtig).

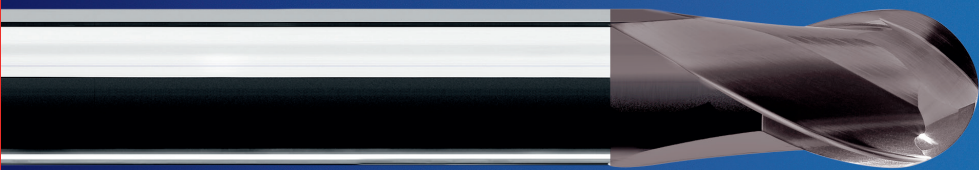
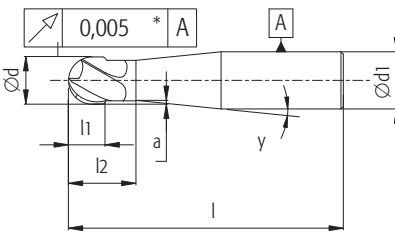


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHPK 2 025 051 04 L030	2,50	1,25	4	51	3,00	-	-	2	15	5,290	5,431	5,744	6,109	new/neu
VHPK 2 025 051 04 L045	2,50	1,25	4	51	3,00	4,50	0,050	2	15	5,483	5,630	5,959	6,341	new/neu
VHPK 2 025 051 04 L060	2,50	1,25	4	51	3,00	6,00	0,050	2	15	7,033	7,235	7,683	8,205	new/neu
VHPK 2 025 051 04 L080	2,50	1,25	4	51	3,00	8,00	0,050	2	15	9,101	9,374	9,983	10,692	new/neu
VHPK 2 025 051 04 L100	2,50	1,25	4	51	3,00	10,00	0,050	2	15	11,168	11,513	12,283	13,178	new/neu
VHPK 2 030 051 04 L035	3,00	1,50	4	51	3,50	-	-	2	15	5,798	5,948	6,281	6,669	new/neu
VHPK 2 030 051 04 L050	3,00	1,50	4	51	3,50	5,00	0,050	2	15	5,991	6,148	6,496	6,901	new/neu
VHPK 2 030 051 04 L060	3,00	1,50	4	51	3,50	6,00	0,050	2	15	7,025	7,217	7,646	8,144	new/neu
VHPK 2 030 051 04 L070	3,00	1,50	4	51	3,50	7,00	0,050	2	15	8,058	8,287	8,796	9,388	new/neu
VHPK 2 030 051 04 L080	3,00	1,50	4	51	3,50	8,00	0,050	2	15	9,092	9,357	9,946	10,631	new/neu
VHPK 2 030 051 04 L100	3,00	1,50	4	51	3,50	10,00	0,050	2	15	11,159	11,496	12,245	∞	new/neu

Shank Ø6

VHPK 2 001 064 06 L015	0,1	0,05	6	64	0,15	-	-	2	15	0,684	0,706	0,755	0,812	new/neu
VHPK 2 001 064 06 L020	0,1	0,05	6	64	0,15	2,00	0,005	2	15	2,357	2,437	2,616	2,825	new/neu
VHPK 2 002 064 06 L003	0,2	0,10	6	64	0,30	-	-	2	15	0,786	0,810	0,863	0,925	new/neu
VHPK 2 002 064 06 L020	0,2	0,10	6	64	0,30	2,00	0,005	2	15	2,355	2,434	2,609	2,812	new/neu
VHPK 2 002 064 06 L040	0,2	0,10	6	64	0,30	4,00	0,005	2	15	4,423	4,573	4,909	5,299	new/neu
VHPK 2 002 064 06 L060	0,2	0,10	6	64	0,30	6,00	0,005	2	15	6,490	6,713	7,208	7,785	new/neu
VHPK 2 004 064 06 L005	0,4	0,20	6	64	0,50	-	-	2	15	1,299	1,337	1,423	1,522	new/neu
VHPK 2 004 064 06 L020	0,4	0,20	6	64	0,50	2,00	0,010	2	15	2,371	2,447	2,615	2,811	new/neu
VHPK 2 004 064 06 L040	0,4	0,20	6	64	0,50	4,00	0,010	2	15	4,439	4,586	4,915	5,298	new/neu
VHPK 2 004 064 06 L060	0,4	0,20	6	64	0,50	6,00	0,010	2	15	6,506	6,726	7,215	7,784	new/neu
VHPK 2 004 064 06 L080	0,4	0,20	6	64	0,50	8,00	0,010	2	15	8,573	8,865	9,515	10,270	new/neu
VHPK 2 005 064 06 L007	0,5	0,25	6	64	0,70	-	-	2	15	1,504	1,548	1,645	1,758	new/neu
VHPK 2 005 064 06 L020	0,5	0,25	6	64	0,70	2,00	0,020	2	15	2,408	2,483	2,651	2,846	new/neu
VHPK 2 005 064 06 L040	0,5	0,25	6	64	0,70	4,00	0,020	2	15	4,476	4,623	4,951	5,332	new/neu
VHPK 2 005 064 06 L060	0,5	0,25	6	64	0,70	6,00	0,020	2	15	6,543	6,762	7,250	7,818	new/neu
VHPK 2 005 064 06 L080	0,5	0,25	6	64	0,70	8,00	0,020	2	15	8,610	8,902	9,550	10,304	new/neu
VHPK 2 006 064 06 L008	0,6	0,30	6	64	0,80	-	-	2	15	2,259	2,327	2,479	2,656	new/neu
VHPK 2 006 064 06 L020	0,6	0,30	6	64	0,80	2,00	0,020	2	15	2,543	2,621	2,795	2,997	new/neu
VHPK 2 008 064 06 L010	0,8	0,40	6	64	1,00	-	-	2	15	2,462	2,534	2,694	2,880	new/neu
VHPK 2 010 064 06 L012	1,0	0,50	6	64	1,20	-	-	2	15	2,665	2,741	2,909	3,104	new/neu
VHPK 2 010 064 06 L022	1,0	0,50	6	64	1,20	2,20	0,020	2	15	2,743	2,821	2,995	3,197	new/neu
VHPK 2 010 064 06 L040	1,0	0,50	6	64	1,20	4,00	0,020	2	15	4,603	4,746	5,064	5,435	new/neu
VHPK 2 010 064 06 L060	1,0	0,50	6	64	1,20	6,00	0,020	2	15	6,671	6,886	7,364	7,921	new/neu
VHPK 2 010 064 06 L080	1,0	0,50	6	64	1,20	8,00	0,020	2	15	8,738	9,025	9,664	10,407	new/neu
VHPK 2 010 064 06 L100	1,0	0,50	6	64	1,20	10,00	0,020	2	15	10,805	11,164	11,964	12,894	new/neu

Standard



Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHPK 2 015 064 06 L018	1,5	0,75	6	64	1,80	-	-	2	15	4,066	4,182	4,439	4,738
VHPK 2 015 064 06 L033	1,5	0,75	6	64	1,80	3,30	0,025	2	15	4,163	4,282	4,546	4,854 new/neu
VHPK 2 015 064 06 L040	1,5	0,75	6	64	1,80	4,00	0,025	2	15	4,886	5,030	5,351	5,725 new/neu
VHPK 2 015 064 06 L060	1,5	0,75	6	64	1,80	6,00	0,025	2	15	6,954	7,170	7,651	8,211 new/neu
VHPK 2 015 064 06 L080	1,5	0,75	6	64	1,80	8,00	0,025	2	15	9,021	9,309	9,951	10,697 new/neu
VHPK 2 015 064 06 L100	1,5	0,75	6	64	1,80	10,00	0,025	2	15	11,088	11,448	12,250	13,183 new/neu
VHPK 2 020 064 06 L025	2,0	1,00	6	64	2,50	-	-	2	15	4,781	4,913	5,206	5,548
VHPK 2 020 064 06 L040	2,0	1,00	6	64	2,50	4,00	0,050	2	15	4,974	5,113	5,421	5,780
VHPK 2 020 064 06 L060	2,0	1,00	6	64	2,50	6,00	0,050	2	15	7,042	7,252	7,721	8,266 new/neu
VHPK 2 020 064 06 L080	2,0	1,00	6	64	2,50	8,00	0,050	2	15	9,109	9,392	10,020	10,752 new/neu
VHPK 2 020 064 06 L100	2,0	1,00	6	64	2,50	10,00	0,050	2	15	11,176	11,531	12,320	13,239 new/neu
VHPK 2 025 064 06 L030	2,5	1,25	6	64	3,00	-	-	2	15	5,290	5,431	5,744	6,109
VHPK 2 025 064 06 L045	2,5	1,25	6	64	3,00	4,50	0,050	2	15	5,483	5,630	5,959	6,341 new/neu
VHPK 2 025 064 06 L060	2,5	1,25	6	64	3,00	6,00	0,050	2	15	7,033	7,235	7,683	8,205 new/neu
VHPK 2 025 064 06 L080	2,5	1,25	6	64	3,00	8,00	0,050	2	15	9,101	9,374	9,983	10,692 new/neu
VHPK 2 025 064 06 L100	2,5	1,25	6	64	3,00	10,00	0,050	2	15	11,168	11,513	12,283	13,178 new/neu
VHPK 2 030 064 06 L035	3,0	1,50	6	64	3,50	-	-	2	15	5,798	5,948	6,281	6,669
VHPK 2 030 064 06 L050	3,0	1,50	6	64	3,50	5,00	0,050	2	15	5,991	6,148	6,496	6,901 new/neu
VHPK 2 030 064 06 L060	3,0	1,50	6	64	3,50	6,00	0,050	2	15	7,025	7,217	7,646	8,144 new/neu
VHPK 2 030 064 06 L070	3,0	1,50	6	64	3,50	7,00	0,050	2	15	8,058	8,287	8,796	9,388
VHPK 2 030 064 06 L080	3,0	1,50	6	64	3,50	8,00	0,050	2	15	9,092	9,357	9,946	10,631 new/neu
VHPK 2 030 064 06 L100	3,0	1,50	6	64	3,50	10,00	0,050	2	15	11,159	11,496	12,245	13,117 new/neu
VHPK 2 040 064 06 L045	4,0	2,00	6	64	4,50	-	-	2	15	6,815	6,983	7,356	7,791
VHPK 2 040 064 06 L080	4,0	2,00	6	64	4,50	8,00	0,100	2	15	9,268	9,521	10,085	10,741
VHPK 2 050 064 06 L060	5,0	2,50	6	64	6,00	-	-	2	15	8,349	8,553	9,006	9,534
VHPK 2 050 064 06 L100	5,0	2,50	6	64	6,00	10,00	0,150	2	15	11,512	11,826	12,525	∞
VHPK 2 060 064 06 L070	6,0	3,00	6	64	7,00	-	-	2	-	∞	∞	∞	∞
VHPK 2 060 064 06 L120	6,0	3,00	6	64	7,00	12,00	0,150	2	-	∞	∞	∞	∞
VHPK 2 060 064 06 L250	6,0	3,00	6	64	7,00	25,00	0,150	2	-	∞	∞	∞	∞
VHPK 2 080 064 08 L090	8,0	4,00	8	64	9,00	-	-	2	-	∞	∞	∞	∞
VHPK 2 080 064 08 L160	8,0	4,00	8	64	9,00	16,00	0,200	2	-	∞	∞	∞	∞
VHPK 2 080 064 08 L250	8,0	4,00	8	64	9,00	25,00	0,200	2	-	∞	∞	∞	∞
VHPK 2 100 078 10 L120	10,0	5,00	10	78	12,00	-	-	2	-	∞	∞	∞	∞
VHPK 2 100 078 10 L200	10,0	5,00	10	78	12,00	20,00	0,200	2	-	∞	∞	∞	∞
VHPK 2 120 078 12 L150	12,0	6,00	12	78	15,00	-	-	2	-	∞	∞	∞	∞

Material group	TSR (N/mm ²)	Hardness	Cutting speed Vc m/min	Coolant
H2.2		50-55 HRC	150 - 220	min.lub.
H2.3		55-70 HRC	200 - 250	min.lub.

Milling up to 70 HRc with 0,1 mm end mill!
Fräsen bis 70 HRc mit 0,1 mm Fräser!

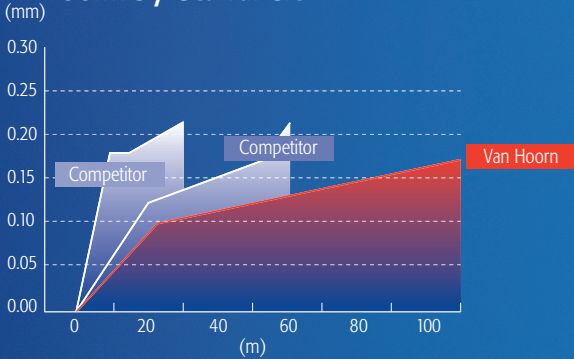
VHPK206006406L070

Workpiece Material: 1.2379

Hardness: 60 HRC

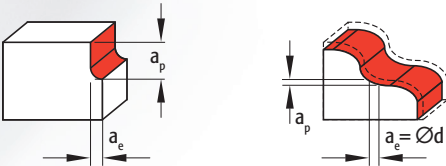
	Van Hoorn	Competitor
v _c	160 m/min	160 m/min
n	8400 rpm	8400 rpm
F _z	0,157 mm/t	0,157 mm/t
v _f	2630 mm/min	2630 mm/min
a _p	0,3 mm	0,3 mm
a _e	1,2 mm	1,2 mm
Coolant	min. lubrication	min. lubrication
Q	0,95 mm ³ /min	0,95 mm ³ /min

Toollife / Standzeit



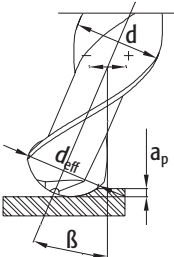
For an extra charge we offer an inspection report of the tool geometry.

Auf Wunsch erhalten Sie zu jedem Werkzeug ein separates Prüfprotokoll (aufpreispflichtig).



Profiling / Profilierung

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,1	< 0,02	< 0,003	0,002 - 0,007
0,2	< 0,04	< 0,006	0,004 - 0,010
0,4	< 0,08	< 0,012	0,006 - 0,013
0,5	< 0,10	< 0,015	0,007 - 0,015
0,6	< 0,12	< 0,018	0,009 - 0,018
0,8	< 0,16	< 0,024	0,012 - 0,021
1,0	< 0,20	< 0,030	0,015 - 0,025
1,5	< 0,30	< 0,045	0,020 - 0,035
2,0	< 0,40	< 0,060	0,030 - 0,050
2,5	< 0,50	< 0,075	0,035 - 0,055
3,0	< 0,60	< 0,090	0,040 - 0,060
4,0	< 0,80	< 0,120	0,050 - 0,080
5,0	< 1,00	< 0,150	0,060 - 0,110
6,0	< 1,20	< 0,180	0,065 - 0,125
8,0	< 1,60	< 0,240	0,080 - 0,130
10,0	< 2,00	< 0,300	0,085 - 0,135
12,0	< 2,40	< 0,360	0,100 - 0,140

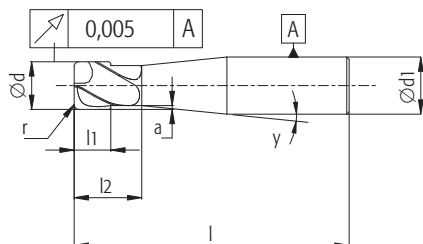


- For the cutting speed Vc calculation the effective cutting diameter d_{eff} has to be taken into account. See formula.

Für die Berechnung der Schnittgeschwindigkeit muss der effektive Durchmesser d_{eff} berücksichtigt werden (siehe Formel).

$$\beta \neq 0: \quad d_{\text{eff}} = d \cdot \sin \left[\beta \pm \arccos \left(\frac{d - 2a_p}{d} \right) \right]$$

Standard



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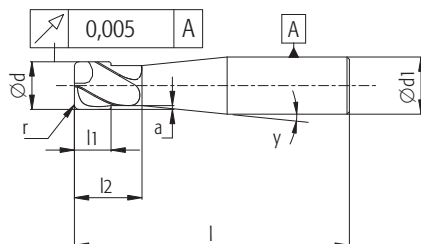
Shank 4 mm
Schaft 4 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHPT 4 002 051 04 40 L002	0,2	0,01	4	51	0,20	-	-	4	15	0,685	0,709	0,761	0,822	new/neu
VHPT 4 002 051 04 40 L004	0,2	0,01	4	51	0,20	0,40	0,010	4	15	0,724	0,749	0,804	0,869	new/neu
VHPT 4 004 051 04 40 L004	0,4	0,01	4	51	0,40	-	-	4	15	1,202	1,244	1,336	1,444	new/neu
VHPT 4 004 051 04 40 L009	0,4	0,01	4	51	0,40	0,90	0,010	4	15	1,241	1,284	1,379	1,490	new/neu
VHPT 4 004 051 04 40 L016	0,4	0,01	4	51	0,40	1,60	0,010	4	15	1,964	2,032	2,184	2,360	new/neu
VHPT 4 005 051 04 40 L005	0,5	0,03	4	51	0,50	-	-	4	15	1,305	1,349	1,448	1,563	new/neu
VHPT 4 005 051 04 40 L010	0,5	0,03	4	51	0,50	1,00	0,010	4	15	1,343	1,389	1,491	1,610	new/neu
VHPT 4 005 051 04 40 L020	0,5	0,03	4	51	0,50	2,00	0,010	4	15	2,377	2,459	2,641	2,853	new/neu
VHPT 4 006 051 04 40 L006	0,6	0,05	4	51	0,60	-	-	4	15	2,060	2,130	2,286	2,468	new/neu
VHPT 4 006 051 04 40 L016	0,6	0,05	4	51	0,60	1,60	0,020	4	15	2,138	2,210	2,372	2,561	new/neu
VHPT 4 006 051 04 40 L024	0,6	0,05	4	51	0,60	2,40	0,020	4	15	2,965	3,066	3,292	3,555	new/neu
VHPT 4 008 051 04 40 L008	0,8	0,05	4	51	0,80	-	-	4	15	2,267	2,344	2,516	2,716	new/neu
VHPT 4 008 051 04 40 L018	0,8	0,05	4	51	0,80	1,80	0,020	4	15	2,344	2,424	2,602	2,809	new/neu
VHPT 4 008 051 04 40 L032	0,8	0,05	4	51	0,80	3,20	0,020	4	15	3,791	3,922	4,212	4,550	new/neu
VHPT 4 010 051 04 40 L001	1,0	0,05	4	51	1,00	-	-	4	15	2,474	2,558	2,746	2,965	new/neu
VHPT 4 010 051 04 40 L020	1,0	0,05	4	51	1,00	2,00	0,020	4	15	2,551	2,638	2,832	3,058	new/neu
VHPT 4 010 051 04 40 L040	1,0	0,05	4	51	1,00	4,00	0,020	4	15	4,618	4,778	5,132	5,544	new/neu
VHPT 4 010 051 04 40 L060	1,0	0,05	4	51	1,00	6,00	0,020	4	15	6,686	6,917	7,432	8,030	new/neu
VHPT 4 01A 051 04 40 L010	1,0	0,10	4	51	1,00	-	-	4	15	2,472	2,555	2,739	2,953	new/neu
VHPT 4 01A 051 04 40 L020	1,0	0,10	4	51	1,00	2,00	0,020	4	15	2,549	2,635	2,825	3,046	new/neu
VHPT 4 01A 051 04 40 L040	1,0	0,10	4	51	1,00	4,00	0,020	4	15	4,617	4,774	5,124	5,532	new/neu
VHPT 4 01A 051 04 40 L060	1,0	0,10	4	51	1,00	6,00	0,020	4	15	6,684	6,913	7,424	8,018	new/neu
VHPT 4 015 051 04 40 L015	1,5	0,10	4	51	1,50	-	-	4	15	3,778	3,906	4,191	4,523	new/neu
VHPT 4 015 051 04 40 L030	1,5	0,10	4	51	1,50	3,00	0,025	4	15	3,874	4,006	4,299	4,639	new/neu
VHPT 4 015 051 04 40 L060	1,5	0,10	4	51	1,50	6,00	0,025	4	15	6,975	7,215	7,748	8,369	new/neu
VHPT 4 015 051 04 40 L090	1,5	0,10	4	51	1,50	9,00	0,025	4	15	10,076	10,424	11,198	12,098	new/neu
VHPT 4 015 B51 04 40 L015	1,5	0,20	4	51	1,50	-	-	4	15	3,775	3,899	4,177	4,499	new/neu
VHPT 4 015 B51 04 40 L030	1,5	0,20	4	51	1,50	3,00	0,025	4	15	3,871	3,999	4,284	4,615	new/neu
VHPT 4 015 B51 04 40 L060	1,5	0,20	4	51	1,50	6,00	0,025	4	15	6,972	7,208	7,733	8,345	new/neu
VHPT 4 015 B51 04 40 L090	1,5	0,20	4	51	1,50	9,00	0,025	4	15	10,073	10,417	11,183	12,074	new/neu

Standard

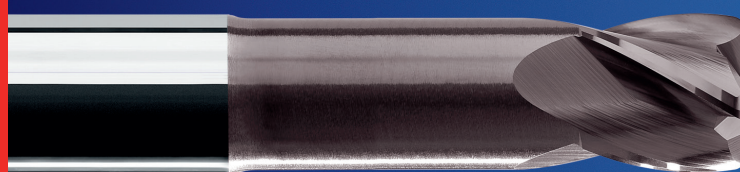


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Shank 4 mm
Schaft 4 mm

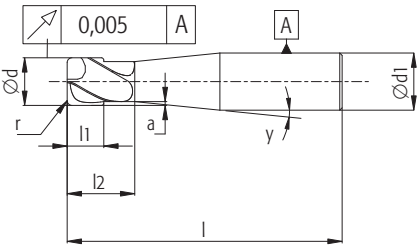
For an extra charge we offer an inspection report of the tool geometry.

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Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHPT 4 020 051 04 40 L020	2,0	0,10	4	51	2,00	-	-	4	15	4,295	4,441	4,766	5,145	new/neu
VHPT 4 020 051 04 40 L040	2,0	0,10	4	51	2,00	4,00	0,050	4	15	5,005	5,175	5,556	5,999	new/neu
VHPT 4 020 051 04 40 L080	2,0	0,10	4	51	2,00	8,00	0,050	4	15	9,139	9,454	10,155	10,971	new/neu
VHPT 4 020 051 04 40 L120	2,0	0,10	4	51	2,00	12,00	0,050	4	15	13,274	13,733	14,755	15,944	new/neu
VHPT 4 02A 051 04 40 L020	2,0	0,30	4	51	2,00	-	-	4	15	4,288	4,427	4,736	5,096	new/neu
VHPT 4 02A 051 04 40 L040	2,0	0,30	4	51	2,00	4,00	0,050	4	15	4,998	5,162	5,526	5,950	new/neu
VHPT 4 02A 051 04 40 L080	2,0	0,30	4	51	2,00	8,00	0,050	4	15	9,133	9,440	10,125	10,923	new/neu
VHPT 4 02A 051 04 40 L120	2,0	0,30	4	51	2,00	12,00	0,050	4	15	13,267	13,719	14,725	15,895	new/neu
VHPT 4 025 051 04 40 L025	2,5	0,10	4	51	2,50	-	-	4	15	4,812	4,976	5,341	5,767	new/neu
VHPT 4 025 051 04 40 L050	2,5	0,10	4	51	2,50	5,00	0,050	4	15	6,038	6,245	6,706	7,242	new/neu
VHPT 4 025 051 04 40 L100	2,5	0,10	4	51	2,50	10,00	0,050	4	15	11,207	11,594	12,455	13,457	new/neu
VHPT 4 025 051 04 40 L150	2,5	0,10	4	51	2,50	15,00	0,050	4	15	16,375	16,942	18,204	∞	new/neu
VHPT 4 025 B51 04 40 L025	2,5	0,30	4	51	2,50	-	-	4	15	4,805	4,962	5,311	5,718	new/neu
VHPT 4 025 B51 04 40 L050	2,5	0,30	4	51	2,50	5,00	0,050	4	15	6,032	6,231	6,676	7,193	new/neu
VHPT 4 025 B51 04 40 L100	2,5	0,30	4	51	2,50	10,00	0,050	4	15	11,200	11,580	12,425	13,409	new/neu
VHPT 4 025 B51 04 40 L150	2,5	0,30	4	51	2,50	15,00	0,050	4	15	16,368	16,928	18,174	∞	new/neu
VHPT 4 030 051 04 40 L030	3,0	0,20	4	51	3,00	-	-	4	15	5,325	5,504	5,901	6,364	new/neu
VHPT 4 030 051 04 40 L060	3,0	0,20	4	51	3,00	6,00	0,050	4	15	7,069	7,308	7,841	8,461	new/neu
VHPT 4 030 051 04 40 L120	3,0	0,20	4	51	3,00	12,00	0,050	4	15	13,271	13,726	14,740	∞	new/neu
VHPT 4 030 051 04 40 L180	3,0	0,20	4	51	3,00	18,00	0,050	4	15	19,473	20,144	∞	∞	new/neu
VHPT 4 03B 051 04 40 L030	3,0	0,20	4	51	3,00	-	-	4	15	5,325	5,504	5,901	6,364	new/neu
VHPT 4 03B 051 04 40 L060	3,0	0,50	4	51	3,00	6,00	0,050	4	15	7,058	7,287	7,796	8,388	new/neu
VHPT 4 03B 051 04 40 L120	3,0	0,50	4	51	3,00	12,00	0,050	4	15	13,260	13,705	14,695	∞	new/neu
VHPT 4 03B 051 04 40 L180	3,0	0,50	4	51	3,00	18,00	0,050	4	15	19,462	20,123	∞	∞	new/neu

Standard



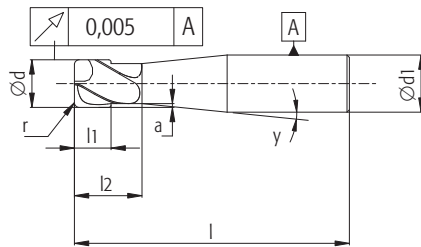
Shank 6 mm
Schaft 6 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHPT 4 002 064 06 40 L002	0,2	0,01	6	64	0,20	-	-	4	15	0,685	0,709	0,761	0,822	new/neu
VHPT 4 002 064 06 40 L004	0,2	0,01	6	64	0,20	0,40	0,010	4	15	0,724	0,749	0,804	0,869	new/neu
VHPT 4 004 064 06 40 L004	0,4	0,01	6	64	0,40	-	-	4	15	1,202	1,244	1,336	1,444	new/neu
VHPT 4 004 064 06 40 L009	0,4	0,01	6	64	0,40	0,90	0,010	4	15	1,241	1,284	1,379	1,490	new/neu
VHPT 4 004 064 06 40 L016	0,4	0,01	6	64	0,40	1,60	0,010	4	15	1,964	2,032	2,184	2,360	new/neu
VHPT 4 005 064 06 40 L005	0,5	0,03	6	64	0,50	-	-	4	15	1,305	1,349	1,448	1,563	new/neu
VHPT 4 005 064 06 40 L010	0,5	0,03	6	64	0,50	1,00	0,010	4	15	1,343	1,389	1,491	1,610	new/neu
VHPT 4 005 064 06 40 L020	0,5	0,03	6	64	0,50	2,00	0,010	4	15	2,377	2,459	2,641	2,853	new/neu
VHPT 4 006 064 06 40 L006	0,6	0,05	6	64	0,60	-	-	4	15	2,060	2,130	2,286	2,468	new/neu
VHPT 4 006 064 06 40 L016	0,6	0,05	6	64	0,60	1,60	0,020	4	15	2,138	2,210	2,372	2,561	new/neu
VHPT 4 006 064 06 40 L024	0,6	0,05	6	64	0,60	2,40	0,020	4	15	2,965	3,066	3,292	3,555	new/neu
VHPT 4 008 064 06 40 L008	0,8	0,05	6	64	0,80	-	-	4	15	2,267	2,344	2,516	2,716	new/neu
VHPT 4 008 064 06 40 L018	0,8	0,05	6	64	0,80	1,80	0,020	4	15	2,344	2,424	2,602	2,809	new/neu
VHPT 4 008 064 06 40 L032	0,8	0,05	6	64	0,80	3,20	0,020	4	15	3,791	3,922	4,212	4,550	new/neu
VHPT 4 010 064 06 40 L001	1,0	0,05	6	64	1,00	-	-	4	15	2,474	2,558	2,746	2,965	new/neu
VHPT 4 010 064 06 40 L020	1,0	0,05	6	64	1,00	2,00	0,020	4	15	2,551	2,638	2,832	3,058	new/neu
VHPT 4 010 064 06 40 L040	1,0	0,05	6	64	1,00	4,00	0,020	4	15	4,618	4,778	5,132	5,544	new/neu
VHPT 4 010 064 06 40 L060	1,0	0,05	6	64	1,00	6,00	0,020	4	15	6,686	6,917	7,432	8,030	new/neu
VHPT 4 01A 064 06 40 L001	1,0	0,10	6	64	1,00	-	-	4	15	2,472	2,555	2,739	2,953	new/neu
VHPT 4 01A 064 06 40 L020	1,0	0,10	6	64	1,00	2,00	0,020	4	15	2,549	2,635	2,825	3,046	new/neu
VHPT 4 01A 064 06 40 L040	1,0	0,10	6	64	1,00	4,00	0,020	4	15	4,617	4,774	5,124	5,532	new/neu
VHPT 4 01A 064 06 40 L060	1,0	0,10	6	64	1,00	6,00	0,020	4	15	6,684	6,913	7,424	8,018	new/neu
VHPT 4 015 064 06 40 L015	1,5	0,10	6	64	1,50	-	-	4	15	3,778	3,906	4,191	4,523	new/neu
VHPT 4 015 064 06 40 L030	1,5	0,10	6	64	1,50	3,00	0,025	4	15	3,874	4,006	4,299	4,639	new/neu
VHPT 4 015 064 06 40 L060	1,5	0,10	6	64	1,50	6,00	0,025	4	15	6,975	7,215	7,748	8,369	new/neu
VHPT 4 015 064 06 40 L090	1,5	0,10	6	64	1,50	9,00	0,025	4	15	10,076	10,424	11,198	12,098	new/neu
VHPT 4 015 B64 06 40 L015	1,5	0,20	6	64	1,50	-	-	4	15	3,775	3,899	4,177	4,499	new/neu
VHPT 4 015 B64 06 40 L030	1,5	0,20	6	64	1,50	3,00	0,025	4	15	3,871	3,999	4,284	4,615	new/neu
VHPT 4 015 B64 06 40 L060	1,5	0,20	6	64	1,50	6,00	0,025	4	15	6,972	7,208	7,733	8,345	new/neu
VHPT 4 015 B64 06 40 L090	1,5	0,20	6	64	1,50	9,00	0,025	4	15	10,073	10,417	11,183	12,074	new/neu
VHPT 4 020 064 06 40 L002	2,0	0,10	6	64	2,00	-	-	4	15	4,295	4,441	4,766	5,145	new/neu
VHPT 4 020 064 06 40 L040	2,0	0,10	6	64	2,00	4,00	0,050	4	15	5,005	5,175	5,556	5,999	
VHPT 4 020 064 06 40 L080	2,0	0,10	6	64	2,00	8,00	0,050	4	15	9,139	9,454	10,155	10,971	
VHPT 4 020 064 06 40 L120	2,0	0,10	6	64	2,00	12,00	0,050	4	15	13,274	13,733	14,755	15,944	
VHPT 4 02A 064 06 40 L002	2,0	0,30	6	64	2,00	-	-	4	15	4,288	4,427	4,736	5,096	new/neu
VHPT 4 02A 064 06 40 L040	2,0	0,30	6	64	2,00	4,00	0,050	4	15	4,998	5,162	5,526	5,950	
VHPT 4 02A 064 06 40 L080	2,0	0,30	6	64	2,00	8,00	0,050	4	15	9,133	9,440	10,125	10,923	
VHPT 4 02A 064 06 40 L120	2,0	0,30	6	64	2,00	12,00	0,050	4	15	13,267	13,719	14,725	15,895	

Standard

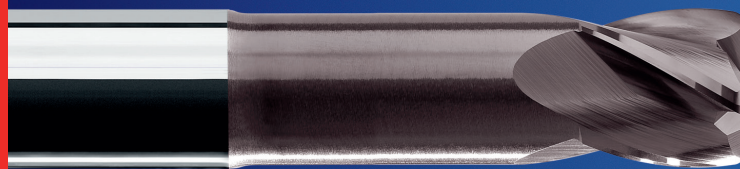


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Shank 6 mm
Schaft 6 mm

For an extra charge we offer an inspection report of the tool geometry.

Auf Wunsch erhalten Sie zu jedem Werkzeug ein separates Prüfprotokoll (aufpreispflichtig).



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHPT 4 025 064 06 40 L025	2,5	0,10	6	64	2,50	-	-	4	15	4,812	4,976	5,341	5,767	new/neu
VHPT 4 025 064 06 40 L050	2,5	0,10	6	64	2,50	5,00	0,050	4	15	6,038	6,245	6,706	7,242	new/neu
VHPT 4 025 064 06 40 L100	2,5	0,10	6	64	2,50	10,00	0,050	4	15	11,207	11,594	12,455	13,457	new/neu
VHPT 4 025 064 06 40 L150	2,5	0,10	6	64	2,50	15,00	0,050	4	15	16,375	16,942	18,204	19,673	new/neu
VHPT 4 025 B64 06 40 L025	2,5	0,30	6	64	2,50	-	-	4	15	4,805	4,962	5,311	5,718	new/neu
VHPT 4 025 B64 06 40 L050	2,5	0,30	6	64	2,50	5,00	0,050	4	15	6,032	6,231	6,676	7,193	new/neu
VHPT 4 025 B64 06 40 L100	2,5	0,30	6	64	2,50	10,00	0,050	4	15	11,200	11,580	12,425	13,409	new/neu
VHPT 4 025 B64 06 40 L150	2,5	0,30	6	64	2,50	15,00	0,050	4	15	16,368	16,928	18,174	19,625	new/neu
VHPT 4 030 064 06 40 L003	3,0	0,20	6	64	3,00	-	-	4	15	5,325	5,504	5,901	6,364	new/neu
VHPT 4 030 064 06 40 L060	3,0	0,20	6	64	3,00	6,00	0,050	4	15	7,069	7,308	7,841	8,461	
VHPT 4 030 064 06 40 L120	3,0	0,20	6	64	3,00	12,00	0,050	4	15	13,271	13,726	14,740	15,919	
VHPT 4 030 064 06 40 L180	3,0	0,20	6	64	3,00	18,00	0,050	4	15	19,473	20,144	21,639	23,378	
VHPT 4 03B 064 06 40 L003	3,0	0,50	6	64	3,00	-	-	4	15	5,325	5,504	5,901	6,364	new/neu
VHPT 4 03B 064 06 40 L060	3,0	0,50	6	64	3,00	6,00	0,050	4	15	7,058	7,287	7,796	8,388	
VHPT 4 03B 064 06 40 L120	3,0	0,50	6	64	3,00	12,00	0,050	4	15	13,260	13,705	14,695	15,846	
VHPT 4 03B 064 06 40 L180	3,0	0,50	6	64	3,00	18,00	0,050	4	15	19,462	20,123	21,594	23,305	
VHPT 4 040 064 06 40 L080	4,0	0,20	6	64	4,00	8,00	0,100	4	15	9,329	9,647	10,355	11,179	
VHPT 4 040 064 06 40 L160	4,0	0,20	6	64	4,00	16,00	0,100	4	15	17,598	18,204	19,554	∞	
VHPT 4 040 064 06 40 L240	4,0	0,20	6	64	4,00	24,00	0,100	4	15	25,867	26,762	28,753	∞	
VHPT 4 04B 064 06 40 L080	4,0	0,50	6	64	4,00	8,00	0,100	4	15	9,319	9,626	10,310	11,106	
VHPT 4 04B 064 06 40 L160	4,0	0,50	6	64	4,00	16,00	0,100	4	15	17,588	18,183	19,509	∞	
VHPT 4 04B 064 06 40 L240	4,0	0,50	6	64	4,00	24,00	0,100	4	15	25,857	26,741	28,708	∞	
VHPT 4 06B 064 06 40 L120	6,0	0,50	6	64	6,00	12,00	0,150	4	-	-	-	-	-	
VHPT 4 06B 064 06 40 L240	6,0	0,50	6	64	6,00	24,00	0,150	4	-	-	-	-	-	
VHPT 4 06C 064 06 40 L120	6,0	1,00	6	64	6,00	12,00	0,150	4	-	-	-	-	-	
VHPT 4 06C 064 06 40 L240	6,0	1,00	6	64	6,00	24,00	0,150	4	-	-	-	-	-	
VHPT 4 08B 078 08 40 L160	8,0	0,50	8	78	8,00	16,00	0,200	4	-	-	-	-	-	
VHPT 4 08B 078 08 40 L320	8,0	0,50	8	78	8,00	32,00	0,200	4	-	-	-	-	-	
VHPT 4 08C 078 08 40 L160	8,0	1,00	8	78	8,00	16,00	0,200	4	-	-	-	-	-	
VHPT 4 08C 078 08 40 L320	8,0	1,00	8	78	8,00	32,00	0,200	4	-	-	-	-	-	
VHPT 4 10B 100 10 40 L200	10,0	0,50	10	100	10,00	20,00	0,200	4	-	-	-	-	-	
VHPT 4 10B 100 10 40 L400	10,0	0,50	10	100	10,00	40,00	0,200	4	-	-	-	-	-	
VHPT 4 10C 100 10 40 L200	10,0	1,00	10	100	10,00	20,00	0,200	4	-	-	-	-	-	
VHPT 4 10C 100 10 40 L400	10,0	1,00	10	100	10,00	40,00	0,200	4	-	-	-	-	-	
VHPT 4 12B 100 12 40 L240	12,0	0,50	12	100	12,00	24,00	0,200	4	-	-	-	-	-	
VHPT 4 12B 100 12 40 L480	12,0	0,50	12	100	12,00	48,00	0,200	4	-	-	-	-	-	
VHPT 4 12C 100 12 40 L240	12,0	1,00	12	100	12,00	24,00	0,200	4	-	-	-	-	-	
VHPT 4 12C 100 12 40 L480	12,0	1,00	12	100	12,00	48,00	0,200	4	-	-	-	-	-	

Material group	TSR (N/mm ²)	Hardness	Cutting speed Vc m/min	Coolant
H2.2		50-55 HRc	150 - 220	min.lub.
H2.3		55-70 HRc	200 - 250	min.lub.

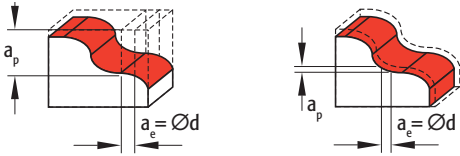
VHPT408B0780840L160
Workpiece Material: 1.2162
Hardness: 60 HRC

	Van Hoorn	Competitor
v_c	200 m/min	25 m/min
n	7958 rpm	995 rpm
F_z	0,079 mm/t	0,038 mm/t
v_f	2500 mm/min	150 mm/min
a_p	3 mm	3 mm
a_e	0,1 mm	0,25 mm
Coolant	air	air
Q	0,75 mm³/min	0,11 mm³/min

Finishing application / Schlichtbearbeitung
6 times faster than Competitor! / 6-Mal
schneller als der Wettbewerb!

VHC Technology for hardened
materials (55-70 HRc)
VHC Technologie für gehärtete
Werkstoffe (55-70 HRc)

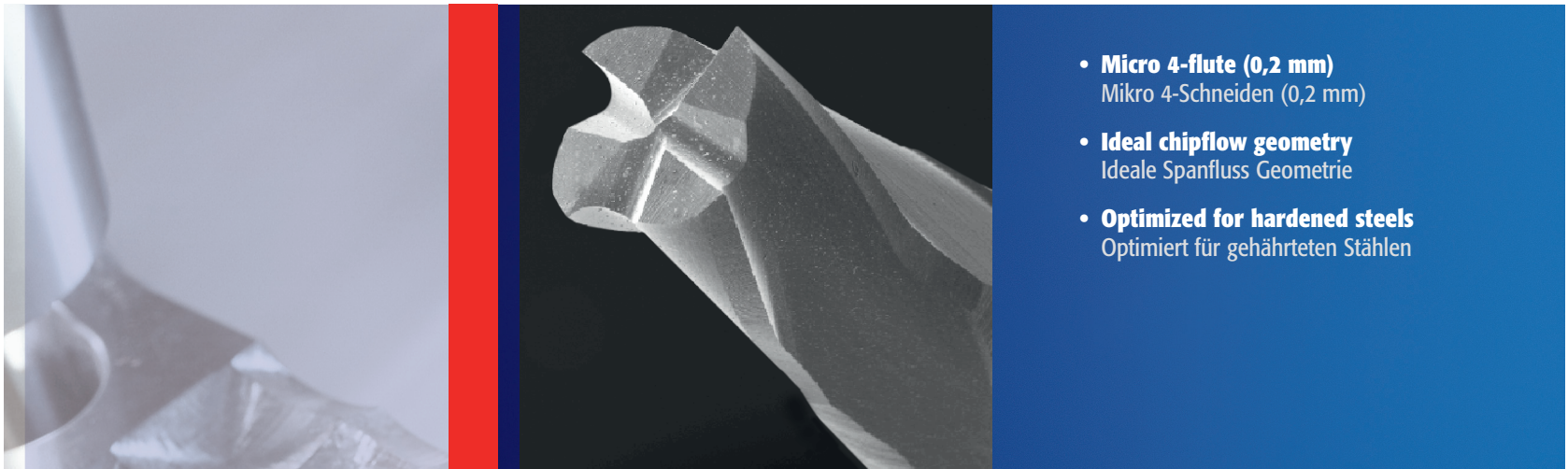
- Consistency of cutting Speeds.
- Gleichbleibende Schnittgeschwindigkeit.
- Optimized performance.
- Optimierte Leistung.
- Significant production time reductions.
- Deutlich verkürzte Fertigungszeiten.



Shoulder milling / Stirnfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,2	< 0,15	< 0,005	0,004 - 0,010
0,4	< 0,30	< 0,010	0,006 - 0,013
0,5	< 0,38	< 0,013	0,007 - 0,015
0,6	< 0,45	< 0,015	0,009 - 0,018
0,8	< 0,60	< 0,020	0,012 - 0,021
1,0	< 0,75	< 0,025	0,015 - 0,025
1,5	< 1,13	< 0,038	0,020 - 0,035
2,0	< 1,50	< 0,050	0,030 - 0,050
2,5	< 1,88	< 0,063	0,035 - 0,055
3,0	< 2,25	< 0,075	0,040 - 0,060
4,0	< 3,00	< 0,100	0,050 - 0,080
5,0	< 3,75	< 0,125	0,060 - 0,110
6,0	< 4,50	< 0,150	0,065 - 0,125
8,0	< 6,00	< 0,200	0,080 - 0,130
10,0	< 7,50	< 0,250	0,085 - 0,135
12,0	< 9,00	< 0,300	0,100 - 0,140

Materials from 55 until 70 HRc
Materiale von 55 bis 70 HRc

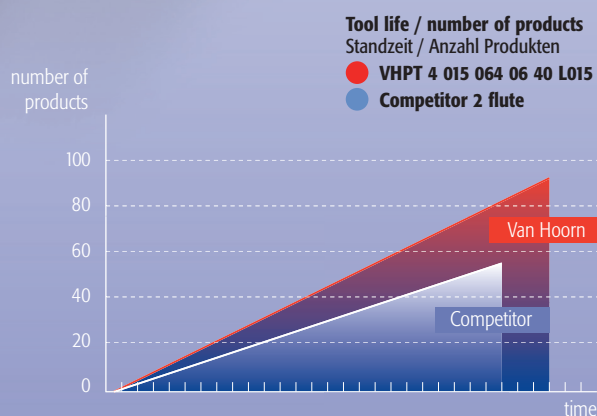
- From 0,1mm until 3,0 micro milling
 Ab 0,1mm bis zum 3,0mm Mikro Fräsen
- Shaft 4 and 6mm
 Schaft 4 und 6mm
- 2 flute and 4 flute
 2 Schneiden und 4 Schneiden
- Ballnose
 Kugel
- Torus
 Torus
- Multiple flute
 Mehrscheiderfräsen



- **Micro 4-flute (0,2 mm)**
 Mikro 4-Schneiden (0,2 mm)
- **Ideal chipflow geometry**
 Ideale Spanfluss Geometrie
- **Optimized for hardened steels**
 Optimiert für gehärteten Stählen

Micro 4-flute
 42% higher material removal rate!

Mikro 4-Schneiden
 42% höheres Zeitspanvolumen



VHPT 4 flute / 4 Schneiden

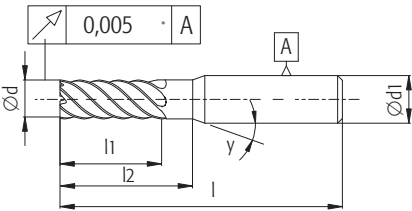
Workpiece Material: Elmax Hardened

Hardness: 62 HRC

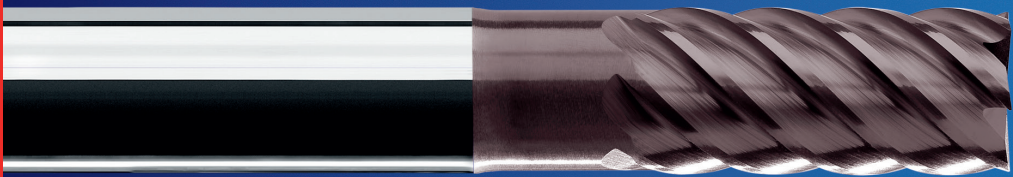
	Van Hoon	Competitor
Ø	1,5 mm	1,5 mm
z	4 teeth	2 teeth
v_c	85 m/min	85 m/min
n	18000 rpm	18000 rpm
v_f	1440 mm/min	828 mm/min
F_z	0,02 mm/t	0,023 mm/t
a_p	0,65 mm	0,65 mm
a_e	0,04 mm	0,04 mm
Coolant	MMS	MMS

Q **37,44 mm³/min** **21,52 mm³/min**

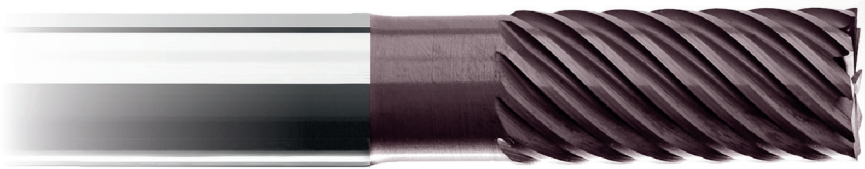
Standard



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHPPM 6 030 064 06 40	3,0	-	6	64	8,00	15,00	0,050	6	15
VHPPM 6 040 064 06 40	4,0	-	6	64	10,00	16,00	0,100	6	15
VHPPM 6 050 064 06 40	5,0	-	6	64	12,00	18,00	0,150	6	15
VHPPM 6 060 064 06 40	6,0	-	6	64	14,00	20,00	0,200	6	-
VHPPM 6 080 078 08 40	8,0	-	8	78	18,00	25,00	0,200	6	-
VHPPM 6 100 078 10 40	10,0	-	10	78	22,00	30,00	0,300	6	-
VHPPM 6 120 089 12 40	12,0	-	12	89	26,00	35,00	0,300	6	-
VHPPM 6 160 089 16 40	16,0	-	16	89	34,00	40,00	0,300	6	-
VHPPM 8 200 102 20 40	20,0	-	20	102	42,00	48,00	0,300	8	-



Also available with extra teeth for higher productivity
Auch lieferbar mit höherer Zähnezahl zur Produktivitätssteigerung.

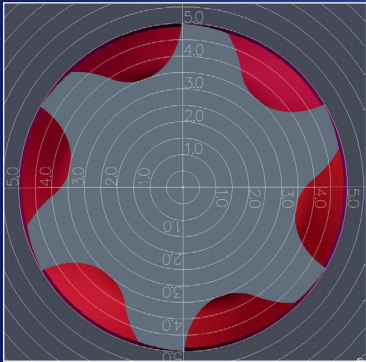
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHPPM 8 080 078 08 40	8,0	-	8	78	18,00	25,00	0,200	8	-
VHPPM 10 100 078 10 40	10,0	-	10	78	22,00	30,00	0,300	10	-
VHPPM 12 120 089 12 40	12,0	-	12	89	26,00	35,00	0,300	12	-
VHPPM 16 160 089 16 40	16,0	-	16	89	34,00	40,00	0,300	16	-

Material group	TSR (N/mm ²)	Hardness	Cutting speed Vc m/min	Coolant
H2.2		50-55 HRc	110 - 170	min.lub.
H2.3		55-70 HRc	80 - 140	min.lub.

For an extra charge we offer an inspection report of the tool geometry.

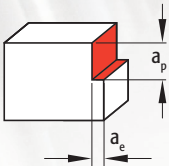
Auf Wunsch erhalten Sie zu jedem Werkzeug ein separates Prüfprotokoll (aufpreispflichtig).

Negative rake angle
Negativer Spanwinkel



Workpiece Material: 1.2379
Hardness: 60HrC

	Van Hoorn	Competitor
v_c	101 m/min	101 m/min
n	3200 rpm	3200 rpm
F_z	0,052 mm/t	0,04 mm/t
Z	6	4
v_f	1000 mm/min	512 mm/min
a_p	18 mm	18 mm
a_e	0,1 mm	0,1 mm
Coolant	air	air
Q	1,8 cm³/min	0,9 cm³/min

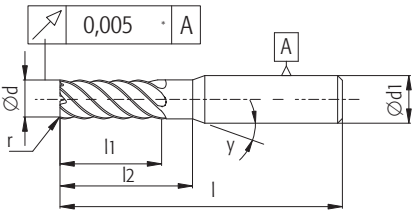


Hardened material
Gehärtete Werkstoffe

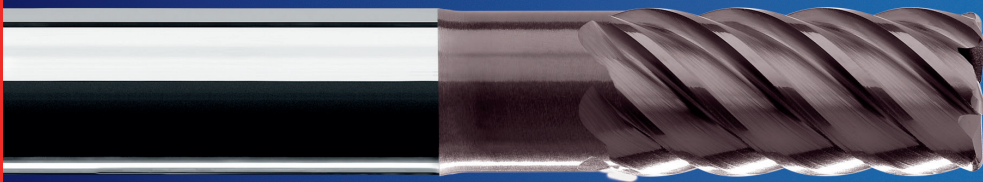
a_p up to 2,00 x d
a_e up to 0,02 x d

Shoulder milling / Eckfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	< 0,03	0,020 - 0,035
4,0	< 6,0	< 0,05	0,030 - 0,045
5,0	< 7,5	< 0,07	0,035 - 0,055
6,0	< 12,0	< 0,10	0,045 - 0,065
8,0	< 16,0	< 0,13	0,060 - 0,080
10,0	< 20,0	< 0,17	0,070 - 0,095
12,0	< 24,0	< 0,21	0,085 - 0,110
16,0	< 32,0	< 0,28	0,095 - 0,125
20,0	< 40,0	< 0,35	0,105 - 0,140

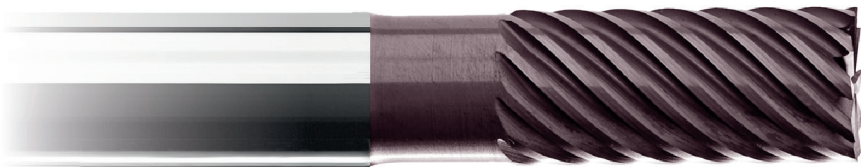
Standard



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHPMR 6 030 064 06 40 030	3,0	0,30	6	64	8,00	15,00	0,050	6	15
VHPMR 6 040 064 06 40 030	4,0	0,30	6	64	10,00	16,00	0,100	6	15
VHPMR 6 050 064 06 40 030	5,0	0,30	6	64	12,00	18,00	0,150	6	15
VHPMR 6 050 064 06 40 050	5,0	0,50	6	64	12,00	18,00	0,150	6	15
VHPMR 6 060 064 06 40 050	6,0	0,50	6	64	14,00	20,00	0,200	6	-
VHPMR 6 060 064 06 40 100	6,0	1,00	6	64	14,00	20,00	0,200	6	-
VHPMR 6 080 070 08 40 050	8,0	0,50	8	70	18,00	25,00	0,300	6	-
VHPMR 6 080 070 08 40 100	8,0	1,00	8	70	18,00	25,00	0,300	6	-
VHPMR 6 100 078 10 40 050	10,0	0,50	10	78	22,00	30,00	0,300	6	-
VHPMR 6 100 078 10 40 100	10,0	1,00	10	78	22,00	30,00	0,300	6	-
VHPMR 6 100 078 10 40 150	10,0	1,50	10	78	22,00	30,00	0,300	6	-
VHPMR 6 120 078 12 40 050	12,0	0,50	12	78	26,00	35,00	0,300	6	-
VHPMR 6 120 078 12 40 100	12,0	1,00	12	78	26,00	35,00	0,300	6	-
VHPMR 6 120 078 12 40 200	12,0	2,00	12	78	26,00	35,00	0,300	6	-
VHPMR 6 160 089 16 40 100	16,0	1,00	16	89	34,00	40,00	0,300	6	-
VHPMR 6 160 089 16 40 200	16,0	2,00	16	89	34,00	40,00	0,300	6	-
VHPMR 8 200 102 20 40 100	20,0	1,00	20	102	42,00	48,00	0,300	8	-
VHPMR 8 200 102 20 40 200	20,0	2,00	20	102	42,00	48,00	0,300	8	-



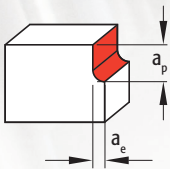
Also available with extra teeth for higher productivity
Auch lieferbar mit höherer Zähnezahl zur Produktivitätssteigerung.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHPMR 8 080 078 08 40 050	8,0	0,50	8	78	18,00	25,00	0,200	8	-
VHPMR 10 100 078 10 40 050	10,0	0,50	10	78	22,00	30,00	0,300	10	-
VHPMR 12 120 089 12 40 050	12,0	0,50	12	89	26,00	35,00	0,300	12	-
VHPMR 16 160 089 16 40 050	16,0	0,50	16	89	34,00	40,00	0,300	16	-

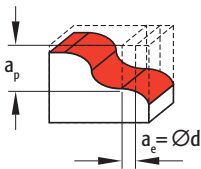
Material group	TSR (N/mm ²)	Hardness	Cutting speed Vc m/min	Coolant
H2.2		50-55 HRc	110 - 170	min.lub.
H2.3		55-70 HRc	80 - 140	min.lub.

For an extra charge we offer an inspection report of the tool geometry.

Auf Wunsch erhalten Sie zu jedem Werkzeug ein separates Prüfprotokoll (aufpreispflichtig).



Hardened material
Gehärtete Werkstoffe
a_p up to 2,00 x d
a_e up to 0,02 x d



Hardened material
Gehärtete Werkstoffe
a_p up to 2,00 x d
a_e up to 0,02 x d

Shoulder milling / Eckfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	< 0,03	0,020 - 0,035
4,0	< 6,0	< 0,05	0,030 - 0,045
5,0	< 7,5	< 0,07	0,035 - 0,055
6,0	< 12,0	< 0,10	0,045 - 0,065
8,0	< 16,0	< 0,13	0,060 - 0,080
10,0	< 20,0	< 0,17	0,070 - 0,095
12,0	< 24,0	< 0,21	0,085 - 0,110
16,0	< 32,0	< 0,28	0,095 - 0,125
20,0	< 40,0	< 0,35	0,105 - 0,140

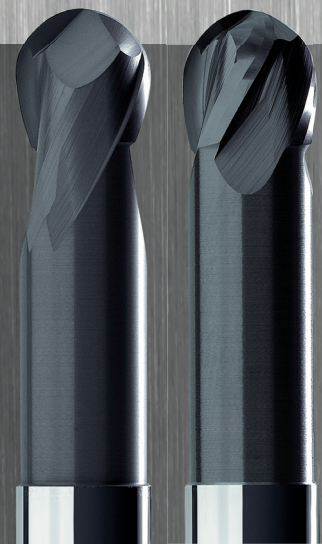
Expanded program! Erweitertes Programm!

An optimized combination between geometry, coating and tolerances result in an excellent surface finish and extended tool life.

Eine optimierte Kombination aus Schneidengeometrie, Beschichtung und Toleranzen gewährleisten ausgezeichnete Oberflächen und verlängerte Standzeiten.

Ballnose geometries Vollradius Geometrien:

- Special designed center
Spezial entwickeltes Zentrum
- Smooth surface finish
Glatte Oberflächen
- Optimized coating for tool life improvement
Optimierte Beschichtung für Standzeitverbesserung

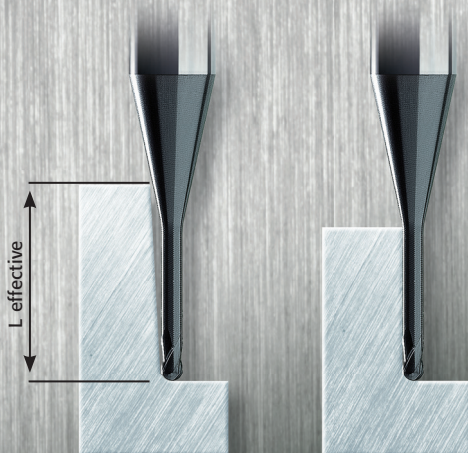


Update micro end mills:

- Also standard in shank 4!
Auch Standard in Schaft 4!
- Radial runout determines tool life
Rundlaufgenauigkeit beeinflusst Standzeit
- Micro 4 flutes!
Mikro 4 Schneiden!
- New designed ideal clearance
Neuer idealer Freilauf

4 Flute! Higher feedrate, higher productivity, better solution!

4 Schneiden! Höhere forschub, höhere Produktivität, bessere Lösung!



A complete range of high end solutions
for typical Mould & Die applications

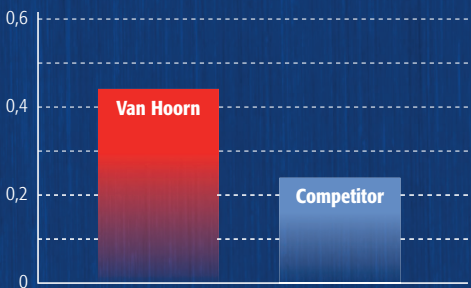
Ein vollständiges Sortiment an High-End-Produkte für den
Werkzeug- und Formenbau.



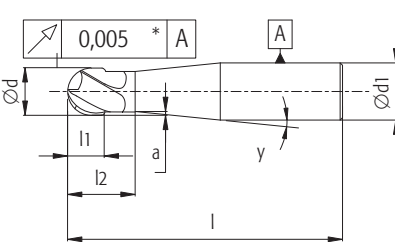
Workpiece Material: 1.2343 (S136)
Hardness: 52HrC

	Van Hoorn	Competitor
v_c	132 m/min	132 m/min
n	7000 rpm	7000 rpm
F_z	0,036 mm/t	0,029 mm/t
Z	6	4
v_f	1500 mm/min	800 mm/min
a_p	0,1 mm	0,1 mm
a_e	3 mm	3 mm
Coolant	emulsion	emulsion
Q	0,45 cm ³ /min	0,24 cm ³ /min

VHMF Material removal rate



Standard



* For endmills / für Schaftfräser L < 100 mm.

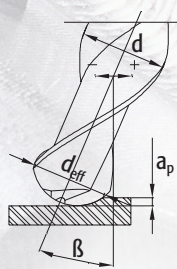
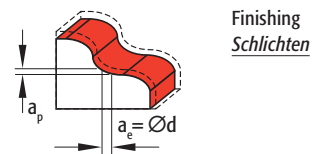
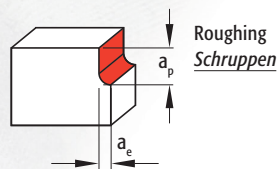


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
VHKF 2 010 064 06 03	1,0	0,50	6	64	2,00	4,00	0,050	2	7	new/neu
VHKF 2 010 078 06 03	1,0	0,50	6	78	2,00	4,00	0,050	2	4	new/neu
VHKF 2 015 064 06 03	1,5	0,75	6	64	2,00	4,00	0,050	2	6	new/neu
VHKF 2 015 078 06 03	1,5	0,75	6	78	2,00	4,00	0,050	2	4	new/neu
VHKF 2 020 064 06 03	2,0	1,00	6	64	3,00	5,00	0,050	2	6	new/neu
VHKF 2 020 064 06 03 L080	2,0	1,00	6	64	3,00	8,00	0,050	2	9	new/neu
VHKF 2 020 078 06 03 L080	2,0	1,00	6	78	3,00	8,00	0,050	2	4	new/neu
VHKF 2 020 078 06 03	2,0	1,00	6	78	3,00	15,00	0,050	2	5	new/neu
VHKF 2 030 064 06 03	3,0	1,50	6	64	4,00	7,00	0,050	2	5	
VHKF 2 030 078 06 03	3,0	1,50	6	78	4,00	15,00	0,050	2	4	
VHKF 2 030 100 06 03	3,0	1,50	6	100	4,00	7,00	0,050	2	2	
VHKF 2 040 064 06 03	4,0	2,00	6	64	5,00	8,00	0,100	2	4	
VHKF 2 040 078 06 03	4,0	2,00	6	78	5,00	15,00	0,100	2	3	
VHKF 2 040 100 06 03	4,0	2,00	6	100	5,00	8,00	0,100	2	1	
VHKF 2 050 064 06 03	5,0	2,50	6	64	5,00	10,00	0,150	2	2	
VHKF 2 050 078 06 03	5,0	2,50	6	78	5,00	20,00	0,150	2	2	
VHKF 2 060 064 06 03	6,0	3,00	6	64	6,00	25,00	0,200	2	-	
VHKF 2 060 078 06 03	6,0	3,00	6	78	6,00	35,00	0,200	2	-	
VHKF 2 060 100 08 03	6,0	3,00	8	100	6,00	25,00	0,200	2	2	
VHKF 2 080 064 08 03	8,0	4,00	8	64	8,00	25,00	0,300	2	-	
VHKF 2 080 078 08 03	8,0	4,00	8	78	8,00	35,00	0,300	2	-	
VHKF 2 080 100 08 03	8,0	4,00	8	100	8,00	50,00	0,300	2	-	
VHKF 2 080 120 10 03	8,0	4,00	10	120	8,00	30,00	0,300	2	2	
VHKF 2 100 078 10 03	10,0	5,00	10	78	10,00	35,00	0,300	2	-	
VHKF 2 100 100 10 03	10,0	5,00	10	100	10,00	55,00	0,300	2	-	
VHKF 2 100 120 12 03	10,0	5,00	12	120	10,00	30,00	0,300	2	2	
VHKF 2 120 078 12 03	12,0	6,00	12	78	12,00	35,00	0,300	2	-	
VHKF 2 120 100 12 03	12,0	6,00	12	100	12,00	55,00	0,300	2	-	
VHKF 2 120 120 16 03	12,0	6,00	16	120	12,00	40,00	0,300	2	5	
VHKF 2 160 100 16 03	16,0	8,00	16	100	20,00	50,00	0,300	2	-	
VHKF 2 160 150 16 03	16,0	8,00	16	150	20,00	100,00	0,300	2	-	

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	150 - 250	emulsion
P1.2	< 1000	< 300	120 - 200	emulsion
P1.3	< 1400	< 400	100 - 160	emulsion
H2.1		42-50 HRc	120 - 180	min.lub.
H2.2		50-55 HRc	150 - 200	min.lub.
H2.3		55-70 HRc	200 - 250	min.lub.

**Special/ideal
ballnose geometry**

**Spezieller/idealer
Kugelgeometrie**



- For the cutting speed Vc calculation the effective cutting diameter d_{eff} has to be taken into account. See formula.

Für die Berechnung der Schnittgeschwindigkeit muss der effektive Durchmesser d_{eff} berücksichtigt werden (siehe Formel).

