INDEXABLE MILLING

SOLID END MILLING

HOLEMAKING

TAPPING

TOOLING SYSTEMS

2017 Advances Catalogue

METRIC

WIDIA™

For more than 90 years, WIDIA™ brand products and services have defined excellence in innovation, technology, and customer service.

From turning, indexable milling, solid end milling, holemaking, tapping, and tooling systems — WIDIA offers a broad range of solutions, all delivered from a single source. Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialised network of Authorised Distributor partners, and you have the tools you need — and the power that only comes from WIDIA.

WIDIA™

Table of Contents

1926
Tungsten carbide production begins

1937
WIDIA™ wins the Grand Prix at the world exposition in Paris

1962
First patent granted for coated carbide inserts

1967
WIDIA (India) begins producing carbide and tools

1968
Launch of first global coated grade

A **Powerful History** of **High Performance**

For more than 90 years, WIDIA™ brand products and services have defined excellence in innovation, technology, and customer service. From the world's first patent for carbide indexable inserts to the development of the world's first coated grades, WIDIA delivers extreme results, no matter what the challenge.

From turning, indexable milling, solid end milling, holemaking, tapping, and tooling systems — WIDIA offers a broad range of solutions. Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialised network of Authorised Distributor partners, and you have the tools you need — and the power that only comes from WIDIA.

WIDIA™

1982
Launch of first PVD TiN coated taps (VTD)

1987
Launch of the Widaflex™ tooling system for turning, holemaking, and milling

2000
QS 9000 TES and VDA 6.4 certification for the WIDIA™ operations in Germany

2009
The WIDIA, Hanita, Greenfield Tap & Die, Circle, ClappDiCo, Manchester, Metal Removal, Metcut, and Rübig brands combine to create the WIDIA Products Group

2011
Launch KM™ and ERICKSON™ Portfolio

2013
Launch of new VariTap™ series

2016
WIDIA celebrates 90 years

WIDIA™ Metalworking Services

WIDIA™ provides an array of products and support services from onsite tool management and engineering personnel, to inventory control systems, to tool manufacturing, reconditioning, and recycling to support tools and their processes throughout their entire lifecycle. Our metalworking services are designed to save your business time, money, and inventory, and protect your cutting tool investment for the long term.

Let WIDIA help you extend the life of your tools and maintain their performance in delivering productivity. Contact your local Authorised WIDIA distributor or visit **widia.com/services** to learn more.

NOVO™

NOVO™ possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

See page A17 to learn more.

Customer Application Support

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

See page F28 to learn more.

Carbide Recycling

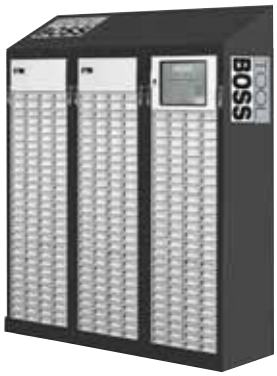
The WIDIA™ Carbide Recycling Programme can turn accumulated scrap carbide tooling in your shop into cash.

See page B43 to learn more.

Tool Reconditioning

WIDIA Reconditioning Services optimise the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

See page D7 to learn more.



ToolBOSS™ Vending Solution

ToolBOSS vending solutions help to reduce costs and improve efficiencies to give you a competitive edge.

KNOWLEDGE CENTER

Knowledge Center

The Knowledge Center offers several ways to get trained. In-person classes include lecture, lab, and machining demonstrations.

WIDIA and the Machine Tool Industry (MTI)

We have Machine Tool Industry (MTI) specialists in more than 60 countries around the world, so there's always someone near you: W-MTI.Solutions@WIDIA.com.

Toolholder Service and Repair

When your WIDIA™ advanced tooling products need to be serviced, the WIDIA Service and Repair Department has the highly trained staff to provide expert assistance.

For information on any of these services, go to **widia.com/services**.


WIDIA

Indexable Milling

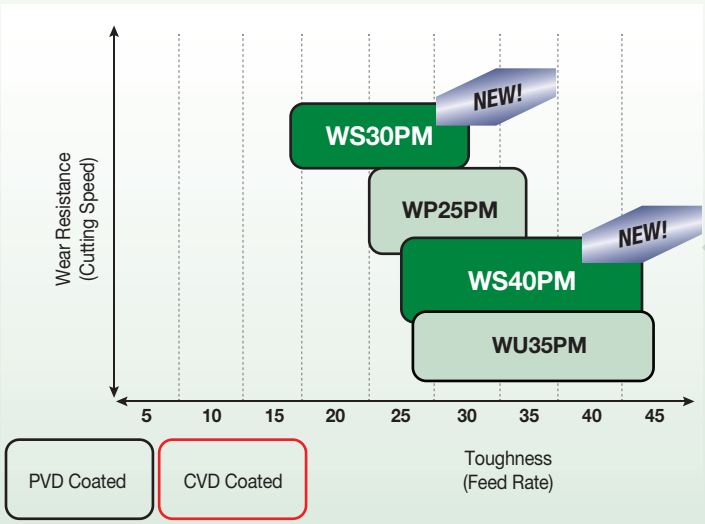
WS40PM

New substrate plus proven PVD coating technology increases performance in rough milling titanium and stainless steels. Excellent toughness and better wear resistance leads to higher efficiency in these demanding applications.

- Proven PVD coating for titanium and stainless to minimise microchipping and provide improved wear resistance.
- New advanced alloyed substrate achieves excellent cutting edge strength and avoids catastrophic insert breakage in severe cutting conditions.
- Resists thermal cracking:
  - — Extremely important in machining titanium as coolant is used.
  - — A common failure mode that leads to chipping.

Grade Positioning

- WS40PM completes the WIDIA™ indexable milling grade portfolio for titanium and stainless steel machining.
- WIDIA can now offer a grade as tough as WU35PM, with more wear resistance.



New WS40PM

- Expanded wear resistance range.
- Overlaps toughness range of WU35PM.
- New advanced substrate.

Application Recommendations

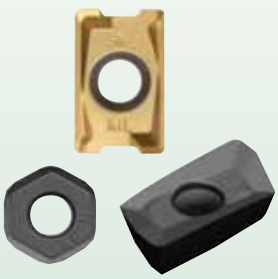
- The go-to grade for rough milling titanium and stainless steel.
- Up to 20% greater tool life at the same cutting conditions.
- Engineered to resist thermal cracking — a huge benefit in titanium milling (wet application).
  - — The ideal speed range for the best tool life in titanium is 46–53 m/min.

Recommended Speeds

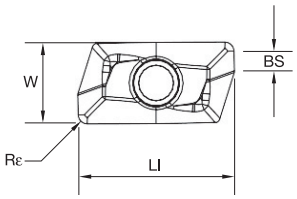
			WS40PM	Speed Vc (m/min)		
Material Group	ISO	Material	Description	max	(starting)	min
P5	P	Stainless Steel	Ferritic, Martensitic, and PH SS	135	**100**	70
P6			High-Strength Ferritic Austenitic and PH SS	115	**80**	50
M1	M	Stainless Steel	Austenitic SS	260	**185**	115
M2			High-Strength Austenitic S and Cast SS	230	**170**	105
M3			Duplex SS	190	**135**	85
S1	S	High-Temp Alloys	Iron Based	62	**45**	27
S2			Cobalt Based	55	**40**	26
S3			Nickel Based	64	**46**	29
S4			Titanium Based	90	**66**	42

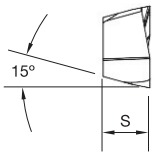
WS40PM is available in these leading indexable milling platforms

- Face Milling: M1200, M1200 Mini, M640, M690
- Shoulder Milling: VSM11™, VSM17™
- Copy Milling: VSM490™




XDCT-ML





- -ML is a light- to medium-machining geometry and is the first choice for stainless steel and titanium materials.

● first choice
○ alternate choice

WIDIA VICTORY

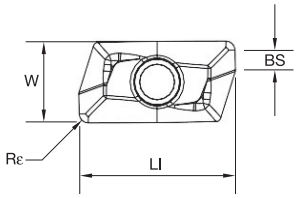
		WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P					○	●	●		○	●
M					●	○	●		●	●
K		●	●		○	○				
N				●						
S					●		○	●	●	●
H										

NEW!

XDCT-ML

catalogue number	cutting edges	LI	BS	S	W	Rε	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDCT110404PDERML	2	13,43	2,09	4,00	6,90	0,40	0,04	-	-	-	5415548	5415547	5545065	5517826	6180173	5415546
XDCT110408PDERML	2	13,44	1,69	4,00	6,90	0,80	0,04	-	5415549	-	5536671	5536670	5642230	-	6180174	-


XDPT-MM



- -MM is a medium- to heavy-machining geometry and is the first choice for general purpose and universal applications.

● first choice
○ alternate choice

WIDIA VICTORY

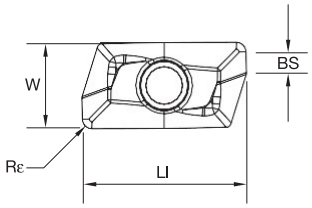
P					○	●	●		○	●
M					●	○	●		●	●
K	●	●			○	○				
N			●							
S					●		○	●	●	●
H										

NEW!

catalogue number	cutting edges	LI	BS	S	W	Rε	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDPT110404PDSRMM	2	13,43	2,06	4,00	6,90	0,40	0,06	-	5415428	-	5642237	5415450	5642231	-	6180149	-
XDPT110408PDSRMM	2	13,44	1,68	4,00	6,90	0,79	0,06	-	5415315	-	5415319	5415318	5545063	5519921	6180148	5415317
XDPT110412PDSRMM	2	13,44	1,29	4,00	6,90	1,20	0,06	-	5415310	-	5415314	5415313	5642232	-	6180150	5415312
XDPT110416PDSRMM	2	13,51	0,85	4,13	6,95	1,60	0,06	-	5415250	-	5415254	5415253	5642233	-	6180172	-
XDPT110420PDSRMM	2	13,51	0,45	4,13	6,95	2,00	0,06	-	-	-	5980399	5980400	5980398	-	-	-
XDPT110424PDSRMM	2	13,37	–	4,01	6,94	2,40	0,06	-	-	-	5901355	-	5901354	-	-	-
XDPT110431PDSRMM	2	12,91	–	4,00	6,89	3,10	0,06	-	5415422	-	5415426	5415425	5642234	5517827	-	-

XDPT-MM


XDCT-ML



- -ML is a light- to medium-machining geometry and is the first choice for stainless steel and titanium materials.

● first choice
○ alternate choice

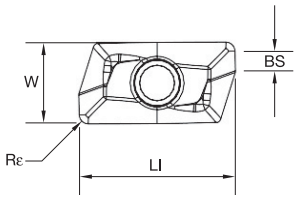
WIDIA VICTORY

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

XDCT-ML

catalogue number	cutting edges	LI	BS	S	W	Rε	hm	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
										NEW!				
XDCT170404PEERML	2	19,15	2,62	4,90	9,60	0,40	0,04	■	■	5989010	■	■	■	■
XDCT170408PEERML	2	19,15	2,22	4,90	9,60	0,80	0,04	■	■	5988983	5988982	5988981	6180180	■
XDCT170412PEERML	2	19,16	1,82	4,90	9,60	1,20	0,04	■	■	5988988	5988987	5988986	6180211	■
XDCT170416PEERML	2	19,17	1,42	4,90	9,60	1,60	0,04	■	■	6001257	■	■	■	■
XDCT170420PEERML	2	19,17	1,01	4,90	9,60	2,00	0,04	■	■	6001255	■	■	■	■
XDCT170424PEERML	2	19,17	0,63	4,90	9,60	2,40	0,04	■	■	6001253	■	■	■	■
XDCT170432PEERML	2	18,85	–	4,88	9,59	3,20	0,04	■	■	6001251	■	■	■	■
XDCT170440PEERML	2	18,33	–	4,87	9,59	4,00	0,04	■	■	6001239	■	■	■	■
XDCT170460PEERML	2	17,02	–	4,80	9,56	6,00	0,04	■	■	■	■	6118069	6232053	■


XDPT-MM



- -MM is a medium- to heavy-machining geometry and is the first choice for general purpose and universal applications.

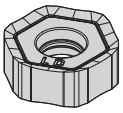
● first choice
○ alternate choice

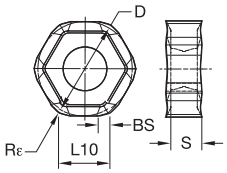
WIDIA VICTORY

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

XDPT-MM

catalogue number	cutting edges	LI	BS	S	W	Rε	hm	WK15CM	WN25PM	NEW! WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XDPT170404PESRMM	2	19,15	2,52	4,90	9,60	0,40	0,10	-	-	-	-	5987689	-	5987690
XDPT170408PESRMM	2	19,15	2,15	4,90	9,60	0,80	0,10	5987948	-	5987949	5987947	5987946	6180212	5987950
XDPT170412PESRMM	2	19,16	1,77	4,90	9,60	1,20	0,10	5988138	-	5988151	5988140	5988139	6180213	5988152
XDPT170416PESRMM	2	19,17	1,38	4,90	9,60	1,60	0,10	5988153	-	5988155	5988156	5988154	6180214	-
XDPT170420PESRMM	2	19,17	0,99	4,90	9,60	2,00	0,10	-	-	5988158	5988160	5988159	-	-
XDPT170424PESRMM	2	19,17	0,62	4,90	9,60	2,40	0,10	-	-	5988203	-	5988202	-	-
XDPT170432PESRMM	2	18,85	–	4,89	9,59	3,20	0,10	-	-	5988206	5988204	5988205	-	-
XDPT170440PESRMM	2	18,33	–	4,87	9,59	4,00	0,10	-	-	5988970	-	5988969	-	-


HNGJ-LD

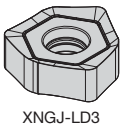


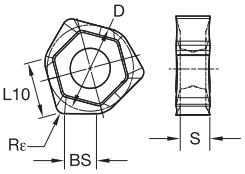
● first choice
○ alternate choice

		TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P				●	●	●		●	●	●		○
M				○	●	○		●	●	●	○	●
K		●	●	○	○	○	●	○				
N												
S					●			●	●	○	●	●
H								○				

■ HNGJ-LD

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	3954419	3954420	3954421	3954422	-	-	5895291	5895292	5550905	5528975	6180295
HNGJ0704ANENLD	12	12,70	6,80	4,48	1,60	1,20	0,08											
HNGJ070432ANENLD	12	12,70	6,80	4,48	–	3,21	0,08	3954428	-	3954429	3954430	-	-	-	-	-	-	6180300


XNGJ-LD3
Wiper



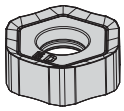
● first choice
○ alternate choice

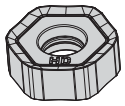
		TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P				●	●	●		●	●	●		○
M				○	●	○		●	●	●	○	●
K		●	●	○	○	○	●	○				
N												
S					●			●	●	○	●	●
H								○				

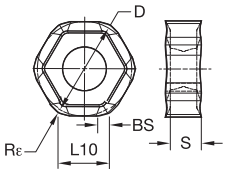
■ XNGJ-LD3 Wiper

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	3954424	3954425	3954426	3954427	-	5427373	5895298	-	5895299	-	-
XNGJ0704ANENLD3W	3	12,70	6,78	4,47	6,78	1,30	0,08											

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.


HNPJ-GD


HNPJ-HD



● first choice
○ alternate choice

		TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P				●	●	●		●	●	●		○
M				○	●	○		●	●	●	○	●
K		●	●	○	○	○	●	○				
N												
S					●			●	●	○	●	●
H								○				

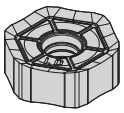
NEW!

■ HNPJ-GD

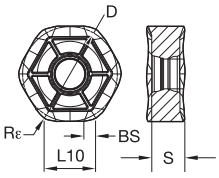
catalogue number	cutting edges	D	L10	S	BS	Rε	hm											
HNPJ0704ANSNGD	12	12,70	6,80	4,45	1,27	1,20	0,10	3954432	3954473	-	3954474	3954475	5427374	5895293	5895294	5550906	5528976	6180297

■ HNPJ-HD

catalogue number	cutting edges	D	L10	S	BS	Rε	hm											
HNPJ0704ANSNHD	12	12,70	6,80	4,41	1,25	1,20	0,14	3954477	3954478	-	3954479	3954480	5427375	5895295	5895296	5550907	-	6180299
HNPJ070432ANSNHD	12	12,70	6,80	4,42	–	3,20	0,14	3954481	3954482	-	3954483	3954484	-	-	-	5895297	-	6180311



HNGJ-LD

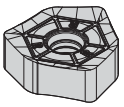


● first choice
○ alternate choice

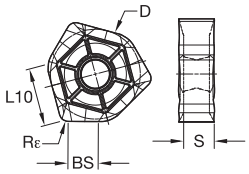
P			●	●	●		●	●	●		○					
M			○	●	○		●	●	●	○	●					
K		●	○	○	○	●	○									
N																
S				●			●	●	○	●	●					
H							○									

■ HNGJ-LD

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
													NEW!				
HNGJ0905ANENLD	12	15,88	8,58	5,56	1,80	1,20	0,05	3093559	3330950	3030034	3030017	I	5895346	5895347	5895348	5528973	6180276



XNGJ-GD3
Wiper



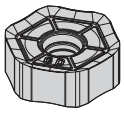
● first choice
○ alternate choice

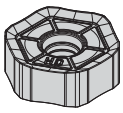
P			●	●	●		●	●	●		○					
M			○	●	○		●	●	●	○	●					
K		●	○	○	○	●	○									
N																
S				●			●	●	○	●	●					
H							○									

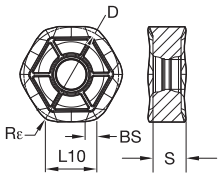
■ XNGJ-GD3 Wiper

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
													NEW!				
XNGJ0905ANSNGD3W	3	15,88	9,60	5,51	6,00	1,60	0,09	3524707	3523620	3066479	I	5622622	5895381	I	5895382	I	6180277

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.


HNGJ-GD


HNGJ-HD



● first choice
○ alternate choice

		TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
P			●	●	●		●	●	●		○
M			○	●	○		●	●	●	○	●
K		●	○	○	○	●	○				
N											
S				●			●	●	○	●	●
H							○				

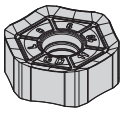
NEW!

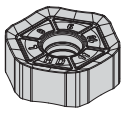
HNGJ-GD

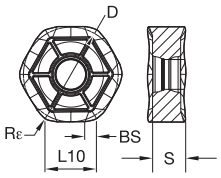
catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0905ANSNGD	12	15,88	8,58	5,56	1,80	1,20	0,10	3119541	3614650	3037596	3093721	5427370	5400965	5895349	5895350	5528974	6180280

HNGJ-HD

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNGJ0905ANSNHD	12	15,88	8,59	5,46	1,66	1,20	0,17	3563900	3563901	3563902	I	I	5895371	5895372	5895373	I	6180291
HNGJ090543ANSNHD	12	15,88	8,50	5,44	–	4,35	0,20	3564083	3564084	3564085	I	I	I	I	I	I	6180292


HNPJ-GD


HNPJ-HD



● first choice
○ alternate choice

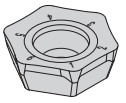
P			●	●	●		●	●	●		○
M			○	●	○		●	●	●	○	●
K		●	○	○	○	●	○				
N											
S				●			●	●	○	●	●
H							○				

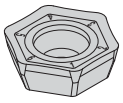
HNPJ-GD

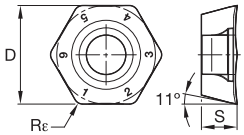
catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
													NEW!				
HNPJ0905ANSNGD	12	15,88	8,58	5,56	1,80	1,20	0,10	3761185	–	3761187	3761188	5427372	5895374	5895375	5550908	–	6180278

HNPJ-HD

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HNPJ0905ANSNHD	12	15,88	8,59	5,46	1,66	1,20	0,18	3670864	–	3670842	–	5427371	5895376	5895377	5550909	–	6180279
HNPJ090543ANSNHD	12	15,88	8,50	5,44	–	4,34	0,13	3670866	–	3670865	–	–	5895378	5895379	5895380	–	6180294


HPGT-LD


HPGT-GD
HPPT-GD



● first choice
○ alternate choice

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

HPGT-LD

catalogue number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
														NEW!				
HPGT06T3DZERLD	6	10,90	3,99	0,98	0,08	2288072	I	2957585	2957547	2957587	2288070	I	I	5895784	I	5895785	I	6180312

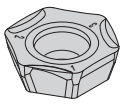
NOTE: Ap1 max = 3mm with this geometry.

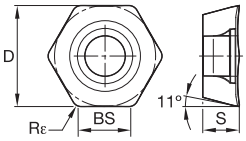
HPGT-GD

catalogue number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HPGT06T3DZENGD	6	10,98	3,97	0,98	0,10	2288069	2957589	I	2957588	2957546	2288067	2288066	5427387	5895782	I	5895783	5528978	6180313

HPPT-GD

catalogue number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
HPPT06T3DZENGD	6	10,97	3,97	0,98	0,10	I	I	2957583	2957586	2957552	2271760	2271759	I	5895788	5895790	5895789	I	6180315


HPGT-GD
Wiper

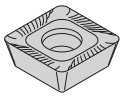


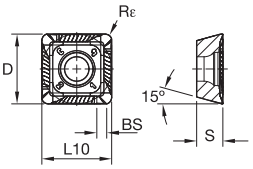
● first choice
○ alternate choice

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

HPGT-GD Wiper

catalogue number	cutting edges	D	S	BS	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM
															NEW!				
HPGT06T3DZERGD3W	3	11,14	4,00	2,88	0,98	0,10	I	2957549	I	2957584	I	2288103	I	5427388	5895786	I	5895787	I	I


SDMT-ML

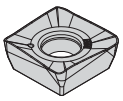


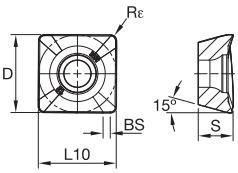
● first choice
○ alternate choice

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

■ SDMT-ML

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM	WS40PM
													NEW!			
SDMT1204PDRML	4	12,70	12,70	4,77	1,10	1,20	0,08	-	3094667	-	3020185	2030439	2030437	5427423	-	6180319


SDMX-MM

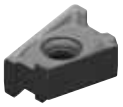


● first choice
○ alternate choice

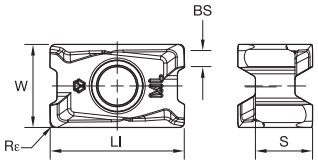
P			●	●	●	●			○					
M			○	●	○	○		○	●					
K		●	○	○		○	●							
N														
S				●				●	●					
H														

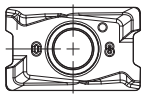
■ SDMX-MM

catalogue number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM	WS40PM
												NEW!			
SDMX120408RMM	4	12,70	12,70	4,76	1,93	0,80	0,10	-	3950588	3950589	3950590	3950591	-	5522490	6180317
SDMX120412RMM	4	12,70	12,70	4,76	1,50	1,20	0,10	-	3950596	3950597	3950599	3950600	-	5519572	6180318
SDMX120416RMM	4	12,70	12,70	4,76	1,50	1,60	0,10	4145063	4145064	4145065	-	-	-	-	-
SDMX120424RMM	4	12,70	12,70	4,76	0,60	2,40	0,10	-	-	4145072	-	4145093	-	-	-
SDMX120432RMM	4	12,70	12,70	4,76	–	3,20	0,10	-	-	4145094	-	4145095	-	-	-


XNGU-ML


XNGU-ML




Back View

- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.

● first choice
○ alternate choice

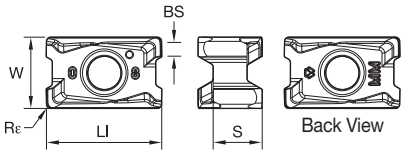
		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P					○	●	●	○	●
M					●	○	●	●	●
K		●	●		○	○			
N				●					
S					●		○	●	●
H									

■ XNGU-ML • Precision Finishing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604ERML	4	16,20	6,88	10,00	2,20	0,40	0,08	ı	ı	ı	5890821	ı	5890822	6180323	5890823
XNGU15T608ERML	4	16,20	6,88	10,00	1,80	0,80	0,08	ı	ı	ı	5873481	ı	5873482	6180324	5873483


XNPU-MM


XNPU-MM



- -MM is the universal geometry for VSM490-15. First choice when machining steel, as well as stainless steel and high-temp alloys in heavy applications.

● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P					○	●	●	○	●
M					●	○	●	●	●
K		●	●		○	○			
N				●					
S					●		○	●	●
H									

NEW!

■ XNPU-MM • Utility Roughing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNPU15T608SRMM	4	16,10	6,88	10,00	1,90	0,80	0,10	5873420	5873419	-	5873415	5873418	5873416	6180320	5873417
XNPU15T612SRMM	4	16,10	6,88	10,00	1,50	1,20	0,10	5890763	5890762	-	5890728	5890761	5890729	6180321	5890730
XNPU15T616SRMM	4	16,10	6,88	10,00	1,10	1,60	0,10	5883522	5883521	-	5883447	5883450	5883448	6180322	5883449
XNPU15T620SRMM	4	16,10	6,88	10,00	0,70	2,00	0,10	6030375	-	-	6030372	6030374	6030373	-	-

NOVO KNOWS SEARCH

Searching for a tool by using the outdated method of a catalogue has been replaced with the Advise and Select functions from NOVO™ — saving you time and money.

ADVISE

Uses a rules-based approach to provide cutting tool recommendations:

- Define Machining Feature (face milling, slotting, blind hole, etc.)
- Apply Constraint Requirements (geometric, material, tolerance, etc.)
- Set Machining Sequence (single or multi-step operations, rough then finish, etc.)
- Receive Ranked Results

SELECT

A method of selecting cutting tools from a tree structure via a hierarchy or parametric search:

- If you know which product you are looking for, a quick search can be performed by just the catalogue number or product description.
- Smart filters significantly reduce the amount of potential tooling solutions.
- After the tool is selected, NOVO also provides cutting and adaptive item options that fit with your solution.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximises every shift. **widia.com/novo**

Double-Sided Shoulder Mill •
VSM490™-15

VSM490-15

WIDIA™ Victory™ Shoulder Milling Series (VSM series) is specially engineered to achieve excellent surface quality as well as higher material removal rates in shoulder milling applications. The VSM490 series, with its unique design, enables the tool to be applied in multiple passes (stepping down) with outstanding results. VSM490-15 is applicable in a wide range of workpiece materials: steel, cast iron, stainless steel, and titanium, from roughing to finishing applications.

- Double-sided strong insert with 4 cutting edges.
- High positive geometry for lower cutting forces.
- Superior wall and surface finish capabilities.

State-of-the-art stepping down capabilities due to its ultimate design concept.

Multiple corner nose radii available.

Up to 15mm (0.59") depth-of-cut capabilities.

Cutter bodies with effective internal coolant supply.

Four geometries for all material groups in shoulder milling applications.

-ALP	-ML	-MM	-MH
			
N	P M S	P M K S	P K
For non-ferrous materials.	First choice for stainless steel. Lower cutting forces.	First choice, especially when machining steels.	First choice for cast iron, also recommended for heavy applications.

Geometry Strengthening

Finishing Capabilities/Reduced Cutting Force

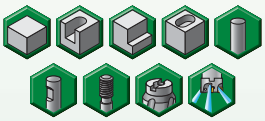
90° Shoulder Mills

VSM490™-15

Max depth of cut: 15mm

Lead angle: 90°
Indexes per insert: 4
Diameter: 25–160mm

Pages: A15–A16, A20–A28



VSM490-15 • Unbeatable Performance in Shoulder Milling

- "Stepless" solution.
- No mismatch when machining walls in different steps.

Innovative cutting geometry provides superior wall and surface finish.

Integrated wiper facet for excellent floor finishing.

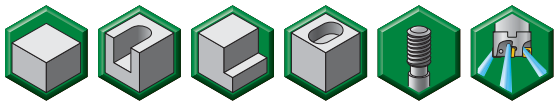
Competitor Tool • Wall Quality

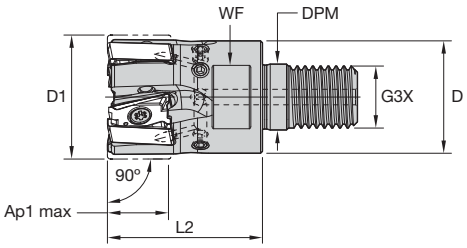
Traditional tools are designed to achieve a 90° wall, but exhibit poor performance when machining walls in multiple passes.

VSM490-15 • Wall Quality

VSM490-15 minimises the marks left. By increasing wall quality and avoiding a second tool, productivity increases significantly.

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 90° to run precise applications in multiple axial passes.
- Strong concept to run up to 15mm (.590") depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.





Screw-On End Mills

order number	catalogue number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	kg	max RPM
5873211	**VSM490D025Z02M12XN15**	25	21	13	M12	32	17	15,0	2	0,18	26700
5873212	**VSM490D032Z03M16XN15**	32	29	17	M16	40	24	15,0	3	0,18	22000
5873213	**VSM490D032Z04M16XN15**	32	29	17	M16	40	24	15,0	4	0,18	22000
5873214	**VSM490D035Z04M16XN15**	35	29	17	M16	40	24	15,0	4	0,19	20600

Spare Parts

insert screw

MS-2071

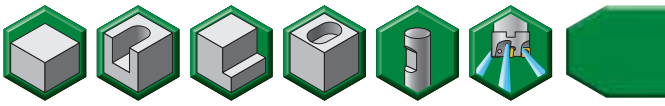
Nm

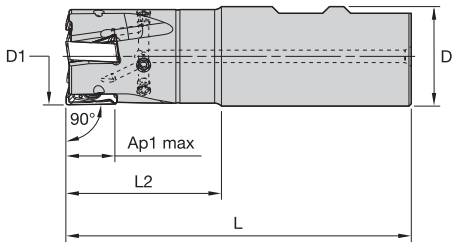
3,5

Torx Plus driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 90° to run precise applications in multiple axial passes.
- Strong concept to run up to 15mm (.590") depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.





Weldon Shanks

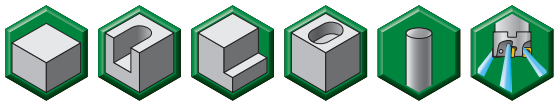
order number	catalogue number	D1	D	L	L2	Ap1 max	Z	kg	max RPM
5710285	**VSM490D025Z02B25XN15**	25	25	89	32	15,0	2	0,28	26700
5710286	**VSM490D032Z03B32XN15**	32	32	111	50	15,0	3	0,58	22000
5873215	**VSM490D040Z03B32XN15**	40	32	111	50	15,0	3	0,65	18800

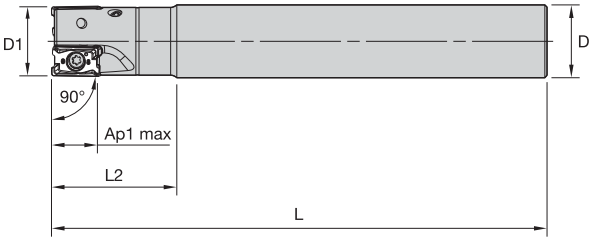
NOTE: Weldon type not recommended for finishing operations.

Spare Parts

insert screw	Nm	Torx Plus driver
MS-2071	3,5	**DT15IP**

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 90° to run precise applications in multiple axial passes.
- Strong concept to run up to 15mm (.590") depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.





Cylindrical End Mills

order number	catalogue number	D1	D	L	L2	Ap1 max	Z	kg	max RPM
5873216	**VSM490D025Z02A25XN15L100**	25	25	100	43	15,0	2	0,32	26700
5710287	**VSM490D025Z02A25XN15L170**	25	25	170	43	15,0	2	0,59	26700
5873217	**VSM490D032Z03A32XN15L110**	32	32	110	49	15,0	3	0,59	22000
5710288	**VSM490D032Z03A32XN15L200**	32	32	200	50	15,0	3	1,14	22000
5873218	**VSM490D032Z04A32XN15L110**	32	32	110	49	15,0	4	0,58	22000
5873219	**VSM490D032Z04A32XN15L200**	32	32	200	50	15,0	4	1,14	22000

Spare Parts

insert screw

MS-2071

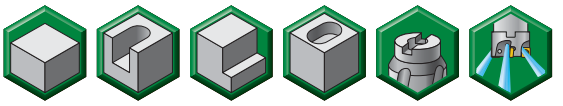
Nm

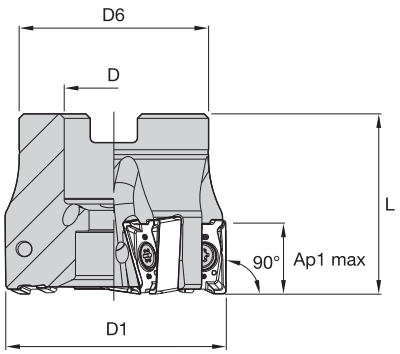
3,5

Torx Plus driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 90° to run precise applications in multiple axial passes.
- Strong concept to run up to 15mm (.590") depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.





Shell Mills

order number	catalogue number	D1	D	D6	L	Ap1 max	Z	kg	max RPM
5710289	VSM490D040Z04S16XN15	40	16	37	40	15,0	4	0,20	18800
5710520	VSM490D040Z05S16XN15	40	16	37	40	15,0	5	0,19	18800
5873221	VSM490D050Z04S22XN15	50	22	42	40	15,0	4	0,28	16300
5710521	VSM490D050Z05S22XN15	50	22	42	40	15,0	5	0,28	16300
5710522	VSM490D050Z06S22XN15	50	22	42	40	15,0	6	0,28	16300
5873222	VSM490D063Z05S22XN15	63	22	50	40	15,0	5	0,50	14200
5710523	VSM490D063Z06S22XN15	63	22	50	40	15,0	6	0,49	14200
5710524	VSM490D063Z07S22XN15	63	22	50	40	15,0	7	0,48	14200
5873223	VSM490D080Z05S27XN15	80	27	60	50	15,0	5	1,03	12300
5710525	VSM490D080Z07S27XN15	80	27	60	50	15,0	7	1,03	12300
5873224	VSM490D080Z09S27XN15	80	27	60	50	15,0	9	1,04	12300
5710526	VSM490D100Z08S32XN15	100	32	80	50	15,0	8	1,61	10900
5873225	VSM490D100Z11S32XN15	100	32	80	50	15,0	11	1,64	10900
5873226	VSM490D125Z09S40XN15	125	40	90	63	15,0	9	2,96	9600
5873227	VSM490D125Z12S40XN15	125	40	90	63	15,0	12	3,11	9600
5873228	VSM490D160Z12S40XN15	160	40	110	63	15,0	12	4,80	8400

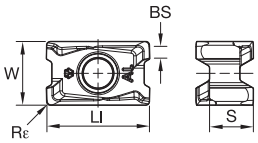
Spare Parts

D1	insert screw	Nm	Torx Plus driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly	coolant lock screw	coolant shower plate
40	MS-2071	3,5	DT15IP	125.825	MS1294CG	–	–	–
50	MS-2071	3,5	DT15IP	125.025	MS1234CG	–	–	–
63	MS-2071	3,5	DT15IP	125.025	MS1234CG	–	–	–
80	MS-2071	3,5	DT15IP	125.230	MS2038CG	–	–	–
100	MS-2071	3,5	DT15IP	–	–	MS2189C	–	–
125	MS-2071	3,5	DT15IP	–	–	MS2187C	–	–
160	MS-2071	3,5	DT15IP	–	–	–	420.200	470.233

NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	XNGU-ML	WP40PM	**XNPU-ML**	**WP40PM**	XNPU-MM	WP40PM
P3–P4	XNGU-ML	WP25PM	**XNPU-MM**	**WP35CM**	XNPU-MM	WP40PM
P5–P6	XNGU-MM	WP25PM	**XNPU-MM**	**WP35CM**	XNPU-MM	WP40PM
M1–M2	XNGU-ML	WU35PM	**XNGU-ML**	**WU35PM**	XNPU-MM	WU35PM
M3	XNGU-ML	WU35PM	**XNGU-ML**	**WU35PM**	XNPU-MM	WU35PM
K1–K2	XNPU-MM	WK15CM	**XNGU-MH**	**WK15CM**	XNGU-MH	WP35CM
K3	XNPU-MM	WK15PM	**XNGU-MH**	**WK15PM**	XNGU-MH	WP25PM
N1–N2	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
N3	XNGU-ALP	WN25PM	**XNGU-ALP**	**WN25PM**	XNGU-ALP	WN25PM
S1–S2	XNGU-ML	WP25PM	**XNGU-ML**	**WU35PM**	XNPU-MM	WU35PM
S3	XNGU-ML	WP25PM	**XNGU-ML**	**WU35PM**	XNPU-MM	WU35PM
S4	XNGU-ML	WU35PM	**XNGU-ML**	**WU35PM**	XNPU-MM	WU35PM
H1	–	–	**–**	**–**	–	–



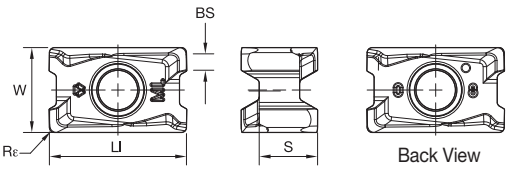
- -ALP is the first choice for milling aluminium and other non-ferrous alloys.

● first choice
○ alternate choice

	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P				○	●	●	○	●
M				●	○	●	●	●
K	●	●		○	○			
N			●					
S				●		○	●	●
H								

XNGU-ALP • For aluminium and other non-ferrous alloys

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
NEW! **XNGU15T604ERALP**	4	16,20	6,88	10,00	2,20	0,40	0,03	'	'	6082644	'	'	'	'	'
NEW! **XNGU15T608ERALP**	4	16,20	6,88	10,00	1,80	0,80	0,03	'	'	6082645	'	'	'	'	'



- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.

● first choice
○ alternate choice

	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P				○	●	●	○	●
M				●	○	●	●	●
K	●	●		○	○			
N			●					
S				●		○	●	●
H								

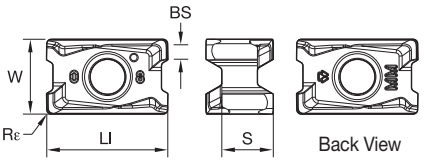
XNGU-ML • Precision Finishing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604ERML	4	16,20	6,88	10,00	2,20	0,40	0,08	'	'	'	5890821	'	5890822	6180323	5890823
XNGU15T608ERML	4	16,20	6,88	10,00	1,80	0,80	0,08	'	'	'	5873481	'	5873482	6180324	5873483


XNGU-MM
XNPU-MM


XNPU-ML


XNGU-MH



- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.
- -MM is the universal geometry for VSM490-15. First choice when machining steel, as well as stainless steel and high-temp alloys in heavy applications.
- -MH geometry is the first choice for cast iron machining in the medium and heavy applications.

● first choice
○ alternate choice

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

XNGU-MM • Precision Finishing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM (NEW!)	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T604SRMM	4	16,20	6,88	10,00	2,20	0,40	0,10	-	-	-	5949204	-	5949205	-	5949206
XNGU15T608SRMM	4	16,20	6,88	10,00	1,90	0,80	0,10	-	-	-	5710527	-	5710528	-	5710529

XNPU-ML • Utility Roughing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNPU15T608ERML	4	16,10	6,88	10,00	1,90	0,80	0,08	-	-	-	5883097	-	5883098	-	5883099

XNPU-MM • Utility Roughing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNPU15T608SRMM	4	16,10	6,88	10,00	1,90	0,80	0,10	5873420	5873419	-	5873415	5873418	5873416	6180320	5873417
XNPU15T612SRMM	4	16,10	6,88	10,00	1,50	1,20	0,10	5890763	5890762	-	5890728	5890761	5890729	6180321	5890730
XNPU15T616SRMM	4	16,10	6,88	10,00	1,10	1,60	0,10	5883522	5883521	-	5883447	5883450	5883448	6180322	5883449
NEW! XNPU15T620SRMM	4	16,10	6,88	10,00	0,70	2,00	0,10	6030375	-	-	6030372	6030374	6030373	-	-

XNGU-MH • Utility Roughing

catalogue number	cutting edges	LI	S	W	BS	Rε	hm	WK15CM	WK15PM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XNGU15T608SRMH	4	16,20	6,88	10,00	1,80	0,80	0,10	6003725	6003724	-	6003570	6003723	6003721	-	6003722
NEW! XNGU15T616SRMH	4	16,20	6,88	10,00	1,00	1,60	0,10	6030380	6030378	-	6030376	6030377	-	-	-

Recommended Starting Speeds [m/min]

Material Group		WK15CM			WK15PM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU35PM		
P	1	–	–	–	–	–	–	–	–	–	330	**285**	270	455	**395**	370	295	**260**	245	–	–	–	260	**230**	215
	2	–	–	–	–	–	–	–	–	–	275	**240**	200	280	**255**	230	250	**215**	180	–	–	–	220	**190**	160
	3	–	–	–	–	–	–	–	–	–	255	**215**	175	255	**230**	205	230	**195**	160	–	–	–	200	**170**	140
	4	–	–	–	–	–	–	–	–	–	225	**185**	150	190	**175**	160	205	**170**	135	–	–	–	180	**150**	120
	5	–	–	–	–	–	–	–	–	–	185	**170**	150	260	**230**	210	170	**155**	135	135	**100**	70	150	**135**	120
	6	–	–	–	–	–	–	–	–	–	165	**125**	100	160	**135**	110	150	**115**	90	115	**80**	50	130	**100**	80
M	1	–	–	–	–	–	–	–	–	–	205	**180**	165	205	**185**	155	195	**170**	155	260	**185**	115	170	**150**	135
	2	–	–	–	–	–	–	–	–	–	185	**160**	130	185	**160**	140	175	**150**	125	230	**170**	105	155	**130**	110
	3	–	–	–	–	–	–	–	–	–	140	**120**	95	145	**130**	115	130	**115**	90	190	**135**	85	115	**100**	80
K	1	420	**385**	340	270	**245**	215	–	–	–	230	**205**	185	295	**265**	240	–	–	–	–	–	–	–	–	–
	2	335	**295**	275	210	**190**	175	–	–	–	180	**160**	150	235	**210**	190	–	–	–	–	–	–	–	–	–
	3	280	**250**	230	175	**160**	145	–	–	–	150	**135**	120	195	**175**	160	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	1075	**945**	875	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	945	**875**	760	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	945	**875**	760	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	40	**35**	25	–	–	–	40	**35**	30	62	**45**	27	35	**30**	25
	2	–	–	–	–	–	–	–	–	–	40	**35**	25	–	–	–	40	**35**	30	55	**40**	26	35	**30**	25
	3	–	–	–	–	–	–	–	–	–	50	**40**	25	–	–	–	50	**40**	30	64	**46**	29	45	**35**	25
	4	–	–	–	–	–	–	–	–	–	70	**50**	35	66	**50**	33	65	**50**	35	90	**66**	42	60	**45**	30
H	1	–	–	–	–	–	–	–	–	–	120	**90**	70	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50–100%			
XNGU-ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	XNGU-ALP
XNGU-ML	0,17	**0,33**	0,46	0,13	**0,24**	0,33	0,09	**0,18**	0,25	0,08	**0,16**	0,22	0,08	**0,14**	0,20	XNGU-ML
XNPU-MM	0,23	**0,40**	0,64	0,17	**0,29**	0,46	0,13	**0,22**	0,35	0,11	**0,19**	0,30	0,10	**0,18**	0,28	XNPU-MM
XNGU-MH	0,23	**0,46**	0,70	0,17	**0,33**	0,50	0,13	**0,25**	0,38	0,11	**0,22**	0,33	0,10	**0,20**	0,30	XNGU-MH

NOTE: Use "Light Machining" values as starting feed rate.

Order a VSM490™ Kit and experience the next level of shoulder milling!

VSM490-15 Starter Kits

Order one of our starter kits and test the performance of our new VSM490-15 platform. The kits are set up to serve the majority of shoulder milling applications and workpiece materials, delivered with a cutter body as well as 20 inserts from a premium WIDIA™ grade. Detailed order information can be found in the table below.

■ VSM490-15 Starter Kits • Metric

order number	catalogue number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5966234	VSM490KITC-D25Z02WP40PM	25z2	CYLINDRICAL	P	∇∇	VSM490D025Z02A25XN15L170	1	XNPU15T608SRMM	WP40PM	20
5966235	VSM490KITC-D32Z03WP40PM	32z3	CYLINDRICAL	P	∇∇	VSM490D032Z03A32XN15L200	1	XNPU15T608SRMM	WP40PM	20
5966236	VSM490KITS-D40Z04WP40PM	40z4	SHELL MILL	P	∇∇	VSM490D040Z04S16XN15	1	XNPU15T608SRMM	WP40PM	20
5966237	VSM490KITS-D50Z05WP40PM	50z5	SHELL MILL	P	∇∇	VSM490D050Z05S22XN15	1	XNPU15T608SRMM	WP40PM	20
5966238	VSM490KITS-D50Z06WP40PM	50z6	SHELL MILL	P	∇∇	VSM490D050Z06S22XN15	1	XNPU15T608SRMM	WP40PM	20
5966239	VSM490KITS-D63Z06WP40PM	63z6	SHELL MILL	P	∇∇	VSM490D063Z06S22XN15	1	XNPU15T608SRMM	WP40PM	20
5966240	VSM490KITS-D80Z07WP40PM	80z7	SHELL MILL	P	∇∇	VSM490D080Z07S27XN15	1	XNPU15T608SRMM	WP40PM	20
5966251	VSM490KITS-D100Z08WP40PM	100z8	SHELL MILL	P	∇∇∇	VSM490D100Z08S32XN15	1	XNPU15T608SRMM	WP40PM	20

∇ Heavy/Roughing
∇∇ Medium
∇∇∇ Light Machining/Finishing

(continued)

(VSM490-15 Starter Kits • Metric — continued)

order number	catalogue number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5966252	VSM490KITC-D25Z02WU35PM	25z2	CYLINDRICAL	M+S	∇∇∇	VSM490D025Z02A25XN15L170	1	XNGU15T608ERML	WU35PM	20
5966253	VSM490KITC-D32Z03WU35PM	32z3	CYLINDRICAL	M+S	∇∇∇	VSM490D032Z03A32XN15L200	1	XNGU15T608ERML	WU35PM	20
5966255	VSM490KITS-D40Z04WU35PM	40z4	SHELL MILL	M+S	∇∇∇	VSM490D040Z04S16XN15	1	XNGU15T608ERML	WU35PM	20
5966256	VSM490KITS-D50Z05WU35PM	50z5	SHELL MILL	M+S	∇∇∇	VSM490D050Z05S22XN15	1	XNGU15T608ERML	WU35PM	20
5966257	VSM490KITS-D50Z06WU35PM	50z6	SHELL MILL	M+S	∇∇∇	VSM490D050Z06S22XN15	1	XNGU15T608ERML	WU35PM	20
5966258	VSM490KITS-D63Z06WU35PM	63z6	SHELL MILL	M+S	∇∇∇	VSM490D063Z06S22XN15	1	XNGU15T608ERML	WU35PM	20
5966259	VSM490KITS-D80Z07WU35PM	80z7	SHELL MILL	M+S	∇∇∇	VSM490D080Z07S27XN15	1	XNGU15T608ERML	WU35PM	20
5966260	VSM490KITC-D25Z02WK15PM	25z2	CYLINDRICAL	K	∇	VSM490D025Z02A25XN15L170	1	XNPU15T608SRMM	WK15PM	20
5966261	VSM490KITC-D32Z03WK15PM	32z3	CYLINDRICAL	K	∇	VSM490D032Z03A32XN15L200	1	XNPU15T608SRMM	WK15PM	20
5966262	VSM490KITS-D40Z04WK15PM	40z4	SHELL MILL	K	∇	VSM490D040Z04S16XN15	1	XNPU15T608SRMM	WK15PM	20
5966263	VSM490KITS-D50Z05WK15PM	50z5	SHELL MILL	K	∇	VSM490D050Z05S22XN15	1	XNPU15T608SRMM	WK15PM	20
5966264	VSM490KITS-D50Z06WK15PM	50z6	SHELL MILL	K	∇	VSM490D050Z06S22XN15	1	XNPU15T608SRMM	WK15PM	20
5966265	VSM490KITS-D63Z07WK15PM	63z7	SHELL MILL	K	∇	VSM490D063Z07S22XN15	1	XNPU15T608SRMM	WK15PM	20
5966266	VSM490KITS-D80Z09WK15PM	80z9	SHELL MILL	K	∇	VSM490D080Z09S27XN15	1	XNPU15T608SRMM	WK15PM	20
5966267	VSM490KITS-D100Z11WK15PM	100z11	SHELL MILL	K	∇	VSM490D100Z11S32XN15	1	XNPU15T608SRMM	WK15PM	20

∇ Heavy/Roughing
∇∇ Medium
∇∇∇ Light Machining/Finishing

Engineered to Achieve Superior Surface Quality

Victory™ Shoulder Mill Series

The Victory Shoulder Mill (VSM) family of tools provides a comprehensive solution for your most challenging shoulder milling applications. The unique design of the VSM11™, VSM17™, and VSM490™ is capable of producing a true 90° wall in multiple material types. When combined with the latest WIDIA™ Victory grades, VSM from WIDIA provides superior performance at high speeds.

- Innovative cutting geometry provides superior wall and surface finish.
- State-of-the-art step-down capability.
- Real soft cutting action results in lower cutting forces and low machine power consumption.
- VSM11 and VSM17 offer aggressive ramping capabilities.
- VSM490 provides outstanding step-down capabilities in applications that require multiple passes.

To learn more about the benefits of the **WIDIA™ Victory Shoulder Mill Series**, contact your local distributor.

WIDIA™

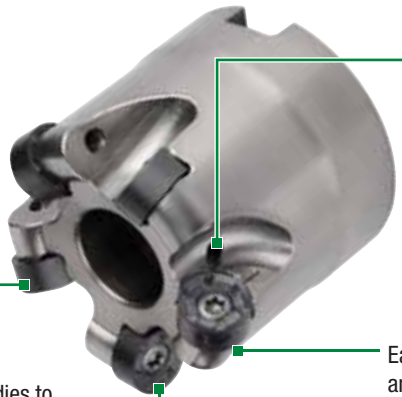
Double-Sided Round Insert •

M200™ Series

Revolutionary double-sided round insert, capable of running in multiple types of milling operations and workpiece materials, increases customers' productivity with the most efficient cost per edge.

M200

- Up to 12 cutting edges per insert.
- Effective anti-rotation feature.
- Able to apply in all type of materials and milling applications.
- Latest WIDIA™ Victory™ grades offered.



Screw-on, end mill, and shell mill cutters with internal coolant.

Higher clearance in bodies to permit pocketing, profiling, and 5-axis machining.

Easy-to-use and unique anti-rotation feature for excellent stability for higher feed rates and cutting forces.

Three different insert sizes and three insert topography styles with the new WIDIA Victory milling grades cover any type of component and application.

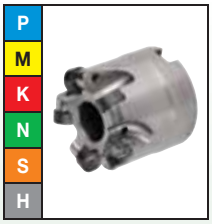
Copy Mills

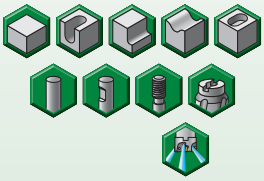
M200™

Max depth of cut: up to 5mm

Indexes per insert: up to 12
Diameter: 25–125mm

Pages: A32–A51





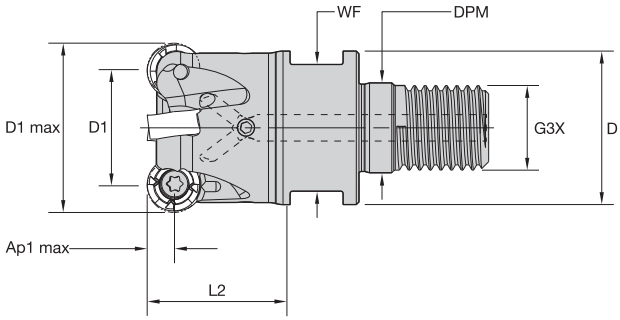
Insert Offering

M200 IC 10
10mm IC insert
8 cutting edges

M200 IC 12
12mm IC insert
12 cutting edges

M200 IC 16
16mm IC insert
12 cutting edges

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Screw-On End Mills

order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
5210273	**M200D25Z03M12RN10**	25	15	21	12,5	M12	32	17	5,0	3	0.6	54700	Yes	0,08
5210274	**M200D32Z04M16RN10**	32	22	29	17,0	M16	40	24	5,0	4	0.5	48300	Yes	0,18
5210275	**M200D35Z05M16RN10**	35	24	29	17,0	M16	40	24	5,0	5	0.5	46200	Yes	0,20
5210276	**M200D42Z06M16RN10**	42	32	29	17,0	M16	40	24	5,0	6	0.4	42200	Yes	0,24

Spare Parts

insert screw

191.848

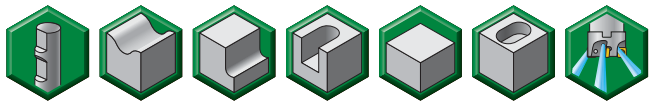
Nm

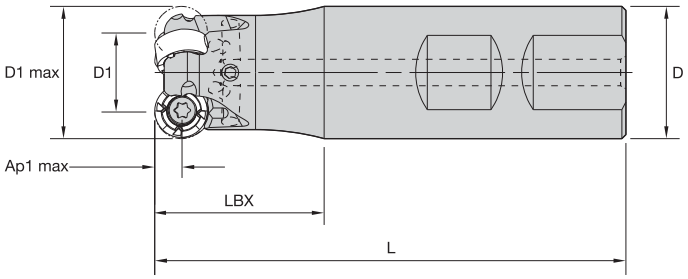
2,0

Torx driver

170.025

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





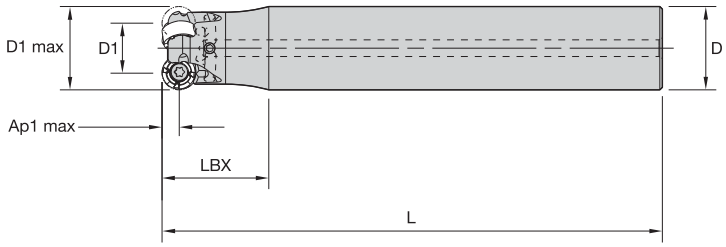
Weldon Shanks

order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
5210277	**M200D25Z03B25RN10**	25	15	25	89	40	5,0	3	0.6	54700	Yes	0,27
5210278	**M200D32Z04B32RN10**	32	22	32	101	40	5,0	4	0.5	48300	Yes	0,52

Spare Parts

insert screw	Nm	Torx driver
191.848	2,0	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



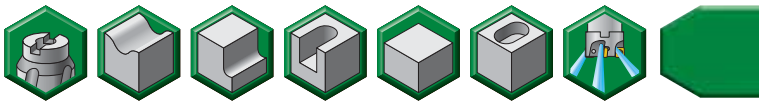
Cylindrical End Mills

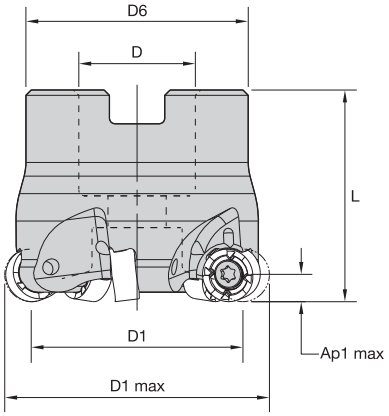
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
5210279	**M200D25Z03A25RN10L150**	25	15	25	150	32	5,0	3	0.6	54700	Yes	0,50
5210300	**M200D25Z03A25RN10L200**	25	15	25	200	32	5,0	3	0.6	54700	Yes	0,69
5210301	**M200D25Z03A32RN10L250**	25	15	32	250	32	5,0	3	0.6	54700	Yes	1,42
5210302	**M200D28Z03A25RN10L200**	28	18	25	200	40	5,0	3	0.6	51600	Yes	0,70
5210304	**M200D32Z03A32RN10L200**	32	22	32	200	40	5,0	3	0.5	48300	Yes	1,14
5210303	**M200D32Z04A32RN10L150**	32	22	32	150	40	5,0	4	0.5	48300	Yes	0,83

Spare Parts

		
insert screw	**Nm**	**Torx driver**
191.848	2,0	**170.025**

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





Shell Mills

order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
5210305	**M200D40Z04RN10**	40	30	16	38	40	5,0	4	0.4	43200	Yes	0,23
5210306	**M200D40Z06RN10**	40	30	16	38	40	5,0	6	0.4	43200	Yes	0,24
5210307	**M200D50Z05RN10**	50	40	22	42	40	5,0	5	0.3	38600	Yes	0,32
5210308	**M200D50Z06RN10**	50	40	22	42	40	5,0	6	0.3	38600	Yes	0,32
5210309	**M200D52Z06RN10**	52	42	22	49	50	5,0	6	0.3	37900	Yes	0,52

Spare Parts

D1 max	insert screw	Nm	wrench	socket-head cap screw	socket-head cap screw with coolant groove
40	**191.848**	2,0	**170.025**	**MS1294**	**MS1294CG**
50	**191.848**	2,0	**170.025**	**MS1234**	**MS1234CG**
52	**191.848**	2,0	**170.025**	**MS1242**	**MS1242CG**

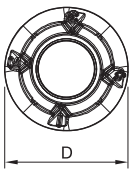
NOTE: Socket-head cap screw and socket-head cap screw with coolant groove must be ordered separately.

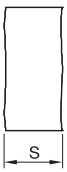
Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	ML	WP25PM	**MM**	**WP40PM**	MM	WP40PM
P3–P4	ML	WP25PM	**MM**	**WP25PM**	MH	WP40PM
P5–P6	ML	WP35CM	**MM**	**WP35CM**	MH	WP35CM
M1–M2	ML	WP25PM	**ML**	**WU35PM**	MM	WU35PM
M3	ML	WP25PM	**MM**	**WU35PM**	MM	WU35PM
K1–K2	MH	WK15CM	**MH**	**WK15CM**	MH	WP20CM
K3	MH	WK15CM	**MH**	**WK15CM**	MH	WP25PM
N1–N2	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
N3	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
S1–S2	ML	WS30PM	**MM**	**WS30PM**	MM	WU35PM
S3	ML	WS30PM	**MM**	**WU35PM**	MM	WU35PM
S4	ML	WS30PM	**MM**	**WU35PM**	MM	WU35PM
H1	MH	WP25PM	**MH**	**WP20CM**	–	–

IC10 • Inserts • RN.J10…


RNGJ-ALP





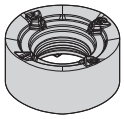
- -ALP is the first choice for milling aluminium and other non-ferrous alloys.

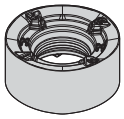
● first choice
○ alternate choice

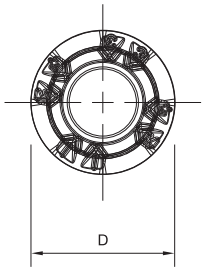
		WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P				●	●	●	●		●
M				○	●	○	●	○	●
K		●		○	○	○			
N			●						
S					●		○	●	●
H				○	○				

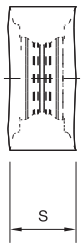
RNGJ-ALP • For aluminium and other non-ferrous alloys

catalogue number	number of indexes	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
NEW! **RNGJ10T3M0FALP**	8	10,00	4,76	0,02	ı	6065590	ı	ı	ı	ı	ı	ı


RNGJ-ML


RNGJ-MM





● first choice
○ alternate choice

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

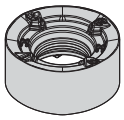
- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.

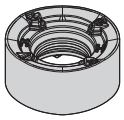
RNGJ-ML

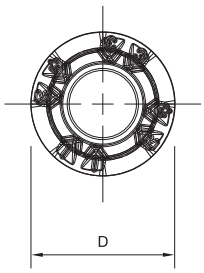
catalogue number	number of indexes	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ10T3M0EML	8	10,00	4,76	0,04	-	-	-	5274456	5274455	-	5520352	5274457

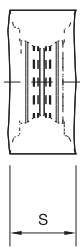
RNGJ-MM

catalogue number	number of indexes	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ10T3M0SMM	8	10,00	4,76	0,09	-	-	-	5274511	-	-	5520353	5274512


RNPJ-MM


RNPJ-MH





● first choice
○ alternate choice

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

- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steel.

RNPJ-MM

catalogue number	number of indexes	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ10T3M0SMM	8	10,00	4,76	0,09	-	-	5276198	5276197	5276196	5542327	-	-

RNPJ-MH

catalogue number	number of indexes	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ10T3M0SMH	8	10,00	4,76	0,18	5276243	-	5276241	5276240	5276199	5542328	-	5476633

Recommended Starting Speeds [m/min]

Material Group		WK15CM			WN25PM			WP20CM			WP25PM		
P	1	–	–	–	–	–	–	660	**580**	540	395	**340**	325
	2	–	–	–	–	–	–	410	**370**	330	330	**290**	240
	3	–	–	–	–	–	–	370	**330**	305	305	**260**	210
	4	–	–	–	–	–	–	275	**260**	230	270	**220**	180
	5	–	–	–	–	–	–	330	**300**	275	220	**205**	180
	6	–	–	–	–	–	–	230	**205**	175	200	**150**	120
M	1	–	–	–	–	–	–	270	**240**	210	245	**215**	200
	2	–	–	–	–	–	–	245	**210**	190	220	**190**	155
	3	–	–	–	–	–	–	190	**175**	150	170	**145**	115
K	1	505	**460**	410	–	–	–	430	**390**	355	275	**245**	220
	2	400	**355**	330	–	–	–	340	**305**	280	215	**190**	180
	3	335	**300**	275	–	–	–	290	**260**	240	180	**160**	145
N	1	–	–	–	1290	**1135**	1050	–	–	–	–	–	–
	2	–	–	–	1135	**1050**	910	–	–	–	–	–	–
	3	–	–	–	1135	**1050**	910	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	50	**40**	30
	2	–	–	–	–	–	–	–	–	–	50	**40**	30
	3	–	–	–	–	–	–	–	–	–	60	**50**	30
	4	–	–	–	–	–	–	–	–	–	85	**60**	40
H	1	–	–	–	–	–	–	170	**140**	115	145	**110**	85
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WP35CM			WP40PM			WS30PM			WU35PM		
P	1	545	**475**	445	355	**310**	295	445	**385**	360	310	**275**	260
	2	335	**305**	275	300	**260**	215	365	**325**	265	265	**230**	190
	3	305	**275**	245	275	**235**	190	340	**290**	235	240	**205**	170
	4	230	**210**	190	245	**205**	160	300	**245**	200	215	**180**	145
	5	310	**275**	250	205	**185**	160	245	**230**	200	180	**160**	145
	6	190	**160**	130	180	**140**	110	220	**170**	130	155	**120**	95
M	1	245	**220**	185	235	**205**	185	270	**240**	220	205	**180**	160
	2	220	**190**	170	210	**180**	150	245	**215**	175	185	**155**	130
	3	175	**155**	140	155	**140**	110	185	**160**	125	140	**120**	95
K	1	355	**320**	290	–	–	–	–	–	–	–	–	–
	2	280	**250**	230	–	–	–	–	–	–	–	–	–
	3	235	**210**	190	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	50	**40**	35	55	**50**	35	40	**35**	30
	2	–	–	–	50	**40**	35	55	**50**	35	40	**35**	30
	3	–	–	–	60	**50**	35	65	**55**	35	55	**40**	30
	4	80	**60**	40	80	**60**	40	100	**70**	50	70	**55**	35
H	1	–	–	–	–	–	–	160	**120**	90	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining

At 5,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,13	**0,44**	0,80	0,10	**0,32**	0,57	0,07	**0,24**	0,43	0,06	**0,21**	0,37	0,06	**0,19**	0,34	ML
MM	0,28	**0,50**	0,91	0,20	**0,36**	0,66	0,15	**0,27**	0,49	0,13	**0,24**	0,43	0,12	**0,22**	0,39	MM
MH	0,46	**0,58**	0,96	0,33	**0,42**	0,69	0,25	**0,31**	0,51	0,22	**0,27**	0,45	0,20	**0,25**	0,41	MH

At 2,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,15	**0,51**	0,92	0,11	**0,37**	0,66	0,08	**0,27**	0,49	0,07	**0,24**	0,43	0,07	**0,22**	0,39	ML
MM	0,32	**0,58**	1,06	0,23	**0,42**	0,76	0,18	**0,31**	0,57	0,15	**0,27**	0,49	0,14	**0,25**	0,45	MM
MH	0,54	**0,67**	1,11	0,39	**0,48**	0,80	0,29	**0,36**	0,59	0,25	**0,32**	0,52	0,23	**0,29**	0,47	MH

At 1,25 Axial Depth of Cut (ap)

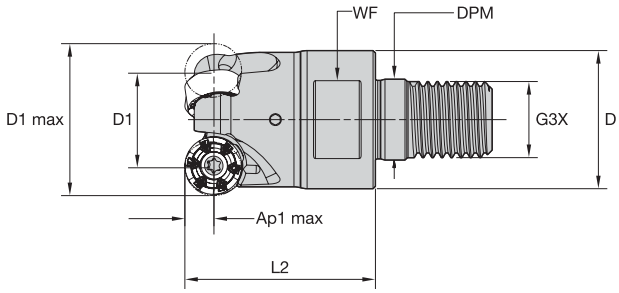
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,20	**0,67**	1,21	0,14	**0,48**	0,87	0,11	**0,36**	0,65	0,09	**0,31**	0,56	0,09	**0,29**	0,52	ML
MM	0,43	**0,77**	1,39	0,31	**0,55**	1,00	0,23	**0,41**	0,74	0,20	**0,36**	0,65	0,18	**0,33**	0,59	MM
MH	0,70	**0,88**	1,46	0,51	**0,63**	1,04	0,38	**0,47**	0,78	0,33	**0,41**	0,68	0,30	**0,38**	0,62	MH

At 0,63 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,27	**0,92**	1,67	0,20	**0,66**	1,19	0,15	**0,49**	0,89	0,13	**0,43**	0,77	0,12	**0,39**	0,71	ML
MM	0,58	**1,05**	1,92	0,42	**0,75**	1,37	0,31	**0,56**	1,02	0,27	**0,49**	0,88	0,25	**0,45**	0,81	MM
MH	0,96	**1,21**	2,02	0,69	**0,87**	1,43	0,52	**0,65**	1,06	0,45	**0,56**	0,93	0,41	**0,52**	0,85	MH

NOTE: Use "Light Machining" value as starting feed rate.

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



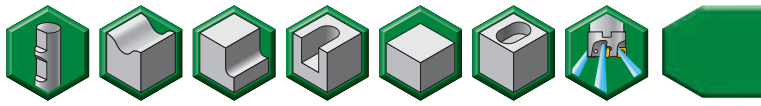
Screw-On End Mills

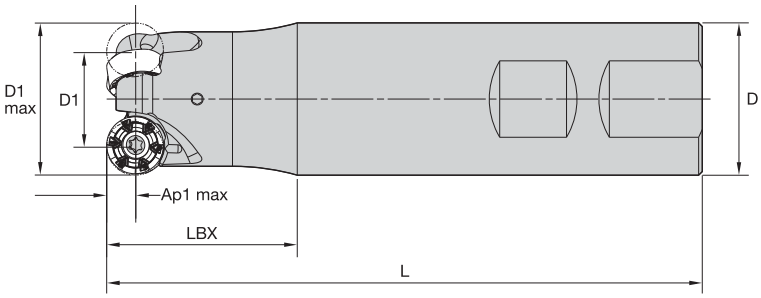
order number	catalogue number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
4147560	**M200D32Z03M16RN12**	32	20	29	17,0	M16	40	24	3,0	3	0.5	39160	Yes	0,18
4147561	**M200D35Z03M16RN12**	35	23	29	17,0	M16	40	24	3,0	3	0.4	37440	Yes	0,19
4147562	**M200D42Z04M16RN12**	42	30	29	17,0	M16	40	24	3,0	4	0.4	34180	Yes	0,23

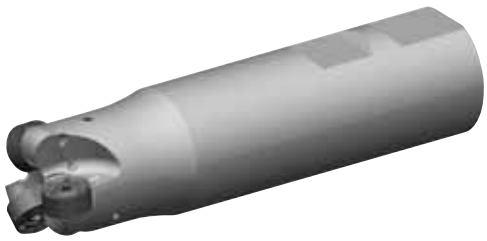
Spare Parts

 insert screw	 Nm	 Torx driver
193.492	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.







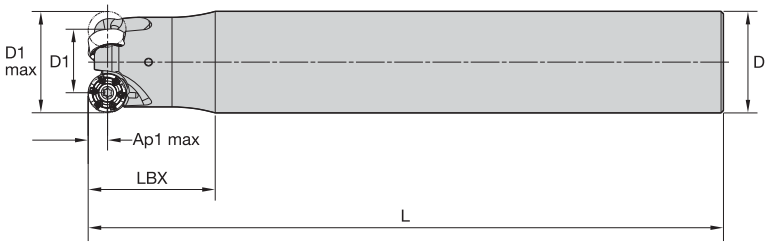
Weldon Shanks

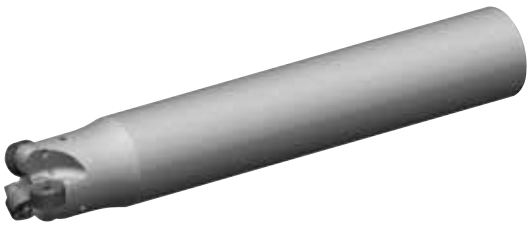
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
4147564	**M200D32Z03B32RN12**	32	20	32	125	40	3,0	3	0.5	39160	Yes	0,65

Spare Parts

insert screw	Nm	Torx driver
193.492	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





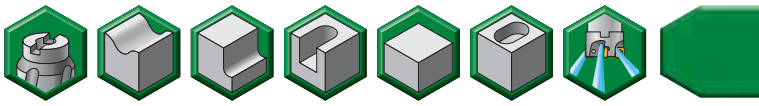
Cylindrical End Mills

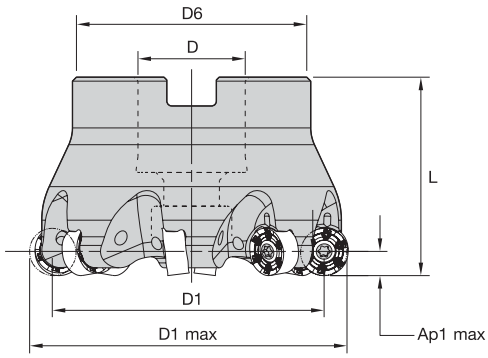
order number	catalogue number	D1 max	D1	D	L	LBX	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
4147567	**M200D32Z02A32RN12L250**	32	20	32	250	40	3,0	2	0.4	39160	Yes	1,41
4147566	**M200D32Z03A32RN12L200**	32	20	32	200	40	3,0	3	0.5	39160	Yes	1,10

Spare Parts

 insert screw	 Nm	 Torx driver
193.492	4,0	**170.025**

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.





Shell Mills

order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
4147568	**M200D40Z04RN12**	40	28	16	38	40	3,0	4	0.4	35020	Yes	0,22
4147569	**M200D50Z04RN12**	50	38	22	42	40	3,0	4	0.5	31330	Yes	0,29
4147570	**M200D50Z05RN12**	50	38	22	42	40	3,0	5	0.3	31330	Yes	0,29
4147571	**M200D52Z05RN12**	52	40	22	49	50	3,0	5	0.5	30720	Yes	0,50
4147572	**M200D63Z05RN12**	63	51	22	49	50	3,0	5	0.5	27910	Yes	0,63
4147573	**M200D63Z07RN12**	63	51	22	49	50	3,0	7	0.3	27910	Yes	0,63
4147574	**M200D66Z07RN12**	66	54	27	60	50	3,0	7	0.3	27260	Yes	0,82
4147575	**M200D80Z06RN12**	80	68	27	60	50	3,0	6	0.5	24760	Yes	1,02
4147576	**M200D80Z08RN12**	80	68	27	60	50	3,0	8	0.2	24760	Yes	1,02
4147577	**M200D100Z07RN12**	100	88	32	78	50	3,0	7	0.2	22150	Yes	1,45
4147578	**M200D100Z09RN12**	100	88	32	78	50	3,0	9	0.2	22150	Yes	1,41

Spare Parts

D1 max	insert screw	Nm	wrench	low-head cap screw	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
40	**193.492**	4,0	**170.025**	–	**MS1294**	**MS1294CG**	–	–
50	**193.492**	4,0	**170.025**	**MS1336**	–	**MS2072CG**	–	–
52	**193.492**	4,0	**170.025**	–	**MS1242**	**MS1242CG**	–	–
63	**193.492**	4,0	**170.025**	–	**MS1242**	**MS1242CG**	–	–
66	**193.492**	4,0	**170.025**	–	**MS2038**	**MS2038CG**	–	–
80	**193.492**	4,0	**170.025**	–	**MS2038**	**MS2038CG**	–	–
100	**193.492**	4,0	**170.025**	–	–	–	**KLS32M**	**MS2195C**

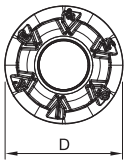
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	ML	WP25PM	**MM**	**WP40PM**	MM	WP40PM
P3–P4	ML	WP25PM	**MM**	**WP25PM**	MH	WP40PM
P5–P6	ML	WP35CM	**MM**	**WP35CM**	MH	WP35CM
M1–M2	ML	WP25PM	**ML**	**WU35PM**	MM	WU35PM
M3	ML	WP25PM	**MM**	**WU35PM**	MM	WU35PM
K1–K2	MH	WK15CM	**MH**	**WK15CM**	MH	WP20CM
K3	MH	WK15PM	**MH**	**WK15PM**	MH	WP25PM
N1–N2	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
N3	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
S1–S2	ML	WS30PM	**MM**	**WS30PM**	MM	WU35PM
S3	ML	WS30PM	**MM**	**WU35PM**	MM	WU35PM
S4	ML	WS30PM	**MM**	**WU35PM**	MM	WU35PM
H1	MH	WP25PM	**MH**	**WP20CM**	–	–

IC12 • Inserts • RN.J12..


RNGJ-ALP



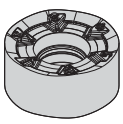
- -ALP is the first choice for milling aluminium and other non-ferrous alloys.

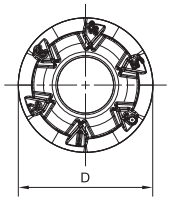
● first choice
○ alternate choice

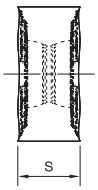
		WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P					●	●	●	●		●
M					○	●	○	●	○	●
K		●	●		○	○	○			
N				●						
S						●		○	●	●
H					○	○				

RNGJ-ALP • For aluminium and other non-ferrous alloys

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
NEW! **RNGJ1204M0FALP**	12	12,00	4,75	0,02	▮	▮	6065661	▮	▮	▮	▮	▮	▮


RNGJ-ML





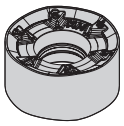
- -ML geometry is the first choice for stainless steel and high-temp alloys.

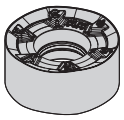
● first choice
○ alternate choice

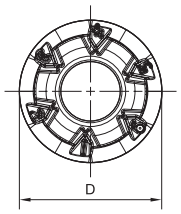
		WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P					●	●	●	●		●
M					○	●	○	●	○	●
K		●	●		○	○	○			
N				●						
S						●		○	●	●
H					○	○				

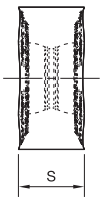
RNGJ-ML

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ1204M0EML	12	12,00	4,75	0,04	▮	▮	▮	▮	5123863	5123865	▮	5520350	5123864


RNGJ-MH
RNPJ-MH


RNPJ-MM
RNGJ-MM





- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steel.

● first choice
○ alternate choice

		WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P					●	●	●	●		●
M					○	●	○	●	○	●
K		●	●		○	○	○			
N				●						
S						●		○	●	●
H					○	○				

■ RNGJ-MM

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ1204M0SMM	12	12,00	4,75	0,09	-	5123866	-	-	5123867	5123869	-	5520351	5123868

■ RNGJ-MH

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ1204M0SMH	12	12,00	4,75	0,19	-	5123900	-	-	5123901	5123903	-	-	5123902

■ RNPJ-MM

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ1204M0SMM	12	12,00	4,75	0,09	-	-	-	5276362	5276361	5276360	5542329	-	5476634

■ RNPJ-MH

catalogue number	cutting edges	D	S	hm	WK15CM	WK15PM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ1204M0SMH	12	12,00	4,75	0,18	5276366	-	-	5276365	5276364	5276363	5542340	-	5476635

Recommended Starting Speeds [m/min]

Material Group		WK15CM			WK15PM			WN25PM			WP20CM			WP25PM		
P	1	–	–	–	–	–	–	–	–	–	660	**580**	540	395	**340**	325
	2	–	–	–	–	–	–	–	–	–	410	**370**	330	330	**290**	240
	3	–	–	–	–	–	–	–	–	–	370	**330**	305	305	**260**	210
	4	–	–	–	–	–	–	–	–	–	275	**260**	230	270	**220**	180
	5	–	–	–	–	–	–	–	–	–	330	**300**	275	220	**205**	180
	6	–	–	–	–	–	–	–	–	–	230	**205**	175	200	**150**	120
M	1	–	–	–	–	–	–	–	–	–	270	**240**	210	245	**215**	200
	2	–	–	–	–	–	–	–	–	–	245	**210**	190	220	**190**	155
	3	–	–	–	–	–	–	–	–	–	190	**175**	150	170	**145**	115
K	1	505	**460**	410	325	**295**	260	–	–	–	430	**390**	355	275	**245**	220
	2	400	**355**	330	250	**230**	210	–	–	–	340	**305**	280	215	**190**	180
	3	335	**300**	275	210	**190**	175	–	–	–	290	**260**	240	180	**160**	145
N	1	–	–	–	–	–	–	1290	**1135**	1050	–	–	–	–	–	–
	2	–	–	–	–	–	–	1135	**1050**	910	–	–	–	–	–	–
	3	–	–	–	–	–	–	1135	**1050**	910	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	50	**40**	30
	2	–	–	–	–	–	–	–	–	–	–	–	–	50	**40**	30
	3	–	–	–	–	–	–	–	–	–	–	–	–	60	**50**	30
	4	–	–	–	–	–	–	–	–	–	–	–	–	85	**60**	40
H	1	–	–	–	–	–	–	–	–	–	170	**140**	115	145	**110**	85
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		WP35CM			WP40PM			WS30PM			WS40PM			WU35PM		
P	1	545	**475**	445	355	**310**	295	445	**385**	360	–	–	–	310	**275**	260
	2	335	**305**	275	300	**260**	215	365	**325**	265	–	–	–	265	**230**	190
	3	305	**275**	245	275	**235**	190	340	**290**	235	–	–	–	240	**205**	170
	4	230	**210**	190	245	**205**	160	300	**245**	200	–	–	–	215	**180**	145
	5	310	**275**	250	205	**185**	160	245	**230**	200	165	**120**	85	180	**160**	145
	6	190	**160**	130	180	**140**	110	220	**170**	130	140	**100**	60	155	**120**	95
M	1	245	**220**	185	235	**205**	185	270	**240**	220	315	**225**	140	205	**180**	160
	2	220	**190**	170	210	**180**	150	245	**215**	175	280	**205**	130	185	**155**	130
	3	175	**155**	140	155	**140**	110	185	**160**	125	230	**165**	105	140	**120**	95
K	1	355	**320**	290	–	–	–	–	–	–	–	–	–	–	–	–
	2	280	**250**	230	–	–	–	–	–	–	–	–	–	–	–	–
	3	235	**210**	190	–	–	–	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	50	**40**	35	55	**50**	35	75	**55**	35	40	**35**	30
	2	–	–	–	50	**40**	35	55	**50**	35	70	**50**	35	40	**35**	30
	3	–	–	–	60	**50**	35	65	**55**	35	80	**55**	35	55	**40**	30
	4	80	**60**	40	80	**60**	40	100	**70**	50	110	**80**	50	70	**55**	35
H	1	–	–	–	–	–	–	160	**120**	90	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining

At 6,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,12	**0,18**	0,32	0,09	**0,13**	0,23	0,07	**0,10**	0,18	0,06	**0,08**	0,15	0,05	**0,08**	0,14	ML
MM	0,28	**0,51**	0,84	0,21	**0,37**	0,61	0,15	**0,28**	0,45	0,13	**0,24**	0,39	0,12	**0,22**	0,36	MM
MH	0,46	**0,70**	1,02	0,33	**0,50**	0,73	0,25	**0,38**	0,55	0,22	**0,33**	0,48	0,20	**0,30**	0,44	MH

At 3,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,14	**0,20**	0,37	0,10	**0,15**	0,27	0,08	**0,11**	0,20	0,07	**0,10**	0,18	0,06	**0,09**	0,16	ML
MM	0,33	**0,59**	0,97	0,24	**0,43**	0,70	0,18	**0,32**	0,52	0,16	**0,28**	0,45	0,14	**0,25**	0,42	MM
MH	0,54	**0,81**	1,18	0,39	**0,58**	0,85	0,29	**0,43**	0,63	0,25	**0,38**	0,55	0,23	**0,35**	0,51	MH

At 1,50 Axial Depth of Cut (ap)

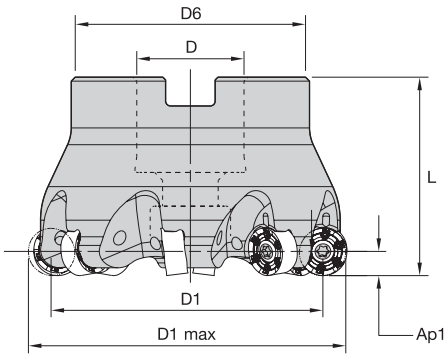
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,18	**0,27**	0,49	0,13	**0,19**	0,35	0,10	**0,15**	0,26	0,09	**0,13**	0,23	0,08	**0,12**	0,21	ML
MM	0,43	**0,77**	1,28	0,31	**0,56**	0,92	0,23	**0,42**	0,68	0,20	**0,36**	0,60	0,19	**0,33**	0,55	MM
MH	0,70	**1,06**	1,56	0,51	**0,76**	1,12	0,38	**0,57**	0,83	0,33	**0,50**	0,72	0,30	**0,45**	0,66	MH

At 0,75 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,25	**0,37**	0,67	0,18	**0,27**	0,48	0,14	**0,20**	0,36	0,12	**0,17**	0,32	0,11	**0,16**	0,29	ML
MM	0,59	**1,06**	1,77	0,43	**0,76**	1,26	0,32	**0,57**	0,94	0,28	**0,50**	0,81	0,25	**0,45**	0,75	MM
MH	0,96	**1,46**	2,16	0,69	**1,04**	1,53	0,52	**0,78**	1,14	0,45	**0,68**	0,99	0,41	**0,62**	0,90	MH

NOTE: Use "Light Machining" value as starting feed rate.

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Shell Mills

order number	catalogue number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
5209989	**M200D50Z04RN16**	50	34	22	42	50	4,0	4	0.5	26700	Yes	0,36
5210210	**M200D52Z04RN16**	52	36	22	42	50	4,0	4	0.4	26000	Yes	0,39
5210211	**M200D63Z04RN16**	63	47	22	49	50	4,0	4	0.4	22700	Yes	0,58
5210212	**M200D63Z06RN16**	63	47	22	49	50	4,0	6	0.4	22700	Yes	0,56
5210213	**M200D66Z05RN16**	66	50	27	60	50	4,0	5	0.4	22000	Yes	0,69
5210214	**M200D80Z05RN16**	80	64	27	60	50	4,0	5	0.3	19500	Yes	0,88
5210215	**M200D80Z07RN16**	80	64	27	60	50	4,0	7	0.3	19500	Yes	0,89
5210216	**M200D100Z06RN16**	100	84	32	78	50	4,0	6	0.3	17000	Yes	1,36
5210217	**M200D100Z08RN16**	100	84	32	78	50	4,0	8	0.3	17000	Yes	1,37
5210218	**M200D125Z08RN16**	125	109	40	90	63	4,0	8	0.2	14900	Yes	2,50

Spare Parts







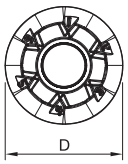
D1 max	insert screw	Nm	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
50	**192.932**	4,0	**170.026**	**MS1242**	**MS1242CG**	–	–
52	**MS2260**	4,0	**170.026**	**MS1242**	**MS1242CG**	–	–
63	**MS2260**	4,0	**170.026**	**MS1242**	**MS1242CG**	–	–
63	**193.343**	4,0	**170.026**	**MS1242**	**MS1242CG**	–	–
66	**MS2260**	4,0	**170.026**	**MS2038**	**MS2038CG**	–	–
80	**MS2260**	4,0	**170.026**	**MS2038**	**MS2038CG**	–	–
100	**MS2260**	4,0	**170.026**	–	–	**KLS32M**	**MS2195C**
125	**MS2260**	4,0	**170.026**	–	–	**KLS40M**	**MS2187C**

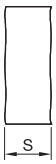
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1–P2	ML	WP25PM	**MM**	**WP40PM**	MM	WP40PM
P3–P4	ML	WP25PM	**MM**	**WP25PM**	MH	WP40PM
P5–P6	ML	WP35CM	**MM**	**WP35CM**	MH	WP35CM
M1–M2	ML	WP25PM	**ML**	**WU35PM**	MM	WU35PM
M3	ML	WP25PM	**MM**	**WU35PM**	MM	WU35PM
K1–K2	MH	WK15CM	**MH**	**WK15CM**	MH	WP20CM
K3	MH	WK15CM	**MH**	**WP20CM**	MH	WP35CM
N1–N2	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
N3	ALP	WN25PM	**ALP**	**WN25PM**	ALP	WN25PM
S1–S2	ML	WS30PM	**ML**	**WS30PM**	ML	WU35PM
S3	ML	WS30PM	**ML**	**WU35PM**	ML	WU35PM
S4	ML	WS30PM	**ML**	**WU35PM**	ML	WU35PM
H1	MH	WP25PM	**MH**	**WP20CM**	–	–


RNGJ-ALP





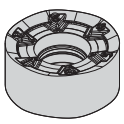
- -ALP is the first choice for milling aluminium and other non-ferrous alloys.

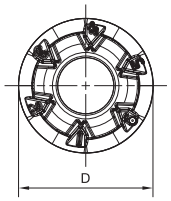
● first choice
○ alternate choice

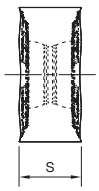
		WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P				●	●	●	●		●
M				○	●	○	●	○	●
K		●		○	○	○			
N			●						
S					●		○	●	●
H				○	○				

RNGJ-ALP • For aluminium and other non-ferrous alloys

catalogue number	cutting edges	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
NEW! **RNGJ1605M0FALP**	12	16,00	6,35	0,02	I	6065662	I	I	I	I	I	I


RNGJ-ML





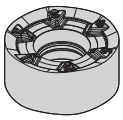
- -ML geometry is the first choice for stainless steel and high-temp alloys.

● first choice
○ alternate choice

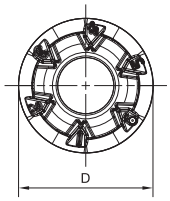
		WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
P				●	●	●	●		●
M				○	●	○	●	○	●
K		●		○	○	○			
N			●						
S					●		○	●	●
H				○	○				

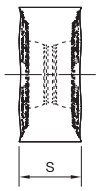
RNGJ-ML

catalogue number	cutting edges	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNGJ1605M0EML	12	16,00	6,35	0,04	I	I	I	5274561	5274560	I	5520354	5274562



RNPJ-MM
RNPJ-MH





- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

● first choice
○ alternate choice

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

■ RNPJ-MM

catalogue number	cutting edges	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ1605M0SMM	12	16,00	6,35	0,09	-	-	5276472	5276471	5276470	5542341	-	5476637

■ RNPJ-MH

catalogue number	cutting edges	D	S	hm	WK15CM	WN25PM	WP20CM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
RNPJ1605M0SMH	12	16,00	6,35	0,23	5276476	-	5276475	5276474	5276473	5542342	-	5476636

Recommended Starting Speeds

■ Recommended Starting Speeds [m/min]

Material Group		WK15CM			WN25PM			WP20CM			WP25PM		
P	1	–	**–**	–	–	**–**	–	660	**580**	540	395	**340**	325
	2	–	**–**	–	–	**–**	–	410	**370**	330	330	**290**	240
	3	–	**–**	–	–	**–**	–	370	**330**	305	305	**260**	210
	4	–	**–**	–	–	**–**	–	275	**260**	230	270	**220**	180
	5	–	**–**	–	–	**–**	–	330	**300**	275	220	**205**	180
	6	–	**–**	–	–	**–**	–	230	**205**	175	200	**150**	120
M	1	–	**–**	–	–	**–**	–	270	**240**	210	245	**215**	200
	2	–	**–**	–	–	**–**	–	245	**210**	190	220	**190**	155
	3	–	**–**	–	–	**–**	–	190	**175**	150	170	**145**	115
K	1	505	**460**	410	–	**–**	–	430	**390**	355	275	**245**	220
	2	400	**355**	330	–	**–**	–	340	**305**	280	215	**190**	180
	3	335	**300**	275	–	**–**	–	290	**260**	240	180	**160**	145
N	1	–	**–**	–	1290	**1135**	1050	–	**–**	–	–	**–**	–
	2	–	**–**	–	1135	**1050**	910	–	**–**	–	–	**–**	–
	3	–	**–**	–	1135	**1050**	910	–	**–**	–	–	**–**	–
S	1	–	**–**	–	–	**–**	–	–	**–**	–	50	**40**	30
	2	–	**–**	–	–	**–**	–	–	**–**	–	50	**40**	30
	3	–	**–**	–	–	**–**	–	–	**–**	–	60	**50**	30
	4	–	**–**	–	–	**–**	–	–	**–**	–	85	**60**	40
H	1	–	**–**	–	–	**–**	–	170	**140**	115	145	**110**	85
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

(continued)

(Recommended Starting Speeds [m/min] — continued)

Material Group		WP35CM			WP40PM			WS30PM			WU35PM		
P	1	545	**475**	445	355	**310**	295	445	**385**	360	310	**275**	260
	2	335	**305**	275	300	**260**	215	365	**325**	265	265	**230**	190
	3	305	**275**	245	275	**235**	190	340	**290**	235	240	**205**	170
	4	230	**210**	190	245	**205**	160	300	**245**	200	215	**180**	145
	5	310	**275**	250	205	**185**	160	245	**230**	200	180	**160**	145
	6	190	**160**	130	180	**140**	110	220	**170**	130	155	**120**	95
M	1	245	**220**	185	235	**205**	185	270	**240**	220	205	**180**	160
	2	220	**190**	170	210	**180**	150	245	**215**	175	185	**155**	130
	3	175	**155**	140	155	**140**	110	185	**160**	125	140	**120**	95
K	1	355	**320**	290	–	**–**	–	–	**–**	–	–	**–**	–
	2	280	**250**	230	–	**–**	–	–	**–**	–	–	**–**	–
	3	235	**210**	190	–	**–**	–	–	**–**	–	–	**–**	–
N	1	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
S	1	–	**–**	–	50	**40**	35	55	**50**	35	40	**35**	30
	2	–	**–**	–	50	**40**	35	55	**50**	35	40	**35**	30
	3	–	**–**	–	60	**50**	35	65	**55**	35	55	**40**	30
	4	80	**60**	40	80	**60**	40	100	**70**	50	70	**55**	35
H	1	–	**–**	–	–	**–**	–	160	**120**	90	–	**–**	–
	2	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–	–	**–**	–

*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining

At 8,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,12	**0,37**	0,48	0,09	**0,27**	0,35	0,07	**0,20**	0,26	0,06	**0,17**	0,23	0,05	**0,16**	0,21	ML
MM	0,28	**0,70**	0,81	0,21	**0,50**	0,58	0,15	**0,38**	0,44	0,13	**0,33**	0,38	0,12	**0,30**	0,35	MM
MH	0,53	**0,70**	1,17	0,38	**0,50**	0,84	0,29	**0,38**	0,63	0,25	**0,33**	0,55	0,23	**0,30**	0,50	MH

At 4,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,14	**0,43**	0,56	0,10	**0,31**	0,40	0,08	**0,23**	0,30	0,07	**0,20**	0,26	0,06	**0,18**	0,24	ML
MM	0,33	**0,81**	0,94	0,24	**0,58**	0,67	0,18	**0,43**	0,50	0,16	**0,38**	0,44	0,14	**0,35**	0,40	MM
MH	0,62	**0,81**	1,36	0,44	**0,58**	0,97	0,33	**0,43**	0,72	0,29	**0,38**	0,63	0,27	**0,35**	0,58	MH

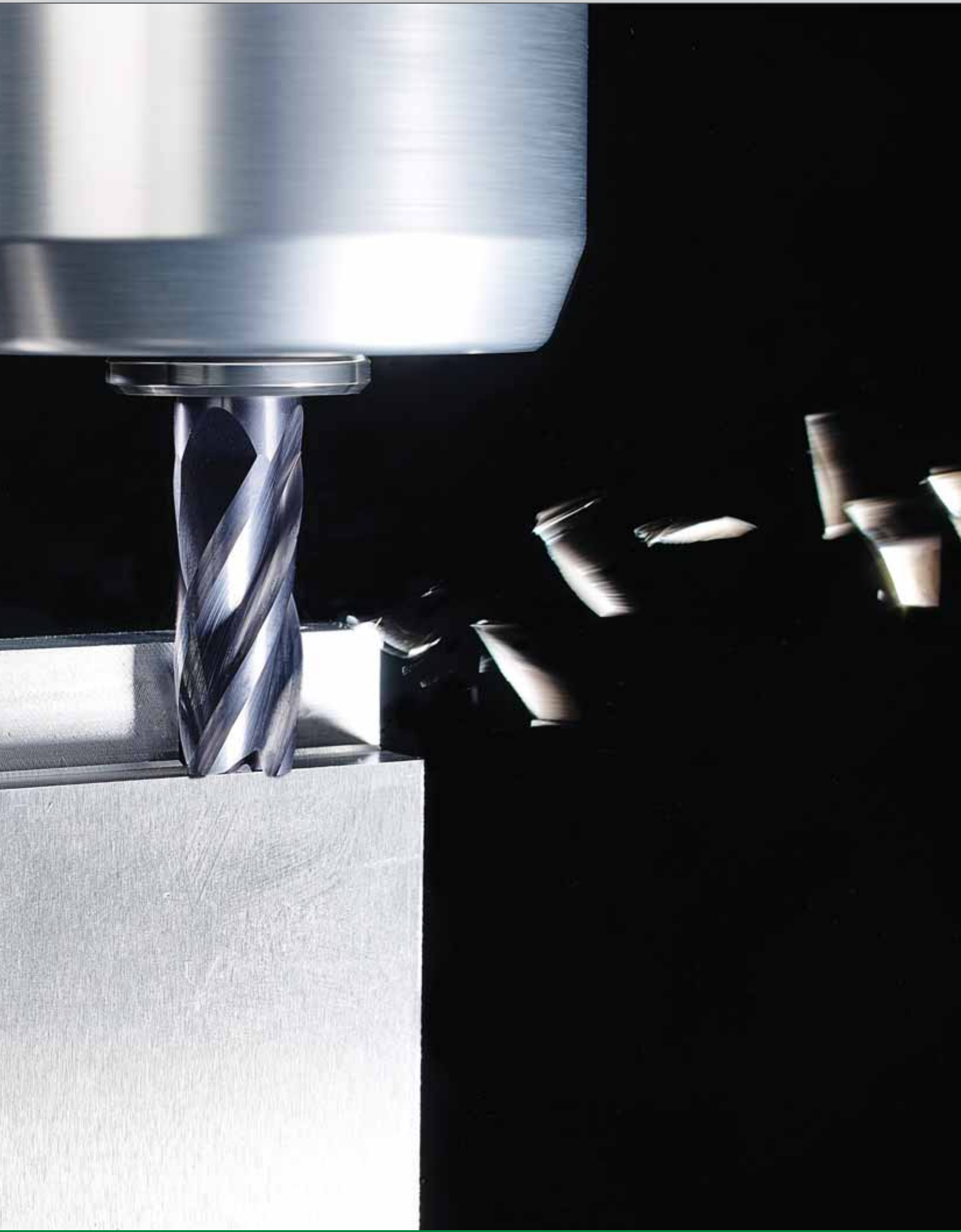
At 2,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,19	**0,56**	0,73	0,14	**0,40**	0,53	0,10	**0,30**	0,40	0,09	**0,26**	0,34	0,08	**0,24**	0,32	ML
MM	0,43	**1,06**	1,24	0,31	**0,76**	0,89	0,23	**0,57**	0,66	0,20	**0,50**	0,57	0,19	**0,45**	0,53	MM
MH	0,81	**1,06**	1,79	0,58	**0,76**	1,28	0,44	**0,57**	0,95	0,38	**0,50**	0,83	0,35	**0,45**	0,76	MH

At 1,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
ALP	0,12	**0,20**	0,28	0,08	**0,15**	0,20	0,06	**0,11**	0,15	0,06	**0,09**	0,13	0,05	**0,09**	0,12	ALP
ML	0,26	**0,77**	1,01	0,19	**0,55**	0,73	0,14	**0,41**	0,54	0,12	**0,36**	0,47	0,11	**0,33**	0,43	ML
MM	0,59	**1,46**	1,70	0,43	**1,04**	1,21	0,32	**0,78**	0,90	0,28	**0,68**	0,79	0,25	**0,62**	0,72	MM
MH	1,11	**1,46**	2,48	0,80	**1,04**	1,75	0,60	**0,78**	1,30	0,52	**0,68**	1,13	0,48	**0,62**	1,03	MH

NOTE: Use "Light Machining" value as starting feed rate.



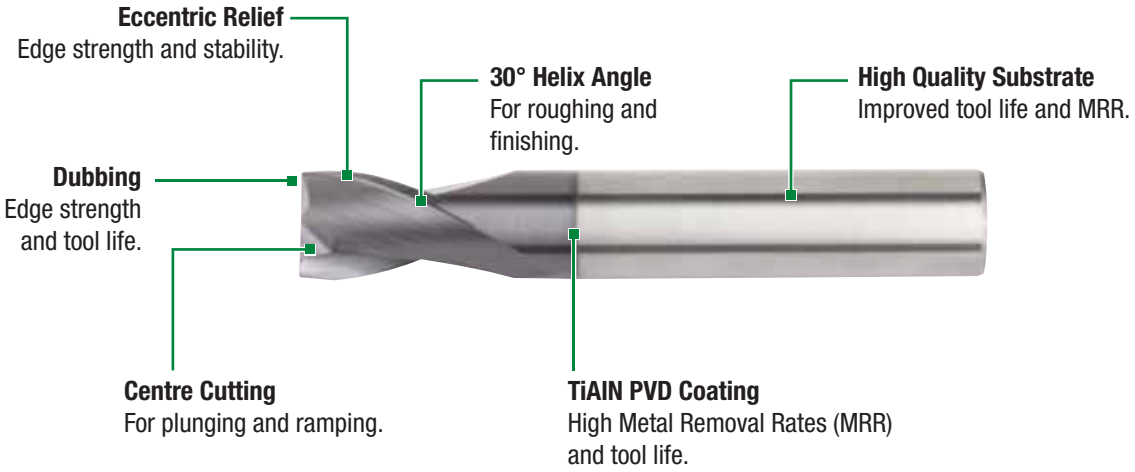
Solid End Milling

VariMill GP

VariMill GP offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as sharp edge, chamfered edge, and ball nose) are available from stock.

VariMill GP • 2-Flute

- General purpose tools for a wide range of workpiece materials.
- Roughing and finishing with one tool.
- Various lengths-of-cut and overall lengths with different front-end designs available.
- Two flutes for high flexibility in unstable conditions.

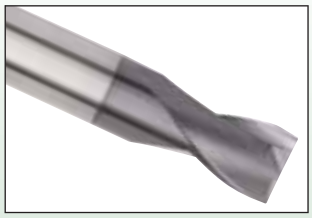


VariMill™ GP

- Increased manufacturing flexibility and reduced tooling cost.
- Fewer tool changes and high Metal Removal Rates (MRR).
- Eccentric relief for improved edge stability and high tool life.
- Easy and cost-efficient regrinding due to eccentric relief.

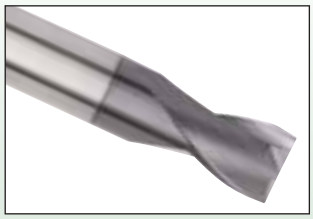
Series D002/D012

- Centre cutting.
- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp edge.



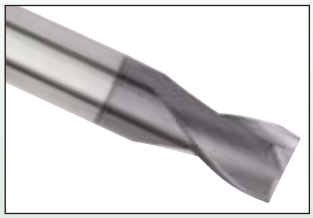
Series 2819

- Centre cutting.
- DIN 6528 standard dimensions.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp edge.



Series 4002/4012

- Centre cutting.
- Wide range of lengths-of-cut — regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp edge.



Series D001/D011

- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.

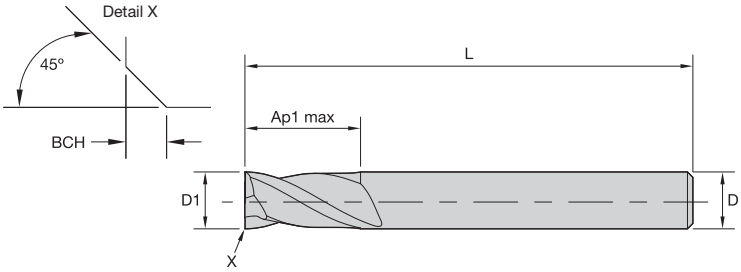
Series 2838

- DIN 6528 standard dimensions.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.

Series 4001/4011/4021

- Wide range of lengths-of-cut — regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.

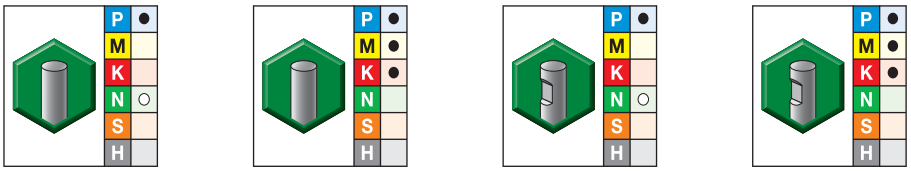
- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series D002 D012 • VariMill GP

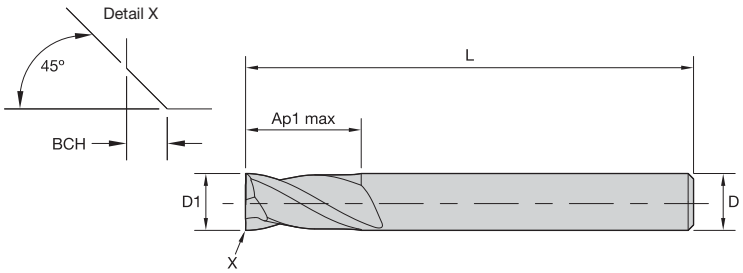


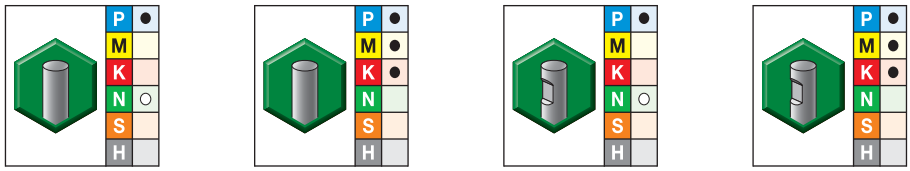
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
5877567	D0020200T003	5877330	D0020200T003	–		–		2,0	6	3,00	50	–
5877568	D0020250T003	5877501	D0020250T003	–		–		2,5	6	3,00	50	–
5877569	D0120250T007	5877502	D0120250T007	–		–		2,5	6	7,00	57	–
5877571	D0020300T004	5877503	D0020300T004	–		–		3,0	6	4,00	50	–
5877572	D0120300T007	5877504	D0120300T007	–		–		3,0	6	7,00	57	–
5877573	D0020350T004	5877505	D0020350T004	–		–		3,5	6	4,00	50	–
5877574	D0020400T005	5877506	D0020400T005	–		–		4,0	6	5,00	54	0,10
6092391	D0020400T005S	6092298	D0020400T005S	–		–		4,0	6	5,00	54	–
6092392	D0120400T008S	6092299	D0120400T008S	–		–		4,0	6	8,00	57	–
5877575	D0120400T008	5877507	D0120400T008	–		–		4,0	6	8,00	57	0,10
6092394	D0020450T005S	6092300	D0020450T005S	–		–		4,5	6	5,00	54	–
5877576	D0020450T005	5877509	D0020450T005	–		–		4,5	6	5,00	54	0,10
6092395	D0120450T008S	6092301	D0120450T008S	–		–		4,5	6	8,00	57	–
5877577	D0120450T008	5877510	D0120450T008	–		–		4,5	6	8,00	57	0,10
6092397	D0020500T006S	6092302	D0020500T006S	–		–		5,0	6	6,00	54	–
5877578	D0020500T006	5877511	D0020500T006	–		–		5,0	6	6,00	54	0,10
6092398	D0120500T010S	6092303	D0120500T010S	–		–		5,0	6	10,00	57	–
5877579	D0120500T010	5877512	D0120500T010	–		–		5,0	6	10,00	57	0,10
6092399	D0020600T007S	6092304	D0020600T007S	–		–		6,0	6	7,00	54	–
5877581	D0020600T007	5877513	D0020600T007	–		–		6,0	6	7,00	54	0,10
6092411	D0120600T010S	6092305	D0120600T010S	–		–		6,0	6	10,00	57	–
5877582	D0120600T010	5877514	D0120600T010	–		–		6,0	6	10,00	57	0,10
6092412	D0020700T008S	6092306	D0020700T008S	–		–		7,0	8	8,00	58	–
5877583	D0020700T008	5877515	D0020700T008	–		–		7,0	8	8,00	58	0,10
6092414	D0120700T013S	6092307	D0120700T013S	–		–		7,0	8	13,00	63	–
5877584	D0120700T013	5877516	D0120700T013	–		–		7,0	8	13,00	63	0,10
6092415	D0020800T009S	6092308	D0020800T009S	–		–		8,0	8	9,00	58	–
5877585	D0020800T009	5877517	D0020800T009	–		–		8,0	8	9,00	58	0,20

(continued)

(Series D002 D012 • VariMill GP — continued)



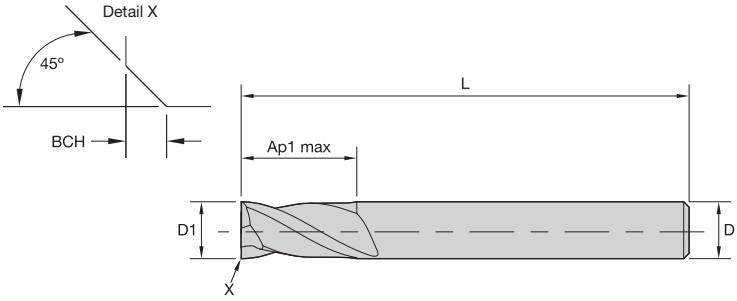


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6092416	D0120800T016S	6092309	D0120800T016S	–		–		8,0	8	16,00	63	–
5877586	D0120800T016	5877518	D0120800T016	–		–		8,0	8	16,00	63	0,20
6092418	D0020900T010S	6092310	D0020900T010S	–		–		9,0	10	10,00	66	–
5877588	D0020900T010	5877520	D0020900T010	–		–		9,0	10	10,00	66	0,20
6092419	D0120900T016S	6092321	D0120900T016S	–		–		9,0	10	16,00	72	–
5877589	D0120900T016	5877521	D0120900T016	–		–		9,0	10	16,00	72	0,20
6092421	D0021000T011S	6092322	D0021000T011S	–		–		10,0	10	11,00	66	–
5877590	D0021000T011	5877522	D0021000T011	–		–		10,0	10	11,00	66	0,20
6092422	D0121000T019S	6092323	D0121000T019S	–		–		10,0	10	19,00	72	–
5877591	D0121000T019	5877523	D0121000T019	–		–		10,0	10	19,00	72	0,20
6092423	D0021200T012S	6092324	D0021200T012S	6092345	D0021200W012S	6092334	D0021200W012S	12,0	12	12,00	73	–
5877592	D0021200T012	5877524	D0021200T012	5877556	D0021200W012	5877535	D0021200W012	12,0	12	12,00	73	0,30
6092424	D0121200T022S	6092325	D0121200T022S	6092346	D0121200W022S	6092335	D0121200W022S	12,0	12	22,00	83	–
5877593	D0121200T022	5877525	D0121200T022	5877557	D0121200W022	5877537	D0121200W022	12,0	12	22,00	83	0,30
6092426	D0021400T014S	6092326	D0021400T014S	6092347	D0021400W014S	6092336	D0021400W014S	14,0	14	14,00	75	–
5877594	D0021400T014	5877526	D0021400T014	5877558	D0021400W014	5877538	D0021400W014	14,0	14	14,00	75	0,30
6092427	D0121400T022S	6092327	D0121400T022S	6092348	D0121400W022S	6092337	D0121400W022S	14,0	14	22,00	83	–
5877595	D0121400T022	5877527	D0121400T022	5877559	D0121400W022	5877539	D0121400W022	14,0	14	22,00	83	0,30
6092429	D0021600T016S	6092328	D0021600T016S	6092349	D0021600W016S	6092338	D0021600W016S	16,0	16	16,00	82	–
5877596	D0021600T016	5877529	D0021600T016	5877560	D0021600W016	5877540	D0021600W016	16,0	16	16,00	82	0,30
6092431	D0121600T026S	6092329	D0121600T026S	6092350	D0121600W026S	6092339	D0121600W026S	16,0	16	26,00	92	–
5877597	D0121600T026	5877530	D0121600T026	5877561	D0121600W026	5877551	D0121600W026	16,0	16	26,00	92	0,30
6092432	D0021800T018S	6092330	D0021800T018S	6092381	D0021800W018S	6092340	D0021800W018S	18,0	18	18,00	84	–
5877598	D0021800T018	5877531	D0021800T018	5877563	D0021800W018	5877552	D0021800W018	18,0	18	18,00	84	0,30
6092435	D0121800T026S	6092331	D0121800T026S	6092382	D0121800W026S	6092341	D0121800W026S	18,0	18	26,00	92	–
5877599	D0121800T026	5877532	D0121800T026	5877564	D0121800W026	5877553	D0121800W026	18,0	18	26,00	92	0,30
6092436	D0022000T020S	6092332	D0022000T020S	6092383	D0022000W020S	6092342	D0022000W020S	20,0	20	20,00	92	–
5877601	D0022000T020	5877533	D0022000T020	5877565	D0022000W020	5877554	D0022000W020	20,0	20	20,00	92	0,30
6092438	D0122000T032S	6092333	D0122000T032S	6092384	D0122000W032S	6092344	D0122000W032S	20,0	20	32,00	104	–
5877602	D0122000T032	5877534	D0122000T032	5877566	D0122000W032	5877555	D0122000W032	20,0	20	32,00	104	0,30

NOTE: For application data, please see page B13.

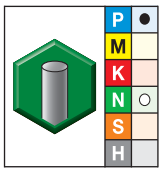
- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.

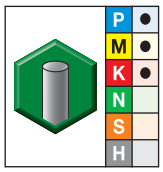


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 2819 • VariMill GP



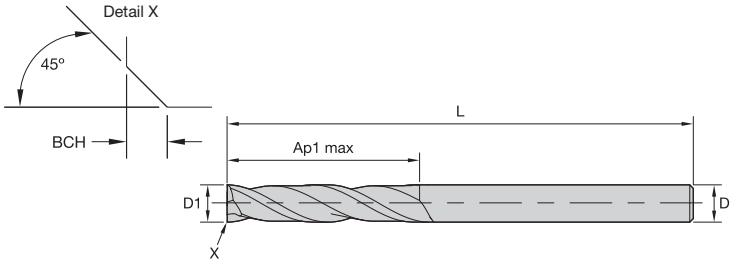


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
5877617	28190300T007	5877603	28190300T007	3,0	3	8,00	50	–
6092573	28190400T008S	6092528	28190400T008S	4,0	4	8,00	50	–
5877618	28190400T008	5877604	28190400T008	4,0	4	8,00	50	0,10
6092574	28190500T010S	6092529	28190500T010S	5,0	5	10,00	50	–
5877619	28190500T010	5877605	28190500T010	5,0	5	10,00	50	0,10
6092576	28190600T010S	6092530	28190600T010S	6,0	6	10,00	57	–
5877620	28190600T010	5877606	28190600T010	6,0	6	10,00	57	0,10
6092577	28190700T013S	6092561	28190700T013S	7,0	7	13,00	60	–
5877621	28190700T013	5877607	28190700T013	7,0	7	13,00	60	0,10
6092578	28190800T016S	6092562	28190800T016S	8,0	8	16,00	63	–
5877622	28190800T016	5877608	28190800T016	8,0	8	16,00	63	0,20
6092579	28190900T016S	6092563	28190900T016S	9,0	9	16,00	67	–
5877623	28190900T016	5877609	28190900T016	9,0	9	16,00	67	0,20
6092580	28191000T019S	6092565	28191000T019S	10,0	10	19,00	72	–
5877624	28191000T019	5877610	28191000T019	10,0	10	19,00	72	0,20
6092581	28191200T022S	6092566	28191200T022S	12,0	12	22,00	83	–
5877625	28191200T022	5877611	28191200T022	12,0	12	22,00	83	0,30
6092582	28191400T022S	6092567	28191400T022S	14,0	14	22,00	83	–
5877626	28191400T022	5877612	28191400T022	14,0	14	22,00	83	0,30
6092583	28191500T026S	6092568	28191500T026S	15,0	15	26,00	92	–
5877627	28191500T026	5877613	28191500T026	15,0	15	26,00	92	0,30
6092584	28191600T026S	6092569	28191600T026S	16,0	16	26,00	92	–
5877628	28191600T026	5877614	28191600T026	16,0	16	26,00	92	0,30
6092585	28191800T026S	6092570	28191800T026S	18,0	18	26,00	92	–
5877629	28191800T026	5877615	28191800T026	18,0	18	26,00	92	0,30
6092586	28192000T032S	6092571	28192000T032S	20,0	20	32,00	104	–
5877630	28192000T032	5877616	28192000T032	20,0	20	32,00	104	0,30

NOTE: For application data, please see page B13.