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[\beta \pm \arccos \left(\frac{d - 2a_p}{d} \right) \right]$$

Roughing / Schrappfräsen

	P1.1 / P1.2 / P1.3		
Ød (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
1,0	< 1,0	< 0,30	0,015 - 0,025
1,5	< 1,5	< 0,45	0,020 - 0,030
2,0	< 2,0	< 0,60	0,025 - 0,035
3,0	< 3,0	< 0,90	0,028 - 0,040
4,0	< 4,0	< 1,20	0,030 - 0,045
5,0	< 5,0	< 1,50	0,035 - 0,050
6,0	< 6,0	< 1,80	0,040 - 0,055
8,0	< 8,0	< 2,40	0,050 - 0,065
10,0	< 10,0	< 3,00	0,055 - 0,080
12,0	< 12,0	< 3,60	0,065 - 0,090
16,0	< 16,0	< 4,80	0,075 - 0,110

Finishing / Schlichtfräsen

	P1.1 / P1.2 / P1.3		
Ød (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
1,0	< 1,0	< 0,10	0,020 - 0,030
1,5	< 1,5	< 0,15	0,025 - 0,040
2,0	< 2,0	< 0,20	0,030 - 0,050
3,0	< 3,0	< 0,30	0,040 - 0,060
4,0	< 4,0	< 0,40	0,050 - 0,080
5,0	< 5,0	< 0,50	0,060 - 0,110
6,0	< 6,0	< 0,60	0,065 - 0,125
8,0	< 8,0	< 0,80	0,080 - 0,130
10,0	< 10,0	< 1,00	0,085 - 0,135
12,0	< 12,0	< 1,20	0,100 - 0,140
16,0	< 16,0	< 1,60	0,120 - 0,160

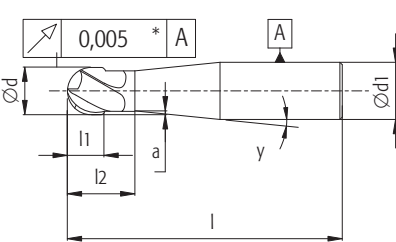
Roughing / Schrappfräsen

	H2.1 / H2.2 / H2.3		
Ød (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
1,0	< 0,5	< 0,05	0,015 - 0,025
1,5	< 0,75	< 0,08	0,020 - 0,030
2,0	< 1,0	< 0,10	0,025 - 0,035
3,0	< 1,5	< 0,15	0,028 - 0,040
4,0	< 2,0	< 0,20	0,030 - 0,045
5,0	< 2,5	< 0,25	0,035 - 0,050
6,0	< 3,0	< 0,30	0,040 - 0,055
8,0	< 4,0	< 0,40	0,050 - 0,065
10,0	< 5,0	< 0,50	0,055 - 0,080
12,0	< 6,0	< 0,60	0,065 - 0,090
16,0	< 8,0	< 0,80	0,075 - 0,110

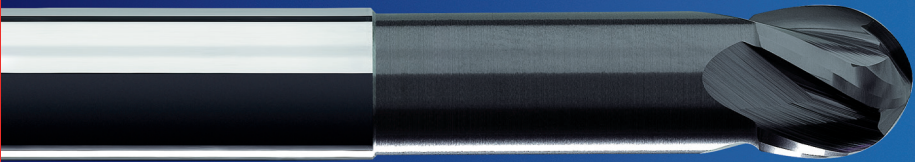
Finishing / Schlichtfräsen

	H2.1 / H2.2 / H2.3		
Ød (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
1,0	< 0,5	< 0,02	0,020 - 0,030
1,5	< 0,75	< 0,03	0,025 - 0,040
2,0	< 1,0	< 0,04	0,030 - 0,050
3,0	< 1,5	< 0,06	0,040 - 0,060
4,0	< 2,0	< 0,08	0,050 - 0,080
5,0	< 2,5	< 0,10	0,060 - 0,110
6,0	< 3,0	< 0,12	0,065 - 0,125
8,0	< 4,0	< 0,16	0,080 - 0,130
10,0	< 5,0	< 0,20	0,085 - 0,135
12,0	< 6,0	< 0,24	0,100 - 0,140
16,0	< 8,0	< 0,32	0,120 - 0,160

Standard



* For endmills / für Schaftfräser L < 100 mm.

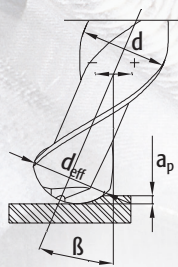
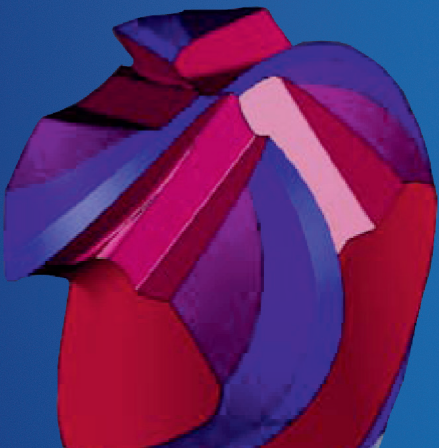


Article Number Artikelnummer	Ød (mm)	r (mm)	Ødl (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHKF 4 060 064 06 03	6,0	3,00	6	64	6,00	25,00	0,200	4	-
VHKF 4 060 078 06 03	6,0	3,00	6	78	6,00	35,00	0,200	4	-
VHKF 4 060 100 08 03	6,0	3,00	8	100	6,00	25,00	0,200	4	2
VHKF 4 080 064 08 03	8,0	4,00	8	64	8,00	25,00	0,300	4	-
VHKF 4 080 078 08 03	8,0	4,00	8	78	8,00	35,00	0,300	4	-
VHKF 4 080 100 08 03	8,0	4,00	8	100	8,00	50,00	0,300	4	-
VHKF 4 080 120 10 03	8,0	4,00	10	120	8,00	30,00	0,300	4	2
VHKF 4 100 078 10 03	10,0	5,00	10	78	10,00	35,00	0,300	4	-
VHKF 4 100 100 10 03	10,0	5,00	10	100	10,00	55,00	0,300	4	-
VHKF 4 100 120 12 03	10,0	5,00	12	120	10,00	30,00	0,300	4	2
VHKF 4 120 078 12 03	12,0	6,00	12	78	12,00	35,00	0,300	4	-
VHKF 4 120 100 12 03	12,0	6,00	12	100	12,00	55,00	0,300	4	-
VHKF 4 120 120 16 03	12,0	6,00	16	120	12,00	40,00	0,300	4	5
VHKF 4 160 100 16 03	16,0	8,00	16	100	20,00	50,00	0,300	4	-
VHKF 4 160 150 16 03	16,0	8,00	16	150	20,00	100,00	0,300	4	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	150 - 250	emulsion
P1.2	< 1000	< 300	120 - 200	emulsion
P1.3	< 1400	< 400	100 - 160	emulsion
H2.1		42-50 HRc	120 - 180	min.lub.
H2.2		50-55 HRc	150 - 200	min.lub.
H2.3		55-70 HRc	200 - 250	min.lub.

**Recommendations:
Empfehlungen:**

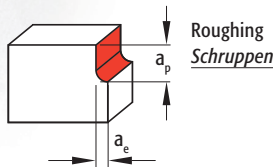
- Down-milling.
Abwärtsfräsen.
- Inclination angle max. 15 degrees.
Eintauchwinkel max. 15°.
- Use the effective diameter d_{eff}
to calculate cutting speed.
Effektive Durchmesser d_{eff} bei der
Schnittgeschwindigkeitsberechnung
berücksichtigen.



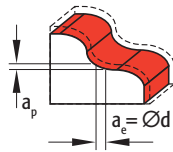
- For the cutting speed Vc
calculation the effective cutting
diameter d_{eff} has to be taken into
account. See formula.

Für die Berechnung der
Schnittgeschwindigkeit muss
der effektive Durchmesser d_{eff}
berücksichtigt werden (siehe
Formel).

$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[\beta \pm \arccos \left(\frac{d - 2a_p}{d} \right) \right]$



Roughing
Schruppfäsen



Finishing
Schlichtfräsen

Roughing / Schruppfäsen

	P1.1 / P1.2 / P1.3		
$\varnothing d$ (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
6,0	< 6,0	< 1,80	0,040 - 0,055
8,0	< 8,0	< 2,40	0,050 - 0,065
10,0	< 10,0	< 3,00	0,055 - 0,080
12,0	< 12,0	< 3,60	0,065 - 0,090
16,0	< 16,0	< 4,80	0,075 - 0,110

Finishing / Schlichtfräsen

	P1.1 / P1.2 / P1.3		
$\varnothing d$ (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
6,0	< 6,0	< 0,60	0,065 - 0,125
8,0	< 8,0	< 0,80	0,080 - 0,130
10,0	< 10,0	< 1,00	0,085 - 0,135
12,0	< 12,0	< 1,20	0,100 - 0,140
16,0	< 16,0	< 1,60	0,120 - 0,160

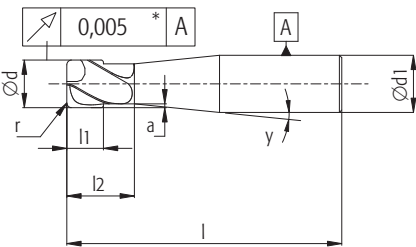
Roughing / Schruppfäsen

	H2.1 / H2.2 / H2.3		
$\varnothing d$ (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
6,0	< 3,0	< 0,30	0,040 - 0,055
8,0	< 4,0	< 0,40	0,050 - 0,065
10,0	< 5,0	< 0,50	0,055 - 0,080
12,0	< 6,0	< 0,60	0,065 - 0,090
16,0	< 8,0	< 0,80	0,075 - 0,110

Finishing / Schlichtfräsen

	H2.1 / H2.2 / H2.3		
$\varnothing d$ (mm)	a_p max. (mm)	a_e max. (mm)	f_z (mm/tooth)
6,0	< 3,0	< 0,12	0,065 - 0,125
8,0	< 4,0	< 0,16	0,080 - 0,130
10,0	< 5,0	< 0,20	0,085 - 0,135
12,0	< 6,0	< 0,24	0,100 - 0,140
16,0	< 8,0	< 0,32	0,120 - 0,160

Standard

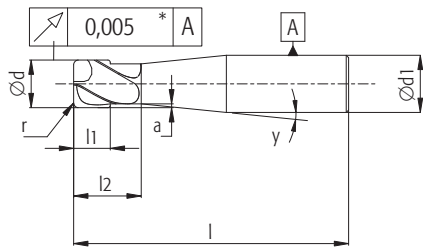


* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHTF 2 015 064 06 03 L050	1,5	0,30	6	64	2,00	5,00	0,050	2	7
VHTF 2 015 064 06 03 L100	1,5	0,30	6	64	2,00	10,00	0,050	2	9
VHTF 2 020 064 06 03	2,0	0,50	6	64	3,00	5,00	0,050	2	6
VHTF 2 020 064 06 03 L080	2,0	0,50	6	64	3,00	8,00	0,050	2	7
VHTF 2 020 064 06 03 L100	2,0	0,50	6	64	3,00	10,00	0,050	2	8
VHTF 2 020 078 06 03	2,0	0,50	6	78	3,00	15,00	0,050	2	5
VHTF 2 020 078 06 03 L080	2,0	0,50	6	78	3,00	8,00	0,050	2	4
VHTF 2 030 064 06 03	3,0	0,50	6	64	4,00	7,00	0,050	2	5
VHTF 2 030 078 06 03	3,0	0,50	6	78	4,00	15,00	0,050	2	4
VHTF 2 040 064 06 03	4,0	0,50	6	64	5,00	8,00	0,100	2	4
VHTF 2 04D 064 06 03	4,0	1,00	6	64	5,00	8,00	0,100	2	4
VHTF 2 04B 078 06 03	4,0	0,50	6	78	5,00	15,00	0,100	2	3
VHTF 2 040 078 06 03	4,0	1,00	6	78	5,00	15,00	0,100	2	3
VHTF 2 050 064 06 03	5,0	0,50	6	64	5,00	10,00	0,150	2	3
VHTF 2 05D 064 06 03	5,0	1,00	6	64	5,00	10,00	0,150	2	3
VHTF 2 05B 078 06 03	5,0	0,50	6	78	5,00	20,00	0,150	2	3
VHTF 2 050 078 06 03	5,0	1,00	6	78	5,00	20,00	0,150	2	2
VHTF 2 060 064 06 03	6,0	0,50	6	64	6,00	25,00	0,200	2	-
VHTF 2 06D 064 06 03	6,0	1,00	6	64	6,00	25,00	0,200	2	-
VHTF 2 06F 064 06 03	6,0	1,50	6	64	6,00	25,00	0,200	2	-
VHTF 2 06B 078 06 03	6,0	0,50	6	78	6,00	35,00	0,200	2	-
VHTF 2 06D 078 06 03	6,0	1,00	6	78	6,00	35,00	0,200	2	-
VHTF 2 060 078 06 03	6,0	1,50	6	78	6,00	35,00	0,200	2	-
VHTF 2 06B 100 08 03	6,0	0,50	8	100	6,00	25,00	0,200	2	2
VHTF 2 06D 100 08 03	6,0	1,00	8	100	6,00	25,00	0,200	2	2
VHTF 2 060 100 08 03	6,0	1,50	8	100	6,00	25,00	0,200	2	2

Standard

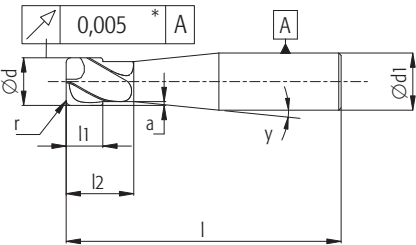


* For endmills L < 100 mm.

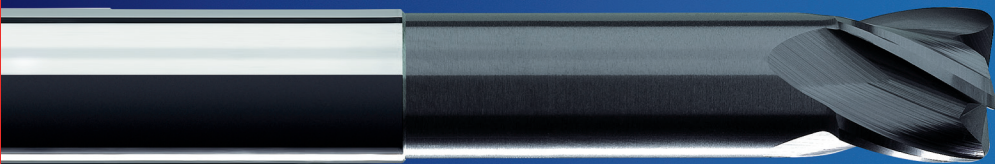


Article Number <i>Artikelnummer</i>	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHTF 2 08B 064 08 03	8,0	0,50	8	64	8,00	25,00	0,300	2	-
VHTF 2 080 064 08 03	8,0	1,00	8	64	8,00	25,00	0,300	2	-
VHTF 2 08H 064 08 03	8,0	2,00	8	64	8,00	25,00	0,300	2	-
VHTF 2 08B 078 08 03	8,0	0,50	8	78	8,00	25,00	0,300	2	-
VHTF 2 08D 078 08 03	8,0	1,00	8	78	8,00	35,00	0,300	2	-
VHTF 2 080 078 08 03	8,0	2,00	8	78	8,00	35,00	0,300	2	-
VHTF 2 08D 100 08 03	8,0	1,00	8	100	8,00	50,00	0,300	2	-
VHTF 2 080 100 08 03	8,0	2,00	8	100	8,00	50,00	0,300	2	-
VHTF 2 08D 120 10 03	8,0	1,00	10	120	8,00	30,00	0,300	2	2
VHTF 2 080 120 10 03	8,0	2,00	10	120	8,00	30,00	0,300	2	2
VHTF 2 100 078 10 03	10,0	0,50	10	78	10,00	35,00	0,300	2	-
VHTF 2 10D 078 10 03	10,0	1,00	10	78	10,00	35,00	0,300	2	-
VHTF 2 10H 078 10 03	10,0	2,00	10	78	10,00	35,00	0,300	2	-
VHTF 2 100 100 10 03	10,0	1,00	10	100	10,00	55,00	0,300	2	-
VHTF 2 10H 100 10 03	10,0	2,00	10	100	10,00	55,00	0,300	2	-
VHTF 2 100 120 12 03	10,0	2,00	12	120	10,00	30,00	0,300	2	2
VHTF 2 120 078 12 03	12,0	0,50	12	78	12,00	35,00	0,300	2	-
VHTF 2 12H 078 12 03	12,0	2,00	12	78	12,00	35,00	0,300	2	-
VHTF 2 120 100 12 03	12,0	1,00	12	100	12,00	55,00	0,300	2	-
VHTF 2 12H 100 12 03	12,0	2,00	12	100	12,00	55,00	0,300	2	-
VHTF 2 120 120 16 03	12,0	2,00	16	120	12,00	40,00	0,300	2	5
VHTF 2 160 100 16 03	16,0	3,50	16	100	20,00	50,00	0,300	2	-
VHTF 2 160 150 16 03	16,0	3,50	16	150	20,00	100,00	0,300	2	-

Standard



* For endmills / für Schaftfräser L < 100 mm.

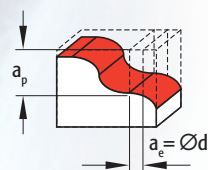
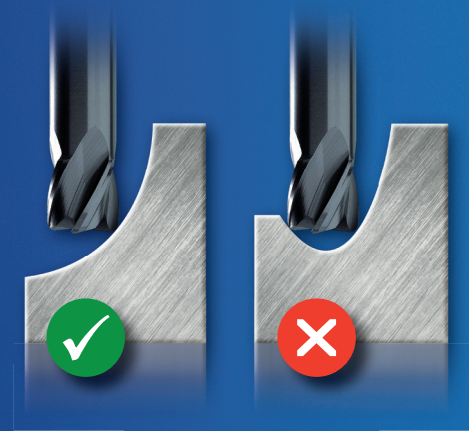


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
VHTF 4 030 064 06 03 050	3,0	0,50	6	64	4,00	7,00	0,050	4	5	new/neu
VHTF 4 030 078 06 03 050	3,0	0,50	6	78	4,00	15,00	0,050	4	4	new/neu
VHTF 4 040 064 06 03 050	4,0	0,50	6	64	5,00	8,00	0,100	4	4	new/neu
VHTF 4 040 064 06 03 100	4,0	1,00	6	64	5,00	8,00	0,100	4	4	new/neu
VHTF 4 040 078 06 03 050	4,0	0,50	6	78	5,00	15,00	0,100	4	3	new/neu
VHTF 4 040 078 06 03 100	4,0	1,00	6	78	5,00	15,00	0,100	4	3	new/neu
VHTF 4 050 064 06 03 050	5,0	0,50	6	64	5,00	10,00	0,150	4	2	new/neu
VHTF 4 050 064 06 03 100	5,0	1,00	6	64	5,00	10,00	0,150	4	2	new/neu
VHTF 4 050 078 06 03 050	5,0	0,50	6	78	5,00	20,00	0,150	4	2	new/neu
VHTF 4 050 078 06 03 100	5,0	1,00	6	78	5,00	20,00	0,150	4	2	new/neu
VHTF 4 060 064 06 03 050	6,0	0,50	6	64	6,00	25,00	0,200	4	-	
VHTF 4 060 064 06 03 100	6,0	1,00	6	64	6,00	25,00	0,200	4	-	
VHTF 4 060 064 06 03 150	6,0	1,50	6	64	6,00	25,00	0,200	4	-	
VHTF 4 060 078 06 03 050	6,0	0,50	6	78	6,00	35,00	0,200	4	-	
VHTF 4 060 078 06 03 150	6,0	1,50	6	78	6,00	35,00	0,200	4	-	
VHTF 4 060 100 08 03 050	6,0	0,50	8	100	6,00	25,00	0,200	4	2	
VHTF 4 060 100 08 03 150	6,0	1,50	8	100	6,00	25,00	0,200	4	2	
VHTF 4 080 064 08 03 050	8,0	0,50	8	64	8,00	25,00	0,300	4	-	
VHTF 4 080 064 08 03 100	8,0	1,00	8	64	8,00	25,00	0,300	4	-	
VHTF 4 080 064 08 03 200	8,0	2,00	8	64	8,00	25,00	0,300	4	-	
VHTF 4 080 078 08 03 050	8,0	0,50	8	78	8,00	25,00	0,300	4	-	
VHTF 4 080 078 08 03 100	8,0	1,00	8	78	8,00	35,00	0,300	4	-	
VHTF 4 080 078 08 03 200	8,0	2,00	8	78	8,00	35,00	0,300	4	-	
VHTF 4 080 100 08 03 050	8,0	0,50	8	100	8,00	50,00	0,300	4	-	new/neu
VHTF 4 080 100 08 03 100	8,0	1,00	8	100	8,00	50,00	0,300	4	-	
VHTF 4 080 100 08 03 200	8,0	2,00	8	100	8,00	50,00	0,300	4	-	
VHTF 4 080 120 10 03 100	8,0	1,00	10	120	8,00	30,00	0,300	4	-	
VHTF 4 080 120 10 03 200	8,0	2,00	10	120	8,00	30,00	0,300	4	2	
VHTF 4 100 078 10 03 050	10,0	0,50	10	78	10,00	35,00	0,300	4	2	
VHTF 4 100 078 10 03 200	10,0	2,00	10	78	10,00	35,00	0,300	4	-	
VHTF 4 100 100 10 03 100	10,0	1,00	10	100	10,00	55,00	0,300	4	-	
VHTF 4 100 100 10 03 200	10,0	2,00	10	100	10,00	55,00	0,300	4	-	
VHTF 4 100 120 12 03 200	10,0	2,00	12	120	10,00	30,00	0,300	4	-	
VHTF 4 120 078 12 03 050	12,0	0,50	12	78	12,00	35,00	0,300	4	2	
VHTF 4 120 078 12 03 200	12,0	2,00	12	78	12,00	35,00	0,300	4	-	
VHTF 4 120 100 12 03 100	12,0	1,00	12	100	12,00	55,00	0,300	4	-	
VHTF 4 120 100 12 03 200	12,0	2,00	12	100	12,00	55,00	0,300	4	-	
VHTF 4 120 120 16 03 200	12,0	2,00	16	120	12,00	40,00	0,300	4	-	
VHTF 4 160 100 16 03 350	16,0	3,50	16	100	20,00	50,00	0,300	4	5	
VHTF 4 160 150 16 03 350	16,0	3,50	16	150	20,00	100,00	0,300	4	-	

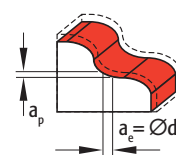
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	150 - 250	emulsion
P1.2	< 1000	< 300	120 - 200	emulsion
P1.3	< 1400	< 400	100 - 160	emulsion
H2.1		42-50 HRc	120 - 180	min.lub.
H2.2		50-55 HRc	150 - 200	min.lub.
H2.3		55-70 HRc	200 - 250	min.lub.

Torus endmills: Torusfräser:

- High effective cutting speed
Hohe Schnittgeschwindigkeit
- Optimized surface finish
Optimale Oberflächenqualität
- 2 Flute and 4 flute
2 Schneiden und 4 Schneiden
- Finishing – Semi finishing (- Roughing)
Schlicht-, Semi- und Schruppbearbeitung



Roughing
Schruppen



Finishing
Schlichten

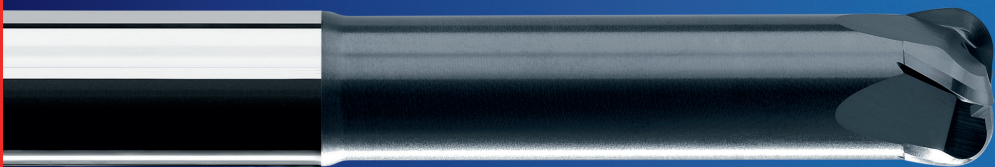
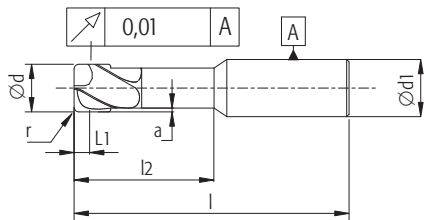
Shoulder milling / Eckfräsen

P1.1 / P1.2 / P1.3			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
1,5	< 1,5	< 0,15	0,025 - 0,040
2	< 2,0	< 0,2	0,030 - 0,050
3,0	< 3,0	< 0,30	0,040 - 0,060
4,0	< 4,0	< 0,40	0,050 - 0,080
5,0	< 5,0	< 0,50	0,060 - 0,110
6,0	< 6,0	< 0,60	0,065 - 0,125
8,0	< 8,0	< 0,80	0,080 - 0,130
10,0	< 10,0	< 1,00	0,085 - 0,135
12,0	< 12,0	< 1,20	0,100 - 0,140
16,0	< 16,0	< 1,60	0,100 - 0,150

Shoulder milling / Eckfräsen

H2.1 / H2.2 / H2.3		
a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 0,7	< 0,03	0,025 - 0,040
< 1,0	< 0,04	0,030 - 0,050
< 1,5	< 0,06	0,040 - 0,060
< 2,0	< 0,10	0,050 - 0,080
< 2,5	< 0,13	0,060 - 0,110
< 3,0	< 0,18	0,065 - 0,125
< 4,0	< 0,24	0,080 - 0,130
< 5,0	< 0,30	0,085 - 0,135
< 6,0	< 0,36	0,100 - 0,140
< 8,0	< 0,50	0,100 - 0,150

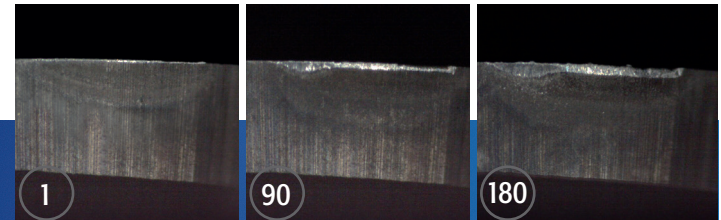
Standard



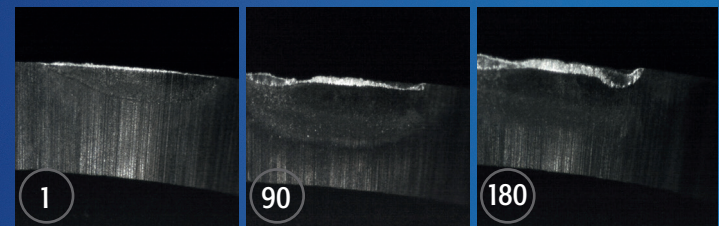
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHDR 4 020 060 06 03 L04	2,0	0,50	6	60	1,00	4,00	0,100	4	15
VHDR 4 020 060 06 03 L08	2,0	0,50	6	60	1,00	8,00	0,100	4	15
VHDR 4 030 060 06 03 L06	3,0	0,75	6	60	1,50	6,00	0,150	4	15
VHDR 4 030 060 06 03 L12	3,0	0,75	6	60	1,50	12,00	0,150	4	15
VHDR 4 040 060 06 03 L08	4,0	1,00	6	60	2,00	8,00	0,200	4	15
VHDR 4 040 060 06 03 L16	4,0	1,00	6	60	2,00	16,00	0,200	4	15
VHDR 4 060 080 06 03 L12	6,0	1,50	6	80	3,00	12,00	0,250	4	-
VHDR 4 060 080 06 03 L24	6,0	1,50	6	80	3,00	24,00	0,250	4	-
VHDR 4 080 090 08 03 L16	8,0	2,00	8	90	4,00	16,00	0,300	4	-
VHDR 4 080 090 08 03 L32	8,0	2,00	8	90	4,00	32,00	0,300	4	-
VHDR 4 100 100 10 03 L20	10,0	2,50	10	100	5,00	20,00	0,400	4	-
VHDR 4 100 100 10 03 L40	10,0	2,50	10	100	5,00	40,00	0,400	4	-
VHDR 4 120 110 12 03 L24	12,0	3,00	12	110	6,00	24,00	0,500	4	-
VHDR 4 120 110 12 03 L48	12,0	3,00	12	110	6,00	48,00	0,500	4	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	200 - 300	emulsion
P1.2	< 1000	< 300	150 - 200	emulsion
P1.3	< 1400	< 400	120 - 180	emulsion
H2.1		42-50 HRc	80 - 120	min.lub.
K4.1		< 260	100 - 200	emulsion

Van Hoorn Carbide



Competitor

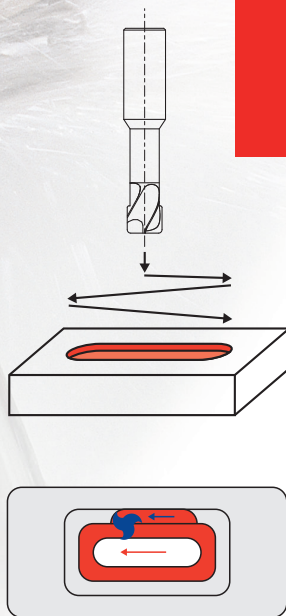


Wear after 1, 90 and 180 metres
Verschleiß nach 1, 90 und 180 Meter

VHDR40800900803L16
Material 1.2311

v_c 150 m/min
n 6000 rpm
f_z 0,70 mm/t
v_f **16800 mm/min**
a_p 0,5 mm
a_e 8,0 mm
Coolant emulsion

Q **67,2 cm³/min**



This endmill can be used for pocket milling; for strategy see drawings above. Always mill from inside to outside. If possible use helicoidal down-milling, otherwise ramping down.

Dieser Fräser kann zum Taschenfräsen eingesetzt werden; entsprechende Frässtrategie entnehmen Sie von obenstehenden Zeichnungen. Fräsen Sie stets von Innen nach Außen. Wenn möglich zirkular Abwärtsfräsen oder Schrägeintauchen.

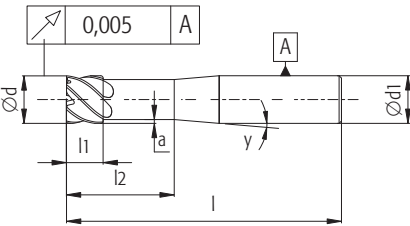
Shoulder milling / Eckfräsen

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
2,0	< 0,1	< 1,2	0,3 - 0,7
3,0	< 0,2	< 1,8	0,3 - 0,7
4,0	< 0,3	< 2,4	0,3 - 0,7
6,0	< 0,4	< 4,0	0,5 - 1,0
8,0	< 0,5	< 5,5	0,5 - 1,0
10,0	< 0,6	< 7,0	0,5 - 1,0
12,0	< 0,8	< 8,4	0,5 - 1,0

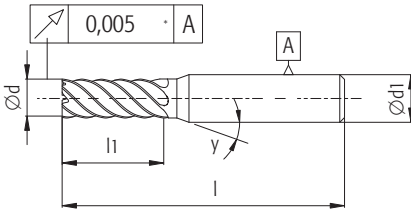
Slot milling / Nutenfräsen

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
2,0	< 0,1	< 2,0	0,3 - 0,6
3,0	< 0,2	< 3,0	0,3 - 0,6
4,0	< 0,3	< 4,0	0,3 - 0,6
6,0	< 0,4	< 6,0	0,4 - 0,9
8,0	< 0,5	< 8,0	0,4 - 0,9
10,0	< 0,6	< 10,0	0,4 - 0,9
12,0	< 0,8	< 12,0	0,4 - 0,9

Short / Kurze Ausführung



Standard / Standard Ausführung



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHMF 6 030 064 06 03 S	3,0	-	6	64	3,00	10,00	0,050	6	15
VHMF 6 040 064 06 03 S	4,0	-	6	64	4,00	10,00	0,100	6	15
VHMF 6 050 064 06 03 S	5,0	-	6	64	5,00	15,00	0,150	6	15
VHMF 6 060 064 06 03 S	6,0	-	6	64	6,00	20,00	0,200	6	-
VHMF 6 080 064 08 03 S	8,0	-	8	64	8,00	20,00	0,300	6	-
VHMF 6 100 070 10 03 S	10,0	-	10	70	10,00	25,00	0,300	6	-
VHMF 6 120 078 12 03 S	12,0	-	12	78	12,00	25,00	0,300	6	-
VHMF 6 160 089 16 03 S	16,0	-	16	89	16,00	35,00	0,300	6	-
VHMF 8 200 102 20 03 S	20,0	-	20	102	20,00	40,00	0,300	8	-
Standard / Standard Ausführung									
VHMF 6 030 064 06 03	3,0	-	6	64	10,00	-	-	6	15
VHMF 6 040 064 06 03	4,0	-	6	64	10,00	-	-	6	15
VHMF 6 050 064 06 03	5,0	-	6	64	15,00	-	-	6	15
VHMF 6 060 064 06 03	6,0	-	6	64	20,00	-	-	6	15
VHMF 6 080 064 08 03	8,0	-	8	64	20,00	-	-	6	-
VHMF 6 100 070 10 03	10,0	-	10	70	25,00	-	-	6	-
VHMF 6 120 078 12 03	12,0	-	12	78	25,00	-	-	6	-
VHMF 6 160 089 16 03	16,0	-	16	89	30,00	-	-	6	-
VHMF 8 200 102 20 03	20,0	-	20	102	40,00	-	-	8	-

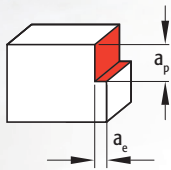
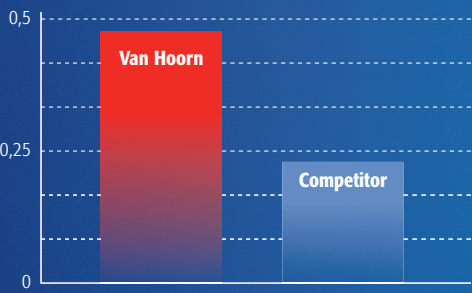
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	130 - 180	emulsion
P1.2	< 1000	< 300	100 - 160	emulsion
P1.3	< 1400	< 400	90 - 140	emulsion
H2.1		42-50 HRc	150 - 200	min.lub.
H2.2		50-55 HRc	120 - 180	min.lub.
H2.3		55-70 HRc	80 - 150	min.lub.



VHMF60600640603
Workpiece Material: 1.2343
Hardness: 52 HRC

	Van Hoorn	Competitor
v _c	132 m/min	132 m/min
n	7000 rpm	7000 rpm
F _z	0,036 mm/t	0,029 mm/t
v _f	1500 mm/min	800 mm/min
a _p	0,1 mm	0,1 mm
a _e	3,0 mm	3,0 mm
Coolant	min. lubrication	min. lubrication
Q	0,45 mm ³ /min	0,24 mm ³ /min

Material removal rate
Zerspanungsleistung



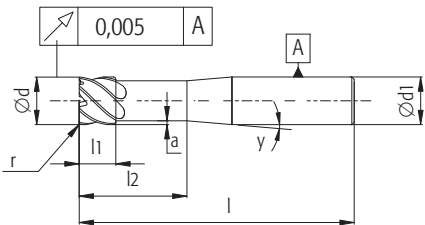
Shoulder milling / Eckfräsen

	P1.1 / P1.2 / P1.3		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 6,0	< 0,30	0,020 - 0,035
4,0	< 8,0	< 0,40	0,030 - 0,045
5,0	< 10,0	< 0,50	0,035 - 0,055
6,0	< 12,0	< 0,60	0,045 - 0,65
8,0	< 16,0	< 0,80	0,060 - 0,080
10,0	< 20,0	< 1,00	0,070 - 0,095
12,0	< 24,0	< 1,20	0,085 - 0,110
16,0	< 32,0	< 1,60	0,095 - 0,125
20,0	< 40,0	< 2,00	0,105 - 0,140

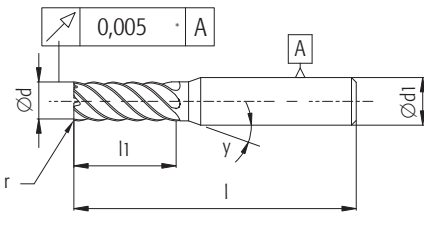
Shoulder milling / Eckfräsen

	H2.1 / H2.2 / H2.3		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 6,0	< 0,06	0,020 - 0,035
4,0	< 8,0	< 0,10	0,030 - 0,045
5,0	< 10,0	< 0,12	0,035 - 0,055
6,0	< 12,0	< 0,18	0,045 - 0,650
8,0	< 16,0	< 0,24	0,060 - 0,080
10,0	< 20,0	< 0,30	0,070 - 0,095
12,0	< 24,0	< 0,36	0,085 - 0,110
16,0	< 32,0	< 0,48	0,095 - 0,125
20,0	< 40,0	< 0,60	0,105 - 0,140

Short / Kurze Ausführung



Standard / Standard Ausführung



* For endmills / für Schaftfräser L < 100 mm.

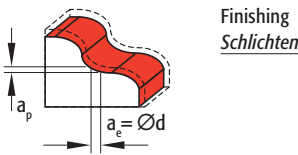
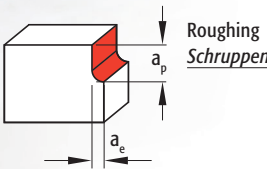


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHMFR 6 030 064 06 03 030 S	3,0	0,30	6	64	3,00	10,00	0,050	6	15
VHMFR 6 040 064 06 03 030 S	4,0	0,30	6	64	4,00	10,00	0,100	6	15
VHMFR 6 050 064 06 03 030 S	5,0	0,30	6	64	5,00	15,00	0,150	6	15
VHMFR 6 050 064 06 03 050 S	5,0	0,50	6	64	5,00	15,00	0,150	6	15
VHMFR 6 060 064 06 03 050 S	6,0	0,50	6	64	6,00	20,00	0,200	6	-
VHMFR 6 060 064 06 03 100 S	6,0	1,00	6	64	6,00	20,00	0,200	6	-
VHMFR 6 080 064 08 03 050 S	8,0	0,50	8	64	8,00	20,00	0,300	6	-
VHMFR 6 080 064 08 03 100 S	8,0	1,00	8	64	8,00	20,00	0,300	6	-
VHMFR 6 100 070 10 03 050 S	10,0	0,50	10	70	10,00	25,00	0,300	6	-
VHMFR 6 100 070 10 03 100 S	10,0	1,00	10	70	10,00	25,00	0,300	6	-
VHMFR 6 100 070 10 03 150 S	10,0	1,50	10	70	10,00	25,00	0,300	6	-
VHMFR 6 120 078 12 03 050 S	12,0	0,50	12	78	12,00	25,00	0,300	6	-
VHMFR 6 120 078 12 03 100 S	12,0	1,00	12	78	12,00	25,00	0,300	6	-
VHMFR 6 120 078 12 03 200 S	12,0	2,00	12	78	12,00	25,00	0,300	6	-
VHMFR 6 160 089 16 03 100 S	16,0	1,00	16	89	16,00	35,00	0,300	6	-
VHMFR 6 160 089 16 03 200 S	16,0	2,00	16	89	16,00	35,00	0,300	6	-
VHMFR 8 200 102 20 03 100 S	20,0	1,00	20	102	20,00	40,00	0,300	8	-
VHMFR 8 200 102 20 03 200 S	20,0	2,00	20	102	20,00	40,00	0,300	8	-
Standard / Standard Ausführung									
VHMFR 6 030 064 06 03 030	3,0	0,30	6	64	10,00	-	-	6	15
VHMFR 6 040 064 06 03 030	4,0	0,30	6	64	10,00	-	-	6	15
VHMFR 6 050 064 06 03 030	5,0	0,30	6	64	15,00	-	-	6	15
VHMFR 6 050 064 06 03 050	5,0	0,50	6	64	15,00	-	-	6	15
VHMFR 6 060 064 06 03 050	6,0	0,50	6	64	20,00	-	-	6	-
VHMFR 6 060 064 06 03 100	6,0	1,00	6	64	20,00	-	-	6	-
VHMFR 6 080 064 08 03 050	8,0	0,50	8	64	20,00	-	-	6	-
VHMFR 6 080 064 08 03 100	8,0	1,00	8	64	20,00	-	-	6	-
VHMFR 6 100 070 10 03 050	10,0	0,50	10	70	25,00	-	-	6	-
VHMFR 6 100 070 10 03 100	10,0	1,00	10	70	25,00	-	-	6	-
VHMFR 6 100 070 10 03 150	10,0	1,50	10	70	25,00	-	-	6	-
VHMFR 6 120 078 12 03 050	12,0	0,50	12	78	25,00	-	-	6	-
VHMFR 6 120 078 12 03 100	12,0	1,00	12	78	25,00	-	-	6	-
VHMFR 6 120 078 12 03 200	12,0	2,00	12	78	25,00	-	-	6	-
VHMFR 6 160 089 16 03 100	16,0	1,00	16	89	35,00	-	-	6	-
VHMFR 6 160 089 16 03 200	16,0	2,00	16	89	35,00	-	-	6	-
VHMFR 8 200 102 20 03 100	20,0	1,00	20	102	40,00	-	-	8	-
VHMFR 8 200 102 20 03 200	20,0	2,00	20	102	40,00	-	-	8	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	130 - 180	emulsion
P1.2	< 1000	< 300	100 - 160	emulsion
P1.3	< 1400	< 400	90 - 140	emulsion
H2.1		42-50 HRc	150 - 200	min.lub.
H2.2		50-55 HRc	120 - 180	min.lub.
H2.3		55-70 HRc	80 - 150	min.lub.

VHMF
Recommended for Side milling.
Empfohlen für Stirnfräsen.

VHMF
Recommended for Shoulder milling.
Empfohlen für Eckfräsen.



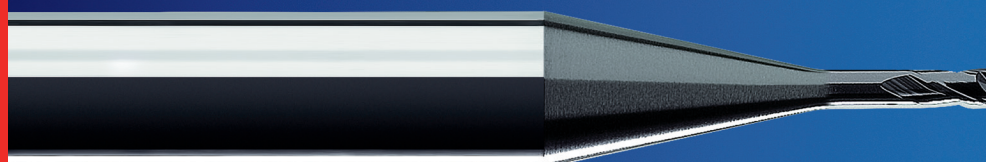
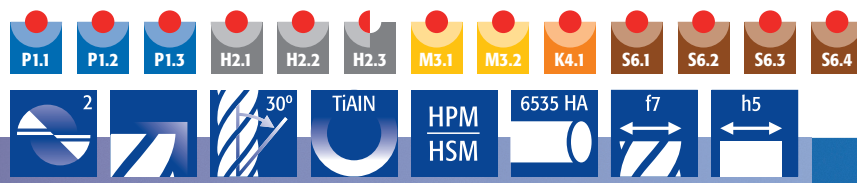
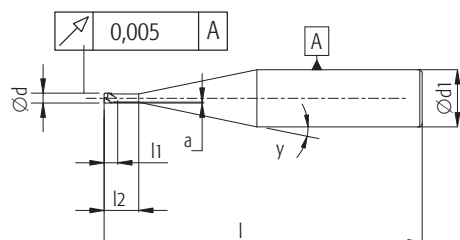
Shoulder milling / Eckfräsen

P1.1 / P1.2 / P1.3			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 6,0	< 0,30	0,020 - 0,035
4,0	< 8,0	< 0,40	0,030 - 0,045
5,0	< 10,0	< 0,50	0,035 - 0,055
6,0	< 12,0	< 0,60	0,045 - 0,65
8,0	< 16,0	< 0,80	0,060 - 0,080
10,0	< 20,0	< 1,00	0,070 - 0,095
12,0	< 24,0	< 1,20	0,085 - 0,110
16,0	< 32,0	< 1,60	0,095 - 0,125
20,0	< 40,0	< 2,00	0,105 - 0,140

Shoulder milling / Eckfräsen

H2.1 / H2.2 / H2.3		
a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 6,0	< 0,06	0,020 - 0,035
< 8,0	< 0,10	0,030 - 0,045
< 10,0	< 0,12	0,035 - 0,055
< 12,0	< 0,18	0,045 - 0,650
< 16,0	< 0,24	0,060 - 0,080
< 20,0	< 0,30	0,070 - 0,095
< 24,0	< 0,36	0,085 - 0,110
< 32,0	< 0,48	0,095 - 0,125
< 40,0	< 0,60	0,105 - 0,140

Standard



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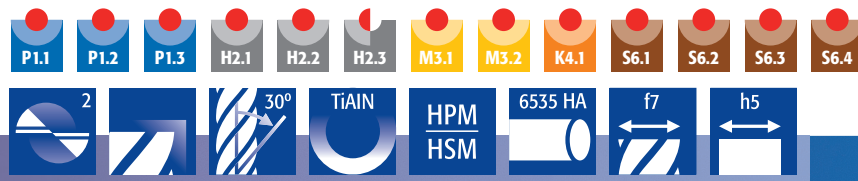
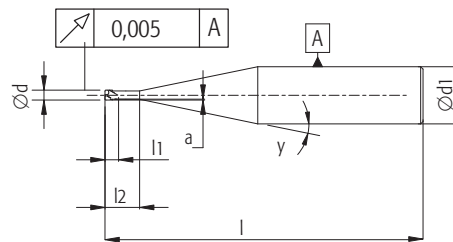
Shank 4 mm
Schaft 4 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

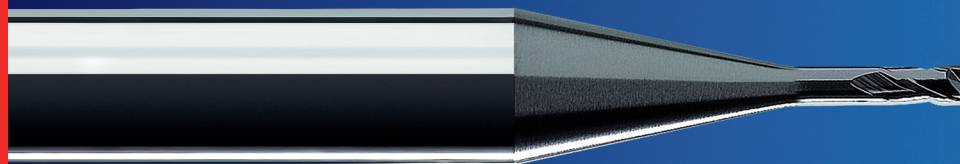
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMS 2 001 051 04 03 L0015	0,1	-	4	51	0,15	-	-	2	15	0,634	0,656	0,705	0,762	new/neu
VHMS 2 002 051 04 03 L0025	0,2	-	4	51	0,25	-	-	2	15	0,737	0,763	0,820	0,887	new/neu
VHMS 2 003 051 04 03 L003	0,3	-	4	51	0,30	-	-	2	15	1,099	1,137	1,223	1,322	new/neu
VHMS 2 003 051 04 03 L015	0,3	-	4	51	0,30	1,50	0,010	2	15	1,861	1,926	2,070	2,238	new/neu
VHMS 2 003 051 04 03 L030	0,3	-	4	51	0,30	3,00	0,010	2	15	3,412	3,531	3,795	4,103	new/neu
VHMS 2 004 051 04 03 L004	0,4	-	4	51	0,40	-	-	2	15	1,202	1,244	1,338	1,446	new/neu
VHMS 2 004 051 04 03 L020	0,4	-	4	51	0,40	2,00	0,010	2	15	2,378	2,461	2,645	2,860	new/neu
VHMS 2 004 051 04 03 L040	0,4	-	4	51	0,40	4,00	0,010	2	15	4,445	4,600	4,945	5,346	new/neu
VHMS 2 005 051 04 03 L005	0,5	-	4	51	0,50	-	-	2	15	1,306	1,351	1,453	1,570	new/neu
VHMS 2 005 051 04 03 L030	0,5	-	4	51	0,50	3,00	0,015	2	15	3,431	3,551	3,817	4,126	new/neu
VHMS 2 005 051 04 03 L060	0,5	-	4	51	0,50	6,00	0,015	2	15	6,532	6,760	7,266	7,856	new/neu
VHMS 2 005 051 04 03 L080	0,5	-	4	51	0,50	8,00	0,015	2	15	8,599	8,899	9,566	10,342	new/neu
VHMS 2 005 051 04 03 L100	0,5	-	4	51	0,50	10,00	0,015	2	15	10,667	11,038	11,866	12,828	new/neu
VHMS 2 006 051 04 03 L006	0,6	-	4	51	0,60	-	-	2	15	2,062	2,134	2,294	2,480	new/neu
VHMS 2 006 051 04 03 L020	0,6	-	4	51	0,60	2,00	0,025	2	15	2,572	2,662	2,861	3,093	new/neu
VHMS 2 006 051 04 03 L040	0,6	-	4	51	0,60	4,00	0,025	2	15	4,639	4,801	5,161	5,580	new/neu
VHMS 2 006 051 04 03 L060	0,6	-	4	51	0,60	6,00	0,025	2	15	6,707	6,940	7,461	8,066	new/neu
VHMS 2 006 051 04 03 L080	0,6	-	4	51	0,60	8,00	0,025	2	15	8,774	9,080	9,760	10,552	new/neu
VHMS 2 006 051 04 03 L100	0,6	-	4	51	0,60	10,00	0,025	2	15	10,841	11,219	12,060	13,038	new/neu
VHMS 2 008 051 04 03 L008	0,8	-	4	51	0,80	-	-	2	15	2,269	2,348	2,524	2,729	new/neu
VHMS 2 008 051 04 03 L025	0,8	-	4	51	0,80	2,50	0,025	2	15	3,089	3,196	3,436	3,715	new/neu
VHMS 2 008 051 04 03 L050	0,8	-	4	51	0,80	5,00	0,025	2	15	5,673	5,871	6,311	6,823	new/neu
VHMS 2 008 051 04 03 L080	0,8	-	4	51	0,80	8,00	0,025	2	15	8,774	9,080	9,760	10,552	new/neu
VHMS 2 008 051 04 03 L100	0,8	-	4	51	0,80	10,00	0,025	2	15	10,841	11,219	12,060	13,038	new/neu
VHMS 2 010 051 04 03 L010	1,0	-	4	51	1,00	-	-	2	15	2,476	2,562	2,754	2,977	new/neu
VHMS 2 010 051 04 03 L040	1,0	-	4	51	1,00	4,00	0,025	2	15	4,639	4,801	5,161	5,580	new/neu
VHMS 2 010 051 04 03 L060	1,0	-	4	51	1,00	6,00	0,025	2	15	6,707	6,940	7,461	8,066	new/neu
VHMS 2 010 051 04 03 L080	1,0	-	4	51	1,00	8,00	0,025	2	15	8,774	9,080	9,760	10,552	new/neu
VHMS 2 010 051 04 03 L100	1,0	-	4	51	1,00	10,00	0,025	2	15	10,841	11,219	12,060	13,038	new/neu
VHMS 2 010 051 04 03 L120	1,0	-	4	51	1,00	12,00	0,025	2	15	12,909	13,358	14,360	15,525	new/neu
VHMS 2 010 051 04 03 L150	1,0	-	4	51	1,00	15,00	0,025	2	15	16,010	16,568	17,809	19,254	new/neu
VHMS 2 010 060 04 03 L200	1,0	-	4	60	1,00	20,00	0,025	2	15	21,178	21,916	23,559	25,470	new/neu
VHMS 2 010 060 04 03 L250	1,0	-	4	60	1,00	25,00	0,025	2	15	26,346	27,264	29,308	∞	new/neu
VHMS 2 012 051 04 03 L012	1,2	-	4	51	1,20	-	-	2	15	3,471	3,592	3,862	4,175	new/neu
VHMS 2 012 051 04 03 L040	1,2	-	4	51	1,20	4,00	0,025	2	15	4,912	5,083	5,464	5,907	new/neu
VHMS 2 012 051 04 03 L060	1,2	-	4	51	1,20	6,00	0,025	2	15	6,979	7,222	7,763	8,393	new/neu
VHMS 2 012 051 04 03 L080	1,2	-	4	51	1,20	8,00	0,025	2	15	9,046	9,361	10,063	10,879	new/neu
VHMS 2 012 051 04 03 L120	1,2	-	4	51	1,20	12,00	0,025	2	15	13,181	13,640	14,662	15,852	new/neu
VHMS 2 012 051 04 03 L160	1,2	-	4	51	1,20	16,00	0,025	2	15	17,316	17,919	19,262	20,825	new/neu

Standard



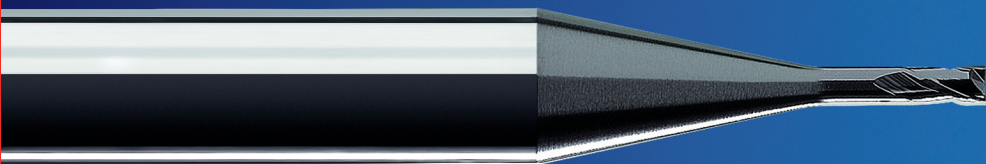
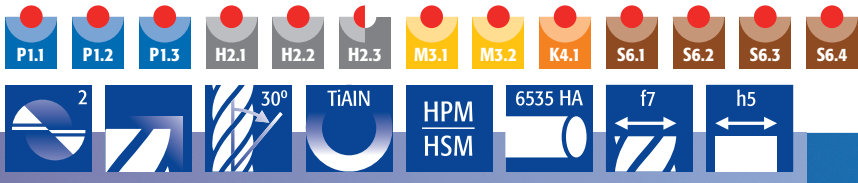
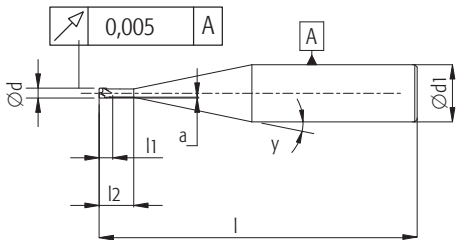
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Shank 4 mm
Schaft 4 mm



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMS 2 015 051 04 03 L015	1,5	-	4	51	1,50	-	-	2	15	3,781	3,913	4,206	4,548	new/neu
VHMS 2 015 051 04 03 L040	1,5	-	4	51	1,50	4,00	0,025	2	15	4,912	5,083	5,464	5,907	new/neu
VHMS 2 015 051 04 03 L060	1,5	-	4	51	1,50	6,00	0,025	2	15	6,979	7,222	7,763	8,393	new/neu
VHMS 2 015 051 04 03 L080	1,5	-	4	51	1,50	8,00	0,025	2	15	9,046	9,361	10,063	10,879	new/neu
VHMS 2 015 051 04 03 L100	1,5	-	4	51	1,50	10,00	0,025	2	15	11,114	11,501	12,363	13,366	new/neu
VHMS 2 015 051 04 03 L120	1,5	-	4	51	1,50	12,00	0,025	2	15	13,181	13,640	14,662	15,852	new/neu
VHMS 2 015 051 04 03 L150	1,5	-	4	51	1,50	15,00	0,025	2	15	16,282	16,849	18,112	19,581	new/neu
VHMS 2 015 060 04 03 L200	1,5	-	4	60	1,50	20,00	0,025	2	15	21,450	22,198	23,861	∞	new/neu
VHMS 2 015 060 04 03 L250	1,5	-	4	60	1,50	25,00	0,025	2	15	26,619	27,546	29,611	∞	new/neu
VHMS 2 020 051 04 03 L020	2,0	-	4	51	2,00	-	-	2	15	4,298	4,448	4,781	5,169	new/neu
VHMS 2 020 051 04 03 L060	2,0	-	4	51	2,00	6,00	0,050	2	15	7,075	7,322	7,871	8,509	new/neu
VHMS 2 020 051 04 03 L080	2,0	-	4	51	2,00	8,00	0,050	2	15	9,143	9,461	10,170	10,995	new/neu
VHMS 2 020 051 04 03 L100	2,0	-	4	51	2,00	10,00	0,050	2	15	11,210	11,601	12,470	13,482	new/neu
VHMS 2 020 051 04 03 L120	2,0	-	4	51	2,00	12,00	0,050	2	15	13,277	13,740	14,770	15,968	new/neu
VHMS 2 020 051 04 03 L160	2,0	-	4	51	2,00	16,00	0,050	2	15	17,412	18,019	19,369	∞	new/neu
VHMS 2 020 060 04 03 L200	2,0	-	4	60	2,00	20,00	0,050	2	15	21,547	22,297	23,969	∞	new/neu
VHMS 2 020 060 04 03 L250	2,0	-	4	60	2,00	25,00	0,050	2	15	26,715	27,646	∞	∞	new/neu
VHMS 2 020 064 04 03 L300	2,0	-	4	64	2,00	30,00	0,050	2	15	31,883	32,994	∞	∞	new/neu
VHMS 2 025 051 04 03 L025	2,5	-	4	51	2,50	-	-	2	15	4,815	4,983	5,356	5,791	new/neu
VHMS 2 025 051 04 03 L060	2,5	-	4	51	2,50	6,00	0,050	2	15	7,075	7,322	7,871	8,509	new/neu
VHMS 2 025 051 04 03 L080	2,5	-	4	51	2,50	8,00	0,050	2	15	9,143	9,461	10,170	10,995	new/neu
VHMS 2 025 051 04 03 L100	2,5	-	4	51	2,50	10,00	0,050	2	15	11,210	11,601	12,470	13,482	new/neu
VHMS 2 025 051 04 03 L120	2,5	-	4	51	2,50	12,00	0,050	2	15	13,277	13,740	14,770	∞	new/neu
VHMS 2 025 051 04 03 L160	2,5	-	4	51	2,50	16,00	0,050	2	15	17,412	18,019	19,369	∞	new/neu
VHMS 2 025 060 04 03 L200	2,5	-	4	60	2,50	20,00	0,050	2	15	21,547	22,297	∞	∞	new/neu
VHMS 2 025 060 04 03 L250	2,5	-	4	60	2,50	25,00	0,050	2	15	26,715	27,646	∞	∞	new/neu
VHMS 2 025 064 04 03 L300	2,5	-	4	64	2,50	30,00	0,050	2	15	31,883	32,994	∞	∞	new/neu
VHMS 2 030 051 04 03 L030	3,0	-	4	51	3,00	-	-	2	15	5,332	5,518	5,931	6,412	new/neu
VHMS 2 030 051 04 03 L060	3,0	-	4	51	3,00	6,00	0,050	2	15	7,075	7,322	7,871	8,509	new/neu
VHMS 2 030 051 04 03 L080	3,0	-	4	51	3,00	8,00	0,050	2	15	9,143	9,461	10,170	∞	new/neu
VHMS 2 030 051 04 03 L100	3,0	-	4	51	3,00	10,00	0,050	2	15	11,210	11,601	12,470	∞	new/neu
VHMS 2 030 051 04 03 L120	3,0	-	4	51	3,00	12,00	0,050	2	15	13,277	13,740	∞	∞	new/neu
VHMS 2 030 051 04 03 L160	3,0	-	4	51	3,00	16,00	0,050	2	15	17,412	18,019	∞	∞	new/neu
VHMS 2 030 060 04 03 L200	3,0	-	4	60	3,00	20,00	0,050	2	15	21,547	22,297	∞	∞	new/neu
VHMS 2 030 060 04 03 L250	3,0	-	4	60	3,00	25,00	0,050	2	15	26,715	27,646	∞	∞	new/neu
VHMS 2 030 064 04 03 L300	3,0	-	4	64	3,00	30,00	0,050	2	15	31,883	-	∞	∞	new/neu

Standard

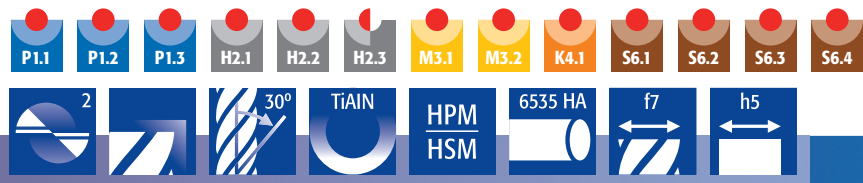
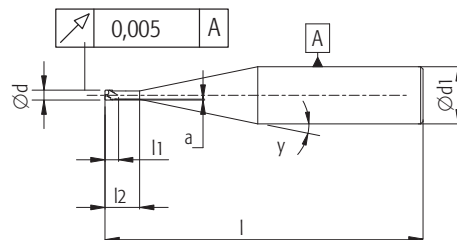


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Shank 6 mm
Schaft 6 mm

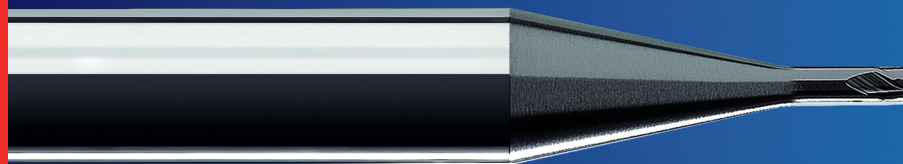
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMS 2 001 064 06 03 L0015	0,1	-	6	64	0,15	-	-	2	10	0,552	0,583	0,655	0,747
VHMS 2 002 064 06 03 L005	0,2	-	6	64	0,50	-	-	2	10	0,710	0,749	0,842	0,960
VHMS 2 003 064 06 03 L005	0,3	-	6	64	0,50	-	-	2	10	1,236	1,304	1,465	1,672
VHMS 2 003 064 06 03 L015	0,3	-	6	64	0,50	1,50	0,01	2	11	1,826	1,916	2,126	2,388
VHMS 2 003 064 06 03 L030	0,3	-	6	64	0,50	3,00	0,01	2	12	3,397	3,549	3,898	4,323
VHMS 2 004 064 06 03 L006	0,4	-	6	64	0,60	-	-	2	10	1,341	1,415	1,590	1,814
VHMS 2 004 064 06 03 L020	0,4	-	6	64	0,60	2,00	0,01	2	11	2,350	2,465	2,735	3,072
VHMS 2 004 064 06 03 L040	0,4	-	6	64	0,60	4,00	0,01	2	13	4,439	4,621	5,032	5,525
VHMS 2 005 064 06 03 L008	0,5	-	6	64	0,80	-	-	2	10	1,552	1,637	1,839	2,099
VHMS 2 005 064 06 03 L030	0,5	-	6	64	0,80	3,00	0,015	2	12	3,421	3,574	3,926	4,354
VHMS 2 005 064 06 03 L060	0,5	-	6	64	0,80	6,00	0,015	2	15	6,532	6,760	7,266	7,856
VHMS 2 005 064 06 03 L080	0,5	-	6	64	0,80	8,00	0,015	2	15	8,599	8,899	9,566	10,342
VHMS 2 005 064 06 03 L100	0,5	-	6	64	0,80	10,00	0,015	2	15	10,667	11,038	11,866	12,828
VHMS 2 006 064 06 03 L009	0,6	-	6	64	0,90	-	-	2	10	1,749	1,845	2,073	2,366
VHMS 2 006 064 06 03 L020	0,6	-	6	64	0,90	2,00	0,025	2	11	2,531	2,656	2,947	3,310
VHMS 2 006 064 06 03 L040	0,6	-	6	64	0,90	4,00	0,025	2	12	4,623	4,830	5,304	5,884
VHMS 2 006 064 06 03 L060	0,6	-	6	64	0,90	6,00	0,025	2	15	6,707	6,940	7,461	8,066
VHMS 2 006 064 06 03 L080	0,6	-	6	64	0,90	8,00	0,025	2	15	8,774	9,080	9,760	10,552
VHMS 2 006 064 06 03 L100	0,6	-	6	64	0,90	10,00	0,025	2	15	10,841	11,219	12,060	13,038
VHMS 2 008 064 06 03 L012	0,8	-	6	64	1,20	-	-	2	10	2,591	2,733	3,071	3,504
VHMS 2 008 064 06 03 L025	0,8	-	6	64	1,20	2,50	0,025	2	11	3,055	3,205	3,556	3,994
VHMS 2 008 064 06 03 L050	0,8	-	6	64	1,20	5,00	0,025	2	13	5,664	5,896	6,421	7,051
VHMS 2 008 064 06 03 L080	0,8	-	6	64	1,20	8,00	0,025	2	15	8,774	9,080	9,760	10,552
VHMS 2 008 064 06 03 L100	0,8	-	6	64	1,20	10,00	0,025	2	15	10,841	11,219	12,060	13,038
VHMS 2 010 064 06 03 L015	1,0	-	6	64	1,50	-	-	2	10	2,906	3,066	3,445	3,931
VHMS 2 010 064 06 03 L040	1,0	-	6	64	1,50	4,00	0,025	2	11	4,625	4,853	5,385	6,048
VHMS 2 010 064 06 03 L060	1,0	-	6	64	1,50	6,00	0,025	2	14	6,703	6,956	7,522	8,190
VHMS 2 010 064 06 03 L080	1,0	-	6	64	1,50	8,00	0,025	2	15	8,774	9,080	9,760	10,552
VHMS 2 010 064 06 03 L100	1,0	-	6	64	1,50	10,00	0,025	2	15	10,841	11,219	12,060	13,038
VHMS 2 010 064 06 03 L120	1,0	-	6	64	1,50	12,00	0,025	2	15	12,909	13,358	14,360	15,525
VHMS 2 010 064 06 03 L150	1,0	-	6	64	1,50	15,00	0,025	2	15	16,010	16,568	17,809	19,254
VHMS 2 010 064 06 03 L200	1,0	-	6	64	1,50	20,00	0,025	2	15	21,178	21,916	23,559	25,470
VHMS 2 010 064 06 03 L250	1,0	-	6	64	1,50	25,00	0,025	2	15	26,346	27,264	29,308	31,686
VHMS 2 012 064 06 03 L018	1,2	-	6	64	1,80	-	-	2	10	3,932	4,148	4,660	5,318
VHMS 2 012 064 06 03 L040	1,2	-	6	64	1,80	4,00	0,025	2	11	4,827	5,065	5,620	6,312
VHMS 2 012 064 06 03 L060	1,2	-	6	64	1,80	6,00	0,025	2	13	6,940	7,224	7,868	8,639
VHMS 2 012 064 06 03 L080	1,2	-	6	64	1,80	8,00	0,025	2	15	9,046	9,361	10,063	10,879
VHMS 2 012 064 06 03 L120	1,2	-	6	64	1,80	12,00	0,025	2	15	13,181	13,640	14,662	15,852
VHMS 2 012 064 06 03 L160	1,2	-	6	64	1,80	16,00	0,025	2	15	17,316	17,919	19,262	20,825