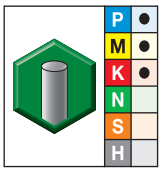
- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4002 4012 • VariMill GP

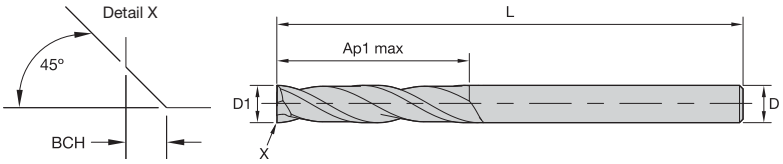


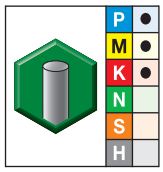
● first choice
○ alternate choice

grade TiAlN TiAlN						
order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
5873484	40020100T004	1,0	3	4,00	38	–
5873485	40020150T004	1,5	3	4,00	38	–
5873486	40020180T004	1,8	3	4,00	38	–
5873487	40020200T006	2,0	3	6,30	38	–
5873488	40020250T006	2,5	3	6,30	38	–
5873489	40020300T009	3,0	3	9,50	38	–
5873490	40020300T019	3,0	3	19,00	63	–
5873491	40120300T025	3,0	3	25,00	75	–
5873492	40020350T012	3,5	4	12,00	50	–
5873493	40020400T012	4,0	4	12,00	50	0,10
6092621	40020400T012S	4,0	4	12,00	50	–
5873494	40020400T019	4,0	4	19,00	63	0,10
6092622	40020400T019S	4,0	4	19,00	63	–
6092623	40120400T031S	4,0	4	31,00	75	–
5873495	40120400T031	4,0	4	31,00	75	0,10
6092624	40020450T014S	4,5	6	14,00	50	–
5873496	40020450T014	4,5	6	14,00	50	0,10
5873497	40020480T014	4,8	6	14,00	50	0,10
6092626	40020480T014S	4,8	6	14,00	50	–
5873498	40020500T014	5,0	5	14,00	50	0,10
6092627	40020500T014S	5,0	5	14,00	50	–
5873499	40020500T020	5,0	5	20,00	63	0,10
6092628	40020500T020S	5,0	5	20,00	63	–
6092631	40120500T031S	5,0	5	31,00	100	–
5873500	40120500T031	5,0	5	31,00	100	0,10
5873501	40020550T014	5,5	6	14,00	50	0,10
6092632	40020550T014S	5,5	6	14,00	50	–
6092633	40020600T016S	6,0	6	16,00	50	–
5873502	40020600T016	6,0	6	16,00	50	0,10
5873503	40020600T028	6,0	6	28,00	76	0,10
6092634	40020600T028S	6,0	6	28,00	76	–
6092636	40120600T038S	6,0	6	38,00	100	–
5873504	40120600T038	6,0	6	38,00	100	0,10
6092637	40020700T020S	7,0	7	20,00	63	–
5873505	40020700T020	7,0	7	20,00	63	0,10
5873506	40020800T020	8,0	8	20,00	63	0,20

(continued)

(Series 4002 4012 • VariMill GP — continued)



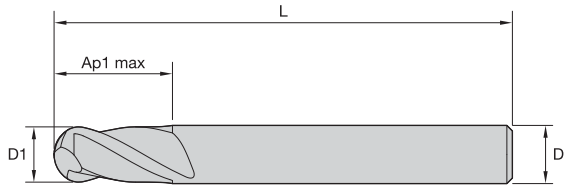


● first choice
○ alternate choice

grade TiAlN TiAlN						
order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6092638	40020800T020S	8,0	8	20,00	63	–
6092639	40020800T028S	8,0	8	28,00	76	–
5873507	40020800T028	8,0	8	28,00	76	0,20
6092640	40120800T041S	8,0	8	41,00	100	–
5873508	40120800T041	8,0	8	41,00	100	0,20
5873509	40020900T020	9,0	9	20,00	63	0,20
6092641	40020900T020S	9,0	9	20,00	63	–
5873510	40021000T022	10,0	10	22,00	72	0,20
6092643	40021000T022S	10,0	10	22,00	72	–
6092644	40021000T032S	10,0	10	32,00	89	–
5873511	40021000T032	10,0	10	32,00	89	0,20
6092645	40121000T045S	10,0	10	45,00	100	–
5873512	40121000T045	10,0	10	45,00	100	0,20
6092646	40021100T025S	11,0	11	25,00	76	–
5873513	40021100T025	11,0	11	25,00	76	0,30
5873514	40021200T025	12,0	12	25,00	76	0,30
6092647	40021200T025S	12,0	12	25,00	76	–
5873515	40021200T045	12,0	12	45,00	100	0,30
6092648	40021200T045S	12,0	12	45,00	100	–
6092650	40121200T075S	12,0	12	75,00	150	–
5873516	40121200T075	12,0	12	75,00	150	0,30
6092651	40021400T032S	14,0	14	32,00	83	–
5873517	40021400T032	14,0	14	32,00	83	0,30
6092653	40021400T050S	14,0	14	50,00	100	–
5873518	40021400T050	14,0	14	50,00	100	0,30
6092654	40121400T075S	14,0	14	75,00	150	–
5873519	40121400T075	14,0	14	75,00	150	0,30
5873520	40021600T032	16,0	16	32,00	89	0,30
6092657	40021600T032S	16,0	16	32,00	89	–
6092658	40021600T056S	16,0	16	56,00	110	–
5873531	40021600T056	16,0	16	56,00	110	0,30
6092659	40121600T075S	16,0	16	75,00	150	–
5873532	40121600T075	16,0	16	75,00	150	0,30
5873533	40021800T038	18,0	18	38,00	100	0,30
6092660	40021800T038S	18,0	18	38,00	100	–
5873534	40021800T060	18,0	18	60,00	125	0,30
6092681	40021800T060S	18,0	18	60,00	125	–
6092682	40121800T075S	18,0	18	75,00	150	–
5873535	40121800T075	18,0	18	75,00	150	0,30
6092683	40022000T038S	20,0	20	38,00	104	–
5873536	40022000T038	20,0	20	38,00	104	0,30
6092684	40022000T056S	20,0	20	56,00	125	–
5873537	40022000T056	20,0	20	56,00	125	0,30
6092685	40122000T075S	20,0	20	75,00	150	–
5873538	40122000T075	20,0	20	75,00	150	0,30

NOTE: For application data, please see pages B13–B14.

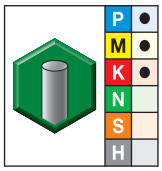
- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series D001 D011 • VariMill GP

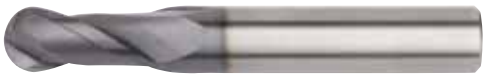


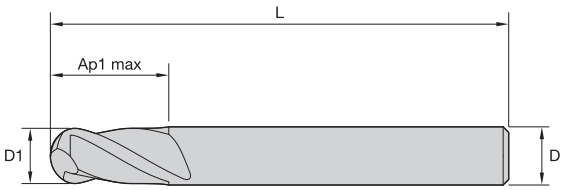
● first choice
○ alternate choice

grade TiAlN TiAlN					
order #	catalogue #	D1	D	length of cut Ap1 max	length L
5880362	D0110200T006	2,0	6	6,00	57
5880363	D0010300T004	3,0	6	4,00	50
5880364	D0110300T007	3,0	6	7,00	57
5880365	D0010400T005	4,0	6	5,00	54
5880366	D0110400T008	4,0	6	8,00	57
5880367	D0110500T010	5,0	6	10,00	57
5880368	D0110600T010	6,0	6	10,00	57
5880369	D0110700T013	7,0	8	13,00	63
5880370	D0110800T016	8,0	8	16,00	63
5880381	D0111000T019	10,0	10	19,00	72
5880382	D0111200T022	12,0	12	22,00	83
5880383	D0111400T022	14,0	14	22,00	83
5880384	D0111600T026	16,0	16	26,00	92
5880385	D0012000T020	20,0	20	20,00	92
5880386	D0112000T032	20,0	20	32,00	104

NOTE: For application data, please see page B15.

- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.

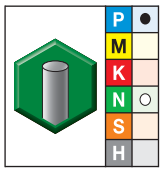


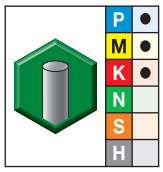


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 2838 • VariMill GP



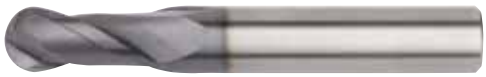


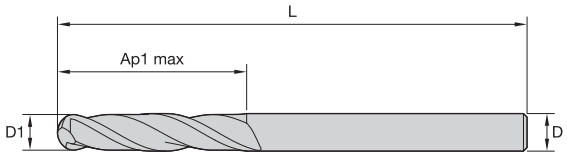
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
	–	5880451	28380200T007	2,0	2	7,00	50
5880462	28380300T007	5880452	28380300T007	3,0	3	7,00	50
5880463	28380400T008	5880453	28380400T008	4,0	4	8,00	50
5880464	28380500T010	5880454	28380500T010	5,0	5	10,00	50
5880465	28380600T010	5880455	28380600T010	6,0	6	10,00	57
5880466	28380800T016	5880456	28380800T016	8,0	8	16,00	63
5880467	28381000T019	5880457	28381000T019	10,0	10	19,00	72
5880468	28381200T022	5880458	28381200T022	12,0	12	22,00	83
5880469	28381400T022	5880459	28381400T022	14,0	14	22,00	83
5880470	28381600T026	5880460	28381600T026	16,0	16	26,00	92
5880471	28382000T032	5880461	28382000T032	20,0	20	32,00	104

NOTE: For application data, please see page B15.

- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.

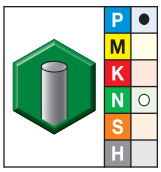


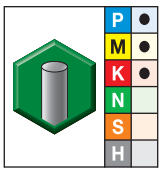


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4001 4011 4021 • VariMill GP



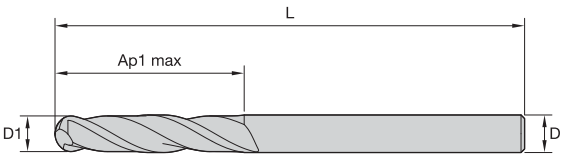


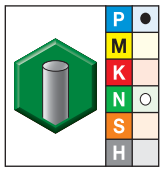
● first choice
○ alternate choice

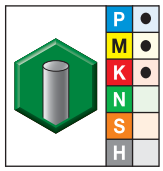
grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
5880425	40010100T004	5880387	40010100T004	1,0	3	4,00	38
5880426	40010150T005	5880388	40010150T005	1,5	3	5,00	38
5880427	40010200T006	5880389	40010200T006	2,0	3	6,30	38
5880428	40010250T007	5880390	40010250T007	2,5	3	7,00	38
5880429	40010300T009	5880391	40010300T009	3,0	3	9,50	38
	–	5880392	40010350T012	3,5	4	12,00	50
5880430	40010400T012	5880393	40010400T012	4,0	4	12,00	50
5880431	40110400T019	5880395	40110400T019	4,0	4	19,00	63
5880432	40210400T031	5880396	40210400T031	4,0	4	31,00	75
5880433	40010500T014		–	5,0	5	14,00	50
	–	5880397	40210500T014	5,0	6	14,00	50
5880435	40010600T020	5880398	40010600T020	6,0	6	20,00	63
5880436	40110600T028	5880399	40110600T028	6,0	6	28,00	76
5880437	40210600T038	5880400	40210600T038	6,0	6	38,00	100
5880438	40010800T020	5880401	40010800T020	8,0	8	20,00	63
5880439	40110800T028	5880402	40110800T028	8,0	8	28,00	76
5880440	40210800T040	5880403	40210800T040	8,0	8	40,00	100
5880441	40011000T022	5880404	40011000T022	10,0	10	22,00	76
5880442	40111000T032	5880405	40111000T032	10,0	10	32,00	89
5880443	40211000T045	5880406	40211000T045	10,0	10	45,00	100

(continued)

(Series 4001 4011 4021 • VariMill GP — continued)







● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
5880444	40011200T025	5880407	40011200T025	12,0	12	25,00	75
5880445	40111200T045	5880408	40111200T045	12,0	12	45,00	100
5880446	40211200T075	5880409	40211200T075	12,0	12	75,00	150
5880447	40011400T032	5880410	40011400T032	14,0	14	32,00	89
5880448	40011600T032	5880411	40011600T032	16,0	16	32,00	89
5880449	40012000T038	5880412	40012000T038	20,0	20	38,00	100
5880450	40112000T075	5880413	40112000T075	20,0	20	75,00	150

NOTE: For application data, please see pages B15–B17.

Series D002 D012 2819 4002 • TiAlN • VariMill GP



Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.												
		A		B	Cutting Speed — vc m/min				D1 — Diameter											
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D002 D012 2819 4002 • Uncoated • VariMill GP



Material Group		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.								
		A		B	Cutting Speed — vc m/min				D1 — Diameter							
		ap	ae	ap	min		max	mm	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	0,1 x D	0,1 x D	0,5 x D	120	–	160	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	0,1 x D	0,1 x D	0,5 x D	120	–	160	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	0,1 x D	0,1 x D	0,5 x D	112	–	152	fz	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series 4012 • TiAlN • VariMill GP

Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A).											
		A		Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

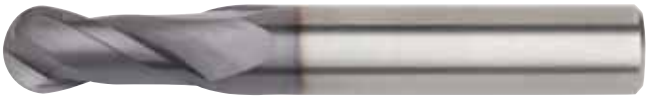
Series 4012 • Uncoated • VariMill GP

Material Group		Side Milling (A)		uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D001 D011 2838 4001 • TiAlN • VariMill GP





Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.											
		A		B	Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

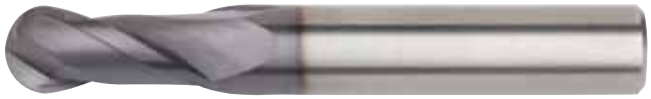
Series D001 D011 2838 4001 • Uncoated • VariMill GP



Material Group		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

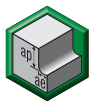
Series 4011 4021 • TiAlN • VariMill GP

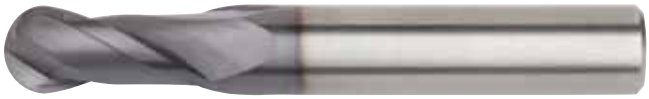


Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A).											
		A		Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series 4011 4021 • Uncoated • VariMill GP





Material Group		Side Milling (A)		uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

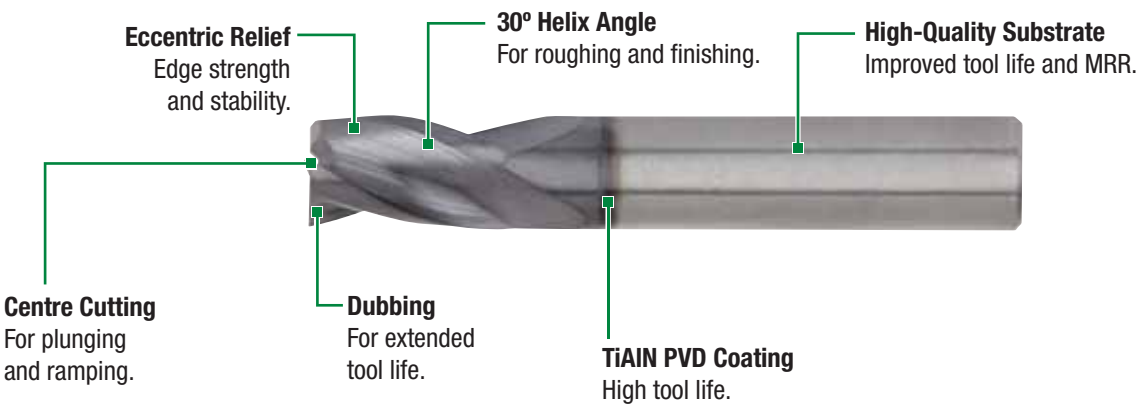
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

VariMill GP

VariMill GP offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as chamfered and sharp edge) are available from stock.

VariMill GP • 3-Flute

- General purpose tools for a wide range of workpiece materials.
- Roughing and finishing with one tool.
- Various lengths-of-cut and overall lengths with different front end designs available.
- Three flutes for slotting in unstable conditions.

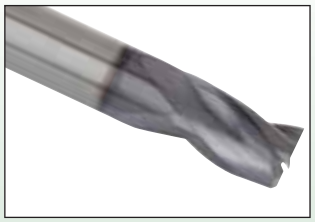


VariMill™ GP

- Increased manufacturing flexibility and reduced tool cost.
- Fewer tool changes and high Metal Removal Rates (MRR).
- Eccentric relief for improved edge stability and high tool life.
- Easy and cost-efficient regrinding due to eccentric relief.

Series D003..S/D013..S

- Centre cutting.
- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Sharp edge where required.

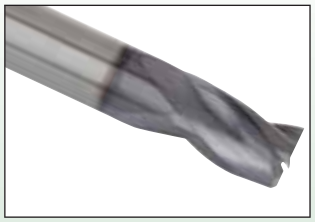


Series 4003..S/4013..S

- Centre cutting.
- Factory standard in short and long.
- Steel, stainless, and cast iron.
- Sharp edge where required.

Series D003/D013

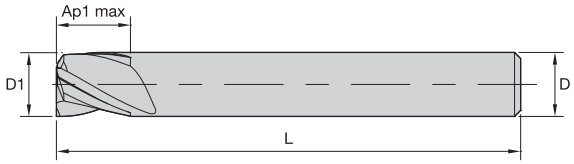
- Centre cutting.
- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Chamfered edge for extended tool life.



Series 4003/4013

- Centre cutting.
- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Chamfered edge for extended tool life.

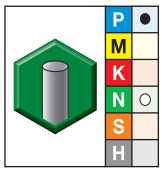
• Centre cutting.

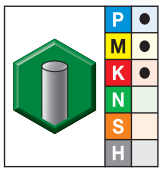


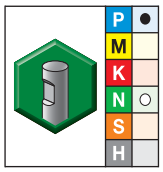
End Mill Tolerances

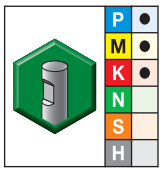
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

■ Series D003..S D013..S • VariMill GP







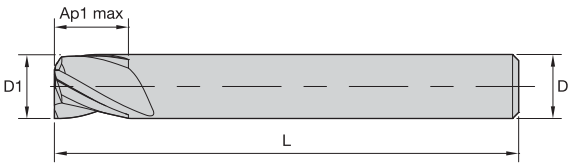


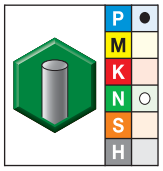
● first choice
○ alternate choice

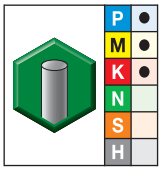
grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
6144450	D0030200T003S	6144351	D0030200T003S	6144484	D0030200W003S	6144388	D0030200W003S	2,0	6	3,00	50
6143764	D0130200T006S	6144441	D0130200T006S	6143831	D0130200W006S	6144467	D0130200W006S	2,0	6	6,00	57
6144452	D0030250T003S	6144352	D0030250T003S	6144486	D0030250W003S	6144390	D0030250W003S	2,5	6	3,00	50
6143765	D0130250T007S	6144442	D0130250T007S	6143832	D0130250W007S	6144469	D0130250W007S	2,5	6	7,00	57
6144454	D0030300T004S	6144353	D0030300T004S	6144488	D0030300W004S	6144392	D0030300W004S	3,0	6	4,00	50
6143766	D0130300T007S	6144443	D0130300T007S	6143833	D0130300W007S	6144471	D0130300W007S	3,0	6	7,00	57
6144456	D0030350T004S	6144354	D0030350T004S	6144490	D0030350W004S	6144394	D0030350W004S	3,5	6	4,00	50
6143767	D0130350T007S	6144444	D0130350T007S	6143834	D0130350W007S	6144473	D0130350W007S	3,5	6	7,00	57
6144458	D0030400T005S	6144355	D0030400T005S	6144492	D0030400W005S	6144396	D0030400W005S	4,0	6	5,00	54
6143768	D0130400T008S	6144445	D0130400T008S	6143835	D0130400W008S	6144475	D0130400W008S	4,0	6	8,00	57
6144460	D0030450T005S		–	6144494	D0030450W005S	6144398	D0030450W005S	4,5	6	5,00	54
6143769	D0130450T008S	6144446	D0130450T008S	6143836	D0130450W008S	6144477	D0130450W008S	4,5	6	8,00	57
6144462	D0030500T006S	6144357	D0030500T006S	6144496	D0030500W006S	6144400	D0030500W006S	5,0	6	6,00	54
6143770	D0130500T010S	6144447	D0130500T010S	6143837	D0130500W010S	6144479	D0130500W010S	5,0	6	10,00	57
6144464	D0030550T007S	6144358	D0030550T007S	6144498	D0030550W007S	6144402	D0030550W007S	5,5	6	7,00	54
6143821	D0130550T010S	6144448	D0130550T010S	6143838	D0130550W010S	6144481	D0130550W010S	5,5	6	10,00	57
6144466	D0030600T007S	6144360	D0030600T007S	6144500	D0030600W007S	6144404	D0030600W007S	6,0	6	7,00	54
6143822	D0130600T010S	6144449	D0130600T010S	6143839	D0130600W010S	6144483	D0130600W010S	6,0	6	10,00	57
6144468	D0030700T008S	6144372	D0030700T008S	6144501	D0030700W008S	6144406	D0030700W008S	7,0	8	8,00	58
6143823	D0130700T013S	6144451	D0130700T013S	6143840	D0130700W013S	6144485	D0130700W013S	7,0	8	13,00	63

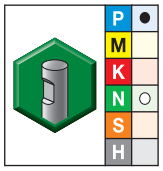
(continued)

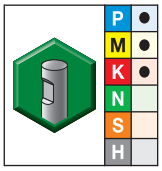
(Series D003..S D013..S • VariMill GP — continued)









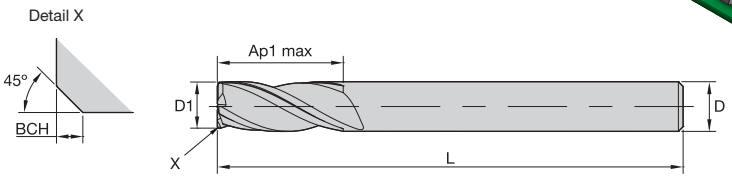


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
6144470	D0030800T009S	6144374	D0030800T009S	6144502	D0030800W009S	6144408	D0030800W009S	8,0	8	9,00	58
6143824	D0130800T016S	6144453	D0130800T016S	6143841	D0130800W016S	6144487	D0130800W016S	8,0	8	16,00	63
6144472	D0031000T011S	6144376	D0031000T011S	6144503	D0031000W011S	6144410	D0031000W011S	10,0	10	11,00	66
6143825	D0131000T019S	6144455	D0131000T019S	6143842	D0131000W019S	6144489	D0131000W019S	10,0	10	19,00	72
6144474	D0031200T012S	6144378	D0031200T012S	6144504	D0031200W012S	6144412	D0031200W012S	12,0	12	12,00	73
6143826	D0131200T022S	6144457	D0131200T022S	6143843	D0131200W022S	6144491	D0131200W022S	12,0	12	22,00	83
6144476	D0031400T014S	6144380	D0031400T014S	6144505	D0031400W014S	6144414	D0031400W014S	14,0	14	14,00	75
6143827	D0131400T022S	6144459	D0131400T022S	6143844	D0131400W022S	6144493	D0131400W022S	14,0	14	22,00	83
6144478	D0031600T016S	6144382	D0031600T016S	6144506	D0031600W016S	6144416	D0031600W016S	16,0	16	16,00	82
6143828	D0131600T026S	6144461	D0131600T026S	6143845	D0131600W026S	6144495	D0131600W026S	16,0	16	26,00	92
6144480	D0031800T018S	6144384	D0031800T018S	6144507	D0031800W018S	6144418	D0031800W018S	18,0	18	18,00	84
6143829	D0131800T026S	6144463	D0131800T026S	6143846	D0131800W026S	6144497	D0131800W026S	18,0	18	26,00	92
6144482	D0032000T020S	6144386	D0032000T020S	6144508	D0032000W020S	6144420	D0032000W020S	20,0	20	20,00	92
6143830	D0132000T032S	6144465	D0132000T032S	6143847	D0132000W032S	6144499	D0132000W032S	20,0	20	32,00	104

NOTE: For application data, please see page B26.

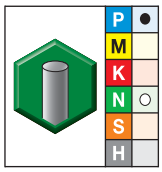
• Centre cutting.

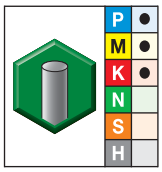


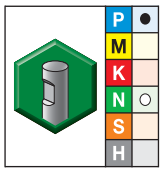
End Mill Tolerances

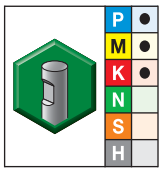
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series D003 D013 • VariMill GP







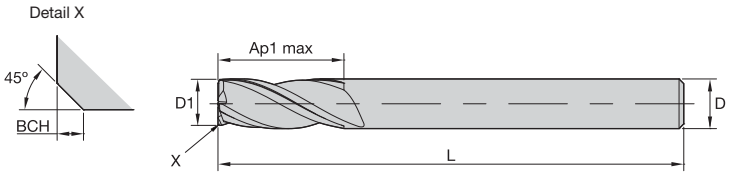


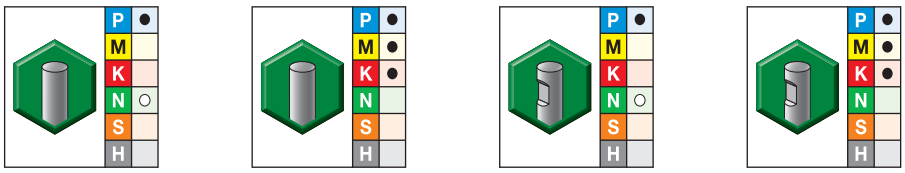
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6145042	D0030400T005	6144295	D0030400T005	6145056	D0030400W005	6144318	D0030400W005	4,0	6	5,00	54	0,10
	–	6144359	D0130400T008	6145094	D0130400W008	6144395	D0130400W008	4,0	6	8,00	57	0,10
6145043	D0030450T005	6144296	D0030450T005	6145057	D0030450W005	6144319	D0030450W005	4,5	6	5,00	54	0,10
	–	6144371	D0130450T008	6145095	D0130450W008	6144397	D0130450W008	4,5	6	8,00	57	0,10
6145044	D0030500T006	6144297	D0030500T006	6145058	D0030500W006	6144320	D0030500W006	5,0	6	6,00	54	0,10
6145083	D0130500T010	6144373	D0130500T010	6145096	D0130500W010	6144399	D0130500W010	5,0	6	10,00	57	0,10
6145045	D0030550T007	6144298	D0030550T007	6145059	D0030550W007	6144331	D0030550W007	5,5	6	7,00	54	0,10
	–	6144375	D0130550T010	6145097	D0130550W010	6144401	D0130550W010	5,5	6	10,00	57	0,10
6145046	D0030600T007	6144299	D0030600T007	6145060	D0030600W007	6144332	D0030600W007	6,0	6	7,00	54	0,10
6145085	D0130600T010	6144377	D0130600T010	6145098	D0130600W010	6144403	D0130600W010	6,0	6	10,00	57	0,10
6145047	D0030700T008	6144300	D0030700T008	6145061	D0030700W008	6144333	D0030700W008	7,0	8	8,00	58	0,10
	–	6144379	D0130700T013	6145099	D0130700W013	6144405	D0130700W013	7,0	8	13,00	63	0,10
6145048	D0030800T009	6144311	D0030800T009	6145062	D0030800W009	6144334	D0030800W009	8,0	8	9,00	58	0,20
6145087	D0130800T016	6144381	D0130800T016	6145100	D0130800W016	6144407	D0130800W016	8,0	8	16,00	63	0,20
6145049	D0031000T011	6144312	D0031000T011	6145063	D0031000W011	6144335	D0031000W011	10,0	10	11,00	66	0,20
6145088	D0131000T019	6144383	D0131000T019	6145101	D0131000W019	6144409	D0131000W019	10,0	10	19,00	72	0,20
6145050	D0031200T012	6144313	D0031200T012	6145064	D0031200W012	6144336	D0031200W012	12,0	12	12,00	73	0,30
6145089	D0131200T022	6144385	D0131200T022	6145102	D0131200W022	6144411	D0131200W022	12,0	12	22,00	83	0,30
6145051	D0031400T014	6144314	D0031400T014	6145065	D0031400W014	6144337	D0031400W014	14,0	14	14,00	75	0,30
6145090	D0131400T022	6144387	D0131400T022	6145103	D0131400W022	6144413	D0131400W022	14,0	14	22,00	83	0,30

(continued)

(Series D003 D013 • VariMill GP — continued)



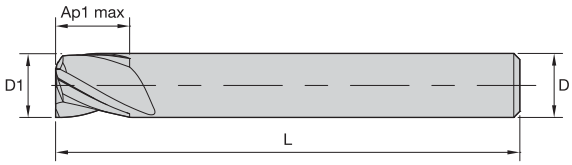


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6145052	D0031600T016	6144315	D0031600T016	6145066	D0031600W016	6144338	D0031600W016	16,0	16	16,00	82	0,30
6145091	D0131600T026	6144389	D0131600T026	6145104	D0131600W026	6144415	D0131600W026	16,0	16	26,00	92	0,30
6145053	D0031800T018	6144316	D0031800T018	6145067	D0031800W018	6144339	D0031800W018	18,0	18	18,00	84	0,30
6145092	D0131800T026	6144391	D0131800T026	6145105	D0131800W026	6144417	D0131800W026	18,0	18	26,00	92	0,30
6145054	D0032000T020	6144317	D0032000T020	6145068	D0032000W020	6144340	D0032000W020	20,0	20	20,00	92	0,30
6145093	D0132000T032	6144393	D0132000T032	6145106	D0132000W032	6144419	D0132000W032	20,0	20	32,00	104	0,30

NOTE: For application data, please see page B26.

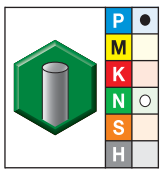
• Centre cutting.

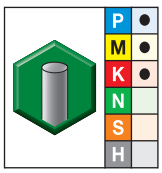


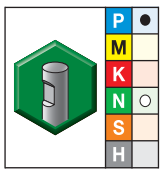
End Mill Tolerances

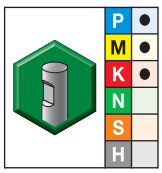
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4003..S 4013..S • VariMill GP







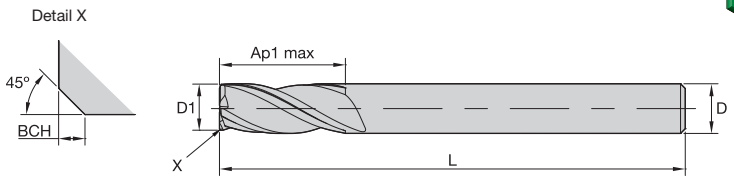


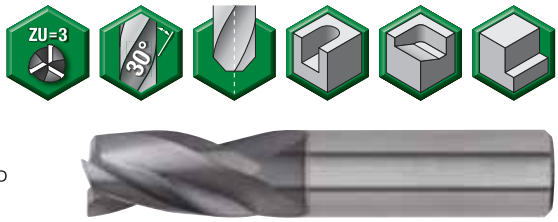
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
6144570	40030100T004S	6144056	40030100T004S		–		–	1,0	3	4,00	38
6144651	40030150T004S	6144057	40030150T004S		–		–	1,5	3	4,00	38
6144652	40030200T006S	6144058	40030200T006S		–		–	2,0	3	6,30	38
6144653	40030250T006S	6144059	40030250T006S		–		–	2,5	3	6,30	38
6144654	40030300T009S	6144060	40030300T009S		–		–	3,0	3	9,50	38
6145303	40130300T019S	6145199	40130300T019S	6145319	40130300W019S	6145243	40130300W019S	3,0	6	19,00	63
6144655	40030400T012S	6144551	40030400T012S		–		–	4,0	4	12,00	50
6145305	40130400T019S	6145200	40130400T019S		–		–	4,0	4	19,00	63
6144656	40030500T014S	6144552	40030500T014S		–		–	5,0	6	14,00	50
6145307	40130500T020S	6145231	40130500T020S	6145321	40130500W020S	6145247	40130500W020S	5,0	6	20,00	63
6144657	40030600T016S	6144553	40030600T016S	6144669	40030600W016S	6144565	40030600W016S	6,0	6	16,00	50
6145309	40130600T028S	6145232	40130600T028S	6145322	40130600W028S	6145249	40130600W028S	6,0	6	28,00	75
6144658	40030800T019S	6144554	40030800T019S	6144670	40030800W019S	6144566	40030800W019S	8,0	8	19,00	63
6145311	40130800T028S	6145233	40130800T028S	6145323	40130800W028S	6145251	40130800W028S	8,0	8	28,00	75
6144659	40031000T022S	6144555	40031000T022S	6144671	40031000W022S	6144567	40031000W022S	10,0	10	22,00	76
6145313	40131000T032S	6145234	40131000T032S	6145324	40131000W032S	6145253	40131000W032S	10,0	10	32,00	89
6144660	40031200T025S	6144556	40031200T025S	6144672	40031200W025S	6144568	40031200W025S	12,0	12	25,00	75
6145315	40131200T045S	6145235	40131200T045S	6145325	40131200W045S	6145255	40131200W045S	12,0	12	45,00	100
6144661	40031600T032S	6144557	40031600T032S	6144673	40031600W032S	6144569	40031600W032S	16,0	16	32,00	89
6145317	40131600T056S	6145238	40131600T056S	6145326	40131600W056S	6145257	40131600W056S	16,0	16	56,00	110
6145318	40132000T064S	6145241	40132000T064S	6145327	40132000W064S	6145259	40132000W064S	20,0	20	64,00	125

NOTE: For application data, please see pages B26–B27.

• Centre cutting.

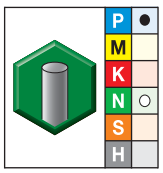


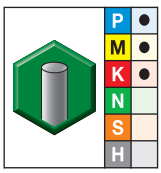


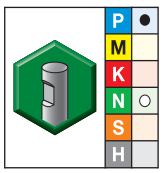
End Mill Tolerances

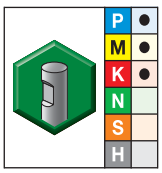
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4003 4013 • VariMill GP









● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6145236	40030400T012	6145107	40030400T012		–		–	4,0	4	12,00	50	0,10
6145274	40130400T019	6145181	40130400T019		–		–	4,0	4	19,00	63	0,10
6145275	40130500T020	6145182	40130500T020	6145304	40130500W020	6145190	40130500W020	5,0	6	20,00	63	0,10
6145242	40030600T016	6145109	40030600T016	6145256	40030600W016	6145176	40030600W016	6,0	6	16,00	50	0,10
6145276	40130600T028	6145183	40130600T028	6145306	40130600W028	6145191	40130600W028	6,0	6	28,00	75	0,10
6145244	40030800T019	6145110	40030800T019		–		–	8,0	8	19,00	63	0,20
6145277	40130800T028	6145184	40130800T028	6145308	40130800W028	6145192	40130800W028	8,0	8	28,00	75	0,20
6145246	40031000T022	6145171	40031000T022	6145260	40031000W022	6145178	40031000W022	10,0	10	22,00	76	0,20
6145278	40131000T032	6145185	40131000T032	6145310	40131000W032	6145193	40131000W032	10,0	10	32,00	89	0,20
6145248	40031200T025	6145172	40031200T025	6145271	40031200W025	6145179	40031200W025	12,0	12	25,00	75	0,30
6145279	40131200T045	6145186	40131200T045	6145312	40131200W045	6145194	40131200W045	12,0	12	45,00	100	0,30
6145250	40031600T032	6145173	40031600T032	6145272	40031600W032	6145180	40031600W032	16,0	16	32,00	89	0,30
6145280	40131600T056	6145187	40131600T056	6145314	40131600W056	6145195	40131600W056	16,0	16	56,00	110	0,30
6145301	40132000T064	6145188	40132000T064	6145316	40132000W064	6145196	40132000W064	20,0	20	64,00	125	0,30

NOTE: For application data, please see pages B26–B27.

Series D003..S D013..S D003 D013 4003..S 4003 • VariMill GP TiAlN



Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.												
		A		B	Cutting Speed – vc m/min				D1 – Diameter											
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.

Series D003..S D003 4003..S 4003 • VariMill GP Uncoated


Material Group		Side Milling (A)		uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed – vc m/min				D1 – Diameter						
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.

Series 4013..S 4013 • VariMill GP TiAlN

Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A).											
		A		Cutting Speed – vc m/min			D1 – Diameter											
		ap	ae	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.

Series 4013..S 4013 • VariMill GP Uncoated

Material Group		Side Milling (A)		uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed – vc m/min			D1 – Diameter							
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

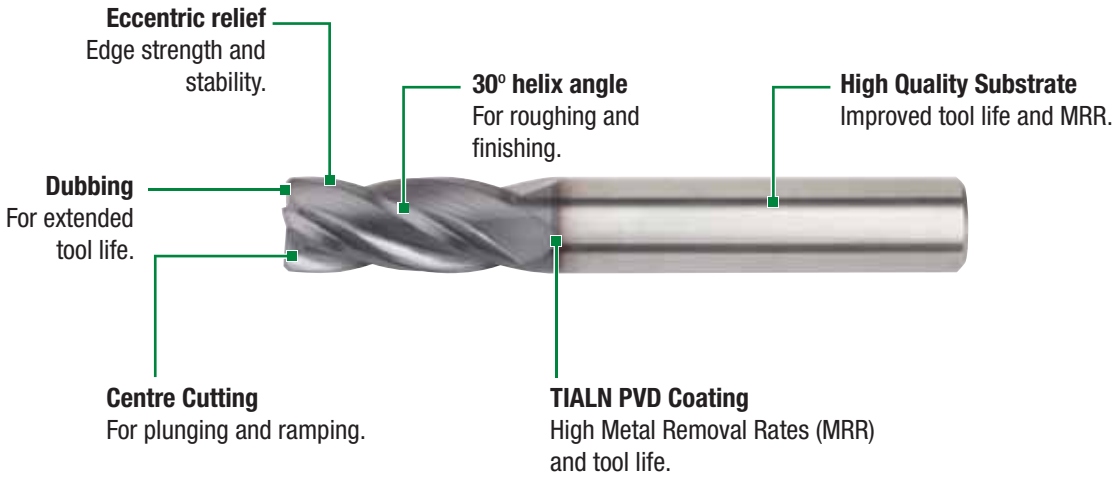
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.

VariMill GP

VariMill GP offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as chamfered, sharp edge, and ball nose) are available from stock.

VariMill GP • 4-Flute

- General purpose tools for wide a range of workpiece materials.
- Roughing and finishing with one tool.
- Various lengths-of-cut and overall lengths with different front end designs available.
- Four flutes for high Metal Removal Rates (MRR) and tool life.



VariMill™ GP

- Increased manufacturing flexibility and reduced tooling cost.
- Less tool changes and high Metal Removal Rates (MRR).
- One tool required for roughing and finishing.
- Eccentric relief for improved edge stability and high tool life.
- Easy and cost-efficient regrinding due to eccentric relief.

Series D004/D014

- Centre cutting.
- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp corner.

Series 2528

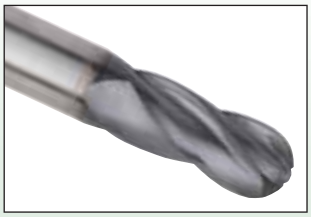
- Centre cutting.
- DIN 6528 standard dimensions.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp corner.

Series 4004/4014/4024

- Centre cutting.
- Wide range of lengths-of-cut — regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Sharp corner.

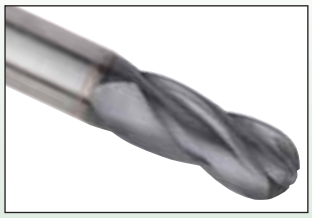
Series D010

- DIN 6527 standard dimensions — short and long.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.



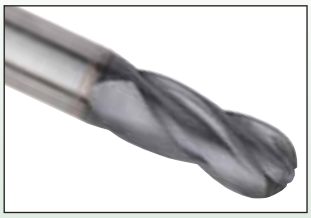
Series 2848

- DIN 6528 standard dimensions.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.

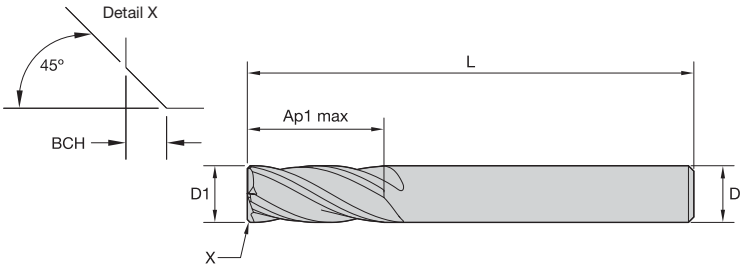


Series 4000/4010

- Wide range of lengths-of-cut — regular and long.
- Steel, stainless steel, and cast iron.
- Centre cut ball nose.



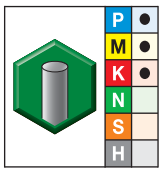
- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.

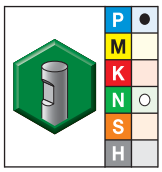


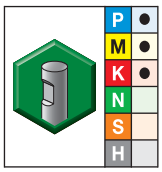
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series D004 D014 • VariMill GP





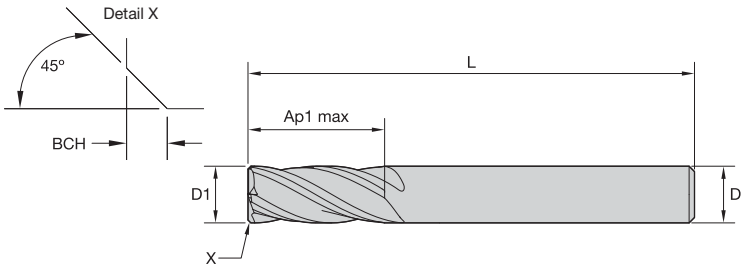


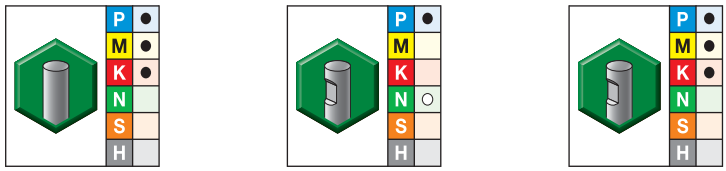
● first choice
○ alternate choice

grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
5825894	D0040200T004		–		–	2,0	6	4,00	50	–
5825895	D0140200T007		–		–	2,0	6	7,00	57	–
5825896	D0140250T008		–		–	2,5	6	8,00	57	–
5825897	D0040300T005		–		–	3,0	6	5,00	50	–
5825898	D0140300T008		–		–	3,0	6	8,00	57	–
5825899	D0140350T010		–		–	3,5	6	10,00	57	–
5825900	D0040400T008		–		–	4,0	6	8,00	54	0,10
6085348	D0040400T008S		–		–	4,0	6	8,00	54	–
6085349	D0140400T011S		–		–	4,0	6	11,00	57	–
5825931	D0140400T011		–		–	4,0	6	11,00	57	0,10
6085350	D0140450T011S		–		–	4,5	6	11,00	57	–
5825932	D0140450T011		–		–	4,5	6	11,00	57	0,10
6085361	D0040500T009S		–		–	5,0	6	9,00	54	–
5825933	D0040500T009		–		–	5,0	6	9,00	54	0,10
6085362	D0140500T013S		–		–	5,0	6	13,00	57	–
5825934	D0140500T013		–		–	5,0	6	13,00	57	0,10
6085363	D0140550T013S		–		–	5,5	6	13,00	57	–
5825935	D0140550T013		–		–	5,5	6	13,00	57	0,10
6085364	D0040600T010S		–		–	6,0	6	10,00	54	–
5825936	D0040600T010		–		–	6,0	6	10,00	54	0,10
6085365	D0140600T013S		–		–	6,0	6	13,00	57	–
5825937	D0140600T013		–		–	6,0	6	13,00	57	0,10
6085366	D0140650T016S		–		–	6,5	8	16,00	63	–
5825938	D0140650T016		–		–	6,5	8	16,00	63	0,10
6085367	D0040700T011S		–		–	7,0	8	11,00	58	–
5825939	D0040700T011		–		–	7,0	8	11,00	58	0,10
6085368	D0140700T016S		–		–	7,0	8	16,00	63	–
5825940	D0140700T016		–		–	7,0	8	16,00	63	0,10

(continued)

(Series D004 D014 • VariMill GP — continued)



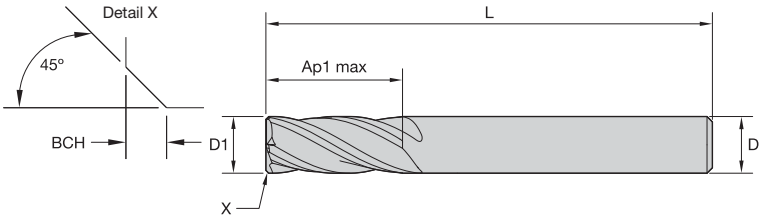


● first choice
○ alternate choice

grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6085369	D0140750T019S		–		–	7,5	8	19,00	63	–
5825941	D0140750T019		–		–	7,5	8	19,00	63	0,10
6085370	D0040800T012S		–		–	8,0	8	12,00	58	–
5825942	D0040800T012		–		–	8,0	8	12,00	58	0,20
6085371	D0140800T019S		–		–	8,0	8	19,00	63	–
5825943	D0140800T019		–		–	8,0	8	19,00	63	0,20
6085372	D0040900T013S		–		–	9,0	10	13,00	66	–
5825944	D0040900T013		–		–	9,0	10	13,00	66	0,20
6085373	D0140900T019S		–		–	9,0	10	19,00	72	–
5825945	D0140900T019		–		–	9,0	10	19,00	72	0,20
6085374	D0041000T014S		–		–	10,0	10	14,00	66	–
5825946	D0041000T014		–		–	10,0	10	14,00	66	0,20
6085375	D0141000T022S		–		–	10,0	10	22,00	72	–
5825947	D0141000T022		–		–	10,0	10	22,00	72	0,20
6085376	D0041200T016S	6085406	D0041200W016S	6085396	D0041200W016S	12,0	12	16,00	73	–
5825948	D0041200T016	5825968	D0041200W016	5825958	D0041200W016	12,0	12	16,00	73	0,30
6085377	D0141200T026S		–	6085397	D0141200W026S	12,0	12	26,00	83	–
5825949	D0141200T026	5825969	D0141200W026	5825959	D0141200W026	12,0	12	26,00	83	0,30
	–		–	6085407	D0141200W026S	12,0	12	26,00	83	–
6085378	D0041400T018S	6085408	D0041400W018S	6085398	D0041400W018S	14,0	14	18,00	75	–
5825950	D0041400T018	5825970	D0041400W018	5825960	D0041400W018	14,0	14	18,00	75	0,30
6085379	D0141400T026S		–	6085399	D0141400W026S	14,0	14	26,00	83	–
5825951	D0141400T026	5825971	D0141400W026	5825961	D0141400W026	14,0	14	26,00	83	0,30
	–		–	6085409	D0141400W026S	14,0	14	26,00	83	–
6085380	D0041600T022S	6085410	D0041600W022S	6085400	D0041600W022S	16,0	16	22,00	82	–
5825952	D0041600T022	5825972	D0041600W022	5825962	D0041600W022	16,0	16	22,00	82	0,30
6085391	D0141600T032S	6085421	D0141600W032S	6085401	D0141600W032S	16,0	16	32,00	92	–
5825953	D0141600T032	5825973	D0141600W032	5825963	D0141600W032	16,0	16	32,00	92	0,30
6085392	D0041800T024S	6086478	D0041800W024S	6085402	D0041800W024S	18,0	18	24,00	84	–
5825954	D0041800T024	5825974	D0041800W024	5825964	D0041800W024	18,0	18	24,00	84	0,30
6085393	D0141800T032S	6086479	D0141800W032S	6085403	D0141800W032S	18,0	18	32,00	92	–
5825955	D0141800T032	5825975	D0141800W032	5825965	D0141800W032	18,0	18	32,00	92	0,30
6085394	D0042000T026S	6086480	D0042000W026S	6085404	D0042000W026S	20,0	20	26,00	92	–
5825956	D0042000T026	5825976	D0042000W026	5825966	D0042000W026	20,0	20	26,00	92	0,30
6085395	D0142000T038S	6086491	D0142000W038S	6085405	D0142000W038S	20,0	20	38,00	104	–
5825957	D0142000T038	5825977	D0142000W038	5825967	D0142000W038	20,0	20	38,00	104	0,30

NOTE: For application data, please see pages B38–B39.

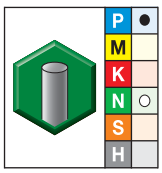
- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.

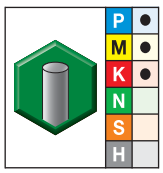


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 2528 • VariMill GP



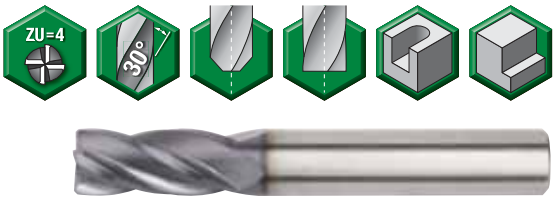


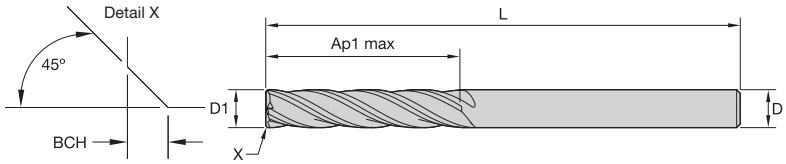
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6086507	25280400T011S	6086492	25280400T011S	4,0	4	11,00	50	–
5825993	25280400T011	5825978	25280400T011	4,0	4	11,00	50	0,10
6086508	25280500T013S	6086493	25280500T013S	5,0	5	13,00	50	–
5825994	25280500T013	5825979	25280500T013	5,0	5	13,00	50	0,10
6086509	25280600T013S	6086494	25280600T013S	6,0	6	13,00	57	–
5825995	25280600T013	5825980	25280600T013	6,0	6	13,00	57	0,10
6086510	25280800T019S	6086495	25280800T019S	8,0	8	19,00	63	–
5825996	25280800T019	5825981	25280800T019	8,0	8	19,00	63	0,20
6086531	25281000T022S	6086496	25281000T022S	10,0	10	22,00	72	–
5825997	25281000T022	5825982	25281000T022	10,0	10	22,00	72	0,20
6086502	25281200T026S	6086497	25281200T026S	12,0	12	26,00	83	–
5825988	25281200T026	5825983	25281200T026	12,0	12	26,00	83	0,30
6086503	25281400T026S	6086498	25281400T026S	14,0	14	26,00	83	–
5825989	25281400T026	5825984	25281400T026	14,0	14	26,00	83	0,30
6086504	25281600T032S	6086499	25281600T032S	16,0	16	32,00	92	–
5825990	25281600T032	5825985	25281600T032	16,0	16	32,00	92	0,30
6086505	25281800T032S	6086500	25281800T032S	18,0	18	32,00	92	–
5825991	25281800T032	5825986	25281800T032	18,0	18	32,00	92	0,30
6086506	25282000T038S	6086501	25282000T038S	20,0	20	38,00	104	–
5825992	25282000T038	5825987	25282000T038	20,0	20	38,00	104	0,30

NOTE: For application data, please see page B39.

- Centre cutting.
- Chamfered and sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.

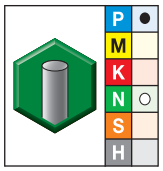


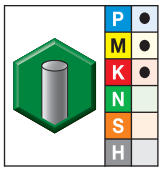


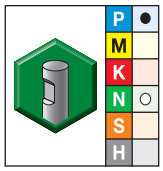
End Mill Tolerances

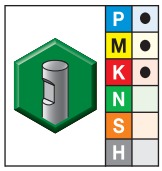
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4004 4014 4024 • VariMill GP







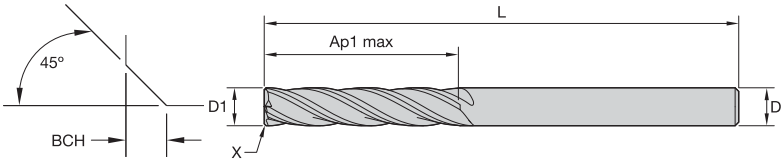


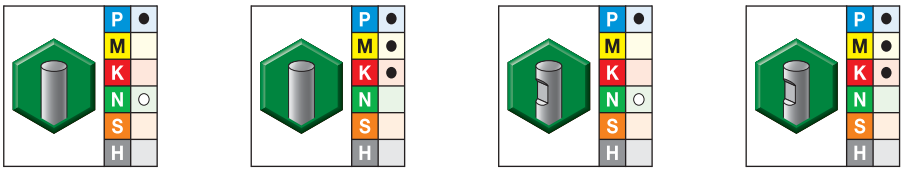
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
5826085	40040100T004	5826016	40040100T004	–		–		1,0	3	4,00	38	–
5826086	40040150T004	5826017	40040150T004	–		–		1,5	3	4,00	38	–
5826087	40040200T006	5826018	40040200T006	–		–		2,0	3	6,30	38	–
5826088	40040250T006	5826019	40040250T006	–		–		2,5	3	6,30	38	–
5826089	40040300T009	5826020	40040300T009	–		–		3,0	3	9,50	38	–
5826090	40140300T019	5826021	40140300T019	–		–		3,0	3	19,00	63	–
5826101	40240300T025	5826022	40240300T025	–		–		3,0	3	25,00	75	–
5826102	40040350T012	5826023	40040350T012	–		–		3,5	4	12,00	50	–
5826103	40040400T011	5826024	40040400T011	–		–		4,0	4	11,00	50	0,10
6085522	40040400T011S	6085576	40040400T011S	–		–		4,0	4	11,00	50	–
–		6085577	40140400T019S	–		–		4,0	4	19,00	63	–
–		5826025	40140400T019	–		–		4,0	4	19,00	63	0,10
–		6085578	40240400T031S	–		–		4,0	4	31,00	75	–
–		5826026	40240400T031	–		–		4,0	4	31,00	75	0,10
6085523	40040450T014S	6085579	40040450T014S	–		–		4,5	5	14,00	50	–
5826104	40040450T014	5826027	40040450T014	–		–		4,5	5	14,00	50	0,10
–		6085580	40040500T013S	–		–		5,0	5	13,00	50	–
–		5826028	40040500T013	–		–		5,0	5	13,00	50	0,10
6085524	40040500T020S	6085581	40040500T020S	–		–		5,0	5	20,00	63	–
5826105	40040500T020	5826029	40040500T020	–		–		5,0	5	20,00	63	0,10
–		6085582	40140500T030S	–		–		5,0	5	30,00	75	–
–		5826030	40140500T030	–		–		5,0	5	30,00	75	0,10
–		6085583	40240500T031S	–		–		5,0	5	31,00	100	–
–		5826031	40240500T031	–		–		5,0	5	31,00	100	0,10
6085525	40040600T016S	6085584	40040600T016S	–		–		6,0	6	16,00	50	–
5826106	40040600T016	5826032	40040600T016	–		–		6,0	6	16,00	50	0,10
6085526	40140600T028S	6085585	40140600T028S	–		–		6,0	6	28,00	75	–
5826107	40140600T028	5826033	40140600T028	–		–		6,0	6	28,00	75	0,10
6085527	40240600T038S	6085586	40240600T038S	–		–		6,0	6	38,00	100	–
5826108	40240600T038	5826034	40240600T038	–		–		6,0	6	38,00	100	0,10
–		6085587	40040700T020S	–		–		7,0	8	20,00	63	–
–		5826035	40040700T020	–		–		7,0	8	20,00	63	0,10

(continued)

(Series 4004 4014 4024 • VariMill GP — continued)



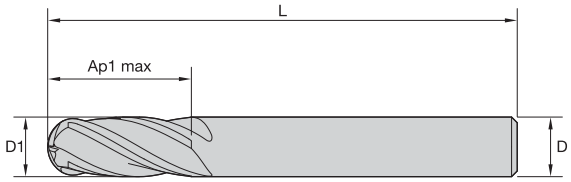


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L	BCH
6085528	40040800T020S	6085588	40040800T020S		–		–	8,0	8	20,00	50	–
5826109	40040800T020	5826036	40040800T020		–		–	8,0	8	20,00	50	0,20
6085529	40140800T028S	6085589	40140800T028S		–		–	8,0	8	28,00	75	–
5826110	40140800T028	5826037	40140800T028		–		–	8,0	8	28,00	75	0,20
6085530	40240800T041S	6085590	40240800T041S		–		–	8,0	8	41,00	100	–
5826111	40240800T041	5826038	40240800T041		–		–	8,0	8	41,00	100	0,20
	–	6085591	40040900T020S		–		–	9,0	9	20,00	63	–
	–	5826039	40040900T020		–		–	9,0	9	20,00	63	0,20
6085531	40041000T022S	6085592	40041000T022S		–		–	10,0	10	22,00	72	–
5826113	40041000T022	5826040	40041000T022		–		–	10,0	10	22,00	72	0,20
6085532	40141000T032S	6085593	40141000T032S		–		–	10,0	10	32,00	89	–
5826114	40141000T032	5826041	40141000T032		–		–	10,0	10	32,00	89	0,20
6085533	40241000T045S	6085594	40241000T045S		–		–	10,0	10	45,00	100	–
5826115	40241000T045	5826042	40241000T045		–		–	10,0	10	45,00	100	0,20
6085534	40041200T025S		–	6085549	40041200W025S	6085610	40041200W025S	12,0	12	25,00	75	–
	–	5826043	40041200T025		–		–	12,0	12	25,00	89	0,30
	–	6085595	40041200T025S		–		–	12,0	12	25,00	89	–
5826116	40041200T025		–	5826141	40041200W025	5826070	40041200W025	12,0	12	25,00	75	0,30
6085535	40141200T045S	6085596	40141200T045S	6085550	40141200W045S	6085611	40141200W045S	12,0	12	45,00	100	–
5826117	40141200T045	5826044	40141200T045	5826142	40141200W045	5826071	40141200W045	12,0	12	45,00	100	0,30
6085536	40241200T075S	6085597	40241200T075S	6085551	40241200W075S	6085612	40241200W075S	12,0	12	75,00	150	–
5826118	40241200T075	5826045	40241200T075	5826143	40241200W075	5826072	40241200W075	12,0	12	75,00	150	0,30
6085537	40041400T032S	6085598	40041400T032S	6085552	40041400W032S	6085613	40041400W032S	14,0	14	32,00	83	–
5826119	40041400T032	5826046	40041400T032	5826144	40041400W032	5826073	40041400W032	14,0	14	32,00	83	0,30
5826120	40141400T050	5826047	40141400T050	5826146	40141400W050	5826074	40141400W050	14,0	14	50,00	100	0,30
6085538	40141400T050S	6085599	40141400T050S	6085553	40141400W050S	6085614	40141400W050S	14,0	14	50,00	100	–
6085539	40241400T075S	6085600	40241400T075S	6085554	40241400W075S	6085615	40241400W075S	14,0	14	75,00	150	–
5826121	40241400T075	5826049	40241400T075	5826147	40241400W075	5826075	40241400W075	14,0	14	75,00	150	0,30
5826122	40041600T032	5826061	40041600T032	5826148	40041600W032	5826076	40041600W032	16,0	16	32,00	92	0,30
6085540	40041600T032S	6085601	40041600T032S	6085555	40041600W032S	6085616	40041600W032S	16,0	16	32,00	92	–
6085541	40141600T056S	6085602	40141600T056S	6085556	40141600W056S	6102465	40141600W056S	16,0	16	56,00	110	–
5826123	40141600T056	5826062	40141600T056	5826149	40141600W056	5826077	40141600W056	16,0	16	56,00	110	0,30
6085542	40241600T075S	6085603	40241600T075S	6086532	40241600W075S	6085427	40241600W075S	16,0	16	75,00	150	–
5826124	40241600T075	5826063	40241600T075	5826150	40241600W075	5826078	40241600W075	16,0	16	75,00	150	0,30
6085543	40041800T038S	6085604	40041800T038S	6086533	40041800W038S	6085428	40041800W038S	18,0	18	38,00	100	–
5826125	40041800T038	5826064	40041800T038	5826151	40041800W038	5826079	40041800W038	18,0	18	38,00	100	0,30
6085544	40141800T060S	6085605	40141800T060S	6086534	40141800W060S	6085429	40141800W060S	18,0	18	60,00	125	–
5826126	40141800T060	5826065	40141800T060	5826152	40141800W060	5826080	40141800W060	18,0	18	60,00	125	0,30
6085545	40241800T075S	6085606	40241800T075S	6086535	40241800W075S	6085430	40241800W075S	18,0	18	75,00	150	–
5826127	40241800T075	5826066	40241800T075	5826153	40241800W075	5826081	40241800W075	18,0	18	75,00	150	0,30
5826128	40042000T038	5826067	40042000T038	5826154	40042000W038	5826082	40042000W038	20,0	20	38,00	104	0,30
6085546	40042000T038S	6085607	40042000T038S	6086536	40042000W038S	6085511	40042000W038S	20,0	20	38,00	104	–
6085547	40142000T056S	6085608	40142000T056S	6086537	40142000W056S	6085512	40142000W056S	20,0	20	56,00	125	–
5826129	40142000T056	5826068	40142000T056	5826155	40142000W056	5826083	40142000W056	20,0	20	56,00	125	0,30
6085548	40242000T075S	6085609	40242000T075S	6086538	40242000W075S	6085513	40242000W075S	20,0	20	75,00	150	–
5826130	40242000T075	5826069	40242000T075	5826156	40242000W075	5826084	40242000W075	20,0	20	75,00	150	0,30

NOTE: For application data, please see pages B38–B39.

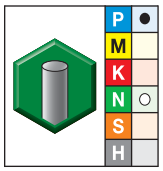
- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.

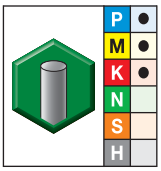


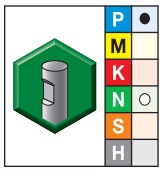
End Mill Tolerances

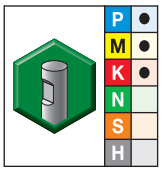
D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series D010 • VariMill GP







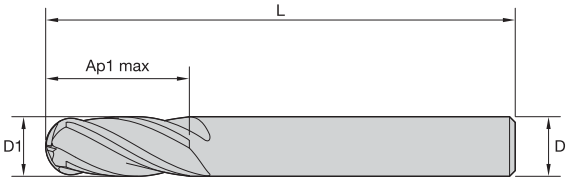


● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
5825604	D0100300T008	5825527	D0100300T008	–		–		3,0	6	8,00	57
5825605	D0100400T011	5825528	D0100400T011	–		–		4,0	6	11,00	57
5825606	D0100500T013	5825529	D0100500T013	–		–		5,0	6	13,00	57
5825607	D0100600T013	5825530	D0100600T013	–		–		6,0	6	13,00	57
5825608	D0100800T019	5825531	D0100800T019	–		–		8,0	8	19,00	63
5825609	D0101000T022	5825532	D0101000T022	–		–		10,0	10	22,00	72
5825610	D0101200T026	5825533	D0101200T026	5825589	D0101200W026	5825540	D0101200W026	12,0	12	26,00	83
5825611	D0101400T026	5825534	D0101400T026	5825590	D0101400W026	5825541	D0101400W026	14,0	14	26,00	83
5825612	D0101600T032	5825536	D0101600T032	5825591	D0101600W032	5825542	D0101600W032	16,0	16	32,00	92
5825613	D0101800T032	5825538	D0101800T032	5825592	D0101800W032	5825543	D0101800W032	18,0	18	32,00	92
5825614	D0102000T038	5825539	D0102000T038	5825593	D0102000W038	5825544	D0102000W038	20,0	20	38,00	104

NOTE: For application data, please see pages B40–B41.

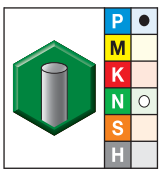
- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.

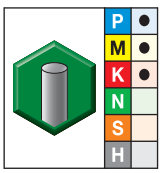


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

■ Series 2848 • VariMill GP



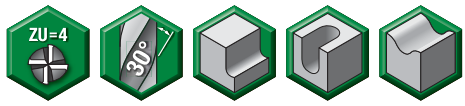


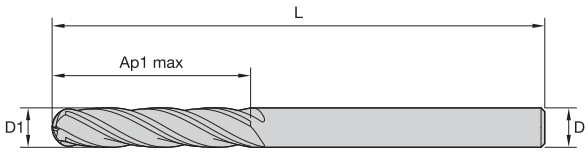
● first choice
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN					
order #	catalogue #	order #	catalogue #	D1	D	length of cut Ap1 max	length L
5825594	28480400T011	5825545	28480400T011	4,0	4	11,00	50
5825595	28480500T013	5825546	28480500T013	5,0	5	13,00	50
5825596	28480600T013	5825547	28480600T013	6,0	6	13,00	57
5825597	28480800T019	5825548	28480800T019	8,0	8	19,00	63
5825598	28481000T022	5825549	28481000T022	10,0	10	22,00	72
5825599	28481200T026	5825550	28481200T026	12,0	12	26,00	83
5825600	28481400T026	5825551	28481400T026	14,0	14	26,00	83
5825601	28481600T032	5825552	28481600T032	16,0	16	32,00	92
5825602	28481800T032	5825553	28481800T032	18,0	18	32,00	92
5825603	28482000T038	5825554	28482000T038	20,0	20	38,00	104

NOTE: For application data, please see pages B40–B41.

- Centre cutting.
- Standard items listed. Additional styles and coatings made-to-order.

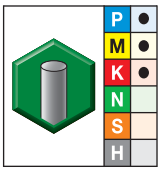




End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3–6	-0,020/-0,038	> 3–6	0/0,008
> 6–10	-0,025/-0,047	> 6–10	0/0,009
> 10–18	-0,032/-0,059	> 10–18	0/0,011
> 18–30	-0,040/-0,073	> 18–30	0/0,013

Series 4000 4010 • VariMill GP



● first choice
○ alternate choice

grade TiAlN TiAlN					
order #	catalogue #	D1	D	length of cut Ap1 max	length L
5825555	40000200T006	2,0	3	6,30	38
5825556	40000300T020	3,0	3	20,00	75
5825557	40000400T014	4,0	4	14,00	50
5825558	40100400T025	4,0	4	25,00	75
5825559	40000500T016	5,0	5	16,00	50
5825560	40100500T030	5,0	5	30,00	75
5825573	40000600T016	6,0	6	16,00	50
5825574	40100600T019	6,0	6	19,00	63
5825575	40100600T030	6,0	6	30,00	75
5825576	40000800T019	8,0	8	19,00	63
5825577	40100800T040	8,0	8	40,00	100
5825578	40001000T022	10,0	10	22,00	72
5825579	40101000T040	10,0	10	40,00	100
5825580	40001200T025	12,0	12	25,00	75
5825581	40101200T045	12,0	12	45,00	150
5825583	40001400T032	14,0	14	32,00	83
5825584	40101400T050	14,0	14	50,00	100
5825585	40001600T032	16,0	16	32,00	89
5825586	40101600T065	16,0	16	65,00	150
5825587	40001800T038	18,0	18	38,00	100
5825588	40102000T056	20,0	20	56,00	125

NOTE: For application data, please see page B40.

Series D004 4004 • TiAlN • VariMill GP



Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.												
		A		B	Cutting Speed — vc m/min				D1 — Diameter											
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,005	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,005	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,007	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,006	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D004 4004 • Uncoated • VariMill GP



Material Group		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter									
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D014 2528 4014 4024 • TiAlN • VariMill GP

Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (fz = mm/th) for side milling (A).											
		A		Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	min		max	mm	2,0	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,010	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,009	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,014	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,011	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

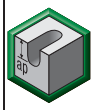
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions.For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D014 2528 4014 4024 • Uncoated • VariMill GP

Material Group		Side Milling (A)		uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A).							
		A		Cutting Speed — vc m/min				D1 — Diameter						
		ap	ae	min		max	mm	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	120	–	160	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	112	–	152	fz	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	400	–	1600	fz	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	400	–	1200	fz	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	320	–	600	fz	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

■ Series D010 2848 4000 • TiAlN • VariMill GP

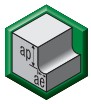




Material Group		Side Milling (A) and Slotting (B)			TiAlN				Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.										
		A		B	Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	ap	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	0,5 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	0,5 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	0,5 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	0,5 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	0,5 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	0,5 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Application Data • Series 4010 • VariMill GP

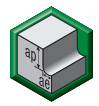
■ Series 4010 • TiAlN • VariMill GP




Material Group		Side Milling (A)		TiAlN				Recommended feed per tooth (fz = mm/th) for side milling (A).										
		A		Cutting Speed — vc m/min				D1 — Diameter										
		ap	ae	min		max	mm	3,0	4,0	5,0	6,0	8,0	10,0	12,0	14,0	16,0	18,0	20,0
P	0	Ap1 max	0,1 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	1	Ap1 max	0,1 x D	150	–	200	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	140	–	190	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	3	Ap1 max	0,1 x D	120	–	160	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	4	Ap1 max	0,1 x D	90	–	150	fz	0,016	0,021	0,027	0,033	0,045	0,054	0,062	0,070	0,077	0,083	0,088
M	1	Ap1 max	0,1 x D	90	–	115	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101
	2	Ap1 max	0,1 x D	60	–	80	fz	0,014	0,019	0,024	0,029	0,040	0,048	0,056	0,063	0,070	0,076	0,081
K	1	Ap1 max	0,1 x D	120	–	150	fz	0,021	0,028	0,036	0,044	0,060	0,072	0,083	0,092	0,101	0,108	0,114
	2	Ap1 max	0,1 x D	110	–	140	fz	0,017	0,023	0,030	0,036	0,050	0,061	0,070	0,079	0,087	0,095	0,101

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

Series D010 2848 • Uncoated • VariMill GP

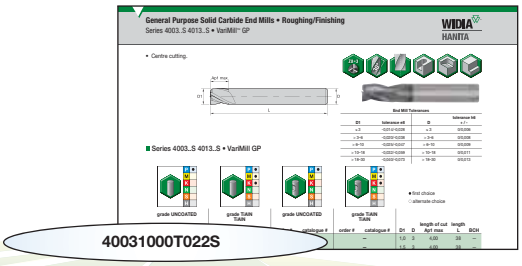


Material Group		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.									
		A		B	Cutting Speed — vc m/min				D1 — Diameter								
		ap	ae	ap	min		max	mm	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
P	0	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	1	Ap1 max	0,1 x D	0,5 x D	120	–	160	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
	2	Ap1 max	0,1 x D	0,5 x D	112	–	152	fz	0,007	0,014	0,021	0,028	0,044	0,060	0,072	0,083	0,101	0,114
N	1	Ap1 max	0,1 x D	0,5 x D	400	–	1600	fz	0,010	0,020	0,030	0,040	0,060	0,080	0,100	0,120	0,160	0,200
	2	Ap1 max	0,1 x D	0,5 x D	400	–	1200	fz	0,008	0,016	0,024	0,032	0,048	0,064	0,080	0,096	0,128	0,160
	4	Ap1 max	0,1 x D	0,5 x D	320	–	600	fz	0,007	0,014	0,021	0,028	0,042	0,056	0,070	0,084	0,112	0,140

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on >12mm diameters.

How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



4003	1000	T	022	S
Series	Diameter mm	Shank Style	Ap1 max mm	Corner Style
D002 = 2FL Square DIN6527 Short		**T** = Plain Shank		**S** = Sharp Corner
D012 = 2FL Square DIN6527 Long		**W** = Weldon® Shank		
2819 = 2FL Square DIN6528				
4002 = 2FL Square Factory Standard Short/Regular				
4012 = 2FL Square Factory Standard Long				
4022 = 2FL Square Factory Standard Extra Long				
D001 = 2FL Ball Nose DIN6527 Short				
D011 = 2FL Ball Nose DIN6527 Long				
2838 = 2FL Ball Nose DIN6528				
4001 = 2FL Ball Nose Factory Standard Short/Regular				
4011 = 2FL Ball Nose Factory Standard Long				
4021 = 2FL Ball Nose Factory Standard Extra Long				
D003 = 3FL Square DIN6527 Short				
D013 = 3FL Square DIN6527 Long				
4003 = 3FL Square Factory Standard Short/Regular				
4013 = 3 FL Square Factory Standard Long				
D004 = 4FL Square DIN6527 Short				
D014 = 4FL Square DIN6527 Long				
2528 = 4FL Square DIN6528				
4004 = 4FL Square Factory Standard Short/Regular				
4014 = 4FL Square Factory Standard Long				
4024 = 4FL Square Factory Standard Extra Long				
D000 = 4FL Ball Nose DIN6527 Short				
D010 = 4FL Ball Nose DIN6527 Long				
2848 = 4FL Ball Nose DIN6528				
4000 = 4FL Ball Nose Factory Standard Short/Regular				
4010 = 2FL Ball Nose Factory Standard Long/Extra Long				

Good for You, Better for the Environment!

The WIDIA™ Carbide Recycling Programme can turn accumulated scrap carbide tooling in your shop into cash.

Carbide Recycling

We pay cash for used carbide tooling, including coated or non-coated carbide inserts, drills, end mills, reamers, and taps, regardless of brand.

It's good for the environment and a responsible way to dispose of scrap carbide.

Our carbide recycling programme features:

- Easy-to-use web portal that shows what your scrap carbide is worth before sending it to us.
- Online forms that make it easy to ship scrap carbide to WIDIA.
- Green Box™ containers for safe, convenient shipping of scrap carbide to WIDIA.
- Cash payment for used carbide tooling.

For more information, contact your local WIDIA Authorised Distributor or visit **widia.com/services.**

WIDIA™

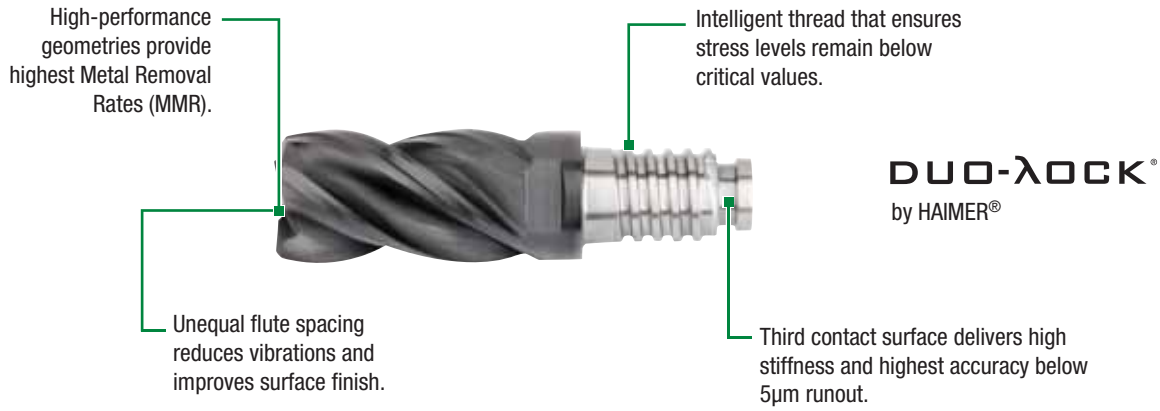
High-Performance Modular Solid Carbide End Mills •

Duo-Lock™

DUO-λOCK®

Duo-Lock™ combines highest runout accuracy and length repeatability with maximum coupling stability. This allows the Duo-Lock™ system to fully utilise the full potential of WIDIA™ VariMill™ cutting geometries and WIDIA Victory™ grades. The flexible modular system, Duo-Lock™, targets applications like solid carbide end mills. A wide range of diameters between 16–32mm and multiple corner configurations, such as chamfer, and radii, are available from stock.

- Cutting data and tool life comparable to high-performance solid carbide.
- Proprietary VariMill geometries allow roughing and finishing with one tool.
- 1,5 x D standard cutting edge length allows for less passes.
- Up to 1 x D full slotting increases Metal Removal Rates (MRR) and productivity significantly.
- Extensive straight and conical shank, as well as integral adaptor offering including CV, DV, BT, and HSK.



DUO-λOCK®
by HAIMER®

VariMill™ Duo-Lock™ Series

- Less cutting forces and pressure on cutting edge through tailored axial and radial rake angles.
- Proprietary tapered core provides highest tool stability at roughing and finishing operations.
- Eccentric relief design increases tool life through higher edge stability.

4X47 VariMill Series

- 4 flute.
- New asymmetrical fluting geometry.
- High metal removal rates and tool life in:
  - Stainless steels, steels, and alloyed steels.
  - High-temperature alloys and titanium.

4X48 VariMill Series

- 4 flute.
- New asymmetrical fluting geometry.
- Titanium geometry design.
- Extensive radii corner offering.

5747 VariMill II™ Series

- 5 flute.
- High metal removal rates and tool life in:
  - Stainless steels, steels, and alloyed steels.
  - Cast iron.
  - High-temperature alloys and titanium.

5748 VariMill II ER Series

- 5 flute.
- Titanium geometry design.
- Eccentric relief for edge stability and strength.
- Extensive radii corner offering.

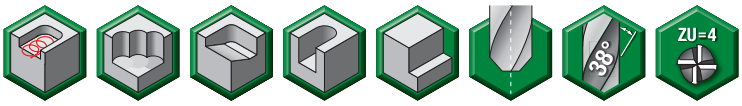
4XN0 VariMill Series

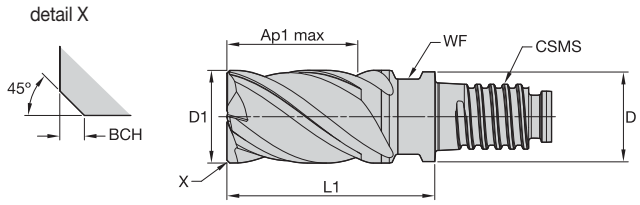
- 4 flute.
- Stainless steel and steel geometry design.
- Centre cutting ball nose.

774E VariMill III™ ER Series

- 7 flute.
- Titanium geometry design.
- Eccentric relief for edge stability and strength.
- Extensive radii corner offering.

- Asymmetrical flute spacing configuration minimises chatter and harmonics for smoother machining.
- Centre cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.

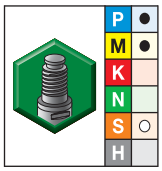




End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

4X47 • 4 Flute • Metric

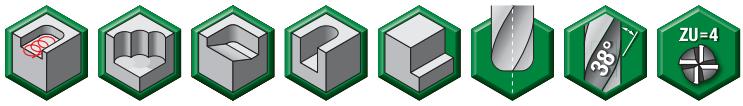


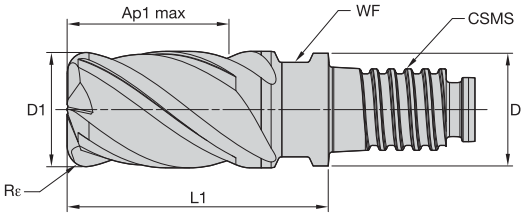
● first choice
○ alternate choice

grade WP15PE AlTiN								
order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF	BCH
6071091	4X47160NDL16	16,0	15,50	24,00	36	DL16	13,00	0,50
6071092	4X47200NDL20	20,0	19,30	30,00	45	DL20	16,00	0,50
6071093	4X47250NDL25	25,0	24,00	37,50	57	DL25	21,00	0,50
6071094	4X47320NDL32	32,0	31,00	48,00	72	DL32	28,00	0,50

NOTE: For application data, please see page B48.

- Asymmetrical flute spacing configuration minimises chatter and harmonics for smoother machining.
- Centre cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.

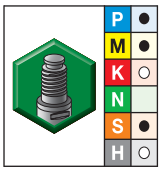




End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

4X48 • 4 Flute • Metric



● first choice
○ alternate choice

WS15PE AlTiN								
order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF	Rε
6071111	4X481603DL16	16,0	15,50	24,00	36	DL16	13,00	1,00
6071112	4X481605DL16	16,0	15,50	24,00	36	DL16	13,00	2,00
6071113	4X481607DL16	16,0	15,50	24,00	36	DL16	13,00	3,00
6071114	4X482003DL20	20,0	19,30	30,00	45	DL20	16,00	1,00
6071115	4X482005DL20	20,0	19,30	30,00	45	DL20	16,00	2,00
6071116	4X482007DL20	20,0	19,30	30,00	45	DL20	16,00	3,00
6071117	4X482008DL20	20,0	19,30	30,00	45	DL20	16,00	4,00
6071118	4X482503DL25	25,0	24,00	37,50	57	DL25	21,00	1,00
6071119	4X482505DL25	25,0	24,00	37,50	57	DL25	21,00	2,00
6071120	4X482507DL25	25,0	24,00	37,50	57	DL25	21,00	3,00
6071121	4X482508DL25	25,0	24,00	37,50	57	DL25	21,00	4,00
6071122	4X483205DL32	32,0	31,00	48,00	72	DL32	28,00	2,00
6071123	4X483207DL32	32,0	31,00	48,00	72	DL32	28,00	3,00

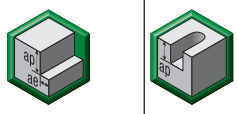
NOTE: For application data, please see page B49.

VariMill • 4X47 • Asymmetrical Flute Spacing

Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.				
		A		B	adaptor reach										D1 — Diameter			
					WP15PE			WP15PE			WP15PE							
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min							
		ap	ae	ap	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	1	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	2	1,5 x D	0,5 x D	1 x D	140	–	190	126	–	171	126	–	171	fz	0,101	0,114	0,124	0,125
	3	1,5 x D	0,5 x D	1 x D	120	–	160	108	–	144	108	–	144	fz	0,087	0,101	0,114	0,123
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	81	–	135	81	–	135	fz	0,077	0,088	0,098	0,102
	5	1,5 x D	0,5 x D	1 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091	0,099
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	42	–	64	40	–	60	fz	0,057	0,065	0,071	0,073
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	72	–	92	63	–	80	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	42	–	56	fz	0,070	0,081	0,091	0,099
	3	1,5 x D	0,5 x D	1 x D	60	–	70	48	–	56	42	–	49	fz	0,057	0,065	0,071	0,073
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061	0,067
	3	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091	0,099
	4	1,5 x D	0,5 x D	1 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084	0,090

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

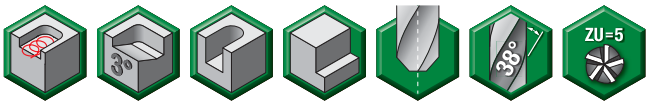
■ VariMill • 4X48 • Asymmetrical Flute Spacing



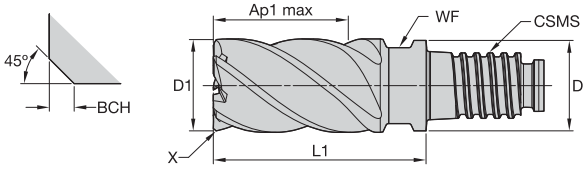
Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.				
		A		B	adaptor reach													
					WS15PE			WS15PE			WS15PE				D1 — Diameter			
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min							
		ap	ae	ap	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	1	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	2	1,5 x D	0,5 x D	1 x D	140	–	190	126	–	171	126	–	171	fz	0,101	0,114	0,124	0,125
	3	1,5 x D	0,5 x D	1 x D	120	–	160	108	–	144	108	–	144	fz	0,087	0,101	0,114	0,123
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	81	–	135	81	–	135	fz	0,077	0,088	0,098	0,102
	5	1,5 x D	0,5 x D	1 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091	0,099
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	42	–	64	40	–	60	fz	0,057	0,065	0,071	0,073
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	72	–	92	63	–	80	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	42	–	56	fz	0,070	0,081	0,091	0,099
	3	1,5 x D	0,5 x D	1 x D	60	–	70	48	–	56	42	–	49	fz	0,057	0,065	0,071	0,073
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	108	–	135	108	–	135	fz	0,101	0,114	0,124	0,125
	2	1,5 x D	0,5 x D	1 x D	110	–	140	99	–	126	99	–	126	fz	0,087	0,101	0,114	0,123
	3	1,5 x D	0,5 x D	1 x D	110	–	130	99	–	117	99	–	117	fz	0,070	0,081	0,091	0,099
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061	0,067
	3	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091	0,099
	4	1,5 x D	0,5 x D	1 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084	0,090
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	64	–	112	48	–	84	fz	0,077	0,088	0,098	0,102
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	56	–	96	42	–	72	fz	0,057	0,065	0,071	0,073

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

- Unequal flute spacing configuration minimises chatter and harmonics for smoother machining.
- Non-centre cutting.
- Ramping up to 3°.
- Five-flute geometry able to slot up to 1 x D.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.



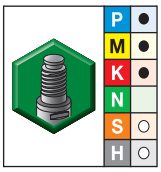
detail X



End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

5747 • 5 Flute • Metric

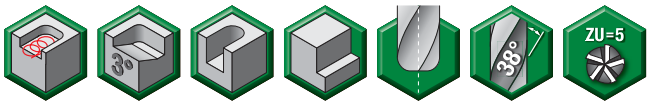


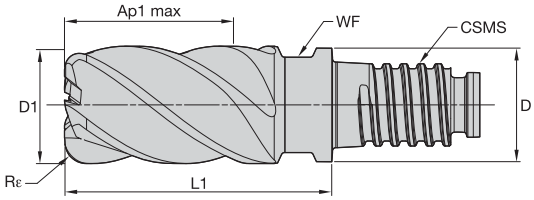
● first choice
○ alternate choice

grade WP15PE AlTiN								
order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF	BCH
6071362	**5747160NDL16**	16,0	15,50	24,00	36	DL16	13,00	0,50
6071363	**5747200NDL20**	20,0	19,30	30,00	45	DL20	16,00	0,50
6071364	**5747250NDL25**	25,0	24,00	37,50	57	DL25	21,00	0,50
6071365	**5747320NDL32**	32,0	31,00	48,00	72	DL32	28,00	0,50

NOTE: For application data, please see page B52.

- Unequal flute spacing configuration minimises chatter and harmonics for smoother machining.
- Non-centre cutting.
- Ramping up to 3°.
- Five-flute geometry able to slot up to 1 x D.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.

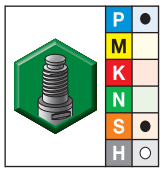




End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

5748 • 5 Flute • Metric



● first choice
○ alternate choice

order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF	Rε
		WS15PE AlTiN						
6071372	57481603DL16	16,0	15,50	24,00	36	DL16	13,00	1,00
6071373	57481605DL16	16,0	15,50	24,00	36	DL16	13,00	2,00
6071374	57481607DL16	16,0	15,50	24,00	36	DL16	13,00	3,00
6071375	57482003DL20	20,0	19,30	30,00	45	DL20	16,00	1,00
6071376	57482005DL20	20,0	19,30	30,00	45	DL20	16,00	2,00
6071377	57482007DL20	20,0	19,30	30,00	45	DL20	16,00	3,00
6071378	57482008DL20	20,0	19,30	30,00	45	DL20	16,00	4,00
6071379	57482503DL25	25,0	24,00	37,50	56	DL25	21,00	1,00
6071380	57482505DL25	25,0	24,00	37,50	56	DL25	21,00	2,00
6071391	57482507DL25	25,0	24,00	37,50	56	DL25	21,00	3,00
6071392	57482508DL25	25,0	24,00	37,50	56	DL25	21,00	4,00
6071393	57483205DL32	32,0	31,00	48,00	72	DL32	28,00	2,00
6071394	57483207DL32	32,0	31,00	48,00	72	DL32	28,00	3,00

NOTE: For application data, please see page B53.

Solid End Milling

VariMill II™ • 5747 • Unequal Flute Spacing

Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.				
		A		B	adaptor reach													
					WP15PE			WP15PE			WP15PE							
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min				D1 — Diameter			
		ap	ae	ap	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	0	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	1	1,5 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124	0,125
	2	1,5 x D	0,5 x D	1 x D	140	–	190	126	–	171	126	–	171	fz	0,101	0,114	0,124	0,125
	3	1,5 x D	0,5 x D	1 x D	120	–	160	108	–	144	108	–	144	fz	0,087	0,101	0,114	0,123
	4	1,5 x D	0,5 x D	0,75 x D	90	–	150	81	–	135	81	–	135	fz	0,077	0,088	0,098	0,102
	5	1,5 x D	0,5 x D	1 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091	0,099
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	42	–	64	40	–	60	fz	0,057	0,065	0,071	0,073
M	1	1,5 x D	0,5 x D	1 x D	90	–	115	72	–	92	63	–	80	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	42	–	56	fz	0,070	0,081	0,091	0,099
	3	1,5 x D	0,5 x D	1 x D	60	–	70	48	–	56	42	–	49	fz	0,057	0,065	0,071	0,073
K	1	1,5 x D	0,5 x D	1 x D	120	–	150	108	–	135	108	–	135	fz	0,101	0,114	0,124	0,125
	2	1,5 x D	0,5 x D	1 x D	110	–	140	99	–	126	99	–	126	fz	0,087	0,101	0,114	0,123
	3	1,5 x D	0,5 x D	1 x D	110	–	130	99	–	117	99	–	117	fz	0,070	0,081	0,091	0,099
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061	0,067
	3	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091	0,099
	4	1,5 x D	0,5 x D	1 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084	0,090
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	64	–	112	48	–	84	fz	0,077	0,088	0,098	0,102
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	56	–	96	42	–	72	fz	0,057	0,065	0,071	0,073

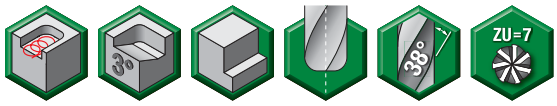
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

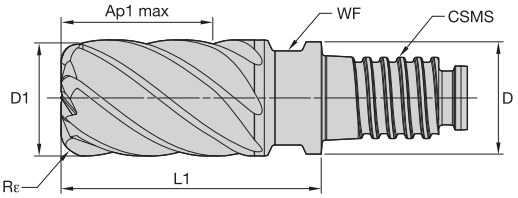
■ VariMill II™ • 5748 • Unequal Flute Spacing

Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.				
		A		B	adaptor reach													
					WS15PE			WS15PE			WS15PE							
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min				D1 — Diameter			
		ap	ae	ap	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	5	1,5 x D	0,5 x D	1 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091	0,099
	6	1,5 x D	0,5 x D	0,75 x D	50	–	75	42	–	64	40	–	60	fz	0,057	0,065	0,071	0,073
S	1	1,5 x D	0,3 x D	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114	0,123
	2	1,5 x D	0,3 x D	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061	0,067
	3	1,5 x D	0,5 x D	1 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091	0,099
	4	1,5 x D	0,5 x D	1 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084	0,090
H	1	1,5 x D	0,5 x D	0,75 x D	80	–	140	64	–	112	48	–	84	fz	0,077	0,088	0,098	0,102
	2	1,5 x D	0,2 x D	0,5 x D	70	–	120	56	–	96	42	–	72	fz	0,057	0,065	0,071	0,073

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

- Unequal flute spacing configuration minimises chatter and harmonics for smoother machining.
- Centre cutting.
- Optimised geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.

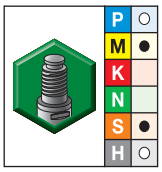




End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

774E • 7 Flute with Eccentric Relief Grind • Metric



● first choice
○ alternate choice

WS15PE AlTiN								
order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF	Rε
6071521	774E1603DL16	16,0	15,50	24,00	36	DL16	13,00	1,00
6071522	774E1605DL16	16,0	15,50	24,00	36	DL16	13,00	2,00
6071523	774E1607DL16	16,0	15,50	24,00	36	DL16	13,00	3,00
6071524	774E2003DL20	20,0	19,30	30,00	45	DL20	16,00	1,00
6071525	774E2005DL20	20,0	19,30	30,00	45	DL20	16,00	2,00
6071526	774E2007DL20	20,0	19,30	30,00	45	DL20	16,00	3,00
6071527	774E2008DL20	20,0	19,30	30,00	45	DL20	16,00	4,00
6071528	774E2503DL25	25,0	24,00	37,50	57	DL25	21,00	1,00
6071529	774E2505DL25	25,0	24,00	37,50	57	DL25	21,00	2,00
6071530	774E2507DL25	25,0	24,00	37,50	57	DL25	21,00	3,00
6071531	774E2508DL25	25,0	24,00	37,50	57	DL25	21,00	4,00
6071532	774E3205DL32	32,0	31,00	48,00	72	DL32	28,00	2,00
6071533	774E3207DL32	32,0	31,00	48,00	72	DL32	28,00	3,00

NOTE: For application data, please see page B55.

VariMill III™ • 774E • Unequal Flute Spacing • Roughing

Material Group		Side Milling (A)		short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A).				
		A		adaptor reach										D1 — Diameter			
				WS15PE			WS15PE			WS15PE							
				Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min							
		ap	ae	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	5	Ap max	0,3 x D	90	–	150	81	–	135	81	–	135	fz	0,077	0,088	0,098	0,102
	6	Ap max	0,3 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091	0,099
M	1	Ap max	0,3 x D	90	–	115	72	–	92	63	–	80	fz	0,087	0,101	0,114	0,123
	2	Ap max	0,3 x D	60	–	80	48	–	64	42	–	56	fz	0,070	0,081	0,091	0,099
	3	Ap max	0,3 x D	60	–	70	48	–	56	42	–	49	fz	0,057	0,065	0,071	0,073
S	1	Ap max	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114	0,123
	2	Ap max	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061	0,067
	3	Ap max	0,3 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091	0,099
	4	Ap max	0,3 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084	0,090
H	1	Ap max	0,3 x D	80	–	140	64	–	112	48	–	84	fz	0,077	0,088	0,098	0,102
	2	Ap max	0,3 x D	70	–	120	56	–	96	42	–	72	fz	0,057	0,065	0,071	0,073

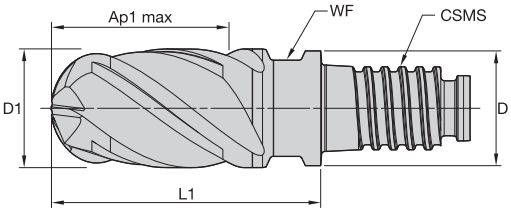
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

VariMill III • 774E • Unequal Flute Spacing • Finishing

Material Group		Side Milling (A)		short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A).				
		A		adaptor reach										D1 — Diameter			
				WS15PE			WS15PE			WS15PE							
				Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min							
		ap	ae	min		max	min		max	min		max	mm	16,0	20,0	25,0	32,0
P	5	Ap max	0,06 x D	180	–	300	162	–	270	162	–	270	fz	0,092	0,106	0,117	0,123
	6	Ap max	0,06 x D	120	–	200	102	–	170	96	–	160	fz	0,084	0,097	0,109	0,118
M	1	Ap max	0,06 x D	180	–	230	144	–	184	126	–	161	fz	0,105	0,121	0,137	0,148
	2	Ap max	0,06 x D	120	–	160	96	–	128	84	–	112	fz	0,084	0,097	0,109	0,118
	3	Ap max	0,06 x D	120	–	140	96	–	112	84	–	98	fz	0,068	0,078	0,085	0,088
S	1	Ap max	0,06 x D	100	–	180	80	–	144	60	–	108	fz	0,105	0,121	0,137	0,148
	2	Ap max	0,06 x D	50	–	80	40	–	64	30	–	48	fz	0,056	0,065	0,074	0,081
	3	Ap max	0,06 x D	120	–	160	96	–	128	72	–	96	fz	0,084	0,097	0,109	0,118
	4	Ap max	0,06 x D	100	–	120	80	–	96	60	–	72	fz	0,077	0,089	0,100	0,108
H	1	Ap max	0,06 x D	160	–	280	128	–	224	96	–	168	fz	0,092	0,106	0,117	0,123
	2	Ap max	0,06 x D	140	–	240	112	–	192	84	–	144	fz	0,068	0,078	0,085	0,088

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

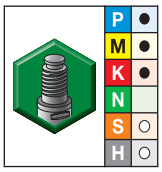
- Asymmetrical flute spacing configuration minimises chatter and harmonics for smoother machining.
- Centre cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8
> 10–18	-0,032/-0,059
> 18–30	-0,040/-0,073
> 30	-0,050/-0,089

4XN0 • 4-Flute Ball Nose • Metric

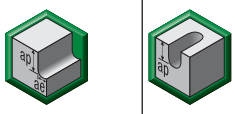


● first choice
○ alternate choice

grade WP15PE AlTiN							
order #	catalogue #	D1	D	length of cut Ap1 max	L1	CSMS system size	WF
6071151	**4XN01600DL16**	16,0	15,50	24,00	36	DL16	13,00
6071152	**4XN02000DL20**	20,0	19,30	30,00	45	DL20	16,00
6071153	**4XN02500DL25**	25,0	24,00	37,50	56	DL25	21,00

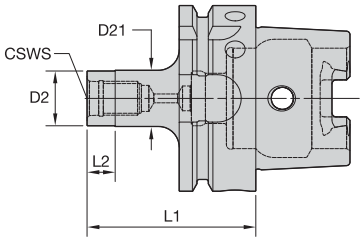
NOTE: For application data, please see page B57.

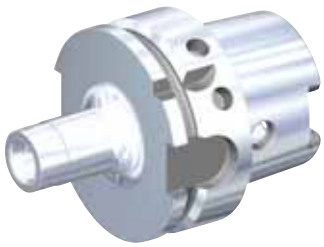
■ VariMill Ball Nose • 4XN0 • Asymmetrical Flute Spacing



Material Group		Side Milling (A) and Slotting (B)			short			medium			long			Recommended feed per tooth (fz = mm/th) for side milling (A). For slotting (B), reduce fz by 20%.			
		A		B	adaptor reach												
					WP15PE			WP15PE			WP15PE				D1 — Diameter		
					Cutting Speed — vc m/min			Cutting Speed — vc m/min			Cutting Speed — vc m/min						
		ap	ae	ap	min		max	min		max	min		max	mm	16,0	20,0	25,0
P	0	1,25 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124
	1	1,25 x D	0,5 x D	1 x D	150	–	200	135	–	180	135	–	180	fz	0,101	0,114	0,124
	2	1,25 x D	0,5 x D	1 x D	140	–	190	126	–	171	126	–	171	fz	0,101	0,114	0,124
	3	1,25 x D	0,5 x D	1 x D	120	–	160	108	–	144	108	–	144	fz	0,087	0,101	0,114
	4	1,25 x D	0,5 x D	0,75 x D	90	–	150	81	–	135	81	–	135	fz	0,077	0,088	0,098
	5	1,25 x D	0,5 x D	1 x D	60	–	100	51	–	85	48	–	80	fz	0,070	0,081	0,091
	6	1,25 x D	0,5 x D	0,75 x D	50	–	75	42	–	64	40	–	60	fz	0,057	0,065	0,071
M	1	1,25 x D	0,5 x D	1 x D	90	–	115	72	–	92	63	–	80	fz	0,087	0,101	0,114
	2	1,25 x D	0,5 x D	1 x D	60	–	80	48	–	64	42	–	56	fz	0,070	0,081	0,091
	3	1,25 x D	0,5 x D	1 x D	60	–	70	48	–	56	42	–	49	fz	0,057	0,065	0,071
K	1	1,25 x D	0,5 x D	1 x D	120	–	150	108	–	135	108	–	135	fz	0,101	0,114	0,124
	2	1,25 x D	0,5 x D	1 x D	110	–	140	99	–	126	99	–	126	fz	0,087	0,101	0,114
	3	1,25 x D	0,5 x D	1 x D	110	–	130	99	–	117	99	–	117	fz	0,070	0,081	0,091
S	1	1 x D	0,3 x D	0,3 x D	50	–	90	40	–	72	30	–	54	fz	0,087	0,101	0,114
	2	1 x D	0,3 x D	0,3 x D	25	–	40	20	–	32	15	–	24	fz	0,046	0,054	0,061
	3	1,25 x D	0,5 x D	1 x D	60	–	80	48	–	64	36	–	48	fz	0,070	0,081	0,091
	4	1,25 x D	0,5 x D	1 x D	50	–	60	40	–	48	30	–	36	fz	0,064	0,074	0,084
H	1	1,25 x D	0,5 x D	0,75 x D	80	–	140	64	–	112	48	–	84	fz	0,077	0,088	0,098
	2	1,25 x D	0,2 x D	0,5 x D	70	–	120	56	–	96	42	–	72	fz	0,057	0,065	0,071

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centres, please adjust parameters accordingly on diameters >12mm.
For side milling with ap larger than 1 x D, reduce fz by 20%!

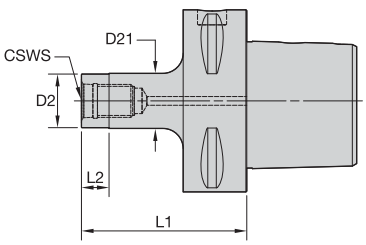




DL HSK Form A Metric

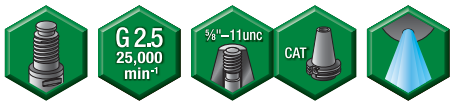
order number	catalogue number	CSWS system size	D2	D21	L1	L2	kg
6136951	HSK63ADL16057M	DL16	16	16	57	8	0,68
6136952	HSK63ADL20057M	DL20	19	20	57	10	0,70
6136953	HSK63ADL25061M	DL25	24	25	61	13	0,71
6136954	HSK63ADL32072M	DL32	31	32	72	16	0,80

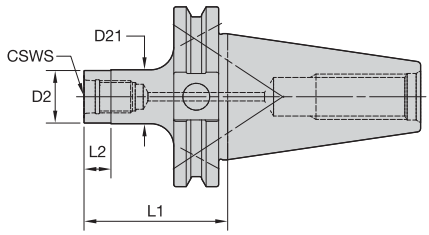
PSC63 Duo-Lock™ Integrated



DL PSC63 Metric

order number	catalogue number	CSWS system size	D2	D21	L1	L2	kg
6136957	PSC63DL16055M	DL16	16	16	55	8	0,81
6136958	PSC63DL20055M	DL20	19	20	55	10	0,82
6136959	PSC63DL25060M	DL25	24	25	60	13	0,85
6136960	PSC63DL32068M	DL32	31	32	68	16	0,93

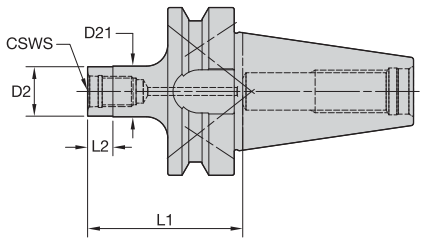




DL CV40 Metric

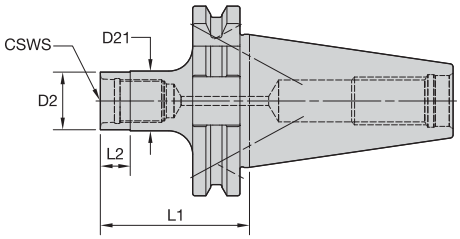
order number	catalogue number	CSWS system size	D2	D21	L1	L2	kg
6136973	CV40BDL16050M	DL16	16	16	50	8	0,87
6136974	CV40BDL20050M	DL20	19	20	50	10	0,90
6136975	CV40BDL25056M	DL25	24	25	56	13	0,91
6136976	CV40BDL32065M	DL32	31	32	65	16	0,99

BT40 Duo-Lock™ Integrated



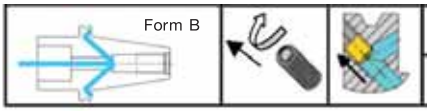
DL BT40 Metric

order number	catalogue number	CSWS system size	D2	D21	L1	L2	kg
6136979	BT40BDL16058M	DL16	16	16	58	8	1,02
6136980	BT40BDL20058M	DL20	19	20	58	10	1,03
6136991	BT40BDL25060M	DL25	24	25	60	13	1,05
6136992	BT40BDL32068M	DL32	31	32	68	16	1,11

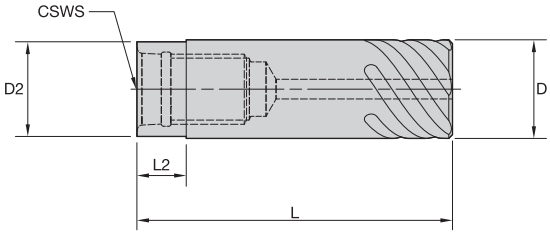


DL DV40 Metric

order number	catalogue number	CSWS system size	D2	D21	L1	L2	kg
6136995	**DV40BDL16050M**	DL16	16	16	50	8	0,87
6136996	**DV40BDL20050M**	DL20	19	20	50	10	0,89
6136997	**DV40BDL25056M**	DL25	24	25	56	13	0,91
6136998	**DV40BDL32065M**	DL32	31	32	65	16	0,99

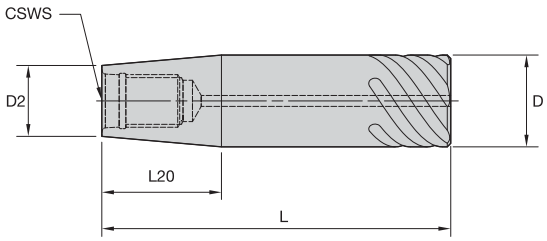


40	(2x) MS2221S	2,5mm
50	(2x) MS1296S	3mm



DL SS SL Cylindrical Metric

order number	catalogue number	CSWS system size	D	D2	L	L2	kg
6135049	SS16SLDL16065M	DL16	16	16	65	8	0,08
6135057	SS20SLDL20070M	DL20	20	19	70	10	0,14
6135063	SS25SLDL25080M	DL25	25	24	80	13	0,24
6135067	SS32SLDL32090M	DL32	32	31	90	16	0,43



DL SS SL Conical Metric

order number	catalogue number	CSWS system size	D	D2	L	L20	kg
6135055	SS20SLDL16080M	DL16	20	16	80	26	0,17
6135059	SS25SLDL16115M	DL16	25	16	115	54	0,35
6135061	SS25SLDL20095M	DL20	25	19	95	33	0,31
6135065	SS32SLDL25105M	DL25	32	24	105	46	0,53
6135069	SS40SLDL32140M	DL32	40	31	140	51	1,13
6135081	SS50SLDL32200M	DL32	50	31	200	109	2,37

Torque Wrench

order number	catalogue number	Description
6135412	TWDLTMSET	TORQUE WRENCH SET
6135413	TWDLTM	BASIC DUO LOCK WRENCH
6135414	TWTMINSERTDL10	TORQUE WRENCH INSERT DL10
6135415	TWTMINSERTDL12	TORQUE WRENCH INSERT DL12
6135416	TWTMINSERTDL16	TORQUE WRENCH INSERT DL16
6135417	TWTMINSERTDL20	TORQUE WRENCH INSERT DL20
6135418	TWTMINSERTDL25	TORQUE WRENCH INSERT DL25
6135419	TWTMINSERTDL32	TORQUE WRENCH INSERT DL32
6135420	TWTMINSERTDL10W	TORQUE WRENCH INSERT DL10 WEAR
6135421	TWTMINSERTDL12W	TORQUE WRENCH INSERT DL12 WEAR
6135422	TWTMEXT	TORQUE WRENCH EXTENSION HANDLE
6135423	TWTMBC	TORQUE WRENCH BOLT SET

Assembly

Please wear sufficient personal safety equipment such as gloves and eye protection during assembly.

1. Clean the Duo-Lock™ cutting insert and shank coupling.


2. Mount the Duo-Lock™ adaptor in a mounting block with a clamping chuck sufficient to enable torque transmission.

3. Screw the Duo-Lock™ cutting tip into adaptor by hand.
Attention: Use of protective gloves is mandatory!

4. A gap of approx. 0,15–0,3mm should be visible.

5. Apply the torque shown in the table. Use of a high quality common torque wrench is mandatory.
The ERICKSON™ Torque Master wrench is recommended.

Duo-Lock™ Size	Torque Nm
DL 16	60
DL 20	80
DL 25	100
DL 32	130

Holemaking

TRF and TRM

Common reamers of this category have single tips, brazed onto a steel body. The new WIDIA™ TRF and TRM reamers have a solid carbide disc brazed onto the steel body instead. This allows for more regrinds than a regular tipped reamer, which brings down the cost-per-hole significantly. Additionally, the new coating WU05PR™ holds the surface finish more than twice as long as conventional coatings applied on reamers, depending on the workpiece material.

Disc Style Versus Regular Tipped Reamers

- Stronger brazing joint than conventional tipped reamers.
- Practically no influence of temperature on runout.
- More rigidity and less vibrations due to full carbide front-end.
- Minimum of four regrinds possible versus regularly tipped reamers with an average of three regrinds, depending on wear situation.
- No damage of flutes, compared to the steel portion of regularly tipped reamers when chips constantly rub across.

New Coating WU05PR™

The new disc style design combined with the new reaming coating WU05PR allows for significant cost-per-hole improvements.

- WU05PR was specifically developed for reaming applications and shows superior results versus usual market grades applied on reamers.
- Holds surface finish more than 3x as long in steel compared to regular TiAlN thin coatings.
- Holds surface finish more than 2x as long in cast iron compared to regular TiAlN thin coatings.

TRF

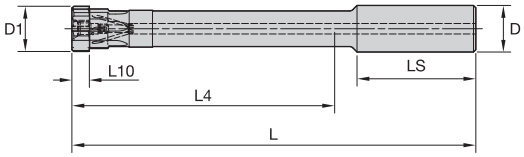
In comparison to solid carbide reamers or single-tipped reamers, TRF is the economic alternative without any disadvantages in regards to productivity or hole quality.

- Solid carbide disc at front instead of single-tipped carbide blanks.
- Unique coating, specially developed for reaming applications.
- High-speed and high-performance ready.
- Superior surface finish due to lapped ground leads.
- Improved hole straightness and roundness due to unequal flute spacing (less vibrations) and runout <3 microns.
- Helical and straight flutes for chip control in through and blind holes.
- Adjustment screw with straight-fluted RMR reamers to change internal coolant supply from axial to radial.

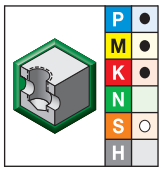
Customisation

- All diameters between 14–42,5mm.
- Variation of leads and cylindrical margin for application-specific optimisation.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.



TRF • Disc Style Reamer • Straight Fluted for Blind Holes and Through Holes with Internal Coolant

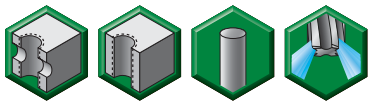


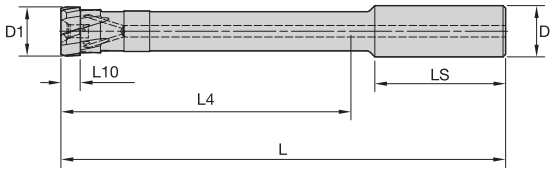
grade WU05PR
AlCrN

● first choice
○ alternate choice

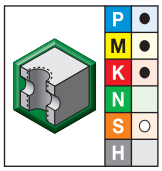
order #	catalogue #	D1	D	L	L4	L10	LS	Z
6055331	TRF14000H7SF	14,00	16,00	147,4	92,4	7,5	49,0	6
6055332	TRF15000H7SF	15,00	16,00	147,4	92,4	7,5	49,0	6
6055333	TRF16000H7SF	16,00	20,00	159,4	102,4	7,5	51,0	6
6055334	TRF17000H7SF	17,00	20,00	159,4	102,4	7,5	51,0	6
6055335	TRF18000H7SF	18,00	20,00	173,4	116,4	7,5	51,0	6
6055336	TRF19000H7SF	19,00	20,00	173,4	116,4	7,5	51,0	6
6055337	TRF20000H7SF	20,00	20,00	173,4	116,4	7,5	51,0	6
6135130	TRF21000H7SF	21,00	20,00	202,4	145,4	7,5	51,0	6
6135191	TRF22000H7SF	22,00	20,00	202,4	145,4	7,5	51,0	6
6135192	TRF23000H7SF	23,00	20,00	212,4	155,4	7,5	51,0	6
6135193	TRF24000H7SF	24,00	20,00	212,4	155,4	7,5	51,0	6
6135194	TRF25000H7SF	25,00	25,00	232,4	169,4	7,5	57,0	8
6135195	TRF26000H7SF	26,00	25,00	232,4	169,4	7,5	57,0	8
6135196	TRF27000H7SF	27,00	25,00	232,4	169,4	7,5	57,0	8
6135197	TRF28000H7SF	28,00	25,00	242,4	179,4	7,5	57,0	8
6135198	TRF29000H7SF	29,00	25,00	242,4	179,4	7,5	57,0	8
6135199	TRF30000H7SF	30,00	25,00	272,4	209,4	7,5	57,0	8
6135200	TRF31000H7SF	31,00	25,00	272,4	209,4	7,5	57,0	8
6135201	TRF32000H7SF	32,00	25,00	272,4	209,4	7,5	57,0	8
6135202	TRF33000H7SF	33,00	32,00	272,4	205,4	7,5	61,0	8
6135203	TRF34000H7SF	34,00	32,00	272,4	205,4	7,5	61,0	8
6135204	TRF35000H7SF	35,00	32,00	272,4	205,4	7,5	61,0	8
6135205	TRF36000H7SF	36,00	32,00	272,4	205,4	7,5	61,0	8
6135206	TRF37000H7SF	37,00	32,00	272,4	205,4	7,5	61,0	8
6135207	TRF38000H7SF	38,00	32,00	272,4	205,4	7,5	61,0	8
6135208	TRF39000H7SF	39,00	32,00	272,4	205,4	7,5	61,0	8
6135209	TRF40000H7SF	40,00	32,00	272,4	205,4	7,5	61,0	8
6135210	TRF41000H7SF	41,00	32,00	272,4	205,4	7,5	61,0	8
6135211	TRF42000H7SF	42,00	32,00	272,4	205,4	7,5	61,0	8

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.