Standard



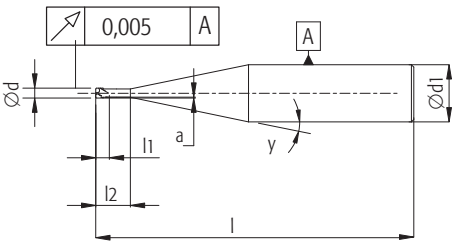
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Shank 6 mm
Schaft 6 mm



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMS 2 015 064 06 03 L023	1,5	-	6	64	2,30	-	-	2	9	4,438	4,713	5,380	6,267
VHMS 2 015 064 06 03 L040	1,5	-	6	64	2,30	4,00	0,025	2	10	4,818	5,082	5,710	6,516
VHMS 2 015 064 06 03 L060	1,5	-	6	64	2,30	6,00	0,025	2	12	6,928	7,237	7,949	8,817
VHMS 2 015 064 06 03 L080	1,5	-	6	64	2,30	8,00	0,025	2	15	9,046	9,361	10,063	10,879
VHMS 2 015 064 06 03 L100	1,5	-	6	64	2,30	10,00	0,025	2	15	11,114	11,501	12,363	13,366
VHMS 2 015 064 06 03 L120	1,5	-	6	64	2,30	12,00	0,025	2	15	13,181	13,640	14,662	15,852
VHMS 2 015 064 06 03 L150	1,5	-	6	64	2,30	15,00	0,025	2	15	16,282	16,849	18,112	19,581
VHMS 2 015 064 06 03 L200	1,5	-	6	64	2,30	20,00	0,025	2	15	21,450	22,198	23,861	25,797
VHMS 2 015 064 06 03 L250	1,5	-	6	64	2,30	25,00	0,025	2	15	26,619	27,546	29,611	32,013
VHMS 2 020 064 06 03 L030	2,0	-	6	64	3,00	-	-	2	8	5,171	5,537	6,453	7,733
VHMS 2 020 064 06 03 L060	2,0	-	6	64	3,00	6,00	0,05	2	11	7,055	7,403	8,214	9,226
VHMS 2 020 064 06 03 L080	2,0	-	6	64	3,00	8,00	0,05	2	14	9,134	9,478	10,250	11,160
VHMS 2 020 064 06 03 L100	2,0	-	6	64	3,00	10,00	0,05	2	15	11,210	11,601	12,470	13,482
VHMS 2 020 064 06 03 L120	2,0	-	6	64	3,00	12,00	0,05	2	15	13,277	13,740	14,770	15,968
VHMS 2 020 064 06 03 L160	2,0	-	6	64	3,00	16,00	0,05	2	15	17,412	18,019	19,369	20,941
VHMS 2 020 064 06 03 L200	2,0	-	6	64	3,00	20,00	0,05	2	15	21,547	22,297	23,969	25,913
VHMS 2 020 064 06 03 L250	2,0	-	6	64	3,00	25,00	0,05	2	15	26,715	27,646	29,718	32,129
VHMS 2 020 064 06 03 L300	2,0	-	6	64	3,00	30,00	0,05	2	15	31,883	32,994	35,467	38,345
VHMS 2 025 064 06 03 L030	2,5	-	6	64	3,00	-	-	2	8	5,171	5,537	6,453	7,733
VHMS 2 025 064 06 03 L060	2,5	-	6	64	3,00	6,00	0,05	2	10	7,071	7,459	8,381	9,563
VHMS 2 025 064 06 03 L080	2,5	-	6	64	3,00	8,00	0,05	2	12	9,136	9,545	10,483	11,628
VHMS 2 025 064 06 03 L100	2,5	-	6	64	3,00	10,00	0,05	2	15	11,210	11,601	12,470	13,482
VHMS 2 025 064 06 03 L120	2,5	-	6	64	3,00	12,00	0,05	2	15	13,277	13,740	14,770	15,968
VHMS 2 025 064 06 03 L160	2,5	-	6	64	3,00	16,00	0,05	2	15	17,412	18,019	19,369	20,941
VHMS 2 025 064 06 03 L200	2,5	-	6	64	3,00	20,00	0,05	2	15	21,547	22,297	23,969	25,913
VHMS 2 025 064 06 03 L250	2,5	-	6	64	3,00	25,00	0,05	2	15	26,715	27,646	29,718	32,129
VHMS 2 025 064 06 03 L300	2,5	-	6	64	3,00	30,00	0,05	2	15	31,883	32,994	35,467	38,345
VHMS 2 030 064 06 03 L030	3,0	-	6	64	3,00	-	-	2	7	5,174	5,602	6,716	8,385
VHMS 2 030 064 06 03 L060	3,0	-	6	64	3,00	6,00	0,05	2	8	7,149	7,656	8,922	10,693
VHMS 2 030 064 06 03 L080	3,0	-	6	64	3,00	8,00	0,05	2	10	9,175	9,679	10,875	12,409
VHMS 2 030 064 06 03 L100	3,0	-	6	64	3,00	10,00	0,05	2	13	11,210	11,668	12,709	13,954
VHMS 2 030 064 06 03 L120	3,0	-	6	64	3,00	12,00	0,05	2	15	13,277	13,740	14,770	15,968
VHMS 2 030 064 06 03 L160	3,0	-	6	64	3,00	16,00	0,05	2	15	17,412	18,019	19,369	20,941
VHMS 2 030 064 06 03 L200	3,0	-	6	64	3,00	20,00	0,05	2	15	21,547	22,297	23,969	25,913
VHMS 2 030 064 06 03 L250	3,0	-	6	64	3,00	25,00	0,05	2	15	26,715	27,646	29,718	32,129
VHMS 2 030 064 06 03 L300	3,0	-	6	64	3,00	30,00	0,05	2	15	31,883	32,994	35,467	38,345

Standard



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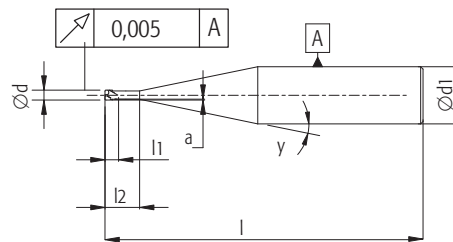
Shank 4 mm
Schaft 4 mm
4 Flute
4 Schneiden

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMS 4 002 051 04 03 L020	0,2	-	4	51	0,25	2,0	0,010	4	15	2,378	2,461	2,645	2,860	new/neu
VHMS 4 002 051 04 03 L040	0,2	-	4	51	0,25	4,0	0,010	4	15	4,445	4,600	4,945	5,346	new/neu
VHMS 4 004 051 04 03 L020	0,4	-	4	51	0,40	2,0	0,010	4	15	2,378	2,461	2,645	2,860	new/neu
VHMS 4 004 051 04 03 L040	0,4	-	4	51	0,40	4,0	0,010	4	15	4,445	4,600	4,945	5,346	new/neu
VHMS 4 004 051 04 03 L060	0,4	-	4	51	0,40	6,0	0,010	4	15	6,513	6,740	7,245	7,833	new/neu
VHMS 4 004 051 04 03 L080	0,4	-	4	51	0,40	8,0	0,010	4	15	8,580	8,879	9,545	10,319	new/neu
VHMS 4 004 051 04 03 L100	0,4	-	4	51	0,40	10,0	0,010	4	15	10,647	11,018	11,844	12,805	new/neu
VHMS 4 005 051 04 03 L020	0,5	-	4	51	0,50	2,0	0,015	4	15	2,397	2,481	2,667	2,883	new/neu
VHMS 4 005 051 04 03 L040	0,5	-	4	51	0,50	4,0	0,015	4	15	4,465	4,620	4,967	5,369	new/neu
VHMS 4 005 051 04 03 L060	0,5	-	4	51	0,50	6,0	0,015	4	15	6,532	6,760	7,266	7,856	new/neu
VHMS 4 005 051 04 03 L080	0,5	-	4	51	0,50	8,0	0,015	4	15	8,599	8,899	9,566	10,342	new/neu
VHMS 4 005 051 04 03 L100	0,5	-	4	51	0,50	10,0	0,015	4	15	10,667	11,038	11,866	12,828	new/neu
VHMS 4 010 051 04 03 L020	1,0	-	4	51	1,00	2,0	0,025	4	15	2,572	2,662	2,861	3,093	new/neu
VHMS 4 010 051 04 03 L040	1,0	-	4	51	1,00	4,0	0,025	4	15	4,639	4,801	5,161	5,580	new/neu
VHMS 4 010 051 04 03 L060	1,0	-	4	51	1,00	6,0	0,025	4	15	6,707	6,940	7,461	8,066	new/neu
VHMS 4 010 051 04 03 L080	1,0	-	4	51	1,00	8,0	0,025	4	15	8,774	9,080	9,760	10,552	new/neu
VHMS 4 010 051 04 03 L100	1,0	-	4	51	1,00	10,0	0,025	4	15	10,841	11,219	12,060	13,038	new/neu
VHMS 4 015 051 04 03 L015	1,5	-	4	51	1,50	-	-	4	15	3,781	3,913	4,206	4,548	new/neu
VHMS 4 015 051 04 03 L040	1,5	-	4	51	1,50	4,0	0,025	4	15	4,912	5,083	5,464	5,907	new/neu
VHMS 4 015 051 04 03 L060	1,5	-	4	51	1,50	6,0	0,025	4	15	6,979	7,222	7,763	8,393	new/neu
VHMS 4 015 051 04 03 L080	1,5	-	4	51	1,50	8,0	0,025	4	15	9,046	9,361	10,063	10,879	new/neu
VHMS 4 015 051 04 03 L100	1,5	-	4	51	1,50	10,0	0,025	4	15	11,114	11,501	12,363	13,366	new/neu
VHMS 4 020 051 04 03 L020	2,0	-	4	51	2,00	-	-	4	15	4,298	4,448	4,781	5,169	new/neu
VHMS 4 020 051 04 03 L040	2,0	-	4	51	2,00	4,0	0,050	4	15	5,008	5,182	5,571	6,023	new/neu
VHMS 4 020 051 04 03 L060	2,0	-	4	51	2,00	6,0	0,050	4	15	7,075	7,322	7,871	8,509	new/neu
VHMS 4 020 051 04 03 L080	2,0	-	4	51	2,00	8,0	0,050	4	15	9,143	9,461	10,170	10,995	new/neu
VHMS 4 020 051 04 03 L100	2,0	-	4	51	2,00	10,0	0,050	4	15	11,210	11,601	12,470	13,482	new/neu
VHMS 4 025 051 04 03 L025	2,5	-	4	51	2,50	-	-	4	15	4,815	4,983	5,356	5,791	new/neu
VHMS 4 025 051 04 03 L040	2,5	-	4	51	2,50	4,0	0,050	4	15	5,008	5,182	5,571	6,023	new/neu
VHMS 4 025 051 04 03 L060	2,5	-	4	51	2,50	6,0	0,050	4	15	7,075	7,322	7,871	8,509	new/neu
VHMS 4 025 051 04 03 L080	2,5	-	4	51	2,50	8,0	0,050	4	15	9,143	9,461	10,170	10,995	new/neu
VHMS 4 025 051 04 03 L100	2,5	-	4	51	2,50	10,0	0,050	4	15	11,210	11,601	12,470	13,482	new/neu
VHMS 4 030 051 04 03 L030	3,0	-	4	51	3,00	-	-	4	15	5,332	5,518	5,931	6,412	new/neu
VHMS 4 030 051 04 03 L045	3,0	-	4	51	3,00	4,5	0,050	4	15	5,525	5,717	6,146	6,644	new/neu
VHMS 4 030 051 04 03 L060	3,0	-	4	51	3,00	6,0	0,050	4	15	7,075	7,322	7,871	8,509	new/neu
VHMS 4 030 051 04 03 L080	3,0	-	4	51	3,00	8,0	0,050	4	15	9,143	9,461	10,170	∞	new/neu
VHMS 4 030 051 04 03 L100	3,0	-	4	51	3,00	10,0	0,050	4	15	11,210	11,601	12,470	∞	new/neu

Standard



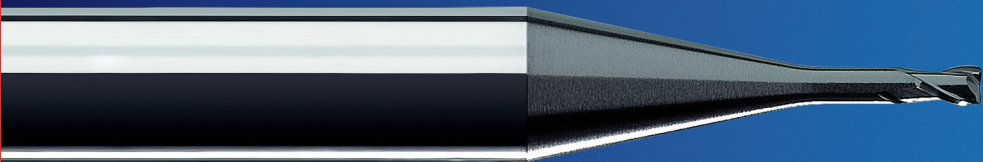
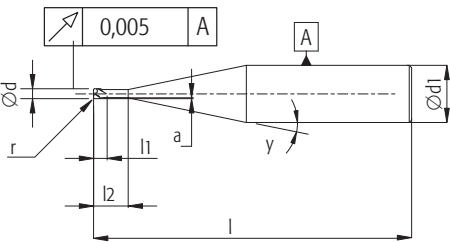
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Shank 6 mm
Schaft 6 mm
4 Flute
4 Schneiden



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMS 4 002 064 06 03 L020	0,2	-	6	64	0,30	2,0	0,010	4	11	2,350	2,465	2,735	3,072
VHMS 4 002 064 06 03 L040	0,2	-	6	64	0,30	4,0	0,010	4	13	4,439	4,621	5,032	5,525
VHMS 4 002 064 06 03 L060	0,2	-	6	64	0,30	6,0	0,010	4	15	6,513	6,740	7,245	7,833
VHMS 4 002 064 06 03 L080	0,2	-	6	64	0,30	8,0	0,010	4	15	8,580	8,879	9,545	10,319
VHMS 4 002 064 06 03 L100	0,2	-	6	64	0,30	10,0	0,010	4	15	10,647	11,018	11,844	12,805
VHMS 4 004 064 06 03 L020	0,4	-	6	64	0,60	2,0	0,010	4	11	2,350	2,465	2,735	3,072
VHMS 4 004 064 06 03 L040	0,4	-	6	64	0,60	4,0	0,010	4	13	4,439	4,621	5,032	5,525
VHMS 4 004 064 06 03 L060	0,4	-	6	64	0,60	6,0	0,010	4	15	6,513	6,740	7,245	7,833
VHMS 4 004 064 06 03 L080	0,4	-	6	64	0,60	8,0	0,010	4	15	8,580	8,879	9,545	10,319
VHMS 4 004 064 06 03 L100	0,4	-	6	64	0,60	10,0	0,010	4	15	10,647	11,018	11,844	12,805
VHMS 4 005 064 06 03 L020	0,5	-	6	64	0,80	2,0	0,015	4	11	2,376	2,494	2,767	3,108
VHMS 4 005 064 06 03 L040	0,5	-	6	64	0,80	4,0	0,015	4	12	4,464	4,664	5,122	5,682
VHMS 4 005 064 06 03 L060	0,5	-	6	64	0,80	6,0	0,015	4	15	6,532	6,760	7,266	7,856
VHMS 4 005 064 06 03 L080	0,5	-	6	64	0,80	8,0	0,015	4	15	8,599	8,899	9,566	10,342
VHMS 4 005 064 06 03 L100	0,5	-	6	64	0,80	10,0	0,015	4	15	10,667	11,038	11,866	12,828
VHMS 4 010 064 06 03 L015	1,0	-	6	64	1,50	-	-	4	10	3,055	3,223	3,621	4,133
VHMS 4 010 064 06 03 L040	1,0	-	6	64	1,50	4,0	0,025	4	11	4,625	4,853	5,385	6,048
VHMS 4 010 064 06 03 L060	1,0	-	6	64	1,50	6,0	0,025	4	14	6,703	6,956	7,522	8,190
VHMS 4 010 064 06 03 L080	1,0	-	6	64	1,50	8,0	0,025	4	15	8,774	9,080	9,760	10,552
VHMS 4 010 064 06 03 L100	1,0	-	6	64	1,50	10,0	0,025	4	15	10,841	11,219	12,060	13,038
VHMS 4 015 064 06 03 L023	1,5	-	6	64	2,30	-	-	4	9	4,438	4,713	5,380	6,267
VHMS 4 015 064 06 03 L040	1,5	-	6	64	2,30	4,0	0,025	4	10	4,818	5,082	5,710	6,516
VHMS 4 015 064 06 03 L060	1,5	-	6	64	2,30	6,0	0,025	4	12	6,928	7,237	7,949	8,817
VHMS 4 015 064 06 03 L080	1,5	-	6	64	2,30	8,0	0,025	4	15	9,046	9,361	10,063	10,879
VHMS 4 015 064 06 03 L100	1,5	-	6	64	2,30	10,0	0,025	4	15	11,114	11,501	12,363	13,366
VHMS 4 020 064 06 03 L030	2,0	-	6	64	3,00	-	-	4	8	5,171	5,537	6,453	7,733
VHMS 4 020 064 06 03 L045	2,0	-	6	64	3,00	4,5	0,050	4	9	5,513	5,854	6,683	7,785
VHMS 4 020 064 06 03 L060	2,0	-	6	64	3,00	6,0	0,050	4	11	7,055	7,403	8,214	9,226
VHMS 4 020 064 06 03 L080	2,0	-	6	64	3,00	8,0	0,050	4	14	9,134	9,478	10,250	11,160
VHMS 4 020 064 06 03 L100	2,0	-	6	64	3,00	10,0	0,050	4	15	11,210	11,601	12,470	13,482
VHMS 4 025 064 06 03 L030	2,5	-	6	64	3,00	-	-	4	8	5,171	5,537	6,453	7,733
VHMS 4 025 064 06 03 L045	2,5	-	6	64	3,00	4,5	0,050	4	9	5,513	5,854	6,683	7,785
VHMS 4 025 064 06 03 L060	2,5	-	6	64	3,00	6,0	0,050	4	11	7,055	7,403	8,214	9,226
VHMS 4 025 064 06 03 L080	2,5	-	6	64	3,00	8,0	0,050	4	14	9,134	9,478	10,250	11,160
VHMS 4 025 064 06 03 L100	2,5	-	6	64	3,00	10,0	0,050	4	15	11,210	11,601	12,470	13,482
VHMS 4 030 064 06 03 L030	3,0	-	6	64	3,00	-	-	4	6	5,193	5,710	7,131	9,498
VHMS 4 030 064 06 03 L045	3,0	-	6	64	3,00	4,5	0,050	4	7	5,612	6,077	7,285	9,095
VHMS 4 030 064 06 03 L060	3,0	-	6	64	3,00	6,0	0,050	4	8	7,149	7,656	8,922	10,693
VHMS 4 030 064 06 03 L080	3,0	-	6	64	3,00	8,0	0,050	4	10	9,175	9,679	10,875	12,409
VHMS 4 030 064 06 03 L100	3,0	-	6	64	3,00	10,0	0,050	4	13	11,210	11,668	12,709	13,954

Standard



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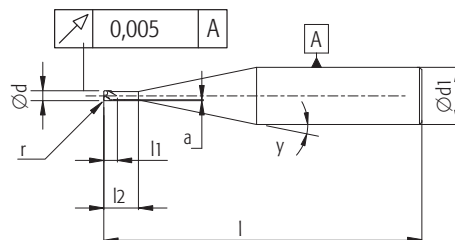
Shank 4 mm
Schaft 4 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

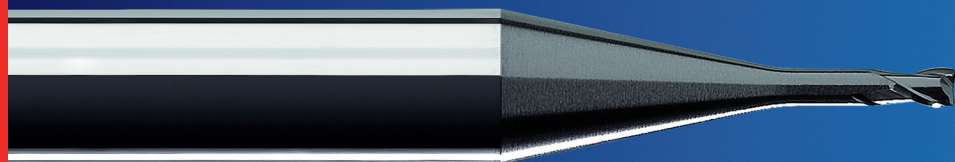
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMSR 2 001 051 04 03 L002	0,1	0,03	4	51	0,20	-	-	2	7	0,560	0,604	0,718	0,889	new/neu
VHMSR 2 001 051 04 03 L0015	0,1	0,03	4	51	0,15	-	-	2	15	0,633	0,654	0,701	0,755	new/neu
VHMSR 2 002 051 04 03 L0025	0,2	0,03	4	51	0,25	-	-	2	15	0,736	0,761	0,816	0,879	new/neu
VHMSR 2 003 051 04 03 L003	0,3	0,05	4	51	0,30	-	-	2	15	1,097	1,134	1,215	1,310	new/neu
VHMSR 2 003 051 04 03 L015	0,3	0,05	4	51	0,30	1,5	0,010	2	15	1,860	1,923	2,063	2,226	new/neu
VHMSR 2 003 051 04 03 L030	0,3	0,05	4	51	0,30	3,0	0,010	2	15	3,410	3,527	3,788	4,091	new/neu
VHMSR 2 004 051 04 03 L004	0,4	0,05	4	51	0,40	-	-	2	15	1,201	1,241	1,330	1,434	new/neu
VHMSR 2 004 051 04 03 L020	0,4	0,05	4	51	0,40	2,0	0,010	2	15	2,376	2,457	2,638	2,848	new/neu
VHMSR 2 004 051 04 03 L040	0,4	0,05	4	51	0,40	4,0	0,010	2	15	4,444	4,597	4,938	5,334	new/neu
VHMSR 2 005 051 04 03 L005	0,5	0,05	4	51	0,50	-	-	2	15	1,304	1,348	1,445	1,558	new/neu
VHMSR 2 005 051 04 03 L010	0,5	0,05	4	51	0,50	1,0	0,015	2	15	1,362	1,408	1,509	1,628	new/neu
VHMSR 2 005 051 04 03 L030	0,5	0,05	4	51	0,50	3,0	0,015	2	15	3,429	3,547	3,809	4,114	new/neu
VHMSR 2 005 051 04 03 L060	0,5	0,05	4	51	0,50	6,0	0,015	2	15	6,530	6,756	7,259	7,844	new/neu
VHMSR 2 005 051 04 03 L080	0,5	0,05	4	51	0,50	8,0	0,015	2	15	8,598	8,896	9,558	10,330	new/neu
VHMSR 2 005 051 04 03 L100	0,5	0,05	4	51	0,50	10,0	0,015	2	15	10,665	11,035	11,858	12,816	new/neu
VHMSR 2 006 051 04 03 L006	0,6	0,05	4	51	0,60	-	-	2	15	2,060	2,130	2,286	2,468	new/neu
VHMSR 2 006 051 04 03 L020	0,6	0,05	4	51	0,60	2,0	0,025	2	15	2,570	2,658	2,854	3,081	new/neu
VHMSR 2 006 051 04 03 L040	0,6	0,05	4	51	0,60	4,0	0,025	2	15	4,638	4,798	5,153	5,567	new/neu
VHMSR 2 006 051 04 03 L060	0,6	0,05	4	51	0,60	6,0	0,025	2	15	6,705	6,937	7,453	8,054	new/neu
VHMSR 2 006 051 04 03 L080	0,6	0,05	4	51	0,60	8,0	0,025	2	15	8,772	9,076	9,753	10,540	new/neu
VHMSR 2 006 051 04 03 L100	0,6	0,05	4	51	0,60	10,00	0,025	2	15	10,840	11,216	12,052	13,026	new/neu
VHMSR 2 008 051 04 03 L008	0,8	0,05	4	51	0,80	-	-	2	15	2,267	2,344	2,516	2,716	new/neu
VHMSR 2 008 051 04 03 L025	0,8	0,05	4	51	0,80	2,5	0,025	2	15	3,087	3,193	3,429	3,703	new/neu
VHMSR 2 008 051 04 03 L050	0,8	0,05	4	51	0,80	5,0	0,025	2	15	5,671	5,867	6,303	6,811	new/neu
VHMSR 2 008 051 04 03 L080	0,8	0,05	4	51	0,80	8,0	0,025	2	15	8,772	9,076	9,753	10,540	new/neu
VHMSR 2 008 051 04 03 L100	0,8	0,05	4	51	0,80	10,0	0,025	2	15	10,840	11,216	12,052	13,026	new/neu
VHMSR 2 010 051 04 03 L010	1,0	0,10	4	51	1,00	-	-	2	15	2,472	2,555	2,739	2,953	new/neu
VHMSR 2 010 051 04 03 L020	1,0	0,10	4	51	1,00	2,0	0,025	2	15	2,569	2,655	2,846	3,069	new/neu
VHMSR 2 010 051 04 03 L040	1,0	0,10	4	51	1,00	4,0	0,025	2	15	4,636	4,794	5,146	5,555	new/neu
VHMSR 2 010 051 04 03 L060	1,0	0,10	4	51	1,00	6,0	0,025	2	15	6,703	6,933	7,446	8,042	new/neu
VHMSR 2 010 051 04 03 L080	1,0	0,10	4	51	1,00	8,0	0,025	2	15	8,771	9,073	9,745	10,528	new/neu
VHMSR 2 010 051 04 03 L100	1,0	0,10	4	51	1,00	10,0	0,025	2	15	10,838	11,212	12,045	13,014	new/neu
VHMSR 2 010 051 04 03 L120	1,0	0,10	4	51	1,00	12,0	0,025	2	15	12,905	13,352	14,345	15,500	new/neu
VHMSR 2 010 051 04 03 L150	1,0	0,10	4	51	1,00	15,0	0,025	2	15	16,006	16,561	17,794	19,230	new/neu
VHMSR 2 010 060 04 03 L200	1,0	0,10	4	60	1,00	20,0	0,025	2	15	21,175	21,909	23,544	25,446	new/neu
VHMSR 2 010 060 04 03 L250	1,0	0,10	4	60	1,00	25,0	0,025	2	15	26,343	27,257	29,293	∞	new/neu
VHMSR 2 012 051 04 03 L012	1,2	0,10	4	51	1,20	-	-	2	15	3,468	3,585	3,847	4,150	new/neu
VHMSR 2 012 051 04 03 L040	1,2	0,10	4	51	1,20	4,0	0,025	2	15	4,908	5,076	5,449	5,883	new/neu
VHMSR 2 012 051 04 03 L060	1,2	0,10	4	51	1,20	6,0	0,025	2	15	6,975	7,215	7,748	8,369	new/neu
VHMSR 2 012 051 04 03 L080	1,2	0,10	4	51	1,20	8,0	0,025	2	15	9,043	9,354	10,048	10,855	new/neu
VHMSR 2 012 051 04 03 L120	1,2	0,10	4	51	1,20	12,0	0,025	2	15	13,177	13,633	14,647	15,828	new/neu
VHMSR 2 012 051 04 03 L160	1,2	0,10	4	51	1,20	16,0	0,025	2	15	17,312	17,912	19,247	20,800	new/neu

Standard



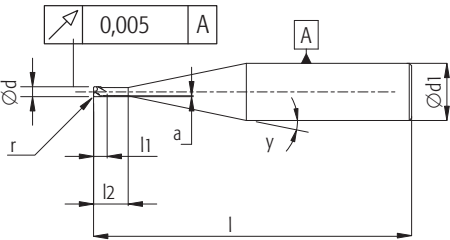
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Shank 4 mm
Schaft 4 mm



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMSR 2 015 051 04 03 L015	1,5	0,15	4	51	1,50	-	-	2	15	3,776	3,903	4,184	4,511	new/neu
VHMSR 2 015 051 04 03 L030	1,5	0,15	4	51	1,50	3,0	0,025	2	15	3,873	4,003	4,291	4,627	new/neu
VHMSR 2 015 051 04 03 L040	1,5	0,15	4	51	1,50	4,0	0,025	2	15	4,906	5,072	5,441	5,870	new/neu
VHMSR 2 015 051 04 03 L060	1,5	0,15	4	51	1,50	6,0	0,025	2	15	6,974	7,212	7,741	8,357	new/neu
VHMSR 2 015 051 04 03 L080	1,5	0,15	4	51	1,50	8,0	0,025	2	15	9,041	9,351	10,041	10,843	new/neu
VHMSR 2 015 051 04 03 L100	1,5	0,15	4	51	1,50	10,0	0,025	2	15	11,108	11,490	12,340	13,329	new/neu
VHMSR 2 015 051 04 03 L120	1,5	0,15	4	51	1,50	12,0	0,025	2	15	13,176	13,630	14,640	15,816	new/neu
VHMSR 2 015 051 04 03 L150	1,5	0,15	4	51	1,50	15,0	0,025	2	15	16,277	16,839	18,090	19,545	new/neu
VHMSR 2 015 060 04 03 L200	1,5	0,15	4	60	1,50	20,0	0,025	2	15	21,445	22,187	23,839	∞	new/neu
VHMSR 2 015 060 04 03 L250	1,5	0,15	4	60	1,50	25,0	0,025	2	15	26,613	27,536	29,588	∞	new/neu
VHMSR 2 020 051 04 03 L020	2,0	0,20	4	51	2,00	-	-	2	15	4,292	4,434	4,751	5,121	new/neu
VHMSR 2 020 051 04 03 L040	2,0	0,20	4	51	2,00	4,0	0,050	2	15	5,001	5,169	5,541	5,974	new/neu
VHMSR 2 020 051 04 03 L060	2,0	0,20	4	51	2,00	6,0	0,050	2	15	7,069	7,308	7,841	8,461	new/neu
VHMSR 2 020 051 04 03 L080	2,0	0,20	4	51	2,00	8,0	0,050	2	15	9,136	9,447	10,140	10,947	new/neu
VHMSR 2 020 051 04 03 L100	2,0	0,20	4	51	2,00	10,0	0,050	2	15	11,203	11,587	12,440	13,433	new/neu
VHMSR 2 020 051 04 03 L120	2,0	0,20	4	51	2,00	12,0	0,050	2	15	13,271	13,726	14,740	15,919	new/neu
VHMSR 2 020 051 04 03 L160	2,0	0,20	4	51	2,00	16,0	0,050	2	15	17,405	18,005	19,339	∞	new/neu
VHMSR 2 020 060 04 03 L200	2,0	0,20	4	60	2,00	20,0	0,050	2	15	21,540	22,283	23,939	∞	new/neu
VHMSR 2 020 060 04 03 L250	2,0	0,20	4	60	2,00	25,0	0,050	2	15	26,708	27,632	∞	∞	new/neu
VHMSR 2 020 064 04 03 L300	2,0	0,20	4	64	2,00	30,0	0,050	2	15	31,877	32,980	∞	∞	new/neu
VHMSR 2 025 051 04 03 L025	2,5	0,20	4	51	2,50	-	-	2	15	4,808	4,969	5,326	5,742	new/neu
VHMSR 2 025 051 04 03 L040	2,5	0,20	4	51	2,50	4,0	0,050	2	15	5,001	5,169	5,541	5,974	new/neu
VHMSR 2 025 051 04 03 L060	2,5	0,20	4	51	2,50	6,0	0,050	2	15	7,069	7,308	7,841	8,461	new/neu
VHMSR 2 025 051 04 03 L080	2,5	0,20	4	51	2,50	8,0	0,050	2	15	9,136	9,447	10,140	10,947	new/neu
VHMSR 2 025 051 04 03 L100	2,5	0,20	4	51	2,50	10,0	0,050	2	15	11,203	11,587	12,440	13,433	new/neu
VHMSR 2 025 051 04 03 L120	2,5	0,20	4	51	2,50	12,0	0,050	2	15	13,271	13,726	14,740	∞	new/neu
VHMSR 2 025 051 04 03 L160	2,5	0,20	4	51	2,50	16,0	0,050	2	15	17,405	18,005	19,339	∞	new/neu
VHMSR 2 025 060 04 03 L200	2,5	0,20	4	60	2,50	20,0	0,050	2	15	21,540	22,283	∞	∞	new/neu
VHMSR 2 025 060 04 03 L250	2,5	0,20	4	60	2,50	25,0	0,050	2	15	26,708	27,632	∞	∞	new/neu
VHMSR 2 025 064 04 03 L300	2,5	0,20	4	64	2,50	30,0	0,050	2	15	31,877	32,980	∞	∞	new/neu
VHMSR 2 030 051 04 03 L030	3,0	0,30	4	51	3,00	-	-	2	15	5,322	5,497	5,886	6,340	new/neu
VHMSR 2 030 051 04 03 L060	3,0	0,30	4	51	3,00	6,0	0,050	2	15	7,065	7,301	7,826	∞	new/neu
VHMSR 2 030 051 04 03 L080	3,0	0,30	4	51	3,00	8,0	0,050	2	15	9,133	9,440	10,125	∞	new/neu
VHMSR 2 030 051 04 03 L100	3,0	0,30	4	51	3,00	10,0	0,050	2	15	11,200	11,580	12,425	∞	new/neu
VHMSR 2 030 051 04 03 L120	3,0	0,30	4	51	3,00	12,0	0,050	2	15	13,267	13,719	14,725	∞	new/neu
VHMSR 2 030 051 04 03 L160	3,0	0,30	4	51	3,00	16,0	0,050	2	15	17,402	17,998	∞	∞	new/neu
VHMSR 2 030 060 04 03 L200	3,0	0,30	4	60	3,00	20,0	0,050	2	15	21,537	22,276	∞	∞	new/neu
VHMSR 2 030 060 04 03 L250	3,0	0,30	4	60	3,00	25,0	0,050	2	15	26,705	27,625	∞	∞	new/neu
VHMSR 2 030 064 04 03 L300	3,0	0,30	4	64	3,00	30,0	0,050	2	15	31,873	∞	∞	∞	new/neu

Standard

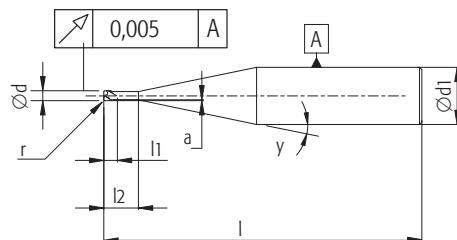


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Shank 6 mm
Schaft 6 mm

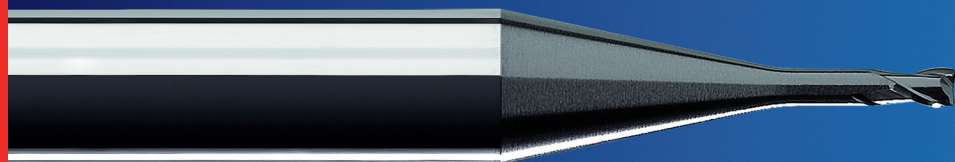
Article Number Artikelnummer	Ød (mm)	(mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle 0,5° 1° 2° 3°				
Standard														
VHMSR 2 002 Z64 06 03 L003	0,2	0,03	6	64	0,30	-	-	2	10	0,709	0,746	0,834	0,948	
VHMSR 2 003 Z64 06 03 L005	0,3	0,05	6	64	0,50	-	-	2	10	1,234	1,299	1,453	1,651	
VHMSR 2 003 Z64 06 03 L015	0,3	0,05	6	64	0,50	1,5	0,010	2	11	1,824	1,911	2,115	2,369	
VHMSR 2 003 Z64 06 03 L030	0,3	0,05	6	64	0,50	3,0	0,010	2	12	3,395	3,544	3,888	4,307	
VHMSR 2 004 Z64 06 03 L006	0,4	0,05	6	64	0,60	-	-	2	10	1,339	1,410	1,577	1,793	
VHMSR 2 004 Z64 06 03 L020	0,4	0,05	6	64	0,60	2,0	0,010	2	11	2,347	2,460	2,725	3,054	
VHMSR 2 004 Z64 06 03 L040	0,4	0,05	6	64	0,60	4,0	0,010	2	13	4,437	4,616	5,023	5,511	
VHMSR 2 005 Z64 06 03 L008	0,5	0,05	6	64	0,80	-	-	2	10	1,549	1,632	1,827	2,078	
VHMSR 2 005 Z64 06 03 L030	0,5	0,05	6	64	0,80	3,0	0,015	2	12	3,419	3,570	3,916	4,338	
VHMSR 2 005 Z64 06 03 L060	0,5	0,05	6	64	0,80	6,0	0,015	2	15	6,530	6,756	7,259	7,844	
VHMSR 2 005 Z64 06 03 L080	0,5	0,05	6	64	0,80	8,0	0,015	2	15	8,598	8,896	9,558	10,330	
VHMSR 2 005 Z64 06 03 L100	0,5	0,05	6	64	0,80	10,0	0,015	2	15	10,665	11,035	11,858	12,816	
VHMSR 2 006 Z64 06 03 L009	0,6	0,05	6	64	0,90	-	-	2	10	2,272	2,395	2,684	3,056	
VHMSR 2 006 Z64 06 03 L020	0,6	0,05	6	64	0,90	2,0	0,025	2	11	2,529	2,651	2,936	3,291	
VHMSR 2 006 Z64 06 03 L040	0,6	0,05	6	64	0,90	4,0	0,025	2	12	4,621	4,825	5,295	5,867	
VHMSR 2 006 Z64 06 03 L060	0,6	0,05	6	64	0,90	6,0	0,025	2	15	6,705	6,937	7,453	8,054	
VHMSR 2 006 Z64 06 03 L080	0,6	0,05	6	64	0,90	8,0	0,025	2	15	8,772	9,076	9,753	10,540	
VHMSR 2 006 Z64 06 03 L100	0,6	0,05	6	64	0,90	10,0	0,025	2	15	10,840	11,216	12,052	13,026	
VHMSR 2 008 Z64 06 03 L012	0,8	0,05	6	64	1,20	-	-	2	10	2,588	2,728	3,058	3,483	
VHMSR 2 008 Z64 06 03 L025	0,8	0,05	6	64	1,20	2,5	0,025	2	11	3,052	3,200	3,545	3,976	
VHMSR 2 008 Z64 06 03 L050	0,8	0,05	6	64	1,20	5,0	0,025	2	13	5,662	5,892	6,412	7,036	
VHMSR 2 008 Z64 06 03 L080	0,8	0,05	6	64	1,20	8,0	0,025	2	15	8,772	9,076	9,753	10,540	
VHMSR 2 008 Z64 06 03 L100	0,8	0,05	6	64	1,20	10,0	0,025	2	15	10,840	11,216	12,052	13,026	
VHMSR 2 010 Y64 06 03 L015	1,0	0,10	6	64	1,50	-	-	2	9	2,890	3,063	3,482	4,040	
VHMSR 2 010 Y64 06 03 L040	1,0	0,10	6	64	1,50	4,0	0,025	2	11	4,620	4,843	5,363	6,011	
VHMSR 2 010 Y64 06 03 L060	1,0	0,10	6	64	1,50	6,0	0,025	2	14	6,700	6,948	7,506	8,164	
VHMSR 2 010 Y64 06 03 L080	1,0	0,10	6	64	1,50	8,0	0,025	2	15	8,771	9,073	9,745	10,528	
VHMSR 2 010 Y64 06 03 L100	1,0	0,10	6	64	1,50	10,0	0,025	2	15	10,838	11,212	12,045	13,014	
VHMSR 2 010 Y64 06 03 L120	1,0	0,10	6	64	1,50	12,0	0,025	2	15	12,905	13,352	14,345	15,500	
VHMSR 2 010 Y64 06 03 L150	1,0	0,10	6	64	1,50	15,0	0,025	2	15	16,006	16,561	17,794	19,230	
VHMSR 2 010 Y64 06 03 L200	1,0	0,10	6	64	1,50	20,0	0,025	2	15	21,175	21,909	23,544	25,446	
VHMSR 2 010 Y64 06 03 L250	1,0	0,10	6	64	1,50	25,0	0,025	2	15	26,343	27,257	29,293	31,661	
VHMSR 2 012 Y64 06 03 L018	1,2	0,10	6	64	1,80	-	-	2	9	3,903	4,139	4,710	5,471	
VHMSR 2 012 Y64 06 03 L040	1,2	0,10	6	64	1,80	4,0	0,025	2	11	4,822	5,055	5,598	6,275	
VHMSR 2 012 Y64 06 03 L060	1,2	0,10	6	64	1,80	6,0	0,025	2	13	6,936	7,216	7,850	8,610	
VHMSR 2 012 Y64 06 03 L080	1,2	0,10	6	64	1,80	8,0	0,025	2	15	9,043	9,354	10,048	10,855	
VHMSR 2 012 Y64 06 03 L120	1,2	0,10	6	64	1,80	12,0	0,025	2	15	13,177	13,633	14,647	15,828	
VHMSR 2 012 Y64 06 03 L160	1,2	0,10	6	64	1,80	16,0	0,025	2	15	17,312	17,912	19,247	20,800	

Standard



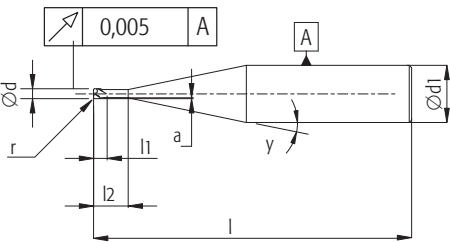
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Shank 6 mm
Schaft 6 mm



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMSR 2 015 X64 06 03 L023	1,5	0,15	6	64	2,30	-	-	2	9	4,429	4,694	5,337	6,193
VHMSR 2 015 X64 06 03 L040	1,5	0,15	6	64	2,30	4,0	0,025	2	10	4,810	5,066	5,673	6,452
VHMSR 2 015 X64 06 03 L060	1,5	0,15	6	64	2,30	6,0	0,025	2	12	6,921	7,224	7,920	8,768
VHMSR 2 015 X64 06 03 L080	1,5	0,15	6	64	2,30	8,0	0,025	2	15	9,041	9,351	10,041	10,843
VHMSR 2 015 X64 06 03 L100	1,5	0,15	6	64	2,30	10,0	0,025	2	15	11,108	11,490	12,340	13,329
VHMSR 2 015 X64 06 03 L120	1,5	0,15	6	64	2,30	12,0	0,025	2	15	13,176	13,630	14,640	15,816
VHMSR 2 015 X64 06 03 L150	1,5	0,15	6	64	2,30	15,0	0,025	2	15	16,277	16,839	18,090	19,545
VHMSR 2 015 X64 06 03 L200	1,5	0,15	6	64	2,30	20,0	0,025	2	15	21,445	22,187	23,839	25,761
VHMSR 2 015 X64 06 03 L250	1,5	0,15	6	64	2,30	25,0	0,025	2	15	26,613	27,536	29,588	31,976
VHMSR 2 020 W64 06 03 L030	2,0	0,20	6	64	3,00	-	-	2	8	5,157	5,509	6,387	7,615
VHMSR 2 020 W64 06 03 L040	2,0	0,20	6	64	3,00	4,0	0,050	2	9	4,972	5,268	5,985	6,939
VHMSR 2 020 W64 06 03 L060	2,0	0,20	6	64	3,00	6,0	0,050	2	11	7,046	7,384	8,171	9,152
VHMSR 2 020 W64 06 03 L080	2,0	0,20	6	64	3,00	8,0	0,050	2	14	9,127	9,463	10,218	11,107
VHMSR 2 020 W64 06 03 L100	2,0	0,20	6	64	3,00	10,0	0,050	2	15	11,203	11,587	12,440	13,433
VHMSR 2 020 W64 06 03 L120	2,0	0,20	6	64	3,00	12,0	0,050	2	15	13,271	13,726	14,740	15,919
VHMSR 2 020 W64 06 03 L160	2,0	0,20	6	64	3,00	16,0	0,050	2	15	17,405	18,005	19,339	20,892
VHMSR 2 020 W64 06 03 L200	2,0	0,20	6	64	3,00	20,0	0,050	2	15	21,540	22,283	23,939	25,865
VHMSR 2 020 W64 06 03 L250	2,0	0,20	6	64	3,00	25,0	0,050	2	15	26,708	27,632	29,688	32,080
VHMSR 2 020 W64 06 03 L300	2,0	0,20	6	64	3,00	30,0	0,050	2	15	31,877	32,980	35,437	38,296
VHMSR 2 025 W64 06 03 L030	2,5	0,20	6	64	3,00	-	-	2	7	5,158	5,569	6,636	8,236
VHMSR 2 025 W64 06 03 L060	2,5	0,20	6	64	3,00	6,0	0,050	2	10	7,061	7,437	8,331	9,479
VHMSR 2 025 W64 06 03 L080	2,5	0,20	6	64	3,00	8,0	0,050	2	12	9,127	9,527	10,444	11,562
VHMSR 2 025 W64 06 03 L100	2,5	0,20	6	64	3,00	10,0	0,050	2	15	11,203	11,587	12,440	13,433
VHMSR 2 025 W64 06 03 L120	2,5	0,20	6	64	3,00	12,0	0,050	2	15	13,271	13,726	14,740	15,919
VHMSR 2 025 W64 06 03 L160	2,5	0,20	6	64	3,00	16,0	0,050	2	15	17,405	18,005	19,339	20,892
VHMSR 2 025 W64 06 03 L200	2,5	0,20	6	64	3,00	20,0	0,050	2	15	21,540	22,283	23,939	25,865
VHMSR 2 025 W64 06 03 L250	2,5	0,20	6	64	3,00	25,0	0,050	2	15	26,708	27,632	29,688	32,080
VHMSR 2 025 W64 06 03 L300	2,5	0,20	6	64	3,00	30,0	0,050	2	15	31,877	32,980	35,437	38,296
VHMSR 2 030 U64 06 03 L030	3,0	0,30	6	64	3,00	-	-	2	6	5,166	5,651	6,982	9,200
VHMSR 2 030 U64 06 03 L060	3,0	0,30	6	64	3,00	6,0	0,050	2	8	7,129	7,614	8,823	10,514
VHMSR 2 030 U64 06 03 L080	3,0	0,30	6	64	3,00	8,0	0,050	2	10	9,159	9,646	10,801	12,282
VHMSR 2 030 U64 06 03 L100	3,0	0,30	6	64	3,00	10,0	0,050	2	13	11,198	11,644	12,655	13,866
VHMSR 2 030 U64 06 03 L120	3,0	0,30	6	64	3,00	12,0	0,050	2	15	13,267	13,719	14,725	15,895
VHMSR 2 030 U64 06 03 L160	3,0	0,30	6	64	3,00	16,0	0,050	2	15	17,402	17,998	19,324	20,868
VHMSR 2 030 U64 06 03 L200	3,0	0,30	6	64	3,00	20,0	0,050	2	15	21,537	22,276	23,924	25,840
VHMSR 2 030 U64 06 03 L250	3,0	0,30	6	64	3,00	25,0	0,050	2	15	26,705	27,625	29,673	32,056
VHMSR 2 030 U64 06 03 L300	3,0	0,30	6	64	3,00	30,0	0,050	2	15	31,873	32,973	35,422	38,272

Standard



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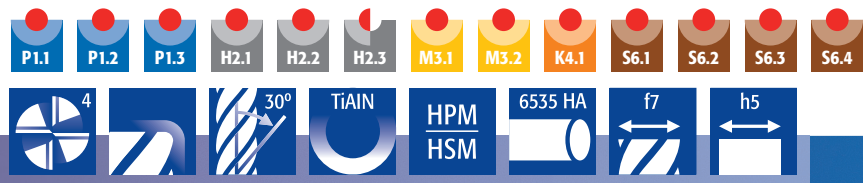
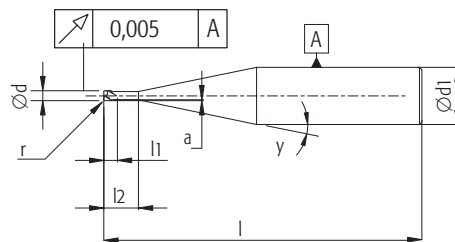
Shank 4 mm
Schaft 4 mm
4 Flute
4 Schneiden

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMSR 4 002 051 04 03 L020	0,2	0,03	4	51	0,25	2,0	0,010	4	15	2,377	2,459	2,641	2,853	new/neu
VHMSR 4 002 051 04 03 L040	0,2	0,03	4	51	0,25	4,0	0,010	4	15	4,444	4,598	4,941	5,339	new/neu
VHMSR 4 004 051 04 03 L020	0,4	0,05	4	51	0,40	2,0	0,010	4	15	2,376	2,457	2,638	2,848	new/neu
VHMSR 4 004 051 04 03 L040	0,4	0,05	4	51	0,40	4,0	0,010	4	15	4,444	4,597	4,938	5,334	new/neu
VHMSR 4 004 051 04 03 L060	0,4	0,05	4	51	0,40	6,0	0,010	4	15	6,511	6,736	7,237	7,820	new/neu
VHMSR 4 004 051 04 03 L080	0,4	0,05	4	51	0,40	8,0	0,010	4	15	8,578	8,876	9,537	10,307	new/neu
VHMSR 4 004 051 04 03 L100	0,4	0,05	4	51	0,40	10,0	0,010	4	15	10,646	11,015	11,837	12,793	new/neu
VHMSR 4 005 051 04 03 L020	0,5	0,05	4	51	0,50	2,0	0,015	4	15	2,396	2,477	2,659	2,871	new/neu
VHMSR 4 005 051 04 03 L040	0,5	0,05	4	51	0,50	4,0	0,015	4	15	4,463	4,617	4,959	5,357	new/neu
VHMSR 4 005 051 04 03 L060	0,5	0,05	4	51	0,50	6,0	0,015	4	15	6,530	6,756	7,259	7,844	new/neu
VHMSR 4 005 051 04 03 L080	0,5	0,05	4	51	0,50	8,0	0,015	4	15	8,598	8,896	9,558	10,330	new/neu
VHMSR 4 005 051 04 03 L100	0,5	0,05	4	51	0,50	10,0	0,015	4	15	10,665	11,035	11,858	12,816	new/neu
VHMSR 4 010 051 04 03 L020	1,0	0,10	4	51	1,00	2,0	0,025	4	15	2,569	2,655	2,846	3,069	new/neu
VHMSR 4 010 051 04 03 L040	1,0	0,10	4	51	1,00	4,0	0,025	4	15	4,636	4,794	5,146	5,555	new/neu
VHMSR 4 010 051 04 03 L060	1,0	0,10	4	51	1,00	6,0	0,025	4	15	6,703	6,933	7,446	8,042	new/neu
VHMSR 4 010 051 04 03 L080	1,0	0,10	4	51	1,00	8,0	0,025	4	15	8,771	9,073	9,745	10,528	new/neu
VHMSR 4 010 051 04 03 L100	1,0	0,10	4	51	1,00	10,0	0,025	4	15	10,838	11,212	12,045	13,014	new/neu
VHMSR 4 015 051 04 03 L015	1,5	0,15	4	51	1,50	-	-	4	15	3,776	3,903	4,184	4,511	new/neu
VHMSR 4 015 051 04 03 L040	1,5	0,15	4	51	1,50	4,0	0,025	4	15	4,906	5,072	5,441	5,870	new/neu
VHMSR 4 015 051 04 03 L060	1,5	0,15	4	51	1,50	6,0	0,025	4	15	6,974	7,212	7,741	8,357	new/neu
VHMSR 4 015 051 04 03 L080	1,5	0,15	4	51	1,50	8,0	0,025	4	15	9,041	9,351	10,041	10,843	new/neu
VHMSR 4 015 051 04 03 L100	1,5	0,15	4	51	1,50	10,0	0,025	4	15	11,108	11,490	12,340	13,329	new/neu
VHMSR 4 020 051 04 03 L020	2,0	0,20	4	51	2,00	-	-	4	15	4,292	4,434	4,751	5,121	new/neu
VHMSR 4 020 051 04 03 L040	2,0	0,20	4	51	2,00	4,0	0,050	4	15	5,001	5,169	5,541	5,974	new/neu
VHMSR 4 020 051 04 03 L060	2,0	0,20	4	51	2,00	6,0	0,050	4	15	7,069	7,308	7,841	8,461	new/neu
VHMSR 4 020 051 04 03 L080	2,0	0,20	4	51	2,00	8,0	0,050	4	15	9,136	9,447	10,140	10,947	new/neu
VHMSR 4 020 051 04 03 L100	2,0	0,20	4	51	2,00	10,0	0,050	4	15	11,203	11,587	12,440	13,433	new/neu
VHMSR 4 025 051 04 03 L025	2,5	0,20	4	51	2,50	-	-	4	15	4,808	4,969	5,326	5,742	new/neu
VHMSR 4 025 051 04 03 L040	2,5	0,20	4	51	2,50	4,0	0,050	4	15	5,001	5,169	5,541	5,974	new/neu
VHMSR 4 025 051 04 03 L060	2,5	0,20	4	51	2,50	6,0	0,050	4	15	7,069	7,308	7,841	8,461	new/neu
VHMSR 4 025 051 04 03 L080	2,5	0,20	4	51	2,50	8,0	0,050	4	15	9,136	9,447	10,140	10,947	new/neu
VHMSR 4 025 051 04 03 L100	2,5	0,20	4	51	2,50	10,0	0,050	4	15	11,203	11,587	12,440	13,433	new/neu
VHMSR 4 030 051 04 03 L030	3,0	0,30	4	51	3,00	-	-	4	15	5,322	5,497	5,886	6,340	new/neu
VHMSR 4 030 051 04 03 L040	3,0	0,30	4	51	3,00	4,0	0,050	4	15	4,998	5,162	5,526	5,950	new/neu
VHMSR 4 030 051 04 03 L060	3,0	0,30	4	51	3,00	6,0	0,050	4	15	7,065	7,301	7,826	8,436	new/neu
VHMSR 4 030 051 04 03 L080	3,0	0,30	4	51	3,00	8,0	0,050	4	15	9,133	9,440	10,125	∞	new/neu
VHMSR 4 030 051 04 03 L100	3,0	0,30	4	51	3,00	10,0	0,050	4	15	11,200	11,580	12,425	∞	new/neu

Standard

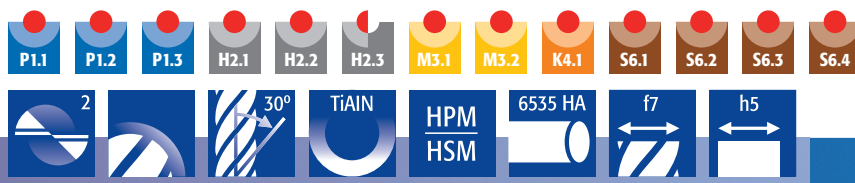
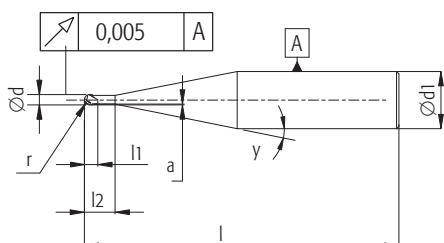


Shank 6 mm
Schaft 6 mm
4 Flute
4 Schneiden



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMSR 4 002 064 06 03 L020	0,2	0,03	6	64	0,30	2,0	0,010	4	11	2,348	2,462	2,729	3,061
VHMSR 4 002 064 06 03 L040	0,2	0,03	6	64	0,30	4,0	0,010	4	13	4,438	4,618	5,027	5,517
VHMSR 4 004 064 06 03 L020	0,4	0,05	6	64	0,60	2,0	0,010	4	11	2,347	2,460	2,725	3,054
VHMSR 4 004 064 06 03 L040	0,4	0,05	6	64	0,60	4,0	0,010	4	13	4,437	4,616	5,023	5,511
VHMSR 4 004 064 06 03 L060	0,4	0,05	6	64	0,60	6,0	0,010	4	15	6,511	6,736	7,237	7,820
VHMSR 4 004 064 06 03 L080	0,4	0,05	6	64	0,60	8,0	0,010	4	15	8,578	8,876	9,537	10,307
VHMSR 4 004 064 06 03 L100	0,4	0,05	6	64	0,60	10,0	0,010	4	15	10,646	11,015	11,837	12,793
VHMSR 4 005 064 06 03 L020	0,5	0,05	6	64	0,80	2,0	0,015	4	11	2,374	2,489	2,756	3,089
VHMSR 4 005 064 06 03 L040	0,5	0,05	6	64	0,80	4,0	0,015	4	12	4,462	4,659	5,112	5,665
VHMSR 4 005 064 06 03 L060	0,5	0,05	6	64	0,80	6,0	0,015	4	15	6,530	6,756	7,259	7,844
VHMSR 4 005 064 06 03 L080	0,5	0,05	6	64	0,80	8,0	0,015	4	15	8,598	8,896	9,558	10,330
VHMSR 4 005 064 06 03 L100	0,5	0,05	6	64	0,80	10,0	0,015	4	15	10,665	11,035	11,858	12,816
VHMSR 4 010 064 06 03 L015	1,0	0,10	6	64	1,50	-	-	4	10	3,050	3,212	3,597	4,090
VHMSR 4 010 064 06 03 L040	1,0	0,10	6	64	1,50	4,0	0,025	4	11	4,620	4,843	5,363	6,011
VHMSR 4 010 064 06 03 L060	1,0	0,10	6	64	1,50	6,0	0,025	4	14	6,700	6,948	7,506	8,164
VHMSR 4 010 064 06 03 L080	1,0	0,10	6	64	1,50	8,0	0,025	4	15	8,771	9,073	9,745	10,528
VHMSR 4 010 064 06 03 L100	1,0	0,10	6	64	1,50	10,0	0,025	4	15	10,838	11,212	12,045	13,014
VHMSR 4 015 064 06 03 L023	1,5	0,15	6	64	2,30	-	-	4	9	4,429	4,694	5,337	6,193
VHMSR 4 015 064 06 03 L040	1,5	0,15	6	64	2,30	4,0	0,025	4	10	4,810	5,066	5,673	6,452
VHMSR 4 015 064 06 03 L060	1,5	0,15	6	64	2,30	6,0	0,025	4	12	6,921	7,224	7,920	8,768
VHMSR 4 015 064 06 03 L080	1,5	0,15	6	64	2,30	8,0	0,025	4	15	9,041	9,351	10,041	10,843
VHMSR 4 015 064 06 03 L100	1,5	0,15	6	64	2,30	10,0	0,025	4	15	11,108	11,490	12,340	13,329
VHMSR 4 020 064 06 03 L030	2,0	0,20	6	64	3,00	-	-	4	8	5,157	5,509	6,387	7,615
VHMSR 4 020 064 06 03 L045	2,0	0,20	6	64	3,00	4,5	0,050	4	9	5,501	5,830	6,626	7,686
VHMSR 4 020 064 06 03 L060	2,0	0,20	6	64	3,00	6,0	0,050	4	11	7,046	7,384	8,171	9,152
VHMSR 4 020 064 06 03 L080	2,0	0,20	6	64	3,00	8,0	0,050	4	14	9,127	9,463	10,218	11,107
VHMSR 4 020 064 06 03 L100	2,0	0,20	6	64	3,00	10,0	0,050	4	15	11,203	11,587	12,440	13,433
VHMSR 4 025 064 06 03 L030	2,5	0,20	6	64	3,00	-	-	4	8	5,157	5,509	6,387	7,615
VHMSR 4 025 064 06 03 L045	2,5	0,20	6	64	3,00	4,5	0,050	4	9	5,501	5,830	6,626	7,686
VHMSR 4 025 064 06 03 L060	2,5	0,20	6	64	3,00	6,0	0,050	4	11	7,046	7,384	8,171	9,152
VHMSR 4 025 064 06 03 L080	2,5	0,20	6	64	3,00	8,0	0,050	4	14	9,127	9,463	10,218	11,107
VHMSR 4 025 064 06 03 L100	2,5	0,20	6	64	3,00	10,0	0,050	4	15	11,203	11,587	12,440	13,433
VHMSR 4 030 064 06 03 L030	3,0	0,30	6	64	3,00	-	-	4	6	5,166	5,651	6,982	9,200
VHMSR 4 030 064 06 03 L045	3,0	0,30	6	64	3,00	4,5	0,050	4	7	5,589	6,027	7,166	8,872
VHMSR 4 030 064 06 03 L060	3,0	0,30	6	64	3,00	6,0	0,050	4	8	7,129	7,614	8,823	10,514
VHMSR 4 030 064 06 03 L080	3,0	0,30	6	64	3,00	8,0	0,050	4	10	9,159	9,646	10,801	12,282
VHMSR 4 030 064 06 03 L100	3,0	0,30	6	64	3,00	10,0	0,050	4	13	11,198	11,644	12,655	13,866