TRF • Disc Style Reamer • Helical Fluted for Through Holes with Internal Coolant



grade WU05PR
AlCrN

● first choice
○ alternate choice

order #	catalogue #	D1	D	L	L4	L10	LS	Z
6055338	TRF14000H7HF	14,00	16,00	147,4	92,4	7,5	49,0	6
6055339	TRF15000H7HF	15,00	16,00	147,4	92,4	7,5	49,0	6
6055340	TRF16000H7HF	16,00	20,00	159,4	102,4	7,5	51,0	6
6055341	TRF17000H7HF	17,00	20,00	159,4	102,4	7,5	51,0	6
6055342	TRF18000H7HF	18,00	20,00	173,4	116,4	7,5	51,0	6
6055343	TRF19000H7HF	19,00	20,00	173,4	116,4	7,5	51,0	6
6055344	TRF20000H7HF	20,00	20,00	173,4	116,4	7,5	51,0	6
6135212	TRF21000H7HF	21,00	20,00	202,4	145,4	7,5	51,0	6
6135213	TRF22000H7HF	22,00	20,00	202,4	145,4	7,5	51,0	6
6135214	TRF23000H7HF	23,00	20,00	212,4	155,4	7,5	51,0	6
6135215	TRF24000H7HF	24,00	20,00	212,4	155,4	7,5	51,0	6
6135216	TRF25000H7HF	25,00	25,00	232,4	169,4	7,5	51,0	8
6135217	TRF26000H7HF	26,00	25,00	232,4	169,4	7,5	51,0	8
6135218	TRF27000H7HF	27,00	25,00	232,4	169,4	7,5	57,0	8
6135219	TRF28000H7HF	28,00	25,00	242,4	179,4	7,5	57,0	8
6135220	TRF29000H7HF	29,00	25,00	242,4	179,4	7,5	57,0	8
6135221	TRF30000H7HF	30,00	25,00	272,4	209,4	7,5	57,0	8
6135222	TRF31000H7HF	31,00	25,00	272,4	209,4	7,5	57,0	8
6135223	TRF32000H7HF	32,00	25,00	272,4	209,4	7,5	57,0	8
6135224	TRF33000H7HF	33,00	32,00	272,4	205,4	7,5	61,0	8
6135225	TRF34000H7HF	34,00	32,00	272,4	205,4	7,5	61,0	8
6135226	TRF35000H7HF	35,00	32,00	272,4	205,4	7,5	61,0	8
6135227	TRF36000H7HF	36,00	32,00	272,4	205,4	7,5	61,0	8
6135228	TRF37000H7HF	37,00	32,00	272,4	205,4	7,5	61,0	8
6135229	TRF38000H7HF	38,00	32,00	272,4	205,4	7,5	61,0	8
6135230	TRF39000H7HF	39,00	32,00	272,4	205,4	7,5	61,0	8
6135231	TRF40000H7HF	40,00	32,00	272,4	205,4	7,5	61,0	8
6135232	TRF41000H7HF	41,00	32,00	272,4	205,4	7,5	61,0	8
6135233	TRF42000H7HF	42,00	32,00	272,4	205,4	7,5	61,0	8

■ TRF • Metric

Material Group		WU05PR™ Cutting Speed — vc Range — m/min			Metric Recommended Feed Rate per Tooth						
					Tool Diameter (mm)	14,00–19,99		20,00–32,00		32,50–42,00	
		min	Starting Value	max	Feed/Tooth	min	max	min	max	min	max
P	1	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	75	**100**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	4	50	**80**	105	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	5	30	**40**	60	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
	6	30	**40**	60	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
M	1	15	**20**	40	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	2	15	**20**	30	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	3	15	**20**	30	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
K	1	80	**110**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	65	**90**	110	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	50	**70**	90	mm/z	0,10	0,18	0,10	0,20	0,10	0,22
S	1	15	**20**	30	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	2	15	**20**	30	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	3	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20
	4	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20

WIDIA™ TRM •
Top Ream Modular (Available as Semi-Standards)

WIDIA TRM

Primary Application

- Achieve solid carbide metal removal rates.
- Five sizes of standard straight shank bodies available to couple reaming heads from 20–42mm.
- The TRM heads are stocked as semi-finished goods.
- Any diameter from 20–42mm is possible.

Features and Benefits

- High-speed and high-performance ready.
- Unique proprietary coupling system enables same runout accuracy as monoblock systems (<3 microns).
- Comfortable radial clamping for quick exchanging even in narrow situations in the machine.
- No fixture for clamping or dismounting necessary.

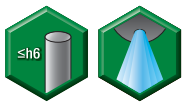
Customisation

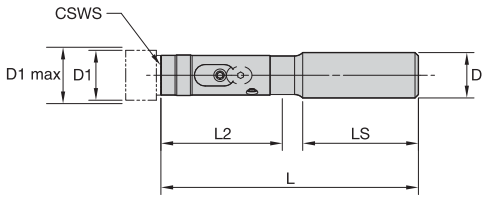
- Heads fully customisable as simple specials with different lead geometries, grades, coatings, and edge hones.
- Semi-finished heads on stock for shorter lead times.

Ordering Process

- Please contact your local Authorised Distributor for a quote.

- Tool body shipped with retention knob, clamp set, and wrench.
- Order reamer head separately.

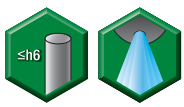


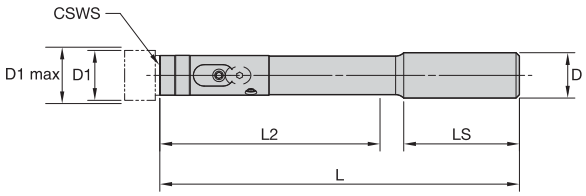


Straight Shank • Radial Clamping • 3 x D

order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	retention knob
6055345	SS20WST175RR3M	KST175	20,00	22,499	20,00	113,50	51,50	51,00	KST175200RK
6055347	SS20WST200RR3M	KST200	22,50	27,499	20,00	130,50	65,50	51,00	KST175200RK
6055349	SS25WST250RR3M	KST250	27,50	32,499	25,00	152,50	80,50	56,00	KST250250RK
6055351	SS32WST300RR3M	KST300	32,50	37,499	32,00	174,00	94,00	61,00	KST300350RK
6055353	SS32WST350RR3M	KST350	37,50	42,000	32,00	190,00	108,00	61,00	KST300350RK

- Tool body shipped with retention knob, clamp set, and wrench.
- Order reamer head separately.

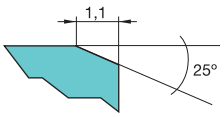
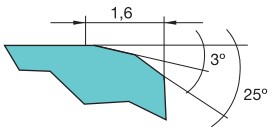
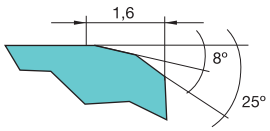
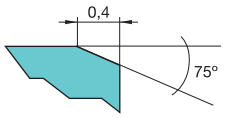
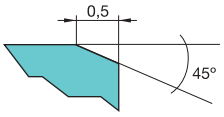
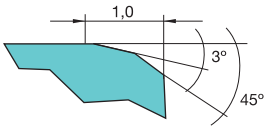
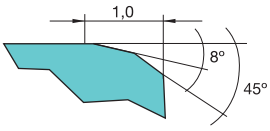
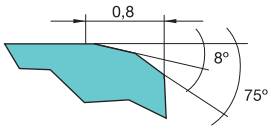




Straight Shank • Radial Clamping • 5 x D

order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	retention knob
6055346	SS20WST175RR5M	KST175	20,00	22,499	20,00	158,50	96,50	51,00	KST175200RK
6055348	SS20WST200RR5M	KST200	22,50	27,499	20,00	185,50	120,50	51,00	KST175200RK
6055350	SS25WST250RR5M	KST250	27,50	32,499	25,00	217,50	145,50	56,00	KST250250RK
6055352	SS32WST300RR5M	KST300	32,50	37,499	32,00	249,00	169,00	61,00	KST300350RK
6055354	SS32WST350RR5M	KST350	37,50	42,000	32,00	274,00	192,00	61,00	KST300350RK

Lead Design Overview

General Purpose	Surface Finish		Hole Position
HFGP	HFF	HFFN	SFP
			
SFGP	SFF	SFFN	SFPN
			

Lead Nomenclature

HFGPC

HF
Flute

HF = Helical Flute
SF = Straight Flute

GP
Application

GP = General Purpose
F = Fine Surface
FN = Fine Surface Non-Ferrous
P = Position Accuracy
PN = Position Accuracy Non-Ferrous
C1 = Chip Control Geometry

C
Reaming Edge

C = Cylindrical
U = Up Sharp
NC = Narrow Cylindrical

General Purpose

Material Group	Hole Type	Surface Requirement	Recommended Geometry	Design
P	through	IT 7, Ra <1.6	HFGP	C
	blind		SFGP	
M	through	IT 7, Ra <1.0	HFGP	C, NC
	blind		SFGP	
K	through	IT 7, Ra <1.6	HFGP	C
	blind		SFGP	
S	through	IT 7, Ra <0.6	HFGP	U, NC
	blind		SFGP	

Extra Surface Finish

Material Group	Hole Type	Surface Requirement	Recommended Geometry	Design
P	through	IT 7, Ra <0.8	HFFN	C
	blind		SFFN	
K	through	IT 7, Ra <0.8	HFFN	C
	blind		SFFN	

Additional Hole Position Accuracy

Material Group	Hole Type	Surface Requirement	Recommended Geometry	Design
P	through	IT 7, Ra <1.6	SFP	C
	blind			
M	through	IT 7, Ra <1.0	SFP	C, NC
	blind			
K	through	IT 7, Ra <1.6	SFP	C
	blind			
S	through	IT 7, Ra <0.6	SFP	U, NC
	blind			

Extra Chip Control

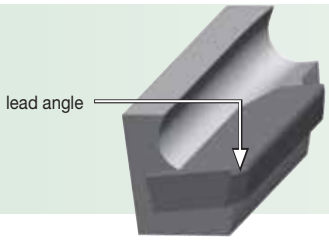
Material Group	Hole Type	Surface Requirement	Recommended Geometry	Design
P	blind	Ra 0.4–1.6	SFC1	C, U

Customisation Capabilities

Diameter

- 14mm up to 42,5mm in diameter.
- Depending on the application, up to tolerance IT6.
- Diameter steps.

Leads

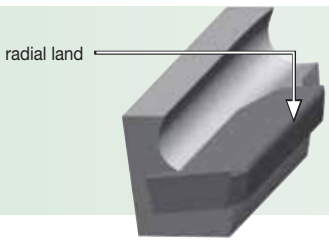


- 25–90° leads for smoother cutting or better positioning.
- Double leads for better surface quality.
- Radius leads for optimal CI machining.

Grades

- Different coatings possible: TiAlN, AlCrN, TiN, TiCN, TiB_2.
- Cermet grades for steel cutting.

Radial Land



- Cylindrical for better guiding and form.
- Upsharp (no land) for best surface finishes and less passive forces.
- Narrow land to reduce forces.

Application Hints

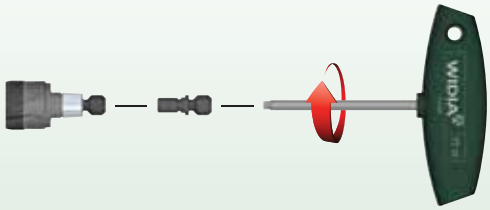
Pre-Drill

- Leave stock for reamer, depending on diameter.
- 0,2mm up to 0,4mm in diameter.
- If possible, a chamfer will ease the reaming operation.

Entries/Exits

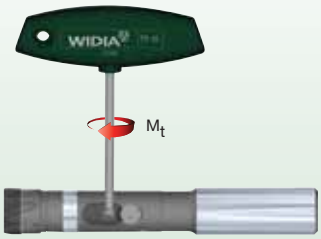
Assembly

1 Assembling the Reamer Head



2 Place the Reamer Head in the Reamer Body

3 Clamp the Reamer Head in the Reamer Body



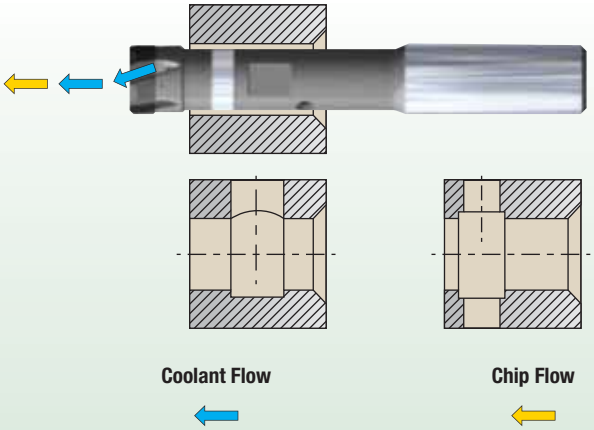
KST	Ø Range (mm)		M_t (Nm)	Torx size
175	20	22,499	4	TT-15
200	22,5	27,499	4	TT-15
250	27,5	32,499	5	TT-25
300	32,5	37,499	9	TT-30
350	37,5	42	9	TT-30

Disassembly

3 2 1

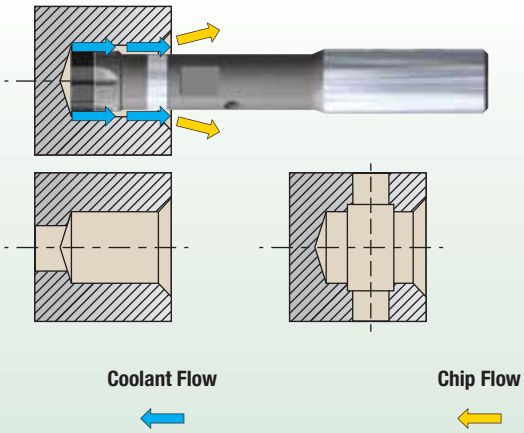
Through Hole

Helical fluted reamer pushes chips forward, supported by coolant.



Blind Hole

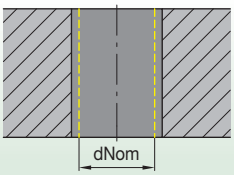
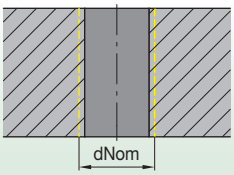
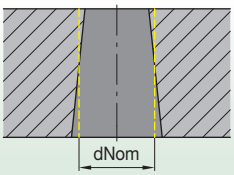
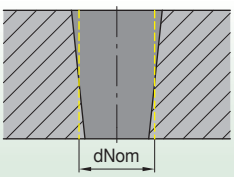
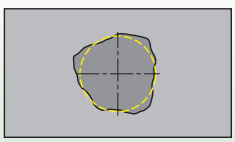
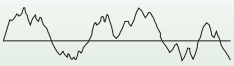
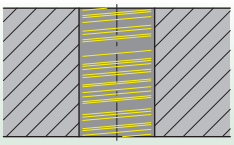
Straight fluted reamer and coolant force chips backwards.



Reaming Allowances for Multi-Blade Reaming

	reaming allowances in diameter mm		
mm	min	middle	max
1,40–4,80	0,08	0,12	0,20
4,81–9,59	0,10	0,15	0,25
9,60–15,00	0,15	0,20	0,30
15,00–20,00	0,15	0,25	0,35
20,00–50,00	0,20	0,30	0,40

Troubleshooting

Problem		Cause	Possible Remedy
Hole diameter too large.		• Reaming tool running out-of-centre. • Concentricity of pilot hole and ream machining unsatisfactory. • Built-up edge. • Unsuitable cooling lubricant. • Reaming tool diameter too large.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Hole diameter too small.		• Reamer worn. • Unsuitable cooling lubricant. • Reaming allowance too small.	• Replace and refit tool. • Change cooling lubricant. • Increase reaming allowance.
Conical hole profile wider towards drill runout.		• Concentricity of pilot hole and reaming unsatisfactory. • Positioning accuracy of pilot hole to reaming.	• Re-align, use equalising adaptor. • Correct positioning accuracy.
Conical hole profile wider at drill entry point.		• Concentricity of pilot hole and reaming unsatisfactory. • Reaming tool skim cutting with ledger.	• Re-align, use floating head. • Securely clamp reaming tool axially.
Hole out-of-centre and/or showing chatter marks.		• Reaming tool running out-of-centre. • Slanted cutting surface/asymmetrical cutting. • Workpiece twisted.	• Use equalising adaptor. • Spot face as drilling preparation. • Take the direction of impact into account when clamping the workpiece.
Surface quality does not meet specification.		• Tool cutters worn. • Reaming tool running out-of-centre. • Incorrect technology data (cutting parameters). • Inadequate chip evacuation.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Feed grooves		• Built-up edge.	• Change cooling lubricant. • Change cutting speed.

Tapping

High-Performance Solution for Multipurpose Tapping •
VariTap™ Line Expansion

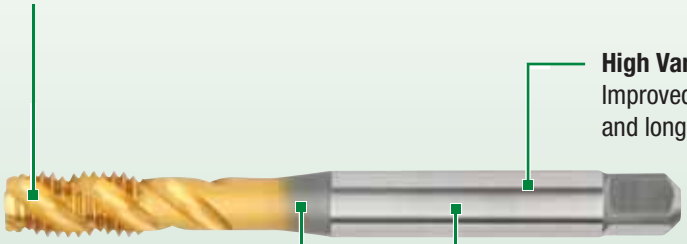
VariTap

VariTap is the high-performance multipurpose tapping solution from WIDIA™. VariTap has an optimised geometry capable of working in a wide variety of ductile materials — including carbon and alloy steels, stainless steels, ductile iron, and cast aluminium. VariTap reduces inventory costs without losing the benefit of high-quality threads and consistent tool life.

With a wide range of inch and metric standard sizes, pitch diameter limits, classes of fit, chamfer styles, and coatings, VariTap offers the most expansive portfolio of multipurpose taps available on the market. VariTap now includes ISO pipe taps for through and blind hole applications.

Multipurpose HSS-E Spiral-Flute Taps For Use in Tension/Compression Tap Holders

Advanced spiral-flute design
Smooth ejection of chips to reduce and eliminate bird-nesting.



High Vanadium HSS-E
Improved wear characteristics and longer tool life.

Precision ground shanks
Low runout.

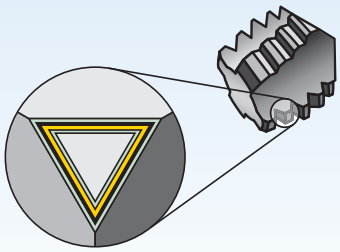
PVD Coating and surface treatment
For use in various workpiece materials:

WU41EG	WP49EG
TiN	Oxide

★ Good
★★ Better
★★★ Best

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension
	through	blind	cutting	forming	flood	through	min–max		carbide	HSS-E-PM	HSS-E	HSS	type	form		
VariTap™ High-Performance Multipurpose Spiral-Point Taps																
VTSPO65 	X		X		X		M2–M36	WP42EG WU41EG WP49EG WU40EG			X		Plug	B	0°	DIN 371, 374, 376
VTSPO60 	X		X		X		#4–1"	WU41EG WP49EG			X		Plug	B	0°	DIN 371, 376
VTSPO75 	X		X		X		M3–M20	WU41EG WU40EG			X		Plug	B	0°	JIS
VariTap High-Performance Multipurpose Spiral-Flute Taps																
VTSFT65 		X	X		X		M2–M36	WP42EG WU41EG WP49EG WU40EG			X		semi-bottom	C	45°	DIN 371, 374, 376
VTSFT65 		X	X		X		M3–M20	WP42EG WP49EG			X		bottoming	E	45°	DIN 371, 374, 376
VTSFT-TC65 		X	X		X		M2–M52	WU41EG WP49EG			X		semi-bottom	C	45°	DIN 371, 374, 376
VTSFT-TC67 		X	X		X		M3–M20	WU41EG WP49EG			X		bottoming	E	45°	DIN 371, 376
VTSFT60 		X	X		X		#4–1"	WU41EG WP49EG			X		semi-bottom	C	45°	DIN 371, 376
VTSFT-TC60 		X	X		X		#6–2"	WU41EG WP49EG			X		semi-bottom	C	45°	DIN 371, 374, 376
VTSFT75 		X	X		X		M3–M20	WU41EG WU40EG			X		semi-bottom	C	45°	JIS
VariTap High-Performance Multipurpose Pipe Taps																
VTSPO86 	X		X		X		1/8–1"	WP49EG WU41EG			X		Plug	B	0°	DIN 5156
VTSFT86 		X	X		X		1/8–1"	WP49EG WU41EG			X		semi-bottom	C	42°	DIN 5156
VTSTR83 	X	X	X		X		1/16–1"	WU40EG			X		semi-bottom	C	0°	DIN 5156
VTSTR88 	X	X	X		X		1/16–1"	WU40EG			X		semi-bottom	C	0°	DIN 5156

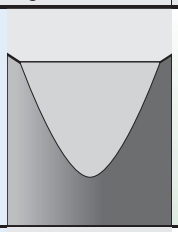
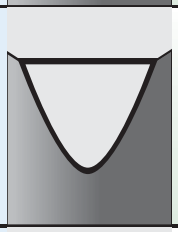
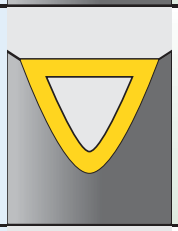
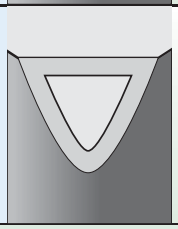
P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel <35 HRC	Steel >36–48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Grey Cast Iron	Ductile Cast Iron	Wrought Aluminium	Cast Aluminium	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49–55 HRC	Hardened Steels 56–68 HRC		
VariTap™ High-Performance Multipurpose Spiral-Point Taps *(continued)*																	
★★	★	★		★★	★	★★	★	★★	★★	★						D9	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D12	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D15	D33
VariTap High-Performance Multipurpose Spiral-Flute Taps *(continued)*																	
★★	★	★		★★	★	★★	★	★★	★★	★						D17	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D20	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D21	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D23	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D24	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D26	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D29	D33
VariTap High-Performance Multipurpose Pipe Taps *(continued)*																	
★★	★	★		★★	★	★★	★	★★	★★	★						D30	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D31	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D32	D33
★★	★	★		★★	★	★★	★	★★	★★	★						D32	D33



Coatings are designed for optimised tapping performance in specific materials.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade: Coating	Grade Description		05	10	15	20	25	30	35	40	45
WU40EG 	Uncoated HSS-E grade with bright surface. Use in easy-to-machine, general-purpose applications.	P								■	■
		M								■	■
		K									■
		N									■
WP49EG 	HSS-E substrate with black oxide surface treatment. Use in a variety of materials, including steel, stainless steel, and ductile iron. Not recommended for non-ferrous materials.	P								■	■
		M								■	■
		K									■
WU41EG 	Coated HSS-E substrate with TiN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminium.	P							■	■	■
		M							■	■	■
		K								■	■
		N								■	■
WP42EG 	Coated HSS-E substrate with TiCN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminium. WP42EG is more abrasion-resistant than WU41EG.	P							■	■	■
		M							■	■	■
		K							■	■	■
		N							■	■	■

Reconditioning Services

Anyone can regrind our tools — but only we can recondition them

WIDIA™ Reconditioning Services optimise the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

To use WIDIA tool reconditioning services, contact your authorised WIDIA distributor to get started.

Global Reconditioning Network

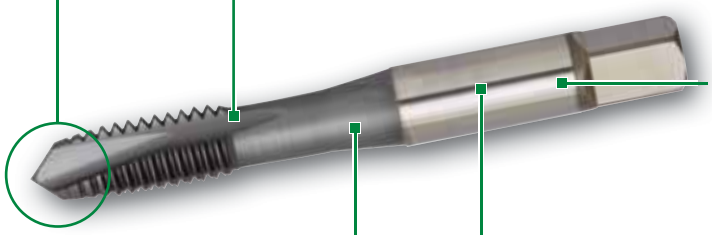
To locate a Reconditioning Center near you, visit **widia.com/services**.

WIDIA™

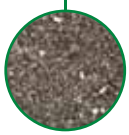
Multipurpose Taps for Steel, Stainless Steel, Cast Aluminium, and Ductile Iron

Unique spiral-point design
Cutting edge angles and positive rake face straight-flutes are optimised for tapping multiple materials.

Multiple tap dimension options
ANSI, DIN, JIS, and DIN/ANSI.



Precision ground shanks
Low runout.

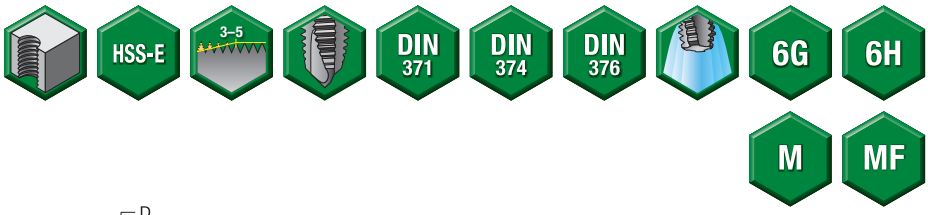


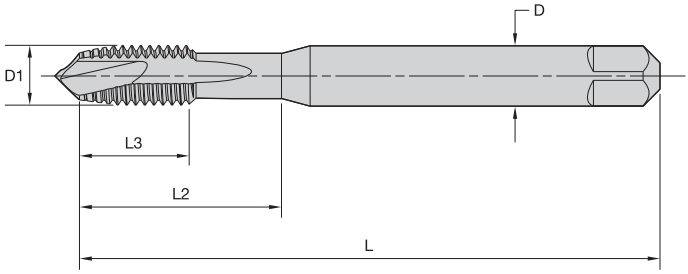
High-vanadium HSS-E
Improved wear characteristics and longer tool life.

PVD coatings and surface treatments
For use with various workpiece materials:

WP42EG	WU41EG	WP49EG	WU40EG
TiCN	TiN	Oxide	Bright

- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright

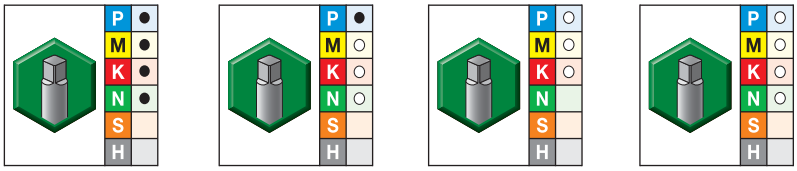




Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376

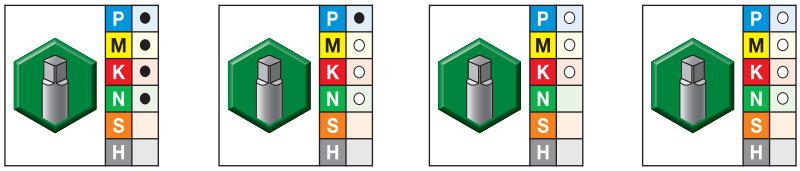


● first choice
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5366647	VTSPO6505	5366646	VTSPO6505	5366648	VTSPO6505	5366649	VTSPO6505	M2 X 0,4	45	7	13	2,8	2	DIN 371	6H
	–		–	5366660	VTSPO6506		–	M2 X 0,4	45	7	13	2,8	2	DIN 371	6G
	–		–	5366661	VTSPO6507		–	M2,2 X 0,45	45	7	13	2,8	2	DIN 371	6H
	–	5366662	VTSPO6508	5366663	VTSPO6508	5366664	VTSPO6508	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6H
	–		–	5366665	VTSPO6509		–	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6G
	–		–	5368602	VTSPO6545	5368603	VTSPO6545	M3 X 0,35	56	8	—	2,2	2	DIN 374	6H
	–	5368514	VTSPO6525	5368515	VTSPO6525	5368516	VTSPO6525	M3 X 0,5	56	8	—	2,2	2	DIN 376	6H
	–		–	5366670	VTSPO6511		–	M3 X 0,5	56	8	18	3,5	2	DIN 371	6G
5366667	VTSPO6510	5366666	VTSPO6510	5366668	VTSPO6510	5366669	VTSPO6510	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
	–	5366671	VTSPO6512	5366673	VTSPO6512	5366674	VTSPO6512	M3,5 X 0,6	56	9	20	4,0	2	DIN 371	6H
	–		–	5368604	VTSPO6546	5368605	VTSPO6546	M4 X 0,5	63	10	21	2,8	2	DIN 374	6H
	–	5368517	VTSPO6526	5368518	VTSPO6526	5368519	VTSPO6526	M4 X 0,7	63	10	21	2,8	2	DIN 376	6H
	–		–	5366679	VTSPO6514		–	M4 X 0,7	63	11	21	4,5	2	DIN 371	6G
5366676	VTSPO6513	5366675	VTSPO6513	5366677	VTSPO6513	5366678	VTSPO6513	M4 X 0,7	63	11	21	4,5	2	DIN 371	6H
	–		–	5368606	VTSPO6547	5368607	VTSPO6547	M5 X 0,5	70	12	25	3,5	2	DIN 374	6H
	–	5368540	VTSPO6527	5368541	VTSPO6527	5368542	VTSPO6527	M5 X 0,8	70	12	25	3,5	2	DIN 376	6H
	–		–	5366685	VTSPO6516		–	M5 X 0,8	70	12	25	6,0	2	DIN 371	6G
5366681	VTSPO6515	5366680	VTSPO6515	5366682	VTSPO6515	5366684	VTSPO6515	M5 X 0,8	70	12	25	6,0	2	DIN 371	6H
	–		–	5368608	VTSPO6548	5368609	VTSPO6548	M6 X 0,5	80	12	30	4,5	3	DIN 374	6H
	–		–	5368610	VTSPO6549	5368611	VTSPO6549	M6 X 0,75	80	12	30	4,5	3	DIN 374	6H
	–	5368543	VTSPO6528	5368544	VTSPO6528	5368545	VTSPO6528	M6 X 1	80	12	30	4,5	3	DIN 376	6H
5366687	VTSPO6517	5366686	VTSPO6517	5366688	VTSPO6517	5366689	VTSPO6517	M6 X 1	80	12	30	6,0	3	DIN 371	6H
	–		–	5366690	VTSPO6518		–	M6 X 1	80	12	30	6,0	3	DIN 371	6G
	–		–	5368612	VTSPO6550	5368613	VTSPO6550	M7 X 0,75	80	12	30	5,5	3	DIN 374	6H

(continued)

(VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376 — continued)

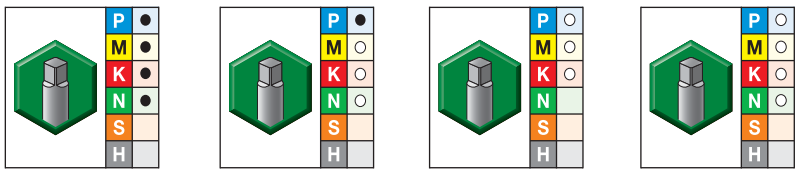


● first choice
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D			
5366693	VTSPO6519	5366692	VTSPO6519	5366695	VTSPO6519	5366696	VTSPO6519	M7 X 1	80	12	30	7,0	3	DIN 371	6H
–		–		5366697	VTSPO6520	–		M7 X 1	80	12	30	7,0	3	DIN 371	6G
–		–		5368614	VTSPO6551	5368615	VTSPO6551	M8 X 0,75	80	12	30	6,0	3	DIN 374	6H
–		–		5368616	VTSPO6552	5368617	VTSPO6552	M8 X 1	90	15	35	6,0	3	DIN 374	6H
–		5368546	VTSPO6529	5368547	VTSPO6529	5368548	VTSPO6529	M8 X 1,25	90	15	35	6,0	3	DIN 376	6H
5366700	VTSPO6521	5366698	VTSPO6521	5366701	VTSPO6521	5366703	VTSPO6521	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
–		–		5366704	VTSPO6522	–		M8 X 1,25	90	15	35	8,0	3	DIN 371	6G
–		–		5368618	VTSPO6553	5368619	VTSPO6553	M10 X 0,75	90	15	35	7,0	3	DIN 374	6H
–		–		5368620	VTSPO6554	5368621	VTSPO6554	M10 X 1	90	15	35	7,0	3	DIN 374	6H
–		–		5368622	VTSPO6555	5368623	VTSPO6555	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
–		–		5366709	VTSPO6524	–		M10 X 1,5	100	18	39	10,0	3	DIN 371	6G
5366706	VTSPO6523	5366705	VTSPO6523	5366707	VTSPO6523	5366708	VTSPO6523	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
–		5368549	VTSPO6530	5368550	VTSPO6530	5368551	VTSPO6530	M10 X 1,5	100	18	39	7,0	3	DIN 376	6H
–		–		5368624	VTSPO6556	5368625	VTSPO6556	M11 X 1	90	15	36	8,0	3	DIN 374	6H
–		–		5368626	VTSPO6557	5368627	VTSPO6557	M12 X 1	100	21	39	9,0	3	DIN 374	6H
–		–		5368628	VTSPO6558	5368629	VTSPO6558	M12 X 1,25	100	21	39	9,0	3	DIN 374	6H
–		–		5368630	VTSPO6559	5368631	VTSPO6559	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
–		–		5368556	VTSPO6532	–		M12 X 1,75	110	21	44	9,0	3	DIN 376	6G
5368553	VTSPO6531	5368552	VTSPO6531	5368554	VTSPO6531	5368555	VTSPO6531	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
–		–		5368632	VTSPO6560	5368633	VTSPO6560	M14 X 1	100	21	47	11,0	3	DIN 374	6H
–		–		5368634	VTSPO6561	5368635	VTSPO6561	M14 X 1,25	100	21	47	11,0	3	DIN 374	6H
–		–		5368636	VTSPO6562	5368637	VTSPO6562	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
5368558	VTSPO6533	5368557	VTSPO6533	5368559	VTSPO6533	5368560	VTSPO6533	M14 X 2	110	24	52	11,0	3	DIN 376	6H
–		–		5368561	VTSPO6534	–		M14 X 2	110	24	52	11,0	3	DIN 376	6G
–		–		5368638	VTSPO6563	5368639	VTSPO6563	M16 X 1	100	21	46	12,0	3	DIN 374	6H
–		–		5368640	VTSPO6564	5368641	VTSPO6564	M16 X 1,5	100	21	46	12,0	3	DIN 374	6H
5368563	VTSPO6535	5368562	VTSPO6535	5368565	VTSPO6535	5368566	VTSPO6535	M16 X 2	110	24	51	12,0	3	DIN 376	6H
–		–		5368567	VTSPO6536	–		M16 X 2	110	24	51	12,0	3	DIN 376	6G
–		–		5368642	VTSPO6565	5368643	VTSPO6565	M18 X 1	110	21	50	14,0	3	DIN 374	6H
–		–		5368683	VTSPO6566	5368684	VTSPO6566	M18 X 1,5	110	21	50	14,0	3	DIN 374	6H
–		–		5368685	VTSPO6567	5368686	VTSPO6567	M18 X 2	125	30	58	14,0	3	DIN 374	6H
5368569	VTSPO6537	5368568	VTSPO6537	5368570	VTSPO6537	5368571	VTSPO6537	M18 X 2,5	125	30	58	14,0	3	DIN 376	6H
–		–		5368687	VTSPO6568	5368688	VTSPO6568	M20 X 1	125	24	56	16,0	3	DIN 374	6H
–		–		5368689	VTSPO6569	5368690	VTSPO6569	M20 X 1,5	125	24	56	16,0	3	DIN 374	6H
–		–		5368691	VTSPO6570	5368692	VTSPO6570	M20 X 2	140	30	64	16,0	3	DIN 374	6H
5368573	VTSPO6538	5368572	VTSPO6538	5368574	VTSPO6538	5368575	VTSPO6538	M20 X 2,5	140	30	64	16,0	3	DIN 376	6H

(continued)

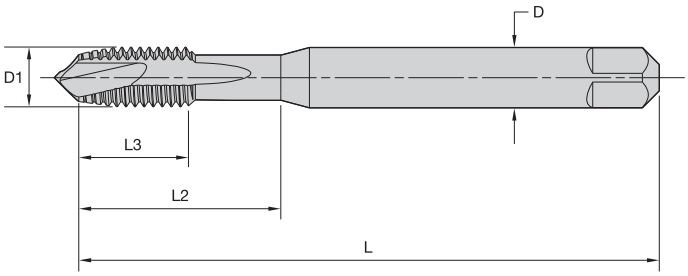
(VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376 — continued)



● first choice
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
–		–		5368693	VTSPO6571	5368694	VTSPO6571	M22 X 1,5	125	24	62	18,0	3	DIN 374	6H
–		–			–	5368695	VTSPO6572	M22 X 2	140	30	70	18,0	3	DIN 374	6H
5368577	VTSPO6539	5368576	VTSPO6539	5368578	VTSPO6539	5368579	VTSPO6539	M22 X 2,5	140	30	70	18,0	3	DIN 376	6H
–		–		5368696	VTSPO6573	5368697	VTSPO6573	M24 X 1,5	140	28	67	18,0	3	DIN 374	6H
–		–			–	5368698	VTSPO6574	M24 X 2	140	30	67	18,0	3	DIN 374	6H
5368581	VTSPO6540	5368580	VTSPO6540	5368582	VTSPO6540	5368583	VTSPO6540	M24 X 3	160	36	77	18,0	3	DIN 376	6H
–		5368584	VTSPO6541	5368585	VTSPO6541	5368586	VTSPO6541	M27 X 3	160	36	82	20,0	4	DIN 376	6H
–		–			–	5368699	VTSPO6575	M30 X 2	150	28	80	22,0	4	DIN 374	6H
–		5368587	VTSPO6542	5368588	VTSPO6542	5368589	VTSPO6542	M30 X 3,5	180	42	91	22,0	4	DIN 376	6H
–		–		5368600	VTSPO6543		–	M33 X 3,5	180	42	100	25,0	4	DIN 376	6H
–		–		5368601	VTSPO6544		–	M36 X 4	200	48	110	28,0	4	DIN 376	6H

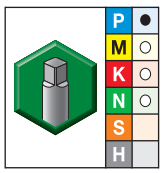
- WU41EG TiN
- WP49EG oxide

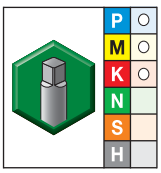


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • DIN 371 and 376



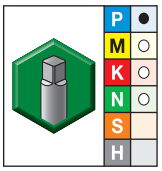


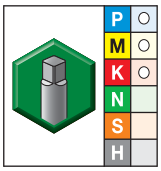
● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5472633	VTSPO6005	5387704	VTSPO6005	4 - 40	56	8	18	3,5	2	DIN 371	2B
5472635	VTSPO6007	5387707	VTSPO6007	5 - 40	56	9	20	4,0	2	DIN 371	2B
5472636	VTSPO6008	5387708	VTSPO6008	6 - 32	56	9	20	4,0	2	DIN 371	2B
5472638	VTSPO6010	5387760	VTSPO6010	6 - 40	56	9	20	4,0	2	DIN 371	2B
5472639	VTSPO6011	5387761	VTSPO6011	8 - 32	63	11	21	4,5	2	DIN 371	2B
5472641	VTSPO6013	5387763	VTSPO6013	10 - 24	70	12	25	6,0	2	DIN 371	2B
5472644	VTSPO6014	5387764	VTSPO6014	10 - 32	70	12	25	6,0	2	DIN 371	2B
5472646	VTSPO6016	5387766	VTSPO6016	1/4 - 20	80	15	30	7,0	3	DIN 371	2B
5472647	VTSPO6017	5387767	VTSPO6017	1/4 - 28	80	15	30	7,0	3	DIN 371	2B
5472649	VTSPO6019	5387769	VTSPO6019	5/16 - 18	90	15	35	8,0	3	DIN 371	2B
5472650	VTSPO6020	5387770	VTSPO6020	5/16 - 24	90	15	35	8,0	3	DIN 371	2B
5472652	VTSPO6022	5387772	VTSPO6022	3/8 - 16	100	19	39	10,0	3	DIN 371	2B
5472653	VTSPO6023	5387773	VTSPO6023	3/8 - 24	100	19	39	10,0	3	DIN 371	2B
5472655	VTSPO6025	5387776	VTSPO6025	7/16 - 14	100	18	41	8,0	3	DIN 376	2B
5472656	VTSPO6026	5387777	VTSPO6026	7/16 - 20	100	18	41	8,0	3	DIN 376	2B
5472658	VTSPO6028	5387779	VTSPO6028	1/2 - 13	110	23	47	9,0	3	DIN 376	2B
5472659	VTSPO6029	5387780	VTSPO6029	1/2 - 20	110	23	47	9,0	3	DIN 376	2B
5472661	VTSPO6031	5387782	VTSPO6031	9/16 - 12	110	25	53	11,0	3	DIN 376	2B
5472662	VTSPO6032	5387783	VTSPO6032	9/16 - 18	110	25	53	11,0	3	DIN 376	2B
5472663	VTSPO6033	5387784	VTSPO6033	5/8 - 11	110	24	51	12,0	3	DIN 376	2B

(continued)

(VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • DIN 371 and 376 — continued)

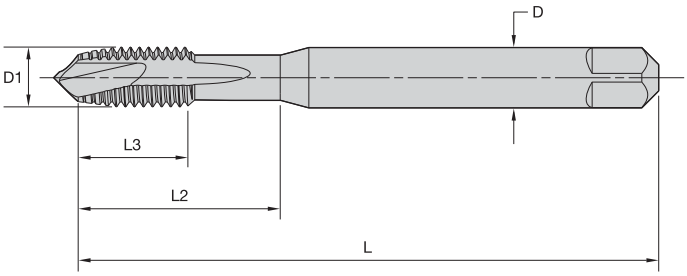




● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5472664	VTSPO6034	5387785	VTSPO6034	5/8 - 18	110	24	51	12,0	3	DIN 376	2B
5472665	VTSPO6035	5387786	VTSPO6035	3/4 - 10	140	30	64	16,0	3	DIN 376	2B
5472666	VTSPO6036	5387787	VTSPO6036	3/4 - 16	140	30	64	16,0	3	DIN 376	2B
5472667	VTSPO6037	5387788	VTSPO6037	7/8 - 9	140	34	71	18,0	3	DIN 376	2B
5472668	VTSPO6038	5387789	VTSPO6038	7/8 - 14	140	34	71	18,0	3	DIN 376	2B
5472669	VTSPO6039	5387790	VTSPO6039	1 - 8	160	38	81	18,0	3	DIN 376	2B
5472670	VTSPO6040	5387791	VTSPO6040	1 - 12	160	38	81	18,0	3	DIN 376	2B

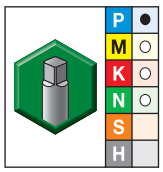
- WU41EG TiN
- WP49EG oxide

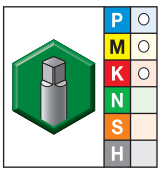


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SPO • Form B Plug Chamfer • UNJC/UNJF • Inch DIN 371 and 376

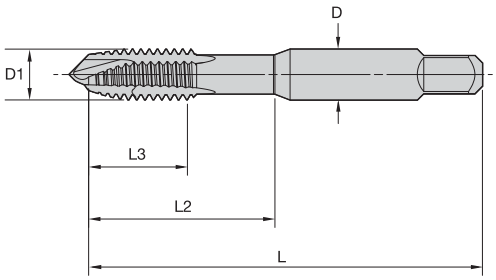




● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5472634	VTSPO6006	5387705	VTSPO6006	4 - 40	56	8	18	3,5	2	DIN 371	3B
5472637	VTSPO6009	5387709	VTSPO6009	6 - 32	56	9	20	4,0	2	DIN 371	3B
5472640	VTSPO6012	5387762	VTSPO6012	8 - 32	63	11	21	4,5	2	DIN 371	3B
5472645	VTSPO6015	5387765	VTSPO6015	10 - 32	70	12	25	6,0	2	DIN 371	3B
5472648	VTSPO6018	5387768	VTSPO6018	1/4 - 28	80	15	30	7,0	3	DIN 371	3B
5472651	VTSPO6021	5387771	VTSPO6021	5/16 - 24	90	15	35	8,0	3	DIN 371	3B
5472654	VTSPO6024	5387774	VTSPO6024	3/8 - 24	100	19	39	10,0	3	DIN 371	3B
5472657	VTSPO6027	5387778	VTSPO6027	7/16 - 20	100	18	41	8,0	3	DIN 376	3B
5472660	VTSPO6030	5387781	VTSPO6030	1/2 - 20	110	23	47	9,0	3	DIN 376	3B

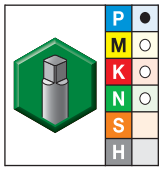
- WU41EG TiN
- WU40EG bright

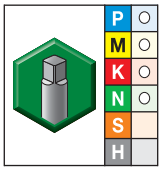


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SPO • Form B Plug Chamfer • Metric • JIS





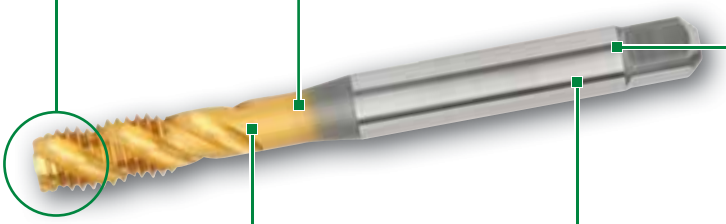
● first choice
○ alternate choice

grade WU41EG TiN		grade WU40EG Bright		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	tap class
5387861	VTSPO7505	5387859	VTSPO7505	M3 X 0,5	46	11	19	4,0	2	JIS	ISO 2
5387865	VTSPO7506	5387863	VTSPO7506	M4 X 0,7	52	13	21	5,0	2	JIS	ISO 2
5387869	VTSPO7507	5387867	VTSPO7507	M5 X 0,8	60	16	24	5,5	2	JIS	ISO 2
5387873	VTSPO7508	5387871	VTSPO7508	M6 X 1	62	19	29	6,0	3	JIS	ISO 2
5387877	VTSPO7509	5387875	VTSPO7509	M8 X 1,25	70	22	37	6,2	3	JIS	ISO 2
5387881	VTSPO7510	5387879	VTSPO7510	M10 X 1,5	75	24	41	7,0	3	JIS	ISO 2
–		5387883	VTSPO7511	M12 X 1,25	82	29	48	8,5	3	JIS	ISO 2
–		5387887	VTSPO7513	M12 X 1,5	82	29	48	8,5	3	JIS	ISO 2
–		5387885	VTSPO7512	M12 X 1,75	82	29	48	8,5	3	JIS	ISO 2
–		5387891	VTSPO7515	M14 X 1,5	88	30	48	10,5	3	JIS	ISO 2
–		5387889	VTSPO7514	M14 X 2	88	30	48	10,5	3	JIS	ISO 2
–		5387895	VTSPO7517	M16 X 1,5	95	32	52	12,5	3	JIS	ISO 2
–		5387893	VTSPO7516	M16 X 2	95	32	52	12,5	3	JIS	ISO 2
–		5387898	VTSPO7518	M18 X 2,5	100	37	55	14,0	3	JIS	ISO 2
–		5387900	VTSPO7519	M20 X 2,5	105	37	60	15,0	3	JIS	ISO 2

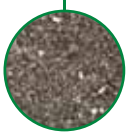
Multipurpose Taps for Steel, Stainless Steel, Cast Aluminium, and Ductile Iron

Advanced spiral-flute design
Smooth ejection of chips to reduce and eliminate bird-nesting.

Multiple tap dimension options
ANSI, DIN, JIS, and DIN/ANSI.



Precision ground shanks
Low runout.

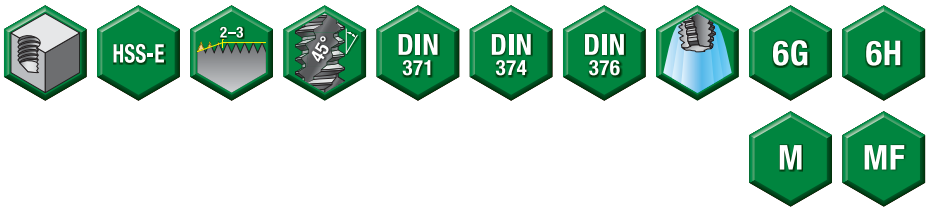


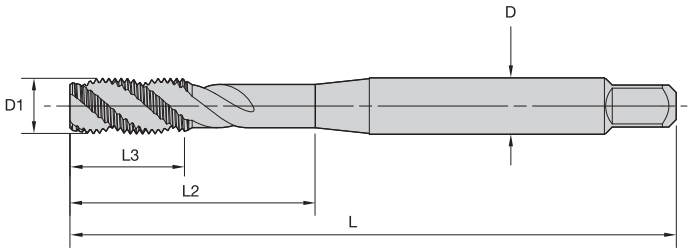
High-vanadium HSS-E
Improved wear resistance and longer life.

PVD coatings and surface treatments
For use with various workpiece materials:

WP42EG	WU41EG	WP49EG	WU40EG
TiCN	TiN	Oxide	Bright

- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright

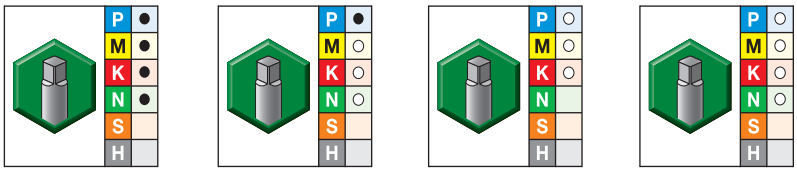




Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • Rigid and Synchronous Holders

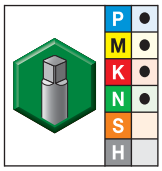


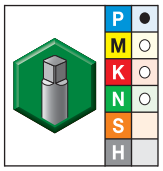
● first choice
○ alternate choice

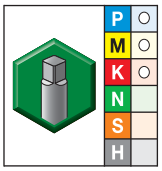
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5368703	VTSFT6506	5368702	VTSFT6506	5368704	VTSFT6506	5368705	VTSFT6506	M2 X 0,4	45	7	13	2,8	2	DIN 371	6H
	–		–	5368706	VTSFT6507		–	M2 X 0,4	45	7	13	2,8	2	DIN 371	6G
	–		–	5368707	VTSFT6508		–	M2,2 X 0,45	45	7	13	2,8	2	DIN 371	6H
	–	5368708	VTSFT6509	5368709	VTSFT6509	5368720	VTSFT6509	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6H
	–		–	5368721	VTSFT6510		–	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6G
	–		–	5402138	VTSFT6545		–	M3 X 0,35	56	8	–	2,2	2	DIN 374	6H
	–		–	5368726	VTSFT6512		–	M3 X 0,5	56	8	18	3,5	2	DIN 371	6G
	–		–	5402227	VTSFT6525	5402228	VTSFT6525	M3 X 0,5	56	8	–	2,2	2	DIN 376	6H
5368723	VTSFT6511	5368722	VTSFT6511	5368724	VTSFT6511	5368725	VTSFT6511	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
	–	5368727	VTSFT6513	5368728	VTSFT6513	5368729	VTSFT6513	M3,5 X 0,6	56	9	20	4,0	2	DIN 371	6H
	–		–	5402139	VTSFT6546	5402180	VTSFT6546	M4 X 0,5	63	10	21	2,8	3	DIN 374	6H
	–		–	5368734	VTSFT6515		–	M4 X 0,7	63	11	21	4,5	3	DIN 371	6G
	–		–	5402229	VTSFT6526	5402250	VTSFT6526	M4 X 0,7	63	10	21	2,8	3	DIN 376	6H
5368731	VTSFT6514	5368730	VTSFT6514	5368732	VTSFT6514	5368733	VTSFT6514	M4 X 0,7	63	11	21	4,5	3	DIN 371	6H
	–		–	5402181	VTSFT6547	5402182	VTSFT6547	M5 X 0,5	70	12	25	3,5	3	DIN 374	6H
	–		–	5368739	VTSFT6517		–	M5 X 0,8	70	12	25	6,0	3	DIN 371	6G
	–		–	5402251	VTSFT6527	5402252	VTSFT6527	M5 X 0,8	70	12	25	3,5	3	DIN 376	6H
5368736	VTSFT6516	5368735	VTSFT6516	5368737	VTSFT6516	5368738	VTSFT6516	M5 X 0,8	70	12	25	6,0	3	DIN 371	6H
	–		–	5402183	VTSFT6548		–	M6 X 0,5	80	12	30	4,5	3	DIN 374	6H
	–		–	5402185	VTSFT6549	5402184	VTSFT6549	M6 X 0,75	80	12	30	4,5	3	DIN 374	6H

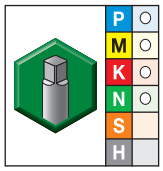
(continued)

(VT-SFT • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • Rigid and Synchronous Holders — continued)







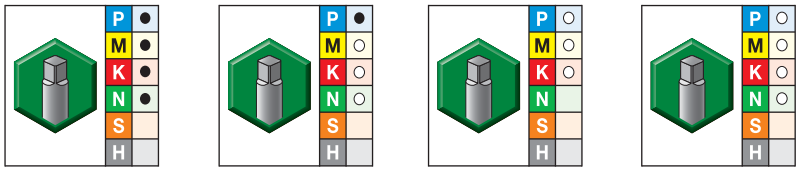


● first choice
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D			
5368741	VTSFT6518	5368740	VTSFT6518	5368742	VTSFT6518	5368743	VTSFT6518	M6 X 1	80	12	30	6,0	3	DIN 371	6H
	–		–	5402253	VTSFT6528	5402254	VTSFT6528	M6 X 1	80	12	30	4,5	3	DIN 376	6H
	–		–	5368744	VTSFT6519		–	M6 X 1	80	12	30	6,0	3	DIN 371	6G
	–		–	5368745	VTSFT6520	5368746	VTSFT6520	M7 X 1	80	12	30	7,0	3	DIN 371	6H
	–		–	5402186	VTSFT6550	5402187	VTSFT6550	M8 X 0,75	80	12	30	6,0	3	DIN 374	6H
5402188	VTSFT6551		–	5402189	VTSFT6551	5402190	VTSFT6551	M8 X 1	90	15	35	6,0	3	DIN 374	6H
	–		–	5368752	VTSFT6522		–	M8 X 1,25	90	15	35	8,0	3	DIN 371	6G
	–		–	5402255	VTSFT6529	5402256	VTSFT6529	M8 X 1,25	90	15	35	6,0	3	DIN 376	6H
5368749	VTSFT6521	5368748	VTSFT6521	5368750	VTSFT6521	5368751	VTSFT6521	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
	–		–		–	5402191	VTSFT6552	M10 X 0,75	90	15	35	7,0	3	DIN 374	6H
	–		–	5402192	VTSFT6553	5402193	VTSFT6553	M10 X 1	90	15	35	7,0	3	DIN 374	6H
5402194	VTSFT6554		–	5402195	VTSFT6554	5402196	VTSFT6554	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
5368754	VTSFT6523	5368753	VTSFT6523	5368755	VTSFT6523	5368756	VTSFT6523	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
	–		–	5368757	VTSFT6524		–	M10 X 1,5	100	18	39	10,0	3	DIN 371	6G
	–		–	5402257	VTSFT6530	5402258	VTSFT6530	M10 X 1,5	100	18	39	7,0	3	DIN 376	6H
	–		–	5402197	VTSFT6555	5402198	VTSFT6555	M12 X 1	100	21	39	9,0	3	DIN 374	6H
	–		–	5402199	VTSFT6556	5402200	VTSFT6556	M12 X 1,25	100	21	39	9,0	3	DIN 374	6H
5402201	VTSFT6557		–	5402202	VTSFT6557	5402203	VTSFT6557	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
	–		–	5402263	VTSFT6532		–	M12 X 1,75	110	21	44	9,0	3	DIN 376	6G
5402260	VTSFT6531	5402259	VTSFT6531	5402261	VTSFT6531	5402262	VTSFT6531	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
	–		–		–	5402204	VTSFT6558	M14 X 1	100	21	47	11,0	3	DIN 374	6H
	–		–		–	5402205	VTSFT6559	M14 X 1,25	100	21	47	11,0	3	DIN 374	6H
5402206	VTSFT6560		–	5402207	VTSFT6560	5402208	VTSFT6560	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
	–		–	5402268	VTSFT6534		–	M14 X 2	110	24	52	11,0	3	DIN 376	6G
5402265	VTSFT6533	5402264	VTSFT6533	5402266	VTSFT6533	5402267	VTSFT6533	M14 X 2	110	24	52	11,0	3	DIN 376	6H
	–		–		–	5402209	VTSFT6561	M16 X 1	100	21	46	12,0	3	DIN 374	6H
	–		–	5402210	VTSFT6562	5402211	VTSFT6562	M16 X 1,5	100	21	46	12,0	3	DIN 374	6H
	–		–	5402272	VTSFT6536		–	M16 X 2	110	24	51	12,0	3	DIN 376	6G
	–	5402269	VTSFT6535	5402270	VTSFT6535	5402271	VTSFT6535	M16 X 2	110	24	51	12,0	3	DIN 376	6H
	–		–		–	5402212	VTSFT6563	M18 X 1	110	21	50	14,0	4	DIN 374	6H
	–		–	5402214	VTSFT6564	5402213	VTSFT6564	M18 X 1,5	110	21	50	14,0	4	DIN 374	6H
	–		–		–	5402215	VTSFT6565	M18 X 2	125	30	58	14,0	4	DIN 374	6H
	–	5402273	VTSFT6537	5402274	VTSFT6537	5402275	VTSFT6537	M18 X 2,5	125	30	58	14,0	4	DIN 376	6H
	–		–		–	5402216	VTSFT6566	M20 X 1	125	24	56	16,0	4	DIN 374	6H
	–		–	5402217	VTSFT6567	5402218	VTSFT6567	M20 X 1,5	125	24	56	16,0	4	DIN 374	6H
	–		–		–	5402219	VTSFT6568	M20 X 2	140	30	64	16,0	4	DIN 374	6H
	–	5402276	VTSFT6538	5402277	VTSFT6538	5402278	VTSFT6538	M20 X 2,5	140	30	64	16,0	4	DIN 376	6H
	–		–	5402220	VTSFT6569	5402221	VTSFT6569	M22 X 1,5	125	24	62	18,0	4	DIN 374	6H
	–		–		–	5402222	VTSFT6570	M22 X 2	140	30	70	18,0	4	DIN 374	6H
	–	5402279	VTSFT6539	5402280	VTSFT6539	5402281	VTSFT6539	M22 X 2,5	140	30	70	18,0	4	DIN 376	6H

(continued)

(VT-SFT • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • Rigid and Synchronous Holders — continued)

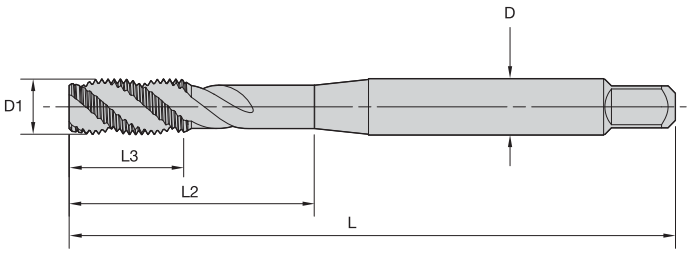


● first choice
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions						
order #	catalogue #	order #	catalogue #	order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
–		–		5402223	VTSFT6571	5402224	VTSFT6571	M24 X 1,5	140	28	67	18,0	4	DIN 374	6H
–		–			–	5402225	VTSFT6572	M24 X 2	140	28	67	18,0	4	DIN 374	6H
–		5402282	VTSFT6540	5402283	VTSFT6540	5402284	VTSFT6540	M24 X 3	160	36	77	18,0	4	DIN 376	6H
–		5402285	VTSFT6541	5402286	VTSFT6541	5402287	VTSFT6541	M27 X 3	160	36	82	20,0	4	DIN 376	6H
–		–			–	5402226	VTSFT6573	M30 X 2	150	28	80	22,0	2	DIN 374	6H
–		5402288	VTSFT6542	5402289	VTSFT6542	5402290	VTSFT6542	M30 X 3,5	180	42	91	22,0	4	DIN 376	6H
–		–		5402291	VTSFT6543	5402292	VTSFT6543	M33 X 3,5	180	42	100	25,0	4	DIN 376	6H
–		–		5402293	VTSFT6544	5402294	VTSFT6544	M36 X 4	200	48	110	28,0	5	DIN 376	6H

NOTE: Suggested for use in rigid and synchronous holders.