Standard



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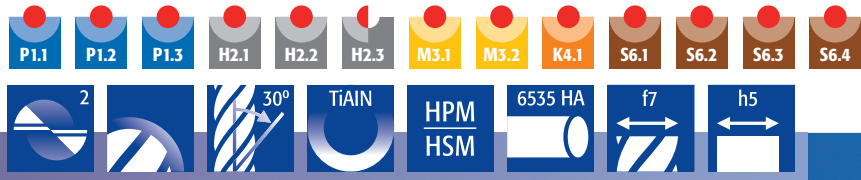
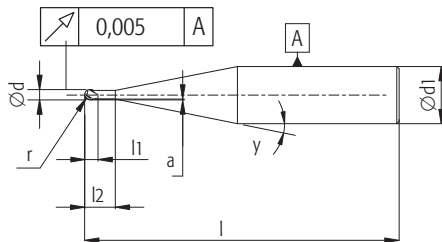
Shank 4 mm Schaft 4 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMSK 2 001 051 04 03 L002	0,1	0,05	4	51	0,20	-	-	2	15	0,684	0,706	0,755	0,812	new/neu
VHMSK 2 001 060 04 03 L002	0,1	0,05	4	60	0,20	-	-	2	10	0,602	0,633	0,705	0,797	
VHMSK 2 002 051 04 03 L003	0,2	0,10	4	51	0,30	-	-	2	15	0,786	0,810	0,863	0,925	new/neu
VHMSK 2 003 051 04 03 L004	0,3	0,15	4	51	0,40	-	-	2	15	1,197	1,234	1,315	1,410	new/neu
VHMSK 2 003 051 04 03 L015	0,3	0,15	4	51	0,40	1,50	0,010	2	15	1,856	1,916	2,048	2,202	new/neu
VHMSK 2 003 051 04 03 L030	0,3	0,15	4	51	0,40	3,00	0,010	2	15	3,407	3,520	3,773	4,067	new/neu
VHMSK 2 004 051 04 03 L005	0,4	0,20	4	51	0,50	-	-	2	15	1,299	1,337	1,423	1,522	new/neu
VHMSK 2 004 051 04 03 L020	0,4	0,20	4	51	0,50	2,00	0,010	2	15	2,371	2,447	2,615	2,811	new/neu
VHMSK 2 004 051 04 03 L040	0,4	0,20	4	51	0,50	4,00	0,010	2	15	4,439	4,586	4,915	5,298	new/neu
VHMSK 2 005 051 04 03 L007	0,5	0,25	4	51	0,70	-	-	2	15	1,504	1,548	1,645	1,758	new/neu
VHMSK 2 005 051 04 03 L030	0,5	0,25	4	51	0,70	3,00	0,015	2	15	3,423	3,533	3,779	4,066	new/neu
VHMSK 2 005 051 04 03 L060	0,5	0,25	4	51	0,70	6,00	0,015	2	15	6,524	6,742	7,229	7,795	new/neu
VHMSK 2 005 051 04 03 L080	0,5	0,25	4	51	0,70	8,00	0,015	2	15	8,591	8,882	9,529	10,281	new/neu
VHMSK 2 005 051 04 03 L100	0,5	0,25	4	51	0,70	10,00	0,015	2	15	10,658	11,021	11,828	12,768	new/neu
VHMSK 2 006 051 04 03 L008	0,6	0,30	4	51	0,80	-	-	2	15	2,259	2,327	2,479	2,656	new/neu
VHMSK 2 006 051 04 03 L020	0,6	0,30	4	51	0,80	2,00	0,025	2	15	2,562	2,641	2,816	3,020	new/neu
VHMSK 2 006 051 04 03 L040	0,6	0,30	4	51	0,80	4,00	0,025	2	15	4,629	4,780	5,116	5,507	new/neu
VHMSK 2 006 051 04 03 L060	0,6	0,30	4	51	0,80	6,00	0,025	2	15	6,697	6,919	7,416	7,993	new/neu
VHMSK 2 006 051 04 03 L080	0,6	0,30	4	51	0,80	8,00	0,025	2	15	8,764	9,059	9,715	10,479	new/neu
VHMSK 2 006 051 04 03 L100	0,6	0,30	4	51	0,80	10,00	0,025	2	15	10,831	11,198	12,015	12,965	new/neu
VHMSK 2 008 051 04 03 L010	0,8	0,40	4	51	1,00	-	-	2	15	2,462	2,534	2,694	2,880	new/neu
VHMSK 2 008 051 04 03 L025	0,8	0,40	4	51	1,00	2,50	0,025	2	15	3,075	3,169	3,376	3,618	new/neu
VHMSK 2 008 051 04 03 L050	0,8	0,40	4	51	1,00	5,00	0,025	2	15	5,660	5,843	6,251	6,725	new/neu
VHMSK 2 008 051 04 03 L080	0,8	0,40	4	51	1,00	8,00	0,025	2	15	8,761	9,052	9,700	10,455	new/neu
VHMSK 2 008 051 04 03 L100	0,8	0,40	4	51	1,00	10,00	0,025	2	15	10,828	11,191	12,000	12,941	new/neu
VHMSK 2 010 051 04 03 L012	1,0	0,50	4	51	1,20	-	-	2	15	2,665	2,741	2,909	3,104	new/neu
VHMSK 2 010 051 04 03 L040	1,0	0,50	4	51	1,20	4,00	0,025	2	15	4,623	4,766	5,086	5,458	new/neu
VHMSK 2 010 051 04 03 L060	1,0	0,50	4	51	1,20	6,00	0,025	2	15	6,690	6,906	7,386	7,944	new/neu
VHMSK 2 010 051 04 03 L080	1,0	0,50	4	51	1,20	8,00	0,025	2	15	8,757	9,045	9,685	10,431	new/neu
VHMSK 2 010 051 04 03 L100	1,0	0,50	4	51	1,20	10,00	0,025	2	15	10,825	11,184	11,985	12,917	new/neu
VHMSK 2 010 051 04 03 L120	1,0	0,50	4	51	1,20	12,00	0,025	2	15	12,892	13,324	14,285	15,403	new/neu
VHMSK 2 010 051 04 03 L150	1,0	0,50	4	51	1,20	15,00	0,025	2	15	15,993	16,533	17,734	19,133	new/neu
VHMSK 2 010 060 04 03 L200	1,0	0,50	4	60	1,20	20,00	0,025	2	15	21,161	21,881	23,484	25,348	new/neu
VHMSK 2 010 060 04 03 L250	1,0	0,50	4	60	1,20	25,00	0,025	2	15	26,330	27,230	29,233	∞	new/neu
VHMSK 2 012 051 04 03 L014	1,2	0,60	4	51	1,40	-	-	2	15	3,658	3,764	4,002	4,278	new/neu
VHMSK 2 012 051 04 03 L040	1,2	0,60	4	51	1,40	4,00	0,025	2	15	4,891	5,041	5,374	5,761	new/neu
VHMSK 2 012 051 04 03 L060	1,2	0,60	4	51	1,40	6,00	0,025	2	15	6,959	7,180	7,673	8,247	new/neu
VHMSK 2 012 051 04 03 L080	1,2	0,60	4	51	1,40	8,00	0,025	2	15	9,026	9,320	9,973	10,734	new/neu
VHMSK 2 012 051 04 03 L120	1,2	0,60	4	51	1,40	12,00	0,025	2	15	13,161	13,598	14,573	15,706	new/neu
VHMSK 2 012 051 04 03 L160	1,2	0,60	4	51	1,40	16,00	0,025	2	15	17,295	17,877	19,172	20,679	new/neu

Standard

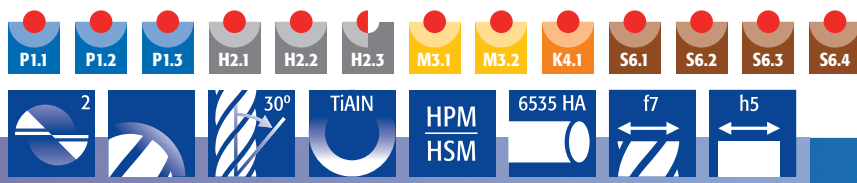
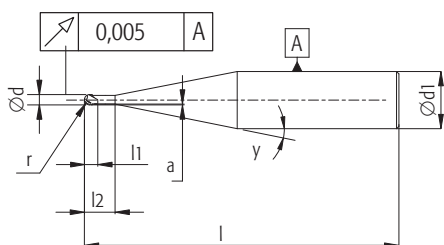


Shank 4 mm
Schaft 4 mm



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMSK 2 015 051 04 03 L018	1,5	0,75	4	51	1,80	-	-	2	15	4,066	4,182	4,439	4,738	new/neu
VHMSK 2 015 051 04 03 L040	1,5	0,75	4	51	1,80	4,00	0,020	2	15	4,867	5,010	5,330	5,701	new/neu
VHMSK 2 015 051 04 03 L060	1,5	0,75	4	51	1,80	6,00	0,025	2	15	6,954	7,170	7,651	8,211	new/neu
VHMSK 2 015 051 04 03 L080	1,5	0,75	4	51	1,80	8,00	0,025	2	15	9,021	9,309	9,951	10,697	new/neu
VHMSK 2 015 051 04 03 L100	1,5	0,75	4	51	1,80	10,00	0,025	2	15	11,088	11,448	12,250	13,183	new/neu
VHMSK 2 015 051 04 03 L120	1,5	0,75	4	51	1,80	12,00	0,025	2	15	13,156	13,588	14,550	15,670	new/neu
VHMSK 2 015 051 04 03 L150	1,5	0,75	4	51	1,80	15,00	0,025	2	15	16,257	16,797	18,000	19,399	new/neu
VHMSK 2 015 060 04 03 L200	1,5	0,75	4	60	1,80	20,00	0,025	2	15	21,425	22,145	23,749	∞	new/neu
VHMSK 2 015 060 04 03 L250	1,5	0,75	4	60	1,80	25,00	0,025	2	15	26,593	27,494	29,498	∞	new/neu
VHMSK 2 020 051 04 03 L025	2,0	1,00	4	51	2,50	-	-	2	15	4,781	4,913	5,206	5,548	new/neu
VHMSK 2 020 051 04 03 L040	2,0	1,00	4	51	2,50	4,00	0,050	2	15	4,974	5,113	5,421	5,780	new/neu
VHMSK 2 020 051 04 03 L060	2,0	1,00	4	51	2,50	6,00	0,050	2	15	7,042	7,252	7,721	8,266	new/neu
VHMSK 2 020 051 04 03 L080	2,0	1,00	4	51	2,50	8,00	0,050	2	15	9,109	9,392	10,020	10,752	new/neu
VHMSK 2 020 051 04 03 L100	2,0	1,00	4	51	2,50	10,00	0,050	2	15	11,176	11,531	12,320	13,239	new/neu
VHMSK 2 020 051 04 03 L120	2,0	1,00	4	51	2,50	12,00	0,050	2	15	13,244	13,670	14,620	15,725	new/neu
VHMSK 2 020 051 04 03 L160	2,0	1,00	4	51	2,50	16,00	0,050	2	15	17,378	17,949	19,219	∞	new/neu
VHMSK 2 020 060 04 03 L200	2,0	1,00	4	60	2,50	20,00	0,050	2	15	21,513	22,228	23,819	∞	new/neu
VHMSK 2 020 060 04 03 L250	2,0	1,00	4	60	2,50	25,00	0,050	2	15	26,681	27,576	29,568	∞	new/neu
VHMSK 2 020 064 04 03 L300	2,0	1,00	4	64	2,50	30,00	0,050	2	15	31,850	32,925	∞	∞	new/neu
VHMSK 2 025 051 04 03 L035	2,5	1,25	4	51	3,50	-	-	2	15	5,807	5,965	6,319	6,730	new/neu
VHMSK 2 025 051 04 03 L060	2,5	1,25	4	51	3,50	6,00	0,050	2	15	7,033	7,235	7,683	8,205	new/neu
VHMSK 2 025 051 04 03 L080	2,5	1,25	4	51	3,50	8,00	0,050	2	15	9,101	9,374	9,983	10,692	new/neu
VHMSK 2 025 051 04 03 L100	2,5	1,25	4	51	3,50	10,00	0,050	2	15	11,168	11,513	12,283	13,178	new/neu
VHMSK 2 025 051 04 03 L120	2,5	1,25	4	51	3,50	12,00	0,050	2	15	13,235	13,653	14,582	15,664	new/neu
VHMSK 2 025 051 04 03 L160	2,5	1,25	4	51	3,50	16,00	0,050	2	15	17,370	17,932	19,182	∞	new/neu
VHMSK 2 025 060 04 03 L200	2,5	1,25	4	60	3,50	20,00	0,050	2	15	21,505	22,210	∞	∞	new/neu
VHMSK 2 025 060 04 03 L250	2,5	1,25	4	60	3,50	25,00	0,050	2	15	26,673	27,559	∞	∞	new/neu
VHMSK 2 025 064 04 03 L300	2,5	1,25	4	64	3,50	30,00	0,050	2	15	31,841	32,907	∞	∞	new/neu
VHMSK 2 030 051 04 03 L035	3,0	1,50	4	51	3,50	-	-	2	15	5,798	5,948	6,281	6,669	new/neu
VHMSK 2 030 051 04 03 L060	3,0	1,50	4	51	3,50	6,00	0,050	2	15	7,025	7,217	7,646	8,144	new/neu
VHMSK 2 030 051 04 03 L080	3,0	1,50	4	51	3,50	8,00	0,050	2	15	9,092	9,357	9,946	10,631	new/neu
VHMSK 2 030 051 04 03 L100	3,0	1,50	4	51	3,50	10,00	0,050	2	15	11,159	11,496	12,245	∞	new/neu
VHMSK 2 030 051 04 03 L120	3,0	1,50	4	51	3,50	12,00	0,050	2	15	13,227	13,635	14,545	∞	new/neu
VHMSK 2 030 051 04 03 L160	3,0	1,50	4	51	3,50	16,00	0,050	2	15	17,361	17,914	∞	∞	new/neu
VHMSK 2 030 060 04 03 L200	3,0	1,50	4	60	3,50	20,00	0,050	2	15	21,496	22,193	∞	∞	new/neu
VHMSK 2 030 060 04 03 L250	3,0	1,50	4	60	3,50	25,00	0,050	2	15	26,664	27,541	∞	∞	new/neu
VHMSK 2 030 064 04 03 L300	3,0	1,50	4	64	3,50	30,00	0,050	2	15	31,833	∞	∞	∞	new/neu

Standard



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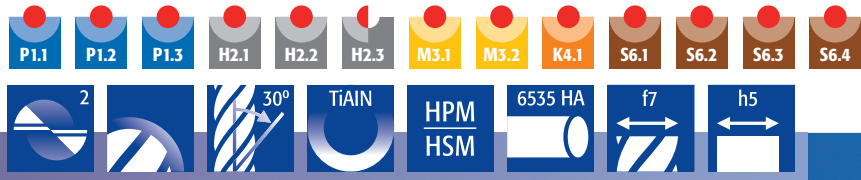
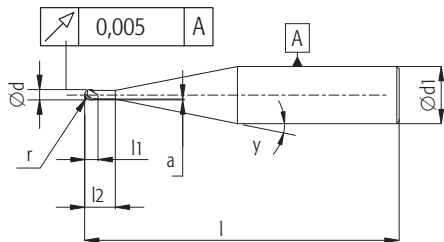
Shank 6 mm
Schaft 6 mm

Remark ∞ = infinity,
no collision in projection
length area.

Bemerkung ∞ = unendlich,
keine Kollision in Länge
Projektionsfläche.

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMSK 2 002 064 06 03 L003	0,2	0,10	6	64	0,30	-	-	2	10	0,705	0,738	0,817	0,918
VHMSK 2 003 064 06 03 L005	0,3	0,15	6	64	0,50	-	-	2	10	1,228	1,288	1,428	1,608
VHMSK 2 003 064 06 03 L015	0,3	0,15	6	64	0,50	1,50	0,010	2	11	1,819	1,901	2,093	2,332
VHMSK 2 003 064 06 03 L030	0,3	0,15	6	64	0,50	3,00	0,010	2	12	3,390	3,535	3,868	4,274
VHMSK 2 004 064 06 03 L006	0,4	0,20	6	64	0,60	-	-	2	10	1,331	1,393	1,540	1,730
VHMSK 2 004 064 06 03 L020	0,4	0,20	6	64	0,60	2,00	0,010	2	11	2,340	2,446	2,692	2,999
VHMSK 2 004 064 06 03 L040	0,4	0,20	6	64	0,60	4,00	0,010	2	13	4,431	4,604	4,997	5,467
VHMSK 2 005 064 06 03 L008	0,5	0,25	6	64	0,80	-	-	2	10	1,539	1,610	1,777	1,993
VHMSK 2 005 064 06 03 L030	0,5	0,25	6	64	0,80	3,00	0,015	2	12	3,411	3,552	3,877	4,273
VHMSK 2 005 064 06 03 L060	0,5	0,25	6	64	0,80	6,00	0,015	2	15	6,524	6,742	7,229	7,795
VHMSK 2 005 064 06 03 L080	0,5	0,25	6	64	0,80	8,00	0,015	2	15	8,591	8,882	9,529	10,281
VHMSK 2 005 064 06 03 L100	0,5	0,25	6	64	0,80	10,00	0,015	2	15	10,658	11,021	11,828	12,768
VHMSK 2 006 064 06 03 L009	0,6	0,30	6	64	0,90	-	-	2	10	2,259	2,367	2,622	2,950
VHMSK 2 006 064 06 03 L020	0,6	0,30	6	64	0,90	2,00	0,025	2	11	2,517	2,626	2,881	3,199
VHMSK 2 006 064 06 03 L040	0,6	0,30	6	64	0,90	4,00	0,025	2	12	4,610	4,803	5,245	5,785
VHMSK 2 006 064 06 03 L060	0,6	0,30	6	64	0,90	6,00	0,025	2	15	6,697	6,919	7,416	7,993
VHMSK 2 006 064 06 03 L080	0,6	0,30	6	64	0,90	8,00	0,025	2	15	8,764	9,059	9,715	10,479
VHMSK 2 006 064 06 03 L100	0,6	0,30	6	64	0,90	10,00	0,025	2	15	10,831	11,198	12,015	12,965
VHMSK 2 008 064 06 03 L012	0,8	0,40	6	64	1,20	-	-	2	10	2,570	2,689	2,972	3,335
VHMSK 2 008 064 06 03 L025	0,8	0,40	6	64	1,20	2,50	0,025	2	11	3,036	3,166	3,469	3,847
VHMSK 2 008 064 06 03 L050	0,8	0,40	6	64	1,20	5,00	0,025	2	13	5,648	5,863	6,350	6,933
VHMSK 2 008 064 06 03 L080	0,8	0,40	6	64	1,20	8,00	0,025	2	15	8,761	9,052	9,700	10,455
VHMSK 2 008 064 06 03 L100	0,8	0,40	6	64	1,20	10,00	0,025	2	15	10,828	11,191	12,000	12,941
VHMSK 2 010 064 06 03 L015	1,0	0,50	6	64	1,50	-	-	2	9	2,866	3,013	3,369	3,842
VHMSK 2 010 064 06 03 L040	1,0	0,50	6	64	1,50	4,00	0,025	2	11	4,602	4,804	5,275	5,864
VHMSK 2 010 064 06 03 L060	1,0	0,50	6	64	1,50	6,00	0,025	2	14	6,685	6,918	7,441	8,057
VHMSK 2 010 064 06 03 L080	1,0	0,50	6	64	1,50	8,00	0,025	2	15	8,757	9,045	9,685	10,431
VHMSK 2 010 064 06 03 L100	1,0	0,50	6	64	1,50	10,00	0,025	2	15	10,825	11,184	11,985	12,917
VHMSK 2 010 064 06 03 L120	1,0	0,50	6	64	1,50	12,00	0,025	2	15	12,892	13,324	14,285	15,403
VHMSK 2 010 064 06 03 L150	1,0	0,50	6	64	1,50	15,00	0,025	2	15	15,993	16,533	17,734	19,133
VHMSK 2 010 064 06 03 L200	1,0	0,50	6	64	1,50	20,00	0,025	2	15	21,161	21,881	23,484	25,348
VHMSK 2 010 064 06 03 L250	1,0	0,50	6	64	1,50	25,00	0,025	2	15	26,330	27,230	29,233	31,564
VHMSK 2 012 064 06 03 L018	1,2	0,60	6	64	1,80	-	-	2	9	3,874	4,077	4,568	5,223
VHMSK 2 012 064 06 03 L040	1,2	0,60	6	64	1,80	4,00	0,025	2	11	4,799	5,006	5,488	6,090
VHMSK 2 012 064 06 03 L060	1,2	0,60	6	64	1,80	6,00	0,025	2	13	6,917	7,175	7,761	8,463
VHMSK 2 012 064 06 03 L080	1,2	0,60	6	64	1,80	8,00	0,025	2	15	9,026	9,320	9,973	10,734
VHMSK 2 012 064 06 03 L120	1,2	0,60	6	64	1,80	12,00	0,025	2	15	13,161	13,598	14,573	15,706
VHMSK 2 012 064 06 03 L160	1,2	0,60	6	64	1,80	16,00	0,025	2	15	17,295	17,877	19,172	20,679

Standard



Shank 6 mm
Schaft 6 mm



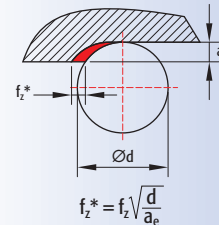
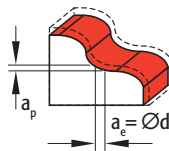
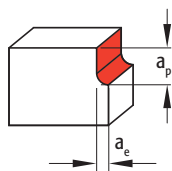
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMSK 2 015 064 06 03 L023	1,5	0,75	6	64	2,30	-	-	2	9	4,394	4,620	5,167	5,896
VHMSK 2 015 064 06 03 L040	1,5	0,75	6	64	2,30	4,00	0,020	2	10	4,749	4,968	5,490	6,158
VHMSK 2 015 064 06 03 L060	1,5	0,75	6	64	2,30	6,00	0,025	2	12	6,895	7,170	7,802	8,572
VHMSK 2 015 064 06 03 L080	1,5	0,75	6	64	2,30	8,00	0,025	2	15	9,021	9,309	9,951	10,697
VHMSK 2 015 064 06 03 L100	1,5	0,75	6	64	2,30	10,00	0,025	2	15	11,088	11,448	12,250	13,183
VHMSK 2 015 064 06 03 L120	1,5	0,75	6	64	2,30	12,00	0,025	2	15	13,156	13,588	14,550	15,670
VHMSK 2 015 064 06 03 L150	1,5	0,75	6	64	2,30	15,00	0,025	2	15	16,257	16,797	18,000	19,399
VHMSK 2 015 064 06 03 L200	1,5	0,75	6	64	2,30	20,00	0,025	2	15	21,425	22,145	23,749	25,615
VHMSK 2 015 064 06 03 L250	1,5	0,75	6	64	2,30	25,00	0,025	2	15	26,593	27,494	29,498	31,831
VHMSK 2 020 064 06 03 L030	2,0	1,00	6	64	3,00	-	-	2	8	5,105	5,396	6,122	7,139
VHMSK 2 020 064 06 03 L045	2,0	1,00	6	64	3,00	4,50	0,050	2	9	5,121	5,376	5,995	6,819
VHMSK 2 020 064 06 03 L060	2,0	1,00	6	64	3,00	6,00	0,050	2	11	7,008	7,305	7,995	8,857
VHMSK 2 020 064 06 03 L080	2,0	1,00	6	64	3,00	8,00	0,050	2	14	9,098	9,403	10,087	10,894
VHMSK 2 020 064 06 03 L100	2,0	1,00	6	64	3,00	10,00	0,050	2	15	11,176	11,531	12,320	13,239
VHMSK 2 020 064 06 03 L120	2,0	1,00	6	64	3,00	12,00	0,050	2	15	13,244	13,670	14,620	15,725
VHMSK 2 020 064 06 03 L160	2,0	1,00	6	64	3,00	16,00	0,050	2	15	17,378	17,949	19,219	20,697
VHMSK 2 020 064 06 03 L200	2,0	1,00	6	64	3,00	20,00	0,050	2	15	21,513	22,228	23,819	25,670
VHMSK 2 020 064 06 03 L250	2,0	1,00	6	64	3,00	25,00	0,050	2	15	26,681	27,576	29,568	31,886
VHMSK 2 020 064 06 03 L300	2,0	1,00	6	64	3,00	30,00	0,050	2	15	31,850	32,925	35,317	38,101
VHMSK 2 025 064 06 03 L030	2,5	1,25	6	64	3,00	-	-	2	7	5,078	5,395	6,219	7,454
VHMSK 2 025 064 06 03 L060	2,5	1,25	6	64	3,00	6,00	0,050	2	10	7,006	7,322	8,072	9,035
VHMSK 2 025 064 06 03 L080	2,5	1,25	6	64	3,00	8,00	0,050	2	12	9,082	9,433	10,237	11,219
VHMSK 2 025 064 06 03 L100	2,5	1,25	6	64	3,00	10,00	0,050	2	15	11,168	11,513	12,283	13,178
VHMSK 2 025 064 06 03 L120	2,5	1,25	6	64	3,00	12,00	0,050	2	15	13,235	13,653	14,582	15,664
VHMSK 2 025 064 06 03 L160	2,5	1,25	6	64	3,00	16,00	0,050	2	15	17,370	17,932	19,182	20,637
VHMSK 2 025 064 06 03 L200	2,5	1,25	6	64	3,00	20,00	0,050	2	15	21,505	22,210	23,781	25,609
VHMSK 2 025 064 06 03 L250	2,5	1,25	6	64	3,00	25,00	0,050	2	15	26,673	27,559	29,531	31,825
VHMSK 2 025 064 06 03 L300	2,5	1,25	6	64	3,00	30,00	0,050	2	15	31,841	32,907	35,280	∞
VHMSK 2 030 064 06 03 L030	3,0	1,50	6	64	3,00	-	-	2	6	5,057	5,412	6,385	8,006
VHMSK 2 030 064 06 03 L060	3,0	1,50	6	64	3,00	6,00	0,050	2	8	7,050	7,444	8,426	9,801
VHMSK 2 030 064 06 03 L080	3,0	1,50	6	64	3,00	8,00	0,050	2	10	9,097	9,514	10,504	11,775
VHMSK 2 030 064 06 03 L100	3,0	1,50	6	64	3,00	10,00	0,050	2	13	11,151	11,546	12,441	13,513
VHMSK 2 030 064 06 03 L120	3,0	1,50	6	64	3,00	12,00	0,050	2	15	13,227	13,635	14,545	15,603
VHMSK 2 030 064 06 03 L160	3,0	1,50	6	64	3,00	16,00	0,050	2	15	17,361	17,914	19,144	20,576
VHMSK 2 030 064 06 03 L200	3,0	1,50	6	64	3,00	20,00	0,050	2	15	21,496	22,193	23,744	25,548
VHMSK 2 030 064 06 03 L250	3,0	1,50	6	64	3,00	25,00	0,050	2	15	26,664	27,541	29,493	∞
VHMSK 2 030 064 06 03 L300	3,0	1,50	6	64	3,00	30,00	0,050	2	15	31,833	32,890	35,242	∞

Material group	TSR (N/mm²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	150 - 220	emulsion
P1.2	< 1000	< 300	120 - 180	emulsion
P1.3	< 1400	< 400	100 - 150	emulsion
H2.1		42-50 HRc	150 - 190	min.lub.
H2.2		50-55 HRc	100 - 140	min.lub.
H2.3		55-70 HRc	70 - 90	min.lub.
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

VHMSK20500640603L030
Material 1.2343 (52HRC)

v_c	56 m/min
n	36000 rpm
f_z	0,006 mm/t
vf	432 mm/min
a_p	0,01 mm
a_e	0,01 mm
Coolant	min. lubrication

- Finishing application.
Schlichtbearbeitung.
- Excellent surface finish.
Ausgezeichnete Oberflächenqualität.
- Save a polishing operation.
Erspart Nachpolieren.



Shoulder milling / Eckfräsen

	P	M	S
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,1	<0,06	<0,004	0,001 - 0,003
0,2	<0,12	<0,008	0,002 - 0,004
0,3	<0,18	<0,012	0,003 - 0,006
0,4	<0,24	<0,016	0,004 - 0,008
0,5	<0,30	<0,020	0,005 - 0,009
0,6	<0,36	<0,024	0,006 - 0,010
0,8	<0,48	<0,032	0,007 - 0,012
1,0	<0,60	<0,040	0,008 - 0,015
1,2	<0,72	<0,048	0,010 - 0,016
1,5	<0,90	<0,060	0,012 - 0,018
2,0	<1,20	<0,080	0,016 - 0,022
2,5	<1,50	<0,100	0,018 - 0,025
3,0	<1,80	<0,120	0,020 - 0,028

Shoulder milling / Eckfräsen

H2.1 / H2.2 / H2.3		
a _p max. (mm)	a _e max. (mm)	f _t (mm/tooth)
< 0,05	< 0,004	0,001 - 0,003
< 0,09	< 0,008	0,002 - 0,004
< 0,14	< 0,012	0,003 - 0,006
< 0,18	< 0,016	0,004 - 0,008
< 0,23	< 0,020	0,005 - 0,009
< 0,27	< 0,024	0,006 - 0,010
< 0,36	< 0,032	0,007 - 0,012
< 0,45	< 0,040	0,008 - 0,015
< 0,54	< 0,048	0,010 - 0,016
< 0,68	< 0,060	0,012 - 0,018
< 0,90	< 0,080	0,016 - 0,022
< 1,13	< 0,100	0,018 - 0,025
< 1,35	< 0,120	0,020 - 0,028

Slot milling / Nutfräsen

	P	M	S
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,1	<0,03	0,100	0,001 - 0,002
0,2	<0,06	0,200	0,002 - 0,003
0,3	<0,09	0,300	0,003 - 0,005
0,4	<0,12	0,400	0,004 - 0,006
0,5	<0,15	0,500	0,005 - 0,008
0,6	<0,18	0,600	0,006 - 0,010
0,8	<0,24	0,800	0,008 - 0,012
1,0	<0,30	1,000	0,009 - 0,014
1,2	<0,36	1,200	0,010 - 0,016
1,5	<0,45	1,500	0,012 - 0,018
2,0	<0,60	2,000	0,016 - 0,022
2,5	<0,75	2,500	0,018 - 0,025
3,0	<0,90	3,000	0,020 - 0,028

Slot milling / Nutfräsen

H2.1 / H2.2 / H2.3		
a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
<0,02	0,100	0,001 - 0,002
<0,04	0,200	0,002 - 0,003
<0,06	0,300	0,003 - 0,005
<0,08	0,400	0,004 - 0,006
<0,10	0,500	0,005 - 0,008
<0,12	0,600	0,006 - 0,010
<0,16	0,800	0,008 - 0,012
<0,20	1,000	0,009 - 0,014
<0,24	1,200	0,010 - 0,016
<0,30	1,500	0,012 - 0,018
<0,40	2,000	0,016 - 0,022
<0,50	2,500	0,018 - 0,025
<0,60	3,000	0,020 - 0,028

- At shoulder milling, feed per tooth f_z* for lower a_e values should be converted according formula.

Beim Eckfräsen ist der Vorschub f_z* von der Schnittbreite a_e abhängig.

- Given conditions are based on VHMS, VHMSR and VHMSK endmills.

Angegebene Schnittwerte sind bezogen auf Schaftfräser VHMS, VHMSR und VHMSK.

- Without corner radius.

Ohne Eckenradius.

- For shoulder milling cutting speed Vc may be increased up to 30%.

Beim Eckfräsen kann die Schnittgeschwindigkeit Vc um 30% erhöht werden.

a _e	f _z *=
0,10 x d	f _z x 3
0,25 x d	f _z x 2
0,50 x d	f _z x 1

Keep the tool cool!

It's recommend to use coolant (emulsion, minimum lubrication, or air) if possible. Coolant contributes to improve tool life, surface finish and chip evacuation. Wenn möglich, empfehlen wir grundsätzlich mit Kühlung zu arbeiten (Emulsion, Minimalmengenschmierung oder Luft). Eine entsprechende Kühlung fördert die Späneabfuhr, verlängert die Werkzeugstandzeit und ermöglicht bessere Oberflächenqualitäten.

- ❶ From the front into the flutes for direct cooling.
Direkte Kühlmittelzufuhr an die Schneiden für den Kühlungseffekt.
- ❷ Pointed from the right hand side in the flutes to evacuate the chips.
Kühlmittelzufuhr von rechts in den Spankammern für die Spanabfuhr.

When to use, what kind of coolant:

Wann wird welches Kühlmedium eingesetzt:

Emulsion

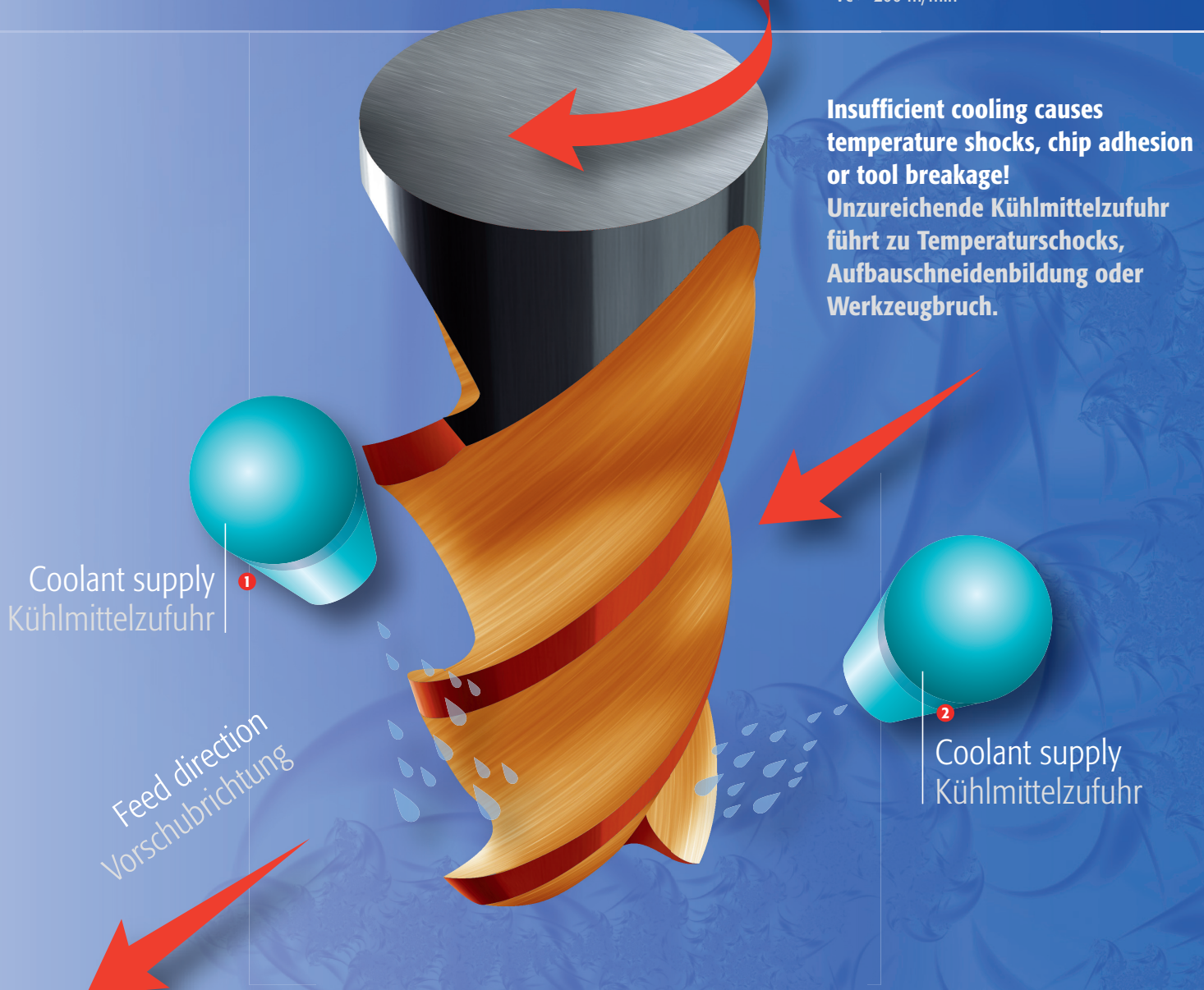
- Hardness less than 50 HRC
Härte bis 50 HRC
- $V_c < 200 \text{ m/min}$
 $V_c < 200 \text{ m/min}$
- Aluminium
Aluminium

- Exotic materials (Stainless Steel, Titanium, Hastelloy)
Exotische Werkstoffe (Nichtrostender Stahl, Titan, Hastelloy)
- Copper
Kupfer

Minimum Lubrication (Preference) Or Air Minimalmengenschmierung (1. Wahl) oder Luft

- Hardness over 50 HRC
Härte ab 50 HRC
- $V_c > 200 \text{ m/min}$
 $V_c > 200 \text{ m/min}$

- Graphite
Graphit
- Synthetics
Kunststoffe

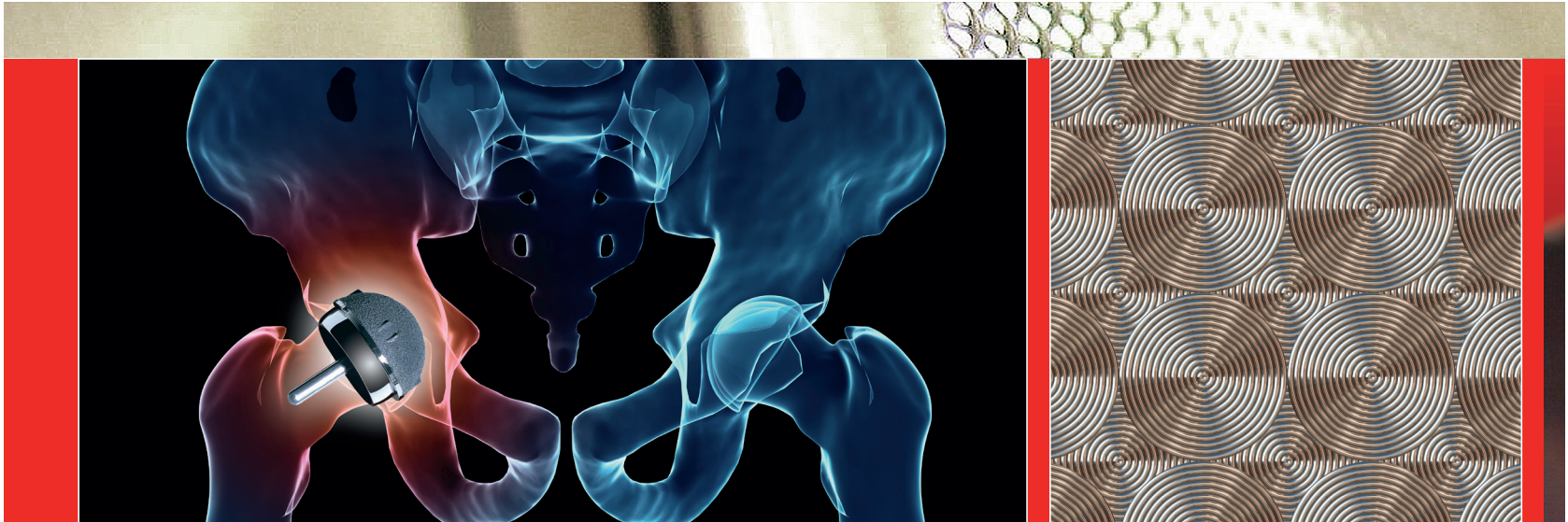


Milling exotic materials

Fräsen exotische Werkstoffe

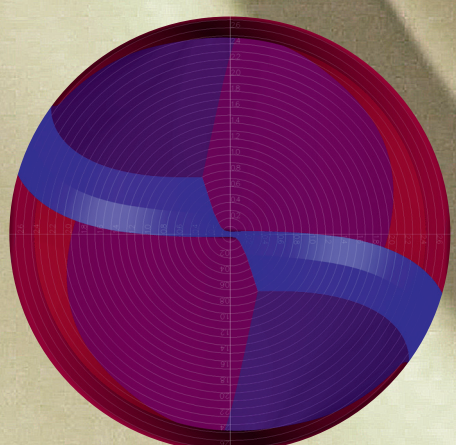
Most common problems to face / Häufig auftretende Probleme:

- Abrasiveness of the material.
Abrasivität des Materials.
- Resonance of the machine and/or workpiece.
Maschinen- und/oder Werkstückschwingungen.
- Vibrations of the workpiece and/or tool.
Werkstück- und/oder Werkzeugvibrationen.
- Burrs.
Grat Bildung.





HABM

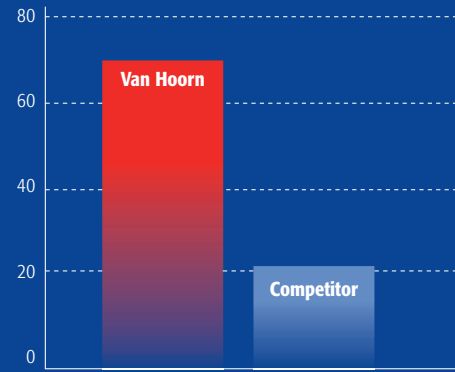


New centre

Workpiece Material: 3.7165

	Van Hoorn	Competitor
v_c	85 m/min	38 m/min
n	1691 rpm	600 rpm
F_z	0,080 mm/t	0,033 mm/t
Z	4	4
v_f	540 mm/min	80 mm/min
a_p	8 mm	16 mm
a_e	16 mm	16 mm
Coolant	emulsion	emulsion
Q	69,12 cm³/min	20,48 cm ³ /min

VHVTR Material removal rate



- Higher productivity with smooth edges
Höhere Produktivität durch glatte Schneiden
- Optimized center
Optimiertes Zentrum
- New generation coating
Neue Generation Beschichtung

VHC new generation endmills for machining exotic materials:

VHC neue Schaftfräser-Generation
für die Bearbeitung exotischer Werkstoffe:

- VHVTR: 4 and 5 Flute for roughing/semi finishing.
VHVTR: 4 und 5 Schneiden für Schrupp- / mittlere Bearbeitung.
- HAMF (L-XL): Multiple flute finishing.
HAMF (L-XL): Mehrschneidenfräser.
- HABM: Ballnose for finishing/semi finishing.
HABM: Vollradius für Schlicht- / mittlere Bearbeitung.

Original edge

Reinforced edge

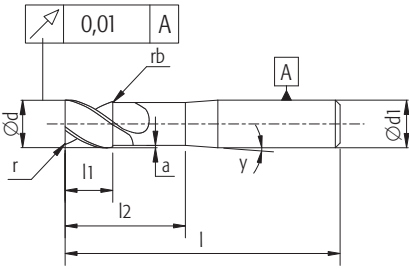
HAMF updated

- Specialized center for chip evacuation!
Spezieller Zentrum für Spänefluss!
- Extreme tool life improvement
Sehr hohe Standzeit Verbesserung

High performance

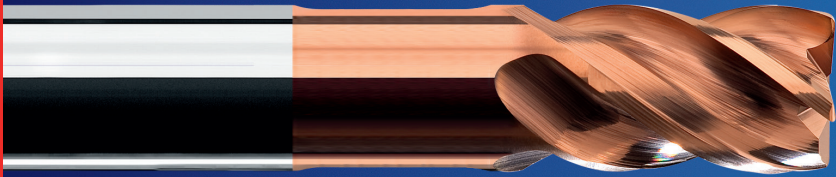


Short



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The new standard
in milling super
alloys!
Der neue Standard
in Fräsen von
Sonderlegierungen!



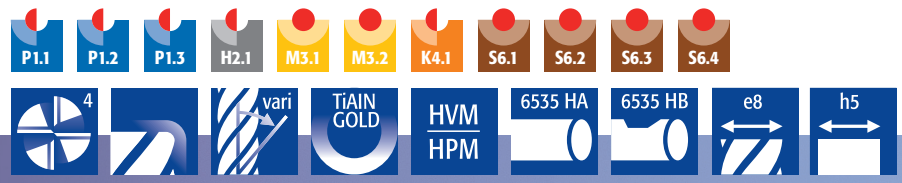
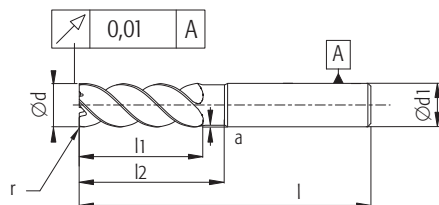
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Short									
VHVTR 4 030 039 06 03 S	3,0	0,20	6	39	5,0	7,0	0,10	4	15
VHVTR 4 040 051 06 03 S	4,0	0,20	6	51	6,0	9,0	0,10	4	15
VHVTR 4 050 051 06 03 S	5,0	0,20	6	51	7,0	11,0	0,20	4	15
VHVTR 4 060 064 06 03 S	6,0	0,30	6	64	8,0	13,0	0,20	4	-
VHVTR 4 060 064 06 03 050 S	6,0	0,50	6	64	8,0	13,0	0,20	4	-
VHVTR 4 060 064 06 03 100 S	6,0	1,00	6	64	8,0	13,0	0,20	4	-
VHVTR 4 080 064 08 03 030 S	8,0	0,30	8	64	11,0	18,0	0,30	4	-
VHVTR 4 080 064 08 03 050 S	8,0	0,50	8	64	11,0	18,0	0,30	4	-
VHVTR 4 080 064 08 03 100 S	8,0	1,00	8	64	11,0	18,0	0,30	4	-
VHVTR 4 100 070 10 03 030 S	10,0	0,30	10	70	13,0	22,0	0,30	4	-
VHVTR 4 100 070 10 03 050 S	10,0	0,50	10	70	13,0	22,0	0,30	4	-
VHVTR 4 100 070 10 03 100 S	10,0	1,00	10	70	13,0	22,0	0,30	4	-
VHVTR 4 120 078 12 03 030 S	12,0	0,30	12	78	15,0	25,0	0,30	4	-
VHVTR 4 120 078 12 03 050 S	12,0	0,50	12	78	15,0	25,0	0,30	4	-
VHVTR 4 120 078 12 03 100 S	12,0	1,00	12	78	15,0	25,0	0,30	4	-
VHVTR 4 140 089 14 03 100 S	14,0	1,00	14	89	17,0	30,0	0,30	4	-
VHVTR 4 160 089 16 03 050 S	16,0	0,50	16	89	19,0	35,0	0,30	4	-
VHVTR 4 160 089 16 03 100 S	16,0	1,00	16	89	19,0	35,0	0,30	4	-
VHVTR 4 200 102 20 03 050 S	20,0	0,50	20	102	23,0	42,0	0,40	4	-
VHVTR 4 200 102 20 03 100 S	20,0	1,00	20	102	23,0	42,0	0,40	4	-
VHVTR 4 250 120 25 03 050 S	25,0	0,50	25	120	28,0	45,0	0,40	4	-
VHVTR 4 250 120 25 03 100 S	25,0	1,00	25	120	28,0	45,0	0,40	4	-

new/neu

new/neu

new/neu

Standard



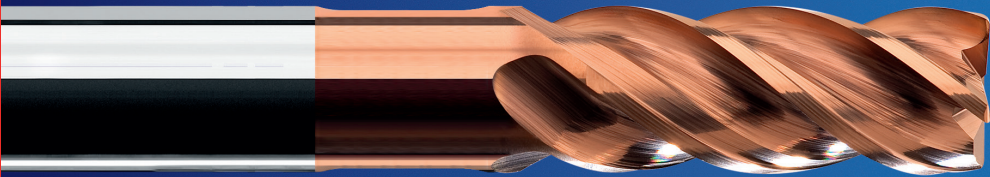
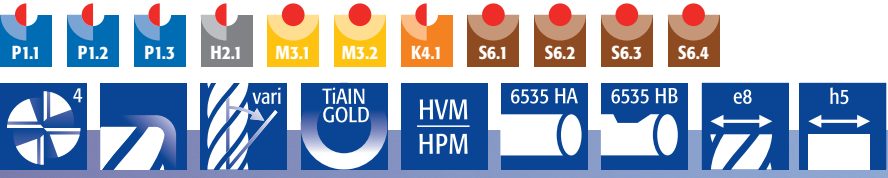
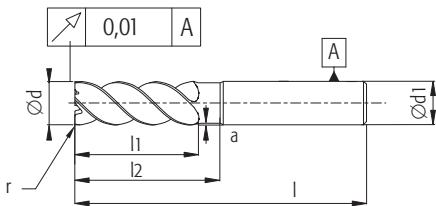
One tool for
roughing and
finishing!
Ein Fräser für
Schruppen und
Schlichten!



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHVTR 4 030 039 06 03	3,0	0,20	6	39	7,0	-	-	4	15
VHVTR 4 040 051 06 03	4,0	0,20	6	51	9,0	-	-	4	15
VHVTR 4 050 051 06 03	5,0	0,20	6	51	11,0	-	-	4	15
VHVTR 4 060 064 06 03	6,0	0,30	6	64	13,0	-	-	4	-
VHVTR 4 060 064 06 03 050	6,0	0,50	6	64	13,0	-	-	4	-
VHVTR 4 060 064 06 03 100	6,0	1,00	6	64	13,0	-	-	4	-
VHVTR 4 080 064 08 03 030	8,0	0,30	8	64	18,0	-	-	4	-
VHVTR 4 080 064 08 03 050	8,0	0,50	8	64	18,0	-	-	4	-
VHVTR 4 080 064 08 03 100	8,0	1,00	8	64	18,0	-	-	4	-
VHVTR 4 100 070 10 03 030	10,0	0,30	10	70	22,0	-	-	4	-
VHVTR 4 100 070 10 03 050	10,0	0,50	10	70	22,0	-	-	4	-
VHVTR 4 100 070 10 03 100	10,0	1,00	10	70	22,0	-	-	4	-
VHVTR 4 120 078 12 03 030	12,0	0,30	12	78	25,0	-	-	4	-
VHVTR 4 120 078 12 03 050	12,0	0,50	12	78	25,0	-	-	4	-
VHVTR 4 120 078 12 03 100	12,0	1,00	12	78	25,0	-	-	4	-
VHVTR 4 140 089 14 03 100	14,0	1,00	14	89	30,0	-	-	4	-
VHVTR 4 160 089 16 03 050	16,0	0,50	16	89	35,0	-	-	4	-
VHVTR 4 160 089 16 03 100	16,0	1,00	16	89	35,0	-	-	4	-
VHVTR 4 200 102 20 03 050	20,0	0,50	20	102	42,0	-	-	4	-
VHVTR 4 200 102 20 03 100	20,0	1,00	20	102	42,0	-	-	4	-
VHVTR 4 250 120 25 03 050	25,0	0,50	25	120	45,0	-	-	4	-
VHVTR 4 250 120 25 03 100	25,0	1,00	25	120	45,0	-	-	4	-

new/neu
new/neu

Neck relief



Wide range of
standard lengths!
Großes Programm
mit Standardmaße!

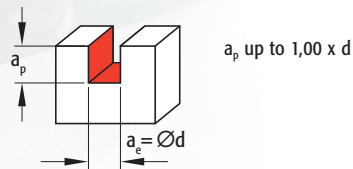
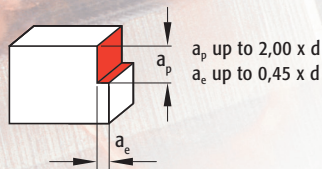
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
With neck relief										
VHVTR 4 030 039 06 03 020 L	3,0	0,20	6	39	7,0	9,0	0,10	4	15	
VHVTR 4 040 051 06 03 020 L	4,0	0,20	6	51	9,0	12,0	0,10	4	15	
VHVTR 4 050 051 06 03 020 L	5,0	0,20	6	51	11,0	15,0	0,20	4	15	
VHVTR 4 060 064 06 03 030 L	6,0	0,30	6	64	13,0	18,0	0,20	4	-	
VHVTR 4 060 064 06 03 050 L	6,0	0,50	6	64	13,0	18,0	0,20	4	-	
VHVTR 4 060 064 06 03 100 L	6,0	1,00	6	64	13,0	18,0	0,20	4	-	
VHVTR 4 080 064 08 03 030 L	8,0	0,30	8	64	18,0	24,0	0,30	4	-	
VHVTR 4 080 064 08 03 050 L	8,0	0,50	8	64	18,0	24,0	0,30	4	-	
VHVTR 4 080 064 08 03 100 L	8,0	1,00	8	64	18,0	24,0	0,30	4	-	
VHVTR 4 100 070 10 03 030 L	10,0	0,30	10	70	22,0	30,0	0,30	4	-	
VHVTR 4 100 070 10 03 050 L	10,0	0,50	10	70	22,0	30,0	0,30	4	-	
VHVTR 4 100 070 10 03 100 L	10,0	1,00	10	70	22,0	30,0	0,30	4	-	
VHVTR 4 120 083 12 03 030 L	12,0	0,30	12	83	25,0	36,0	0,30	4	-	new/neu
VHVTR 4 120 083 12 03 050 L	12,0	0,50	12	83	25,0	36,0	0,30	4	-	new/neu
VHVTR 4 120 083 12 03 100 L	12,0	1,00	12	83	25,0	36,0	0,30	4	-	new/neu
VHVTR 4 120 102 12 03 030 L	12,0	0,30	12	102	25,0	36,0	0,30	4	-	
VHVTR 4 120 102 12 03 050 L	12,0	0,50	12	102	25,0	36,0	0,30	4	-	
VHVTR 4 120 102 12 03 100 L	12,0	1,00	12	102	25,0	36,0	0,30	4	-	
VHVTR 4 140 102 14 03 100 L	14,0	1,00	14	102	30,0	42,0	0,30	4	-	
VHVTR 4 160 102 16 03 050 L	16,0	0,50	16	102	35,0	48,0	0,30	4	-	
VHVTR 4 160 102 16 03 100 L	16,0	1,00	16	102	35,0	48,0	0,30	4	-	
VHVTR 4 200 125 20 03 050 L	20,0	0,50	20	125	42,0	60,0	0,40	4	-	
VHVTR 4 200 125 20 03 100 L	20,0	1,00	20	125	42,0	60,0	0,40	4	-	
VHVTR 4 250 131 25 03 050 L	25,0	0,50	25	131	45,0	75,0	0,40	4	-	new/neu
VHVTR 4 250 131 25 03 100 L	25,0	1,00	25	131	45,0	75,0	0,40	4	-	new/neu

Cutting conditions / Schnittwertempfehlungen

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

High performance!

- Productivity
Produktivität
- Tool life
Standzeit
- Surface finish
Oberfläche Qualität



Shoulder milling / Eckfräsen (1xD depth of cut)

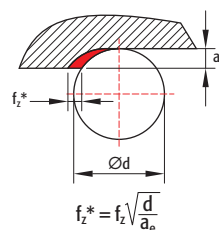
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	< 1,4	0,010 - 0,020
4,0	< 4,0	< 1,8	0,015 - 0,030
5,0	< 5,0	< 2,3	0,020 - 0,040
6,0	< 6,0	< 2,7	0,025 - 0,050
8,0	< 8,0	< 3,6	0,030 - 0,060
10,0	< 10,0	< 4,5	0,040 - 0,070
12,0	< 12,0	< 5,4	0,050 - 0,080
14,0	< 14,0	< 6,3	0,055 - 0,090
16,0	< 16,0	< 7,2	0,060 - 0,100
20,0	< 20,0	< 9,0	0,080 - 0,120
25,0	< 25,0	< 11,3	0,100 - 0,150

Shoulder milling / Eckfräsen (2xD depth of cut)

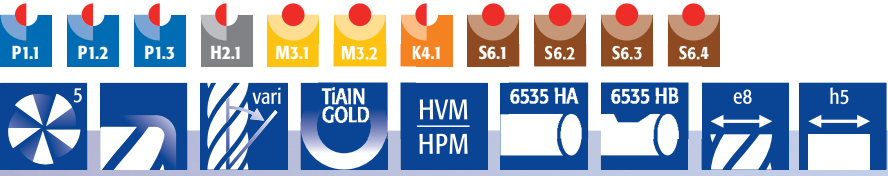
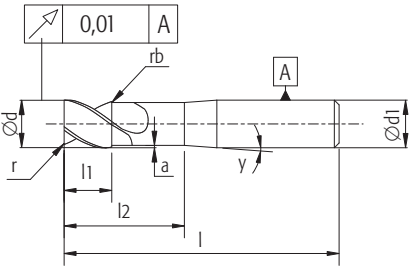
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 6,0	< 0,75	0,010 - 0,030
4,0	< 8,0	< 1,00	0,020 - 0,040
5,0	< 10,0	< 1,25	0,025 - 0,055
6,0	< 12,0	< 1,50	0,035 - 0,065
8,0	< 16,0	< 2,00	0,045 - 0,075
10,0	< 20,0	< 2,50	0,055 - 0,085
12,0	< 24,0	< 3,00	0,070 - 0,100
14,0	< 28,0	< 3,50	0,080 - 0,120
16,0	< 32,0	< 4,00	0,090 - 0,130
20,0	< 40,0	< 5,00	0,110 - 0,150
25,0	< 50,0	< 6,25	0,135 - 0,185

Slot milling / Nutfräsen

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	3,0	0,005 - 0,015
4,0	< 4,0	4,0	0,008 - 0,025
5,0	< 5,0	5,0	0,010 - 0,030
6,0	< 6,0	6,0	0,015 - 0,035
8,0	< 8,0	8,0	0,025 - 0,045
10,0	< 10,0	10,0	0,030 - 0,050
12,0	< 12,0	12,0	0,035 - 0,060
14,0	< 14,0	14,0	0,040 - 0,070
16,0	< 16,0	16,0	0,050 - 0,080
20,0	< 20,0	20,0	0,060 - 0,100
25,0	< 25,0	25,0	0,080 - 0,130



Short

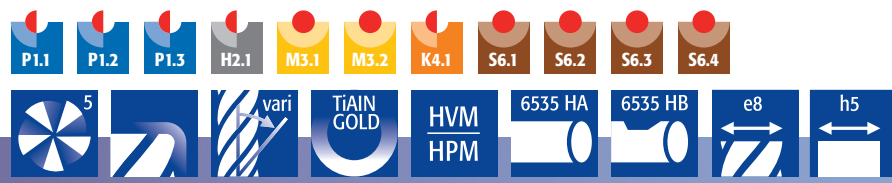
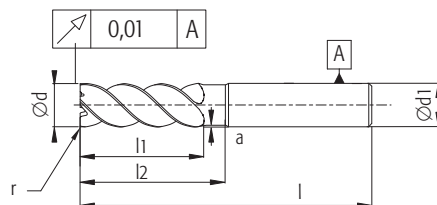


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Ideal tool for trochoidal milling super alloys!
Idealer Fräser für trochoidales Fräsen von Sonderlegierungen!

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Short										
VHVTR 5 030 039 06 03 S	3,0	0,20	6	39	5,0	7,0	0,100	4	15	new/neu
VHVTR 5 040 051 06 03 S	4,0	0,20	6	51	6,0	9,0	0,100	4	15	new/neu
VHVTR 5 050 051 06 03 S	5,0	0,20	6	51	7,0	11,0	0,200	4	15	new/neu
VHVTR 5 060 064 06 03 S	6,0	0,30	6	64	8,0	13,0	0,200	4	-	new/neu
VHVTR 5 060 064 06 03 050 S	6,0	0,50	6	64	8,0	13,0	0,200	4	-	new/neu
VHVTR 5 060 064 06 03 100 S	6,0	1,00	6	64	8,0	13,0	0,200	4	-	new/neu
VHVTR 5 080 064 08 03 030 S	8,0	0,30	8	64	11,0	18,0	0,300	4	-	new/neu
VHVTR 5 080 064 08 03 050 S	8,0	0,50	8	64	11,0	18,0	0,300	4	-	new/neu
VHVTR 5 080 064 08 03 100 S	8,0	1,00	8	64	11,0	18,0	0,300	4	-	new/neu
VHVTR 5 100 070 10 03 030 S	10,0	0,30	10	70	13,0	22,0	0,300	4	-	new/neu
VHVTR 5 100 070 10 03 050 S	10,0	0,50	10	70	13,0	22,0	0,300	4	-	new/neu
VHVTR 5 100 070 10 03 100 S	10,0	1,00	10	70	13,0	22,0	0,300	4	-	new/neu
VHVTR 5 120 078 12 03 030 S	12,0	0,30	12	78	15,0	25,0	0,300	4	-	new/neu
VHVTR 5 120 078 12 03 050 S	12,0	0,50	12	78	15,0	25,0	0,300	4	-	new/neu
VHVTR 5 120 078 12 03 100 S	12,0	1,00	12	78	15,0	25,0	0,300	4	-	new/neu
VHVTR 5 140 089 14 03 100 S	14,0	1,00	14	89	17,0	30,0	0,300	4	-	new/neu
VHVTR 5 160 089 16 03 050 S	16,0	0,50	16	89	19,0	35,0	0,300	5	-	
VHVTR 5 160 089 16 03 100 S	16,0	1,00	16	89	19,0	35,0	0,300	5	-	
VHVTR 5 200 102 20 03 050 S	20,0	0,50	20	102	23,0	42,0	0,400	5	-	new/neu
VHVTR 5 200 102 20 03 100 S	20,0	1,00	20	102	23,0	42,0	0,400	5	-	
VHVTR 5 250 120 25 03 050 S	25,0	0,50	25	120	28,0	45,0	0,400	5	-	
VHVTR 5 250 120 25 03 100 S	25,0	1,00	25	120	28,0	45,0	0,400	5	-	

Standard



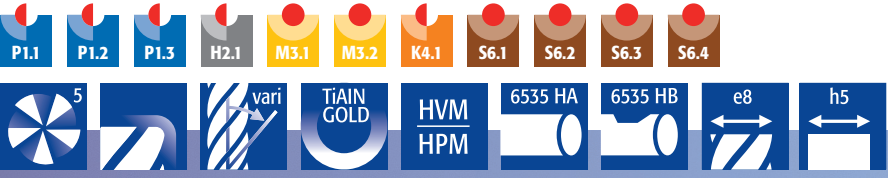
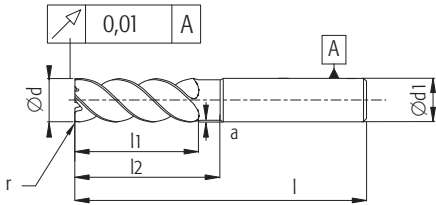
PAGE 65

Earn money by
improving your
production!
Geld sparen durch
Produktionsverbesserung!



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Standard										
VHVTR 5 030 039 06 03	3,0	0,20	6	39	7,0	-	-	5	15	new/neu
VHVTR 5 040 051 06 03	4,0	0,20	6	51	9,0	-	-	5	15	new/neu
VHVTR 5 050 051 06 03	5,0	0,20	6	51	11,0	-	-	5	15	new/neu
VHVTR 5 060 064 06 03	6,0	0,30	6	64	13,0	-	-	5	-	new/neu
VHVTR 5 060 064 06 03 050	6,0	0,50	6	64	13,0	-	-	5	-	new/neu
VHVTR 5 060 064 06 03 100	6,0	1,00	6	64	13,0	-	-	5	-	new/neu
VHVTR 5 080 064 08 03 030	8,0	0,30	8	64	18,0	-	-	5	-	new/neu
VHVTR 5 080 064 08 03 050	8,0	0,50	8	64	18,0	-	-	5	-	new/neu
VHVTR 5 080 064 08 03 100	8,0	1,00	8	64	18,0	-	-	5	-	new/neu
VHVTR 5 100 070 10 03 030	10,0	0,30	10	70	22,0	-	-	5	-	new/neu
VHVTR 5 100 070 10 03 050	10,0	0,50	10	70	22,0	-	-	5	-	new/neu
VHVTR 5 100 070 10 03 100	10,0	1,00	10	70	22,0	-	-	5	-	new/neu
VHVTR 5 120 078 12 03 030	12,0	0,30	12	78	25,0	-	-	5	-	new/neu
VHVTR 5 120 078 12 03 050	12,0	0,50	12	78	25,0	-	-	5	-	new/neu
VHVTR 5 120 078 12 03 100	12,0	1,00	12	78	25,0	-	-	5	-	new/neu
VHVTR 5 140 089 14 03 100	14,0	1,00	14	89	30,0	-	-	5	-	new/neu
VHVTR 5 160 089 16 03 050	16,0	0,50	16	89	35,0	-	-	5	-	
VHVTR 5 160 089 16 03 100	16,0	1,00	16	89	35,0	-	-	5	-	
VHVTR 5 200 102 20 03 050	20,0	0,50	20	102	42,0	-	-	5	-	
VHVTR 5 200 102 20 03 100	20,0	1,00	20	102	42,0	-	-	5	-	
VHVTR 5 250 120 25 03 050	25,0	0,50	25	120	45,0	-	-	5	-	
VHVTR 5 250 120 25 03 100	25,0	1,00	25	120	45,0	-	-	5	-	

Neck relief



VHVTR the best
you can get!
VHVTR das Beste
im Markt!

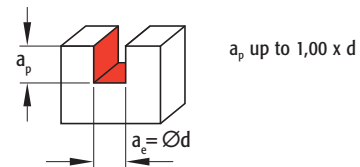
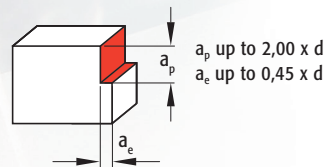
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
With neck relief										
VHVTR 5 030 039 06 03 020 L	3,0	0,20	6	39	8,0	9,0	0,100	5	15	new/neu
VHVTR 5 040 051 06 03 020 L	4,0	0,20	6	51	10,0	12,0	0,100	5	15	new/neu
VHVTR 5 050 051 06 03 020 L	5,0	0,20	6	51	12,0	15,0	0,200	5	15	new/neu
VHVTR 5 060 064 06 03 030 L	6,0	0,30	6	64	14,0	18,0	0,200	5	-	new/neu
VHVTR 5 060 064 06 03 050 L	6,0	0,50	6	64	14,0	18,0	0,200	5	-	new/neu
VHVTR 5 060 064 06 03 100 L	6,0	1,00	6	64	14,0	18,0	0,200	5	-	new/neu
VHVTR 5 080 064 08 03 030 L	8,0	0,30	8	64	18,0	24,0	0,300	5	-	new/neu
VHVTR 5 080 064 08 03 050 L	8,0	0,50	8	64	18,0	24,0	0,300	5	-	new/neu
VHVTR 5 080 064 08 03 100 L	8,0	1,00	8	64	18,0	24,0	0,300	5	-	new/neu
VHVTR 5 100 070 10 03 030 L	10,0	0,30	10	70	22,0	30,0	0,300	5	-	new/neu
VHVTR 5 100 070 10 03 050 L	10,0	0,50	10	70	22,0	30,0	0,300	5	-	new/neu
VHVTR 5 100 070 10 03 100 L	10,0	1,00	10	70	22,0	30,0	0,300	5	-	new/neu
VHVTR 5 120 102 12 03 030 L	12,0	0,30	12	102	26,0	36,0	0,300	5	-	new/neu
VHVTR 5 120 102 12 03 050 L	12,0	0,50	12	102	26,0	36,0	0,300	5	-	new/neu
VHVTR 5 120 102 12 03 100 L	12,0	1,00	12	102	26,0	36,0	0,300	5	-	new/neu
VHVTR 5 140 102 14 03 100 L	14,0	1,00	14	102	30,0	42,0	0,300	5	-	new/neu
VHVTR 5 160 102 16 03 050 L	16,0	0,50	16	102	35,0	48,0	0,300	5	-	
VHVTR 5 160 102 16 03 100 L	16,0	1,00	16	102	35,0	48,0	0,300	5	-	
VHVTR 5 200 125 20 03 050 L	20,0	0,50	20	125	42,0	60,0	0,400	5	-	
VHVTR 5 200 125 20 03 100 L	20,0	1,00	20	125	42,0	60,0	0,400	5	-	
VHVTR 5 250 131 25 03 050 L	25,0	0,50	25	131	45,0	75,0	0,400	5	-	
VHVTR 5 250 131 25 03 100 L	25,0	1,00	25	131	45,0	75,0	0,400	5	-	

Cutting conditions / Schnittwertempfehlungen

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed V _c m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

High performance!

- Productivity
Produktivität
- Tool life
Standzeit
- Surface finish
Oberfläche Qualität

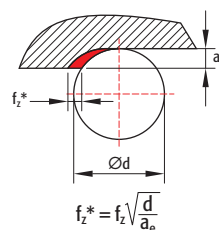


Shoulder milling / Eckfräsen (1xD depth of cut)

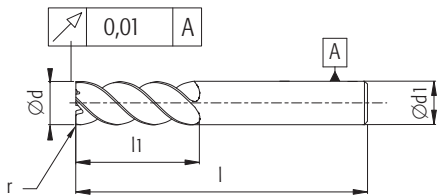
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	< 1,4	0,010 - 0,020
4,0	< 4,0	< 1,8	0,015 - 0,030
5,0	< 5,0	< 2,3	0,020 - 0,040
6,0	< 6,0	< 2,7	0,025 - 0,050
8,0	< 8,0	< 3,6	0,030 - 0,060
10,0	< 10,0	< 4,5	0,040 - 0,070
12,0	< 12,0	< 5,4	0,050 - 0,080
14,0	< 14,0	< 6,3	0,055 - 0,090
16,0	< 16,0	< 7,2	0,060 - 0,100
20,0	< 20,0	< 9,0	0,080 - 0,120
25,0	< 25,0	< 11,3	0,100 - 0,150

Shoulder milling / Eckfräsen (2xD depth of cut)

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 6,0	< 0,75	0,010 - 0,030
4,0	< 8,0	< 1,00	0,020 - 0,040
5,0	< 10,0	< 1,25	0,025 - 0,055
6,0	< 12,0	< 1,50	0,035 - 0,065
8,0	< 16,0	< 2,00	0,045 - 0,075
10,0	< 20,0	< 2,50	0,055 - 0,085
12,0	< 24,0	< 3,00	0,070 - 0,100
14,0	< 28,0	< 3,50	0,080 - 0,120
16,0	< 32,0	< 4,00	0,090 - 0,130
20,0	< 40,0	< 5,00	0,110 - 0,150
25,0	< 50,0	< 6,25	0,135 - 0,185



Standard



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
HAMF 6 060 064 06 03 030	6,0	0,3	6	64	15,0	-	-	6	-
HAMF 6 080 064 08 03 050	8,0	0,5	8	64	20,0	-	-	6	-
HAMF 6 100 078 10 03 050	10,0	0,5	10	78	22,0	-	-	6	-
HAMF 6 120 078 12 03 050	12,0	0,5	12	78	28,0	-	-	6	-
HAMF 6 160 089 16 03 050	16,0	0,5	16	89	34,0	-	-	6	-
HAMF 8 200 102 20 03 050	20,0	0,5	20	102	42,0	-	-	8	-
Long									
HAMFL 6 060 064 06 03 030	6,0	0,3	6	64	20,0	-	-	6	-
HAMFL 6 080 078 08 03 050	8,0	0,5	8	78	30,0	-	-	6	-
HAMFL 6 100 089 10 03 050	10,0	0,5	10	89	35,0	-	-	6	-
HAMFL 6 120 102 12 03 050	12,0	0,5	12	102	40,0	-	-	6	-
HAMFL 6 160 102 16 03 050	16,0	0,5	16	102	50,0	-	-	6	-
HAMFL 8 200 125 20 03 050	20,0	0,5	20	125	60,0	-	-	8	-
Extra long									
HAMFXL 6 080 102 08 03 050	8,0	0,5	8	102	40,0	-	-	6	-
HAMFXL 6 100 125 10 03 050	10,0	0,5	10	125	60,0	-	-	6	-
HAMFXL 6 120 150 12 03 050	12,0	0,5	12	150	65,0	-	-	6	-
HAMFXL 6 160 150 16 03 050	16,0	0,5	16	150	75,0	-	-	6	-
HAMFXL 8 200 150 20 03 050	20,0	0,5	20	150	80,0	-	-	8	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

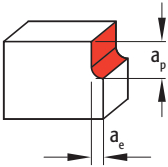
**Super smooth
surface finish**
Super glatte
Oberflächenqualität

HAMFL82001252003050
Material 1.4401 stainless 316

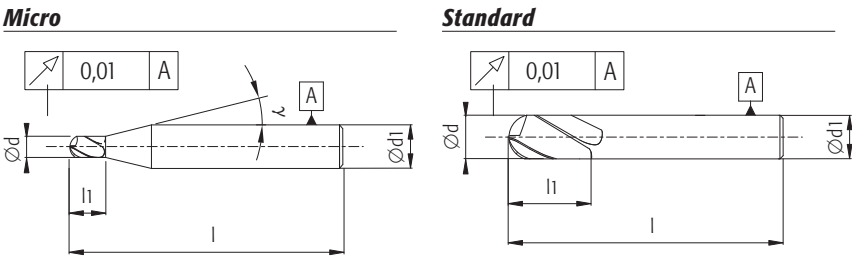
Vc	100 m/min
n	3979 rpm
fz	0,03 mm/t
vf	950 mm/min
ap	40 mm
ae	0,2 mm
Coolant	emulsion

Q 7,6 cm³/min

- Superior surface finish!
Hervorragende Oberflächenqualität!
- Excellent straightness tolerances.
Ausgezeichnete Plantoleranzen.
- Cutting length up to 6 x D.
Schnitttiefen bis 6 x D.



Roughing / Schrubfräsen				Finishing / Schlichtfräsen			
Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	
6,0	< 20,0	< 0,48	0,035 - 0,055	< 20,0	< 0,12	0,020 - 0,040	
8,0	< 40,0	< 0,64	0,045 - 0,075	< 40,0	< 0,16	0,030 - 0,050	
10,0	< 60,0	< 0,80	0,070 - 0,090	< 60,0	< 0,20	0,040 - 0,060	
12,0	< 65,0	< 0,96	0,080 - 0,110	< 65,0	< 0,24	0,050 - 0,080	
16,0	< 75,0	< 1,28	0,100 - 0,140	< 75,0	< 0,32	0,070 - 0,100	
20,0	< 80,0	< 1,60	0,120 - 0,180	< 80,0	< 0,40	0,085 - 0,120	



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
HABM 2 004 051 04 03	0,4	0,20	4	51	0,60	-	-	2	10
HABM 2 005 051 04 03	0,5	0,25	4	51	0,90	-	-	2	10
HABM 2 006 051 04 03	0,6	0,30	4	51	1,20	-	-	2	10
HABM 2 008 051 04 03	0,8	0,40	4	51	1,50	-	-	2	10
HABM 2 010 051 04 03	1,0	0,50	4	51	2,00	-	-	2	15
HABM 2 015 051 04 03	1,5	0,75	4	51	3,00	-	-	2	15
HABM 2 020 051 04 03	2,0	1,00	4	51	4,00	-	-	2	15
HABM 2 030 051 04 03	3,0	1,50	4	51	6,00	-	-	2	15
HABM 2 040 057 06 03	4,0	2,00	6	57	8,00	-	-	2	15
HABM 2 050 057 06 03	5,0	2,50	6	57	10,00	-	-	2	15
HABM 2 060 057 06 03	6,0	3,00	6	57	12,00	-	-	2	-
HABM 2 080 063 08 03	8,0	4,00	8	63	16,00	-	-	2	-
HABM 2 100 072 10 03	10,0	5,00	10	72	20,00	-	-	2	-
HABM 2 120 083 12 03	12,0	6,00	12	83	24,00	-	-	2	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

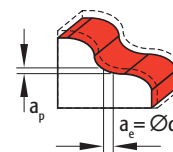
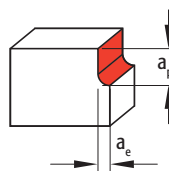
HABM20801000803

Material 1.4462 Duplex

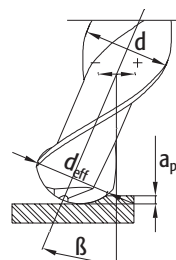
Vc	120 m/min
n	4775 rpm
fz	0,04 mm/t
vf	385 mm/min
ap	0,1 mm
ae	0,1 mm
Coolant	emulsion

Toollife 2,5 Hours

- Improved toollife.
Erhöhte Standzeit.
- Better surface finish.
Bessere Oberflächenqualität.



Roughing / Schrubfräsen				Finishing / Schlichtfräsen			
Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	
0,4	< 0,60	< 0,12	0,004 - 0,008	< 0,60	< 0,04	0,007 - 0,015	
0,5	< 0,75	< 0,15	0,005 - 0,009	< 0,75	< 0,05	0,010 - 0,020	
0,6	< 0,90	< 0,18	0,006 - 0,010	< 0,90	< 0,06	0,012 - 0,021	
0,8	< 1,20	< 0,24	0,007 - 0,012	< 1,20	< 0,08	0,014 - 0,023	
1,0	< 1,50	< 0,30	0,008 - 0,015	< 1,50	< 0,10	0,015 - 0,025	
1,5	< 2,25	< 0,45	0,012 - 0,018	< 2,25	< 0,15	0,020 - 0,030	
2,0	< 3,00	< 0,60	0,016 - 0,022	< 3,00	< 0,20	0,025 - 0,035	
3,0	< 4,50	< 0,90	0,018 - 0,025	< 4,50	< 0,30	0,028 - 0,040	
4,0	< 6,00	< 1,20	0,020 - 0,028	< 6,00	< 0,40	0,030 - 0,045	
5,0	< 7,50	< 1,50	0,025 - 0,035	< 7,50	< 0,50	0,035 - 0,050	
6,0	< 9,00	< 1,80	0,028 - 0,042	< 9,00	< 0,60	0,040 - 0,055	
8,0	< 12,00	< 2,40	0,030 - 0,050	< 12,00	< 0,80	0,050 - 0,065	
10,0	< 15,00	< 3,00	0,040 - 0,070	< 15,00	< 1,00	0,055 - 0,080	
12,0	< 18,00	< 3,60	0,050 - 0,080	< 18,00	< 1,20	0,065 - 0,090	



- For the cutting speed Vc calculation the effective cutting diameter d_{eff} has to be taken into account. See formula.
- Für die Berechnung der Schnittgeschwindigkeit muss der effektive Durchmesser d_{eff} berücksichtigt werden (siehe Formel).

$$\beta \neq 0: \quad d_{eff} = d \cdot \sin \left[\beta \pm \arccos \left(\frac{d - 2a_p}{d} \right) \right]$$

High volume milling or roughing?

HVM oder Schruppen?

Van Hoorn Carbide designed a program of HVM or roughing on a wide spectrum of applications and materials: Steels up to 50HRc, alloy steels, tool steels, stainless steels, carbon steel, cast iron as well as materials that contain Chrome (Cr) or Nickel (Ni).

Van Hoorn Carbide deckt mit seinem Produktprogramm ein weites Anwendungsspektrum in der HVM- und Schrubbearbeitung ab: Stähle bis 50 HRc, legierte Stähle, Werkzeugstähle, nichtrostende Stähle, Kohlenstoffstahl, Guss sowie Werkstoffe mit Chrom (Cr) oder Nickel (Ni) Anteilen.



VHTR / VHTS

- **Trochoidal milling for / Trochoidal Fräsen für**
 - **Stainless / Rostfrei**
 - **Titanium / Titanium**
 - **Steels / Stähle**
- **Efficient production!**
Effizienter Produktion!
- **Longer tool life!**
Hohe Standzeit!

VHVFF

Advantages / Vorteile:

- **Smooth cutting**
Reibungsloses Schneiden
- **Optimized surface finish**
Optimale Oberflächenqualität
- **High feed rate capabilities**
Hohe Vorschubgeschwindigkeiten
- **Reduction of operation times and tooling costs**
Reduzierung der Prozess- und Werkzeugkosten
- **Slot milling up to 1,5xD**
Nutenfräsen bis 1,5xD
- **Side milling: $A_e = 0,45xD$ with $A_p = 2xD$**
Eckfräsen: $A_e = 0,45xD$ mit $A_p = 2xD$

Ideal geometry to optimize chip flow and reduce cutting forces

Ideale Schneidengeometrie für Spanabfuhr und Reduzierung der Schnittkräfte

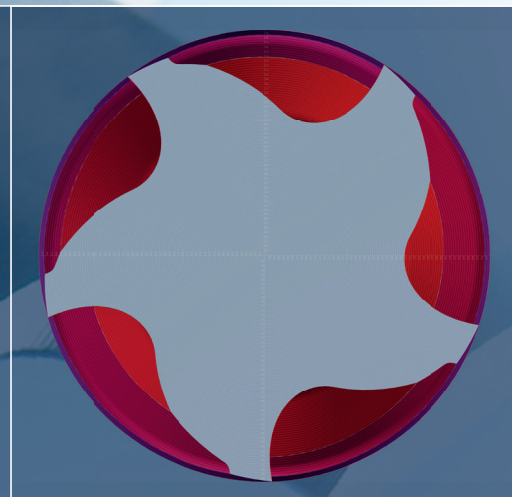
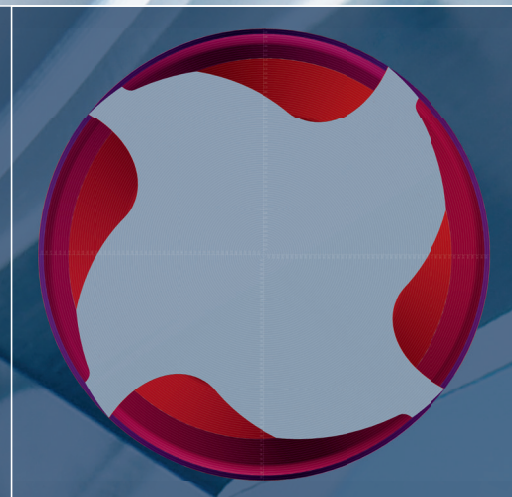
VHC High volume milling and roughing:

VHC HVM und Schruppbearbeitung:

- **VHVF: Sharp corner geometry.**
VHVF: Scharfe Schneidkanten-geometrie.
- **VHVFR: Corner radius.**
VHVFR: Eckenradius.
- **VHVFF: 3 and 4 flute, with chamfer.**
VHVFF: 3 und 4 Schneiden, mit Kantenfase.
- **VHRFF: Chamfer and with ripper profile.**
VHRFF: Kantenfase und Kordelprofil.
- **VHRS: 4 and 5 flute with corner radius.**
VHRS: 4 und 5 Schneiden, mit Eckenradius.
- **VHTR: Trochoidal end mill with chamfer.**
VHTR: Trochoidal Fräser mit Fase.
- **VHTS: Trochoidal end mill with chipbreaker.**
VHTS: Trochoidal Fräser für Stähle.

VHRS

- Suitable for material groups M and P
Verwendbar für Materialgruppe M und P
- Unequal tooth spacing
Ungleiche Zahnteilung
- Variable helix
Ungleicher Spiralwinkel
- Wide range of program
Sehr großes Programm
 - Short / Kurz
 - Standard / Standard
 - Long / Lang
 - 5 flute / 5 Schneiden

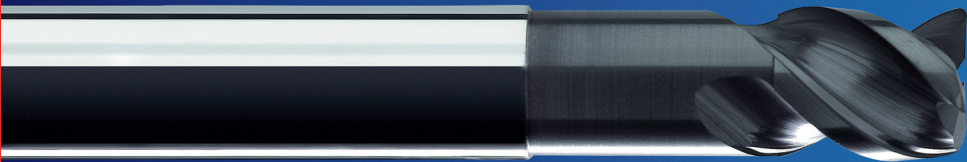
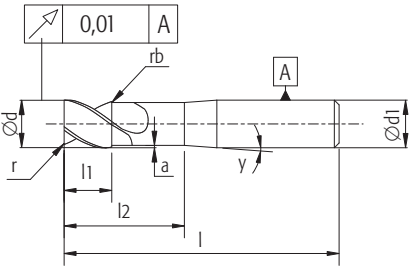


VHRS4

VHRS5



Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHVFR 3 020 039 03 03	2,0	0,20	3	39	3,00	10,00	0,050	3	15
VHVFR 3 030 039 03 03	3,0	0,20	3	39	4,00	10,00	0,050	3	-
VHVFR 3 040 051 06 03	4,0	0,20	6	51	5,00	12,00	0,100	3	15
VHVFR 3 040 064 06 03	4,0	0,20	6	64	5,00	12,00	0,100	3	15
VHVFR 3 050 051 06 03	5,0	0,20	6	51	6,00	14,00	0,150	3	15
VHVFR 3 050 064 06 03	5,0	0,20	6	64	6,00	14,00	0,150	3	15
VHVFR 3 060 064 06 03	6,0	0,30	6	64	7,00	16,00	0,200	3	-
VHVFR 3 080 064 08 03	8,0	0,50	8	64	9,00	20,00	0,300	3	-
VHVFR 3 100 070 10 03	10,0	0,50	10	70	12,00	25,00	0,300	3	-
VHVFR 3 120 078 12 03	12,0	0,50	12	78	15,00	30,00	0,300	3	-
VHVFR 3 160 089 16 03	16,0	0,50	16	89	18,00	38,00	0,300	3	-
with Weldon / mit Weldon									
VHVFRW 3 060 064 06 03	6,0	0,30	6	64	7,00	16,00	0,200	3	-
VHVFRW 3 080 064 08 03	8,0	0,50	8	64	9,00	20,00	0,300	3	-
VHVFRW 3 100 070 10 03	10,0	0,50	10	70	12,00	25,00	0,300	3	-
VHVFRW 3 120 078 12 03	12,0	0,50	12	78	15,00	30,00	0,300	3	-
VHVFRW 3 160 089 16 03	16,0	0,50	16	89	18,00	38,00	0,300	3	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

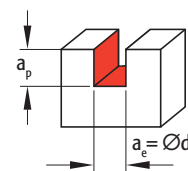
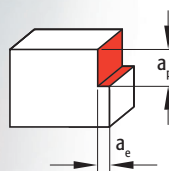
VHVFR30400510603

Workpiece Material: 1.4104

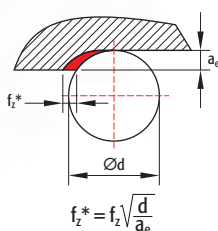
Hardness: 430F

	Van Hoorn	Competitor
v_c	130 m/min	120 m/min
n	10350 rpm	4774 rpm
F_z	0,05 mm/t	0,035 mm/t
v_f	1552 mm/min	500 mm/min
a_p	1,0 mm	8,0 mm
a_e	4,0 mm	1,0 mm
Coolant	emulsion	emulsion
Q	6,2 mm³/min	4,0 mm³/min

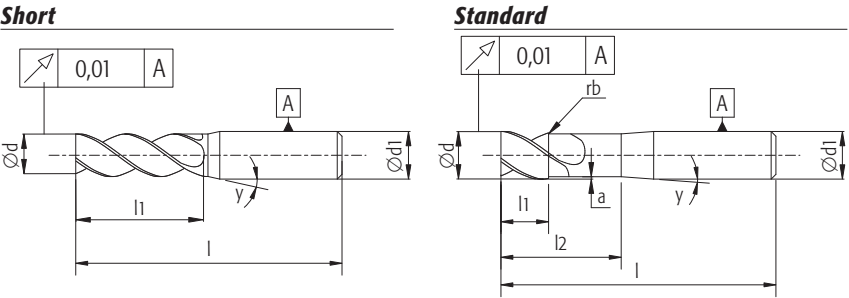
- Optimized chip removal.
Optimierte Spanabfuhr!
- Excellent Toollife!
Hervorragende Standzeit!
- Geometry for roughing - semi finishing.
Schneidengeometrien für Schrapp- und mittlere Bearbeitung.



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
2,0	< 2,0	< 0,9	0,008 - 0,015	< 2,0	2,0	0,003 - 0,010	
3,0	< 3,0	< 1,4	0,010 - 0,020	< 3,0	3,0	0,005 - 0,015	
4,0	< 4,0	< 1,8	0,015 - 0,030	< 4,0	4,0	0,008 - 0,025	
5,0	< 5,0	< 2,3	0,020 - 0,040	< 5,0	5,0	0,010 - 0,030	
6,0	< 6,0	< 2,7	0,025 - 0,050	< 6,0	6,0	0,015 - 0,035	
8,0	< 8,0	< 3,6	0,030 - 0,060	< 8,0	8,0	0,025 - 0,045	
10,0	< 10,0	< 4,5	0,040 - 0,070	< 10,0	10,0	0,030 - 0,050	
12,0	< 12,0	< 5,4	0,050 - 0,080	< 12,0	12,0	0,035 - 0,060	
14,0	< 14,0	< 6,3	0,055 - 0,090	< 14,0	14,0	0,040 - 0,070	
16,0	< 16,0	< 7,2	0,060 - 0,100	< 16,0	16,0	0,050 - 0,080	



- At shoulder milling, feed per tooth f_z* for lower a_e values should be converted according table.
Beim Eckfräsen ist der Vorschub f_z* von der Schnittbreite a_e abhängig.
- For finishing application Vc may be increase up to 20%.
Bei Schlichtoperationen sollte die Schnittgeschwindigkeit Vc um 20% erhöht werden.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHVF 3 020 039 03 03 S	2,0	-	3	39	4,00	8,00	0,050	3	15
VHVF 3 030 039 03 03 S	3,0	-	3	39	5,00	10,00	0,050	3	-
VHVF 3 040 051 04 03 S	4,0	-	4	51	6,00	12,00	0,100	3	-
VHVF 3 050 051 05 03 S	5,0	-	5	51	7,00	14,00	0,150	3	-
VHVF 3 060 064 06 03 S	6,0	-	6	64	8,00	16,00	0,200	3	-
VHVF 3 080 064 08 03 S	8,0	-	8	64	11,00	20,00	0,300	3	-
VHVF 3 100 070 10 03 S	10,0	-	10	70	13,00	22,00	0,300	3	-
VHVF 3 120 078 12 03 S	12,0	-	12	78	15,00	25,00	0,300	3	-
VHVF 3 160 089 16 03 S	16,0	-	16	89	19,00	35,00	0,300	3	-
with Weldon / mit Weldon									
VHVFW 3 060 064 06 03 S	6,0	-	6	64	8,00	16,00	0,200	3	-
VHVFW 3 080 064 08 03 S	8,0	-	8	64	11,00	20,00	0,300	3	-
VHVFW 3 100 070 10 03 S	10,0	-	10	70	13,00	22,00	0,300	3	-
VHVFW 3 120 078 12 03 S	12,0	-	12	78	15,00	25,00	0,300	3	-
VHVFW 3 160 089 16 03 S	16,0	-	16	89	19,00	35,00	0,300	3	-

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHVF 3 020 039 03 03	2,0	-	3	39	8,00	-	-	3	15
VHVF 3 030 039 03 03	3,0	-	3	39	10,00	-	-	3	-
VHVF 3 040 051 04 03	4,0	-	4	51	12,00	-	-	3	-
VHVF 3 050 051 05 03	5,0	-	5	51	14,00	-	-	3	-
VHVF 3 060 064 06 03	6,0	-	6	64	16,00	-	-	3	-
VHVF 3 080 064 08 03	8,0	-	8	64	20,00	-	-	3	-
VHVF 3 100 070 10 03	10,0	-	10	70	22,00	-	-	3	-
VHVF 3 120 078 12 03	12,0	-	12	78	25,00	-	-	3	-
VHVF 3 160 089 16 03	16,0	-	16	89	35,00	-	-	3	-
with Weldon / mit Weldon									
VHVFW 3 060 064 06 03	6,0	-	6	64	16,00	-	-	3	-
VHVFW 3 080 064 08 03	8,0	-	8	64	20,00	-	-	3	-
VHVFW 3 100 070 10 03	10,0	-	10	70	22,00	-	-	3	-
VHVFW 3 120 078 12 03	12,0	-	12	78	25,00	-	-	3	-
VHVFW 3 160 089 16 03	16,0	-	16	89	35,00	-	-	3	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

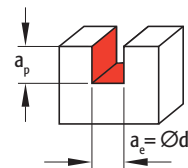
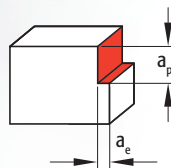
VHVF30300390303

Material 1.2311 not hardened

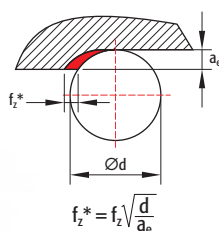
Vc	90 m/min
n	9550 rpm
f_z	0,008 mm/t
vf	230 mm/min
a_p	2,5 mm
a_e	3 mm
Coolant	emulsion

Q 1,73 cm³/min

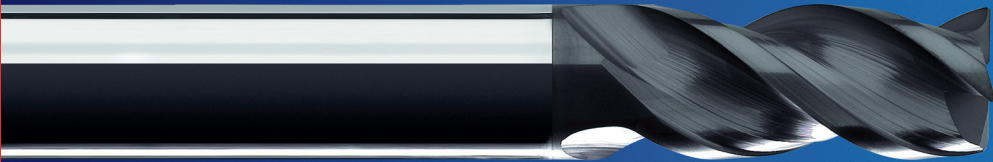
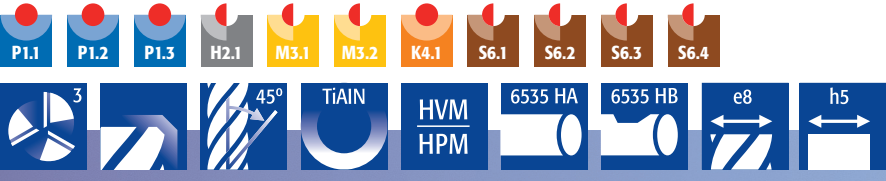
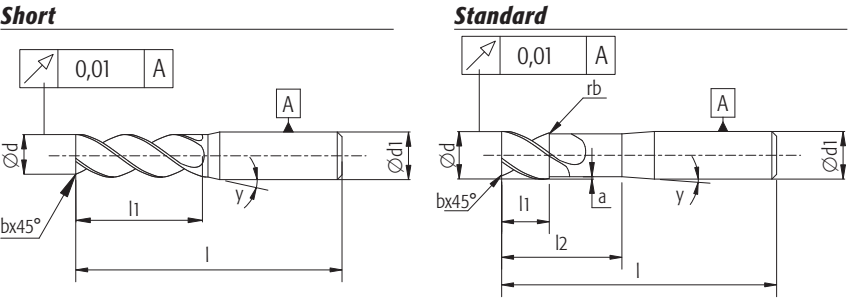
- Improved tool life.
Erhöhte Standzeit.
- No burrs.
Gratfrei.
- Optimized surface finish.
Optimierte Oberflächenqualität.



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
2,0	< 4,0	< 0,6	0,008 - 0,015	< 2,0	2,0	0,003 - 0,010	
3,0	< 6,0	< 0,9	0,010 - 0,020	< 3,0	3,0	0,005 - 0,015	
4,0	< 8,0	< 1,2	0,015 - 0,030	< 4,0	4,0	0,008 - 0,025	
5,0	< 10,0	< 1,5	0,020 - 0,040	< 5,0	5,0	0,010 - 0,030	
6,0	< 12,0	< 1,8	0,025 - 0,050	< 6,0	6,0	0,015 - 0,035	
8,0	< 16,0	< 2,4	0,030 - 0,060	< 8,0	8,0	0,025 - 0,045	
10,0	< 20,0	< 3,0	0,040 - 0,070	< 10,0	10,0	0,030 - 0,050	
12,0	< 24,0	< 3,6	0,050 - 0,080	< 12,0	12,0	0,035 - 0,060	
14,0	< 28,0	< 4,2	0,055 - 0,090	< 14,0	14,0	0,040 - 0,070	
16,0	< 32,0	< 4,8	0,060 - 0,100	< 16,0	16,0	0,050 - 0,080	



- Given conditions are based on VHVF endmills with chamfer. VHVF is with sharp corner.
Angewandte Schnittbedingungen beziehen sich auf VHVF Schaftfräser mit Kantenfase. VHVF Ausführung hat scharfe Schneidkanten.
- For finishing application Vc may be increased up to 20%.
Bei Schlichtoperationen sollte die Schnittgeschwindigkeit Vc um 20% erhöht werden.



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHVFF 3 020 039 03 03 S	2,0	0,10	3	39	4,00	8,00	0,050	3	15
VHVFF 3 030 039 03 03 S	3,0	0,10	3	39	5,00	10,00	0,050	3	-
VHVFF 3 040 051 04 03 S	4,0	0,10	4	51	6,00	12,00	0,100	3	-
VHVFF 3 050 051 05 03 S	5,0	0,15	5	51	7,00	14,00	0,150	3	-
VHVFF 3 060 064 06 03 S	6,0	0,15	6	64	8,00	16,00	0,200	3	-
VHVFF 3 080 064 08 03 S	8,0	0,20	8	64	11,00	20,00	0,300	3	-
VHVFF 3 100 070 10 03 S	10,0	0,20	10	70	13,00	22,00	0,300	3	-
VHVFF 3 120 078 12 03 S	12,0	0,25	12	78	15,00	25,00	0,300	3	-
VHVFF 3 160 089 16 03 S	16,0	0,25	16	89	19,00	35,00	0,300	3	-
Weldon / mit Weldon									
VHVFFW 3 060 064 06 03 S	6,0	0,15	6	64	8,00	16,00	0,200	3	-
VHVFFW 3 080 064 08 03 S	8,0	0,20	8	64	11,00	20,00	0,300	3	-
VHVFFW 3 100 070 10 03 S	10,0	0,20	10	70	13,00	22,00	0,300	3	-
VHVFFW 3 120 078 12 03 S	12,0	0,25	12	78	15,00	25,00	0,300	3	-
VHVFFW 3 160 089 16 03 S	16,0	0,25	16	89	19,00	35,00	0,300	3	-

Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHVFF 3 020 039 03 03	2,0	0,10	3	39	8,00	-	-	3	15
VHVFF 3 030 039 03 03	3,0	0,10	3	39	10,00	-	-	3	-
VHVFF 3 040 051 04 03	4,0	0,10	4	51	12,00	-	-	3	-
VHVFF 3 050 051 05 03	5,0	0,15	5	51	14,00	-	-	3	-
VHVFF 3 060 064 06 03	6,0	0,15	6	64	16,00	-	-	3	-
VHVFF 3 080 064 08 03	8,0	0,20	8	64	20,00	-	-	3	-
VHVFF 3 100 070 10 03	10,0	0,20	10	70	22,00	-	-	3	-
VHVFF 3 120 078 12 03	12,0	0,25	12	78	25,00	-	-	3	-
VHVFF 3 160 089 16 03	16,0	0,25	16	89	35,00	-	-	3	-
with Weldon / mit Weldon									
VHVFFW 3 060 064 06 03	6,0	0,15	6	64	16,00	-	-	3	-
VHVFFW 3 080 064 08 03	8,0	0,20	8	64	20,00	-	-	3	-
VHVFFW 3 100 070 10 03	10,0	0,20	10	70	22,00	-	-	3	-
VHVFFW 3 120 078 12 03	12,0	0,25	12	78	25,00	-	-	3	-
VHVFFW 3 160 089 1 603	16,0	0,25	16	89	35,00	-	-	3	-

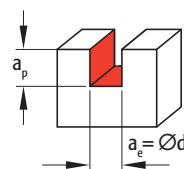
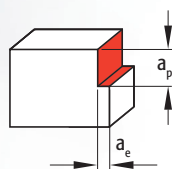
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

VHVFFW30800640803 Hardness: Stainless 304

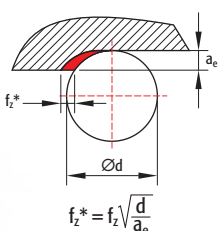
Vc	90 m/min
n	3580 rpm
fz	0,038 mm/t
vf	408 mm/min
ap	10,0 mm
ae	8,0 mm
Coolant	emulsion

Q 32,6 cm³/min

- Slotting application.
Nutenfräsen.
- No burrs.
Gratfrei.
- Excellent surface finish!
Ausgezeichnete Oberflächenqualität.

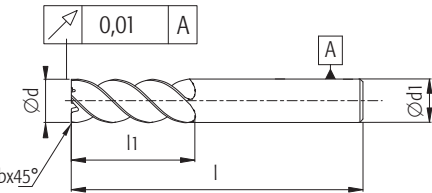


Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	
2,0	< 4,0	< 0,6	0,008 - 0,015	< 2,0	2,0	0,003 - 0,010	
3,0	< 6,0	< 0,9	0,010 - 0,020	< 3,0	3,0	0,005 - 0,015	
4,0	< 8,0	< 1,2	0,015 - 0,030	< 4,0	4,0	0,008 - 0,025	
5,0	< 10,0	< 1,5	0,020 - 0,040	< 5,0	5,0	0,010 - 0,030	
6,0	< 12,0	< 1,8	0,025 - 0,050	< 6,0	6,0	0,015 - 0,035	
8,0	< 16,0	< 2,4	0,030 - 0,060	< 8,0	8,0	0,025 - 0,045	
10,0	< 20,0	< 3,0	0,040 - 0,070	< 10,0	10,0	0,030 - 0,050	
12,0	< 24,0	< 3,6	0,050 - 0,080	< 12,0	12,0	0,035 - 0,060	
14,0	< 28,0	< 4,2	0,055 - 0,090	< 14,0	14,0	0,040 - 0,070	
16,0	< 32,0	< 4,8	0,060 - 0,100	< 16,0	16,0	0,050 - 0,080	

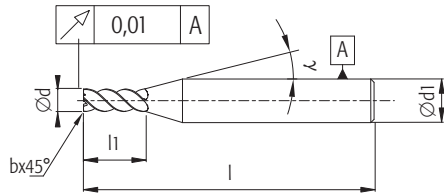


- Given conditions are based on VHVFF endmills with chamfer. VHVFF is with sharp corner.
Angegebene Schnittdaten beziehen sich auf VHVFF Schaftfräser mit Kantenfase. VHVFF Ausführung hat scharfe Schneidkanten.
- For finishing application Vc may be increased up to 20%.
Bei Schlichtoperationen sollte die Schnittgeschwindigkeit Vc um 20% erhöht werden.

Short



Standard



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHVFF 4 040 051 04 03 S	4,0	0,10	4	51	6,00	12,00	0,100	4	-
VHVFF 4 060 064 06 03 S	6,0	0,15	6	64	7,00	14,00	0,200	4	-
VHVFF 4 080 064 08 03 S	8,0	0,20	8	64	11,00	20,00	0,300	4	-
VHVFF 4 100 070 10 03 S	10,0	0,20	10	70	13,00	22,00	0,300	4	-
VHVFF 4 120 078 12 03 S	12,0	0,25	12	78	15,00	25,00	0,300	4	-
VHVFF 4 160 089 16 03 S	16,0	0,25	16	89	19,00	35,00	0,300	4	-
VHVFF 4 200 102 20 03 S	20,0	0,50	20	102	23,00	40,00	0,300	4	-
Weldon / mit Weldon									
VHVFFW 4 060 064 06 03 S	6,0	0,15	6	64	7,00	14,00	0,200	4	-
VHVFFW 4 080 064 08 03 S	8,0	0,20	8	64	11,00	20,00	0,300	4	-
VHVFFW 4 100 070 10 03 S	10,0	0,20	10	70	13,00	22,00	0,300	4	-
VHVFFW 4 120 078 12 03 S	12,0	0,25	12	78	15,00	25,00	0,300	4	-
VHVFFW 4 160 089 16 03 S	16,0	0,25	16	89	19,00	35,00	0,300	4	-
VHVFFW 4 200 102 20 03 S	20,0	0,50	20	102	23,00	40,00	0,300	4	-

Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHVFF 4 040 051 04 03	4,0	0,10	4	51	12,00	-	-	4	-
VHVFF 4 060 064 06 03	6,0	0,15	6	64	16,00	-	-	4	-
VHVFF 4 080 064 08 03	8,0	0,20	8	64	20,00	-	-	4	-
VHVFF 4 100 070 10 03	10,0	0,20	10	70	22,00	-	-	4	-
VHVFF 4 120 078 12 03	12,0	0,25	12	78	25,00	-	-	4	-
VHVFF 4 160 089 16 03	16,0	0,25	16	89	35,00	-	-	4	-
VHVFF 4 200 102 20 03	20,0	0,50	20	102	40,00	-	-	4	-
with Weldon / mit Weldon									
VHVFFW 4 060 064 06 03	6,0	0,15	6	64	16,00	-	-	4	-
VHVFFW 4 080 064 08 03	8,0	0,20	8	64	20,00	-	-	4	-
VHVFFW 4 100 070 10 03	10,0	0,20	10	70	22,00	-	-	4	-
VHVFFW 4 120 078 12 03	12,0	0,25	12	78	25,00	-	-	4	-
VHVFFW 4 160 089 16 03	16,0	0,25	16	89	35,00	-	-	4	-
VHVFFW 4 200 102 20 03	20,0	0,50	20	102	40,00	-	-	4	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

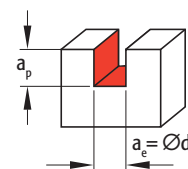
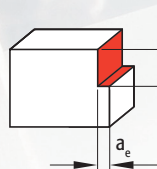
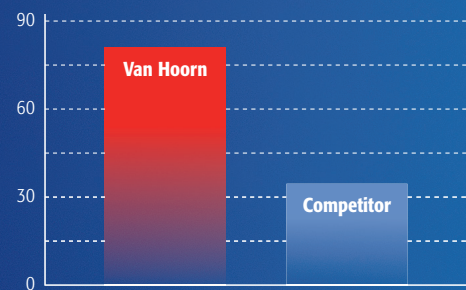
VHVFFW41000701003
Workpiece Material: 1.2316

	Van Hoorn	Competitor
v_c	140 m/min	120 m/min
n	4455 rpm	3820 rpm
F_z	0,045 mm/t	0,046 mm/t
v_f	800 mm/min	700 mm/min
a_p	10,0 mm	4,75 mm
a_e	10,0 mm	10,0 mm
Coolant	emulsion	emulsion

Q 80,0 mm³/min 33,25 mm³/min

No burrs on workpiece

Material removal rate Zerspanungsleistung



Shoulder milling / Eckfräsen (1xD depth of cut)

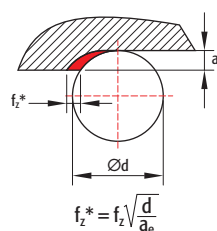
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
4,0	< 4,0	< 1,8	0,015 - 0,030
5,0	< 5,0	< 2,3	0,020 - 0,040
6,0	< 6,0	< 2,7	0,025 - 0,050
8,0	< 8,0	< 3,6	0,030 - 0,060
10,0	< 10,0	< 4,5	0,040 - 0,070
12,0	< 12,0	< 5,4	0,050 - 0,080
14,0	< 14,0	< 6,3	0,055 - 0,090
16,0	< 16,0	< 7,2	0,060 - 0,100
20,0	< 20,0	< 9,0	0,080 - 0,120

Shoulder milling / Eckfräsen (2xD depth of cut)

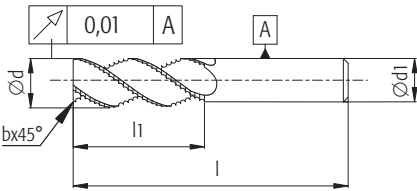
a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 8,00	< 1,000	0,020 - 0,040
< 10,00	< 1,250	0,025 - 0,055
< 12,00	< 1,500	0,035 - 0,065
< 16,00	< 2,000	0,045 - 0,075
< 20,00	< 2,500	0,055 - 0,085
< 24,00	< 3,000	0,070 - 0,100
< 28,00	< 3,500	0,080 - 0,120
< 32,00	< 4,000	0,090 - 0,130
< 40,00	< 5,000	0,110 - 0,150

Slot milling / Nutfräsen

a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 4,0	4,0	0,008 - 0,025
< 5,0	5,0	0,010 - 0,030
< 6,0	6,0	0,015 - 0,035
< 8,0	8,0	0,025 - 0,045
< 10,0	10,0	0,030 - 0,050
< 12,0	12,0	0,035 - 0,060
< 14,0	14,0	0,040 - 0,070
< 16,0	16,0	0,050 - 0,080
< 20,0	20,0	0,060 - 0,100



Standard



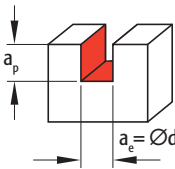
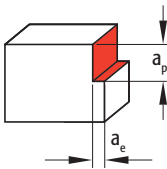
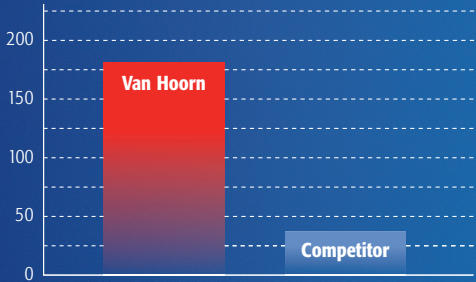
Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHRFF 3 060 064 06 03 025	6,0	0,25	6	64	16,00	-	-	3	-
VHRFF 3 080 064 08 03 050	8,0	0,50	8	64	20,00	-	-	3	-
VHRFF 3 100 070 10 03 050	10,0	0,50	10	70	22,00	-	-	3	-
VHRFF 3 120 078 12 03 050	12,0	0,50	12	78	25,00	-	-	3	-
VHRFF 3 140 089 14 03 100	14,0	1,00	14	89	25,00	-	-	3	-
VHRFF 3 160 089 16 03 100	16,0	1,00	16	89	32,00	-	-	3	-
VHRFF 4 200 102 20 03 100	20,0	1,00	20	102	40,00	-	-	4	-
with Weldon / mit Weldon									
VHRFFW 3 060 064 06 03 025	6,0	0,25	6	64	16,00	-	-	3	-
VHRFFW 3 080 064 08 03 050	8,0	0,50	8	64	20,00	-	-	3	-
VHRFFW 3 100 070 10 03 050	10,0	0,50	10	70	22,00	-	-	3	-
VHRFFW 3 120 078 12 03 050	12,0	0,50	12	78	25,00	-	-	3	-
VHRFFW 3 140 089 14 03 100	14,0	1,00	14	89	25,00	-	-	3	-
VHRFFW 3 160 089 16 03 100	16,0	1,00	16	89	32,00	-	-	3	-
VHRFFW 4 200 102 20 03 100	20,0	1,00	20	102	40,00	-	-	4	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed V _c m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

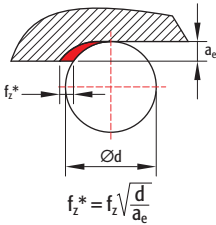
VHRFFW31600891603100
Workpiece Material: 1.0718
Hardness: 170 HB

	Van Hoorn	Competitor
v _c	250 m/min	250 m/min
n	4975 rpm	4975 rpm
F _z	0,20 mm/t	0,08 mm/t
v _f	3000 mm/min	1200 mm/min
a _p	20,0 mm	20,0 mm
a _e	3,0 mm	1,5 mm
Coolant	emulsion	emulsion
Q	180,0 mm ³ /min	36,0 mm ³ /min

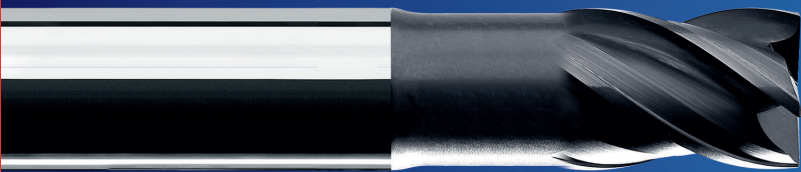
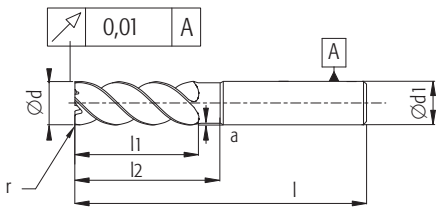
Material removal rate
Zerspanungsleistung



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
6,0	< 12,0	< 2,7	0,025 - 0,050	< 6,0	6,0	0,015 - 0,035	
8,0	< 16,0	< 3,6	0,030 - 0,060	< 8,0	8,0	0,025 - 0,045	
10,0	< 20,0	< 4,5	0,040 - 0,070	< 10,0	10,0	0,030 - 0,050	
12,0	< 24,0	< 5,4	0,050 - 0,080	< 12,0	12,0	0,035 - 0,060	
14,0	< 28,0	< 6,3	0,055 - 0,090	< 14,0	14,0	0,040 - 0,070	
16,0	< 32,0	< 7,2	0,060 - 0,100	< 16,0	16,0	0,050 - 0,080	
20,0	< 40,0	< 9,0	0,080 - 0,120	< 20,0	20,0	0,060 - 0,100	

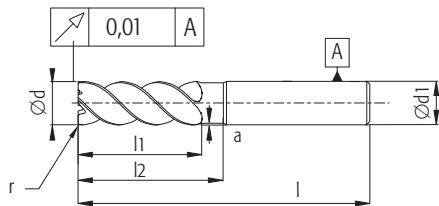


Short



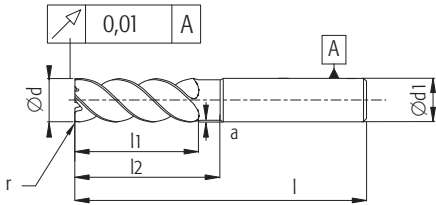
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Short / Kurze Ausführung										
VHRS 4 030 051 06 03 S	3,0	0,20	6	51	5,0	7,0	0,100	4	15	new/neu
VHRS 4 040 051 06 03 S	4,0	0,20	6	51	6,0	9,0	0,100	4	15	new/neu
VHRS 4 050 051 06 03 S	5,0	0,20	6	51	7,0	11,0	0,200	4	15	new/neu
VHRS 4 060 064 06 03 S	6,0	0,30	6	64	8,0	13,0	0,200	4	-	new/neu
VHRS 4 060 064 06 03 050 S	6,0	0,50	6	64	8,0	13,0	0,200	4	-	new/neu
VHRS 4 060 064 06 03 100 S	6,0	1,00	6	64	8,0	13,0	0,200	4	-	new/neu
VHRS 4 080 064 08 03 030 S	8,0	0,30	8	64	11,0	18,0	0,300	4	-	new/neu
VHRS 4 080 064 08 03 050 S	8,0	0,50	8	64	11,0	18,0	0,300	4	-	new/neu
VHRS 4 080 064 08 03 100 S	8,0	1,00	8	64	11,0	18,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 030 S	10,0	0,30	10	70	13,0	22,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 050 S	10,0	0,50	10	70	13,0	22,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 100 S	10,0	1,00	10	70	13,0	22,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 030 S	12,0	0,30	12	78	15,0	25,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 050 S	12,0	0,50	12	78	15,0	25,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 100 S	12,0	1,00	12	78	15,0	25,0	0,300	4	-	new/neu
VHRS 4 140 089 14 03 100 S	14,0	1,00	14	89	17,0	30,0	0,300	4	-	new/neu
VHRS 4 160 089 16 03 050 S	16,0	0,50	16	89	19,0	35,0	0,300	4	-	new/neu
VHRS 4 160 089 16 03 100 S	16,0	1,00	16	89	19,0	35,0	0,300	4	-	new/neu
VHRS 4 200 102 20 03 050 S	20,0	0,50	20	102	23,0	42,0	0,400	4	-	new/neu
VHRS 4 200 102 20 03 100 S	20,0	1,00	20	102	23,0	42,0	0,400	4	-	new/neu
VHRS 4 250 120 25 03 050 S	25,0	0,50	25	120	28,0	45,0	0,400	4	-	new/neu
VHRS 4 250 120 25 03 100 S	25,0	1,00	25	120	28,0	45,0	0,400	4	-	new/neu

Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Standard										
VHRS 4 030 051 06 03	3,0	0,20	6	51	7,0	-	-	4	15	new/neu
VHRS 4 040 051 06 03	4,0	0,20	6	51	9,0	-	-	4	15	new/neu
VHRS 4 050 051 06 03	5,0	0,20	6	51	11,0	-	-	4	15	new/neu
VHRS 4 060 064 06 03 030	6,0	0,30	6	64	13,0	-	-	4	-	new/neu
VHRS 4 060 064 06 03 050	6,0	0,50	6	64	13,0	-	-	4	-	new/neu
VHRS 4 060 064 06 03 100	6,0	1,00	6	64	13,0	-	-	4	-	new/neu
VHRS 4 080 064 08 03 030	8,0	0,30	8	64	18,0	-	-	4	-	new/neu
VHRS 4 080 064 08 03 050	8,0	0,50	8	64	18,0	-	-	4	-	new/neu
VHRS 4 080 064 08 03 100	8,0	1,00	8	64	18,0	-	-	4	-	new/neu
VHRS 4 100 070 10 03 030	10,0	0,30	10	70	22,0	-	-	4	-	new/neu
VHRS 4 100 070 10 03 050	10,0	0,50	10	70	22,0	-	-	4	-	new/neu
VHRS 4 100 070 10 03 100	10,0	1,00	10	70	22,0	-	-	4	-	new/neu
VHRS 4 120 078 12 03 030	12,0	0,30	12	78	25,0	-	-	4	-	new/neu
VHRS 4 120 078 12 03 050	12,0	0,50	12	78	25,0	-	-	4	-	new/neu
VHRS 4 120 078 12 03 100	12,0	1,00	12	78	25,0	-	-	4	-	new/neu
VHRS 4 140 089 14 03 050	14,0	0,50	14	89	30,0	-	-	4	-	new/neu
VHRS 4 160 089 16 03 050	16,0	0,50	16	89	35,0	-	-	4	-	new/neu
VHRS 4 160 089 16 03 100	16,0	1,00	16	89	35,0	-	-	4	-	new/neu
VHRS 4 200 102 20 03 050	20,0	0,50	20	102	42,0	-	-	4	-	new/neu
VHRS 4 200 102 20 03 100	20,0	1,00	20	102	42,0	-	-	4	-	new/neu
VHRS 4 250 120 25 03 050	25,0	0,50	25	120	28,0	-	-	4	-	new/neu
VHRS 4 250 120 25 03 100	25,0	1,00	25	120	45,0	-	-	4	-	new/neu

Neck relief



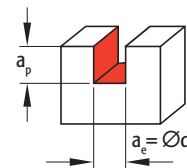
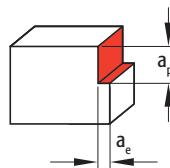
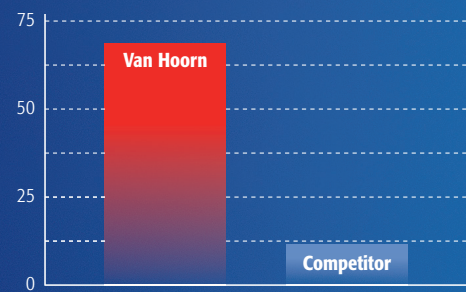
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
With neck relief										
VHRS 4 030 051 06 03 L	3,0	0,20	6	51	7,0	9,0	0,100	4	15	new/neu
VHRS 4 040 051 06 03 L	4,0	0,20	6	51	9,0	12,0	0,100	4	15	new/neu
VHRS 4 050 051 06 03 L	5,0	0,20	6	51	11,0	15,0	0,200	4	15	new/neu
VHRS 4 060 064 06 03 030 L	6,0	0,30	6	64	13,0	18,0	0,200	4	-	new/neu
VHRS 4 060 064 06 03 050 L	6,0	0,50	6	64	13,0	18,0	0,200	4	-	new/neu
VHRS 4 060 064 06 03 100 L	6,0	1,00	6	64	13,0	18,0	0,200	4	-	new/neu
VHRS 4 080 064 08 03 030 L	8,0	0,30	8	64	18,0	24,0	0,300	4	-	new/neu
VHRS 4 080 064 08 03 050 L	8,0	0,50	8	64	18,0	24,0	0,300	4	-	new/neu
VHRS 4 080 064 08 03 100 L	8,0	1,00	8	64	18,0	24,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 030 L	10,0	0,30	10	70	22,0	30,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 050 L	10,0	0,50	10	70	22,0	30,0	0,300	4	-	new/neu
VHRS 4 100 070 10 03 100 L	10,0	1,00	10	70	22,0	30,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 030 L	12,0	0,30	12	78	25,0	36,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 050 L	12,0	0,50	12	78	25,0	36,0	0,300	4	-	new/neu
VHRS 4 120 078 12 03 100 L	12,0	1,00	12	78	25,0	36,0	0,300	4	-	new/neu
VHRS 4 140 089 14 03 050 L	14,0	0,50	14	89	30,0	42,0	0,300	4	-	new/neu
VHRS 4 160 089 16 03 050 L	16,0	0,50	16	89	35,0	48,0	0,300	4	-	new/neu
VHRS 4 160 089 16 03 100 L	16,0	1,00	16	89	35,0	48,0	0,300	4	-	new/neu
VHRS 4 200 102 20 03 050 L	20,0	0,50	20	102	42,0	60,0	0,300	4	-	new/neu
VHRS 4 200 102 20 03 100 L	20,0	1,00	20	102	42,0	60,0	0,300	4	-	new/neu
VHRS 4 250 131 25 03 100 L	25,0	1,00	25	131	45,0	75,0	0,400	4	-	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

VHRS 41200781203
Workpiece Material: 1.0503
Hardness: - HB

	Van Hoorn	Competitor
v_c	100 m/min	70 m/min
n	2650 rpm	1850 rpm
F_z	0,11 mm/t	0,02 mm/t
v_f	1.166 mm/min	222 mm/min
a_p	15,0 mm	5,0 mm
a_e	4,0 mm	11 mm
Coolant	emulsion	emulsion
Q	69,96 mm³/min	12,21 mm³/min

Material removal rate Zerspanungsleistung



Shoulder milling / Eckfräsen (1xD depth of cut)

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,0	< 1,4	0,010 - 0,020
4,0	< 4,0	< 1,8	0,015 - 0,030
5,0	< 5,0	< 2,3	0,020 - 0,040
6,0	< 6,0	< 2,7	0,025 - 0,050
8,0	< 8,0	< 3,6	0,030 - 0,060
10,0	< 10,0	< 4,5	0,040 - 0,070
12,0	< 12,0	< 5,4	0,050 - 0,080
14,0	< 14,0	< 6,3	0,055 - 0,090
16,0	< 16,0	< 7,2	0,060 - 0,100
20,0	< 20,0	< 9,0	0,080 - 0,120
25,0	< 25,0	< 11,3	0,100 - 0,150

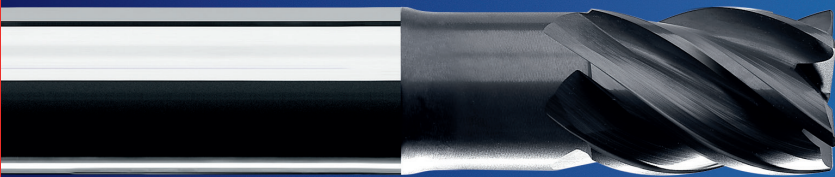
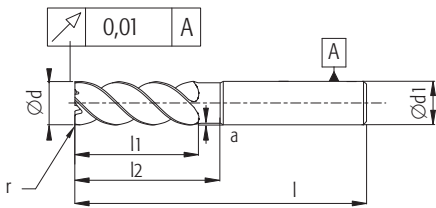
Shoulder milling / Eckfräsen (2xD depth of cut)

a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 6,0	< 0,75	0,010 - 0,030
< 8,0	< 1,00	0,020 - 0,040
< 10,0	< 1,25	0,025 - 0,055
< 12,0	< 1,50	0,035 - 0,065
< 16,0	< 2,00	0,045 - 0,075
< 20,0	< 2,50	0,055 - 0,085
< 24,0	< 3,00	0,070 - 0,100
< 28,0	< 3,50	0,080 - 0,120
< 32,0	< 4,00	0,090 - 0,130
< 40,0	< 5,00	0,110 - 0,150
< 50,0	< 6,25	0,135 - 0,185

Slot milling / Nutfräsen

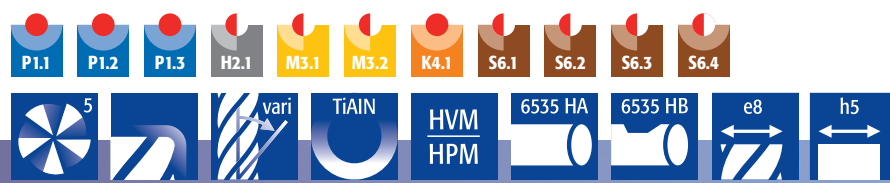
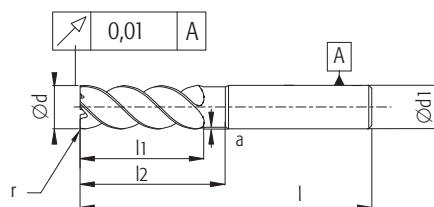
a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 3,0	3,0	0,005 - 0,015
< 4,0	4,0	0,008 - 0,025
< 5,0	5,0	0,010 - 0,030
< 6,0	6,0	0,015 - 0,035
< 8,0	8,0	0,025 - 0,045
< 10,0	10,0	0,030 - 0,050
< 12,0	12,0	0,035 - 0,060
< 14,0	14,0	0,040 - 0,070
< 16,0	16,0	0,050 - 0,080
< 20,0	20,0	0,060 - 0,100
< 25,0	25,0	0,080 - 0,130

Short

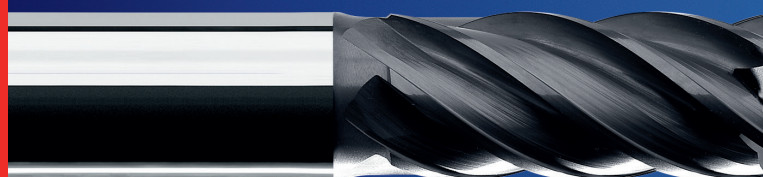


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Short / Kurze Ausführung										
VHRS 5 030 051 06 03 S	3,0	0,20	6	51	5,0	7,0	0,100	5	15	new/neu
VHRS 5 040 051 06 03 S	4,0	0,20	6	51	6,0	9,0	0,100	5	15	new/neu
VHRS 5 050 051 06 03 S	5,0	0,20	6	51	7,0	11,0	0,200	5	15	new/neu
VHRS 5 060 064 06 03 S	6,0	0,30	6	64	8,0	13,0	0,200	5	-	new/neu
VHRS 5 060 064 06 03 050 S	6,0	0,50	6	64	8,0	13,0	0,200	5	-	new/neu
VHRS 5 060 064 06 03 100 S	6,0	1,00	6	64	8,0	13,0	0,200	5	-	new/neu
VHRS 5 080 064 08 03 030 S	8,0	0,30	8	64	11,0	18,0	0,300	5	-	new/neu
VHRS 5 080 064 08 03 050 S	8,0	0,50	8	64	11,0	18,0	0,300	5	-	new/neu
VHRS 5 080 064 08 03 100 S	8,0	1,00	8	64	11,0	18,0	0,300	5	-	new/neu
VHRS 5 100 070 10 03 030 S	10,0	0,30	10	70	13,0	22,0	0,300	5	-	new/neu
VHRS 5 100 070 10 03 050 S	10,0	0,50	10	70	13,0	22,0	0,300	5	-	new/neu
VHRS 5 100 070 10 03 100 S	10,0	1,00	10	70	13,0	22,0	0,300	5	-	new/neu
VHRS 5 120 078 12 03 030 S	12,0	0,30	12	78	15,0	25,0	0,300	5	-	new/neu
VHRS 5 120 078 12 03 050 S	12,0	0,50	12	78	15,0	25,0	0,300	5	-	new/neu
VHRS 5 120 078 12 03 100 S	12,0	1,00	12	78	15,0	25,0	0,300	5	-	new/neu
VHRS 5 140 089 14 03 100 S	14,0	1,00	14	89	17,0	30,0	0,300	5	-	new/neu
VHRS 5 160 089 16 03 050 S	16,0	0,50	16	89	19,0	35,0	0,300	5	-	new/neu
VHRS 5 160 089 16 03 100 S	16,0	1,00	16	89	19,0	35,0	0,300	5	-	new/neu
VHRS 5 200 102 20 03 050 S	20,0	0,50	20	102	23,0	42,0	0,400	5	-	new/neu
VHRS 5 200 102 20 03 100 S	20,0	1,00	20	102	23,0	42,0	0,400	5	-	new/neu
VHRS 5 250 120 25 03 050 S	25,0	0,50	25	120	28,0	45,0	0,400	5	-	new/neu
VHRS 5 250 120 25 03 100 S	25,0	1,00	25	120	28,0	45,0	0,400	5	-	new/neu

Standard



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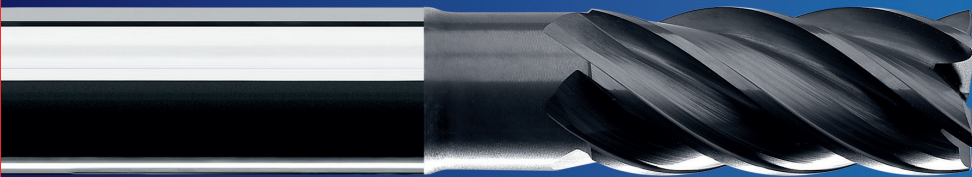
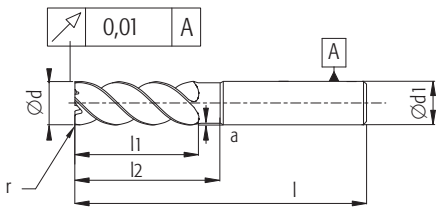
Article Number
Artikelnummer

Ød (mm) r (mm) Ød1 (mm) L (mm) L1 (mm) L2 (mm) a (mm) z γ (°)

Standard

VHRS 5 030 051 06 03	3,0	0,20	6	51	7,0	-	-	5	15	new/neu
VHRS 5 040 051 06 03	4,0	0,20	6	51	9,0	-	-	5	15	new/neu
VHRS 5 050 051 06 03	5,0	0,20	6	51	11,0	-	-	5	15	new/neu
VHRS 5 060 064 06 03	6,0	0,30	6	64	13,0	-	-	5	-	new/neu
VHRS 5 060 064 06 03 050	6,0	0,50	6	64	13,0	-	-	5	-	new/neu
VHRS 5 060 064 06 03 100	6,0	1,00	6	64	13,0	-	-	5	-	new/neu
VHRS 5 080 064 08 03 030	8,0	0,30	8	64	18,0	-	-	5	-	new/neu
VHRS 5 080 064 08 03 050	8,0	0,50	8	64	18,0	-	-	5	-	new/neu
VHRS 5 080 064 08 03 100	8,0	1,00	8	64	18,0	-	-	5	-	new/neu
VHRS 5 100 070 10 03 030	10,0	0,30	10	70	22,0	-	-	5	-	new/neu
VHRS 5 100 070 10 03 050	10,0	0,50	10	70	22,0	-	-	5	-	new/neu
VHRS 5 100 070 10 03 100	10,0	1,00	10	70	22,0	-	-	5	-	new/neu
VHRS 5 120 078 12 03 030	12,0	0,30	12	78	25,0	-	-	5	-	new/neu
VHRS 5 120 078 12 03 050	12,0	0,50	12	78	25,0	-	-	5	-	new/neu
VHRS 5 120 078 12 03 100	12,0	1,00	12	78	25,0	-	-	5	-	new/neu
VHRS 5 140 089 14 03 100	14,0	1,00	14	89	30,0	-	-	5	-	new/neu
VHRS 5 160 089 16 03 050	16,0	0,50	16	89	35,0	-	-	5	-	new/neu
VHRS 5 160 089 16 03 100	16,0	1,00	16	89	35,0	-	-	5	-	new/neu
VHRS 5 200 102 20 03 050	20,0	0,50	20	102	42,0	-	-	5	-	new/neu
VHRS 5 200 102 20 03 100	20,0	1,00	20	102	42,0	-	-	5	-	new/neu
VHRS 5 250 120 25 03 050	25,0	0,50	25	120	45,0	-	-	5	-	new/neu
VHRS 5 250 120 25 03 100	25,0	1,00	25	120	45,0	-	-	5	-	new/neu

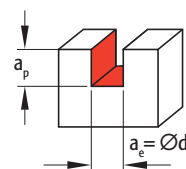
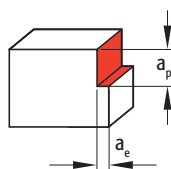
Neck relief



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
With neck relief										
VHRS 5 030 051 06 03 020 L	3,0	0,20	6	51	8,0	9,0	0,10	5	15	new/neu
VHRS 5 040 051 06 03 020 L	4,0	0,20	6	51	10,0	12,0	0,10	5	15	new/neu
VHRS 5 050 051 06 03 020 L	5,0	0,20	6	51	12,0	15,0	0,20	5	15	new/neu
VHRS 5 060 064 06 03 030 L	6,0	0,30	6	64	14,0	18,0	0,20	5	-	new/neu
VHRS 5 060 064 06 03 050 L	6,0	0,50	6	64	14,0	18,0	0,20	5	-	new/neu
VHRS 5 060 064 06 03 100 L	6,0	1,00	6	64	14,0	18,0	0,20	5	-	new/neu
VHRS 5 080 064 08 03 030 L	8,0	0,30	8	64	18,0	24,0	0,30	5	-	new/neu
VHRS 5 080 064 08 03 050 L	8,0	0,50	8	64	18,0	24,0	0,30	5	-	new/neu
VHRS 5 080 064 08 03 100 L	8,0	1,00	8	64	18,0	24,0	0,30	5	-	new/neu
VHRS 5 100 070 10 03 030 L	10,0	0,30	10	70	22,0	30,0	0,30	5	-	new/neu
VHRS 5 100 070 10 03 050 L	10,0	0,50	10	70	22,0	30,0	0,30	5	-	new/neu
VHRS 5 100 070 10 03 100 L	10,0	1,00	10	70	22,0	30,0	0,30	5	-	new/neu
VHRS 5 120 102 12 03 030 L	12,0	0,30	12	102	26,0	36,0	0,30	5	-	new/neu
VHRS 5 120 102 12 03 050 L	12,0	0,50	12	102	26,0	36,0	0,30	5	-	new/neu
VHRS 5 120 102 12 03 100 L	12,0	1,00	12	102	26,0	36,0	0,30	5	-	new/neu
VHRS 5 140 102 14 03 100 L	14,0	1,00	14	102	30,0	42,0	0,30	5	-	new/neu
VHRS 5 160 102 16 03 050 L	16,0	0,50	16	102	35,0	48,0	0,300	5	-	new/neu
VHRS 5 160 102 16 03 100 L	16,0	1,00	16	102	35,0	48,0	0,300	5	-	new/neu
VHRS 5 200 125 20 03 050 L	20,0	0,50	20	125	42,0	60,0	0,400	5	-	new/neu
VHRS 5 200 125 20 03 100 L	20,0	1,00	20	125	42,0	60,0	0,400	5	-	new/neu
VHRS 5 250 131 25 03 050 L	25,0	0,50	25	131	45,0	75,0	0,400	5	-	new/neu
VHRS 5 250 131 25 03 100 L	25,0	1,00	25	131	45,0	75,0	0,400	5	-	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion

- **Special designed geometry for machining materials P1.1, 1.2, 1.3, K4.1**
Spezieller Geometrie zur Zerspanung materialen P1.1, 1.2, 1.3, K4.1
- **5 flute for new machining strategies**
5 Schneiden zur Zerspanung mit neuen Strategien
- **High metal removal rate!**
Maximales Zerspanungsvolumen!