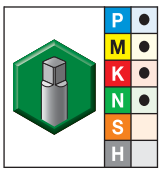
- WP42EG TiCN
- WP49EG oxide

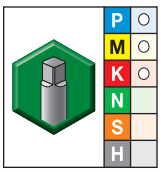


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT • Form E Bottoming Chamfer • Metric DIN 371, 374, and 376 • Rigid and Synchronous Holders



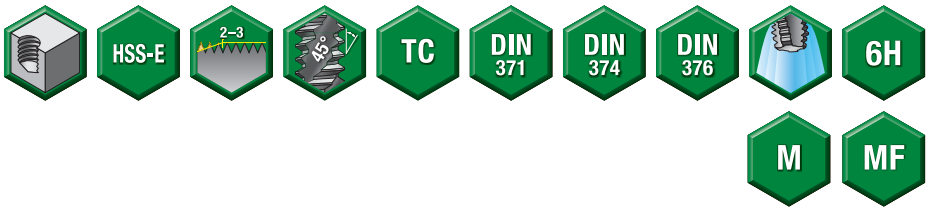


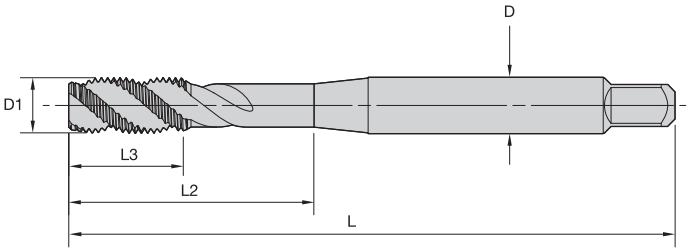
● first choice
○ alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5387434	VTSFT6574	5387435	VTSFT6574	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
5387436	VTSFT6575	5387437	VTSFT6575	M4 X 0,7	63	11	21	4,5	3	DIN 371	6H
5387438	VTSFT6576	5387439	VTSFT6576	M5 X 0,8	70	12	25	6,0	3	DIN 371	6H
5387460	VTSFT6577	5387461	VTSFT6577	M6 X 1	80	12	30	6,0	3	DIN 371	6H
5387475	VTSFT6585	5387476	VTSFT6585	M8 X 1	90	15	35	6,0	3	DIN 374	6H
5387462	VTSFT6578	5387463	VTSFT6578	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
5387477	VTSFT6586	5387478	VTSFT6586	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
5387464	VTSFT6579	5387465	VTSFT6579	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
5387479	VTSFT6587	5387481	VTSFT6587	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
5387466	VTSFT6580	5387467	VTSFT6580	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
5387482	VTSFT6588	5387483	VTSFT6588	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
5387468	VTSFT6581	5387469	VTSFT6581	M14 X 2	110	24	52	11,0	3	DIN 376	6H
–		5387470	VTSFT6582	M16 X 2	110	24	51	12,0	3	DIN 376	6H
5387471	VTSFT6583	5387472	VTSFT6583	M18 X 2,5	125	30	58	14,0	4	DIN 376	6H
5387473	VTSFT6584	5387474	VTSFT6584	M20 X 2,5	140	30	64	16,0	4	DIN 376	6H

NOTE: Suggested for use in rigid and synchronous holders.

- WU41EG TiN
- WP49EG oxide

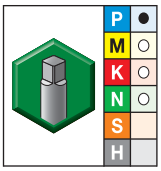


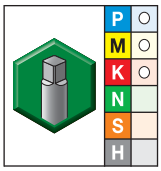


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT TC • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • Tension/Compression Holders



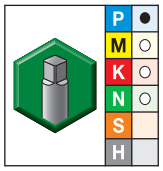


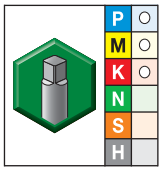
● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
6172434	VTSFT-TC6506	6172432	VTSFT-TC6506	M2 X 0,4	45	7	13	2,8	3	DIN 371	6H
6172438	VTSFT-TC6508	6172436	VTSFT-TC6508	M3 X 0,5	56	5	19	3,5	3	DIN 371	6H
6172442	VTSFT-TC6510	6172440	VTSFT-TC6510	M4 X 0,7	63	7	21	4,5	3	DIN 371	6H
6172446	VTSFT-TC6511	6172444	VTSFT-TC6511	M5 X 0,8	70	8	26	6,0	3	DIN 371	6H
6172450	VTSFT-TC6512	6172448	VTSFT-TC6512	M5 X 0,8	70	8	27	3,5	3	DIN 376	6H
6172464	VTSFT-TC6513	6172462	VTSFT-TC6513	M6 X 0,75	80	10	34	4,5	3	DIN 374	6H
6172468	VTSFT-TC6514	6172466	VTSFT-TC6514	M6 X 1	80	10	30	6,0	3	DIN 371	6H
6172470	VTSFT-TC6515	6172469	VTSFT-TC6515	M6 X 1	80	10	34	4,5	3	DIN 376	6H
6172482	VTSFT-TC6516	6172481	VTSFT-TC6516	M8 X 0,75	90	13	37	6,0	3	DIN 374	6H
6172484	VTSFT-TC6517	6172483	VTSFT-TC6517	M8 X 1	90	13	37	6,0	3	DIN 374	6H
6172486	VTSFT-TC6518	6172485	VTSFT-TC6518	M8 X 1,25	90	13	37	8,0	3	DIN 371	6H
6172488	VTSFT-TC6519	6172487	VTSFT-TC6519	M8 X 1,25	90	13	37	6,0	3	DIN 376	6H
6172490	VTSFT-TC6520	6172489	VTSFT-TC6520	M10 X 0,75	90	15	40	7,0	3	DIN 374	6H
6172492	VTSFT-TC6540	6172491	VTSFT-TC6540	M10 X 1	90	15	40	7,0	3	DIN 374	6H
6172494	VTSFT-TC6522	6172493	VTSFT-TC6522	M10 X 1,25	100	15	44	7,0	3	DIN 374	6H
6172496	VTSFT-TC6550	6172495	VTSFT-TC6550	M10 X 1,5	100	15	41	10,0	3	DIN 371	6H
6172498	VTSFT-TC6524	6172497	VTSFT-TC6524	M10 X 1,5	100	15	44	7,0	3	DIN 376	6H
6172500	VTSFT-TC6525	6172499	VTSFT-TC6525	M12 X 1	100	13	50	9,0	3	DIN 374	6H
6172502	VTSFT-TC6526	6172501	VTSFT-TC6526	M12 X 1,25	100	13	50	9,0	3	DIN 374	6H
6172504	VTSFT-TC6527	6172503	VTSFT-TC6527	M12 X 1,5	100	13	50	9,0	3	DIN 374	6H

(continued)

(VT-SFT TC • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • Tension/Compression Holders — continued)



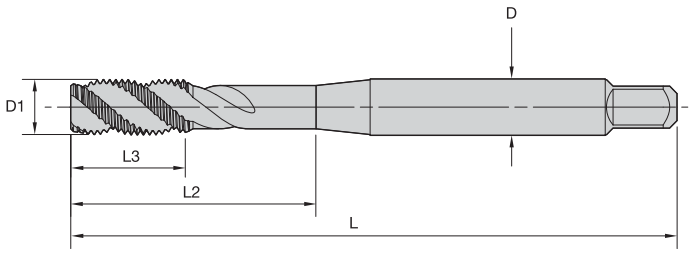


● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
6172506	VTSFT-TC6528	6172505	VTSFT-TC6528	M12 X 1,75	110	18	55	9,0	3	DIN 376	6H
6172508	VTSFT-TC6529	6172507	VTSFT-TC6529	M14 X 1	100	15	41	11,0	4	DIN 374	6H
6172510	VTSFT-TC6530	6172509	VTSFT-TC6530	M14 X 1,25	100	15	41	11,0	4	DIN 374	6H
6172512	VTSFT-TC6536	6172511	VTSFT-TC6536	M14 X 1,5	100	15	41	11,0	4	DIN 374	6H
6172672	VTSFT-TC6532	6172671	VTSFT-TC6532	M14 X 2	110	20	50	11,0	3	DIN 376	6H
6172674	VTSFT-TC6534	6172673	VTSFT-TC6534	M16 X 1,5	100	15	45	12,0	4	DIN 374	6H
6172676	VTSFT-TC6564	6172675	VTSFT-TC6564	M16 X 2	110	20	55	12,0	4	DIN 376	6H
6172678	VTSFT-TC6537	6172677	VTSFT-TC6537	M18 X 1,5	110	17	55	14,0	4	DIN 374	6H
6172680	VTSFT-TC6538	6172679	VTSFT-TC6538	M18 X 2	125	25	61	14,0	4	DIN 374	6H
6172692	VTSFT-TC6539	6172691	VTSFT-TC6539	M18 X 2,5	125	25	61	14,0	4	DIN 376	6H
6172694	VTSFT-TC6541	6172693	VTSFT-TC6541	M20 X 1,5	125	17	56	16,0	4	DIN 374	6H
6172696	VTSFT-TC6542	6172695	VTSFT-TC6542	M20 X 2	140	25	65	16,0	4	DIN 374	6H
6172698	VTSFT-TC6543	6172697	VTSFT-TC6543	M20 X 2,5	140	25	65	16,0	4	DIN 376	6H
6172700	VTSFT-TC6544	6172699	VTSFT-TC6544	M22 X 1,5	125	18	61	18,0	4	DIN 374	6H
6172712	VTSFT-TC6545	6172711	VTSFT-TC6545	M22 X 2	140	25	66	18,0	4	DIN 374	6H
6172714	VTSFT-TC6546	6172713	VTSFT-TC6546	M22 X 2,5	140	25	66	18,0	4	DIN 376	6H
6172716	VTSFT-TC6547	6172715	VTSFT-TC6547	M24 X 1,5	140	20	67	18,0	4	DIN 374	6H
6172718	VTSFT-TC6548	6172717	VTSFT-TC6548	M24 X 2	140	20	67	18,0	4	DIN 374	6H
6172720	VTSFT-TC6549	6172719	VTSFT-TC6549	M24 X 3	160	30	77	18,0	4	DIN 376	6H
6172722	VTSFT-TC6551	6172721	VTSFT-TC6551	M27 X 1,5	140	20	65	20,0	4	DIN 374	6H
6172724	VTSFT-TC6552	6172723	VTSFT-TC6552	M27 X 3	160	33	85	20,0	4	DIN 376	6H
6172726	VTSFT-TC6554	6172725	VTSFT-TC6554	M30 X 1,5	150	22	68	20,0	4	DIN 374	6H
6172728	VTSFT-TC6555	6172727	VTSFT-TC6555	M30 X 2	150	22	68	22,0	4	DIN 374	6H
6172730	VTSFT-TC6556	6172729	VTSFT-TC6556	M30 X 3,5	180	35	87	22,0	4	DIN 376	6H
6172732	VTSFT-TC6558	6172731	VTSFT-TC6558	M33 X 3,5	180	35	92	25,0	4	DIN 376	6H
6172734	VTSFT-TC6560	6172733	VTSFT-TC6560	M36 X 4	200	40	110	28,0	4	DIN 376	6H
6172736	VTSFT-TC6563	6172735	VTSFT-TC6563	M39 X 4	200	40	105	32,0	4	DIN 376	6H
6172738	VTSFT-TC6565	6172737	VTSFT-TC6565	M42 X 4,5	200	40	105	32,0	5	DIN 376	6H
6172740	VTSFT-TC6567	6172739	VTSFT-TC6567	M45 X 5	220	50	110	36,0	5	DIN 376	6H
6172742	VTSFT-TC6569	6172741	VTSFT-TC6569	M48 X 5	250	50	145	36,0	5	DIN 376	6H
6172744	VTSFT-TC6571	6172743	VTSFT-TC6571	M52 X 5	250	50	135	40,0	5	DIN 376	6H

NOTE: Suitable for tension/compression holders.

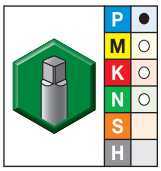
- WU41EG TiN
- WP49EG oxide

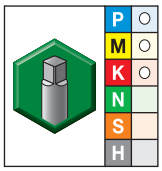


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT TC • Form E Bottoming Chamfer • Metric DIN 371 and 376 • Tension/Compression Holders



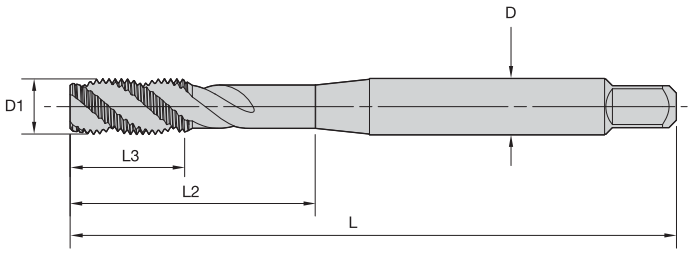


● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
6173197	VTSFT-TC6708	6173196	VTSFT-TC6708	M3 X 0,5	56	5	19	3,5	3	DIN 371	6H
6173199	VTSFT-TC6710	6173198	VTSFT-TC6710	M4 X 0,7	63	7	21	4,5	3	DIN 371	6H
6173211	VTSFT-TC6711	6173200	VTSFT-TC6711	M5 X 0,8	70	8	26	6,0	3	DIN 371	6H
6173213	VTSFT-TC6714	6173212	VTSFT-TC6714	M6 X 1	80	10	30	6,0	3	DIN 371	6H
6173215	VTSFT-TC6718	6173214	VTSFT-TC6718	M8 X 1,25	90	13	37	8,0	3	DIN 371	6H
6173217	VTSFT-TC6723	6173216	VTSFT-TC6723	M10 X 1,5	100	15	42	10,0	3	DIN 371	6H
6173219	VTSFT-TC6728	6173218	VTSFT-TC6728	M12 X 1,75	110	18	55	9,0	3	DIN 376	6H
6173231	VTSFT-TC6732	6173220	VTSFT-TC6732	M14 X 2	110	20	50	11,0	3	DIN 376	6H
6173233	VTSFT-TC6735	6173232	VTSFT-TC6735	M16 X 2	110	20	55	12,0	4	DIN 376	6H
6173235	VTSFT-TC6739	6173234	VTSFT-TC6739	M18 X 2,5	125	25	61	14,0	4	DIN 376	6H
6173237	VTSFT-TC6743	6173236	VTSFT-TC6743	M20 X 2,5	140	25	65	16,0	4	DIN 376	6H

NOTE: Suitable for tension/compression holders.

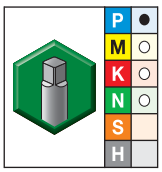
- WU41EG TiN
- WP49EG oxide

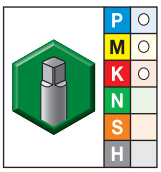


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371 and 376 • Rigid and Synchronous Holders



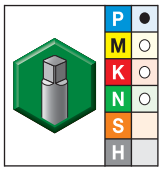


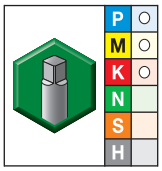
● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5472587	VTSFT6005	5387487	VTSFT6005	4 - 40	56	8	18	3,5	2	DIN 371	2B
5472589	VTSFT6007	5387489	VTSFT6007	5 - 40	56	9	20	4,0	2	DIN 371	2B
5472600	VTSFT6008	5387640	VTSFT6008	6 - 32	56	9	20	4,0	2	DIN 371	2B
5472602	VTSFT6010	5387642	VTSFT6010	6 - 40	56	9	20	4,0	2	DIN 371	2B
5472603	VTSFT6011	5387643	VTSFT6011	8 - 32	63	11	21	4,5	3	DIN 371	2B
5472605	VTSFT6013	5387645	VTSFT6013	10 - 24	70	12	25	6,0	3	DIN 371	2B
5472606	VTSFT6014	5387646	VTSFT6014	10 - 32	70	12	25	6,0	3	DIN 371	2B
5472608	VTSFT6016	5387648	VTSFT6016	1/4 - 20	80	15	30	7,0	3	DIN 371	2B
5472609	VTSFT6017	5387649	VTSFT6017	1/4 - 28	80	15	30	7,0	3	DIN 371	2B
5472611	VTSFT6019	5387651	VTSFT6019	5/16 - 18	90	15	35	8,0	3	DIN 371	2B
5472612	VTSFT6020	5387652	VTSFT6020	5/16 - 24	90	15	35	8,0	3	DIN 371	2B
5472614	VTSFT6022	5387654	VTSFT6022	3/8 - 16	100	19	39	10,0	3	DIN 371	2B
5472615	VTSFT6023	5387655	VTSFT6023	3/8 - 24	100	19	39	10,0	3	DIN 371	2B
5472617	VTSFT6025	5387657	VTSFT6025	7/16 - 14	100	18	41	8,0	3	DIN 376	2B
5472618	VTSFT6026	5387658	VTSFT6026	7/16 - 20	100	18	41	8,0	3	DIN 376	2B
5472620	VTSFT6028	5387670	VTSFT6028	1/2 - 13	110	23	40	9,0	3	DIN 376	2B
5472621	VTSFT6029	5387671	VTSFT6029	1/2 - 20	110	23	40	9,0	3	DIN 376	2B
5472623	VTSFT6031	5387673	VTSFT6031	9/16 - 12	110	25	32	11,0	3	DIN 376	2B
5472624	VTSFT6032	5387674	VTSFT6032	9/16 - 18	110	25	32	11,0	3	DIN 376	2B
5472625	VTSFT6033	5387675	VTSFT6033	5/8 - 11	110	24	35	12,0	3	DIN 376	2B

(continued)

(VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371 and 376 • Rigid and Synchronous Holders — continued)



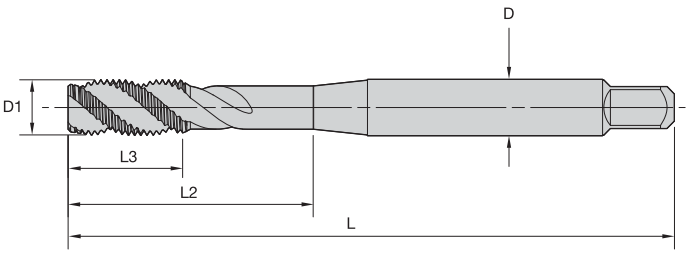


● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5472626	VTSFT6034	5387676	VTSFT6034	5/8 - 18	110	24	35	12,0	3	DIN 376	2B
5472627	VTSFT6035	5387677	VTSFT6035	3/4 - 10	140	30	46	16,0	4	DIN 376	2B
5472628	VTSFT6036	5387678	VTSFT6036	3/4 - 16	140	30	46	16,0	4	DIN 376	2B
5472629	VTSFT6037	5387679	VTSFT6037	7/8 - 9	140	34	35	18,0	4	DIN 376	2B
5472630	VTSFT6038	5387700	VTSFT6038	7/8 - 14	140	34	35	18,0	4	DIN 376	2B
5472631	VTSFT6039	5387701	VTSFT6039	1 - 8	160	38	41	18,0	4	DIN 376	2B
5472632	VTSFT6040	5387702	VTSFT6040	1 - 12	160	38	41	18,0	4	DIN 376	2B

NOTE: Suggested for use in rigid and synchronous holders.

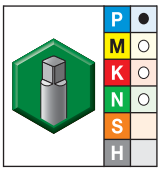
- WU41EG TiN
- WP49EG oxide

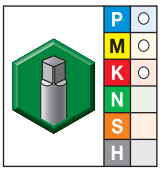


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT TC • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371, 374, and 376 • Tension/Compression Holders



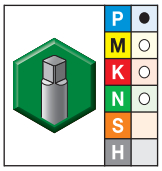


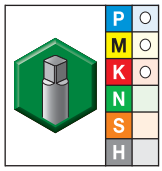
● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
6172748	VTSFT-TC6008	6172747	VTSFT-TC6008	6 - 32	56	7	21	4,0	3	DIN 371	2B
6172750	VTSFT-TC6009	6172749	VTSFT-TC6009	6 - 40	56	7	21	4,0	3	DIN 371	2B
6172782	VTSFT-TC6010	6172781	VTSFT-TC6010	8 - 32	63	7	21	4,5	3	DIN 371	2B
6172784	VTSFT-TC6011	6172783	VTSFT-TC6011	8 - 36	63	7	21	4,5	3	DIN 371	2B
6172786	VTSFT-TC6012	6172785	VTSFT-TC6012	10 - 24	70	8	25	6,0	3	DIN 371	2B
6172788	VTSFT-TC6013	6172787	VTSFT-TC6013	10 - 32	70	8	25	6,0	3	DIN 371	2B
6172790	VTSFT-TC6014	6172789	VTSFT-TC6014	12 - 24	80	10	30	6,0	3	DIN 371	2B
6172792	VTSFT-TC6015	6172791	VTSFT-TC6015	12 - 28	80	10	30	6,0	3	DIN 371	2B
6172794	VTSFT-TC6016	6172793	VTSFT-TC6016	1/4 - 20	80	10	29	7,0	3	DIN 371	2B
6172796	VTSFT-TC6017	6172795	VTSFT-TC6017	1/4 - 20	80	10	36	4,5	3	DIN 376	2B
6172798	VTSFT-TC6018	6172797	VTSFT-TC6018	1/4 - 28	80	10	29	7,0	3	DIN 371	2B
6172800	VTSFT-TC6050	6172799	VTSFT-TC6050	1/4 - 28	80	10	36	4,5	3	DIN 374	2B
6172802	VTSFT-TC6052	6172801	VTSFT-TC6052	5/16 - 18	90	13	37	8,0	3	DIN 371	2B
6172804	VTSFT-TC6021	6172803	VTSFT-TC6021	5/16 - 18	90	13	37	6,0	3	DIN 376	2B
6172806	VTSFT-TC6054	6172805	VTSFT-TC6054	5/16 - 24	90	13	37	6,0	3	DIN 374	2B
6172808	VTSFT-TC6056	6172807	VTSFT-TC6056	3/8 - 16	100	15	42	10,0	3	DIN 371	2B
6172810	VTSFT-TC6024	6172809	VTSFT-TC6024	3/8 - 16	100	15	45	7,0	3	DIN 376	2B
6172812	VTSFT-TC6058	6172811	VTSFT-TC6058	3/8 - 24	90	15	40	7,0	3	DIN 374	2B
6172814	VTSFT-TC6060	6172813	VTSFT-TC6060	7/16 - 14	100	15	47	8,0	3	DIN 376	2B
6172816	VTSFT-TC6027	6172815	VTSFT-TC6027	7/16 - 20	100	15	47	8,0	3	DIN 374	2B

(continued)

(VT-SFT TC • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371, 374, and 376 • Tension/Compression Holders — continued)



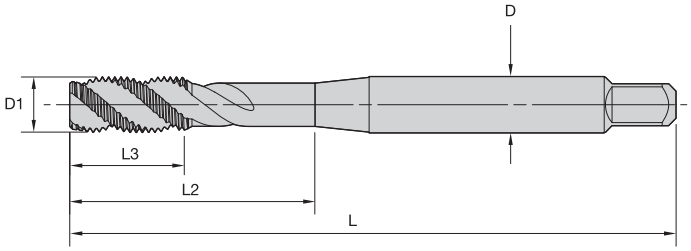


● first choice
○ alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
6172818	VTSFT-TC6062	6172817	VTSFT-TC6062	1/2 - 13	110	18	50	9,0	3	DIN 376	2B
6172820	VTSFT-TC6029	6172819	VTSFT-TC6029	1/2 - 20	100	13	44	9,0	3	DIN 374	2B
6172837	VTSFT-TC6030	6172836	VTSFT-TC6030	9/16 - 12	110	20	55	11,0	4	DIN 376	2B
6172839	VTSFT-TC6031	6172838	VTSFT-TC6031	9/16 - 18	100	15	44	11,0	4	DIN 374	2B
6172911	VTSFT-TC6032	6172840	VTSFT-TC6032	5/8 - 11	110	20	55	12,0	4	DIN 376	2B
6172913	VTSFT-TC6033	6172912	VTSFT-TC6033	5/8 - 18	100	15	45	12,0	4	DIN 374	2B
6172915	VTSFT-TC6034	6172914	VTSFT-TC6034	3/4 - 10	125	25	65	14,0	4	DIN 376	2B
6172917	VTSFT-TC6035	6172916	VTSFT-TC6035	3/4 - 16	110	17	55	14,0	4	DIN 374	2B
6172919	VTSFT-TC6036	6172918	VTSFT-TC6036	7/8 - 9	140	25	68	18,0	4	DIN 376	2B
6172932	VTSFT-TC6037	6172920	VTSFT-TC6037	7/8 - 14	125	18	57	18,0	4	DIN 374	2B
6172934	VTSFT-TC6038	6172933	VTSFT-TC6038	1 - 8	160	30	89	18,0	4	DIN 376	2B
6172936	VTSFT-TC6039	6172935	VTSFT-TC6039	1 - 12	140	22	63	18,0	4	DIN 374	2B
6172938	VTSFT-TC6040	6172937	VTSFT-TC6040	1 1/8 - 7	180	35	90	22,0	4	DIN 376	2B
6172940	VTSFT-TC6041	6172939	VTSFT-TC6041	1 1/8 - 12	150	22	70	22,0	4	DIN 374	2B
6172952	VTSFT-TC6042	6172951	VTSFT-TC6042	1 1/4 - 7	180	35	95	22,0	4	DIN 376	2B
6172954	VTSFT-TC6043	6172953	VTSFT-TC6043	1 1/4 - 12	150	22	67	22,0	5	DIN 374	2B
6172956	VTSFT-TC6044	6172955	VTSFT-TC6044	1 3/8 - 6	200	40	100	28,0	4	DIN 376	2B
6172958	VTSFT-TC6045	6172957	VTSFT-TC6045	1 3/8 - 12	170	24	80	28,0	5	DIN 374	2B
6172960	VTSFT-TC6046	6172959	VTSFT-TC6046	1 1/2 - 6	200	40	100	28,0	4	DIN 376	2B
6172962	VTSFT-TC6047	6172961	VTSFT-TC6047	1 1/2 - 12	170	24	72	28,0	6	DIN 374	2B
6172964	VTSFT-TC6048	6172963	VTSFT-TC6048	1 3/4 - 5	220	50	108	36,0	5	DIN 376	2B
6172966	VTSFT-TC6049	6172965	VTSFT-TC6049	2 - 4 1/2	250	55	140	40,0	5	DIN 376	2B

NOTE: Suitable for tension/compression holders.

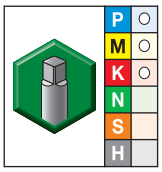
• WP49EG oxide



Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT • Form C Semi-Bottoming Chamfer • UNJC/UNJF • Inch DIN 371 and 376 • Rigid and Synchronous Holders

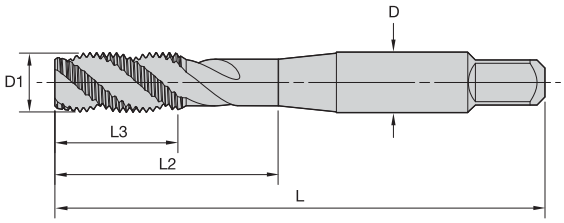


● first choice
○ alternate choice

grade WP49EG Oxide		metric dimensions							
order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	class of fit
5387488	VTSFT6006	4 - 40	56	8	18	3,5	2	DIN 371	3B
5387641	VTSFT6009	6 - 32	56	9	20	4,0	2	DIN 371	3B
5387644	VTSFT6012	8 - 32	63	11	21	4,5	3	DIN 371	3B
5387647	VTSFT6015	10 - 32	70	12	25	6,0	3	DIN 371	3B
5387650	VTSFT6018	1/4 - 28	80	15	30	7,0	3	DIN 371	3B
5387653	VTSFT6021	5/16 - 24	90	15	35	8,0	3	DIN 371	3B
5387656	VTSFT6024	3/8 - 24	100	19	39	10,0	3	DIN 371	3B
5387659	VTSFT6027	7/16 - 20	100	18	41	8,0	3	DIN 376	3B
5387672	VTSFT6030	1/2 - 20	110	23	40	9,0	3	DIN 376	3B

NOTE: Suggested for use in rigid and synchronous holders.

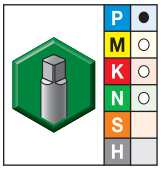
- WU41EG TiN
- WU40EG bright

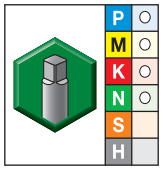


Shank Tolerance

D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052

VT-SFT • Form C Semi-Bottoming Chamfer • Metric • JIS • Rigid and Synchronous Holders



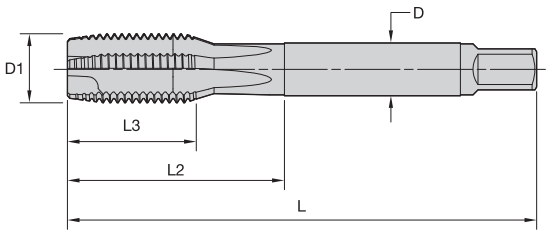


● first choice
○ alternate choice

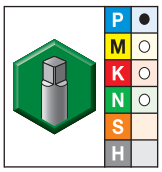
grade WU41EG TiN		grade WU40EG Bright		metric dimensions							
order #	catalogue #	order #	catalogue #	D1 size	L	L3	L2	D	number of flutes	dimension standard	tap class
5398709	VTSFT7505	5398708	VTSFT7505	M3 X 0,5	46	11	19	4,0	2	JIS	ISO 2
5398791	VTSFT7506	5398790	VTSFT7506	M4 X 0,7	52	13	21	5,0	3	JIS	ISO 2
5398793	VTSFT7507	5398792	VTSFT7507	M5 X 0,8	60	16	24	5,5	3	JIS	ISO 2
5398795	VTSFT7508	5398794	VTSFT7508	M6 X 1	62	19	29	6,0	3	JIS	ISO 2
5398797	VTSFT7509	5398796	VTSFT7509	M8 X 1,25	70	22	37	6,2	3	JIS	ISO 2
5398799	VTSFT7510	5398798	VTSFT7510	M10 X 1,5	75	24	41	7,0	3	JIS	ISO 2
–		5398800	VTSFT7511	M12 X 1,25	82	29	48	8,5	3	JIS	ISO 2
–		5398802	VTSFT7513	M12 X 1,5	82	29	48	8,5	3	JIS	ISO 2
–		5398801	VTSFT7512	M12 X 1,75	82	29	48	8,5	3	JIS	ISO 2
–		5398804	VTSFT7515	M14 X 1,5	88	30	48	10,5	3	JIS	ISO 2
–		5398803	VTSFT7514	M14 X 2	88	30	48	10,5	3	JIS	ISO 2
–		5398806	VTSFT7517	M16 X 1,5	95	32	52	12,5	3	JIS	ISO 2
–		5398805	VTSFT7516	M16 X 2	95	32	52	12,5	3	JIS	ISO 2
–		5398807	VTSFT7518	M18 X 2,5	100	37	55	14,0	4	JIS	ISO 2
–		5398808	VTSFT7519	M20 X 2,5	105	37	60	15,0	4	JIS	ISO 2

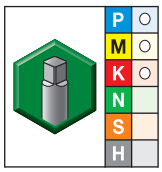
NOTE: Suggested for use in rigid and synchronous holders.

- WU41EG TiN
- WP49EG oxide



■ VTSPO • (G) Whitworth Pipe Thread • DIN EN ISO 228 • Form B



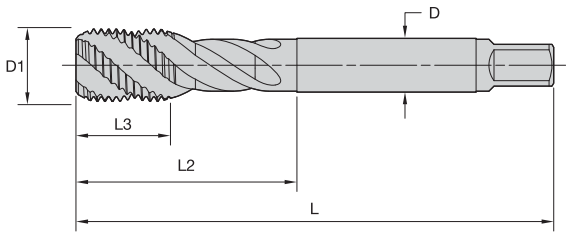


● first choice
○ alternate choice

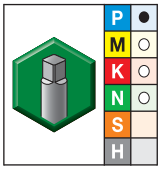
grade WU41EG TiN		grade WP49EG Oxide								
order #	catalogue #	order #	catalogue #	D1 TPI	L	L2	L3	D	number of flutes	thread type
6058785	VTSPO8605	6058784	VTSPO8605	1/8 - 28	90	35	15	7	3	G
6058787	VTSPO8606	6058786	VTSPO8606	1/4 - 19	100	44	22	11	3	G
6058790	VTSPO8607	6058788	VTSPO8607	3/8 - 19	100	47	22	12	4	G
6058792	VTSPO8608	6058791	VTSPO8608	1/2 - 14	125	55	25	16	4	G
6058794	VTSPO8609	6058793	VTSPO8609	5/8 - 14	125	61	25	18	4	G
6058797	VTSPO8610	6058796	VTSPO8610	3/4 - 14	140	60	25	20	4	G
6058799	VTSPO8611	6058798	VTSPO8611	7/8 - 14	150	68	28	22	4	G
6058811	VTSPO8612	6058800	VTSPO8612	1 - 11	160	68	30	25	5	G

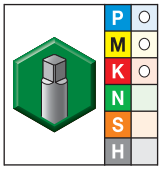
NOTE: Suitable for tension/compression holders.

- WU41EG TiN
- WP49EG oxide



■ VTSFT • (G) Whitworth Pipe Thread • DIN EN ISO 228 • Form C



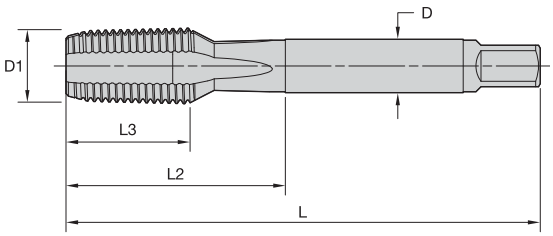


● first choice
○ alternate choice

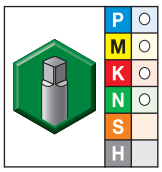
grade WU41EG TiN		grade WP49EG Oxide								
order #	catalogue #	order #	catalogue #	D1 TPI	L	L2	L3	D	number of flutes	thread type
6058815	VTSFT8605	6058814	VTSFT8605	1/8 - 28	90	35	15	7	3	G
6058817	VTSFT8606	6058816	VTSFT8606	1/4 - 19	100	44	15	11	3	G
6058819	VTSFT8607	6058818	VTSFT8607	3/8 - 19	100	47	15	12	4	G
6058871	VTSFT8608	6058820	VTSFT8608	1/2 - 14	125	55	18	16	4	G
6058873	VTSFT8609	6058872	VTSFT8609	5/8 - 14	125	61	18	18	4	G
6058875	VTSFT8610	6058874	VTSFT8610	3/4 - 14	140	65	20	20	4	G
6058877	VTSFT8611	6058876	VTSFT8611	7/8 - 14	150	68	22	22	4	G
6058879	VTSFT8612	6058878	VTSFT8612	1 - 11	160	74	24	25	5	G

NOTE: Suitable for tension/compression holders.

• WU40EG bright



■ VTSTR • NPT and NPTF • Standard Projection • Form C



● first choice
○ alternate choice

grade WU40EG Bright								
order #	catalogue #	D1 TPI	L	L2	L3	D	number of flutes	thread type
6058953	VTSTR8301	1/16 - 27	90	35	13	6	3	NPT
6058960	VTSTR8801	1/16 - 27	90	35	13	6	3	NPTF
6058954	VTSTR8302	1/8 - 27	90	36	13	7	4	NPT
6059011	VTSTR8802	1/8 - 27	90	36	13	7	4	NPTF
6058955	VTSTR8303	1/4 - 18	100	39	20	11	4	NPT
6059012	VTSTR8803	1/4 - 18	100	39	20	11	4	NPTF
6058956	VTSTR8304	3/8 - 18	110	39	20	12	4	NPT
6059013	VTSTR8804	3/8 - 18	110	39	20	12	4	NPTF
6058957	VTSTR8305	1/2 - 14	125	56	26	16	4	NPT
6059014	VTSTR8805	1/2 - 14	125	56	26	16	4	NPTF
6058958	VTSTR8306	3/4 - 14	140	55	26	20	4	NPT
6059015	VTSTR8806	3/4 - 14	140	55	26	20	4	NPTF
6058959	VTSTR8307	1 - 11.5	160	71	32	25	5	NPT
6059016	VTSTR8807	1 - 11.5	160	71	32	25	5	NPTF

NOTE: Suitable for tension/compression holders.

VariTap™ • HSS-E • Metric

Material Group		Through Holes					Blind Holes				
				Range — m/min					Range — m/min		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P1	VT-SPO	WP42EG, WU41EG	21	**27**	34	VT-SFT (TC)	WP42EG, WU41EG	13	**18**	26
		VT-SPO	WP49EG, WU40EG	10	**14**	17	VT-SFT (TC)	WP49EG, WU40EG	6	**9**	13
	P2	VT-SPO	WP42EG, WU41EG	16	**21**	27	VT-SFT (TC)	WP42EG, WU41EG	11	**15**	22
		VT-SPO	WP49EG, WU40EG	8	**11**	13	VT-SFT (TC)	WP49EG, WU40EG	4	**6**	9
	P3	VT-SPO	WP42EG, WU41EG	9	**12**	15	VT-SFT (TC)	WP42EG, WU41EG	6	**9**	13
		VT-SPO	WP49EG, WU40EG	5	**6**	8	VT-SFT (TC)	WP49EG, WU40EG	2	**3**	4
		VT-STR NPT	WU41EG	5	**6**	8	VT-STR NPT	WU41EG	5	**6**	8
		VT-STR NPT	WU40EG	2	**3**	4	VT-STR NPT	WU40EG	2	**3**	4
M	M1	VT-SPO	WP42EG, WU41EG	9	**12**	15	VT-SFT (TC)	WP42EG, WU41EG	6	**9**	13
		VT-SPO	WP49EG, WU40EG	5	**6**	8	VT-SFT (TC)	WP49EG, WU40EG	2	**3**	4
		VT-SFT NPT	WU41EG	5	**6**	8	VT-SFT NPT	WU41EG	5	**6**	8
		VT-SFT NPT	WP49EG, WU40EG	2	**3**	4	VT-SFT NPT	WP49EG, WU40EG	2	**3**	4
	M3	VT-SPO	WP42EG, WU41EG	7	**9**	11	VT-SFT (TC)	WP42EG, WU41EG	4	**6**	9
		VT-SPO	WP49EG, WU40EG	3	**5**	6	VT-SFT (TC)	WP49EG, WU40EG	2	**3**	4
K	K1	VT-STR NPT	WU41EG	10	**14**	17	VT-STR NPT	WU41EG	10	**14**	17
		VT-STR NPT	WU40EG	6	**8**	10	VT-STR NPT	WU40EG	6	**8**	10
	K2	VT-SPO	WP42EG, WU41EG	21	**27**	34	VT-SFT (TC)	WP42EG, WU41EG	13	**18**	26
		VT-SPO	WP49EG, WU40EG	10	**14**	17	VT-SFT (TC)	WP49EG, WU40EG	6	**9**	13
N	N1	VT-SPO	WP42EG, WU41EG	34	**46**	57	VT-SFT (TC)	WP42EG, WU41EG	23	**34**	48
		VT-SPO	WU40EG	17	**23**	29	VT-SFT	WU40EG	11	**15**	22
	N2	VT-SPO	WP42EG, WU41EG	30	**40**	50	VT-SFT (TC)	WP42EG, WU41EG	19	**27**	39
		VT-SPO	WU40EG	15	**20**	25	VT-SFT	WU40EG	11	**15**	22
	N4	VT-SPO	WP42EG, WU41EG	7	**9**	11	VT-SFT (TC)	WP42EG, WU41EG	4	**6**	9
		VT-SPO	WU40EG	3	**5**	6	VT-SFT	WU40EG	2	**3**	4

** Grades: WP42EG = TiCN*
WU41EG = TiN
WP49EG = oxide
WU40EG = bright


HydroForce™

Tooling Systems

HydroForce™ HT Hydraulic Chuck High Torque

- First choice solution for rotating applications.
- HydroForce HT gives you an unparalleled combination of accuracy and clamping force.
- HydroForce HT requires only two clamping sizes for all of your tooling applications.

HydroForce

Compact and Stable Design

- Shorter projection length and thicker front wall cross section result in higher rigidity. This allows higher cutting parameters and better surface quality.

Advanced Hydraulic Clamping

- Three times better clamping force than regular hydraulic chucks, runout of 3 microns at 2.5 times diameter overhang vibration dampening. This results in up to 50% longer tool life and improved workpiece surface quality.

Balance Quality at G2.5 at 25.000 RPM

- Lower vibration, particularly at high speeds. This results in higher productivity.

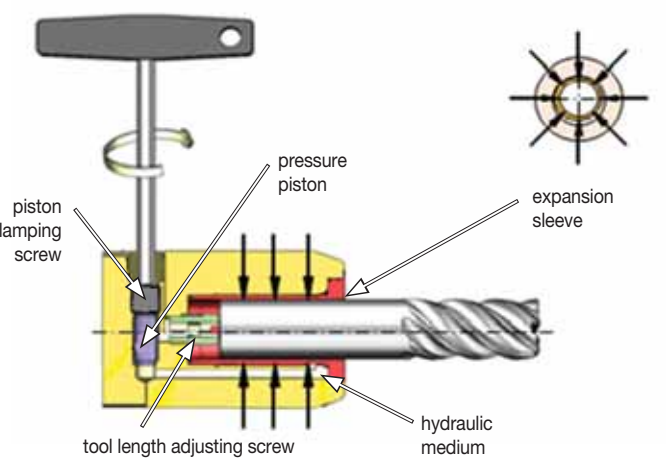
Easy Side Access for Clamping/Unclamping

- Mechanical stop for clamping and 10mm (3/8") length adjustment. This results in reliable, consistent clamping and no over torque. No torque wrench required.

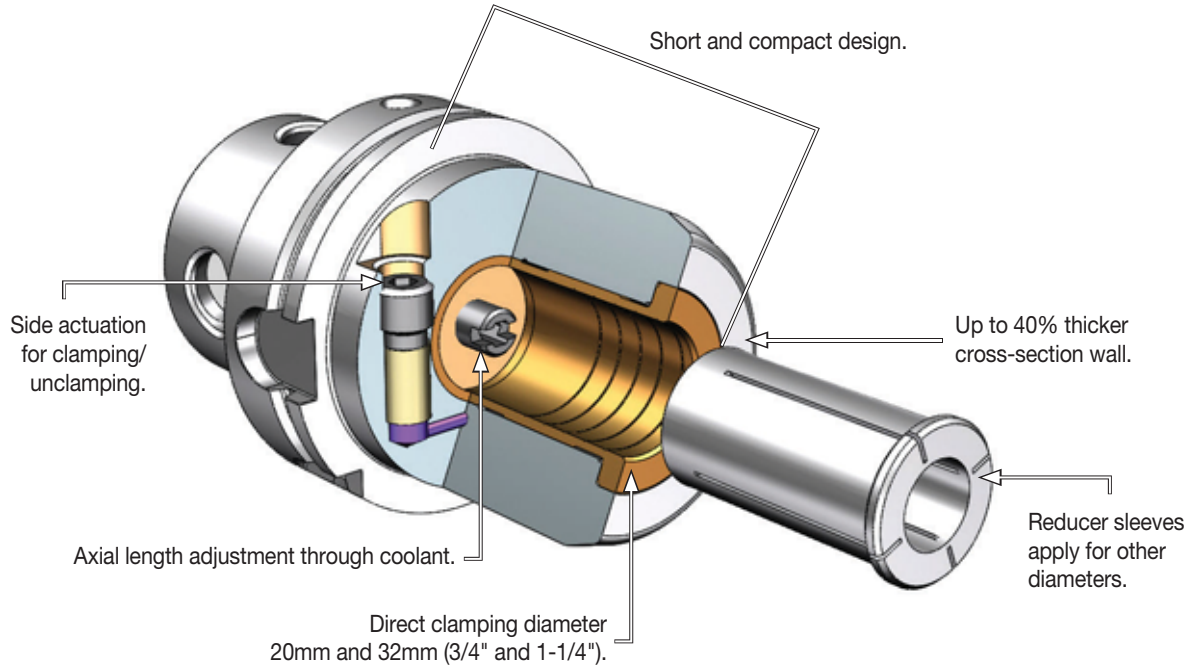
Focused and Flexible Product Offering

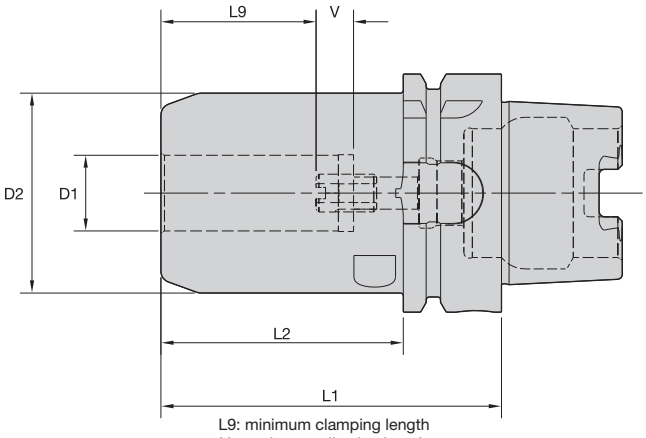
- Allows direct clamping for 20mm and 32mm (3/4" and 1-1/4"). Reducer sleeves available for all combinations metric/inch, which results in reduced toolholder inventory, maximum flexibility, and minimum cost.

Hydraulic Chuck (HC) Basic Working Principle



HydroForce™ Advanced Features





L9: minimum clamping length
V: maximum adjusting length

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON™

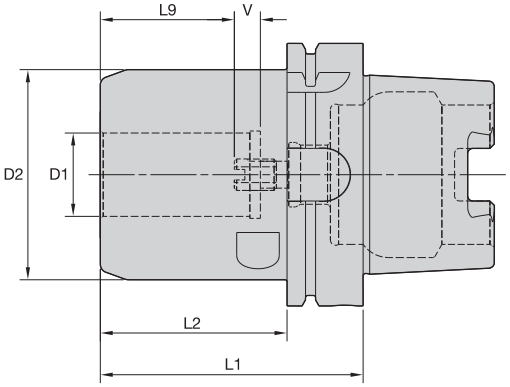
■ HCTHT • Metric • HSK Form A

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520975	**HSK63AHCTHT20090M**	20	53	—	90	64	41	10	**170.135**	5 mm	5 mm	1,54
6048237	**HSK63AHCTHT32100**	32	65	80	100	32	51	10	**170.136**	6 mm	6 mm	2,25

■ HCTHT • Inch • HSK Form A

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5520958	**HSK63AHCTHT075350**	.750	2.067	—	3.500	2.478	1.618	.394	**170.135**	5 mm	5 mm	3.39
6048238	**HSK63AHCTHT125400**	1.250	2.559	3.150	4.000	1.260	2.008	.394	**170.136**	6 mm	6 mm	5.11

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA Tooling Systems catalogue A-09-02122.
Wrenches must be ordered separately.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
HSK coolant unit and wrench are available and must be ordered separately; see page J32 of the WIDIA Tooling Systems catalogue A-09-02122.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON™

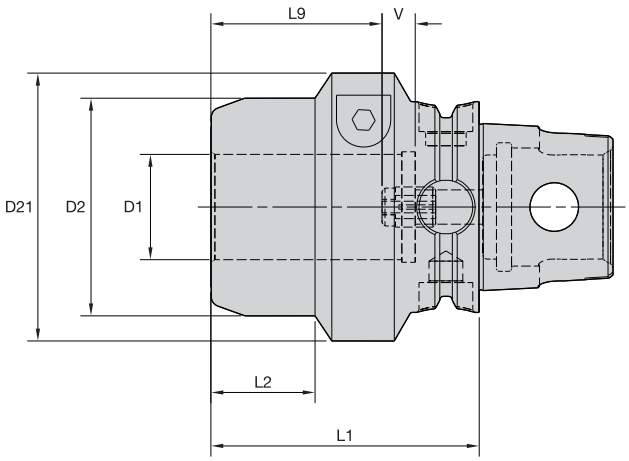
■ HCTHT • Metric • HSK Form A

order number	catalogue number	D1	D2	L1	L2	L9	V	 actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520976	**HSK100AHCTHT20090M**	20	65	90	61	41	10	**170.135**	5 mm	5 mm	3,38
5520977	**HSK100AHCTHT32100M**	32	80	100	71	51	10	**170.136**	6 mm	6 mm	4,29

■ HCTHT • Inch • HSK Form A

order number	catalogue number	D1	D2	L1	L2	L9	V	 actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5520959	**HSK100AHCTHT125400**	1.250	3.150	4.000	2.860	2.012	.394	**170.136**	6 mm	6 mm	9.61

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
HSK coolant unit and wrench are available and must be ordered separately;
see page J32 of the WIDIA Tooling Systems catalogue A-09-02122.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

KM QUICK CHANGE

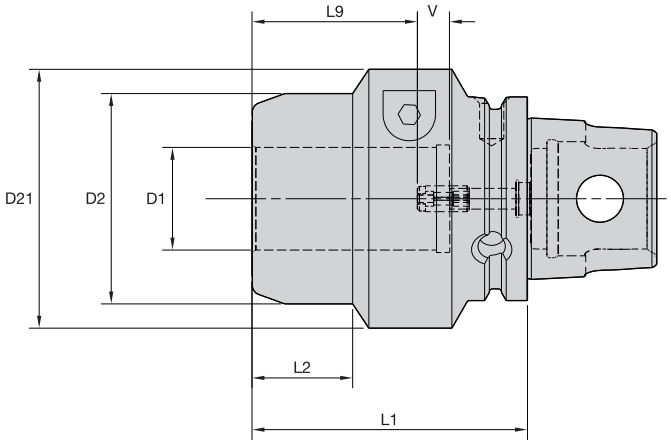
HCTHT • Metric • KM63TS

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	kg
5520979	**KM63TSHCTHT32080M**	32	65,0	80	80	31	51	10	6 mm	6 mm	2,00

HCTHT • Inch • KM63TS

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	lbs
5521070	**KM63TSHCTHT125315**	1.250	2.559	3.150	3.150	1.220	2.012	.394	6 mm	6 mm	4.42

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.



Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

KM QUICK CHANGE

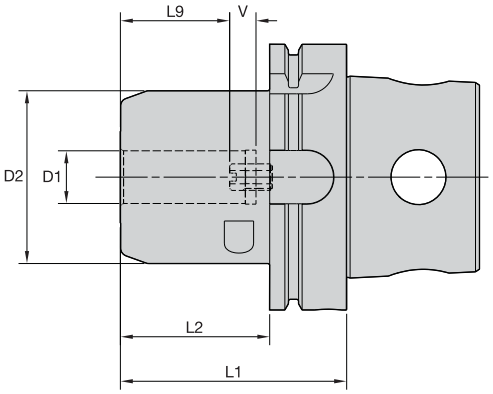
HCTHT • Metric • KM63XMZ

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	kg
5520978	**KM63XMZHCTHT32085M**	32	65,0	80	85	31	51	10	6 mm	4 mm	2,27

HCTHT • Inch • KM63XMZ

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	lbs
5521079	**KM63XMZHCTHT125315**	1.250	2.559	3.150	3.150	1.260	2.012	.394	6 mm	4 mm	4.59

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.



L9: minimum clamping length
V: maximum adjusting length

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

KM QUICK CHANGE

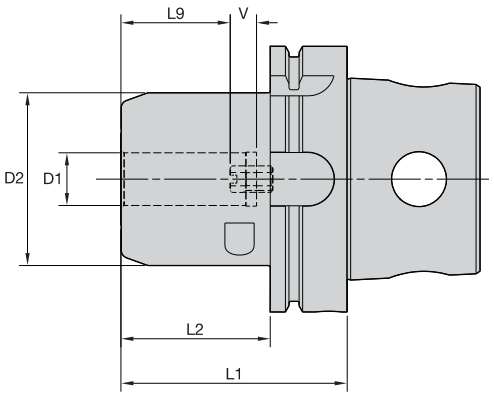
HCTHT • Metric • KM4X™

order number	catalogue number	D1	D2	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	kg
5520990	**KM4X63HCTHT20090M**	20	52,5	90	64	41	10	5 mm	5 mm	1,63

HCTHT • Inch • KM4X

order number	catalogue number	D1	D2	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	lbs
5521071	**KM4X63HCTHT075350**	.750	2.067	3.500	2.478	1.618	.394	5 mm	5 mm	3.57

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
KM4X63 coolant unit and wrench are available and must be ordered separately; order number 5572428 and 1134161.



Cutting Tool Shank Requirements metric (ISO standard)		
cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)	
cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

KM QUICK CHANGE

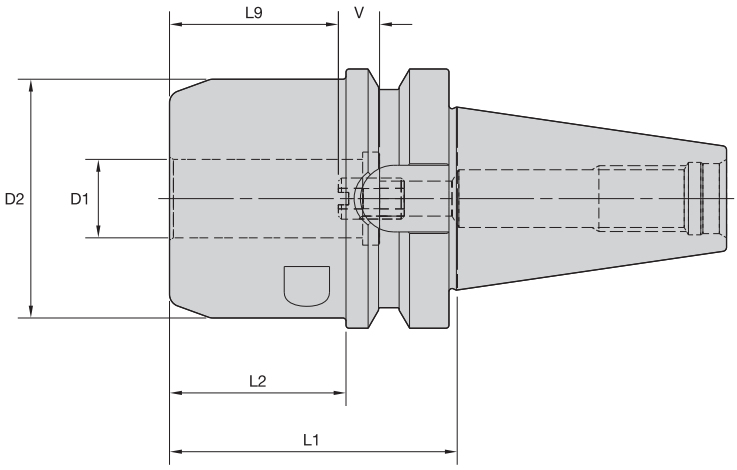
HCTHT • Metric • KM4X™

order number	catalogue number	D1	D2	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	kg
5520991	**KM4X100HCTHT20085M**	20	65,0	85	56	41	10	5 mm	5 mm	3,53
5520992	**KM4X100HCHT32095M**	32	80,0	95	66	51	10	6 mm	6 mm	4,37

HCTHT • Inch • KM4X

order number	catalogue number	D1	D2	L1	L2	L9	V	wrench size actuation screw	wrench size stop screw	lbs
5521072	**KM4X100HCHT125375**	1.250	3.150	3.750	2.630	2.012	.394	6 mm	6 mm	9.66

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
KM4X100 coolant unit and wrench are available and must be ordered separately; order number 5572427 and 1132993.



L9: minimum clamping length
V: maximum adjusting length

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON™

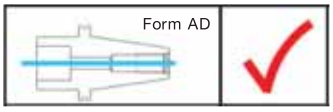
■ HCTHT • Metric • BT40

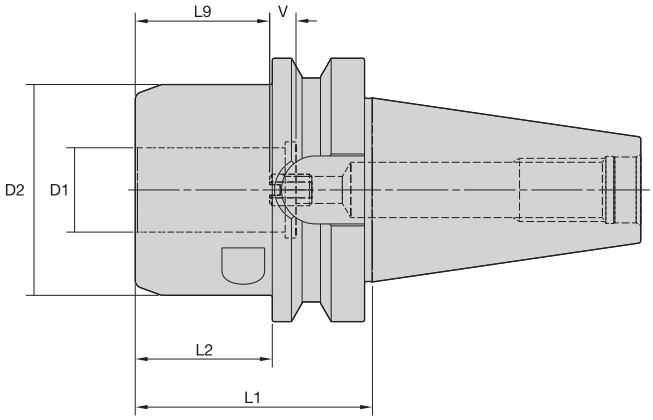
order number	catalogue number	D1	D2	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520971	**BT40HCTHT20070M**	20	58	70	43	41	10	**170.135**	5 mm	5 mm	1,67
6048257	**BT40HCTHT32080M**	32	80	80	80	51	10	**170.136**	6 mm	6 mm	2,31

■ HCTHT • Inch • BT40

order number	catalogue number	D1	D2	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521073	**BT40HCTHT075275**	3/4	2.283	2.750	1.687	1.618	.394	**170.135**	5 mm	5 mm	3.70
6048258	**BT40HCTHT125315**	—	3.150	3.150	3.150	2.008	.394	**170.136**	6 mm	6 mm	5.03

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For retention knobs, see pages J33–J38 of the WIDIA Tooling Systems catalogue A-09-02122.





L9: minimum clamping length
V: maximum adjusting length

Cutting Tool Shank Requirements metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON™

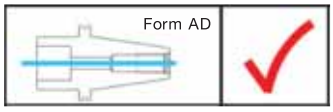
■ HCTHT • Metric • BT50

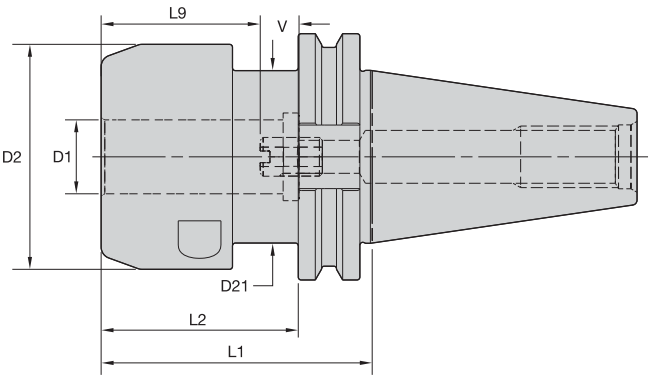
order number	catalogue number	D1	D2	L1	L2	L9	V	 actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520972	**BT50HCTHT32090M**	32	80	90	52	51	10	**170.136**	6 mm	6 mm	5,09

■ HCTHT • Inch • BT50

order number	catalogue number	D1	D2	L1	L2	L9	V	 actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521074	**BT50HCTHT125350**	1 1/4	3.150	3.500	2.004	2.012	.394	**170.136**	6 mm	6 mm	11.14

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For retention knobs, see pages J33–J38 of the WIDIA Tooling Systems catalogue A-09-02122.
For D1 of 32mm (1,25"), please use 6mm Allen wrench with minimum length of 180mm.





L9: minimum clamping length
V: maximum adjusting length

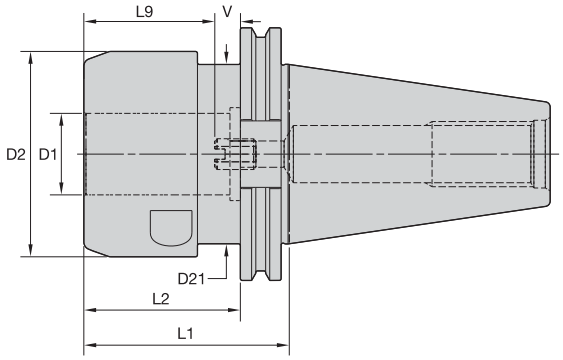
Cutting Tool Shank Requirements inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON™

■ HCTHT • Inch • CV40

order number	catalogue number	D1	D2	D21	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521075	**CV40HCTHT075275**	3/4	2.283	—	2.750	2.000	1.618	.394	**170.135**	5 mm	5 mm	3.41
5647194	**CV40HCTHT125400**	1 1/4	2.559	3.150	4.000	1.575	2.012	.394	**170.136**	6 mm	6 mm	5.59



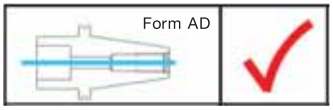
L9: minimum clamping length
V: maximum adjusting length

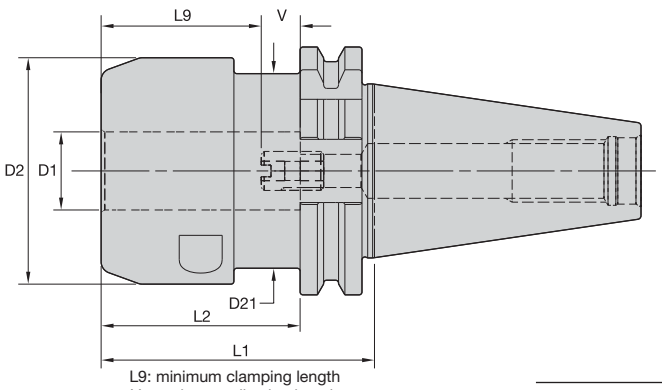
ERICKSON™

■ HCTHT • Inch • CV50

order number	catalogue number	D1	D2	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521076	**CV50HCTHT125315**	1 1/4	3.150	3.150	2.400	2.012	.394	**170.136**	6 mm	6 mm	9.48

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For retention knobs, see pages J33–J38 of the WIDIA Tooling Systems catalogue A-09-02122.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.





L9: minimum clamping length
V: maximum adjusting length

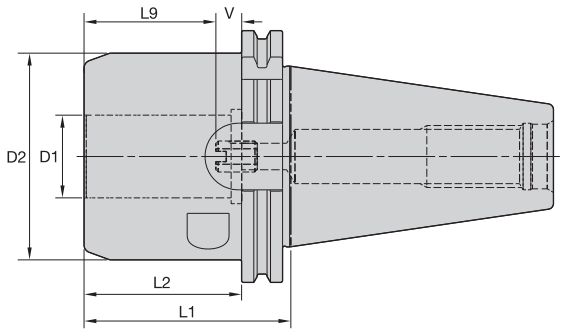
Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

ERICKSON™

■ HCTHT • Metric • DV40

order number	catalogue number	D1	D2	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520973	**DV40HCTHT20070M**	20	58	70	51	41	10	**170.135**	5 mm	5 mm	1,58
6048256	**DV40HCTHT125315**	32	80	80	80	51	10	**170.136**	6 mm	—	2,32
6048255	**DV40HCTHT32080M**	32	80	80	80	51	10	**170.136**	6 mm	6 mm	2,32



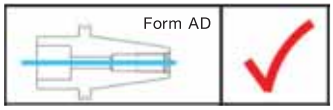
L9: minimum clamping length
V: maximum adjusting length

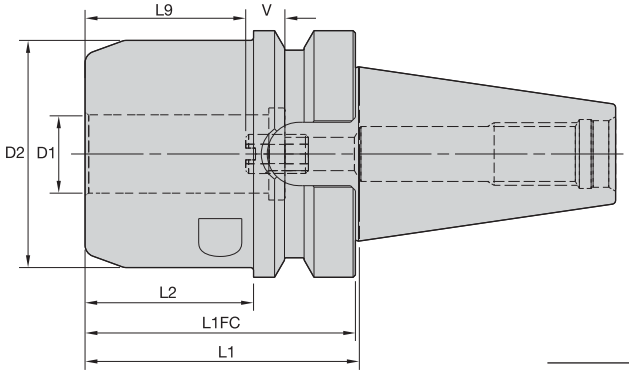
ERICKSON™

■ HCTHT • Metric • DV50

order number	catalogue number	D1	D2	L1	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520974	**DV50HCTHT32080M**	32	80	80	61	51	10	**170.136**	6 mm	6 mm	4,45

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For retention knobs, see pages J33–J38 WIDIA Tooling Systems catalogue A-09-02122.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.





L9: minimum clamping length
V: maximum adjusting length

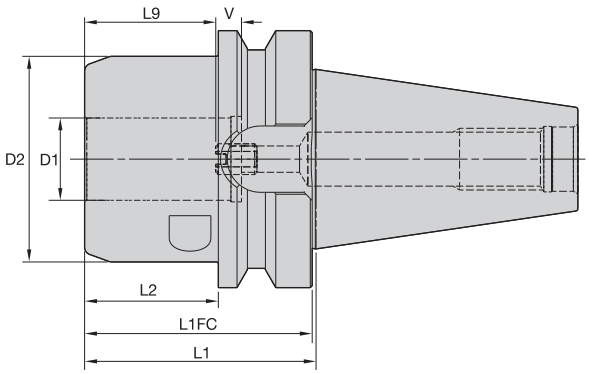
Cutting Tool Shank Requirements
metric (ISO standard)

cutting tool shank diameter	tolerance	
6	h6	0,000/-0,008
8 & 10	h6	0,000/-0,009
12, 14, 16, & 18	h6	0,000/-0,011
20	h6	0,000/-0,013

ERICKSON™

■ HCTHT • Metric • BTKV40

order number	catalogue number	D1	D2	L1	L1FC	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520993	**BTKV40HCTHT20070M**	20	58	70	69	43	41	10	**170.135**	5 mm	5 mm	1,62
6048260	**BTKV40HCTHT125315**	32	80	80	79	79	51	10	**170.136**	6 mm	—	2,28
6048259	**BTKV40HCTHT32080M**	32	80	80	79	79	51	10	**170.136**	6 mm	6 mm	2,29



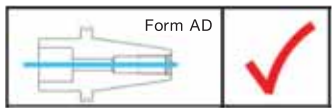
L9: minimum clamping length
V: maximum adjusting length

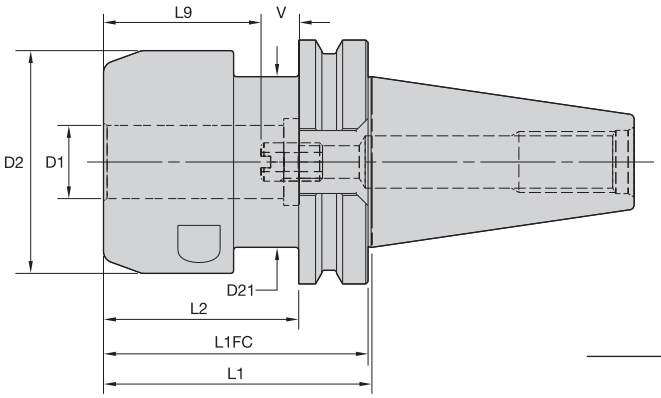
ERICKSON™

■ HCTHT • Metric • BTKV50

order number	catalogue number	D1	D2	L1	L1FC	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	kg
5520994	**BTKV50HCTHT32090M**	32	80	90	89	52	51	10	**170.136**	6 mm	6 mm	5,13

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA™ Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see pages E18–E19.
For retention knobs, see pages J33–J38 WIDIA Tooling Systems catalogue A-09-02122.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.





L9: minimum clamping length
V: maximum adjusting length

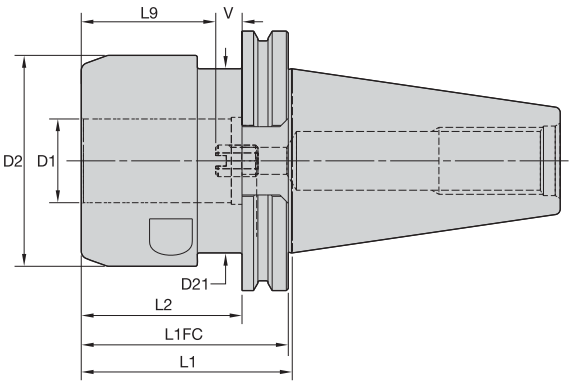
Cutting Tool Shank Requirements
inch (industry standard)

cutting tool shank diameters	tolerance
1/4, 5/16 & 3/8	.0000/-.0004
7/16, 1/2, 9/16, 5/8, & 11/16	.0000/-.0004
3/4, 7/8, 1, & 1-1/4	.0000/-.0005

ERICKSON

■ HCTHT • Inch • CVKV40

order number	catalogue number	D1	D2	D21	L1	L1FC	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521077	**CVKV40HCTHT075275**	.750	2.283	1.750	2.750	2.711	2.000	1.618	.394	**170.135**	5 mm	5 mm	3.43
6048261	**CVKV40HCTHT125315**	1.250	2.559	3.150	3.150	3.110	.787	2.008	.394	**170.136**	6 mm	6 mm	4.39



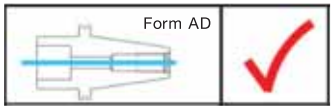
L9: minimum clamping length
V: maximum adjusting length

ERICKSON

■ HCTHT • Inch • CVKV50

order number	catalogue number	D1	D2	D21	L1	L1FC	L2	L9	V	actuation wrench	wrench size actuation screw	wrench size stop screw	lbs
5521078	**CVKV50HCTHT125315**	1.250	3.150	2.750	3.150	3.091	2.400	2.012	.394	**170.136**	6 mm	6 mm	9.52

NOTE: Do not overtorque actuation screw. Tighten by hand until stop is felt.
Hydraulic chuck technical section, see pages K60–K63 of the WIDIA Tooling Systems catalogue A-09-02122.
Supplied with stop screw.
Actuation wrench must be ordered separately.
Reduction sleeves are available and must be ordered separately; see page E18–E19.
For retention knobs, see pages J33–J38 WIDIA Tooling Systems catalogue A-09-02122.
For diameter D1 32mm (1-1/4"), use an L-shape Allen wrench with side length of approximately 200mm.



ERICKSON™ HC Hydraulic Chuck Sleeves

ERICKSON

HC

ERICKSON Hydraulic Reduction Sleeves are specially designed for high-precision clamping of straight cylindrical cutting tool shanks. The self-sealing design enables efficient use of through coolant cutting tools when the cutting tool shank completely engages the full gripping length of the sleeve.

- One-piece design with slot configuration to seal coolant.
- Cutting tool must be cylindrical and have a through hole when using coolant.
- Capable of up to 100 bar (1,500 psi) coolant pressure.
- Cutting tool shank requirement tolerance is h6 and Ra ≥0,3 µm (12 µ in) surface finish.
- Maximum collapse is h6.

How Do Catalogue Numbers Work?

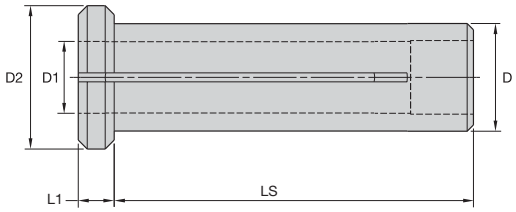
Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

ERICKSON

20MHC160M

20	M	HC	160	M
System Size	System Value	Sleeve Style	Sleeve Bore Size	Identification Value
12 = 12mm **20** = 20mm **32** = 32mm **50** = 1/2" **75** = 3/4" **12** = 1-1/4"	**M** = Previous two numbers built in metric values	**HC** = Hydraulic Chuck	**metric (xx.x)** **010** = 1mm **010** = 16mm **010** = 25mm **inch (x.xxx)** **0125** = 1/8" **0500** = 1/2" **1000** = 1"	**M** = Sleeve bore size built to metric values **(blank)** = Sleeve bore size built to inch values

- One-piece design with slot configuration to seal coolant.
- Cutting tool must be cylindrical and have a through hole when using coolant.
- Sleeve must be inserted completely into the hydraulic chuck until shoulder mates against the hydraulic chuck front face.
- Cutting tools must be in full contact with the sleeve bore length (L9).



ERICKSON

Metric with Metric Bores

D1	L9	12HC D = 12mm D2 = 16mm LS = 40mm	20HC D = 20mm D2 = 25mm LS = 50mm	25HC D = 25mm D2 = 30mm LS = 56mm	32HC D = 32mm D2 = 36mm LS = 60mm
3,0	29	12MHC030M	–	25MHC030M	–
3,0	28	–	20MHC030M	–	–
4,0	29	12MHC040M	–	25MHC040M	–
4,0	28	–	20MHC040M	–	–
5,0	29	12MHC050M	–	25MHC050M	–
5,0	28	–	20MHC050M	–	–
6,0	36	12MHC060M	20MHC060M	–	–
6,0	37	–	–	25MHC060M	32MHC060M
7,0	37	12MHC070M	20MHC070M	25MHC070M	32MHC070M
8,0	37	12MHC080M	20MHC080M	25MHC080M	32MHC080M
9,0	37	12MHC090M	–	–	32MHC090M
9,0	38	–	20MHC090M	25MHC090M	–
10,0	40	12MHC100M	20MHC100M	25MHC100M	32MHC100M
11,0	40	–	20MHC110M	–	–
11,0	41	–	–	–	32MHC110M
12,0	45	–	20MHC120M	–	32MHC120M
12,0	46	–	–	25MHC120M	–
13,0	45	–	20MHC130M	–	32MHC130M
14,0	45	–	20MHC140M	–	–
14,0	47	–	–	25MHC140M	–
14,0	46	–	–	–	32MHC140M
15,0	45	–	20MHC150M	–	–
15,0	46	–	–	–	32MHC150M
16,0	48	–	20MHC160M	25MHC160M	32MHC160M
17,0	48	–	–	–	32MHC170M
18,0	48	–	–	25MHC180M	–
18,0	49	–	–	–	32MHC180M
19,0	49	–	–	–	32MHC190M
20,0	49	–	–	25MHC200M	–
20,0	50	–	–	–	32MHC200M
22,0	51	–	–	–	32MHC220M
25,0	57	–	–	–	32MHC250M

(continued)

(HC Hydraulic Chuck Sleeves — continued)

Metric with Inch Bores

D1	L9	20HC D = 20mm D2 = 25mm LS = 50mm	32HC D = 32mm D2 = 36mm LS = 60mm
3/16	28	20HCM0188	–
1/4	36	20HCM0250	–
5/16	37	20HCM0312	–
3/8	38	20HCM0375	–
7/16	40	20HCM0438	–
1/2	45	20HCM0500	32HCM0500
9/16	45	20HCM0562	–
5/8	48	20HCM0625	–
9/16	46	–	32HCM0562
5/8	46	–	32HCM0625
11/16	48	–	32HCM0688
3/4	50	–	32HCM0750
7/8	51	–	32HCM0875
1	56	–	32HCM1000

Inch with Metric Bores

D1	L9	50HC D = .500 D2 = .630 LS = 1.575	75HC D = .750 D2 = .984	12HC D = 1.250 D2 = 1.417
3,0	29	50HC030M	–	–
3,0	28	–	75HC030M	–
4,0	29	50HC040M	–	–
4,0	28	–	75HC040M	–
5,0	29	50HC050M	–	–
5,0	28	–	75HC050M	–
6,0	36	50HC060M	75HC060M	–
8,0	37	50HC080M	75HC080M	–
10,0	40	50HC100M	75HC100M	–
12,0	45	–	75HC120M	–
14,0	45	–	75HC140M	–
16,0	48	–	75HC160M	–
18,0	49	–	–	12HC180M
20,0	50	–	–	12HC200M
25,0	57	–	–	12HC250M

Inch with Inch Bores

D1	L9	50HC D = .500 D2 = .630 LS = 1.575	75HC D = .750 D2 = .945 LS = 1.969	12HC D = 1.250 D2 = 1.417 LS = 2.362
1/8	29	50HC0125	–	–
1/8	28	–	75HC0125	–
3/16	29	50HC0188	75HC0188	–
1/4	36	50HC0250	–	–
1/4	38	–	75HC0250	–
5/16	37	50HC0312	–	–
5/16	41	–	75HC0312	–
3/8	40	50HC0375	–	–
3/8	41	–	75HC0375	–
7/16	41	–	75HC0438	–
1/2	45	–	–	12HC0500
1/2	46	–	75HC0500	–
9/16	46	–	75HC0562	12HC0562
5/8	46	–	75HC0625	12HC0625
11/16	48	–	–	12HC0688
3/4	50	–	–	12HC0750
13/16	50	–	–	12HC0812
7/8	51	–	–	12HC0875
1	55	–	–	12HC1000

NOTE: Inserting the cutting tool less than the gripping length (L9) of the sleeve can permanently damage the sleeve and hydraulic chuck. Recommended to clean coolant holes periodically with air.

HydroForce HT Torque Comparison

Torque Capacity of Toolholders, Nm

bore diameter (mm)	shank diameter (mm)	adaptor type				
		regular hydraulic chuck	Shrink Fit holder* GP	Shrink Fit holder* HT	HydroForce hydraulic chuck	milling chuck (bearing type)
20	**20**	220	410–1050	650–1290	**800**	1120
32	**32**	700	1030–2080	1340–2380	**2000**	2350
32 with sleeve	**20**	440	–	–	**1500**	1460

**Torque is highly influenced by shank diameter of cutting tool and bore size.*
All above torque values are for solid carbide shanks in dry condition at minimum clamping length.

How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

KM4X	100	HCTHT	32	095	M
Shank Style	System Size	Toolholder Style (**H**ydraulic **C**huck **T**rend **L**ine **H**igh **T**orque)	Toolholder Size (Bore Size)	Tool Length	Metric

HC = Hydraulic Chuck — Standard Line

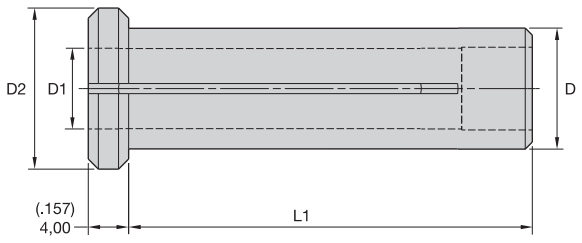
HCB = Hydraulic Chuck — Basic Line

HCSLT = Hydraulic Chuck — Slim Line — Trend

HCT = Hydraulic Chuck — Trend Line

Reducer Sleeve Product Portfolio

Reducer Sleeves		
d	**D (metric)**	**D (inch)**
12mm	3–10	–
20mm	3–16	3/16–5/8"
25mm	3–20	–
32mm	6–25	1/2–1"
1/2"	3–10	1/8–3/8"
3/4"	3–16	1/8–5/8"
1-1/4"	6–25	1/2–1"



Reduction sleeves available in metric and inch bores.

Applying the Product

High Torque Hydraulic Chuck is a new solution developed by WIDIA™ to address holding in all types of applications in all types of material.

These chucks have great gripping torque comparable to shrinkers and power grip chucks.

They can be used to hold shank diameters having h4 (3–4mm), h5 (5mm), h6 (>6mm) tolerance in rough milling, tapping, drilling, and reaming applications recommended to hold solid carbide shanks.

Parameters as recommended in solid carbide end milling catalogues can be used.

NOTE: Check if spindle connections can support the bending loads.

One Powerful Chuck — Best Suited for All Operations.

 3D Profiling	 Coolant — Through Coolant 100 bar (1500 psi) Maximum	 Drilling into Solid	 Drilling — Through Coolant
 Plunge Milling	 Ramping: Blank	 Reaming: Through Hole	 Shank — Cylindrical Plain
 Side/Shoulder Milling: Square End with AE/AP Dimensions	 Slotting: Square End	 Tapping: Through Hole	

- Cutting tool must be cylindrical and have a through hole when using coolant.
- Sleeve must be inserted completely into the hydraulic chuck until shoulder mates against the hydraulic chuck front face.

Benchmark Toolholders

technical data/characteristics	toolholders				
	HydroForce high torque	Shrink Fit	milling chuck	ER collet chuck	Weldon® adaptor
torque transmission	★★★★★	★★★★	★★★★★	★★	★★★★★
radial runout (T.I.R.)[1]	★★★★★	★★★★★	★★★★	★★★	★
radial rigidity[2]	★★★	★★★★★	★★★	★★★	★★★
tool length adjustment	★★★★★	★★★★	★	★★★★	★★
tool shank tolerance requirement	★★★	★★	★★★	★★★★★	★★★
through coolant	★★★★★	★★★★★	★★★	★★★	★★
minimum quantity lubrication (MQL)	★★★★★	★★★★★	★	★	★
dampening capability	★★★★★	★	★★★	★★★	★★★
shank diameter range[3]	★★★★★	★	★★★★★	★★★★★	★
cost of toolholder	★★	★★★	★	★★★★	★★★★★
low requirement of external devices[4]	★★★★★	★	★★★★	★★★★	★★★★★
ease of handling	★★★★★	★★★	★★	★★★★	★★★★
dust resistance	★★★★★	★★★★★	★★★	★★★	★★★★
high-speed capability	★★★★★	★★★★★	★★★	★★★	★
balancing accuracy	★★★★★	★★★★★	★★★	★★★	★

[1] *Radial runout may affect tool life.*
[2] *Radial rigidity for Weldon holder is low at a direction perpendicular to the screw.*
[3] *Accepts different shank diameters through the use of reduction sleeves or due to collapse range.*
[4] *Collet chucks and milling chucks may require the use of a torque or special wrench; Shrink Fit adaptor requires a shrinking unit.*

$25,000 estimated savings per year	2.3x longer tool life	Exceptional surface quality
Field Test 1	**Field Test 2**	**Field Test 3**
S650 Cylinder Head	**Mill Mounting & Pump Flange**	**Straightness Test with INCONEL® 718**
CHALLENGE • Operation — End milling inside of rocker valley • Material — Varifer cast iron • Coolant type — External emulsion	**CHALLENGE** • Operation — Side/face milling and slotting • Material — 80-55-06 (grey cast iron) • Coolant type — External emulsion	**CHALLENGE** • Operation — Slotting • Material — INCONEL 718 • Coolant type — External emulsion
SOLUTION • Adapter — CV50BHCHTHT32080M; used 1" reduction sleeve • Base line — CV50BHPMC100650 • End mill — 4V6525028BW WP15PE	**SOLUTION** • Adapter — CV50BHCHTHT32080M; used 3/4" reduction sleeve • Base line — CV50EM075575 • End mill — 5V0C19007BT WP15PE	**SOLUTION** • Adapter — DV40BHCTHT20090M; direct clamp • Base line — D = 20mm, GPL = 82mm
CUTTING DATA • vc — 116 m/min (380 SFM) • fz — 0,114 mm/U (.0045 IPT) • Ap — 5,08mm (.2") • Ae — 2,54mm (.1") • Spindle speed — 1451 rev/min	**CUTTING DATA** • vc — 105,1 m/min (344 SFM) • F — 0,116 mm/U (.0046 IPT) • Ap — 17,526mm (.69") • Ae — 3,81mm (.15") • Spindle speed — 1750 rev/min	**CUTTING DATA** • vc — 26 m/min (85.09 SFM) • F — 120 m/min • Ap — 20mm (.787") • Ae — 4mm (.015") • Ran for 20 minutes.
RESULT • Standard HPMC chuck — 63 minute tool life. • New HydroForce HT — 101 minute tool life. • 299 m (984 ft) increment in tool life distance.	**RESULT** • Standard end mill adapter — 80.9 minute tool life. • New HydroForce HT — 213.1 minute tool life. • 1612 m (5290 ft) increment in tool life distance.	**RESULT** • Straightness measured — 0,05mm. • No chip-off and no wear found on cutting edges.
BENEFIT • Up to 80% more tool life compared to competition. • Estimated savings of $25,893 per year. • Exceptional surface finish. • Easy handling and tool presetting.	**BENEFIT** • 2.3x more tool life compared to competition. • Estimated savings of $14,840 per year. • Exceptional surface finish. • Easy handling and tool presetting.	**BENEFIT** • Better quality of straightness. • No pullout. • Exceptional surface finish. • Easy handling and tool presetting.

Hydraulic Chuck Reducer Sleeves

Primary Application

Safe-Lock™ Smart Coolant reducer sleeves are specially designed for high precision and secure clamping of Safe-Lock™ tool shanks. The special drive feature in the reducer sleeve and grooves in the tool shank prevent the end mill from spinning and pullout during extreme machining conditions. The Smart Coolant feature enhances efficient cooling and easy chip evacuation, which leads to increased tool life. In addition, the real locking feature, which engages with a basic holder, provides bonus security for reducer sleeves against slippage and pullout.

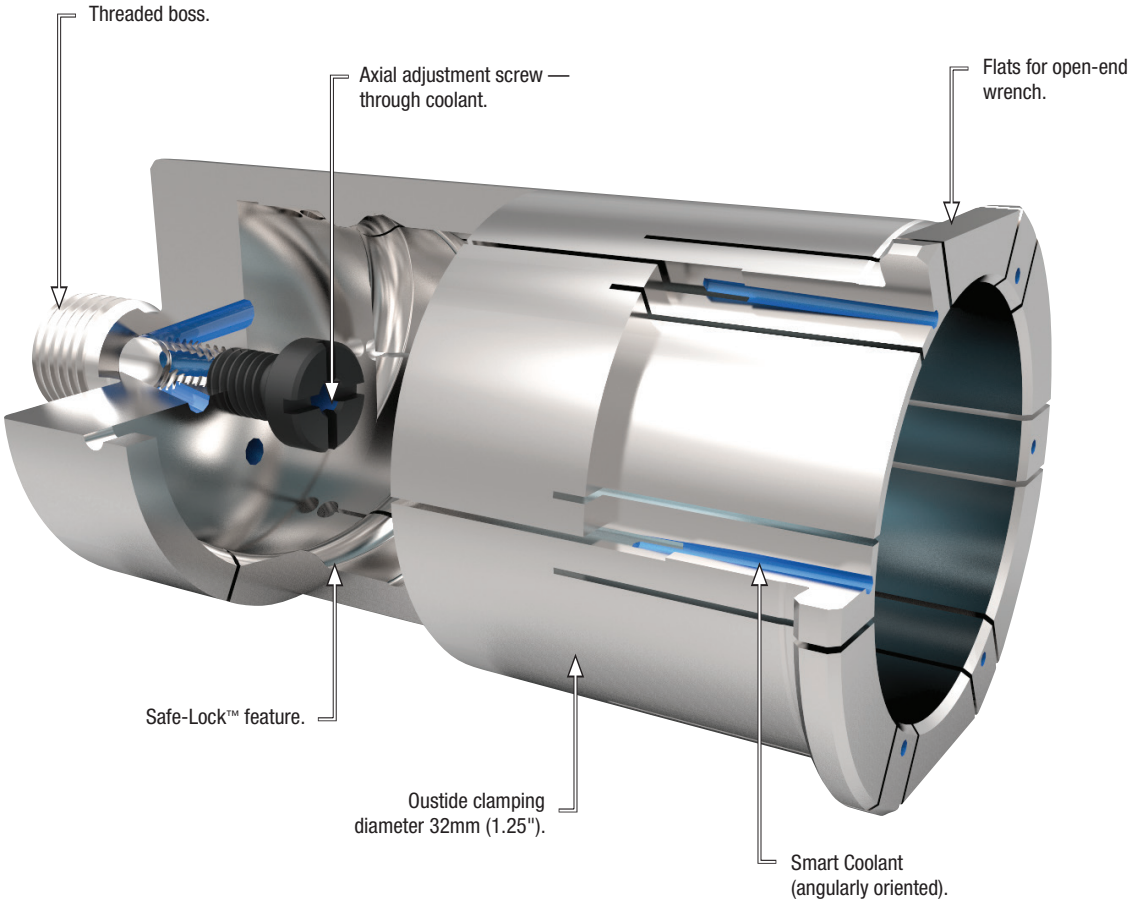
Low vibration, in combination with pullout protection, excellent runout accuracy, and the hydraulic system's dampening property, results in very efficient machining with reduced and uniform tool wear. Due to the increased cutting depths and feeds, the metal removal rates can be increased up to the maximum limits of the tool and machine.

We are the first in the market to introduce the Safe-Lock™ with Smart Coolant feature in the high torque hydraulic chuck portfolio.

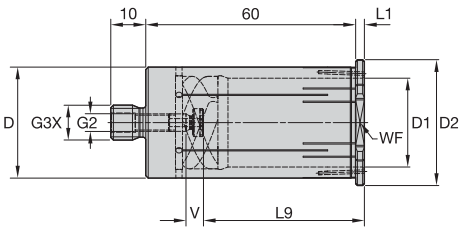
Features and Benefits

Stay Safe with Safe-Lock™ Smart Coolant

- For High-Performance Cutting (HPC).
- Highly accurate clamping due to hydraulic technology.
- High torque due to form-closed clamping.
- Highest stiffness by robust construction of HydroForce™.
- No loss of accuracy.
- No pullout of the tool.
- No spinning of the tool.
- No damage on workpiece or machine.
- Easy and quick clamping and unclamping cycles.
- Safe-Lock™ Smart Coolant reducer sleeves are available for shank diameters 12, 14, 16, 20, and 25mm (.5, .625, .75, and 1").


Threaded boss.
Axial adjustment screw — through coolant.
Flats for open-end wrench.
Safe-Lock™ feature.
Oustide clamping diameter 32mm (1.25").
Smart Coolant (angularly oriented).

- One-piece design with slot configuration to seal coolant.
- Cutting tool must be cylindrical and have the Safe-Lock™ grooves on the shank.
- Sleeve must be screwed completely into the hydraulic chuck until shoulder mates against the hydraulic chuck front face.
- Cutting tool shank holding requirement at least to L9 dimension.

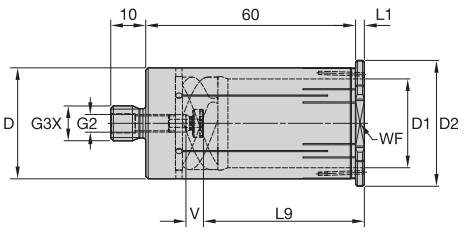


MHCSFC • Metric

order number	catalogue number	D1	D2	D	L1	L9	V	G3X	G2	WF
5998607	**32MHCSFC120M**	12	36	32	2,5	41	4	M12	M6	32
5998608	**32MHCSFC140M**	14	36	32	2,5	41	4	M12	M6	32
5998609	**32MHCSFC160M**	16	36	32	2,5	44	4	M12	M6	32
5998610	**32MHCSFC200M**	20	36	32	2,5	46	4	M12	M6	32
5998751	**32MHCSFC250M**	25	36	32	2,5	47	4	M12	M6	32

NOTE: Inserting the cutting tool less than the gripping length (L9) of the sleeve can permanently damage the sleeve and hydraulic chuck. Recommended to clean coolant holes periodically with air.

- One-piece design with slot configuration to seal coolant.
- Cutting tool must be cylindrical and have the Safe-Lock™ grooves on the shank.
- Sleeve must be screwed completely into the hydraulic chuck until shoulder mates against the hydraulic chuck front face.
- Cutting tool shank holding requirement at least to L9 dimension.



HCSFC • Inch

order number	catalogue number	D1	D2	D	L1	L9	V	G3X	G2	WF
5998754	**12HCSFC0500**	.500	1.417	1.250	.098	1.614	.154	M12	M6	1.260
5998755	**12HCSFC0625**	.625	1.417	1.250	.098	1.732	.154	M12	M6	1.260
5998756	**12HCSFC0750**	.750	1.417	1.250	.098	1.811	.154	M12	M6	1.260
5998757	**12HCSFC1000**	1.000	1.417	1.250	.098	1.850	.154	M12	M6	1.260

NOTE: Inserting the cutting tool less than the gripping length (L9) of the sleeve can permanently damage the sleeve and hydraulic chuck. Recommended to clean coolant holes periodically with air.

Safe-Lock™ Smart Coolant

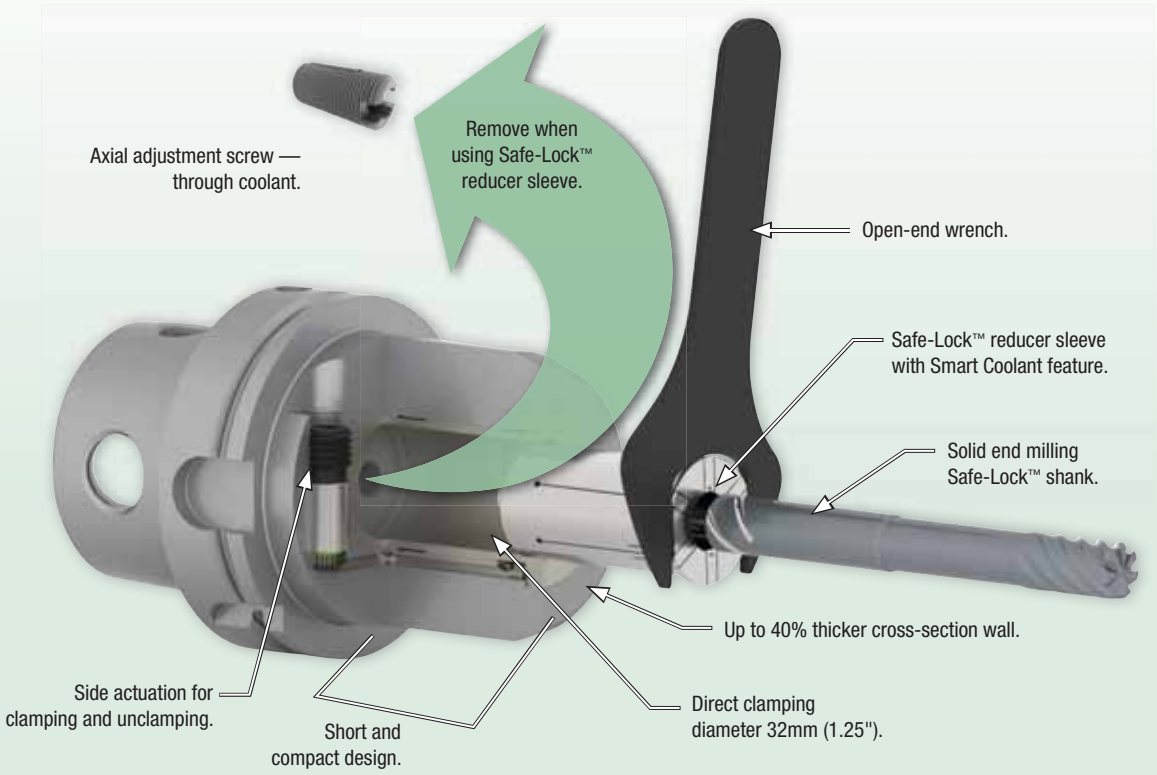
The Safe-Lock™ Smart Coolant feature is a pullout protection system with an effective cooling feature for high-performance machining, in particular for heavy-duty machining. This is achieved by helical grooves that are ground into the tool shank. These, in combination with the drive feature in a Safe-Lock™ Smart Coolant reducer sleeve, prevent the tool from being pulled out during extreme machining conditions.

In addition, the rear-locking feature, which engages with a basic holder, provides bonus security for reducer sleeves against slippage and pullout.

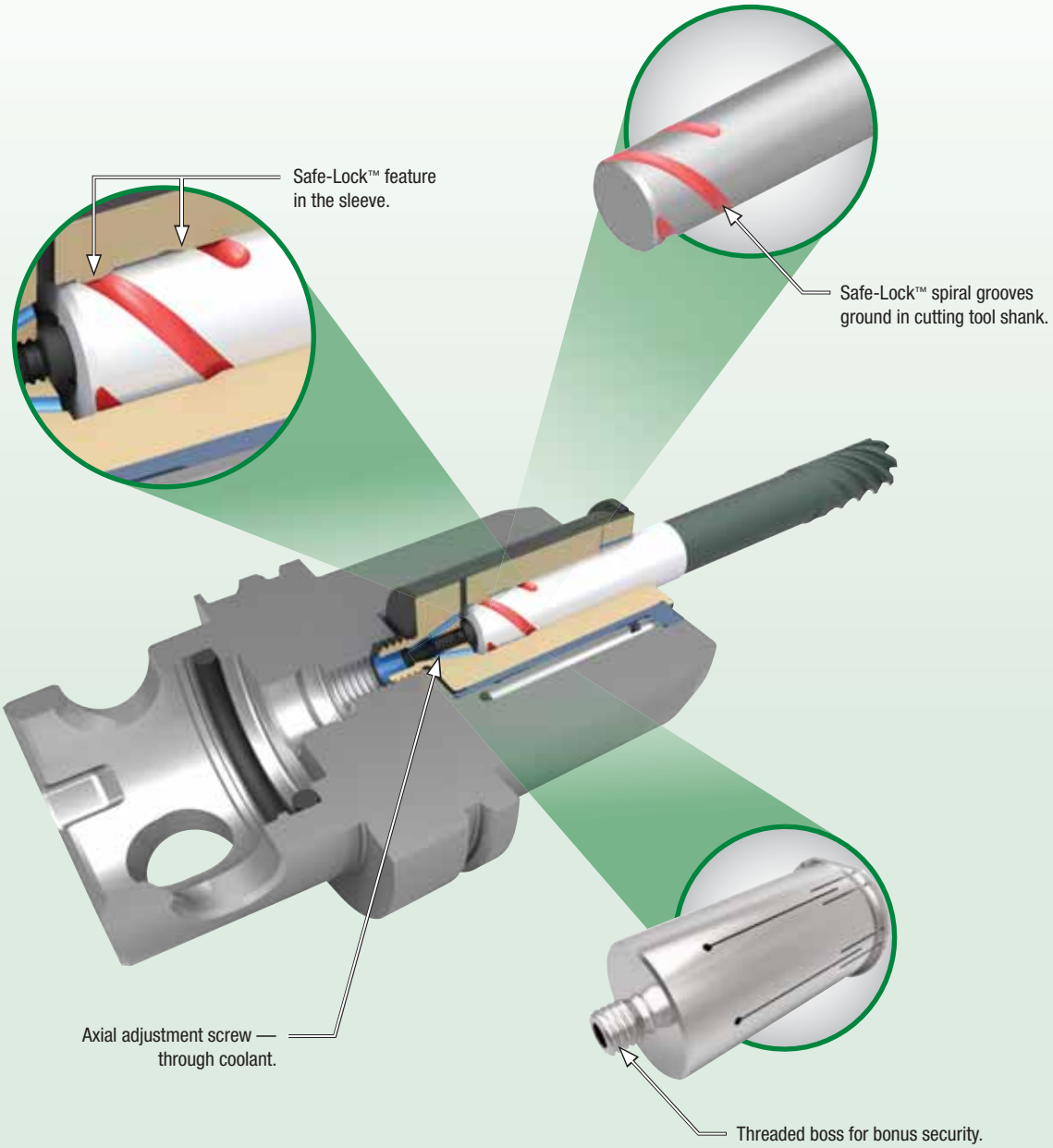
By locking the cutting tool in the Safe-Lock™ Smart Coolant reducer sleeve, the pullout security ensures optimum process reliability in conjunction with the HydroForce™ HT, which has benefits such as runout accuracy, excellent torque, and a unique dampening property. This makes for longer tool life, higher productivity, and excellent part accuracy for our customers.

- Optimum process reliability and security.
- Higher productivity.
- Greater cutting depths and higher feed rates.
- Time-saving and longer cutting tool life.
- Less vibration.
- Optimises the cutting edge technology.
- Able to fully utilise potential of machine tool.
- Minimises potential scrap.
- High accuracy clamping.
- Excellent runout.
- Helical grooves.
- Adjustable clamping length.
- No need to change NC programme after regrinding.

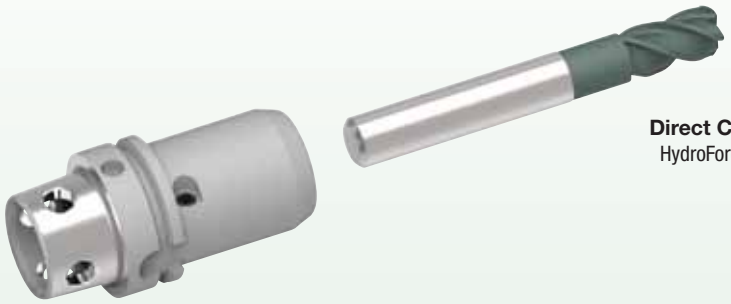
HydroForce — Conversion from Standard to Safe-Lock™



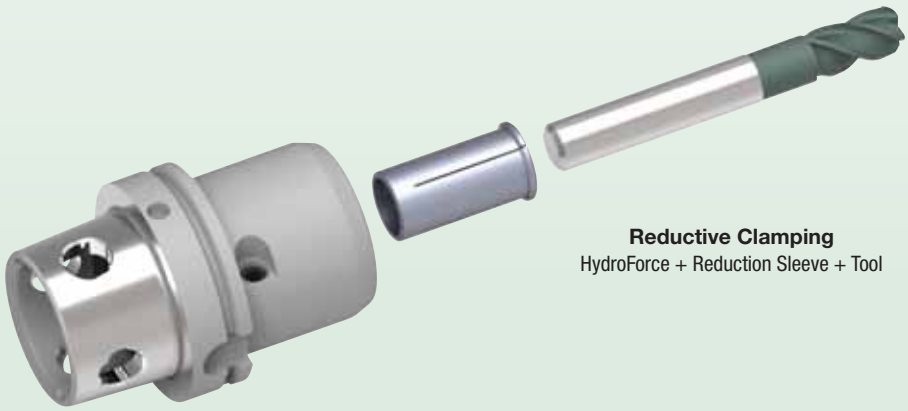
Product Construction and Assembly



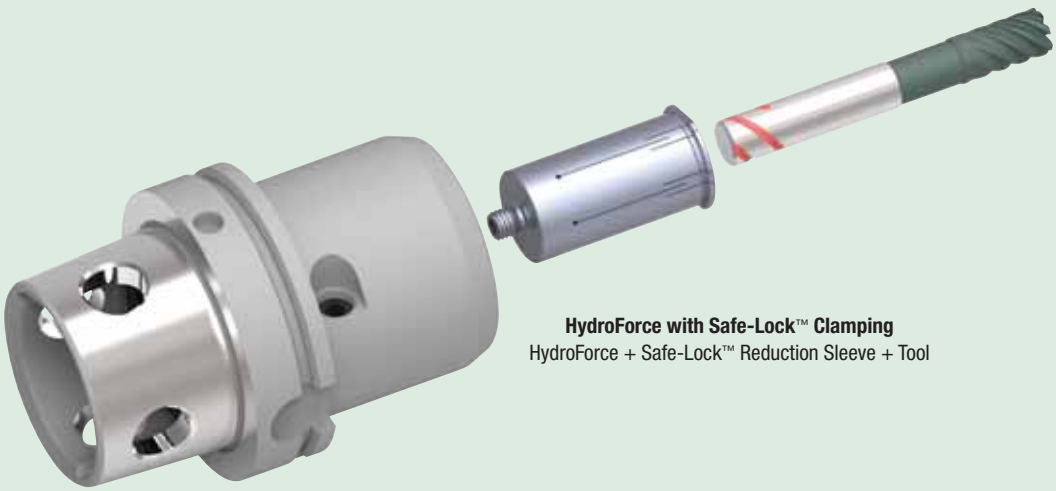
Clamping Combinations with HydroForce™



Direct Clamping
HydroForce + Tool



Reductive Clamping
HydroForce + Reduction Sleeve + Tool



HydroForce with Safe-Lock™ Clamping
HydroForce + Safe-Lock™ Reduction Sleeve + Tool

ERICKSON™ NG Induction Shrink Fit Unit

A complete Shrink Fit unit to fully support your thermo-tool needs!

ERICKSON NG Induction Shrink Fit Unit

- High-performance Shrink Fit machine for all tools.
- With intelligent new generation coil.
- With integrated contact cooling system.

Features and Benefits

- Tool exchanges in 3–5 seconds.
- Complete tool cooling in 30 seconds.
- Simultaneous shrinking and cooling in record time (3 stations).
- Reduction of tool assembly cost.
- Adaptable to multi-clamping.

Delivery Includes:

- Intelligent NG coil VS32-h.
- Integrated contact cooling.
- Speed cooler.
- Cooling manager.
- Rotary table with 3 stations.
- 2 chuck supports for rotary table for your selection.
- Craning boxes.
- System cart.
- Inserts for system cart.
- TME Cooling System for safe handling.
  - 2 cooling adaptors for Shrink Fit extensions.
  - 1 cooling body for Shrink Fit chucks.
- Protection gloves.
- Safe packaging.

ERICKSON NG Induction Shrink Fit Unit comes complete, ready to work!

Enhanced Coil Technology

- Coil is flexible and adjustable by diameter.
- Coils can be set to the size of the diameter with one turn.
- Stop disks are no longer necessary.
- Chucks are only heated where it is intended.
- Intelligent coil to protect from overheating of the chuck.

Select the back ends of the holders you need to shrink and the pots you need will be included with your unit.

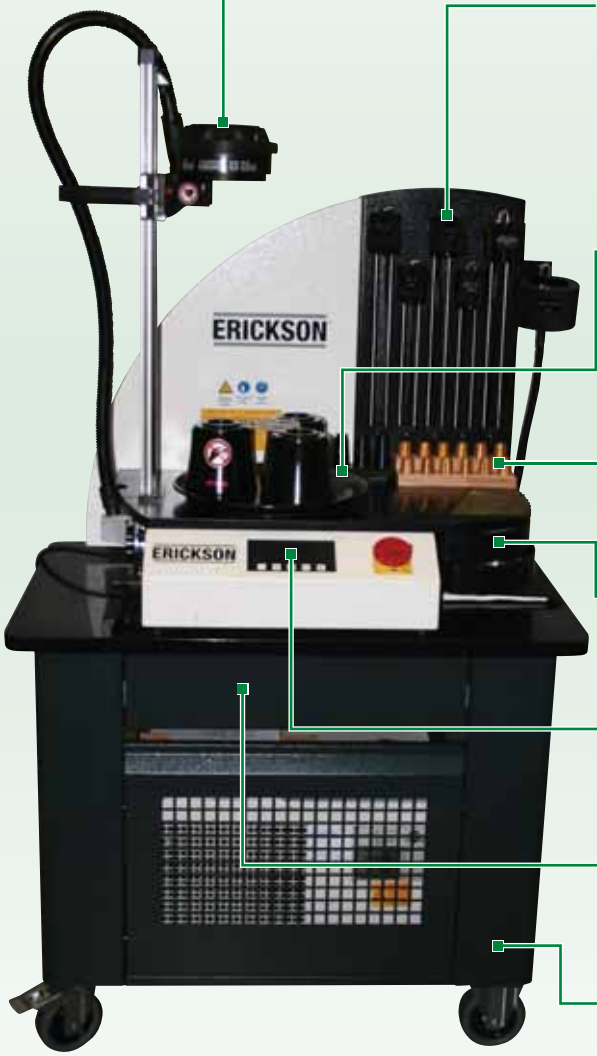
Technical Details

- Power: 13 kW
- Main voltage: 3 x 400–480 V, 16 A
- Tools: solid carbide and HSS from Ø 3–32mm
- Maximum length of shrink fit chuck = 570mm
- Dimensions W x D x H = 860 x 600 x 990mm
- Weight 70 kg
- HD kit for diameters up to 50 mm/2"

US Version
- Order No. **5905657**
- Cat No. **TTPWCNGNA**

EU Version
- Order No. **5906168**
- Cat No. **TTPWCNGEU**

Single-Hand Operation
- Positioning of coil and starting of shrink process with one hand.



Cooling Bodies for Rapid Cooling with TME Cooling System
- Patented temperature control system with LED.
- Chucks remain dry.
- No rust.
- Hot spots always covered, no danger of injury.
- Hot parts need not to be taken into the hand.

Rotary Table
- Work fast and efficient.
- Heating and cooling at the same time on 3 stations.
- No idle periods.

Tool Tray
- For laying down cutting tools.
- Integrated in base plate.

Craning Boxes
- For accessories.
- Everything close at hand.

Display
- User-friendly operating panel.
- Clear, compact, and easy to handle.

Drawer
- Profiled inserts for accessories.
- Everything in its place.

System Cart
- For a clearly arranged and ergonomic work place.

Your first choice for fast, reliable heating and cooling of your Shrink Fit tools.