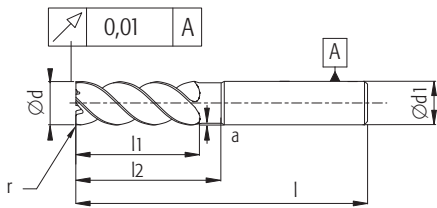
**Shoulder milling / Stirnfräsen
(1xD depth of cut)**

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 3,00	< 1,4	0,010 - 0,020
4,0	< 4,00	< 1,8	0,015 - 0,030
5,0	< 5,00	< 2,3	0,020 - 0,040
6,0	< 6,00	< 2,7	0,025 - 0,050
8,0	< 8,00	< 3,6	0,030 - 0,060
10,0	< 10,00	< 4,5	0,040 - 0,070
12,0	< 12,00	< 5,4	0,050 - 0,080
14,0	< 14,00	< 6,3	0,055 - 0,090
16,0	< 16,00	< 7,2	0,060 - 0,100
20,0	< 20,00	< 9,0	0,080 - 0,120
25,0	< 25,00	< 11,3	0,100 - 0,150

**Shoulder milling / Stirnfräsen
(2xD depth of cut)**

a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 6,00	< 0,750	0,010 - 0,030
< 8,00	< 1,000	0,020 - 0,040
< 10,00	< 1,250	0,025 - 0,055
< 12,00	< 1,500	0,035 - 0,065
< 16,00	< 2,000	0,045 - 0,075
< 20,00	< 2,500	0,055 - 0,085
< 24,00	< 3,000	0,070 - 0,100
< 28,00	< 3,500	0,080 - 0,120
< 32,00	< 4,000	0,090 - 0,130
< 40,00	< 5,000	0,110 - 0,150
< 50,00	< 6,250	0,135 - 0,185

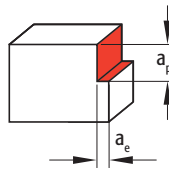
Standard



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
VHTR 4 030 057 06 03	3,0	0,10	6	57	10,0	15,0	0,10	4	-	new/neu
VHTR 4 040 057 06 03	4,0	0,10	6	57	13,0	15,0	0,10	4	-	new/neu
VHTR 4 050 057 06 03	5,0	0,10	6	57	16,0	20,0	0,10	4	-	new/neu
VHTR 5 060 057 06 03	6,0	0,10	6	57	19,0	25,0	0,10	5	-	new/neu
VHTR 5 080 063 08 03	8,0	0,15	8	63	25,0	30,0	0,10	5	-	new/neu
VHTR 5 100 072 10 03	10,0	0,20	10	72	32,0	35,0	0,10	5	-	new/neu
VHTR 6 120 083 12 03	12,0	0,20	12	83	38,0	45,0	0,10	6	-	new/neu
VHTR 6 160 108 16 03	16,0	0,30	16	108	42,0	55,0	0,10	6	-	new/neu
VHTR 7 200 126 20 03	20,0	0,40	20	126	50,0	70,0	0,10	7	-	new/neu

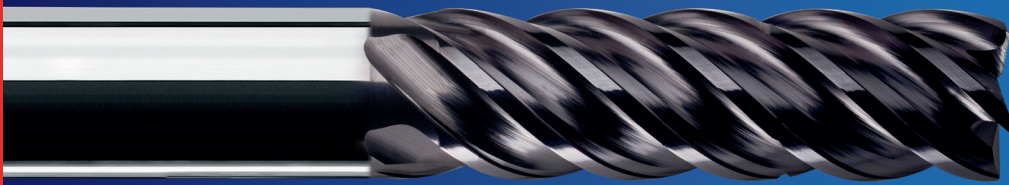
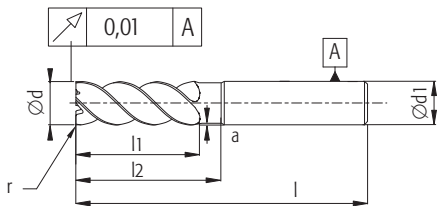
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	220 - 280	emulsion
P1.2	< 1000	< 300	145 - 225	emulsion
P1.3	< 1400	< 400	100 - 180	emulsion
H2.1		< 50 HRC	100 - 150	emulsion
M3.1	< 950		115 - 165	emulsion
M3.2	< 1250		85 - 125	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		55 - 75	emulsion
S6.2	< 1600		60 - 90	emulsion
S6.3	< 1600		45 - 65	emulsion
S6.4	< 1250		80 - 120	emulsion

- High MRR (Material Removal Rate)
Großes Spanvolumen erreichen
- Constant cutting force
Konstante Schnittkraft
 - Better for machine
Besser für die Maschine
 - Better for end mill
Besser für Schaftfräser
 - Increased lifetime
Erhöhte Lebensdauer
- Optimized cutting conditions to application area
Optimierte Schnittwertebedingungen auf Anwendungsgebiet



Shoulder milling / Eckfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 9,00	< 0,450	0,015 - 0,035
4,0	< 12,00	< 0,600	0,025 - 0,050
5,0	< 15,00	< 0,750	0,030 - 0,060
6,0	< 18,00	< 0,900	0,040 - 0,070
8,0	< 24,00	< 1,200	0,050 - 0,085
10,0	< 30,00	< 1,500	0,060 - 0,100
12,0	< 36,00	< 1,800	0,085 - 0,120
16,0	< 40,00	< 2,400	0,100 - 0,145
20,0	< 50,00	< 3,000	0,125 - 0,175

Standard

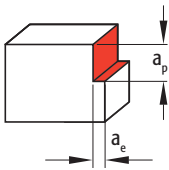
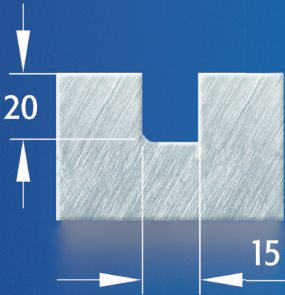


Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
VHTS 4 030 057 06 03	3,0	0,10	6	57	10,0	15,0	0,100	4	-	new/neu
VHTS 4 040 057 06 03	4,0	0,10	6	57	13,0	15,0	0,100	4	-	new/neu
VHTS 4 050 057 06 03	5,0	0,10	6	57	16,0	20,0	0,100	4	-	new/neu
VHTS 4 060 057 06 03	6,0	0,10	6	57	19,0	25,0	0,100	5	-	new/neu
VHTS 5 080 063 08 03	8,0	0,15	8	63	25,0	30,0	0,100	5	-	new/neu
VHTS 5 100 072 10 03	10,0	0,20	10	72	32,0	35,0	0,100	5	-	new/neu
VHTS 6 120 083 12 03	12,0	0,20	12	83	38,0	45,0	0,100	6	-	new/neu
VHTS 6 160 108 16 03	16,0	0,30	16	108	42,0	55,0	0,100	6	-	new/neu
VHTS 7 200 126 20 03	20,0	0,40	20	126	50,0	70,0	0,100	7	-	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	240 - 300	emulsion
P1.2	< 1000	< 300	160 - 240	emulsion
P1.3	< 1400	< 400	130 - 200	emulsion
H2.1		< 50 HRc	100 - 150	emulsion
M3.1	< 950		100 - 150	emulsion
M3.2	< 1250		90 - 120	emulsion
K4.1	< 800		125 - 225	emulsion
S6.1	< 1500		45 - 65	emulsion
S6.2	< 1600		50 - 80	emulsion
S6.3	< 1600		35 - 55	emulsion
S6.4	< 1250		70 - 105	emulsion

Workpiece Material: St.37

	VHTS 5 100 072 06 03	Competitor
a _p max	20 mm	10 mm
a _e	1 mm (programmed)	10 mm / 5 mm
v _c	250 mtr/min	180 mtr/min
n	7957 rpm	5730 rpm
F _z	0,12 mm/t	0,04 mm/t
v _f	4774 mm/min	912 mm/min
Productiontime	24 s	37 s



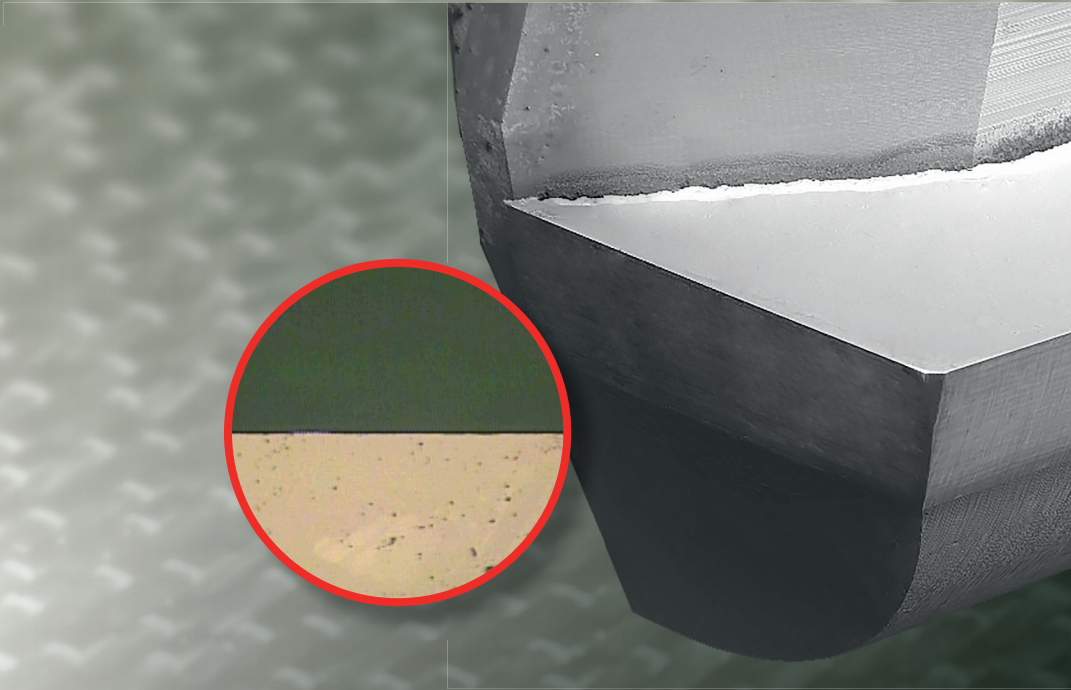
Shoulder milling / Eckfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _t (mm/tooth)
3,0	< 9,00	< 0,600	0,015 - 0,035
4,0	< 12,00	< 0,800	0,025 - 0,050
5,0	< 15,00	< 1,000	0,030 - 0,060
6,0	< 18,00	< 1,200	0,040 - 0,070
8,0	< 24,00	< 1,600	0,050 - 0,085
10,0	< 30,00	< 2,000	0,060 - 0,100
12,0	< 36,00	< 2,400	0,085 - 0,120
16,0	< 40,00	< 3,200	0,100 - 0,145
20,0	< 50,00	< 4,000	0,125 - 0,175

Solutions for synthetics and composite materials

Lösungen für die Bearbeitung von Kunst- und Verbundwerkstoffen

Years of experience and numerous tests in aerospace applications, provided the details required to develop an integral endmill high-end program for glass- and carbon fibre reinforced materials.

Jahrelange Erfahrung und zahlreiche Tests in der Luft- und Raumfahrtindustrie ermöglichten die Entwicklung eines umfassenden High-End-Fräserprogramms für Glas- und Kohlefaserverstärkte Werkstoffe.



Van Hoorn vs competitor

Workpiece Material: Nylon
Endmill: VHDT 2 100 078 R010
Hardness: with Glass Fibre

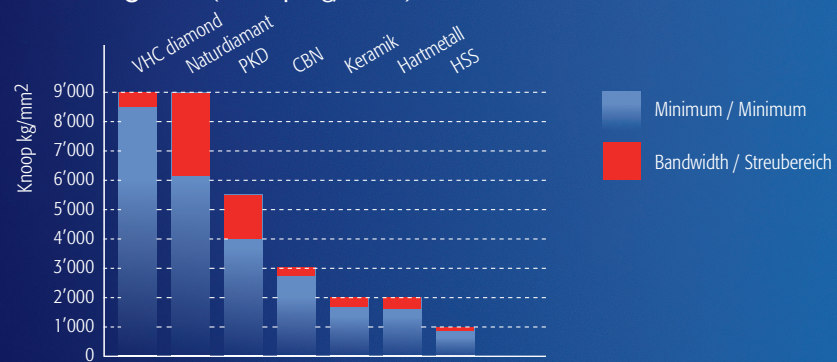
	Van Hoorn	Competitor
v_c	251 m/min	402 m/min
n	8.000 -/min	8.000 -/min
F_z	0,188 mm/t	0,025 mm/t
v_f	3.000 mm/min	400 mm/min
a_p	1,2 mm	4,5 mm
a_e	10 mm	16 mm
Coolant	air / external	air / external
Q	36,0 cm ³ /min	28,8 cm ³ /min
Tool life	25 pockets	13 pockets

Diamond tipped vs PCD

Diamantbestückung vs PCD

- **2 To 5 times more tool life**
2 Bis 5-fache Standzeit
- **More accuracy & a better surface finish**
Höhere Genauigkeit und bessere Oberflächenqualität
- **Higher machine efficiency**
Höhere Maschineneffizienz

Hardness Comparison (Knoop kg/mm²) Härtevergleich (Knoop kg/mm²)



High accurate manufacturing by laser Hohe Genauigkeit Produktion mit laser



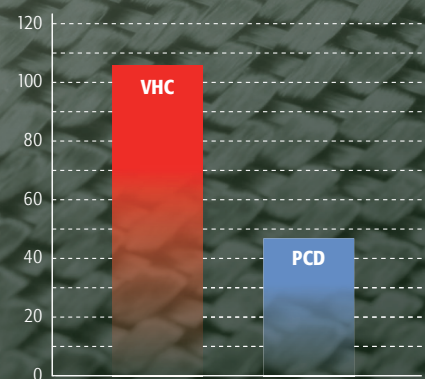
Workpiece Material: Aerospace Composite T800/M21
Endmill: VHDT 2 060 078 R05
Operation / Bearbeitung: Shoulder Milling / Eckfräsen

v_c 285 m/min
 D_c 6,0 -/min
 F_z 0,12 mm/t
 v_f 3.000 mm/min
 a_p 4,0 mm
 a_e 2,5 mm
Coolant air / external

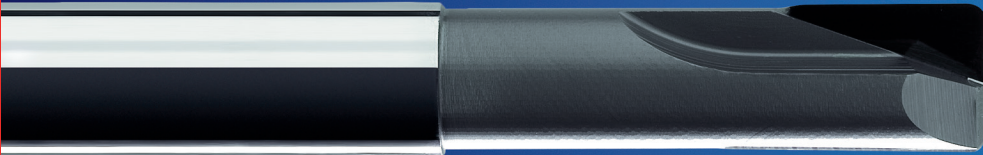
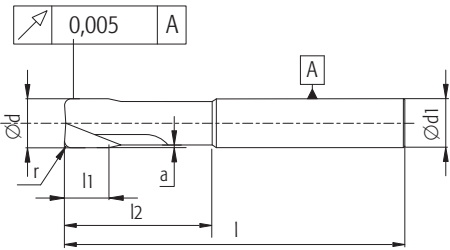
Result / Ergebnis PCD 47,0 cm³/min
Result / Ergebnis VHC 107,0 cm³/min

Improvement **2,3 time higher tool life**
Verbesserung 2,3 fache Standzeit

Praxis examples Bearbeitungsbeispiele



Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard / Standard Ausführung									
VHDT 2 030 078 030 L09	3,0	0,30	6	78	2,50	9,00	0,250	2	25
VHDT 2 030 078 030 L15	3,0	0,30	6	78	2,50	15,00	0,250	2	25
VHDT 2 030 078 050 L09	3,0	0,50	6	78	2,50	9,00	0,250	2	25
VHDT 2 030 078 050 L15	3,0	0,50	6	78	2,50	15,00	0,250	2	25
VHDT 2 040 078 030 L12	4,0	0,30	6	78	2,50	12,00	0,250	2	25
VHDT 2 040 078 030 L20	4,0	0,30	6	78	2,50	20,00	0,250	2	25
VHDT 2 040 078 050 L12	4,0	0,50	6	78	2,50	12,00	0,250	2	25
VHDT 2 040 078 050 L20	4,0	0,50	6	78	2,50	20,00	0,250	2	25
VHDT 2 050 078 030 L15	5,0	0,30	6	78	3,00	15,00	0,300	2	25
VHDT 2 050 078 030 L25	5,0	0,30	6	78	3,00	25,00	0,300	2	25
VHDT 2 050 078 050 L15	5,0	0,50	6	78	3,00	15,00	0,300	2	25
VHDT 2 050 078 050 L25	5,0	0,50	6	78	3,00	25,00	0,300	2	25
VHDT 2 060 102 030 L18	6,0	0,30	6	102	6,00	18,00	0,300	2	-
VHDT 2 060 102 030 L30	6,0	0,30	6	102	6,00	30,00	0,300	2	-
VHDT 2 060 102 050 L18	6,0	0,50	6	102	6,00	18,00	0,300	2	-
VHDT 2 060 102 050 L30	6,0	0,50	6	102	6,00	30,00	0,300	2	-
VHDT 2 060 102 100 L18	6,0	1,00	6	102	6,00	18,00	0,300	2	-
VHDT 2 060 102 100 L30	6,0	1,00	6	102	6,00	30,00	0,300	2	-
VHDT 2 080 102 030 L24	8,0	0,30	8	102	7,00	24,00	0,400	2	-
VHDT 2 080 102 050 L24	8,0	0,50	8	102	7,00	24,00	0,400	2	-
VHDT 2 080 102 100 L24	8,0	1,00	8	102	7,00	24,00	0,400	2	-
VHDT 2 100 102 050 L30	10,0	0,50	10	102	8,00	30,00	0,500	2	-
VHDT 2 100 102 100 L30	10,0	1,00	10	102	8,00	30,00	0,500	2	-
VHDT 2 120 107 050 L36	12,0	0,50	12	107	9,00	36,00	0,500	2	-
VHDT 2 120 107 100 L36	12,0	1,00	12	107	9,00	36,00	0,500	2	-
Long / Lange Ausführung									
VHDT 2 030 078 R03	3,0	0,30	6	78	3,00	9,00	0,100	2	15
VHDT 2 030 078 R05	3,0	0,50	6	78	3,00	9,00	0,100	2	15
VHDT 2 040 078 R03	4,0	0,30	6	78	4,00	12,00	0,100	2	15
VHDT 2 040 078 R05	4,0	0,50	6	78	4,00	12,00	0,100	2	15
VHDT 2 050 078 R05	5,0	0,50	6	78	5,00	15,00	0,100	2	15
VHDT 2 050 078 R10	5,0	1,00	6	78	5,00	15,00	0,100	2	15
VHDT 2 060 078 R05	6,0	0,50	6	78	6,00	18,00	0,100	2	-
VHDT 2 060 078 R10	6,0	1,00	6	78	6,00	18,00	0,100	2	-
VHDT 2 080 078 R05	8,0	0,50	8	78	8,00	24,00	0,100	2	-
VHDT 2 080 078 R10	8,0	1,00	8	78	8,00	24,00	0,100	2	-
VHDT 2 100 078 R10	10,0	1,00	10	78	10,00	30,00	0,100	2	-
VHDT 2 120 078 R10	12,0	1,00	12	78	12,00	30,00	0,100	2	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air
N5.6			< 700	emulsion / air

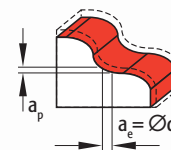
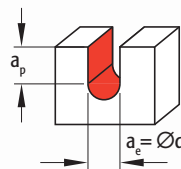
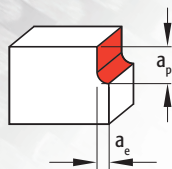
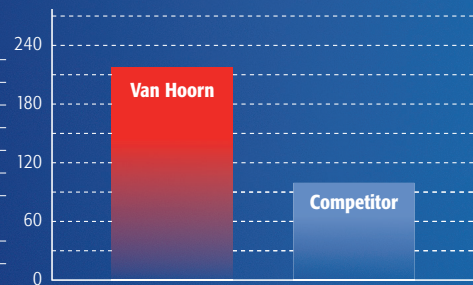
VHDT2060078R05

Workpiece Material: T800 M21

Hardness: Aerospace Material

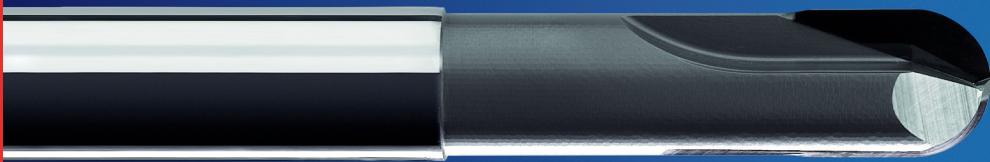
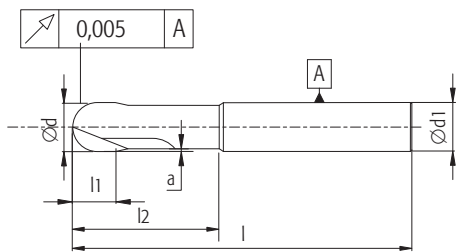
	Van Hoorn	Competitor
v_c	283 m/min	283 m/min
n	15000 rpm	15000 rpm
F_z	0,10 mm/t	0,10 mm/t
v_f	3000 mm/min	3000 mm/min
a_p	4,0 mm	4,0 mm
a_e	6,0 mm	6,0 mm
Coolant	emulsion	emulsion
Q	72,0 mm³/min	72,0 mm³/min
Tool life	214 min	94 min

Tool life Lebensdauer



Shoulder milling / Eckfräsen				Slot milling / Nutenfräsen				Profile milling / Profilfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)		a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
3,0	< 1,95	< 1,20	0,020 - 0,030	< 0,60	< 3,0	0,010 - 0,020		< 0,60	< 0,30	0,020 - 0,030	
4,0	< 2,60	< 1,60	0,030 - 0,045	< 0,80	< 4,0	0,020 - 0,040		< 0,80	< 0,40	0,030 - 0,045	
5,0	< 3,25	< 2,00	0,040 - 0,060	< 1,00	< 5,0	0,030 - 0,045		< 1,00	< 0,50	0,040 - 0,060	
6,0	< 3,90	< 2,40	0,050 - 0,070	< 1,20	< 6,0	0,040 - 0,060		< 1,20	< 0,60	0,050 - 0,070	
8,0	< 5,20	< 3,20	0,060 - 0,080	< 1,60	< 8,0	0,050 - 0,070		< 1,60	< 0,80	0,060 - 0,080	
10,0	< 6,50	< 4,00	0,070 - 0,100	< 2,00	< 10,0	0,060 - 0,080		< 2,00	< 1,00	0,070 - 0,100	
12,0	< 7,80	< 4,80	0,090 - 0,120	< 2,40	< 12,0	0,080 - 0,100		< 2,40	< 12,0	0,080 - 0,120	

Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard/ Standard Ausführung									
VHDB 2 030 078 L09	3,0	1,50	6	78	2,50	9,00	0,250	2	25
VHDB 2 030 078 L15	3,0	1,50	6	78	2,50	15,00	0,250	2	25
VHDB 2 040 078 L12	4,0	2,00	6	78	2,50	12,00	0,250	2	25
VHDB 2 040 078 L20	4,0	2,00	6	78	2,50	20,00	0,250	2	25
VHDB 2 050 078 L15	5,0	2,50	6	78	3,00	15,00	0,300	2	25
VHDB 2 050 078 L25	5,0	2,50	6	78	3,00	25,00	0,300	2	25
VHDB 2 060 102 L18	6,0	3,00	6	102	6,00	18,00	0,300	2	-
VHDB 2 060 102 L30	6,0	3,00	6	102	6,00	30,00	0,300	2	-
VHDB 2 080 102 L24	8,0	4,00	8	102	7,00	24,00	0,400	2	-
VHDB 2 080 102 L40	8,0	4,00	8	102	7,00	40,00	0,400	2	-
VHDB 2 100 102 L30	10,0	5,00	10	102	8,00	30,00	0,500	2	-
VHDB 2 100 102 L50	10,0	5,00	10	102	8,00	50,00	0,500	2	-
VHDB 2 120 107 L36	12,0	6,00	12	107	9,00	36,00	0,500	2	-
VHDB 2 120 107 L60	12,0	6,00	12	107	9,00	60,00	0,500	2	-
Long / Lange Ausführung									
VHDB 2 030 078	3,0	1,50	6	78	3,00	9,00	0,100	2	15
VHDB 2 040 078	4,0	2,00	6	78	4,00	12,00	0,100	2	15
VHDB 2 050 078	5,0	2,50	6	78	5,00	15,00	0,100	2	15
VHDB 2 060 078	6,0	3,00	6	78	6,00	18,00	0,100	2	-
VHDB 2 080 078	8,0	4,00	8	78	8,00	24,00	0,100	2	-
VHDB 2 100 078	10,0	5,00	10	78	10,00	30,00	0,100	2	-
VHDB 2 120 078	12,0	6,00	12	78	12,00	30,00	0,100	2	-

Available in special dimensions on request.
Sondermaße auf Anfrage lieferbar.

new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air
N5.6			< 700	emulsion / air

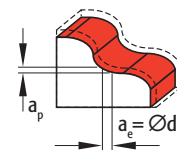
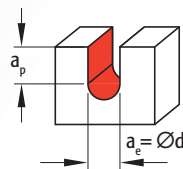
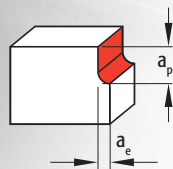
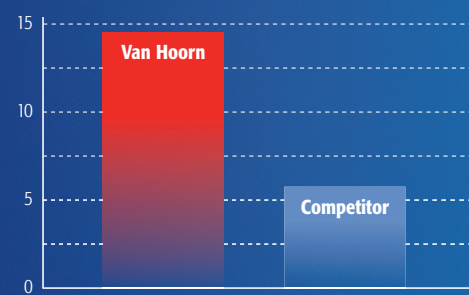
VHDB2100078

Workpiece Material: Hextool

Hardness: Aerospace Material

	Van Hoorn	Competitor
v_c	314 m/min	377 m/min
n	10000 rpm	10000 rpm
F_z	0,15 mm/t	0,10 mm/t
v_f	3000 mm/min	2600 mm/min
a_p	0,35 mm	0,35 mm
a_e	0,35 mm	0,35 mm
Coolant	dry	dry
Q	0,37 mm³/min	0,32 mm³/min
Toollife	14 h 10 min	5 h 33 min

Tool life Lebensdauer



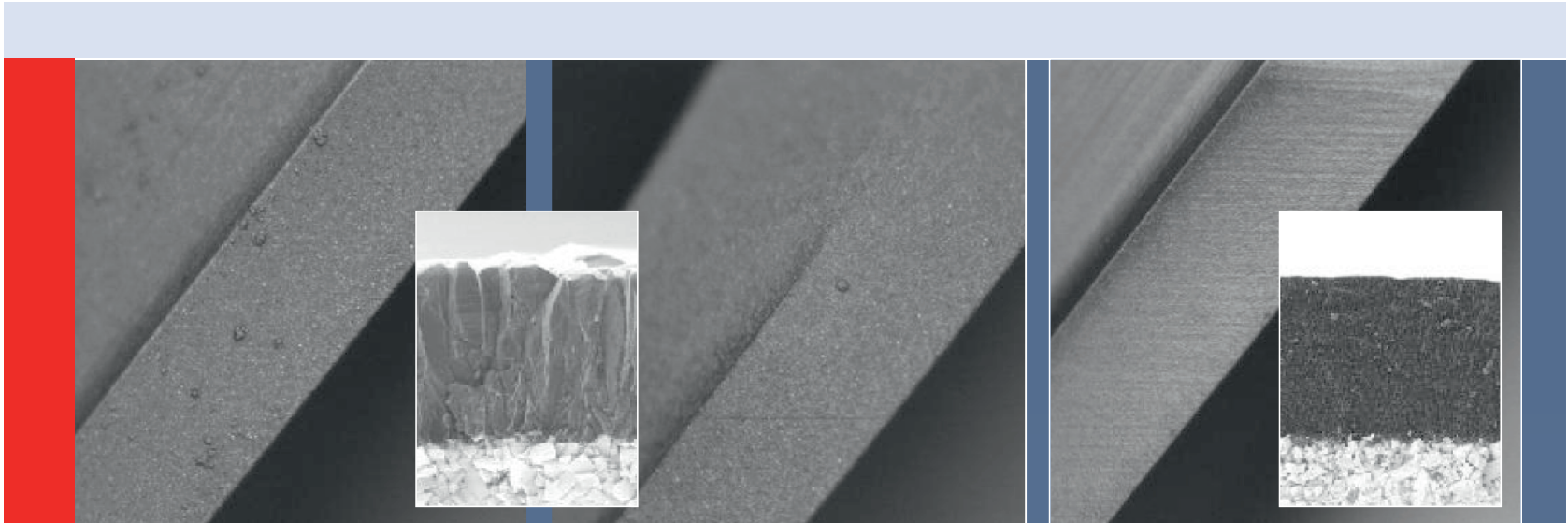
Shoulder milling / Stirnfräsen				Slot milling / Nutenfräsen			Profile milling / Profilfräsen		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
3,0	< 1,95	< 1,2	0,020 - 0,030	< 0,6	3,0	0,010 - 0,020	< 0,6	< 0,3	0,020 - 0,030
4,0	< 2,60	< 1,6	0,030 - 0,045	< 0,8	4,0	0,020 - 0,040	< 0,8	< 0,4	0,030 - 0,045
5,0	< 3,25	< 2,0	0,040 - 0,060	< 1,0	5,0	0,030 - 0,045	< 1,0	< 0,5	0,040 - 0,060
6,0	< 3,90	< 2,4	0,050 - 0,070	< 1,2	6,0	0,040 - 0,060	< 1,2	< 0,6	0,050 - 0,070
8,0	< 5,20	< 3,2	0,060 - 0,080	< 1,6	8,0	0,050 - 0,070	< 1,6	< 0,8	0,060 - 0,080
10,0	< 6,50	< 4,0	0,070 - 0,100	< 2,0	10,0	0,060 - 0,080	< 2,0	< 1,0	0,070 - 0,100
12,0	< 7,80	< 4,8	0,090 - 0,120	< 2,4	12,0	0,080 - 0,100	< 2,4	< 1,2	0,080 - 0,120

End mills for graphite EDM technology

Schafffräser für die Graphit-Bearbeitung in der Erodieretechnik (EDM)

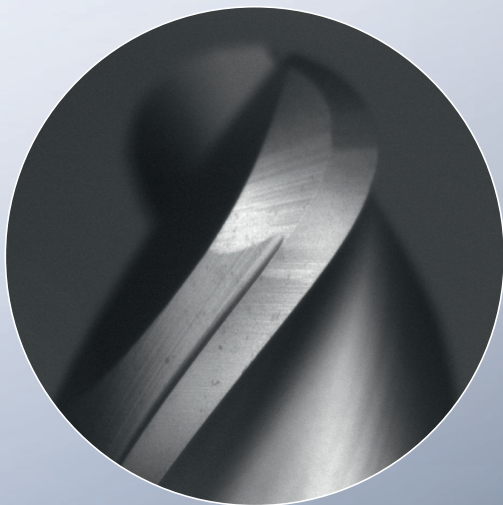
The leading technology of Van Hoorn Carbide diamond coated end mills:
Van Hoorn Carbide's Technologieführung durch Diamantbeschichtete Schafffräser:

- Accuracy
Genauigkeit
 - Smooth surface finish
Glatte Oberflächen
- Process times
Bearbeitungszeiten
 - Toollife
Standzeit



VHC technology / VHC Technologie:

- Technology to minimize droplets
Verfahren zur Minimierung von Tröpfchenbildung
- Superior accuracy and tolerances
Überragende Genauigkeiten und Toleranzen
- Improved performance and toollife
Leistungssteigerungen und Standzeitverlängerung



Productivity test Produktivitäts-Test

Workpiece Material: SGL Graphite
Endmill: VHGR 2 080 078 08 02
Hardness: R8500

	Van Hoorn	Competitor
v_c	503 m/min	302 m/min
n	20.000 -/min	8.000 -/min
F_z	0,113 mm/t	0,167 mm/t
v_f	4.500 mm/min	4.00 mm/min
a_p	8,0 mm	1,5 mm
a_e	8 mm	12 mm
Coolant	air	air
Q	288 cm ³ /min	72 cm ³ /min

VHC diamond coated endmills for applications on graphite:

VHC Diamant beschichtete Schaftfräser für die Graphit-Bearbeitung:

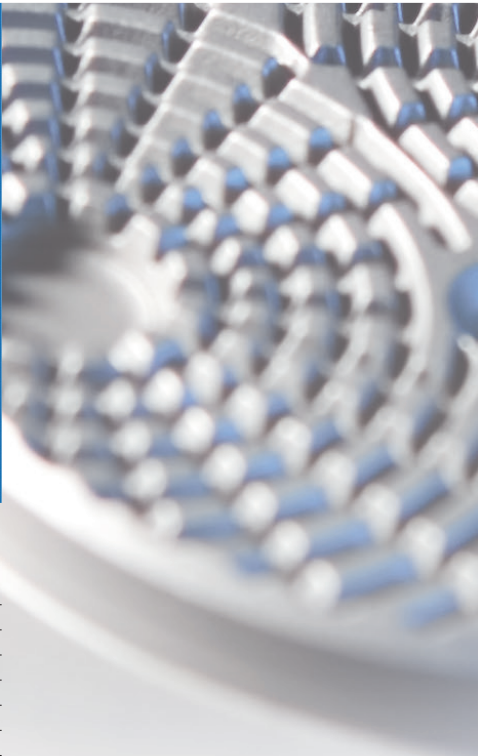
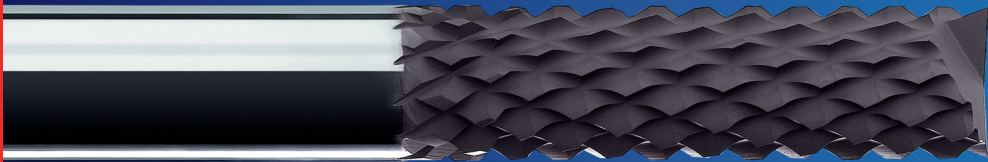
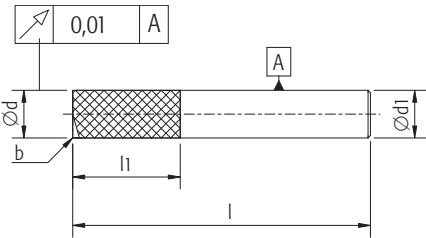
- **VHGR: Roughing geometry.**
VHGR: Schrapp-Geometrie.
- **VHGT: 40° helix sharp geometry.**
VHGT: 40° Spiralwinkel scharfer Schneidengeometrie.
- **VHGTf: 40° helix geometry with corner radius.**
VHGTf: 40° Spiralwinkel mit Eckenradius.
- **VHGKF: 40° helix ballnose geometry.**
VHGKF: 40° Spiralwinkel Radiusfräser.
- **VHMG: Micro endmill with corner radius.**
VHMG: Mikro-Schaftfräser scharfer Schneidengeometrie.
- **VHMGK: Micro ballnose geometry.**
VHMGK: Mikro-Radiusfräser.

Advantages / Vorteile:

- **Better tool life**
Längere Standzeiten
- **Excellent accuracy**
Ausgezeichnete Genauigkeiten
- **High production efficiency**
Hohe Produktivität
- **Excellent surface finish**
Hervorragende Oberflächenqualität

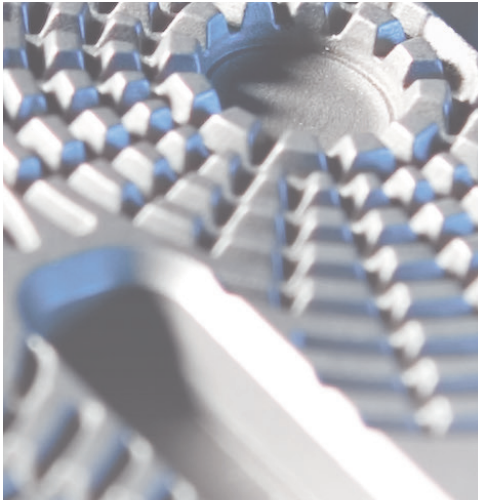


Standard



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z
VHGR 2 040 060 04 02	4,0	0,25	4	60	12,00	-	-	2
VHGR 2 060 078 06 02	6,0	0,30	6	78	18,00	-	-	2
VHGR 2 080 078 08 02	8,0	0,35	8	78	24,00	-	-	2
VHGR 2 100 078 10 02	10,0	0,40	10	78	30,00	-	-	2
VHGR 2 120 089 12 02	12,0	0,50	12	89	36,00	-	-	2
VHGR 2 120 150 12 02	12,0	0,50	12	150	36,00	50,00	0,300	2
VHGR 2 160 150 16 02	16,0	0,50	16	150	36,00	70,00	0,400	2

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air



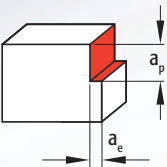
VHGR21000781002

Material EDM200
Graphite

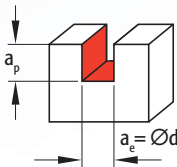
v_c	628 m/min
n	20000 rpm
f_z	* mm/t
v_f	6000 mm/min
a_p	12 mm
a_e	2 mm
Coolant	air
Q	144 cm ³ /min

VHGR for Roughing applications on Graphite:
VHGR für Schrubbearbeitung in Graphit:

- High material removal rate.
Hohe Zerspanungsleistung.
- Special Roughing pitch.
Spezielle Schrubbearbeitung.
- Designed for high feeds on graphite applications.
Entwickelt für hohe Vorschübe in der Graphit-Bearbeitung.



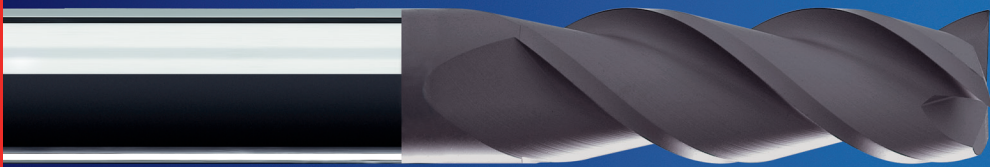
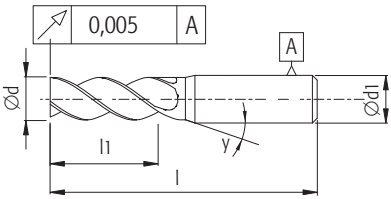
a_p up to 2,50 x d
a_e up to 0,50 x d



a_p up to 1,00 x d

Shoulder milling / Eckfräsen				Slot milling / Nutfräsen		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
4,0	< 10,0	< 2,0	< 5000	< 4,0	4,0	< 3750
6,0	< 15,0	< 3,0	< 6000	< 6,0	6,0	< 4500
8,0	< 20,0	< 4,0	< 8000	< 8,0	8,0	< 6000
10,0	< 25,0	< 5,0	< 10000	< 10,0	10,0	< 7500
12,0	< 30,0	< 6,0	< 12000	< 12,0	12,0	< 9000
16,0	< 35,0	< 8,0	< 15000	< 16,0	16,0	< 11250

Standard



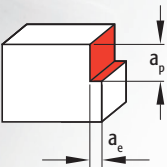
Article Number Artikelnummer	$\varnothing d$ (mm)	r (mm)	$\varnothing d_1$ (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHGT 3 020 050 03 02	2,0	-	3	50	10,00	-	-	3	15
VHGT 3 030 050 03 02	3,0	-	3	50	10,00	-	-	3	-
VHGT 3 040 060 04 02	4,0	-	4	60	15,00	-	-	3	-
VHGT 3 050 060 05 02	5,0	-	5	60	20,00	-	-	3	-
VHGT 3 060 078 06 02	6,0	-	6	78	30,00	-	-	3	-
VHGT 3 080 078 08 02	8,0	-	8	78	30,00	-	-	3	-
VHGT 3 100 078 10 02	10,0	-	10	78	30,00	-	-	3	-
VHGT 3 120 089 12 02	12,0	-	12	89	30,00	-	-	3	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air

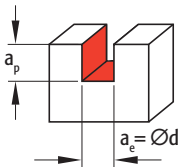
VHGT30600780602
Workpiece Material: Graphite

	Van Hoorn	Competitor
v _c	547 m/min	547 m/min
n	29000 rpm	29000 rpm
F _z	0,023 mm/t	0,005 mm/t
v _f	2000 mm/min	580 mm/min
a _p	3 mm	3 mm
a _e	0,5 mm	0,5 mm
Coolant	air	air
Q	3,00 mm ³ /min	0,87 mm ³ /min
Toollife	7 h 14 min	2 h 37 min

- More accuracy
Höhere Genauigkeit
- Smooth surface on the workpiece
Glatte Werkstückoberflächen
- Better toollife
Längere Standzeit



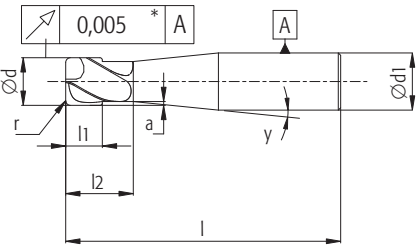
a_p up to 2,0 x d
a_e up to 0,2 x d



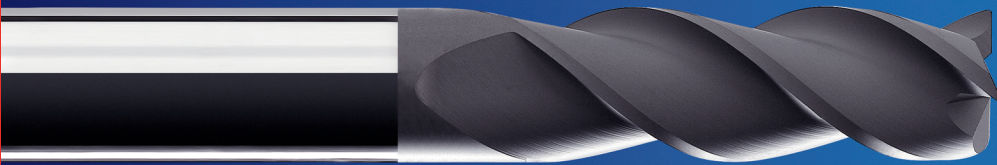
a_p up to 1,00 x d

Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _i (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _i (mm/tooth)	
2,0	< 4,0	< 0,4	0,012 - 0,036	< 2,0	2,0	0,010 - 0,030	
3,0	< 6,0	< 0,6	0,018 - 0,048	< 3,0	3,0	0,015 - 0,040	
4,0	< 8,0	< 0,8	0,030 - 0,060	< 4,0	4,0	0,025 - 0,050	
5,0	< 10,0	< 1,0	0,042 - 0,072	< 5,0	5,0	0,035 - 0,060	
6,0	< 12,0	< 1,2	0,054 - 0,096	< 6,0	6,0	0,045 - 0,080	
8,0	< 16,0	< 1,6	0,066 - 0,120	< 8,0	8,0	0,055 - 0,100	
10,0	< 20,0	< 2,0	0,090 - 0,144	< 10,0	10,0	0,075 - 0,120	
12,0	< 24,0	< 2,4	0,108 - 0,168	< 12,0	12,0	0,090 - 0,140	

Standard



* For endmills / für Schaftfräser L < 100 mm.



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHGTf 2 020 050 03 02 S	2,0	0,10	3	50	3,00	10,00	0,100	2	15
VHGTf 2 030 051 06 02 S	3,0	0,10	6	51	4,00	10,00	0,100	2	15
VHGTf 4 040 051 06 02 S	4,0	0,20	6	51	4,00	10,00	0,100	4	15
VHGTf 4 050 051 06 02 S	5,0	0,20	6	51	5,00	10,00	0,150	4	15
VHGTf 4 060 051 06 02 S	6,0	0,30	6	51	6,00	10,00	0,200	4	-
VHGTf 4 080 064 08 02 S	8,0	0,30	8	64	8,00	15,00	0,300	4	-
VHGTf 4 100 078 10 02 S	10,0	0,30	10	78	10,00	20,00	0,300	4	-
VHGTf 4 120 078 12 02 S	12,0	0,30	12	78	10,00	20,00	0,300	4	-
Standard									
VHGTf 3 020 050 02 02	2,0	0,10	2	50	10,00	-	-	3	-
VHGTf 3 020 050 03 02	2,0	0,10	3	50	10,00	-	-	3	15
VHGTf 3 020 050 03 02 L150	2,0	0,10	3	50	10,00	15,00	0,100	3	10
VHGTf 3 020 050 03 02 L200	2,0	0,10	3	50	10,00	20,00	0,100	3	15
VHGTf 3 020 065 03 02 L300	2,0	0,10	3	65	10,00	30,00	0,100	3	15
VHGTf 3 020 080 03 02 L300	2,0	0,10	3	80	10,00	30,00	0,100	3	15
VHGTf 3 030 050 03 02	3,0	0,10	3	50	10,00	-	-	3	-
VHGTf 3 030 065 03 02 L200	3,0	0,10	3	65	10,00	20,00	0,100	3	-
VHGTf 3 030 065 03 02 L300	3,0	0,10	3	65	10,00	30,00	0,100	3	-
VHGTf 3 030 080 03 02 L300	3,0	0,10	3	80	10,00	30,00	0,100	3	-
VHGTf 3 040 060 04 02	4,0	0,20	4	60	15,00	-	-	3	-
VHGTf 3 050 060 05 02	5,0	0,20	5	60	20,00	-	-	3	-
VHGTf 3 060 078 06 02	6,0	0,30	6	78	30,00	-	-	3	-
VHGTf 3 080 078 08 02	8,0	0,30	8	78	30,00	-	-	3	-
VHGTf 3 100 078 10 02	10,0	0,30	10	78	30,00	-	-	3	-
VHGTf 3 120 089 12 02	12,0	0,30	12	89	30,00	-	-	3	-
Long / Lange Ausführung									
VHGTf 2 040 102 04 02	4,0	0,30	4	102	10,00	-	-	2	-
VHGTf 2 050 102 05 02	5,0	0,50	5	102	13,00	-	-	2	-
VHGTf 2 060 102 06 02	6,0	0,50	6	102	42,00	-	-	2	-
VHGTf 2 060 150 06 02	6,0	0,50	6	150	26,00	-	-	2	-
VHGTf 2 080 150 08 02	8,0	0,50	8	150	41,00	-	-	2	-
VHGTf 2 100 150 10 02	10,0	0,50	10	150	42,00	-	-	2	-

new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air

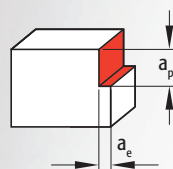
VHGT30400600402

Material EDM-3 Graphite

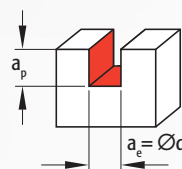
Vc	440 m/min
n	35000 rpm
f_z	0,049 mm/t
v_f	5145 mm/min
a_p	0,8 mm
a_e	1,6 mm
Coolant	air

Q 6,60 cm³/min

- More accuracy.
Höhere Genauigkeit.
- Smooth surface on the workpiece.
Glatte Werkstückoberflächen.
- Longer tool life.
Längere Standzeit.



a_p up to 2,0 x d
a_e up to 0,2 x d



a_p up to 1,00 x d

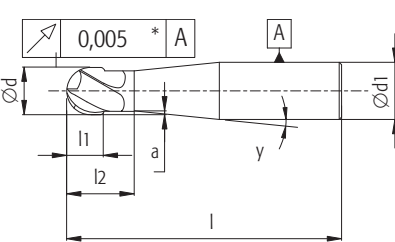
Shoulder milling / Eckfräsen

Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
2,0	< 4,0	< 0,4	0,012 - 0,036
3,0	< 6,0	< 0,6	0,018 - 0,048
4,0	< 8,0	< 0,8	0,030 - 0,060
5,0	< 10,0	< 1,0	0,042 - 0,072
6,0	< 12,0	< 1,2	0,054 - 0,096
8,0	< 16,0	< 1,6	0,066 - 0,120
10,0	< 20,0	< 2,0	0,090 - 0,144
12,0	< 24,0	< 2,4	0,108 - 0,168

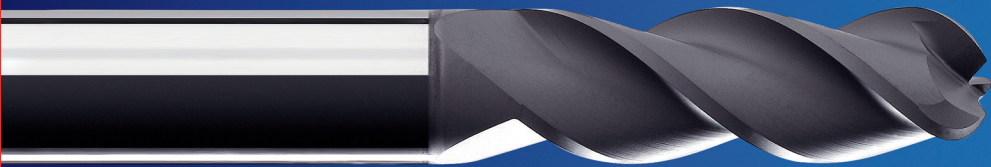
Slot milling / Nutfräsen

a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
< 2,0	2,0	0,010 - 0,030
< 3,0	3,0	0,015 - 0,040
< 4,0	4,0	0,025 - 0,050
< 5,0	5,0	0,035 - 0,060
< 6,0	6,0	0,045 - 0,080
< 8,0	8,0	0,055 - 0,100
< 10,0	10,0	0,075 - 0,120
< 12,0	12,0	0,090 - 0,140

Standard



* For endmills / für Schaftfräser L < 100 mm.



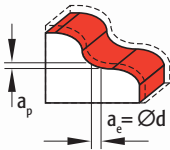
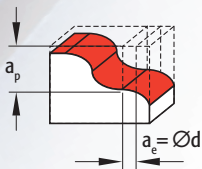
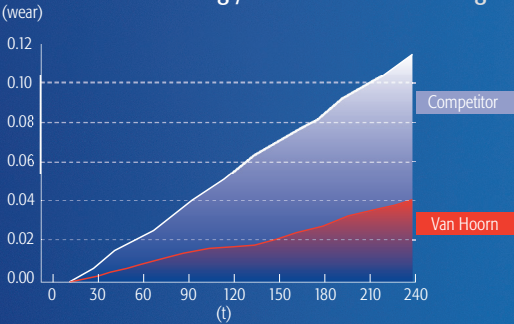
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Short / Kurze Ausführung									
VHGKF 2 020 050 03 02 S	2,0	1,00	3	50	3,00	10,00	0,100	2	15
VHGKF 2 030 051 06 02 S	3,0	1,50	6	51	4,00	10,00	0,100	2	15
VHGKF 4 040 051 06 02 S	4,0	2,00	6	51	4,00	10,00	0,100	4	15
VHGKF 4 050 051 06 02 S	5,0	2,50	6	51	5,00	10,00	0,150	4	15
VHGKF 4 060 051 06 02 S	6,0	3,00	6	51	6,00	10,00	0,200	4	-
VHGKF 4 080 064 08 02 S	8,0	4,00	8	64	8,00	15,00	0,300	4	-
VHGKF 4 100 078 10 02 S	10,0	5,00	10	78	10,00	20,00	0,300	4	-
VHGKF 4 120 078 12 02 S	12,0	6,00	12	78	10,00	20,00	0,300	4	-
Standard									
VHGKF 3 020 050 02 02	2,0	1,00	2	50	10,00	-	-	3	-
VHGKF 3 020 050 03 02	2,0	1,00	3	50	10,00	-	-	3	15
VHGKF 3 020 050 03 02 L150	2,0	1,00	3	50	10,00	15,00	0,100	3	15 new/neu
VHGKF 3 020 050 03 02 L200	2,0	1,00	3	50	10,00	20,00	0,100	3	15 new/neu
VHGKF 3 020 065 03 02 L300	2,0	1,00	3	65	10,00	30,00	0,100	3	15 new/neu
VHGKF 3 030 050 03 02	3,0	1,50	3	50	10,00	-	-	3	-
VHGKF 3 030 050 03 02 L150	3,0	1,50	3	50	10,00	15,00	0,100	3	- new/neu
VHGKF 3 030 050 03 02 L200	3,0	1,50	3	50	10,00	20,00	0,100	3	- new/neu
VHGKF 3 030 050 03 02 L300	3,0	1,50	3	50	10,00	30,00	0,100	3	- new/neu
VHGKF 3 040 060 04 02	4,0	2,00	4	60	15,00	-	-	3	-
VHGKF 3 050 060 05 02	5,0	2,50	5	60	20,00	-	-	3	-
VHGKF 3 060 078 06 02	6,0	3,00	6	78	30,00	-	-	3	-
VHGKF 3 080 078 08 02	8,0	4,00	8	78	30,00	-	-	3	-
VHGKF 3 100 078 10 02	10,0	5,00	10	78	30,00	-	-	3	-
VHGKF 3 120 089 12 02	12,0	6,00	12	89	30,00	-	-	3	-
Long / Lange Ausführung									
VHGKF 2 020 102 03 02	2,0	1,00	3	102	6,00	-	-	2	15
VHGKF 2 030 102 03 02	3,0	1,50	3	102	16,00	-	-	2	-
VHGKF 2 040 102 04 02	4,0	2,00	4	102	16,00	-	-	2	-
VHGKF 2 060 102 06 02	6,0	3,00	6	102	42,00	-	-	2	-
VHGKF 2 060 150 06 02	6,0	3,00	6	150	42,00	-	-	2	-
VHGKF 2 080 102 08 02	8,0	4,00	8	102	42,00	-	-	2	-
VHGKF 2 080 150 08 02	8,0	4,00	8	150	42,00	-	-	2	-
VHGKF 2 100 150 10 02	10,0	5,00	10	150	45,00	-	-	2	-
VHGKF 2 120 150 12 02	12,0	6,00	12	150	65,00	-	-	2	-

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed V _c m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air

VHGKF30400600402
Material ISO 63

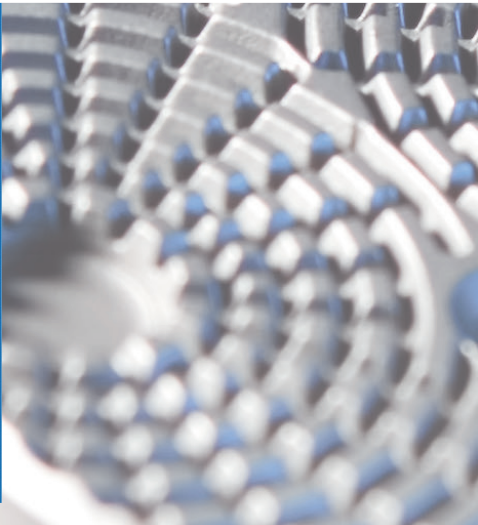
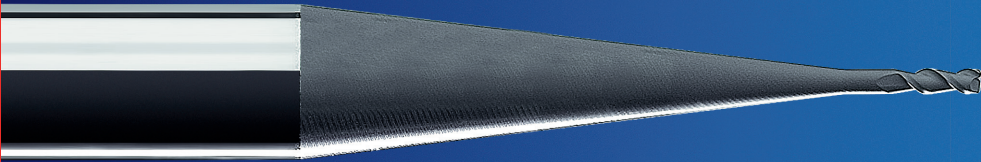
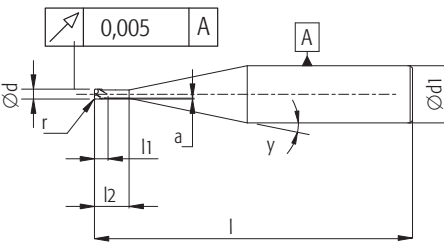
V _c	276 m/min
n	22000 rpm
f _z	0,121 mm/t
v _f	8000 mm/min
a _p	5,0 mm
a _e	0,1 mm
Coolant	air
Q	4,0 cm ³ /min

Wear / Verschleiß
Diamond coating / Diamantbeschichtung



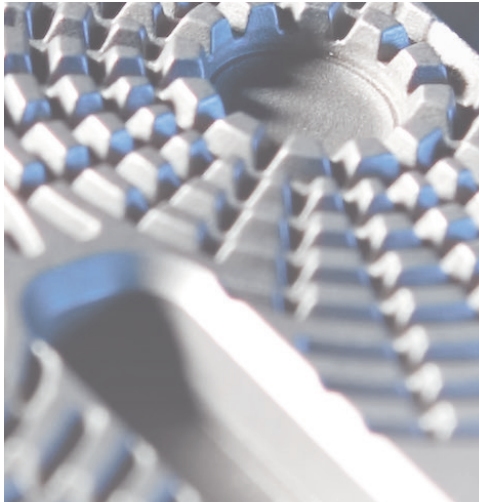
Roughing / Schrappen				Finishing / Schlichten		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
2,0	< 4,0	< 0,4	0,012 - 0,036	< 0,4	0,2	0,012 - 0,036
3,0	< 6,0	< 0,6	0,018 - 0,048	< 0,6	0,3	0,018 - 0,048
4,0	< 8,0	< 0,8	0,030 - 0,060	< 0,8	0,4	0,030 - 0,060
5,0	< 10,0	< 1,0	0,042 - 0,072	< 1,0	0,5	0,042 - 0,072
6,0	< 12,0	< 1,2	0,054 - 0,096	< 1,2	0,6	0,054 - 0,096
8,0	< 16,0	< 1,6	0,066 - 0,120	< 1,6	0,8	0,066 - 0,120
10,0	< 20,0	< 2,0	0,090 - 0,144	< 2,0	1,0	0,090 - 0,144
12,0	< 24,0	< 2,4	0,108 - 0,168	< 2,4	1,2	0,108 - 0,168

Standard



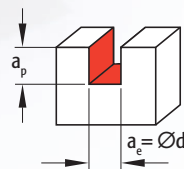
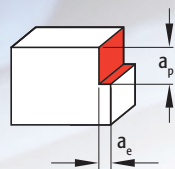
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMG 2 003 064 06 02 L010	0,3	0,05	6	64	1,00	-	-	2	7	1,743	1,896	2,304	2,944
VHMG 2 003 064 06 02 L025	0,3	0,05	6	64	1,50	2,50	0,010	2	7	2,908	3,148	3,771	4,710
VHMG 2 003 064 06 02	0,3	0,05	6	64	1,50	5,00	0,010	2	8	5,562	5,967	6,988	8,436
VHMG 2 004 064 06 02 L010	0,4	0,05	6	64	1,50	-	-	2	6	1,744	1,900	2,319	2,985
VHMG 2 004 064 06 02 L025	0,4	0,05	6	64	1,50	2,50	0,010	2	7	2,912	3,156	3,797	4,773
VHMG 2 004 064 06 02	0,4	0,05	6	64	1,50	5,00	0,010	2	8	5,568	5,982	7,029	8,529
VHMG 2 005 064 06 02 L015	0,5	0,05	6	64	1,50	-	-	2	6	2,286	2,492	3,043	3,918
VHMG 2 005 064 06 02 L035	0,5	0,05	6	64	1,50	3,50	0,010	2	7	3,984	4,310	5,158	6,429
VHMG 2 005 064 06 02	0,5	0,05	6	64	1,50	7,00	0,010	2	8	7,671	8,192	9,480	11,256
VHMG 2 005 064 06 02 L100	0,5	0,05	6	64	1,50	10,00	0,010	2	10	10,772	11,375	12,813	14,671
VHMG 2 006 064 06 02 L015	0,6	0,05	6	64	1,50	-	-	2	6	2,890	3,157	3,878	5,036
VHMG 2 006 064 06 02 L035	0,6	0,05	6	64	2,00	3,50	0,025	2	7	4,185	4,534	5,442	6,815
VHMG 2 006 064 06 02	0,6	0,05	6	64	2,00	7,00	0,025	2	8	7,864	8,405	9,750	11,614
VHMG 2 006 064 06 02 L100	0,6	0,05	6	64	2,00	10,00	0,025	2	10	10,959	11,582	13,070	15,001
VHMG 2 008 064 06 02 L020	0,8	0,05	6	64	2,00	-	-	2	6	3,435	3,760	4,642	6,078
VHMG 2 008 064 06 02 L050	0,8	0,05	6	64	2,00	5,00	0,025	2	7	5,787	6,253	7,456	9,240
VHMG 2 008 064 06 02 L075	0,8	0,05	6	64	2,00	7,50	0,025	2	8	8,402	8,987	10,447	12,478
VHMG 2 008 064 06 02	0,8	0,05	6	64	2,00	10,00	0,025	2	9	10,978	11,629	13,195	15,253
VHMG 2 008 064 06 02 L150	0,8	0,05	6	64	2,00	15,00	0,025	2	13	16,043	16,674	18,099	19,794
VHMG 2 010 064 06 02 L025	1,0	0,05	6	64	2,50	-	-	2	6	3,982	4,368	5,423	7,163
VHMG 2 010 064 06 02 L050	1,0	0,05	6	64	3,00	5,00	0,025	2	7	5,805	6,294	7,572	9,512
VHMG 2 010 064 06 02 L075	1,0	0,05	6	64	3,00	7,50	0,025	2	8	8,422	9,036	10,581	12,772
VHMG 2 010 064 06 02	1,0	0,05	6	64	3,00	10,00	0,025	2	9	10,999	11,680	13,333	15,537
VHMG 2 010 064 06 02 L150	1,0	0,05	6	64	3,00	15,00	0,025	2	13	16,057	16,716	18,212	20,005
VHMG 2 010 064 06 02 L200	1,0	0,05	6	64	3,00	20,00	0,025	2	18	21,124	21,741	23,091	24,621
VHMG 2 012 064 06 02 L050	1,2	0,05	6	64	3,00	5,00	0,025	2	7	5,950	6,475	7,869	10,037
VHMG 2 012 064 06 02	1,2	0,05	6	64	3,00	10,00	0,025	2	9	11,183	11,907	13,683	16,087
VHMG 2 015 064 06 02 L050	1,5	0,05	6	64	3,00	5,00	0,025	2	6	5,978	6,548	8,094	10,609
VHMG 2 015 064 06 02 L075	1,5	0,05	6	64	3,00	7,50	0,025	2	7	8,618	9,326	11,166	13,921
VHMG 2 015 064 06 02	1,5	0,05	6	64	3,00	10,00	0,025	2	8	11,215	11,996	13,941	16,647
VHMG 2 015 064 06 02 L150	1,5	0,05	6	64	3,00	15,0	0,025	2	12	16,319	17,069	18,798	20,921
VHMG 2 015 064 06 02 L200	1,5	0,05	6	64	3,00	20,0	0,025	2	15	21,448	22,194	23,854	25,785

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air



VHC Diamond coated endmills: VHC Diamant beschichtete Schaftfräser:

- Excellent accuracy and tolerances.
Ausgezeichnete Genauigkeiten und Toleranzen.
- Optimized surface finish on workpiece.
Optimierte Werkstückoberflächen.
- Leading diamond coating technology.
Führende Diamant-Beschichtungstechnologie.
- Superior tool life.
Hervorragende Standzeiten.

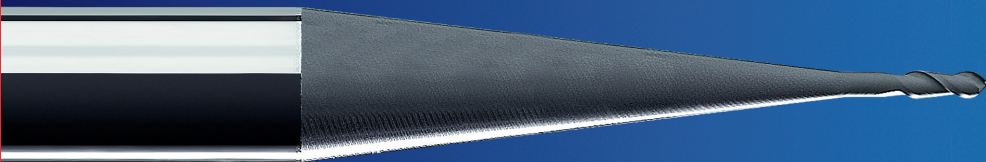
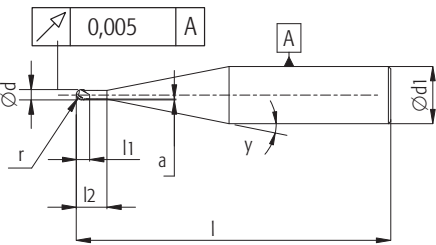


Shoulder milling / Eckfräsen				Slot milling / Nutfräsen		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,3	< 0,6	< 0,03	0,007 - 0,014	< 0,15	0,3	0,006 - 0,012
0,4	< 0,8	< 0,04	0,010 - 0,018	< 0,20	0,4	0,008 - 0,015
0,5	< 1,0	< 0,05	0,012 - 0,024	< 0,25	0,5	0,010 - 0,020
0,6	< 1,2	< 0,06	0,014 - 0,026	< 0,30	0,6	0,012 - 0,022
0,8	< 1,6	< 0,08	0,018 - 0,030	< 0,40	0,8	0,015 - 0,025
1,0	< 2,0	< 0,10	0,022 - 0,036	< 0,50	1,0	0,018 - 0,030
1,2	< 2,4	< 0,12	0,024 - 0,042	< 0,60	1,2	0,020 - 0,035
1,5	< 3,0	< 0,15	0,030 - 0,048	< 0,75	1,5	0,025 - 0,040

- Cutting speed Vc is based on max. 40.000 rpm.
Schnittgeschwindigkeit Vc bezogen auf max. 40.000 U/min.
- Given conditions are based on VHMGK short length endmills; when using endmills with longer L2-length, reduce f_z according table.
Die angegebenen Schnittwerte beziehen sich auf die kurze VHMGK Ausführung; beim Einsatz von Schaftfräsern mit größerem L2-Maß, Vorschub f_z gemäß Tabellenangaben reduzieren.

L2-Length	Reduction
1-5 x d	0%
5-10 x d	30%
10 ~	50%

Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle			
										0,5°	1°	2°	3°
VHMCK 2 003 064 06 02 L010	0,3	0,15	6	64	1,00	-	-	2	6	1,736	1,886	2,292	2,946
VHMCK 2 003 064 06 02 L025	0,3	0,15	6	64	1,50	2,50	0,010	2	7	2,901	3,131	3,731	4,635
VHMCK 2 003 064 06 02	0,3	0,15	6	64	1,50	5,00	0,010	2	8	5,555	5,953	6,953	8,373
VHMCK 2 004 064 06 02 L010	0,4	0,20	6	64	1,50	-	-	2	6	1,731	1,880	2,283	2,942
VHMCK 2 004 064 06 02 L025	0,4	0,20	6	64	1,50	2,50	0,010	2	7	2,900	3,131	3,735	4,656
VHMCK 2 004 064 06 02	0,4	0,20	6	64	1,50	5,00	0,010	2	8	5,557	5,959	6,976	8,432
VHMCK 2 005 064 06 02 L015	0,5	0,25	6	64	1,50	-	-	2	6	2,272	2,472	3,020	3,928
VHMCK 2 005 064 06 02 L035	0,5	0,25	6	64	1,50	3,50	0,010	2	7	3,968	4,277	5,078	6,280
VHMCK 2 005 064 06 02	0,5	0,25	6	64	1,50	7,00	0,010	2	8	7,658	8,164	9,417	11,143
VHMCK 2 005 064 06 02 L100	0,5	0,25	6	64	1,50	10,00	0,010	2	10	10,761	11,353	12,762	14,584
VHMCK 2 006 064 06 02 L015	0,6	0,30	6	64	1,50	-	-	2	6	2,871	3,131	3,849	5,055
VHMCK 2 006 064 06 02 L035	0,6	0,30	6	64	2,00	3,50	0,025	2	7	4,166	4,492	5,341	6,624
VHMCK 2 006 064 06 02	0,6	0,30	6	64	2,00	7,00	0,025	2	8	7,848	8,371	9,670	11,470
VHMCK 2 006 064 06 02 L100	0,6	0,30	6	64	2,00	10,00	0,025	2	10	10,946	11,554	13,006	14,890
VHMCK 2 008 064 06 02 L020	0,8	0,40	6	64	2,00	-	-	2	6	3,413	3,731	4,625	6,177
VHMCK 2 008 064 06 02 L050	0,8	0,40	6	64	2,00	5,00	0,025	2	7	5,761	6,196	7,320	8,987
VHMCK 2 008 064 06 02 L075	0,8	0,40	6	64	2,00	7,50	0,025	2	8	8,379	8,938	10,332	12,273
VHMCK 2 008 064 06 02	0,8	0,40	6	64	2,00	10,00	0,025	2	9	10,958	11,587	13,100	15,089
VHMCK 2 008 064 06 02 L150	0,8	0,40	6	64	2,00	15,00	0,025	2	13	16,029	16,646	18,039	19,695
VHMCK 2 010 064 06 02 L025	1,0	0,50	6	64	2,50	-	-	2	5	3,958	4,341	5,437	7,410
VHMCK 2 010 064 06 02 L050	1,0	0,50	6	64	3,00	5,00	0,025	2	7	5,770	6,218	7,388	9,164
VHMCK 2 010 064 06 02 L075	1,0	0,50	6	64	3,00	7,50	0,025	2	8	8,392	8,970	10,427	12,491
VHMCK 2 010 064 06 02	1,0	0,50	6	64	3,00	10,00	0,025	2	9	10,973	11,624	13,205	15,313
VHMCK 2 010 064 06 02 L150	1,0	0,50	6	64	3,00	15,00	0,025	2	13	16,040	16,679	18,131	19,872
VHMCK 2 010 064 06 02 L200	1,0	0,50	6	64	3,00	20,00	0,025	2	18	21,111	21,715	23,035	24,532
VHMCK 2 012 064 06 02 L050	1,2	0,60	6	64	3,00	5,00	0,025	2	7	5,905	6,378	7,630	9,579
VHMCK 2 012 064 06 02	1,2	0,60	6	64	3,00	10,00	0,025	2	9	11,149	11,836	13,518	15,796
VHMCK 2 015 064 06 02 L050	1,5	0,75	6	64	3,00	5,00	0,025	2	6	5,917	6,413	7,761	9,953
VHMCK 2 015 064 06 02 L075	1,5	0,75	6	64	3,00	7,50	0,025	2	7	8,564	9,210	10,889	13,401
VHMCK 2 015 064 06 02	1,5	0,75	6	64	3,00	10,00	0,025	2	8	11,169	11,898	13,713	16,238
VHMCK 2 015 064 06 02 L150	1,5	0,75	6	64	3,00	15,00	0,025	2	12	16,288	17,004	18,656	20,684
VHMCK 2 015 064 06 02 L200	1,5	0,75	6	64	3,00	20,00	0,025	2	15	21,425	22,145	23,749	25,615

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.4			< 600	air
N5.5			< 600	air
N5.6			350 - 500	air

VHMGK20100640602

Workpiece Material: Poco Graphite

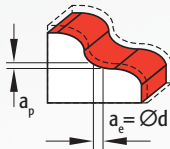
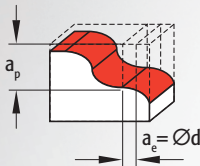
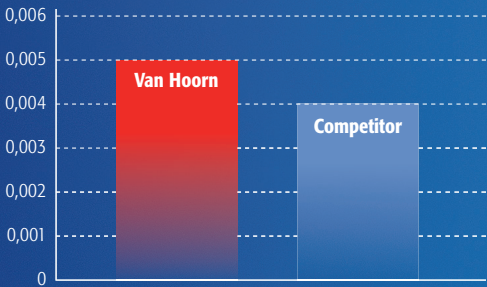
Hardness: 1700

	Van Hoorn	Competitor
v_c	126 m/min	126 m/min
n	40000 rpm	40000 rpm
F_z	0,013 mm/t	0,010 mm/t
v_f	1000 mm/min	800 mm/min
a_p	0,05 mm	0,05 mm
a_e	0,10 mm	0,10 mm
Coolant	air	air

Q 0,005 mm³/min 0,004 mm³/min

Finishing application

Metal removal rate
Zeitspanvolumen



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen		
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)
0,3	< 0,3	<0,03	0,007 - 0,014	< 0,03	0,03	0,007 - 0,014
0,4	< 0,4	<0,04	0,010 - 0,018	< 0,04	0,04	0,010 - 0,018
0,5	< 0,5	<0,05	0,012 - 0,024	< 0,05	0,05	0,012 - 0,024
0,6	< 0,6	<0,06	0,014 - 0,026	< 0,06	0,06	0,014 - 0,026
0,8	< 0,8	<0,08	0,018 - 0,030	< 0,08	0,08	0,018 - 0,030
1,0	< 1,0	<0,10	0,022 - 0,036	< 0,10	0,10	0,022 - 0,036
1,2	< 1,2	<0,12	0,024 - 0,042	< 0,12	0,12	0,024 - 0,042
1,5	< 1,5	<0,15	0,030 - 0,048	< 0,15	0,15	0,030 - 0,048

- Cutting speed Vc is based on max. 40.000 rpm.

Schnittgeschwindigkeit Vc bezogen auf max.
40.000 U/min.

- Given conditions are based on VHMGK short length endmills; when using endmills with longer L2-length, reduce f_z according table.

Die angegebenen Schnittwerte beziehen sich auf die kurze VHMGK Ausführung; beim Einsatz von Schaftfräsern mit größerem L2-Maß, Vorschub f_z gemäß Tabellenangaben reduzieren.

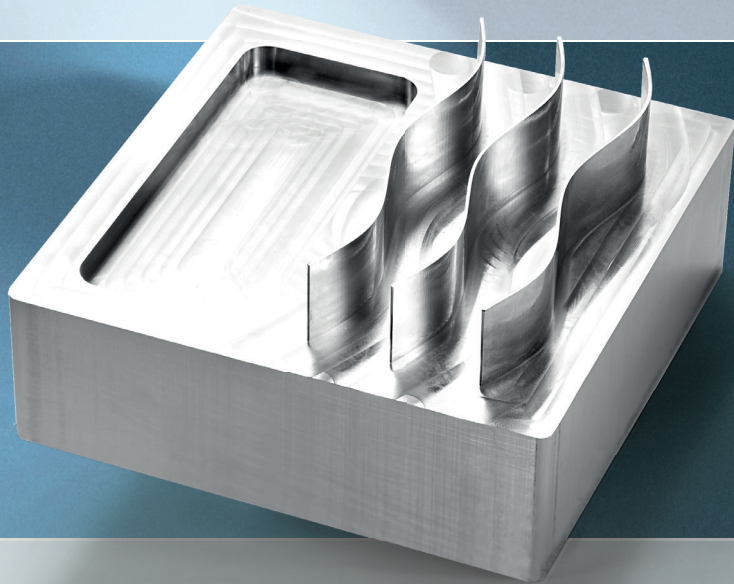
L2-Length	Reduction
1-5 x d	0%
5-10 x d	30%
10 ~	50%

Milling of non Ferrous... an absolute strength.

Fräsen von Nichteisen - Werkstoffe (NE)... unsere Stärke.

With a number of superior endmills for applications on non Ferrous materials, we prove our strength every day: Now we expand the possibilities with the VHMA, VHMAK, VHKE, VHAD.

Mit einer großen Zahl an Top-Fräsern für die NE-Metall beweisen wir täglich aufs Neue unsere Stärke. Jetzt haben wir unsere Lösungen mit den VHMA, VHMAK, VHKE, VHAD erweitert.



**High performance machining
non Ferrous!
Hohe Leistung beim Bearbeitung
NE-Metalle!**

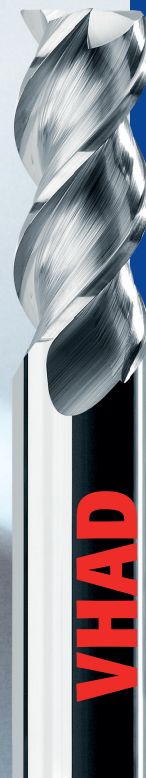
Advantages / Vorteile VHAD

- Allround endmill
Allround-Schaftfräser
- High material removal rates & a smooth surface finish
Hohe Zerspanungsleistung und glatte Oberflächen
- Polished flutes for optimized chip evacuation
Polierte Spannkammer für optimale Späneabfuhr
- Excellent chip flow: high material removal rates
Hervorragende Spanabfuhr: hohe Zerspanungsleistung

High productivity Hohe Produktivität

Workpiece Material: 3.2315
End mill: VHAD3100072
Hardness: Aluminium 51ST

v_c	500 m/min
n	15915 rpm
f_z	0,25 mm/t
Z	3
v_f	11936 mm/min
a_p	10 mm
a_e	10 mm
Coolant	emulsion
Q	1193,7 cm³/min



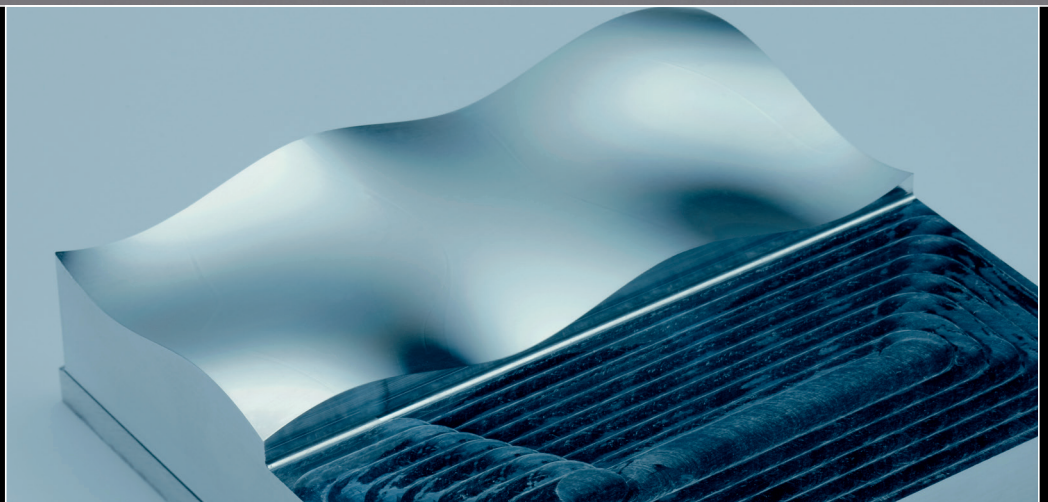
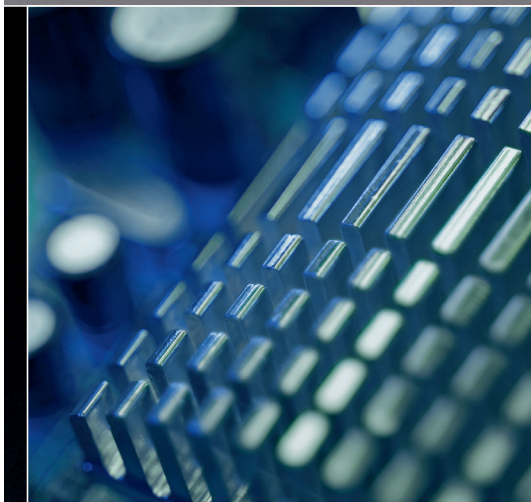
Application demands on aluminium:

Anforderungen in der Aluminium-Bearbeitung:

- Large chipping volumes: VHRA (Improved geometry).
Großes Zeitspanvolumen: VHRAW (verbesserte Schneidengeometrie).
- Burr-free or thin wall applications: VHLA and VHLA.
Gratfreie oder Bearbeitung dünnwandigere.
Werkstücke: VHLAW und VHLA.
- Operation flexibility: VHAE.
Flexible Anwendung: VHAE.
- Multiple demands: VHAD.
Wechselnde Einsatzbedingungen: VHAD.

Micro milling Mikro fräsen

- Straight - VHMA.
Gerade - VHMA.
- Ballnose - VHMAK.
Kugel - VHMAK.

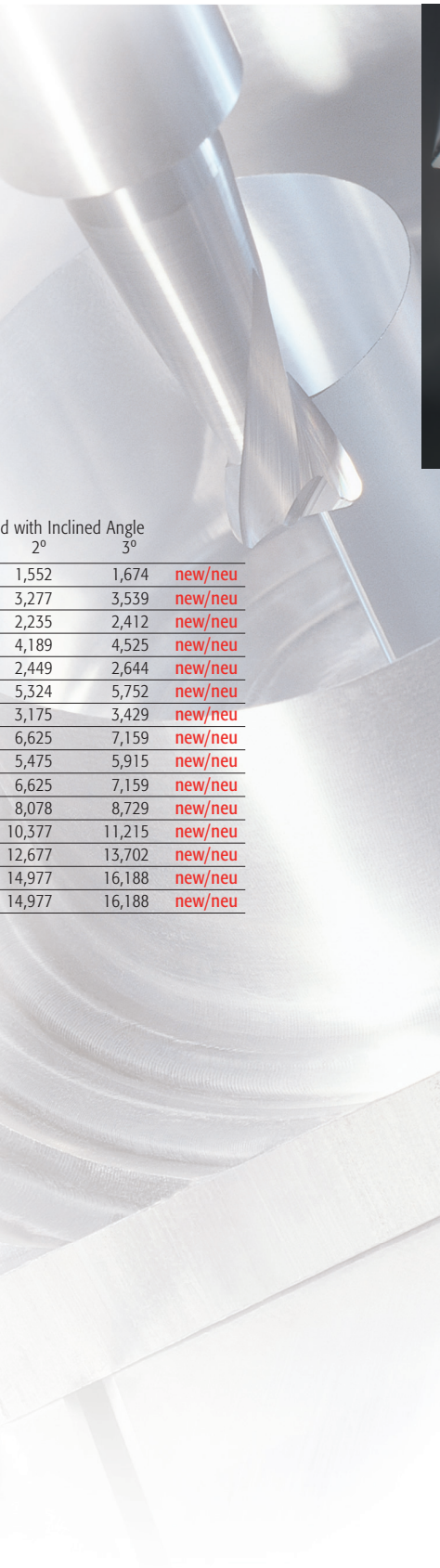
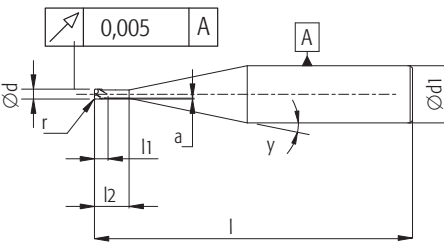


Non Ferrous materials are / NE-Metalle sind

- Aluminium / Aluminium
- Copper / Kupfer
- Bronze / Bronze
- Lead / Blei
- Brass / Messing
- Zinc / Zink
- Plastics / Kunststoff

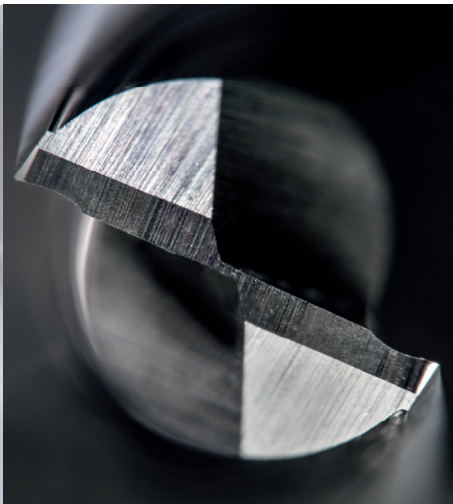


Standard



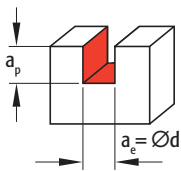
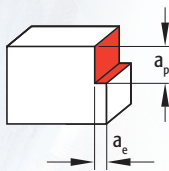
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMA 2 003 064 06 10 L010	0,3	0,05	6	64	0,60	1,00	0,025	2	15	1,401	1,448	1,552	1,674	new/neu
VHMA 2 003 064 06 10 L025	0,3	0,05	6	64	0,60	2,50	0,025	2	15	2,951	3,052	3,277	3,539	new/neu
VHMA 2 004 064 06 10 L015	0,4	0,05	6	64	0,80	1,50	0,050	2	15	2,014	2,082	2,235	2,412	new/neu
VHMA 2 004 064 06 10 L032	0,4	0,05	6	64	0,80	3,20	0,050	2	15	3,771	3,901	4,189	4,525	new/neu
VHMA 2 005 064 06 10 L015	0,5	0,05	6	64	1,00	1,50	0,100	2	15	2,207	2,282	2,449	2,644	new/neu
VHMA 2 005 064 06 10 L040	0,5	0,05	6	64	1,00	4,00	0,100	2	15	4,791	4,956	5,324	5,752	new/neu
VHMA 2 006 064 06 10 L020	0,6	0,05	6	64	1,20	2,00	0,100	2	15	2,860	2,958	3,175	3,429	new/neu
VHMA 2 006 064 06 10 L050	0,6	0,05	6	64	1,20	5,00	0,100	2	15	5,961	6,167	6,625	7,159	new/neu
VHMA 2 008 064 06 10 L040	0,8	0,05	6	64	1,60	4,00	0,100	2	15	4,927	5,097	5,475	5,915	new/neu
VHMA 2 010 064 06 10 L050	1,0	0,05	6	64	2,00	5,00	0,100	2	15	5,961	6,167	6,625	7,159	new/neu
VHMA 2 012 064 06 10 L060	1,2	0,05	6	64	2,40	6,00	0,100	2	15	7,267	7,518	8,078	8,729	new/neu
VHMA 2 015 064 06 10 L080	1,5	0,05	6	64	3,00	8,00	0,100	2	15	9,334	9,657	10,377	11,215	new/neu
VHMA 2 020 064 06 10 L100	2,0	0,05	6	64	3,00	10,00	0,100	2	15	11,401	11,797	12,677	13,702	new/neu
VHMA 2 025 064 06 10 L120	2,5	0,05	6	64	3,00	12,00	0,100	2	15	13,468	13,936	14,977	16,188	new/neu
VHMA 2 030 064 06 10 L120	3,0	0,05	6	64	3,00	12,00	0,100	2	15	13,468	13,936	14,977	16,188	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air



**Micro milling of non Ferrous
Mikro Fräsen von Nichteisen - Werkstoffe**

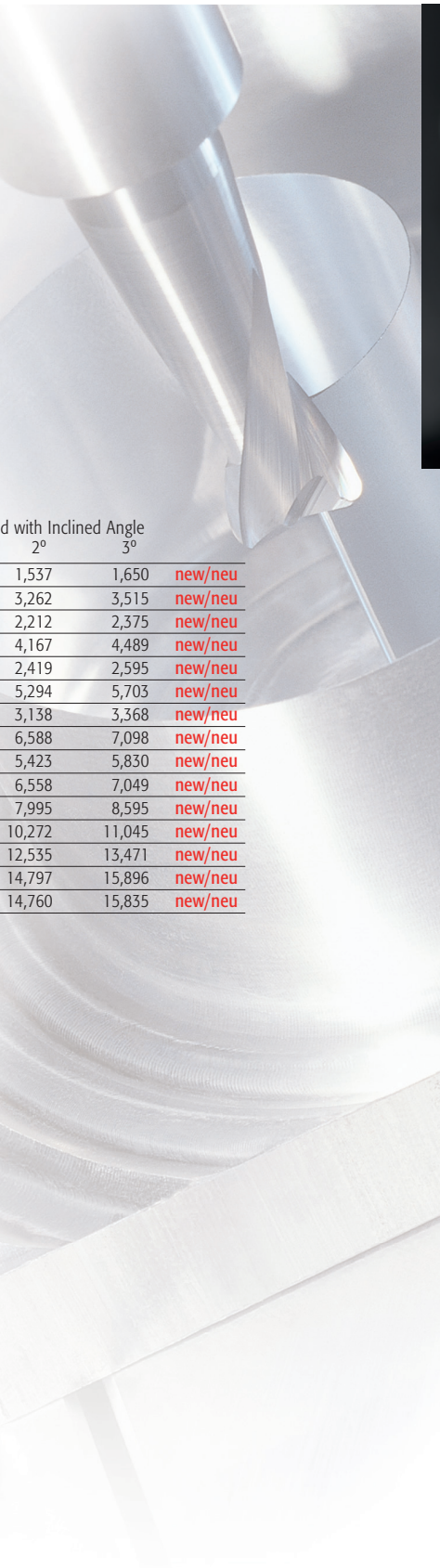
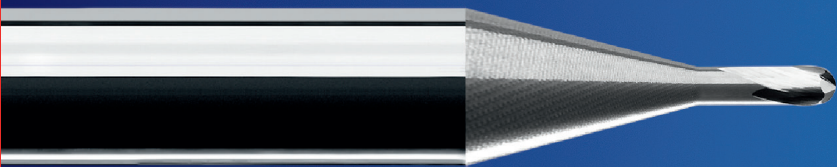
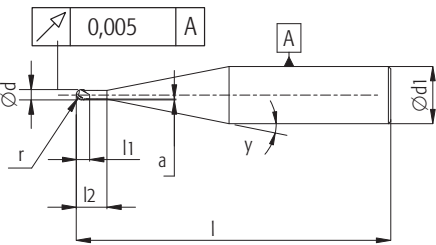
- High accuracy
Hohe Genauigkeit
- Optimized chip evacuation
Optimale Späneabfuhr
- Smooth surface finish
Glatte Oberflächen



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen		
Ød (mm)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)
0,3	< 0,3	<0,03	0,005 - 0,009	< 0,12	0,3	0,003 - 0,006
0,4	< 0,4	<0,04	0,007 - 0,012	< 0,16	0,4	0,005 - 0,009
0,5	< 0,5	<0,05	0,009 - 0,015	< 0,20	0,5	0,007 - 0,012
0,6	< 0,6	<0,06	0,011 - 0,018	< 0,24	0,6	0,009 - 0,014
0,8	< 0,8	<0,08	0,013 - 0,021	< 0,32	0,8	0,010 - 0,016
1,0	< 1,0	<0,10	0,016 - 0,025	< 0,40	1,0	0,012 - 0,019
1,2	< 1,2	<0,12	0,020 - 0,030	< 0,48	1,2	0,015 - 0,023
1,5	< 1,5	<0,15	0,030 - 0,040	< 0,60	1,5	0,023 - 0,030
2,0	< 2,0	<0,20	0,035 - 0,050	< 0,80	2,0	0,026 - 0,038
2,5	< 2,5	<0,25	0,040 - 0,060	< 1,00	2,5	0,030 - 0,045
3,0	< 3,0	<0,30	0,050 - 0,075	< 1,20	3,0	0,038 - 0,056

- Cutting speed Vc is based on max. 50.000 rpm.
Schnittgeschwindigkeit Vc bezogen auf max. 50.000 U/min.
- Endmills can be used also for drilling with reduced cutting conditions.
Mit verringerten Schnittwerten können die Fräser auch zur Herstellung von Bohrungen verwendet werden.

Standard



Article Number <i>Artikelnummer</i>	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	Effective length compared with Inclined Angle				
										0,5°	1°	2°	3°	
VHMAK 2 003 064 06 10 L010	0,3	0,15	6	64	0,60	1,00	0,025	2	15	1,397	1,441	1,537	1,650	new/neu
VHMAK 2 003 064 06 10 L025	0,3	0,15	6	64	0,60	2,50	0,025	2	15	2,948	3,045	3,262	3,515	new/neu
VHMAK 2 004 064 06 10 L015	0,4	0,20	6	64	0,80	1,50	0,050	2	15	2,009	2,072	2,212	2,375	new/neu
VHMAK 2 004 064 06 10 L032	0,4	0,20	6	64	0,80	3,20	0,050	2	15	3,766	3,890	4,167	4,489	new/neu
VHMAK 2 005 064 06 10 L015	0,5	0,25	6	64	1,00	1,50	0,100	2	15	2,200	2,268	2,419	2,595	new/neu
VHMAK 2 005 064 06 10 L040	0,5	0,25	6	64	1,00	4,00	0,100	2	15	4,784	4,942	5,294	5,703	new/neu
VHMAK 2 006 064 06 10 L020	0,6	0,30	6	64	1,20	2,00	0,100	2	15	2,851	2,940	3,138	3,368	new/neu
VHMAK 2 006 064 06 10 L050	0,6	0,30	6	64	1,20	5,00	0,100	2	15	5,952	6,149	6,588	7,098	new/neu
VHMAK 2 008 064 06 10 L040	0,8	0,40	6	64	1,60	4,00	0,100	2	15	4,915	5,073	5,423	5,830	new/neu
VHMAK 2 010 064 06 10 L050	1,0	0,50	6	64	2,00	5,00	0,100	2	15	5,946	6,135	6,558	7,049	new/neu
VHMAK 2 012 064 06 10 L060	1,2	0,60	6	64	2,40	6,00	0,100	2	15	7,248	7,480	7,995	8,595	new/neu
VHMAK 2 015 064 06 10 L080	1,5	0,75	6	64	3,00	8,00	0,100	2	15	9,310	9,609	10,272	11,045	new/neu
VHMAK 2 020 064 06 10 L100	2,0	1,00	6	64	3,00	10,00	0,100	2	15	11,369	11,730	12,535	13,471	new/neu
VHMAK 2 025 064 06 10 L120	2,5	1,25	6	64	3,00	12,00	0,100	2	15	13,428	13,852	14,797	15,896	new/neu
VHMAK 2 030 064 06 10 L120	3,0	1,50	6	64	3,00	12,00	0,100	2	15	13,420	13,835	14,760	15,835	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

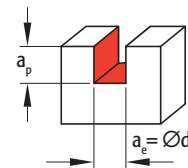
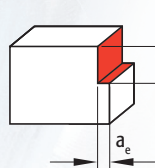
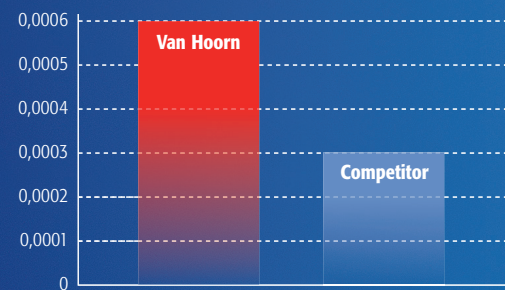
VHMAK 2 015 064 06 10 L080

Workpiece Material: Tungsten Copper

Hardness: -

	Van Hoorn	Competitor
v_c	180 m/min	120 m/min
n	38.200 rpm	25.500 rpm
F_z mm/t	0,021	0,015
v_f mm/min	1500	750
a_p	0,02 mm	0,02 mm
a_e	0,02 mm	0,02 mm
Coolant	emulsion	emulsion
Q mm ³ /min	0,0006	0,0003

**Material removal rate
Zerspanungsleistung**



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
0,3	< 0,3	< 0,03	0,005 - 0,009	< 0,03	< 0,03	0,005 - 0,009	
0,4	< 0,4	< 0,04	0,007 - 0,012	< 0,04	< 0,04	0,007 - 0,012	
0,5	< 0,5	< 0,05	0,009 - 0,015	< 0,05	< 0,05	0,009 - 0,015	
0,6	< 0,6	< 0,06	0,011 - 0,018	< 0,06	< 0,06	0,011 - 0,018	
0,8	< 0,8	< 0,08	0,013 - 0,021	< 0,08	< 0,08	0,013 - 0,021	
1,0	< 1,0	< 0,10	0,016 - 0,025	< 0,10	< 0,10	0,016 - 0,025	
1,2	< 1,2	< 0,12	0,020 - 0,030	< 0,12	< 0,12	0,020 - 0,030	
1,5	< 1,5	< 0,15	0,030 - 0,040	< 0,15	< 0,15	0,030 - 0,040	
2,0	< 2,0	< 0,20	0,035 - 0,050	< 0,20	< 0,20	0,035 - 0,050	
2,5	< 2,5	< 0,25	0,040 - 0,060	< 0,25	< 0,25	0,040 - 0,060	
3,0	< 3,0	< 0,30	0,050 - 0,075	< 0,30	< 0,30	0,050 - 0,075	

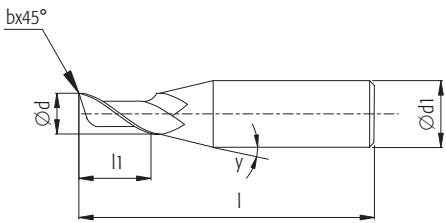
- Cutting speed Vc is based on max. 50.000 rpm.

Schnittgeschwindigkeit Vc bezogen auf max. 50.000 U/min.

- Endmills can be used also for drilling with reduced cutting conditions.

Mit verringerten Schnittwerten können die Fräser auch zur Herstellung von Bohrungen verwendet werden.

Standard



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standard									
VHKE 1 010 039 03 10 L 020	1,0	-	3	39	2,00	-	-	1	15
VHKE 1 010 039 03 10 L 040	1,0	-	3	39	4,00	-	-	1	15
VHKE 1 015 039 03 10 L 025	1,5	-	3	39	2,50	-	-	1	15
VHKE 1 015 039 03 10 L 050	1,5	-	3	39	5,00	-	-	1	15
VHKE 1 020 039 03 10 L 030	2,0	-	3	39	3,00	-	-	1	15
VHKE 1 020 039 03 10 L 060	2,0	-	3	39	6,00	-	-	1	15
VHKE 1 025 039 03 10 L 040	2,5	-	3	39	4,00	-	-	1	15
VHKE 1 025 039 03 10 L 060	2,5	-	3	39	6,00	-	-	1	15
VHKE 1 030 051 06 10 L 040	3,0	0,05	6	51	4,00	-	-	1	15
VHKE 1 030 051 06 10 L 060	3,0	0,05	6	51	6,00	-	-	1	15
VHKE 1 030 051 06 10 L 080	3,0	0,05	6	51	8,00	-	-	1	15
VHKE 1 030 051 06 10 L 120	3,0	0,05	6	51	12,00	-	-	1	15
VHKE 1 040 051 06 10 L 050	4,0	0,05	6	51	5,00	-	-	1	15
VHKE 1 040 051 06 10 L 080	4,0	0,05	6	51	8,00	-	-	1	15
VHKE 1 040 051 06 10 L 100	4,0	0,05	6	51	10,00	-	-	1	15
VHKE 1 040 051 06 10 L 140	4,0	0,05	6	51	14,00	-	-	1	15
VHKE 1 050 051 06 10 L 060	5,0	0,08	6	51	6,00	-	-	1	15
VHKE 1 050 051 06 10 L 100	5,0	0,08	6	51	10,00	-	-	1	15
VHKE 1 050 051 06 10 L 120	5,0	0,08	6	51	12,00	-	-	1	15
VHKE 1 060 051 06 10 L 080	6,0	0,10	6	51	8,00	-	-	1	-
VHKE 1 060 051 06 10 L 120	6,0	0,10	6	51	12,00	-	-	1	-
VHKE 1 060 051 06 10 L 140	6,0	0,10	6	51	14,00	-	-	1	-
VHKE 1 080 060 08 10 L 100	8,0	0,12	8	60	10,00	-	-	1	-
VHKE 1 080 060 08 10 L 160	8,0	0,12	8	60	16,00	-	-	1	-
VHKE 1 100 070 10 10 L 120	10,0	0,15	10	70	12,00	-	-	1	-
VHKE 1 100 070 10 10 L 220	10,0	0,15	10	70	22,00	-	-	1	-
VHKE 1 120 078 12 10 L 150	12,0	0,20	12	78	15,00	-	-	1	-
Long / Lange Ausführung									
VHKE 1 030 060 06 10 L 220	3,0	-	6	60	22,00	-	-	1	15
VHKE 1 040 060 06 10 L 220	4,0	-	6	60	22,00	-	-	1	15
VHKE 1 060 064 06 10 L 250	6,0	-	6	64	25,00	-	-	1	-
VHKE 1 060 070 06 10 L 320	6,0	-	6	70	32,00	-	-	1	-
VHKE 1 080 078 08 10 L 420	8,0	-	8	78	42,00	-	-	1	-

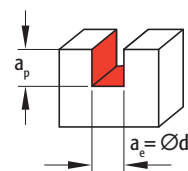
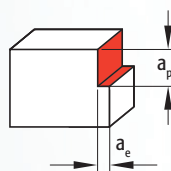
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHKE10300510610L060

Vc	226 m/min
n	24000 rpm
f_z	0,167 mm/t
vf	4000 mm/min
a_p	5,0 mm
a_e	3,0 mm
Coolant	air

Q	60,0 cm ³ /min
----------	---------------------------

- Burr free milling!
Gratfrei fräsen!
- Excellent chip evacuation!
Ausgezeichnete Spanabfuhr!



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
1,0	< 2,0	< 0,4	0,020 - 0,030	< 1,0	1,0	0,015 - 0,022	
1,5	< 3,0	< 0,6	0,030 - 0,050	< 1,5	1,5	0,022 - 0,037	
2,0	< 4,0	< 0,8	0,045 - 0,065	< 2,0	2,0	0,034 - 0,048	
2,5	< 5,0	< 1,0	0,060 - 0,080	< 2,5	2,5	0,045 - 0,060	
3,0	< 6,0	< 1,2	0,070 - 0,100	< 3,0	3,0	0,053 - 0,075	
4,0	< 8,0	< 1,6	0,085 - 0,115	< 4,0	4,0	0,064 - 0,086	
5,0	< 10,0	< 2,0	0,100 - 0,140	< 5,0	5,0	0,075 - 0,105	
6,0	< 12,0	< 2,4	0,125 - 0,175	< 6,0	6,0	0,094 - 0,131	
8,0	< 16,0	< 3,2	0,140 - 0,220	< 8,0	8,0	0,105 - 0,165	
10,0	< 20,0	< 4,0	0,180 - 0,270	< 10,0	10,0	0,135 - 0,200	
12,0	< 15,0	< 4,8	0,220 - 0,300	< 12,0	12,0	0,165 - 0,225	

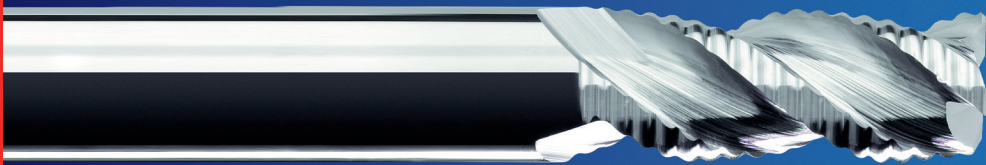
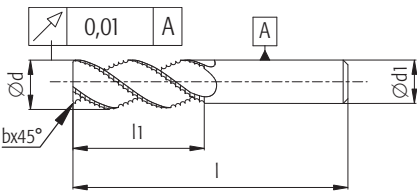
- Cutting speed Vc is based on max. 50.000 rpm.

Schnittgeschwindigkeit Vc bezogen auf max.
50.000 U/min.

- Endmills can be used also for drilling with reduced cutting conditions.

Mit verringerten Schnittwerten können die Fräser
auch zur Herstellung von Bohrungen verwendet
werden.

Standard



**Ripper formed for
optimized chip flow**
Kordelprofil für
optimale Spanabfuhr

Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHRAW 3 060 064 06 15	6,0	0,25	6	64	16,00	-	-	3	-
VHRAW 3 080 064 08 15	8,0	0,50	8	64	20,00	-	-	3	-
VHRAW 3 100 070 10 15	10,0	0,50	10	70	22,00	-	-	3	-
VHRAW 3 120 078 12 15	12,0	0,50	12	78	25,00	-	-	3	-
VHRAW 3 160 089 16 15	16,0	1,00	16	89	35,00	-	-	3	-
VHRAW 3 200 102 20 15	20,0	1,00	20	102	40,00	-	-	3	-
VHRAW 3 250 120 25 15	25,0	1,00	25	120	50,00	-	-	3	-

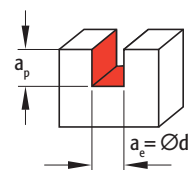
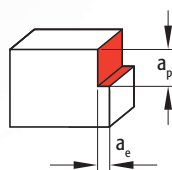
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHRAW31200781215

Material 51ST Aluminium

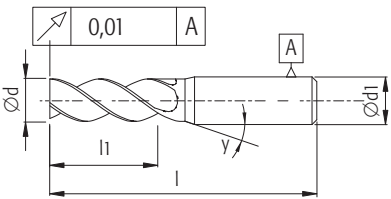
Vc	829 m/min
n	22000 rpm
f_z	0,067 mm/t
v_f	4400 mm/min
a_p	12 mm
a_e	5,5 mm
Coolant	emulsion

Q 290,4 cm³/min



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
6,0	< 12,0	< 2,70	0,040 - 0,080	< 6,00	6,00	0,032 - 0,064	
8,0	< 16,0	< 3,60	0,060 - 0,100	< 8,00	8,00	0,048 - 0,080	
10,0	< 20,0	< 4,50	0,080 - 0,120	< 10,00	10,00	0,064 - 0,096	
12,0	< 24,0	< 5,40	0,090 - 0,150	< 12,00	12,00	0,072 - 0,120	
16,0	< 32,0	< 7,20	0,120 - 0,180	< 16,00	16,00	0,096 - 0,144	
20,0	< 40,0	< 9,00	0,150 - 0,230	< 20,00	20,00	0,120 - 0,184	
25,0	< 50,0	< 11,25	0,180 - 0,280	< 25,00	25,00	0,144 - 0,224	

Standard



2 flute
2 Schneiden

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
VHLA 2 020 039 03 15	2,0	0,10	3	39	3,00	6,00	0,050	2	15
VHLA 2 030 064 03 15	3,0	0,10	3	64	4,00	9,00	0,050	2	-
VHLA 2 040 064 04 15	4,0	0,10	4	64	5,00	12,00	0,100	2	-
VHLA 2 040 064 06 15	4,0	-	6	64	11,00	-	-	2	15
VHLA 2 050 064 05 15	5,0	0,10	5	64	8,00	15,00	0,100	2	-
VHLA 2 050 064 06 15	5,0	-	6	64	13,00	-	-	2	15
VHLA 2 060 064 06 15	6,0	0,10	6	64	8,00	18,00	0,100	2	-
VHLA 2 060 102 06 15	6,0	0,10	6	102	8,00	24,00	0,100	2	-
VHLA 2 080 070 08 15	8,0	0,10	8	70	10,00	24,00	0,100	2	-
VHLA 2 080 102 08 15	8,0	0,10	8	102	10,00	32,00	0,100	2	-
VHLA 2 100 070 10 15	10,0	0,10	10	70	14,00	26,00	0,150	2	- new/neu
VHLA 2 100 102 10 15	10,0	0,10	10	102	14,00	30,00	0,150	2	-
VHLA 2 120 089 12 15	12,0	0,10	12	89	16,00	36,00	0,150	2	-
VHLA 2 120 125 12 15	12,0	0,10	12	125	16,00	48,00	0,150	2	-
VHLA 2 160 089 16 15	16,0	0,10	16	89	20,00	40,00	0,250	2	-
VHLA 2 200 102 20 15	20,0	0,10	20	102	25,00	50,00	0,250	2	-

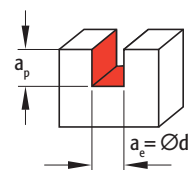
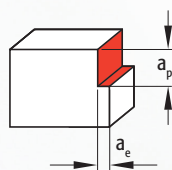
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed V _c m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHLA21001021015

Material PEEK 30

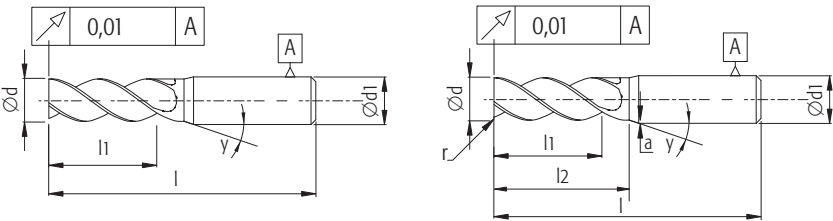
V_c	157 m/min
n	5000 rpm
f_z	0,08 mm/t
v_f	800 mm/min
a_p	10 mm
a_e	4 mm
Coolant	emulsion

Q 32 cm³/min



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
4,0	< 4,0	< 1,80	0,025 - 0,050	< 4,00	4,00	0,020 - 0,040	
5,0	< 5,0	< 2,25	0,030 - 0,060	< 5,00	5,00	0,024 - 0,048	
6,0	< 6,0	< 2,70	0,040 - 0,080	< 6,00	6,00	0,032 - 0,064	
8,0	< 8,0	< 3,60	0,060 - 0,100	< 8,00	8,00	0,048 - 0,080	
10,0	< 10,0	< 4,50	0,080 - 0,120	< 10,00	10,00	0,064 - 0,096	
12,0	< 12,0	< 5,40	0,090 - 0,150	< 12,00	12,00	0,072 - 0,120	
16,0	< 16,0	< 7,20	0,120 - 0,180	< 16,00	16,00	0,096 - 0,144	
20,0	< 20,0	< 9,00	0,150 - 0,230	< 20,00	20,00	0,120 - 0,184	
25,0	< 25,0	< 11,25	0,200 - 0,300	< 25,00	25,00	0,160 - 0,240	

Standard



3 flute
3 Schneiden

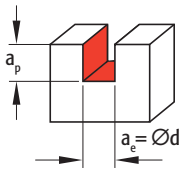
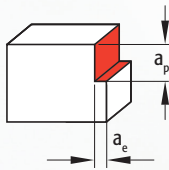
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Standard										
VHLA 3 040 064 06 15	4,0	-	-	6	64	11,0	-	-	3	15 new/neu
VHLA 3 050 064 06 15	5,0	-	-	6	64	13,0	-	-	3	15 new/neu
VHLA 3 060 064 06 15	6,0	-	-	6	64	13,0	-	-	3	-
VHLA 3 080 064 08 15	8,0	-	-	8	64	19,0	-	-	3	-
VHLA 3 100 070 10 15	10,0	-	-	10	70	22,0	-	-	3	-
VHLA 3 120 078 12 15	12,0	-	-	12	78	26,0	-	-	3	-
VHLA 3 160 089 16 15	16,0	-	-	16	89	32,0	-	-	3	-
VHLA 3 200 102 20 15	20,0	-	-	20	102	38,0	-	-	3	-
VHLA 3 250 120 25 15	25,0	-	-	25	120	45,0	-	-	3	-
3xD										
VHLA 3 040 064 06 15 L012	4,0	-	-	6	64	6,0	12,0	-	3	15 new/neu
VHLA 3 050 064 06 15 L015	5,0	-	-	6	64	7,0	15,0	-	3	15 new/neu
VHLA 3 060 064 06 15 L018	6,0	-	-	6	64	9,0	18,0	-	3	- new/neu
VHLA 3 080 064 08 15 L024	8,0	-	-	8	64	12,0	24,0	-	3	- new/neu
VHLA 3 100 072 10 15 L030	10,0	-	-	10	72	15,0	30,0	-	3	- new/neu
VHLA 3 120 083 12 15 L036	12,0	-	-	12	83	18,0	36,0	-	3	- new/neu
VHLA 3 160 100 16 15 L048	16,0	-	-	16	100	24,0	48,0	-	3	- new/neu
VHLA 3 200 110 20 15 L060	20,0	-	-	20	110	30,0	60,0	-	3	- new/neu
5xD										
VHLA 3 040 064 06 15 L020	4,0	-	-	6	64	6,00	20,00	-	3	15 new/neu
VHLA 3 050 064 06 15 L025	5,0	-	-	6	64	7,00	25,00	-	3	15 new/neu
VHLA 3 060 072 06 15 L030	6,0	-	-	6	72	9,00	30,00	-	3	- new/neu
VHLA 3 080 078 08 15 L040	8,0	-	-	8	78	12,00	40,00	-	3	- new/neu
VHLA 3 100 092 10 15 L050	10,0	-	-	10	92	15,00	50,00	-	3	- new/neu
VHLA 3 120 100 12 15 L060	12,0	-	-	12	100	18,00	60,00	-	3	- new/neu
VHLA 3 160 130 16 15 L080	16,0	-	-	16	130	24,00	80,00	-	3	- new/neu
VHLA 3 200 150 20 15 L100	20,0	-	-	20	150	30,00	100,00	-	3	- new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHLA31000701015

Material PA 6 PLM

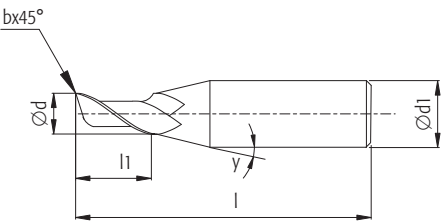
Vc	550 m/min
n	17500 rpm
fz	0,171 mm/t
vf	9000 mm/min
ap	20 mm
ae	10 mm
Coolant	air
Q	1800 cm ³ /min



Ød (mm)	Shoulder milling / Eckfräsen			Slot milling / Nutfräsen		
	ap max. (mm)	ae max. (mm)	fz (mm/tooth)	ap max. (mm)	ae max. (mm)	fz (mm/tooth)
4,0	< 4,0	< 1,80	0,025 - 0,050	< 4,00	4,00	0,020 - 0,040
5,0	< 5,0	< 2,25	0,030 - 0,060	< 5,00	5,00	0,024 - 0,048
6,0	< 6,0	< 2,70	0,040 - 0,080	< 6,00	6,00	0,032 - 0,064
8,0	< 8,0	< 3,60	0,060 - 0,100	< 8,00	8,00	0,048 - 0,080
10,0	< 10,0	< 4,50	0,080 - 0,120	< 10,00	10,00	0,064 - 0,096
12,0	< 12,0	< 5,40	0,090 - 0,150	< 12,00	12,00	0,072 - 0,120
16,0	< 16,0	< 7,20	0,120 - 0,180	< 16,00	16,00	0,096 - 0,144
20,0	< 20,0	< 9,00	0,150 - 0,230	< 20,00	20,00	0,120 - 0,184
25,0	< 25,0	< 11,25	0,200 - 0,300	< 25,00	25,00	0,160 - 0,240

Ø x D	Recalculation / Neuberechnung			Recalculation / Neuberechnung		
	Ap %	Ae %	Fz %	Ap %	Ae %	Fz %
3 x D	150	50	85	60	100	85
5 x D	150	25	60	40	100	60

Standard



Article Number Artikelnummer	Ød (mm)	b (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
VHAE 1 005 038 03 10	0,5	-	3	38	2,50	-	-	1	15	new/neu
VHAE 1 006 038 03 10	0,6	-	3	38	3,00	-	-	1	15	
VHAE 1 008 038 03 10	0,8	-	3	38	4,00	-	-	1	15	
VHAE 1 010 038 03 10	1,0	-	3	38	5,00	-	-	1	15	
VHAE 1 012 038 03 10	1,2	-	3	38	5,00	-	-	1	15	
VHAE 1 015 038 03 10	1,5	-	3	38	5,00	-	-	1	15	
VHAE 1 016 038 03 10	1,6	-	3	38	6,00	-	-	1	15	
VHAE 1 018 038 03 10	1,8	-	3	38	7,00	-	-	1	15	
VHAE 1 020 038 03 10	2,0	-	3	38	8,00	-	-	1	15	
VHAE 1 025 038 03 10	2,5	-	3	38	9,00	-	-	1	15	
VHAE 1 030 038 03 10	3,0	0,10	3	38	12,00	-	-	1	-	
VHAE 1 040 050 04 10	4,0	0,10	4	50	12,00	-	-	1	-	
VHAE 1 050 050 05 10	5,0	0,15	5	50	15,00	-	-	1	-	
VHAE 1 060 050 06 10	6,0	0,20	6	50	16,00	-	-	1	-	
VHAE 1 070 060 07 10	7,0	0,20	7	60	20,00	-	-	1	-	
VHAE 1 080 060 08 10	8,0	0,25	8	60	20,00	-	-	1	-	
VHAE 1 100 070 10 10	10,0	0,30	10	70	22,00	-	-	1	-	
VHAE 1 120 075 12 10	12,0	0,35	12	75	25,00	-	-	1	-	
VHAE 1 160 081 16 10	16,0	0,40	16	81	33,00	-	-	1	-	new/neu

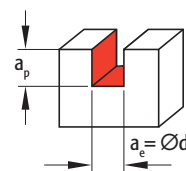
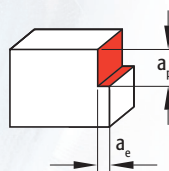
Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHAE11000701010

Material Aluminium

Vc	471 m/min
n	15000 rpm
f_z	0,102 mm/t
v_f	1525 mm/min
a_p	10 mm
a_e	10 mm
Coolant	emulsion

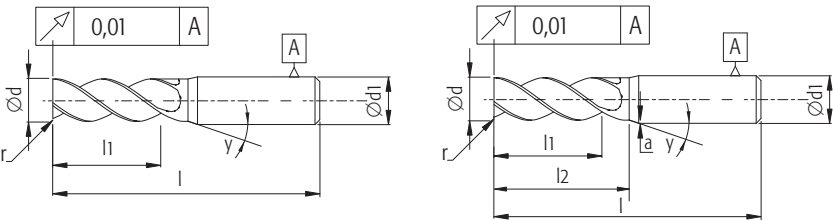
Q 152,5 cm³/min



Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
0,5	< 1,0	< 0,15	0,010 - 0,018	< 0,5	0,5	0,007 - 0,012	
0,6	< 1,2	< 0,18	0,012 - 0,020	< 0,6	0,6	0,009 - 0,015	
0,8	< 1,6	< 0,24	0,016 - 0,024	< 0,8	0,8	0,012 - 0,018	
1,0	< 2,0	< 0,30	0,020 - 0,030	< 1,0	1,0	0,015 - 0,022	
1,2	< 2,4	< 0,36	0,025 - 0,040	< 1,2	1,2	0,019 - 0,030	
1,5	3,0	< 0,45	0,030 - 0,050	< 1,5	1,5	0,022 - 0,037	
1,6	3,2	< 0,48	0,035 - 0,055	< 1,6	1,6	0,026 - 0,041	
1,8	3,6	< 0,54	0,040 - 0,060	< 1,8	1,8	0,030 - 0,045	
2,0	4,0	< 0,60	0,045 - 0,065	< 2,0	2,0	0,034 - 0,048	
2,5	5,0	< 0,75	0,060 - 0,080	< 2,5	2,5	0,045 - 0,060	
3,0	< 6,0	< 0,90	0,070 - 0,100	< 3,0	3,0	0,053 - 0,075	
4,0	< 8,0	< 1,20	0,085 - 0,115	< 4,0	4,0	0,064 - 0,086	
5,0	< 10,0	< 1,50	0,100 - 0,140	< 5,0	5,0	0,075 - 0,105	
6,0	< 12,0	< 1,80	0,125 - 0,175	< 6,0	6,0	0,094 - 0,131	
7,0	14,0	< 2,10	0,132 - 0,200	< 7,0	7,0	0,100 - 0,150	
8,0	< 16,0	< 2,40	0,140 - 0,220	< 8,0	8,0	0,105 - 0,165	
10,0	< 20,0	< 3,00	0,180 - 0,270	< 10,0	10,0	0,135 - 0,200	
12,0	< 15,0	< 3,60	0,220 - 0,300	< 12,0	12,0	0,165 - 0,225	
16,0	< 16,0	< 4,80	0,250 - 0,350	< 16,0	16,0	0,180 - 0,250	

- Cutting speed Vc is based on max. 20.000 rpm. Schnittgeschwindigkeit Vc bezogen auf max. 20.000 U/min.
- Conditions are based on pure aluminium for < 5% Si reduce feed per tooth f_z up to 10% and for > 5% Si reduce f_z up to 20%.
Schnittwerte sind auf die Bearbeitung von Rein-Aluminium ausgelegt. Für Aluminium < 5% Si den Zahnvorschub f_z um 10%, für Aluminium > 5% Si um 20% reduzieren.
- Endmills can be used also for drilling with the same cutting conditions.
Die Schaftfräser können mit gleichen Schnittwerten auch für die Herstellung von Bohrungen verwendet werden.

Standard

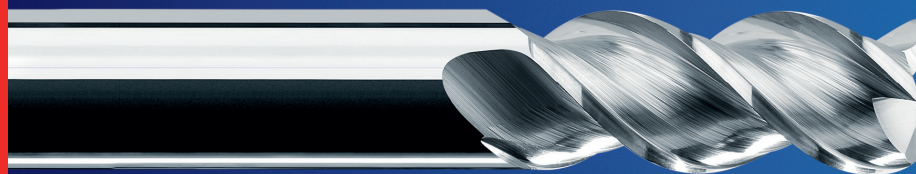
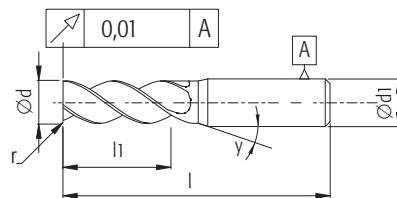


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Complete program for
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*Komplettes
Programm für
Ihre Wünsche!*

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)
Standaard									
VHAD 3 020 057 06 10	2,0	0,05	6	57	5,0	-	-	3	15
VHAD 3 030 057 06 10	3,0	0,10	6	57	8,0	-	-	3	15
VHAD 3 040 057 06 10	4,0	0,10	6	57	11,0	-	-	3	15
VHAD 3 050 057 06 10	5,0	0,20	6	57	13,0	-	-	3	15
VHAD 3 060 057 06 10	6,0	0,20	6	57	16,0	-	-	3	-
VHAD 3 080 063 08 10	8,0	0,20	8	63	19,0	-	-	3	-
VHAD 3 100 072 10 10	10,0	0,20	10	72	22,0	-	-	3	-
VHAD 3 120 083 12 10	12,0	0,20	12	83	26,0	-	-	3	-
VHAD 3 160 092 16 10	16,0	0,20	16	92	32,0	-	-	3	-
VHAD 3 200 104 20 10	20,0	0,20	20	104	40,0	-	-	3	-
3xD									
VHAD 3 020 057 06 10 L060	2,0	0,05	6	57	5,0	6,0	0,050	3	15 new/neu
VHAD 3 030 057 06 10 L090	3,0	0,10	6	57	8,0	9,0	0,050	3	15 new/neu
VHAD 3 040 057 06 10 L120	4,0	0,10	6	57	11,0	12,0	0,100	3	15 new/neu
VHAD 3 050 057 06 10 L150	5,0	0,20	6	57	13,0	15,0	0,100	3	15 new/neu
VHAD 3 060 057 06 10 L200	6,0	0,20	6	57	16,0	20,0	0,100	3	15 new/neu
VHAD 3 080 063 08 10 L250	8,0	0,20	8	63	19,0	25,0	0,100	3	15 new/neu
VHAD 3 100 072 10 10 L300	10,0	0,20	10	72	22,0	30,0	0,150	3	15 new/neu
VHAD 3 120 083 12 10 L360	12,0	0,20	12	83	26,0	36,0	0,150	3	15 new/neu
VHAD 3 160 100 16 10 L480	16,0	0,20	16	100	32,0	48,0	0,200	3	15 new/neu
VHAD 3 200 110 20 10 L600	20,0	0,20	20	110	40,0	60,0	0,250	3	15 new/neu
5xD									
VHAD 3 020 063 06 10 L100	2,0	0,05	6	63	5,0	10,0	0,050	3	15 new/neu
VHAD 3 030 063 06 10 L150	3,0	0,10	6	63	8,0	15,0	0,050	3	15 new/neu
VHAD 3 040 063 06 10 L200	4,0	0,10	6	63	11,0	20,0	0,100	3	15 new/neu
VHAD 3 050 063 06 10 L250	5,0	0,20	6	63	13,0	25,0	0,100	3	15 new/neu
VHAD 3 060 072 06 10 L300	6,0	0,20	6	72	16,0	30,0	0,100	3	15 new/neu
VHAD 3 080 078 08 10 L400	8,0	0,20	8	78	19,0	40,0	0,100	3	15 new/neu
VHAD 3 100 092 10 10 L500	10,0	0,20	10	92	22,0	50,0	0,150	3	15 new/neu
VHAD 3 120 100 12 10 L600	12,0	0,20	12	100	26,0	60,0	0,150	3	15 new/neu
VHAD 3 160 130 16 10 L800	16,0	0,20	16	130	32,0	80,0	0,200	3	15 new/neu
VHAD 3 200 150 20 10 L100	20,0	0,20	20	150	40,0	100,0	0,250	3	15 new/neu

Standard



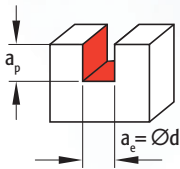
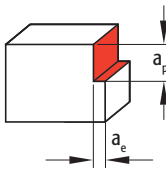
Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	a (mm)	z	γ (°)	
Long										
VHADL 3 020 057 06 10	2,0	0,05	6	57	6,0	-	-	3	15	new/neu
VHADL 3 030 057 06 10	3,0	0,10	6	57	11,0	-	-	3	15	new/neu
VHADL 3 040 057 06 10	4,0	0,10	6	57	14,0	-	-	3	15	new/neu
VHADL 3 050 057 06 10	5,0	0,20	6	57	18,0	-	-	3	15	new/neu
VHADL 3 060 057 06 10	6,0	0,20	6	57	20,0	-	-	3	-	new/neu
VHADL 3 080 063 08 10	8,0	0,20	8	63	25,0	-	-	3	-	new/neu
VHADL 3 100 072 10 10	10,0	0,20	10	72	30,0	-	-	3	-	new/neu
VHADL 3 120 083 12 10	12,0	0,20	12	83	36,0	-	-	3	-	new/neu
VHADL 3 160 100 16 10	16,0	0,20	16	100	48,0	-	-	3	-	new/neu
VHADL 3 200 110 20 10	20,0	0,20	20	110	60,0	-	-	3	-	new/neu

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
N5.1	< 500	< 150	350 - 650	emulsion / air
N5.2	< 400	< 120	200 - 500	emulsion / air
N5.3	< 350	< 100	350 - 500	emulsion / air
N5.4			400 - 1000	emulsion / air
N5.5			400 - 1000	emulsion / air

VHAD
Material Aluminium 7075

v_c	800 m/min
n	25.465 rpm
f_z	0,250 mm/t
v_f	19.099 mm/min
a_p	10 mm
a_e	5 mm
Coolant	emulsion

Q	954,95 cm ³ /min
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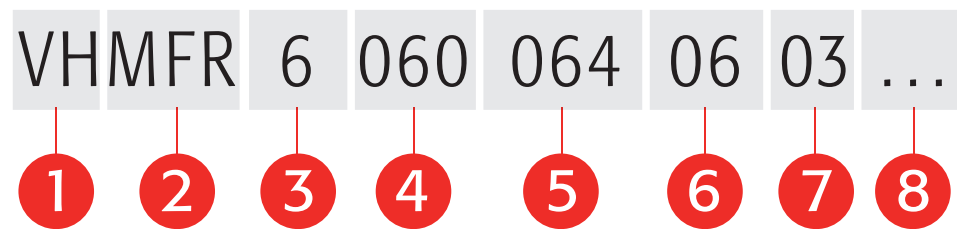


Shoulder milling / Eckfräsen				Slot milling / Nutfräsen			
Ød (mm)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	a _p max. (mm)	a _e max. (mm)	f _z (mm/tooth)	
2,0	< 4,0	< 0,90	0,015 - 0,030	< 2,00	2,00	0,012 - 0,024	
3,0	< 6,0	< 1,35	0,020 - 0,040	< 3,00	3,00	0,016 - 0,032	
4,0	< 8,0	< 1,80	0,025 - 0,050	< 4,00	4,00	0,020 - 0,040	
5,0	< 10,0	< 2,25	0,030 - 0,060	< 5,00	5,00	0,024 - 0,048	
6,0	< 12,0	< 2,70	0,040 - 0,080	< 6,00	6,00	0,032 - 0,064	
8,0	< 16,0	< 3,60	0,060 - 0,100	< 8,00	8,00	0,048 - 0,080	
10,0	< 20,0	< 4,50	0,080 - 0,120	< 10,00	10,00	0,064 - 0,096	
12,0	< 24,0	< 5,40	0,090 - 0,150	< 12,00	12,00	0,072 - 0,120	
16,0	< 32,0	< 7,20	0,120 - 0,180	< 16,00	16,00	0,096 - 0,144	
20,0	< 38,0	< 9,00	0,150 - 0,230	< 20,00	20,00	0,120 - 0,184	

Recalculation / Neuberechnung				Recalculation / Neuberechnung			
Ø x D	Ap %	Ae %	Fz %	Ap %	Ae %	Fz %	
3 x D	150	50	85	60	100	85	
5 x D	150	25	60	40	100	60	

End mill designation

Fräserbezeichnung



- 1 Van Hoorn Carbide or Van Hoorn Asia line / Van Hoorn Carbide oder Van Hoorn Asia line
- 2 Type of end mill / Typ Fräser

AD A aluminum D three flute L long
 AE A aluminum E single flute
 BM B ball nose M end mill
 DR D double R radius
 DB D diamond B ball nose
 DT D diamond T torus
 GKF G graphite K ball nose F end mill
 GR G graphite R rougher
 GT G graphite T straight
 GTF G graphite T torus F end mill
 KE K plastic E single flute
 KF K ball nose F end mill

LA L long A aluminium
 MA M micro A aluminium
 MAK M micro A aluminium K ballnose
 MF M multiple F flute
 MFR M multiple F flute R radius
 MG M micro G graphite
 MGK M micro G graphite K ball nose
 MS M micro S steel
 MSK M micro S steel K ball nose
 MSR M micro S steel R radius
 PM P performance M multiple flute
 PMR P performance M multiple flute R radius

PK P performance K ball nose
 PT P performance T Torus
 RAW R rougher A aluminium W Weldon
 RS R rougher S steel
 RFF R rougher F end mill F chamfer
 TF T torus F end mill
 TR T trochoidal R stainless/titanium
 TS T trochoidal S steel
 VF V 45 degree F end mill
 VFF V 45 degree F end mill F chamfer
 VFR V 45 degree F end mill R radius
 VTR V variable T titanium R radius

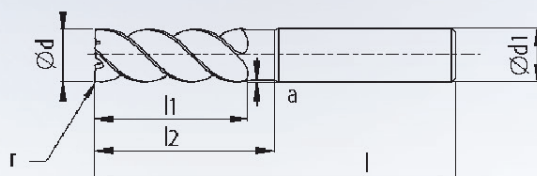
- 3 Number of teeth (z) / Zähnezahl (z)
- 4 End mill diameter Ød (mm) / Fräserdurchmesser Ød (mm)
- 5 Overall length l (mm) / Gesamtlänge l (mm)
- 6 Shank diameter Ød1 (mm) / Schaftdurchmesser Ød1 (mm)
- 7 Coating / Beschichtung

02 Diamond coating / Diamant Beschichtung
 10 Uncoated / Nicht Beschichtet
 23 DLC coating / DLC Beschichtung
 40 TiAlN+ coating / TiAlN+ Beschichtung

40 TiAlN Gold coating / TiAlN Gold Beschichtung
 03 TiAlN coating / TiAlN Beschichtung
 15 Uncoated / Nicht Beschichtet
 31 C+ coating / C+ Beschichtung

- 8 Alternative measurements / Alternative maßen

- cutting length l2 (mm) / Schneidenlänge l2 (mm)
- corner radius r (mm) / Eckenradius r (mm)



PARA Tooling

Solid carbide end mills for standard machining

Vollhartmetall Fräser für Standard Zerspanung

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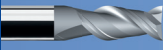
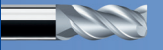
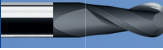


All round machining

Allgemeine Zerspanung

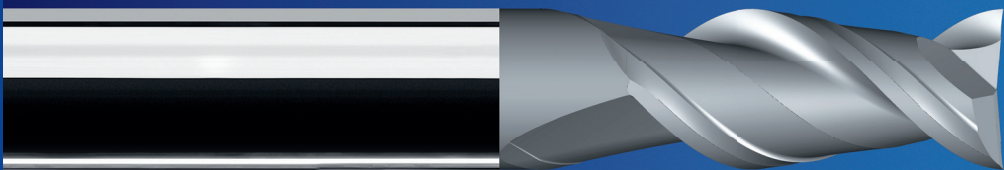
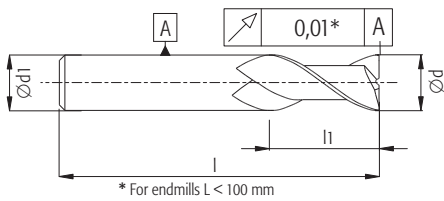
P1.1 P1.2 P1.3 H2.1 H2.2 H2.3 M3.1 M3.2 K4.1 N5.1 N5.2 N5.3 N5.4 N5.5 N5.6 S6.1 S6.2 S6.3 S6.4

Number of Flutes | Anzahl der Schneiden
Coating | Beschichtung
Size range | Durchmesserbereich
Page | Seite

		P1.1	P1.2	P1.3	H2.1	H2.2	H2.3	M3.1	M3.2	K4.1	N5.1	N5.2	N5.3	N5.4	N5.5	N5.6	S6.1	S6.2	S6.3	S6.4				
AS2											●	●	●	●								Uncoated	3,0 20,0	136
AS3											●	●	●	●								Uncoated	3,0 20,0	137
BT2		●	●	●	●			●	●	●	●	●	●	●								TiAIN+	1,0 20,0	138
BTL2		●	●	●	●			●	●	●	●	●	●	●								TiAIN+	1,0 12,0	139
BT4		●	●	●	●			●	●	●			●	●								TiAIN	1,0 20,0	140
MS		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	6,0 20,0	141
ST2		●	●	●	●			●	●	●	●	●	●									TiAIN	1,0 20,0	142
ST3		●	●	●	●			●	●	●	●	●	●									TiAIN	1,0 20,0	143
ST4		●	●	●	●			●	●	●	●	●	●									TiAIN	1,0 20,0	144
STR2		●	●	●	●			●	●	●	●	●	●									TiAIN	3,0 20,0	145
STR4		●	●	●	●			●	●	●	●	●	●									TiAIN	3,0 20,0	146
RS3		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	2,0 20,0	147
RS4		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	3,0 20,0	148
RV4		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	4,0 20,0	149
RVR4		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	3,0 16,0	150
RVR5		●	●	●	●			●	●	●			●				●	●	●	●		TiAIN	3,0 16,0	152
RSR4		●	●	●	●			●	●	●			●									TiAIN	4,0 20,0	154
RR		●	●	●				●	●	●			●									TiAIN	4,0 20,0	155
CH 60°		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		TiAIN	1,0 16,0	156
CH 90°		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		TiAIN	1,0 20,0	157
CH 120°		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		TiAIN	1,0 16,0	158

- Well suited / besonders geeignet
- Suited / geeignet

Standard

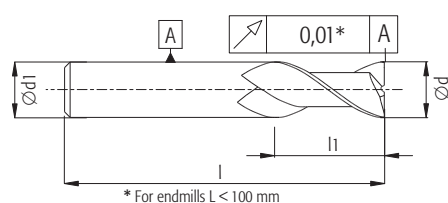


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
AS2 3,0x57	3,0	-	6	57	8	-	-	2
AS2 4,0x57	4,0	-	6	57	11	-	-	2
AS2 5,0x57	5,0	-	6	57	13	-	-	2
AS2 6,0x57	6,0	-	6	57	13	-	-	2
AS2 8,0x63	8,0	-	8	63	19	-	-	2
AS2 10,0x72	10,0	-	10	72	22	-	-	2
AS2 12,0x83	12,0	-	12	83	26	-	-	2
AS2 16,0x92	16,0	-	16	92	32	-	-	2
AS2 20,0x104	20,0	-	20	104	38	-	-	2

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

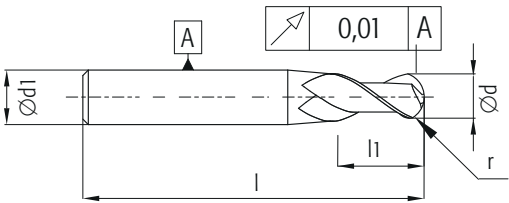


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z	
AS3 3,0x57	3,0	-	6	57	6	-	0,10	3	new/neu
AS3 4,0x57	4,0	-	6	57	8	-	0,10	3	new/neu
AS3 5,0x57	5,0	-	6	57	10	-	0,15	3	new/neu
AS3 6,0x57	6,0	-	6	57	12	-	0,15	3	new/neu
AS3 8,0x63	8,0	-	8	63	16	-	0,20	3	new/neu
AS3 10,0x72	10,0	-	10	72	20	-	0,20	3	new/neu
AS3 12,0x83	12,0	-	12	83	24	-	0,25	3	new/neu
AS3 16,0x92	16,0	-	16	92	32	-	0,25	3	new/neu
AS3 20,0x104	20,0	-	20	104	40	-	0,25	3	new/neu
AS3 3,0x57 L009	3,0	-	6	57	6	9	0,10	3	new/neu
AS3 4,0x57 L012	4,0	-	6	57	8	12	0,10	3	new/neu
AS3 5,0x57 L015	5,0	-	6	57	10	15	0,15	3	new/neu
AS3 6,0x57 L018	6,0	-	6	57	12	18	0,15	3	new/neu
AS3 8,0x63 L024	8,0	-	8	63	16	24	0,20	3	new/neu
AS3 10,0x72 L030	10,0	-	10	72	20	30	0,20	3	new/neu
AS3 12,0x83 L036	12,0	-	12	83	24	36	0,25	3	new/neu
AS3 16,0x100 L048	16,0	-	16	100	32	48	0,25	3	new/neu
AS3 20,0x110 L060	20,0	-	20	110	40	60	0,25	3	new/neu

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

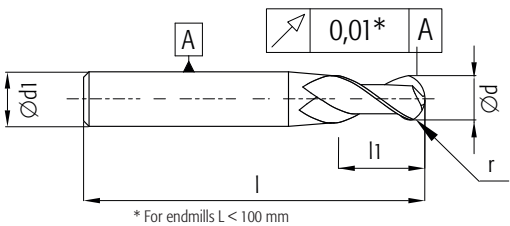


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
BT2 1,0x40	1,0	0,50	3	40	3	-	-	2
BT2 1,5x40	1,5	0,75	3	40	5	-	-	2
BT2 2,0x40	2,0	1,00	3	40	7	-	-	2
BT2 2,5x40	2,5	1,25	3	40	7	-	-	2
BT2 3,0x40	3,0	1,50	3	40	10	-	-	2
BT2 3,5x50	3,5	1,75	4	50	12	-	-	2
BT2 4,0x50	4,0	2,00	4	50	15	-	-	2
BT2 4,5x50	4,5	2,25	5	50	15	-	-	2
BT2 5,0x50	5,0	2,50	5	50	15	-	-	2
BT2 6,0x65	6,0	3,00	6	65	20	-	-	2
BT2 7,0x65	7,0	3,50	8	65	20	-	-	2
BT2 8,0x65	8,0	4,00	8	65	20	-	-	2
BT2 9,0x70	9,0	4,50	10	70	22	-	-	2
BT2 10,0x70	10,0	5,00	10	70	22	-	-	2
BT2 11,0x70	11,0	5,50	11	70	25	-	-	2
BT2 12,0x80	12,0	6,00	12	80	25	-	-	2
BT2 14,0x90	14,0	7,00	14	90	30	-	-	2
BT2 16,0x90	16,0	8,00	16	90	32	-	-	2
BT2 18,0x100	18,0	9,00	18	100	35	-	-	2
BT2 20,0x100	20,0	10,00	20	100	38	-	-	2

Only even shanks starting from Ø6 mm available with Weldon shank.
All items are available uncoated for the same price.

Nur gerade Schäfte ab Ø6 mm verfügbar mit Weldonfläche.
Alle Positionen auch Unbeschichtet lieferbar für den Beschichteten Preis.

Standard



* For endmills L < 100 mm



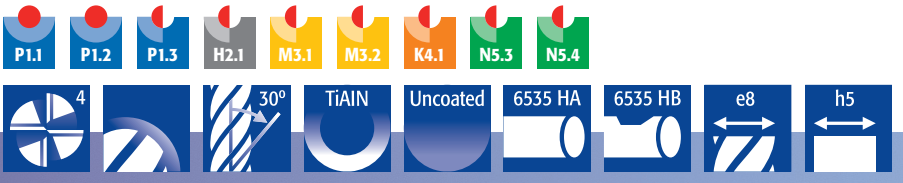
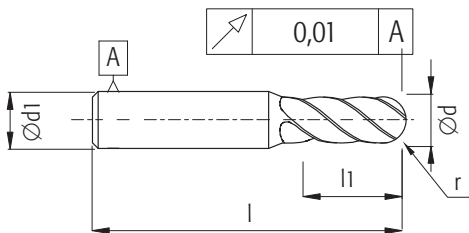
Long length / Lange länge

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
BTL2 1,0x50	1,0	0,50	4	50	2,5	-	-	2
BTL2 1,5x50	1,5	0,75	4	50	4	-	-	2
BTL2 2,0x50	2,0	1,00	6	50	5	-	-	2
BTL2 3,0x60	3,0	1,50	6	60	8	-	-	2
BTL2 4,0x70	4,0	2,00	6	70	8	-	-	2
BTL2 5,0x80	5,0	2,50	6	80	10	-	-	2
BTL2 6,0x90	6,0	3,00	6	90	12	-	-	2
BTL2 8,0x100	8,0	4,00	8	100	14	-	-	2
BTL2 10,0x100	10,0	5,00	10	100	18	-	-	2
BTL2 12,0x110	12,0	6,00	12	110	22	-	-	2
					-			
BTXL2 2,0x80	2,0	1,00	3	80	6	-	-	2
BTXL2 3,0x100	3,0	1,50	3	100	8	-	-	2
BTXL2 4,0x100	4,0	2,00	4	100	8	-	-	2
BTXL2 5,0x120	5,0	2,50	6	120	10	-	-	2
BTXL2 6,0x120	6,0	3,00	6	120	10	-	-	2
BTXL2 8,0x140	8,0	4,00	8	140	14	-	-	2
BTXL2 10,0x180	10,0	5,00	10	180	18	-	-	2
BTXL2 12,0x200	12,0	6,00	12	200	22	-	-	2

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

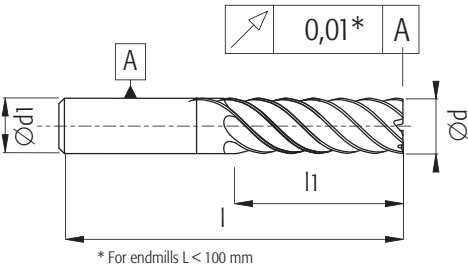


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
BT4 1,0x40	1,0	0,50	3	40	3	-	-	4
BT4 1,5x40	1,5	0,75	3	40	5	-	-	4
BT4 2,0x40	2,0	1,00	3	40	7	-	-	4
BT4 2,5x40	2,5	1,25	3	40	7	-	-	4
BT4 3,0x40	3,0	1,50	3	40	10	-	-	4
BT4 3,5x50	3,5	1,75	4	50	12	-	-	4
BT4 4,0x50	4,0	2,00	4	50	15	-	-	4
BT4 4,5x50	4,5	2,25	5	50	15	-	-	4
BT4 5,0x50	5,0	2,50	5	50	15	-	-	4
BT4 6,0x65	6,0	3,00	6	65	20	-	-	4
BT4 7,0x65	7,0	3,50	8	65	20	-	-	4
BT4 8,0x65	8,0	4,00	8	65	20	-	-	4
BT4 9,0x70	9,0	4,50	10	70	22	-	-	4
BT4 10,0x70	10,0	5,00	10	70	22	-	-	4
BT4 11,0x70	11,0	5,50	11	70	25	-	-	4
BT4 12,0x80	12,0	6,00	12	80	25	-	-	4
BT4 14,0x90	14,0	7,00	14	90	30	-	-	4
BT4 16,0x90	16,0	8,00	16	90	32	-	-	4
BT4 18,0x100	18,0	9,00	18	100	35	-	-	4
-BT4 20,0x100	20,0	10,00	20	100	38	-	-	4

Only even shanks starting from Ø6 mm available with Weldon shank.
All items are available uncoated for the same price.

Nur gerade Schäfte ab Ø6 mm verfügbar mit Weldonfläche.
Alle Positionen auch Unbeschichtet lieferbar für den Beschichteten Preis.

Standard

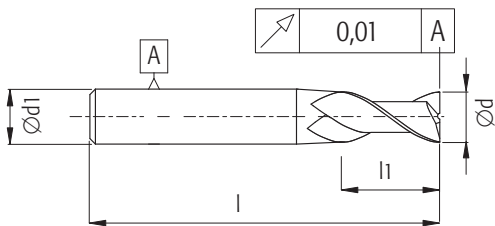


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
MS 6,0x58	6,0	-	6	58	13	-	-	6
MS 8,0x65	8,0	-	8	65	19	-	-	6
MS 10,0x72	10,0	-	10	72	22	-	-	6
MS 12,0x83	12,0	-	12	83	26	-	-	6
MS 16,0x92	16,0	-	16	92	32	-	-	6
MS 20,0x103	20,0	-	20	103	38	-	-	8
MSL 6,0x70	6,0	-	6	70	26	-	-	6
MSL 8,0x90	8,0	-	8	90	36	-	-	6
MSL 10,0x100	10,0	-	10	100	46	-	-	6
MSL 12,0x110	12,0	-	12	110	56	-	-	6
MSL 16,0x130	16,0	-	16	130	66	-	-	6
MSL 20,0x140	20,0	-	20	140	76	-	-	6

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

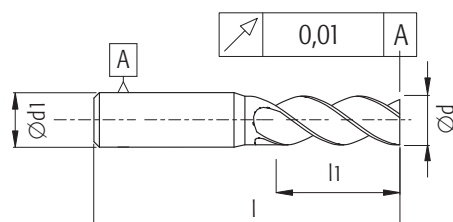


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
ST2 1,0x40	1,0	-	3	40	3	-	-	2
ST2 1,5x40	1,5	-	3	40	5	-	-	2
ST2 2,0x40	2,0	-	3	40	7	-	-	2
ST2 2,5x40	2,5	-	3	40	7	-	-	2
ST2 3,0x40	3,0	-	3	40	10	-	-	2
ST2 3,5x50	3,5	-	4	50	12	-	-	2
ST2 4,0x50	4,0	-	4	50	15	-	-	2
ST2 4,5x50	4,5	-	5	50	15	-	-	2
ST2 5,0x50	5,0	-	5	50	15	-	-	2
ST2 6,0x65	6,0	-	6	65	20	-	-	2
ST2 7,0x65	7,0	-	8	65	20	-	-	2
ST2 8,0x65	8,0	-	8	65	20	-	-	2
ST2 9,0x70	9,0	-	10	70	22	-	-	2
ST2 10,0x70	10,0	-	10	70	22	-	-	2
ST2 11,0x70	11,0	-	11	70	25	-	-	2
ST2 12,0x80	12,0	-	12	80	25	-	-	2
ST2 14,0x90	14,0	-	14	90	30	-	-	2
ST2 16,0x90	16,0	-	16	90	32	-	-	2
ST2 18,0x100	18,0	-	18	100	35	-	-	2
ST2 20,0x100	20,0	-	20	100	38	-	-	2

Only even shanks starting from Ø6 mm available with Weldon shank.
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Nur gerade Schäfte ab Ø6 mm verfügbar mit Weldonfläche.
Alle Positionen auch Unbeschichtet lieferbar für den Beschichteten Preis.

Standard



PAGE 159



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
ST3 1,0x40	1,0	-	3	40	3	-	-	3
ST3 1,5x40	1,5	-	3	40	5	-	-	3
ST3 2,0x40	2,0	-	3	40	7	-	-	3
ST3 2,5x40	2,5	-	3	40	7	-	-	3
ST3 3,0x40	3,0	-	3	40	10	-	-	3
ST3 3,5x50	3,5	-	4	50	12	-	-	3
ST3 4,0x50	4,0	-	4	50	15	-	-	3
ST3 4,5x50	4,5	-	5	50	15	-	-	3
ST3 5,0x50	5,0	-	5	50	15	-	-	3
ST3 6,0x65	6,0	-	6	65	20	-	-	3
ST3 7,0x65	7,0	-	8	65	20	-	-	3
ST3 8,0x65	8,0	-	8	65	20	-	-	3
ST3 9,0x70	9,0	-	10	70	22	-	-	3
ST3 10,0x70	10,0	-	10	70	22	-	-	3
ST3 11,0x70	11,0	-	11	70	25	-	-	3
ST3 12,0x80	12,0	-	12	80	25	-	-	3
ST3 14,0x90	14,0	-	14	90	30	-	-	3
ST3 16,0x90	16,0	-	16	90	32	-	-	3
ST3 18,0x100	18,0	-	18	100	35	-	-	3
ST3 20,0x100	20,0	-	20	100	38	-	-	3

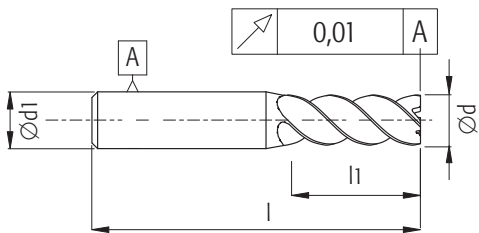
Only even shanks starting from Ø6 mm available with Weldon shank.

All items are available uncoated for the same price.

Nur gerade Schäfte ab Ø6 mm verfügbar mit Weldonfläche.

Alle Positionen auch Unbeschichtet lieferbar für den Beschichteten Preis.

Standard

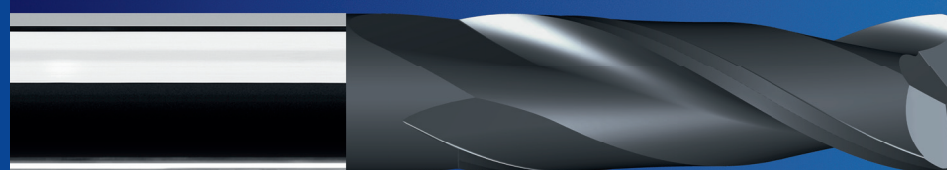
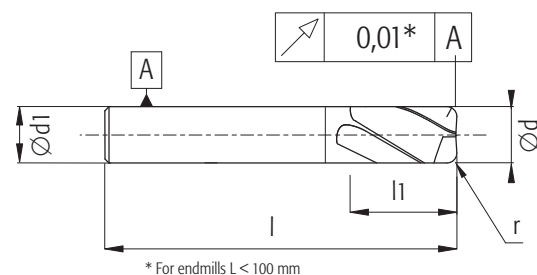


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
ST4 1,0x40	1,0	-	3	40	3	-	-	4
ST4 1,5x40	1,5	-	3	40	5	-	-	4
ST4 2,0x40	2,0	-	3	40	7	-	-	4
ST4 2,5x40	2,5	-	3	40	7	-	-	4
ST4 3,0x40	3,0	-	3	40	10	-	-	4
ST4 3,5x50	3,5	-	4	50	12	-	-	4
ST4 4,0x50	4,0	-	4	50	15	-	-	4
ST4 4,5x50	4,5	-	5	50	15	-	-	4
ST4 5,0x50	5,0	-	5	50	15	-	-	4
ST4 6,0x65	6,0	-	6	65	20	-	-	4
ST4 7,0x65	7,0	-	8	65	20	-	-	4
ST4 8,0x65	8,0	-	8	65	20	-	-	4
ST4 9,0x70	9,0	-	10	70	22	-	-	4
ST4 10,0x70	10,0	-	10	70	22	-	-	4
ST4 11,0x70	11,0	-	11	70	25	-	-	4
ST4 12,0x80	12,0	-	12	80	25	-	-	4
ST4 14,0x90	14,0	-	14	90	30	-	-	4
ST4 16,0x90	16,0	-	16	90	32	-	-	4
ST4 18,0x100	18,0	-	18	100	35	-	-	4
ST4 20,0x100	20,0	-	20	100	38	-	-	4

Only even shanks starting from Ø6 mm available with Weldon shank.
All items are available uncoated for the same price.

Nur gerade Schäfte ab Ø6 mm verfügbar mit Weldonfläche.
Alle Positionen auch Unbeschichtet lieferbar für den Beschichteten Preis.

Standard

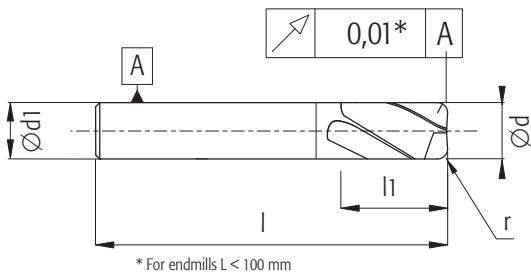


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
STR2 3,0x50 R=0,3	3,0	0,3	6	50	12	-	-	2
STR2 4,0x50 R=0,3	4,0	0,3	6	50	15	-	-	2
STR2 4,0x50 R=0,5	4,0	0,5	6	50	15	-	-	2
STR2 5,0x60 R=0,3	5,0	0,3	6	60	20	-	-	2
STR2 5,0x60 R=0,5	5,0	0,5	6	60	20	-	-	2
STR2 6,0x60 R=0,3	6,0	0,3	6	60	20	-	-	2
STR2 6,0x60 R=0,5	6,0	0,5	6	60	20	-	-	2
STR2 6,0x60 R=1,0	6,0	1,0	6	60	20	-	-	2
STR2 8,0x70 R=0,3	8,0	0,3	8	70	25	-	-	2
STR2 8,0x70 R=0,5	8,0	0,5	8	70	25	-	-	2
STR2 8,0x70 R=1,0	8,0	1,0	8	70	25	-	-	2
STR2 8,0x70 R=1,5	8,0	1,5	8	70	25	-	-	2
STR2 8,0x70 R=2,0	8,0	2,0	8	70	25	-	-	2
STR2 10,0x90 R=0,3	10,0	0,3	10	90	30	-	-	2
STR2 10,0x90 R=0,5	10,0	0,5	10	90	30	-	-	2
STR2 10,0x90 R=1,0	10,0	1,0	10	90	30	-	-	2
STR2 10,0x90 R=1,5	10,0	1,5	10	90	30	-	-	2
STR2 10,0x90 R=2,0	10,0	2,0	10	90	30	-	-	2
STR2 12,0x90 R=0,5	12,0	0,5	12	90	30	-	-	2
STR2 12,0x90 R=1,0	12,0	1,0	12	90	30	-	-	2
STR2 12,0x90 R=1,5	12,0	1,5	12	90	30	-	-	2
STR2 12,0x90 R=2,0	12,0	2,0	12	90	30	-	-	2
STR2 16,0x110 R=0,5	16,0	0,5	16	110	50	-	-	2
STR2 16,0x110 R=1,0	16,0	1,0	16	110	50	-	-	2
STR2 16,0x110 R=1,5	16,0	1,5	16	110	50	-	-	2
STR2 16,0x110 R=2,0	16,0	2,0	16	110	50	-	-	2
STR2 20,0x110 R=0,5	20,0	0,5	20	110	50	-	-	2
STR2 20,0x110 R=1,0	20,0	1,0	20	110	50	-	-	2
STR2 20,0x110 R=1,5	20,0	1,5	20	110	50	-	-	2
STR2 20,0x110 R=2,0	20,0	2,0	20	110	50	-	-	2

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

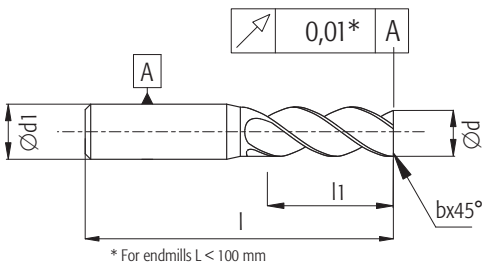
Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
STR4 3,0x50 R=0,3	3,0	0,3	6	50	12	-	-	4
STR4 4,0x50 R=0,3	4,0	0,3	6	50	15	-	-	4
STR4 4,0x50 R=0,5	4,0	0,5	6	50	15	-	-	4
STR4 5,0x60 R=0,3	5,0	0,3	6	60	20	-	-	4
STR4 5,0x60 R=0,5	5,0	0,5	6	60	20	-	-	4
STR4 6,0x60 R=0,3	6,0	0,3	6	60	20	-	-	4
STR4 6,0x60 R=0,5	6,0	0,5	6	60	20	-	-	4
STR4 6,0x60 R=1,0	6,0	1,0	6	60	20	-	-	4
STR4 8,0x70 R=0,3	8,0	0,3	8	70	25	-	-	4
STR4 8,0x70 R=0,5	8,0	0,5	8	70	25	-	-	4
STR4 8,0x70 R=1,0	8,0	1,0	8	70	25	-	-	4
STR4 8,0x70 R=1,5	8,0	1,5	8	70	25	-	-	4
STR4 8,0x70 R=2,0	8,0	2,0	8	70	25	-	-	4
STR4 10,0x90 R=0,3	10,0	0,3	10	90	30	-	-	4
STR4 10,0x90 R=0,5	10,0	0,5	10	90	30	-	-	4
STR4 10,0x90 R=1,0	10,0	1,0	10	90	30	-	-	4
STR4 10,0x90 R=1,5	10,0	1,5	10	90	30	-	-	4
STR4 10,0x90 R=2,0	10,0	2,0	10	90	30	-	-	4
STR4 12,0x90 R=0,5	12,0	0,5	12	90	30	-	-	4
STR4 12,0x90 R=1,0	12,0	1,0	12	90	30	-	-	4
STR4 12,0x90 R=1,5	12,0	1,5	12	90	30	-	-	4
STR4 12,0x90 R=2,0	12,0	2,0	12	90	30	-	-	4
STR4 16,0x110 R=0,5	16,0	0,5	16	110	50	-	-	4
STR4 16,0x110 R=1,0	16,0	1,0	16	110	50	-	-	4
STR4 16,0x110 R=1,5	16,0	1,5	16	110	50	-	-	4
STR4 16,0x110 R=2,0	16,0	2,0	16	110	50	-	-	4
STR4 20,0x110 R=0,5	20,0	0,5	20	110	50	-	-	4
STR4 20,0x110 R=1,0	20,0	1,0	20	110	50	-	-	4
STR4 20,0x110 R=1,5	20,0	1,5	20	110	50	-	-	4
STR4 20,0x110 R=2,0	20,0	2,0	20	110	50	-	-	4

Starting from shank Ø6 mm available with Weldon shank.
Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

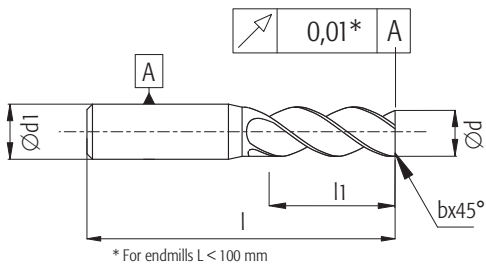


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
RS3 2,0x40	2,0	-	3	40	8	-	0,10	3
RS3 3,0x40	3,0	-	3	40	10	-	0,10	3
RS3 4,0x50	4,0	-	4	50	12	-	0,10	3
RS3 5,0x50	5,0	-	5	50	15	-	0,15	3
RS3 6,0x65	6,0	-	6	65	15	-	0,15	3
RS3 8,0x65	8,0	-	8	65	20	-	0,20	3
RS3 10,0x70	10,0	-	10	70	22	-	0,20	3
RS3 12,0x80	12,0	-	12	80	25	-	0,25	3
RS3 16,0x90	16,0	-	16	90	35	-	0,25	3
RS3 20,0x102	20,0	-	20	102	40	-	0,25	3

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

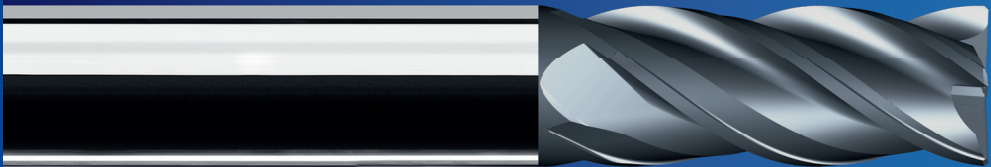
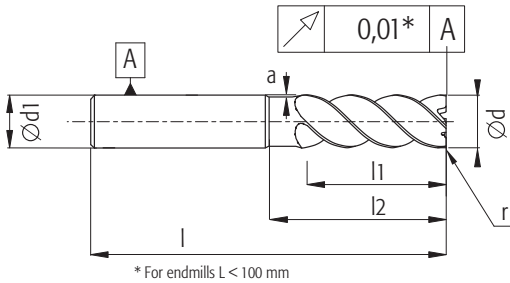


Article Number Artikelnummer	$\varnothing d$ (mm)	r (mm)	$\varnothing d_1$ (mm)	L (mm)	L_1 (mm)	L_2 (mm)	b (mm)	z
RS4 3,0x40	3,0	-	3	40	10	-	0,10	4
RS4 4,0x50	4,0	-	4	50	12	-	0,10	4
RS4 5,0x50	5,0	-	5	50	15	-	0,15	4
RS4 6,0x65	6,0	-	6	65	15	-	0,15	4
RS4 8,0x65	8,0	-	8	65	20	-	0,20	4
RS4 10,0x70	10,0	-	10	70	22	-	0,20	4
RS4 12,0x80	12,0	-	12	80	25	-	0,25	4
RS4 16,0x90	16,0	-	16	90	35	-	0,25	4
RS4 20,0x102	20,0	-	20	102	40	-	0,25	4

Starting from shank $\varnothing 6$ mm available with Weldon shank.

Ab Schaft $\varnothing 6$ mm verfügbar mit Weldonfläche.

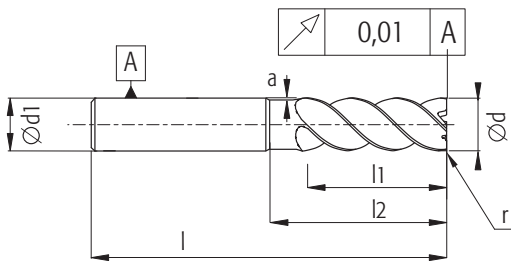
Standard



Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
RV4 4,0x57	4,0	-	6	57	11	-	0,25	4
RV4 5,0x57	5,0	-	6	57	13	-	0,25	4
RV4 6,0x57	6,0	-	6	57	13	-	0,25	4
RV4 8,0x63	8,0	-	8	63	19	-	0,25	4
RV4 10,0x72	10,0	-	10	72	22	-	0,25	4
RV4 12,0x83	12,0	-	12	83	26	-	0,25	4
RV4 16,0x92	16,0	-	16	92	32	-	0,25	4
RV4 20,0x104	20,0	-	20	104	38	-	0,40	4
RV4 4,0x57 L021	4,0	-	6	57	11	21	0,25	4 new/neu
RV4 5,0x57 L021	5,0	-	6	57	13	21	0,25	4 new/neu
RV4 6,0x57 L021	6,0	-	6	57	13	21	0,25	4 new/neu
RV4 8,0x63 L028	8,0	-	8	63	19	28	0,25	4 new/neu
RV4 10,0x72 L032	10,0	-	10	72	22	32	0,25	4 new/neu
RV4 12,0x83 L038	12,0	-	12	83	26	38	0,25	4 new/neu
RV4 16,0x92 L044	16,0	-	16	92	32	44	0,25	4 new/neu
RV4 20,0x104 L054	20,0	-	20	104	38	54	0,40	4 new/neu

Starting from shank Ø6 mm available with Weldon shank.
Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

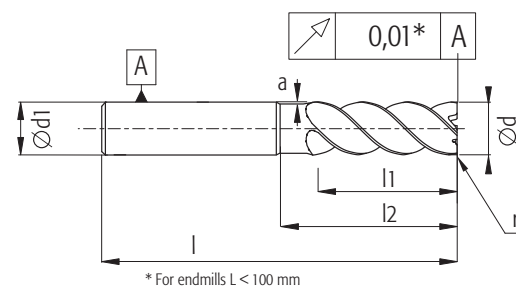


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
RVR 3,0x57 R=0,25	3,0	0,25	6	57	11	-	-	4
RVR 3,0x57 R0,50	3,0	0,50	6	57	13	-	-	4
RVR 4,0x57 R=0,50	4,0	0,50	6	57	13	-	-	4
RVR 5,0x57 R=0,50	5,0	0,50	6	57	13	-	-	4
RVR 6,0x57 R=0,50	6,0	0,50	6	57	13	-	-	4
RVR 6,0x57 R=1,00	6,0	1,00	6	57	13	-	-	4
RVR 6,0x57 R=1,50	6,0	1,50	6	57	13	-	-	4
RVR 8,0x63 R=0,50	8,0	0,50	8	63	19	-	-	4
RVR 8,0x63 R=1,00	8,0	1,00	8	63	19	-	-	4
RVR 8,0x63 R=1,50	8,0	1,50	8	63	19	-	-	4
RVR 10,0x72 R=0,50	10,0	0,50	10	72	22	-	-	4
RVR 10,0x72 R=1,00	10,0	1,00	10	72	22	-	-	4
RVR 10,0x72 R=1,50	10,0	1,50	10	72	22	-	-	4
RVR 12,0x83 R=0,50	12,0	0,50	12	83	26	-	-	4
RVR 12,0x83 R=1,50	12,0	1,50	12	83	26	-	-	4
RVR 16,0x92 R=1,50	16,0	1,50	16	92	32	-	-	4
RVR 16,0x92 R=3,00	16,0	3,00	16	92	32	-	-	4

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Neck relief



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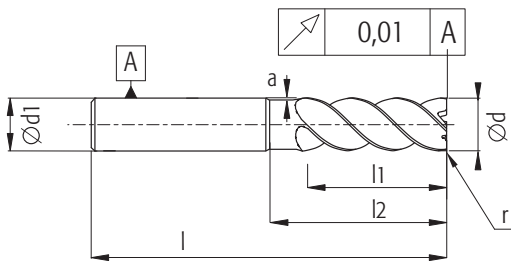


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
RVR 3,0x57 L021 R=0,25	3,0	0,25	6	57	11	21	-	4
RVR 3,0x57 L021 R=0,50	3,0	0,50	6	57	13	21	-	4
RVR 4,0x57 L021 R=0,50	4,0	0,50	6	57	13	21	-	4
RVR 5,0x57 L021 R=0,50	5,0	0,50	6	57	13	21	-	4
RVR 6,0x57 L021 R=0,50	6,0	0,50	6	57	13	21	-	4
RVR 6,0x57 L021 R=1,00	6,0	1,00	6	57	13	21	-	4
RVR 6,0x57 L021 R=1,50	6,0	1,50	6	57	13	21	-	4
RVR 6,0x63 L026 R=0,50	6,0	0,50	6	63	13	26	-	4
RVR 8,0x63 L028 R=0,50	8,0	0,50	8	63	19	28	-	4
RVR 8,0x63 L028 R=1,00	8,0	1,00	8	63	19	28	-	4
RVR 8,0x63 L028 R=1,50	8,0	1,50	8	63	19	28	-	4
RVR 8,0x72 L034 R=0,50	8,0	0,50	8	72	19	34	-	4
RVR 10,0x72 L032 R=0,50	10,0	0,50	10	72	22	32	-	4
RVR 10,0x72 L032 R=1,00	10,0	1,00	10	72	22	32	-	4
RVR 10,0x72 L032 R=1,50	10,0	1,50	10	72	22	32	-	4
RVR 10,0x83 L042 R=0,50	10,0	0,50	10	83	22	42	-	4
RVR 12,0x83 L038 R=0,50	12,0	0,50	12	83	26	38	-	4
RVR 12,0x83 L038 R=1,50	12,0	1,50	12	83	26	38	-	4
RVR 12,0x100 L050 R=0,50	12,0	0,50	12	100	26	50	-	4
RVR 16,0x92 L044 R=1,50	16,0	1,50	16	92	32	44	-	4
RVR 16,0x92 L044 R=3,00	16,0	3,00	16	92	32	44	-	4
RVR 16,0x120 L066 R=1,50	16,0	1,50	16	120	32	66	-	4
RVR 6,0x57 L026 R=0,50	6,0	0,50	6	57	13	26	-	4 new/neu
RVR 8,0x63 L034 R=0,50	8,0	0,50	8	63	19	34	-	4 new/neu
RVR 10,0x72 L042 R=0,50	10,0	0,50	10	72	22	42	-	4 new/neu
RVR 12,0x83 L050 R=0,50	12,0	0,50	12	83	26	50	-	4 new/neu
RVR 16,0x92 L066 R=1,50	16,0	1,50	16	92	32	66	-	4 new/neu

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

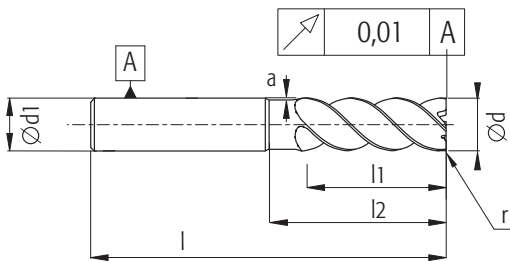


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z	
RVR5 3,0x57 R=0,25	3,0	0,25	6	57	11	-	-	5	new/neu
RVR5 3,0x57 R=0,50	3,0	0,50	6	57	13	-	-	5	new/neu
RVR5 4,0x57 R=0,50	4,0	0,50	6	57	13	-	-	5	new/neu
RVR5 5,0x57 R=0,50	5,0	0,50	6	57	13	-	-	5	new/neu
RVR5 6,0x57 R=0,50	6,0	0,50	6	57	13	-	-	5	new/neu
RVR5 6,0x57 R=1,00	6,0	1,00	6	57	13	-	-	5	new/neu
RVR5 6,0x57 R=1,50	6,0	1,50	6	57	13	-	-	5	new/neu
RVR5 8,0x63 R=0,50	8,0	0,50	8	63	19	-	-	5	new/neu
RVR5 8,0x63 R=1,00	8,0	1,00	8	63	19	-	-	5	new/neu
RVR5 8,0x63 R=1,50	8,0	1,50	8	63	19	-	-	5	new/neu
RVR5 10,0x72 R=0,50	10,0	0,50	10	72	22	-	-	5	new/neu
RVR5 10,0x72 R=1,00	10,0	1,00	10	72	22	-	-	5	new/neu
RVR5 10,0x72 R=1,50	10,0	1,50	10	72	22	-	-	5	new/neu
RVR5 12,0x83 R=0,50	12,0	0,50	12	83	26	-	-	5	new/neu
RVR5 12,0x83 R=1,50	12,0	1,50	12	83	26	-	-	5	new/neu
RVR5 16,0x92 R=1,50	16,0	1,50	16	92	32	-	-	5	new/neu
RVR5 16,0x92 R=3,00	16,0	3,00	16	92	32	-	-	5	new/neu

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Neck relief

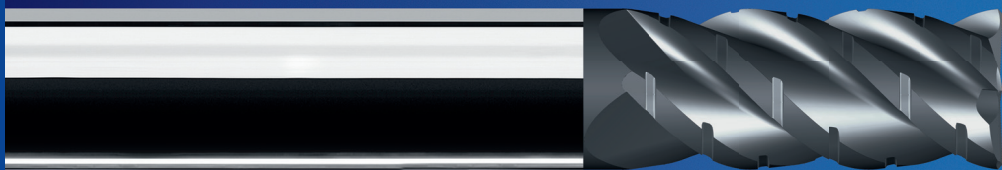
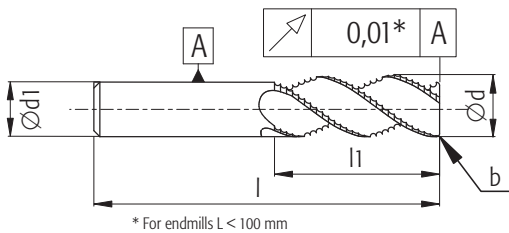


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z	
RVR5 3,0x57 L021 R=0,25	3,0	0,25	6	57	11	21	-	5	new/neu
RVR5 3,0x57 L021 R=0,50	3,0	0,50	6	57	13	21	-	5	new/neu
RVR5 4,0x57 L021 R=0,50	4,0	0,50	6	57	13	21	-	5	new/neu
RVR5 5,0x57 L021 R=0,50	5,0	0,50	6	57	13	21	-	5	new/neu
RVR5 6,0x57 L021 R=0,50	6,0	0,50	6	57	13	21	-	5	new/neu
RVR5 6,0x57 L021 R=1,00	6,0	1,00	6	57	13	21	-	5	new/neu
RVR5 6,0x57 L021 R=1,50	6,0	1,50	6	57	13	21	-	5	new/neu
RVR5 6,0x63 L026 R=0,50	6,0	0,50	6	63	13	26	-	5	new/neu
RVR5 8,0x63 L028 R=0,50	8,0	0,50	8	63	19	28	-	5	new/neu
RVR5 8,0x63 L028 R=1,00	8,0	1,00	8	63	19	28	-	5	new/neu
RVR5 8,0x63 L028 R=1,50	8,0	1,50	8	63	19	28	-	5	new/neu
RVR5 8,0x72 L034 R=0,50	8,0	0,50	8	72	19	34	-	5	new/neu
RVR5 10,0x72 L032 R=0,50	10,0	0,50	10	72	22	32	-	5	new/neu
RVR5 10,0x72 L032 R=1,00	10,0	1,00	10	72	22	32	-	5	new/neu
RVR5 10,0x72 L032 R=1,50	10,0	1,50	10	72	22	32	-	5	new/neu
RVR5 10,0x83 L042 R=0,50	10,0	0,50	10	83	22	42	-	5	new/neu
RVR5 12,0x83 L038 R=0,50	12,0	0,50	12	83	26	38	-	5	new/neu
RVR5 12,0x83 L038 R=1,50	12,0	1,50	12	83	26	38	-	5	new/neu
RVR5 12,0x100 L050 R=0,50	12,0	0,50	12	100	26	50	-	5	new/neu
RVR5 16,0x92 L044 R=1,50	16,0	1,50	16	92	32	44	-	5	new/neu
RVR5 16,0x92 L044 R=3,00	16,0	3,00	16	92	32	44	-	5	new/neu
RVR5 16,0x120 L066 R=1,50	16,0	1,50	16	120	32	66	-	5	new/neu

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard

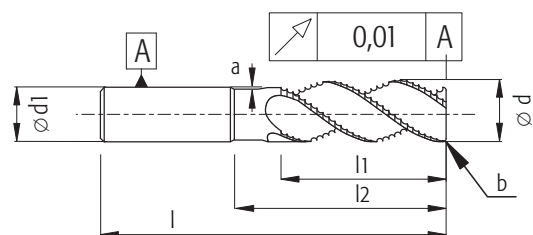


Article Number Artikelnummer	$\varnothing d$ (mm)	r (mm)	$\varnothing d_1$ (mm)	L (mm)	L_1 (mm)	L_2 (mm)	b (mm)	z
RSR4 4,0x57	4,0	-	6	57	11	-	0,25	4
RSR4 5,0x57	5,0	-	6	57	13	-	0,25	4
RSR4 6,0x57	6,0	-	6	57	13	-	0,25	4
RSR4 8,0x63	8,0	-	8	63	19	-	0,25	4
RSR4 10,0x72	10,0	-	10	72	22	-	0,25	4
RSR4 12,0x83	12,0	-	12	83	26	-	0,25	4
RSR4 16,0x92	16,0	-	16	92	32	-	0,25	4
RSR4 20,0x104	20,0	-	20	104	38	-	0,40	4

Starting from shank $\varnothing 6$ mm available with Weldon shank.

Ab Schaft $\varnothing 6$ mm verfügbar mit Weldonfläche.

Standard

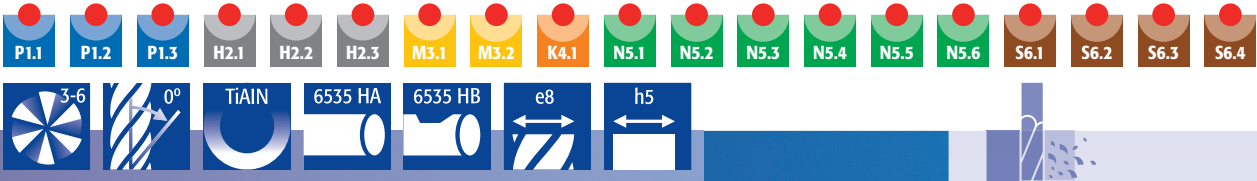
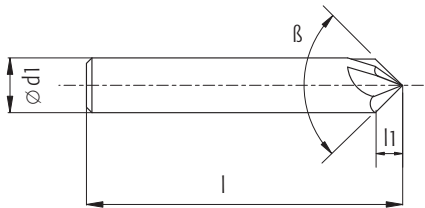


Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
RR 4,0x57	4,0	-	6	57	11	-	0,25	3
RR 5,0x57	5,0	-	6	57	13	-	0,25	4
RR 6,0x57	6,0	-	6	57	13	-	0,25	4
RR 8,0x63	8,0	-	8	63	19	-	0,25	4
RR 10,0x72	10,0	-	10	72	22	-	0,25	4
RR 12,0x83	12,0	-	12	83	26	-	0,25	4
RR 16,0x92	16,0	-	16	92	32	-	0,25	5
RR 20,0x104	20,0	-	20	104	38	-	0,40	6
RR 6,0x57 L021	6,0	-	6	57	13	21	0,25	4
RR 8,0x63 L027	8,0	-	8	63	19	27	0,25	4
RR 10,0x72 L032	10,0	-	10	72	22	32	0,25	4
RR 12,0x83 L038	12,0	-	12	83	26	38	0,25	4
RR 16,0x92 L044	16,0	-	16	92	32	44	0,25	5
RR 20,0x104 L054	20,0	-	20	104	38	54	0,40	6

Standard with Weldon shank.

Standard mit Weldonfläche.

Standard



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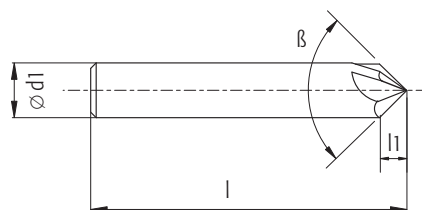
Deburring 60° / Entgrater 60°

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
CH3 1,0x39 60°	1,0	-	3	39	0,8	-	-	3
CH3 2,0x39 60°	2,0	-	3	39	1,7	-	-	3
CH3 3,0x39 60°	3,0	-	3	39	2,6	-	-	3
CH4 4,0x51 60°	4,0	-	4	51	3,5	-	-	4
CH4 6,0x64 60°	6,0	-	6	64	5,2	-	-	4
CH4 8,0x64 60°	8,0	-	8	64	6,9	-	-	4
CH5 8,0x64 60°	8,0	-	8	64	6,9	-	-	5
CH4 10,0x70 60°	10,0	-	10	70	8,7	-	-	4
CH6 10,0x70 60°	10,0	-	10	70	8,7	-	-	6
CH4 12,0x78 60°	12,0	-	12	78	10,4	-	-	4
CH6 12,0x78 60°	12,0	-	12	78	10,4	-	-	6
CH6 16,0x89 60°	16,0	-	16	89	13,8	-	-	6

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard



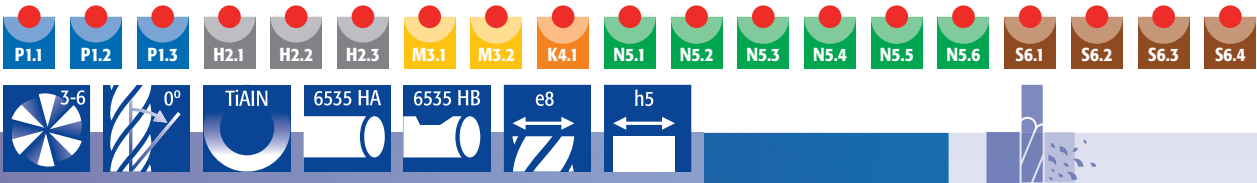
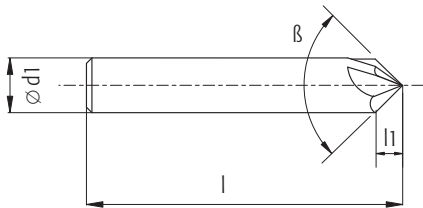
Deburring 90° / Entgrater 90°

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
CH3 1,0x39 90°	1,0	-	3	39	0,5	-	-	3
CH3 2,0x39 90°	2,0	-	3	39	1,0	-	-	3
CH3 3,0x39 90°	3,0	-	3	39	1,5	-	-	3
CH4 4,0x51 90°	4,0	-	4	51	2,0	-	-	4
CH4 6,0x64 90°	6,0	-	6	64	3,0	-	-	4
CH4 8,0x64 90°	8,0	-	8	64	4,0	-	-	4
CH5 8,0x64 90°	8,0	-	8	64	4,0	-	-	5
CH4 10,0x70 90°	10,0	-	10	70	5,0	-	-	4
CH6 10,0x70 90°	10,0	-	10	70	5,0	-	-	6
CH4 12,0x78 90°	12,0	-	12	78	6,0	-	-	4
CH6 12,0x78 90°	12,0	-	12	78	6,0	-	-	6
CH6 16,0x89 90°	16,0	-	16	89	8,0	-	-	6
CH6 20,0x104 90°	20,0	-	20	104	10,0	-	-	6

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Standard



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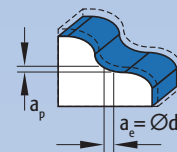
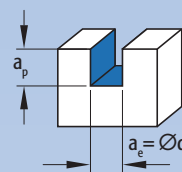
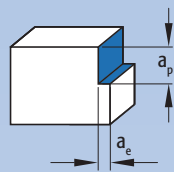
Deburring 120° / Entgrater 120°

Article Number Artikelnummer	Ød (mm)	r (mm)	Ød1 (mm)	L (mm)	L1 (mm)	L2 (mm)	b (mm)	z
CH3 1,0x39 120°	1,0	-	3	39	0,2	-	-	3
CH3 2,0x39 120°	2,0	-	3	39	0,5	-	-	3
CH3 3,0x39 120°	3,0	-	3	39	0,8	-	-	3
CH4 4,0x51 120°	4,0	-	4	51	1,1	-	-	4
CH4 6,0x64 120°	6,0	-	6	64	1,7	-	-	4
CH4 8,0x64 120°	8,0	-	8	64	2,3	-	-	4
CH5 8,0x64 120°	8,0	-	8	64	2,3	-	-	5
CH4 10,0x70 120°	10,0	-	10	70	2,8	-	-	4
CH6 10,0x70 120°	10,0	-	10	70	2,8	-	-	6
CH4 12,0x78 120°	12,0	-	12	78	3,4	-	-	4
CH6 12,0x78 120°	12,0	-	12	78	3,4	-	-	6
CH6 16,0x89 120°	16,0	-	16	89	4,6	-	-	6

Starting from shank Ø6 mm available with Weldon shank.

Ab Schaft Ø6 mm verfügbar mit Weldonfläche.

Material group	TSR (N/mm ²)	Hardness HB	Cutting speed Vc m/min	Coolant
P1.1	< 750	< 250	140 - 220	emulsion
P1.2	< 1000	< 300	100 - 180	emulsion
P1.3	< 1400	< 400	70 - 160	emulsion
H2.1		42-50 HRc	80 - 140	emulsion
M3.1	< 950		80 - 130	emulsion
M3.2	< 1250		60 - 100	emulsion
K4.1	< 800		100 - 160	emulsion
S6.1	< 1500		40 - 60	emulsion
S6.2	< 1600		45 - 70	emulsion
S6.3	< 1600		30 - 50	emulsion
S6.4	< 1250		60 - 90	emulsion



Roughing

a_p up to 1,25 x d
 a_e up to 0,40 x d

Semi finishing

a_p up to 1,50 x d
 a_e up to 0,20 x d

Finishing

a_p up to 2,0 x d
 a_e up to 0,05 x d

0,5xD

a_p up to 0,5 x d
 a_e up to 1,0 x d

1,0xD

a_p up to 1,0 x d
 a_e up to 1,0 x d

Semi finishing

a_p up to 0,10 x d
 a_e up to 0,40 x d

Finishing

a_p up to 0,05 x d
 a_e up to 0,20 x d

Contouring / Konturierung

Ød (mm)	Roughing / Eckfräsen fz	Semi finishing / Halbbearbeitung fz	Finishing / Weiterverarbeitung fz
1	0,005	0,007	0,009
2	0,008	0,009	0,011
3	0,015	0,025	0,035
4	0,020	0,030	0,045
5	0,025	0,035	0,055
6	0,030	0,040	0,065
8	0,035	0,045	0,075
10	0,040	0,055	0,085
12	0,050	0,065	0,095
16	0,070	0,090	0,115
20	0,090	0,110	0,130

Slot milling / Nutenfräsen

0,5xD fz	1,0xD fz
0,008	0,005
0,010	0,008
0,020	0,010
0,025	0,013
0,030	0,015
0,035	0,020
0,045	0,030
0,055	0,040
0,065	0,050
0,075	0,060
0,085	0,075

Profile milling / Profilfräsen

Semi finishing / Halbbearbeitung fz	Finishing / Weiterverarbeitung fz
0,020	0,040
0,030	0,050
0,040	0,060
0,050	0,080
0,060	0,100
0,070	0,120
0,080	0,140
0,100	0,180
0,120	0,200
0,140	0,220
0,160	0,250

Symbols / Piktogramme

Number of Flutes Schneidenzahl	1 flute	2 flutes	3 flutes	3-6 flutes	4 flutes	5 flutes	6-8 flutes			
										
Centre cutting Centrum Schneidend	3-6 flutes	4-7 flutes	6-8 flutes	6-16 flutes						
										
Non centre cutting Nicht centrum Schneidend	Cylinder	Cylinder Weldon								
										
Helix angle Spiralwinkel	Angle 0°	Angle 10°	Angle 20°	Angle 25°	Angle 30°	Angle 35-38°	Angle 40°	Angle 45°	Angle 50°	Variable
										
Diameter Tolerance Durchmessertoleranz	Shank	Cutting diameter								
										
End face Schneidengeometrie	Sharp	Chamfer	Cornerradius	Ballnose						
										
Coating Beschichtung	CrCN	Diamond	TiAlN	TiAlN+	TiAlN GOLD	Uncoated	Diamond			
										
Strategy Strategie	HVM	HPM	HSM	HVM/HPM	HPM/HSM					
										

Tolerances / Toleranzen

Diameter range	Shank Ød1-h5	Cutting diameter Ød-e8	Cutting diameter Ød-f7	Cutting diameter Ød-g7	Cutting diameter Para Tooling Ød-e8
d ≤ 3	0 -0,004	-0,014 -0,028	-0,006 -0,016	-0,002 -0,012	0 -0,025
3 < d ≤ 6	0 -0,005	-0,020 -0,038	-0,010 -0,022	-0,004 -0,016	0 -0,030
6 < d ≤ 10	0 -0,006	-0,025 -0,047	-0,013 -0,028	-0,005 -0,020	0 -0,036
10 < d ≤ 18	0 -0,008	-0,032 -0,059	-0,016 -0,034	-0,006 -0,024	0 -0,043
18 < d ≤ 30	0 -0,009	-0,040 -0,073	-0,020 -0,041	-0,006 -0,024	0 -0,052



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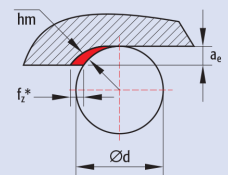
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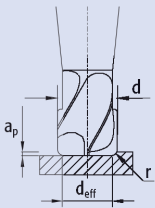
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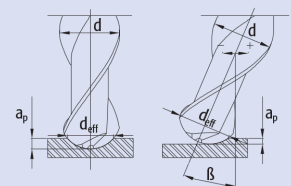
Average chip thickness



Effective diameter torus



Effective diameter ballnose



a_e	Width of cut	mm
a_p	Depth of cut	mm
v_c	Cutting speed	m/min
f_t	Feed per tooth	mm
v_f	Feedrate	mm/min
d	Cutting diameter	mm
z	Number of teeth	
h_n	Average chip thickness	mm

Spindle speed:

$$n = \frac{v_c \cdot 1000}{d \cdot \pi}$$

Feed per tooth:

$$f_z = \frac{v_f}{z \cdot n}$$

Material removal rate:

$$Q = \frac{a_e \cdot a_p \cdot v_f}{1000} \quad (\text{mm}^3/\text{min})$$

Effective diameter at ballnose endmills:

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p - a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[\beta \pm \arccos \left(\frac{d - 2a_p}{d} \right) \right]$$

Cutting speed:

$$v_c = \frac{d \cdot \pi \cdot n}{1000}$$

Feedrate:

$$v_f = f_z \cdot z \cdot n$$

Average chip thickness:

$$h_n = f_z \cdot \sqrt{\frac{a_e}{d}} \quad (\text{mm})$$

Effective diameter at torus endmills:

$$d_{\text{eff}} = d - 2r + 2 \cdot \sqrt{a_p(2r - a_p)} \quad (\text{mm})$$

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