Shrink Fit Unit Complete

order number	catalogue number	description
5905657	TTPWCNGNA	POWER CLAMP NEW GEN SHRINK FIT (UL and CSA approved) for North America
5906168	TTPWCNGEU	POWER CLAMP NEXT GEN SHRINK FIT (CE and FC approved) for Europe/ROW

Order No.	Catalogue No.	Page(s)
5210278	M200D32Z04B32RN10	A33
5210279	M200D25Z03A25RN10L150	A34
5210300	M200D25Z03A25RN10L200	A34
5210301	M200D25Z03A32RN10L250	A34
5210302	M200D28Z03A25RN10L200	A34
5210303	M200D32Z04A32RN10L150	A34
5210304	M200D32Z03A32RN10L200	A34
5210305	M200D40Z04RN10	A35
5210306	M200D40Z06RN10	A35
5210307	M200D50Z05RN10	A35
5210308	M200D50Z06RN10	A35
5210309	M200D52Z06RN10	A35
5274455	RNGJ10T3M0EML WP35CM	A37
5274456	RNGJ10T3M0EML WP25PM	A37
5274457	RNGJ10T3M0EML WU35PM	A37
5274511	RNGJ10T3M0SMM WP25PM	A37
5274512	RNGJ10T3M0SMM WU35PM	A37
5274560	RNGJ1605M0EML WP35CM	A49
5274561	RNGJ1605M0EML WP25PM	A49
5274562	RNGJ1605M0EML WU35PM	A49
5276196	RNPJ10T3M0SMM WP35CM	A37
5276197	RNPJ10T3M0SMM WP25PM	A37
5276198	RNPJ10T3M0SMM WP20CM	A37
5276199	RNPJ10T3M0SMH WP35CM	A37
5276240	RNPJ10T3M0SMH WP25PM	A37
5276241	RNPJ10T3M0SMH WP20CM	A37
5276243	RNPJ10T3M0SMH WK15CM	A37
5276360	RNPJ1204M0SMM WP35CM	A45
5276361	RNPJ1204M0SMM WP25PM	A45
5276362	RNPJ1204M0SMM WP20CM	A45
5276363	RNPJ1204M0SMH WP35CM	A45
5276364	RNPJ1204M0SMH WP25PM	A45
5276365	RNPJ1204M0SMH WP20CM	A45
5276366	RNPJ1204M0SMH WK15CM	A45
5276470	RNPJ1605M0SMM WP35CM	A50
5276471	RNPJ1605M0SMM WP25PM	A50
5276472	RNPJ1605M0SMM WP20CM	A50
5276473	RNPJ1605M0SMH WP35CM	A50
5276474	RNPJ1605M0SMH WP25PM	A50
5276475	RNPJ1605M0SMH WP20CM	A50
5276476	RNPJ1605M0SMH WK15CM	A50
5366646	VTSPO6505 WU41EG	D9
5366647	VTSPO6505 WP42EG	D9
5366648	VTSPO6505 WP49EG	D9
5366649	VTSPO6505 WU40EG	D9
5366660	VTSPO6506 WP49EG	D9
5366661	VTSPO6507 WP49EG	D9
5366662	VTSPO6508 WU41EG	D9
5366663	VTSPO6508 WP49EG	D9
5366664	VTSPO6508 WU40EG	D9
5366665	VTSPO6509 WP49EG	D9
5366666	VTSPO6510 WU41EG	D9
5366667	VTSPO6510 WP42EG	D9
5366668	VTSPO6510 WP49EG	D9
5366669	VTSPO6510 WU40EG	D9
5366670	VTSPO6511 WP49EG	D9
5366671	VTSPO6512 WU41EG	D9
5366673	VTSPO6512 WP49EG	D9
5366674	VTSPO6512 WU40EG	D9
5366675	VTSPO6513 WU41EG	D9
5366676	VTSPO6513 WP42EG	D9
5366677	VTSPO6513 WP49EG	D9
5366678	VTSPO6513 WU40EG	D9
5366679	VTSPO6514 WP49EG	D9
5366680	VTSPO6515 WU41EG	D9
5366681	VTSPO6515 WP42EG	D9
5366682	VTSPO6515 WP49EG	D9
5366684	VTSPO6515 WU40EG	D9
5366685	VTSPO6516 WP49EG	D9
5366686	VTSPO6517 WU41EG	D9
5366687	VTSPO6517 WP42EG	D9
5366688	VTSPO6517 WP49EG	D9
5366689	VTSPO6517 WU40EG	D9
5366690	VTSPO6518 WP49EG	D9
5366692	VTSPO6519 WU41EG	D10
5366693	VTSPO6519 WP42EG	D10
5366695	VTSPO6519 WP49EG	D10
5366696	VTSPO6519 WU40EG	D10
5366697	VTSPO6520 WP49EG	D10
5366698	VTSPO6521 WU41EG	D10
5366700	VTSPO6521 WP42EG	D10
5366701	VTSPO6521 WP49EG	D10
5366703	VTSPO6521 WU40EG	D10
5366704	VTSPO6522 WP49EG	D10
5366705	VTSPO6523 WU41EG	D10
5366706	VTSPO6523 WP42EG	D10
5366707	VTSPO6523 WP49EG	D10
5366708	VTSPO6523 WU40EG	D10
5366709	VTSPO6524 WP49EG	D10
5368514	VTSPO6525 WU41EG	D9
5368515	VTSPO6525 WP49EG	D9
5368516	VTSPO6525 WU40EG	D9
5368517	VTSPO6526 WU41EG	D9
5368518	VTSPO6526 WP49EG	D9
5368519	VTSPO6526 WU40EG	D9
5368540	VTSPO6527 WU41EG	D9
5368541	VTSPO6527 WP49EG	D9
5368542	VTSPO6527 WU40EG	D9
5368543	VTSPO6528 WU41EG	D9
5368544	VTSPO6528 WP49EG	D9
5368545	VTSPO6528 WU40EG	D9
5368546	VTSPO6529 WU41EG	D10
5368547	VTSPO6529 WP49EG	D10
5368548	VTSPO6529 WU40EG	D10
5368549	VTSPO6530 WU41EG	D10
5368550	VTSPO6530 WP49EG	D10
5368551	VTSPO6530 WU40EG	D10
5368552	VTSPO6531 WU41EG	D10
5368553	VTSPO6531 WP42EG	D10
5368554	VTSPO6531 WP49EG	D10
5368555	VTSPO6531 WU40EG	D10
5368556	VTSPO6532 WP49EG	D10
5368557	VTSPO6533 WU41EG	D10
5368558	VTSPO6533 WP42EG	D10
5368559	VTSPO6533 WP49EG	D10
5368560	VTSPO6533 WU40EG	D10
5368561	VTSPO6534 WP49EG	D10
5368562	VTSPO6535 WU41EG	D10
5368563	VTSPO6535 WP42EG	D10
5368565	VTSPO6535 WP49EG	D10
5368566	VTSPO6535 WU40EG	D10
5368567	VTSPO6536 WP49EG	D10
5368568	VTSPO6537 WU41EG	D10
5368569	VTSPO6537 WP42EG	D10
5368570	VTSPO6537 WP49EG	D10
5368571	VTSPO6537 WU40EG	D10
5368572	VTSPO6538 WU41EG	D10
5368573	VTSPO6538 WP42EG	D10
5368574	VTSPO6538 WP49EG	D10
5368575	VTSPO6538 WU40EG	D10
5368576	VTSPO6539 WU41EG	D11
5368577	VTSPO6539 WP42EG	D11
5368578	VTSPO6539 WP49EG	D11
5368579	VTSPO6539 WU40EG	D11
5368580	VTSPO6540 WU41EG	D11
5368581	VTSPO6540 WP42EG	D11
5368582	VTSPO6540 WP49EG	D11
5368583	VTSPO6540 WU40EG	D11
5368584	VTSPO6541 WU41EG	D11
5368585	VTSPO6541 WP49EG	D11
5368586	VTSPO6541 WU40EG	D11
5368587	VTSPO6542 WU41EG	D11
5368588	VTSPO6542 WP49EG	D11
5368589	VTSPO6542 WU40EG	D11
5368600	VTSPO6543 WP49EG	D11
5368601	VTSPO6544 WP49EG	D11
5368602	VTSPO6545 WP49EG	D9
5368603	VTSPO6545 WU40EG	D9
5368604	VTSPO6546 WP49EG	D9
5368605	VTSPO6546 WU40EG	D9
5368606	VTSPO6547 WP49EG	D9
5368607	VTSPO6547 WU40EG	D9
5368608	VTSPO6548 WP49EG	D9
5368609	VTSPO6548 WU40EG	D9
5368610	VTSPO6549 WP49EG	D9
5368611	VTSPO6549 WU40EG	D9
5368612	VTSPO6550 WP49EG	D9
5368613	VTSPO6550 WU40EG	D9
5368614	VTSPO6551 WP49EG	D10
5368615	VTSPO6551 WU40EG	D10
5368616	VTSPO6552 WP49EG	D10
5368617	VTSPO6552 WU40EG	D10
5368618	VTSPO6553 WP49EG	D10
5368619	VTSPO6553 WU40EG	D10
5368620	VTSPO6554 WP49EG	D10
5368621	VTSPO6554 WU40EG	D10
5368622	VTSPO6555 WP49EG	D10
5368623	VTSPO6555 WU40EG	D10
5368624	VTSPO6556 WP49EG	D10
5368625	VTSPO6556 WU40EG	D10
5368626	VTSPO6557 WP49EG	D10
5368627	VTSPO6557 WU40EG	D10
5368628	VTSPO6558 WP49EG	D10
5368629	VTSPO6558 WU40EG	D10
5368630	VTSPO6559 WP49EG	D10
5368631	VTSPO6559 WU40EG	D10
5368632	VTSPO6560 WP49EG	D10
5368633	VTSPO6560 WU40EG	D10
5368634	VTSPO6561 WP49EG	D10
5368635	VTSPO6561 WU40EG	D10
5368636	VTSPO6562 WP49EG	D10
5368637	VTSPO6562 WU40EG	D10
5368638	VTSPO6563 WP49EG	D10
5368639	VTSPO6563 WU40EG	D10
5368640	VTSPO6564 WP49EG	D10
5368641	VTSPO6564 WU40EG	D10
5368642	VTSPO6565 WP49EG	D10
5368643	VTSPO6565 WU40EG	D10
5368683	VTSPO6566 WP49EG	D10
5368684	VTSPO6566 WU40EG	D10
5368685	VTSPO6567 WP49EG	D10
5368686	VTSPO6567 WU40EG	D10
5368687	VTSPO6568 WP49EG	D10
5368688	VTSPO6568 WU40EG	D10
5368689	VTSPO6569 WP49EG	D10
5368690	VTSPO6569 WU40EG	D10
5368691	VTSPO6570 WP49EG	D10
5368692	VTSPO6570 WU40EG	D10
5368693	VTSPO6571 WP49EG	D11
5368694	VTSPO6571 WU40EG	D11
5368695	VTSPO6572 WU40EG	D11
5368696	VTSPO6573 WP49EG	D11
5368697	VTSPO6573 WU40EG	D11
5368698	VTSPO6574 WU40EG	D11
5368699	VTSPO6575 WU40EG	D11
5368702	VTSFT6506 WU41EG	D17
5368703	VTSFT6506 WP42EG	D17
5368704	VTSFT6506 WP49EG	D17
5368705	VTSFT6506 WU40EG	D17
5368706	VTSFT6507 WP49EG	D17
5368707	VTSFT6508 WP49EG	D17
5368708	VTSFT6509 WU41EG	D17
5368709	VTSFT6509 WP49EG	D17
5368720	VTSFT6509 WU40EG	D17
5368721	VTSFT6510 WP49EG	D17
5368722	VTSFT6511 WU41EG	D17
5368723	VTSFT6511 WP42EG	D17
5368724	VTSFT6511 WP49EG	D17
5368725	VTSFT6511 WU40EG	D17
5368726	VTSFT6512 WP49EG	D17
5368727	VTSFT6513 WU41EG	D17
5368728	VTSFT6513 WP49EG	D17
5368729	VTSFT6513 WU40EG	D17
5368730	VTSFT6514 WU41EG	D17
5368731	VTSFT6514 WP42EG	D17
5368732	VTSFT6514 WP49EG	D17
5368733	VTSFT6514 WU40EG	D17
5368734	VTSFT6515 WP49EG	D17
5368735	VTSFT6516 WU41EG	D17
5368736	VTSFT6516 WP42EG	D17
5368737	VTSFT6516 WP49EG	D17
5368738	VTSFT6516 WU40EG	D17
5368739	VTSFT6517 WP49EG	D17
5368740	VTSFT6518 WU41EG	D18
5368741	VTSFT6518 WP42EG	D18
5368742	VTSFT6518 WP49EG	D18
5368743	VTSFT6518 WU40EG	D18
5368744	VTSFT6519 WP49EG	D18
5368745	VTSFT6520 WP49EG	D18
5368746	VTSFT6520 WU40EG	D18
5368748	VTSFT6521 WU41EG	D18
5368749	VTSFT6521 WP42EG	D18
5368750	VTSFT6521 WP49EG	D18
5368751	VTSFT6521 WU40EG	D18
5368752	VTSFT6522 WP49EG	D18
5368753	VTSFT6523 WU41EG	D18
5368754	VTSFT6523 WP42EG	D18
5368755	VTSFT6523 WP49EG	D18
5368756	VTSFT6523 WU40EG	D18
5368757	VTSFT6524 WP49EG	D18
5387434	VTSFT6574 WP42EG	D20
5387435	VTSFT6574 WP49EG	D20
5387436	VTSFT6575 WP42EG	D20
5387437	VTSFT6575 WP49EG	D20
5387438	VTSFT6576 WP42EG	D20
5387439	VTSFT6576 WP49EG	D20
5387460	VTSFT6577 WP42EG	D20
5387461	VTSFT6577 WP49EG	D20
5387462	VTSFT6578 WP42EG	D20
5387463	VTSFT6578 WP49EG	D20
5387464	VTSFT6579 WP42EG	D20
5387465	VTSFT6579 WP49EG	D20
5387466	VTSFT6580 WP42EG	D20
5387467	VTSFT6580 WP49EG	D20
5387468	VTSFT6581 WP42EG	D20
5387469	VTSFT6581 WP49EG	D20
5387470	VTSFT6582 WP49EG	D20
5387471	VTSFT6583 WP42EG	D20
5387472	VTSFT6583 WP49EG	D20
5387473	VTSFT6584 WP42EG	D20
5387474	VTSFT6584 WP49EG	D20
5387475	VTSFT6585 WP42EG	D20
5387476	VTSFT6585 WP49EG	D20
5387477	VTSFT6586 WP42EG	D20
5387478	VTSFT6586 WP49EG	D20
5387479	VTSFT6587 WP42EG	D20

Order No.	Catalogue No.	Page(s)
5387481	VTSFT6587 WP49EG	D20
5387482	VTSFT6588 WP42EG	D20
5387483	VTSFT6588 WP49EG	D20
5387487	VTSFT6005 WP49EG	D24
5387488	VTSFT6006 WP49EG	D28
5387489	VTSFT6007 WP49EG	D24
5387640	VTSFT6008 WP49EG	D24
5387641	VTSFT6009 WP49EG	D28
5387642	VTSFT6010 WP49EG	D24
5387643	VTSFT6011 WP49EG	D24
5387644	VTSFT6012 WP49EG	D28
5387645	VTSFT6013 WP49EG	D24
5387646	VTSFT6014 WP49EG	D24
5387647	VTSFT6015 WP49EG	D28
5387648	VTSFT6016 WP49EG	D24
5387649	VTSFT6017 WP49EG	D24
5387650	VTSFT6018 WP49EG	D28
5387651	VTSFT6019 WP49EG	D24
5387652	VTSFT6020 WP49EG	D24
5387653	VTSFT6021 WP49EG	D28
5387654	VTSFT6022 WP49EG	D24
5387655	VTSFT6023 WP49EG	D24
5387656	VTSFT6024 WP49EG	D28
5387657	VTSFT6025 WP49EG	D24
5387658	VTSFT6026 WP49EG	D24
5387659	VTSFT6027 WP49EG	D28
5387670	VTSFT6028 WP49EG	D24
5387671	VTSFT6029 WP49EG	D24
5387672	VTSFT6030 WP49EG	D28
5387673	VTSFT6031 WP49EG	D24
5387674	VTSFT6032 WP49EG	D24
5387675	VTSFT6033 WP49EG	D24
5387676	VTSFT6034 WP49EG	D25
5387677	VTSFT6035 WP49EG	D25
5387678	VTSFT6036 WP49EG	D25
5387679	VTSFT6037 WP49EG	D25
5387700	VTSFT6038 WP49EG	D25
5387701	VTSFT6039 WP49EG	D25
5387702	VTSFT6040 WP49EG	D25
5387704	VTSPO6005 WP49EG	D12
5387705	VTSPO6006 WP49EG	D14
5387707	VTSPO6007 WP49EG	D12
5387708	VTSPO6008 WP49EG	D12
5387709	VTSPO6009 WP49EG	D14
5387760	VTSPO6010 WP49EG	D12
5387761	VTSPO6011 WP49EG	D12
5387762	VTSPO6012 WP49EG	D14
5387763	VTSPO6013 WP49EG	D12
5387764	VTSPO6014 WP49EG	D12
5387765	VTSPO6015 WP49EG	D14
5387766	VTSPO6016 WP49EG	D12
5387767	VTSPO6017 WP49EG	D12
5387768	VTSPO6018 WP49EG	D14
5387769	VTSPO6019 WP49EG	D12
5387770	VTSPO6020 WP49EG	D12
5387771	VTSPO6021 WP49EG	D14
5387772	VTSPO6022 WP49EG	D12
5387773	VTSPO6023 WP49EG	D12
5387774	VTSPO6024 WP49EG	D14
5387776	VTSPO6025 WP49EG	D12
5387777	VTSPO6026 WP49EG	D12
5387778	VTSPO6027 WP49EG	D14
5387779	VTSPO6028 WP49EG	D12
5387780	VTSPO6029 WP49EG	D12
5387781	VTSPO6030 WP49EG	D14
5387782	VTSPO6031 WP49EG	D12
5387783	VTSPO6032 WP49EG	D12
5387784	VTSPO6033 WP49EG	D12
5387785	VTSPO6034 WP49EG	D13
5387786	VTSPO6035 WP49EG	D13
5387787	VTSPO6036 WP49EG	D13
5387788	VTSPO6037 WP49EG	D13
5387789	VTSPO6038 WP49EG	D13
5387790	VTSPO6039 WP49EG	D13
5387791	VTSPO6040 WP49EG	D13
5387859	VTSPO7505 WU40EG	D15
5387861	VTSPO7505 WU41EG	D15
5387863	VTSPO7506 WU40EG	D15
5387865	VTSPO7506 WU41EG	D15
5387867	VTSPO7507 WU40EG	D15
5387869	VTSPO7507 WU41EG	D15
5387871	VTSPO7508 WU40EG	D15
5387873	VTSPO7508 WU41EG	D15
5387875	VTSPO7509 WU40EG	D15
5387877	VTSPO7509 WU41EG	D15
5387879	VTSPO7510 WU40EG	D15
5387881	VTSPO7510 WU41EG	D15
5387883	VTSPO7511 WU40EG	D15
5387885	VTSPO7512 WU40EG	D15
5387887	VTSPO7513 WU40EG	D15
5387889	VTSPO7514 WU40EG	D15
5387891	VTSPO7515 WU40EG	D15
5387893	VTSPO7516 WU40EG	D15
5387895	VTSPO7517 WU40EG	D15
5387898	VTSPO7518 WU40EG	D15
5387900	VTSPO7519 WU40EG	D15
5398708	VTSFT7505 WU40EG	D29
5398709	VTSFT7505 WU41EG	D29
5398790	VTSFT7506 WU40EG	D29
5398791	VTSFT7506 WU41EG	D29
5398792	VTSFT7507 WU40EG	D29
5398793	VTSFT7507 WU41EG	D29
5398794	VTSFT7508 WU40EG	D29
5398795	VTSFT7508 WU41EG	D29
5398796	VTSFT7509 WU40EG	D29
5398797	VTSFT7509 WU41EG	D29
5398798	VTSFT7510 WU40EG	D29
5398799	VTSFT7510 WU41EG	D29
5398800	VTSFT7511 WU40EG	D29
5398801	VTSFT7512 WU40EG	D29
5398802	VTSFT7513 WU40EG	D29
5398803	VTSFT7514 WU40EG	D29
5398804	VTSFT7515 WU40EG	D29
5398805	VTSFT7516 WU40EG	D29
5398806	VTSFT7517 WU40EG	D29
5398807	VTSFT7518 WU40EG	D29
5398808	VTSFT7519 WU40EG	D29
5400965	HNGJ0905ANSNGD WP25PM	A11
5402138	VTSFT6545 WP49EG	D17
5402139	VTSFT6546 WP49EG	D17
5402180	VTSFT6546 WU40EG	D17
5402181	VTSFT6547 WP49EG	D17
5402182	VTSFT6547 WU40EG	D17
5402183	VTSFT6548 WP49EG	D17
5402184	VTSFT6549 WU40EG	D17
5402185	VTSFT6549 WP49EG	D17
5402186	VTSFT6550 WP49EG	D18
5402187	VTSFT6550 WU40EG	D18
5402188	VTSFT6551 WP42EG	D18
5402189	VTSFT6551 WP49EG	D18
5402190	VTSFT6551 WU40EG	D18
5402191	VTSFT6552 WU40EG	D18
5402192	VTSFT6553 WP49EG	D18
5402193	VTSFT6553 WU40EG	D18
5402194	VTSFT6554 WP42EG	D18
5402195	VTSFT6554 WP49EG	D18
5402196	VTSFT6554 WU40EG	D18
5402197	VTSFT6555 WP49EG	D18
5402198	VTSFT6555 WU40EG	D18
5402199	VTSFT6556 WP49EG	D18
5402200	VTSFT6556 WU40EG	D18
5402201	VTSFT6557 WP42EG	D18
5402202	VTSFT6557 WP49EG	D18
5402203	VTSFT6557 WU40EG	D18
5402204	VTSFT6558 WU40EG	D18
5402205	VTSFT6559 WU40EG	D18
5402206	VTSFT6560 WP42EG	D18
5402207	VTSFT6560 WP49EG	D18
5402208	VTSFT6560 WU40EG	D18
5402209	VTSFT6561 WU40EG	D18
5402210	VTSFT6562 WP49EG	D18
5402211	VTSFT6562 WU40EG	D18
5402212	VTSFT6563 WU40EG	D18
5402213	VTSFT6564 WU40EG	D18
5402214	VTSFT6564 WP49EG	D18
5402215	VTSFT6565 WU40EG	D18
5402216	VTSFT6566 WU40EG	D18
5402217	VTSFT6567 WP49EG	D18
5402218	VTSFT6567 WU40EG	D18
5402219	VTSFT6568 WU40EG	D18
5402220	VTSFT6569 WP49EG	D18
5402221	VTSFT6569 WU40EG	D18
5402222	VTSFT6570 WU40EG	D18
5402223	VTSFT6571 WP49EG	D19
5402224	VTSFT6571 WU40EG	D19
5402225	VTSFT6572 WU40EG	D19
5402226	VTSFT6573 WU40EG	D19
5402227	VTSFT6525 WP49EG	D17
5402228	VTSFT6525 WU40EG	D17
5402229	VTSFT6526 WP49EG	D17
5402250	VTSFT6526 WU40EG	D17
5402251	VTSFT6527 WP49EG	D17
5402252	VTSFT6527 WU40EG	D17
5402253	VTSFT6528 WP49EG	D18
5402254	VTSFT6528 WU40EG	D18
5402255	VTSFT6529 WP49EG	D18
5402256	VTSFT6529 WU40EG	D18
5402257	VTSFT6530 WP49EG	D18
5402258	VTSFT6530 WU40EG	D18
5402259	VTSFT6531 WU41EG	D18
5402260	VTSFT6531 WP42EG	D18
5402261	VTSFT6531 WP49EG	D18
5402262	VTSFT6531 WU40EG	D18
5402263	VTSFT6532 WP49EG	D18
5402264	VTSFT6533 WU41EG	D18
5402265	VTSFT6533 WP42EG	D18
5402266	VTSFT6533 WP49EG	D18
5402267	VTSFT6533 WU40EG	D18
5402268	VTSFT6534 WP49EG	D18
5402269	VTSFT6535 WU41EG	D18
5402270	VTSFT6535 WP49EG	D18
5402271	VTSFT6535 WU40EG	D18
5402272	VTSFT6536 WP49EG	D18
5402273	VTSFT6537 WU41EG	D18
5402274	VTSFT6537 WP49EG	D18
5402275	VTSFT6537 WU40EG	D18
5402276	VTSFT6538 WU41EG	D18
5402277	VTSFT6538 WP49EG	D18
5402278	VTSFT6538 WU40EG	D18
5402279	VTSFT6539 WU41EG	D18
5402280	VTSFT6539 WP49EG	D18
5402281	VTSFT6539 WU40EG	D18
5402282	VTSFT6540 WU41EG	D19
5402283	VTSFT6540 WP49EG	D19
5402284	VTSFT6540 WU40EG	D19
5402285	VTSFT6541 WU41EG	D19
5402286	VTSFT6541 WP49EG	D19
5402287	VTSFT6541 WU40EG	D19
5402288	VTSFT6542 WU41EG	D19
5402289	VTSFT6542 WP49EG	D19
5402290	VTSFT6542 WU40EG	D19
5402291	VTSFT6543 WP49EG	D19
5402292	VTSFT6543 WU40EG	D19
5402293	VTSFT6544 WP49EG	D19
5402294	VTSFT6544 WU40EG	D19
5415250	XDPT110416PDSRMM WK15CM	A5
5415253	XDPT110416PDSRMM WP35CM	A5
5415254	XDPT110416PDSRMM WP25PM	A5
5415310	XDPT110412PDSRMM WK15CM	A5
5415312	XDPT110412PDSRMM WU35PM	A5
5415313	XDPT110412PDSRMM WP35CM	A5
5415314	XDPT110412PDSRMM WP25PM	A5
5415315	XDPT110408PDSRMM WK15CM	A5
5415317	XDPT110408PDSRMM WU35PM	A5
5415318	XDPT110408PDSRMM WP35CM	A5
5415319	XDPT110408PDSRMM WP25PM	A5
5415422	XDPT110431PDSRMM WK15CM	A5
5415425	XDPT110431PDSRMM WP35CM	A5
5415426	XDPT110431PDSRMM WP25PM	A5
5415428	XDPT110404PDSRMM WK15CM	A5
5415450	XDPT110404PDSRMM WP35CM	A5
5415546	XDCT110408PDERML WU35PM	A4
5415547	XDCT110408PDERML WP35CM	A4
5415548	XDCT110408PDERML WP25PM	A4
5415549	XDCT110408PDERML WK15CM	A4
5427370	HNGJ0905ANSNGD WK15CM	A11
5427371	HNPJ0905ANSNHD WK15CM	A12
5427372	HNPJ0905ANSNGD WK15CM	A12
5427373	XNGJ0704ANENLD3W WK15CM	A8
5427374	HNPJ0704ANSNGD WK15CM	A9
5427375	HNPJ0704ANSNHD WK15CM	A9
5427387	HPGT06T3DZENGD WK15CM	A13
5427388	HPGT06T3DZERGD3W WK15CM	A13
5427423	SDMT1204PDRML WK15CM	A14
5472587	VTSFT6005 WU41EG	D24
5472589	VTSFT6007 WU41EG	D24
5472600	VTSFT6008 WU41EG	D24
5472602	VTSFT6010 WU41EG	D24
5472603	VTSFT6011 WU41EG	D24
5472605	VTSFT6013 WU41EG	D24
5472606	VTSFT6014 WU41EG	D24
5472608	VTSFT6016 WU41EG	D24
5472609	VTSFT6017 WU41EG	D24
5472611	VTSFT6019 WU41EG	D24
5472612	VTSFT6020 WU41EG	D24
5472614	VTSFT6022 WU41EG	D24
5472615	VTSFT6023 WU41EG	D24
5472617	VTSFT6025 WU41EG	D24
5472618	VTSFT6026 WU41EG	D24
5472620	VTSFT6028 WU41EG	D24
5472621	VTSFT6029 WU41EG	D24
5472623	VTSFT6031 WU41EG	D24
5472624	VTSFT6032 WU41EG	D24
5472625	VTSFT6033 WU41EG	D24
5472626	VTSFT6034 WU41EG	D25
5472627	VTSFT6035 WU41EG	D25
5472628	VTSFT6036 WU41EG	D25
5472629	VTSFT6037 WU41EG	D25
5472630	VTSFT6038 WU41EG	D25
5472631	VTSFT6039 WU41EG	D25
5472632	VTSFT6040 WU41EG	D25
5472633	VTSPO6005 WU41EG	D12
5472634	VTSPO6006 WU41EG	D14
5472635	VTSPO6007 WU41EG	D12
5472636	VTSPO6008 WU41EG	D12
5472637	VTSPO6009 WU41EG	D14

Order No.	Catalogue No.	Page(s)
5877622	28190800T016 UNCOATED	B6
5877623	28190900T016 UNCOATED	B6
5877624	28191000T019 UNCOATED	B6
5877625	28191200T022 UNCOATED	B6
5877626	28191400T022 UNCOATED	B6
5877627	28191500T026 UNCOATED	B6
5877628	28191600T026 UNCOATED	B6
5877629	28191800T026 UNCOATED	B6
5877630	28192000T032 UNCOATED	B6
5880362	D0110200T006 TIALN	B9
5880363	D0010300T004 TIALN	B9
5880364	D0110300T007 TIALN	B9
5880365	D0010400T005 TIALN	B9
5880366	D0110400T008 TIALN	B9
5880367	D0110500T010 TIALN	B9
5880368	D0110600T010 TIALN	B9
5880369	D0110700T013 TIALN	B9
5880370	D0110800T016 TIALN	B9
5880381	D0111000T019 TIALN	B9
5880382	D0111200T022 TIALN	B9
5880383	D0111400T022 TIALN	B9
5880384	D0111600T026 TIALN	B9
5880385	D0012000T020 TIALN	B9
5880386	D0112000T032 TIALN	B9
5880387	40010100T004 TIALN	B11
5880388	40010150T005 TIALN	B11
5880389	40010200T006 TIALN	B11
5880390	40010250T007 TIALN	B11
5880391	40010300T009 TIALN	B11
5880392	40010350T012 TIALN	B11
5880393	40010400T012 TIALN	B11
5880395	40110400T019 TIALN	B11
5880396	40210400T031 TIALN	B11
5880397	40210500T014 TIALN	B11
5880398	40010600T020 TIALN	B11
5880399	40110600T028 TIALN	B11
5880400	40210600T038 TIALN	B11
5880401	40010800T020 TIALN	B11
5880402	40110800T028 TIALN	B11
5880403	40210800T040 TIALN	B11
5880404	40011000T022 TIALN	B11
5880405	40111000T032 TIALN	B11
5880406	40211000T045 TIALN	B11
5880407	40011200T025 TIALN	B12
5880408	40111200T045 TIALN	B12
5880409	40211200T075 TIALN	B12
5880410	40011400T032 TIALN	B12
5880411	40011600T032 TIALN	B12
5880412	40012000T038 TIALN	B12
5880413	40112000T075 TIALN	B12
5880425	40010100T004 UNCOATED	B11
5880426	40010150T005 UNCOATED	B11
5880427	40010200T006 UNCOATED	B11
5880428	40010250T007 UNCOATED	B11
5880429	40010300T009 UNCOATED	B11
5880430	40010400T012 UNCOATED	B11
5880431	40110400T019 UNCOATED	B11
5880432	40210400T031 UNCOATED	B11
5880433	40010500T014 UNCOATED	B11
5880435	40010600T020 UNCOATED	B11
5880436	40110600T028 UNCOATED	B11
5880437	40210600T038 UNCOATED	B11
5880438	40010800T020 UNCOATED	B11
5880439	40110800T028 UNCOATED	B11
5880440	40210800T040 UNCOATED	B11
5880441	40011000T022 UNCOATED	B11
5880442	40111000T032 UNCOATED	B11
5880443	40211000T045 UNCOATED	B11
5880444	40011200T025 UNCOATED	B12
5880445	40111200T045 UNCOATED	B12
5880446	40211200T075 UNCOATED	B12
5880447	40011400T032 UNCOATED	B12
5880448	40011600T032 UNCOATED	B12
5880449	40012000T038 UNCOATED	B12
5880450	40112000T075 UNCOATED	B12
5880451	28380200T007 TIALN	B10
5880452	28380300T007 TIALN	B10
5880453	28380400T008 TIALN	B10
5880454	28380500T010 TIALN	B10
5880455	28380600T010 TIALN	B10
5880456	28380800T016 TIALN	B10
5880457	28381000T019 TIALN	B10
5880458	28381200T022 TIALN	B10
5880459	28381400T022 TIALN	B10
5880460	28381600T026 TIALN	B10
5880461	28382000T032 TIALN	B10
5880462	28380300T007 UNCOATED	B10
5880463	28380400T008 UNCOATED	B10
5880464	28380500T010 UNCOATED	B10
5880465	28380600T010 UNCOATED	B10
5880466	28380800T016 UNCOATED	B10
5880467	28381000T019 UNCOATED	B10
5880468	28381200T022 UNCOATED	B10
5880469	28381400T022 UNCOATED	B10
5880470	28381600T026 UNCOATED	B10
5880471	28382000T032 UNCOATED	B10
5883097	XNPU15T608ERML WP25PM	A25
5883098	XNPU15T608ERML WP40PM	A25
5883099	XNPU15T608ERML WU35PM	A25
5883447	XNPU15T616SRMM WP25PM	A16, A25
5883448	XNPU15T616SRMM WP40PM	A16, A25
5883449	XNPU15T616SRMM WU35PM	A16, A25
5883450	XNPU15T616SRMM WP35CM	A16, A25
5883521	XNPU15T616SRMM WK15PM	A16, A25
5883522	XNPU15T616SRMM WK15CM	A16, A25
5890728	XNPU15T612SRMM WP25PM	A16, A25
5890729	XNPU15T612SRMM WP40PM	A16, A25
5890730	XNPU15T612SRMM WU35PM	A16, A25
5890761	XNPU15T612SRMM WP35CM	A16, A25
5890762	XNPU15T612SRMM WK15PM	A16, A25
5890763	XNPU15T612SRMM WK15CM	A16, A25
5890821	XNGU15T604ERML WP25PM	A15, A24
5890822	XNGU15T604ERML WP40PM	A15, A24
5890823	XNGU15T604ERML WU35PM	A15, A24
5895291	HNGJ0704ANENLD WP25PM	A8
5895292	HNGJ0704ANENLD WP35CM	A8
5895293	HNPJ0704ANSNGD WP25PM	A9
5895294	HNPJ0704ANSNGD WP35CM	A9
5895295	HNPJ0704ANSNHD WP25PM	A9
5895296	HNPJ0704ANSNHD WP35CM	A9
5895297	HNPJ070432ANSNHD WP40PM	A9
5895298	XNGJ0704ANENLD3W WP25PM	A8
5895299	XNGJ0704ANENLD3W WP40PM	A8
5895346	HNGJ0905ANENLD WP25PM	A10
5895347	HNGJ0905ANENLD WP35CM	A10
5895348	HNGJ0905ANENLD WP40PM	A10
5895349	HNGJ0905ANSNGD WP35CM	A11
5895350	HNGJ0905ANSNGD WP40PM	A11
5895371	HNGJ0905ANSNHD WP25PM	A11
5895372	HNGJ0905ANSNHD WP35CM	A11
5895373	HNGJ0905ANSNHD WP40PM	A11
5895374	HNPJ0905ANSNGD WP25PM	A12
5895375	HNPJ0905ANSNGD WP35CM	A12
5895376	HNPJ0905ANSNHD WP25PM	A12
5895377	HNPJ0905ANSNHD WP35CM	A12
5895378	HNPJ090543ANSNHD WP25PM	A12
5895379	HNPJ090543ANSNHD WP35CM	A12
5895380	HNPJ090543ANSNHD WP40PM	A12
5895381	XNGJ0905ANSNGD3W WP25PM	A10
5895382	XNGJ0905ANSNGD3W WP40PM	A10
5895782	HPGT06T3DZENGD WP25PM	A13
5895783	HPGT06T3DZENGD WP40PM	A13
5895784	HPGT06T3DZERLD WP25PM	A13
5895785	HPGT06T3DZERLD WP40PM	A13
5895786	HPGT06T3DZERGD3W WP25PM	A13
5895787	HPGT06T3DZERGD3W WP40PM	A13
5895788	HPPT06T3DZENGD WP25PM	A13
5895789	HPPT06T3DZENGD WP40PM	A13
5895790	HPPT06T3DZENGD WP35CM	A13
5901354	XDPT110424PDSRMM WP40PM	A5
5901355	XDPT110424PDSRMM WP25PM	A5
5905657	TTPWCNGNA	E33
5906168	TTPWCNGEU	E33
5949204	XNGU15T604SRMM WP25PM	A25
5949205	XNGU15T604SRMM WP40PM	A25
5949206	XNGU15T604SRMM WU35PM	A25
5966234	VSM490KITCD25Z02WP40PM	A27
5966235	VSM490KITCD32Z03WP40PM	A27
5966236	VSM490KITSD40Z04WP40PM	A27
5966237	VSM490KITSD50Z05WP40PM	A27
5966238	VSM490KITSD50Z06WP40PM	A27
5966239	VSM490KITSD63Z06WP40PM	A27
5966240	VSM490KITSD80Z07WP40PM	A27
5966251	VSM490KITSD100Z08WP40PM	A27
5966252	VSM490KITCD25Z02WU35PM	A28
5966253	VSM490KITCD32Z03WU35PM	A28
5966255	VSM490KITSD40Z04WU35PM	A28
5966256	VSM490KITSD50Z05WU35PM	A28
5966257	VSM490KITSD50Z06WU35PM	A28
5966258	VSM490KITSD63Z06WU35PM	A28
5966259	VSM490KITSD80Z07WU35PM	A28
5966260	VSM490KITCD25Z02WK15PM	A28
5966261	VSM490KITCD32Z03WK15PM	A28
5966262	VSM490KITSD40Z04WK15PM	A28
5966263	VSM490KITSD50Z05WK15PM	A28
5966264	VSM490KITSD50Z06WK15PM	A28
5966265	VSM490KITSD63Z07WK15PM	A28
5966266	VSM490KITSD80Z09WK15PM	A28
5966267	VSM490KITSD100Z11WK15PM	A28
5980398	XDPT110420PDSRMM WP40PM	A5
5980399	XDPT110420PDSRMM WP25PM	A5
5980400	XDPT110420PDSRMM WP35CM	A5
5987689	XDPT170404PESRMM WP40PM	A7
5987690	XDPT170404PESRMM WU35PM	A7
5987946	XDPT170408PESRMM WP40PM	A7
5987947	XDPT170408PESRMM WP35CM	A7
5987948	XDPT170408PESRMM WK15CM	A7
5987949	XDPT170408PESRMM WP25PM	A7
5987950	XDPT170408PESRMM WU35PM	A7
5988138	XDPT170412PESRMM WK15CM	A7
5988139	XDPT170412PESRMM WP40PM	A7
5988140	XDPT170412PESRMM WP35CM	A7
5988151	XDPT170412PESRMM WP25PM	A7
5988152	XDPT170412PESRMM WU35PM	A7
5988153	XDPT170416PESRMM WK15CM	A7
5988154	XDPT170416PESRMM WP40PM	A7
5988155	XDPT170416PESRMM WP25PM	A7
5988156	XDPT170416PESRMM WP35CM	A7
5988158	XDPT170420PESRMM WP25PM	A7
5988159	XDPT170420PESRMM WP40PM	A7
5988160	XDPT170420PESRMM WP35CM	A7
5988202	XDPT170424PESRMM WP40PM	A7
5988203	XDPT170424PESRMM WP25PM	A7
5988204	XDPT170432PESRMM WP35CM	A7
5988205	XDPT170432PESRMM WP40PM	A7
5988206	XDPT170432PESRMM WP25PM	A7
5988969	XDPT170440PESRMM WP40PM	A7
5988970	XDPT170440PESRMM WP25PM	A7
5988981	XDCT170408PEERML WP40PM	A6
5988982	XDCT170408PEERML WP35CM	A6
5988983	XDCT170408PEERML WP25PM	A6
5988986	XDCT170412PEERML WP40PM	A6
5988987	XDCT170412PEERML WP35CM	A6
5988988	XDCT170412PEERML WP25PM	A6
5989010	XDCT170404PEERML WP25PM	A6
5998607	32MHCSFC120M	E26
5998608	32MHCSFC140M	E26
5998609	32MHCSFC160M	E26
5998610	32MHCSFC200M	E26
5998751	32MHCSFC250M	E26
5998754	12HCSFC0500	E26
5998755	12HCSFC0625	E26
5998756	12HCSFC0750	E26
5998757	12HCSFC1000	E26
6001239	XDCT170440PEERML WP25PM	A6
6001251	XDCT170432PEERML WP25PM	A6
6001253	XDCT170424PEERML WP25PM	A6
6001255	XDCT170420PEERML WP25PM	A6
6001257	XDCT170416PEERML WP25PM	A6
6003570	XNGU15T608SRMH WP25PM	A25
6003721	XNGU15T608SRMH WP40PM	A25
6003722	XNGU15T608SRMH WU35PM	A25
6003723	XNGU15T608SRMH WP35CM	A25
6003724	XNGU15T608SRMH WK15PM	A25
6003725	XNGU15T608SRMH WK15CM	A25
6030372	XNPU15T620SRMM WP25PM	A16, A25
6030373	XNPU15T620SRMM WP40PM	A16, A25
6030374	XNPU15T620SRMM WP35CM	A16, A25
6030375	XNPU15T620SRMM WK15CM	A16, A25
6030376	XNGU15T616SRMH WP25PM	A25
6030377	XNGU15T616SRMH WP35CM	A25
6030378	XNGU15T616SRMH WK15PM	A25
6030380	XNGU15T616SRMH WK15CM	A25
6048237	HSK63AHCTHT32100	E4
6048238	HSK63AHCTHT125400	E4
6048255	DV40HCTHT32080M	E13
6048256	DV40HCTHT125315	E13
6048257	BT40HCTHT32080M	E10
6048258	BT40HCTHT125315	E10
6048259	BTKV40HCTHT32080M	E14
6048260	BTKV40HCTHT125315	E14
6048261	CVKV40HCTHT125315	E15
6055331	TRF14000H7SF WU05PR	C5
6055332	TRF15000H7SF WU05PR	C5
6055333	TRF16000H7SF WU05PR	C5
6055334	TRF17000H7SF WU05PR	C5
6055335	TRF18000H7SF WU05PR	C5

Order No.	Catalogue No.	Page(s)
6144318	D0030400W005 TIALN	B22
6144319	D0030450W005 TIALN	B22
6144320	D0030500W006 TIALN	B22
6144331	D0030550W007 TIALN	B22
6144332	D0030600W007 TIALN	B22
6144333	D0030700W008 TIALN	B22
6144334	D0030800W009 TIALN	B22
6144335	D0031000W011 TIALN	B22
6144336	D0031200W012 TIALN	B22
6144337	D0031400W014 TIALN	B22
6144338	D0031600W016 TIALN	B23
6144339	D0031800W018 TIALN	B23
6144340	D0032000W020 TIALN	B23
6144351	D0030200T003S TIALN	B20
6144352	D0030250T003S TIALN	B20
6144353	D0030300T004S TIALN	B20
6144354	D0030350T004S TIALN	B20
6144355	D0030400T005S TIALN	B20
6144357	D0030500T006S TIALN	B20
6144358	D0030550T007S TIALN	B20
6144359	D0130400T008 TIALN	B22
6144360	D0030600T007S TIALN	B20
6144371	D0130450T008 TIALN	B22
6144372	D0030700T008S TIALN	B20
6144373	D0130500T010 TIALN	B22
6144374	D0030800T009S TIALN	B21
6144375	D0130550T010 TIALN	B22
6144376	D0031000T011S TIALN	B21
6144377	D0130600T010 TIALN	B22
6144378	D0031200T012S TIALN	B21
6144379	D0130700T013 TIALN	B22
6144380	D0031400T014S TIALN	B21
6144381	D0130800T016 TIALN	B22
6144382	D0031600T016S TIALN	B21
6144383	D0131000T019 TIALN	B22
6144384	D0031800T018S TIALN	B21
6144385	D0131200T022 TIALN	B22
6144386	D0032000T020S TIALN	B21
6144387	D0131400T022 TIALN	B22
6144388	D0030200W003S TIALN	B20
6144389	D0131600T026 TIALN	B23
6144390	D0030250W003S TIALN	B20
6144391	D0131800T026 TIALN	B23
6144392	D0030300W004S TIALN	B20
6144393	D0132000T032 TIALN	B23
6144394	D0030350W004S TIALN	B20
6144395	D0130400W008 TIALN	B22
6144396	D0030400W005S TIALN	B20
6144397	D0130450W008 TIALN	B22
6144398	D0030450W005S TIALN	B20
6144399	D0130500W010 TIALN	B22
6144400	D0030500W006S TIALN	B20
6144401	D0130550W010 TIALN	B22
6144402	D0030550W007S TIALN	B20
6144403	D0130600W010 TIALN	B22
6144404	D0030600W007S TIALN	B20
6144405	D0130700W013 TIALN	B22
6144406	D0030700W008S TIALN	B20
6144407	D0130800W016 TIALN	B22
6144408	D0030800W009S TIALN	B21
6144409	D0131000W019 TIALN	B22
6144410	D0031000W011S TIALN	B21
6144411	D0131200W022 TIALN	B22
6144412	D0031200W012S TIALN	B21
6144413	D0131400W022 TIALN	B22
6144414	D0031400W014S TIALN	B21
6144415	D0131600W026 TIALN	B23
6144416	D0031600W016S TIALN	B21
6144417	D0131800W026 TIALN	B23
6144418	D0031800W018S TIALN	B21
6144419	D0132000W032 TIALN	B23
6144420	D0032000W020S TIALN	B21
6144441	D0130200T006S TIALN	B20
6144442	D0130250T007S TIALN	B20
6144443	D0130300T007S TIALN	B20
6144444	D0130350T007S TIALN	B20
6144445	D0130400T008S TIALN	B20
6144446	D0130450T008S TIALN	B20
6144447	D0130500T010S TIALN	B20
6144448	D0130550T010S TIALN	B20
6144449	D0130600T010S TIALN	B20
6144450	D0030200T003S UNCOATED	B20
6144451	D0130700T013S TIALN	B20
6144452	D0030250T003S UNCOATED	B20
6144453	D0130800T016S TIALN	B21
6144454	D0030300T004S UNCOATED	B20
6144455	D0131000T019S TIALN	B21
6144456	D0030350T004S UNCOATED	B20
6144457	D0131200T022S TIALN	B21
6144458	D0030400T005S UNCOATED	B20
6144459	D0131400T022S TIALN	B21
6144460	D0030450T005S UNCOATED	B20
6144461	D0131600T026S TIALN	B21
6144462	D0030500T006S UNCOATED	B20
6144463	D0131800T026S TIALN	B21
6144464	D0030550T007S UNCOATED	B20
6144465	D0132000T032S TIALN	B21
6144466	D0030600T007S UNCOATED	B20
6144467	D0130200W006S TIALN	B20
6144468	D0030700T008S UNCOATED	B20
6144469	D0130250W007S TIALN	B20
6144470	D0030800T009S UNCOATED	B21
6144471	D0130300W007S TIALN	B20
6144472	D0031000T011S UNCOATED	B21
6144473	D0130350W007S TIALN	B20
6144474	D0031200T012S UNCOATED	B21
6144475	D0130400W008S TIALN	B20
6144476	D0031400T014S UNCOATED	B21
6144477	D0130450W008S TIALN	B20
6144478	D0031600T016S UNCOATED	B21
6144479	D0130500W010S TIALN	B20
6144480	D0031800T018S UNCOATED	B21
6144481	D0130550W010S TIALN	B20
6144482	D0032000T020S UNCOATED	B21
6144483	D0130600W010S TIALN	B20
6144484	D0030200W003S UNCOATED	B20
6144485	D0130700W013S TIALN	B20
6144486	D0030250W003S UNCOATED	B20
6144487	D0130800W016S TIALN	B21
6144488	D0030300W004S UNCOATED	B20
6144489	D0131000W019S TIALN	B21
6144490	D0030350W004S UNCOATED	B20
6144491	D0131200W022S TIALN	B21
6144492	D0030400W005S UNCOATED	B20
6144493	D0131400W022S TIALN	B21
6144494	D0030450W005S UNCOATED	B20
6144495	D0131600W026S TIALN	B21
6144496	D0030500W006S UNCOATED	B20
6144497	D0131800W026S TIALN	B21
6144498	D0030550W007S UNCOATED	B20
6144499	D0132000W032S TIALN	B21
6144500	D0030600W007S UNCOATED	B20
6144501	D0030700W008S UNCOATED	B20
6144502	D0030800W009S UNCOATED	B21
6144503	D0031000W011S UNCOATED	B21
6144504	D0031200W012S UNCOATED	B21
6144505	D0031400W014S UNCOATED	B21
6144506	D0031600W016S UNCOATED	B21
6144507	D0031800W018S UNCOATED	B21
6144508	D0032000W020S UNCOATED	B21
6144551	40030400T012S TIALN	B24
6144552	40030500T014S TIALN	B24
6144553	40030600T016S TIALN	B24
6144554	40030800T019S TIALN	B24
6144555	40031000T022S TIALN	B24
6144556	40031200T025S TIALN	B24
6144557	40031600T032S TIALN	B24
6144565	40030600W016S TIALN	B24
6144566	40030800W019S TIALN	B24
6144567	40031000W022S TIALN	B24
6144568	40031200W025S TIALN	B24
6144569	40031600W032S TIALN	B24
6144570	40030100T004S UNCOATED	B24
6144651	40030150T004S UNCOATED	B24
6144652	40030200T006S UNCOATED	B24
6144653	40030250T006S UNCOATED	B24
6144654	40030300T009S UNCOATED	B24
6144655	40030400T012S UNCOATED	B24
6144656	40030500T014S UNCOATED	B24
6144657	40030600T016S UNCOATED	B24
6144658	40030800T019S UNCOATED	B24
6144659	40031000T022S UNCOATED	B24
6144660	40031200T025S UNCOATED	B24
6144661	40031600T032S UNCOATED	B24
6144669	40030600W016S UNCOATED	B24
6144670	40030800W019S UNCOATED	B24
6144671	40031000W022S UNCOATED	B24
6144672	40031200W025S UNCOATED	B24
6144673	40031600W032S UNCOATED	B24
6145042	D0030400T005 UNCOATED	B22
6145043	D0030450T005 UNCOATED	B22
6145044	D0030500T006 UNCOATED	B22
6145045	D0030550T007 UNCOATED	B22
6145046	D0030600T007 UNCOATED	B22
6145047	D0030700T008 UNCOATED	B22
6145048	D0030800T009 UNCOATED	B22
6145049	D0031000T011 UNCOATED	B22
6145050	D0031200T012 UNCOATED	B22
6145051	D0031400T014 UNCOATED	B22
6145052	D0031600T016 UNCOATED	B23
6145053	D0031800T018 UNCOATED	B23
6145054	D0032000T020 UNCOATED	B23
6145056	D0030400W005 UNCOATED	B22
6145057	D0030450W005 UNCOATED	B22
6145058	D0030500W006 UNCOATED	B22
6145059	D0030550W007 UNCOATED	B22
6145060	D0030600W007 UNCOATED	B22
6145061	D0030700W008 UNCOATED	B22
6145062	D0030800W009 UNCOATED	B22
6145063	D0031000W011 UNCOATED	B22
6145064	D0031200W012 UNCOATED	B22
6145065	D0031400W014 UNCOATED	B22
6145066	D0031600W016 UNCOATED	B23
6145067	D0031800W018 UNCOATED	B23
6145068	D0032000W020 UNCOATED	B23
6145083	D0130500T010 UNCOATED	B22
6145085	D0130600T010 UNCOATED	B22
6145087	D0130800T016 UNCOATED	B22
6145088	D0131000T019 UNCOATED	B22
6145089	D0131200T022 UNCOATED	B22
6145090	D0131400T022 UNCOATED	B22
6145091	D0131600T026 UNCOATED	B23
6145092	D0131800T026 UNCOATED	B23
6145093	D0132000T032 UNCOATED	B23
6145094	D0130400W008 UNCOATED	B22
6145095	D0130450W008 UNCOATED	B22
6145096	D0130500W010 UNCOATED	B22
6145097	D0130550W010 UNCOATED	B22
6145098	D0130600W010 UNCOATED	B22
6145099	D0130700W013 UNCOATED	B22
6145100	D0130800W016 UNCOATED	B22
6145101	D0131000W019 UNCOATED	B22
6145102	D0131200W022 UNCOATED	B22
6145103	D0131400W022 UNCOATED	B22
6145104	D0131600W026 UNCOATED	B23
6145105	D0131800W026 UNCOATED	B23
6145106	D0132000W032 UNCOATED	B23
6145107	40030400T012 TIALN	B25
6145109	40030600T016 TIALN	B25
6145110	40030800T019 TIALN	B25
6145171	40031000T022 TIALN	B25
6145172	40031200T025 TIALN	B25
6145173	40031600T032 TIALN	B25
6145176	40030600W016 TIALN	B25
6145178	40031000W022 TIALN	B25
6145179	40031200W025 TIALN	B25
6145180	40031600W032 TIALN	B25
6145181	40130400T019 TIALN	B25
6145182	40130500T020 TIALN	B25
6145183	40130600T028 TIALN	B25
6145184	40130800T028 TIALN	B25
6145185	40131000T032 TIALN	B25
6145186	40131200T045 TIALN	B25
6145187	40131600T056 TIALN	B25
6145188	40132000T064 TIALN	B25
6145190	40130500W020 TIALN	B25
6145191	40130600W028 TIALN	B25
6145192	40130800W028 TIALN	B25
6145193	40131000W032 TIALN	B25
6145194	40131200W045 TIALN	B25
6145195	40131600W056 TIALN	B25
6145196	40132000W064 TIALN	B25
6145199	40130300T019S TIALN	B24
6145200	40130400T019S TIALN	B24
6145231	40130500T020S TIALN	B24
6145232	40130600T028S TIALN	B24
6145233	40130800T028S TIALN	B24
6145234	40131000T032S TIALN	B24
6145235	40131200T045S TIALN	B24
6145236	40030400T012 UNCOATED	B25
6145238	40131600T056S TIALN	B24
6145241	40132000T064S TIALN	B24
6145242	40030600T016 UNCOATED	B25
6145243	40130300W019S TIALN	B24
6145244	40030800T019 UNCOATED	B25
6145246	40031000T022 UNCOATED	B25
6145247	40130500W020S TIALN	B24
6145248	40031200T025 UNCOATED	B25
6145249	40130600W028S TIALN	B24
6145250	40031600T032 UNCOATED	B25
6145251	40130800W028S TIALN	B24
6145253	40131000W032S TIALN	B24
6145255	40131200W045S TIALN	B24
6145256	40030600W016 UNCOATED	B25
6145257	40131600W056S TIALN	B24
6145259	40132000W064S TIALN	B24
6145260	40031000W022 UNCOATED	B25
6145271	40031200W025 UNCOATED	B25
6145272	40031600W032 UNCOATED	B25
6145274	40130400T019 UNCOATED	B25
6145275	40130500T020 UNCOATED	B25
6145276	40130600T028 UNCOATED	B25
6145277	40130800T028 UNCOATED	B25
6145278	40131000T032 UNCOATED	B25
6145279	40131200T045 UNCOATED	B25
6145280	40131600T056 UNCOATED	B25

Visit widia.com for additional contact information for locations.

North America

United States
General Sales: +1 800 979 4342
w-na.service@widia.com
Technical Support: +1 888 539 5145
na.techsupport@widia.com

Canada
General Sales: +1 800 979 4342
Technical Support: +1 888 539 5145
na.techsupport@widia.com

Mexico
General Sales: 001 888 402 4963
Technical Support: 888 539 5145
na.techsupport@widia.com

Central/South America

Argentina
General Sales: +54 11 4719 0700
w-ar.service@widia.com

Brazil
General Sales: +55 19 3936 9200
w-br.service@widia.com

Chile
General Sales: +56 2 2641177
w-cl.service@widia.com

El Salvador
General Sales: +503 2218 8096
prometca@salnet.net

Venezuela
General Sales: +58 305 595 5175
paxi@bellsouth.net

Africa

Egypt
General Sales: +20 2 263 9828
w-uk.service@widia.com

South Africa
General Sales: +27 11 748 9300
w-za.service@widia.com
Technical Support: 0800 981644

Europe

Austria
General Sales: +43 2236 379898
Technical Support: 0800 291630
w-at.service@widia.com

Belgium
General Sales: 0800 81372
Technical Support: 0800 80410
w-be.service@widia.com

Czech Republic
General Sales: 800 900 840
w-cz.service@widia.com

Denmark
Technical Support: +45 808 89295
na.techsupport@widia.com

Finland
Technical Support: 0800 919413
na.techsupport@widia.com

France
General Sales: +33 1 60 12 81 00
Technical Support: +33 080 5540 379
w-fr.service@widia.com

Germany
General Sales: 0800 7242999
Technical Support: 0800 1015774
w-de.service@widia.com

Great Britain
General Sales: 0800 072 4528
Technical Support: 0800 028 2996
w-uk.service@widia.com

Hungary
General Sales: +36 96 618 158
w-hu.service@widia.com

Italy
General Sales: +39 02 895 961
Technical Support: 800 916568
w-it.service@widia.com

Luxemborg
General Sales: +32 4 248 48 48
w-be.service@widia.com

Netherlands
General Sales: 0800 3500103
Technical Support: 0800 0201131
w-nl.service@widia.com

Norway
Technical Support: 800 10081
na.techsupport@widia.com

Poland
General Sales: 008004411941
w-pl.service@widia.com
Technical Support: 00800 4411943

Portugal
General Sales: +351 22 4119 400
w-pt.service@widia.com

Russia
General Sales: +7 81080021431044
w-ru.service@widia.com
Technical Support:
Landline: +7 8800 5556395
Cell Phone: +7 8005556395
eu.techsupport@widia.com

Slovakia
General Sales: 0800 044053
w-sk.service@widia.com

Spain
General Sales: +34 93706 06 10
w-es.service@widia.com

Sweden
Technical Support: +46 020798794
na.techsupport@widia.com

Turkey
General Sales: +90 216 574 4780
w-tr.service@widia.com

Ukraine
General Sales: +380 0048 616656573
w-ru.service@widia.com
Technical Support: 0800502665
eu.techsupport@widia.com

East/Asia Pacific

Australia
General Sales: +61 1300 094 342 (Local)
+61 7 3801 5844 (Overseas)
w-au.service@widia.com

China
General Sales: +86 400 889 2136
Technical Support: +86 400 889 2237
w-cn.service@widia.com

India
General Sales: +91 80 2219 8215
Technical Support: 1 800 103 5227
Order Support: 1 800 103 5139
in.techsupport@widia.com

Israel
General Sales: +972 3 5562211
w-il.sales@widia.com

Japan
General Sales: +81 3 3820 2855
w-jp.service@widia.com

Korea
General Sales: +82 2 2109 5505
w-kr-service@widia.com

Middle East*
General Sales: 0800 072 4528
Technical Support: 0800 028 2996
w-uk.service@widia.com

*Includes Bahrain, Dubai, and Kuwait.

Malaysia
General Sales: +60 03-5569 9080
w-my.service@widia.com

New Zealand
General Sales: 0800 536 626 (Local)
+61 1300 094 342 (Overseas)
w-nz.service@widia.com

Singapore*
General Sales: +65 65724466
w-sg.service@widia.com

*Vietnam, Philippines, and Indonesia individuals should contact the Singapore office.

Taiwan
General Sales: +886 4 2350 1920
w-tw.service@widia.com

Thailand
General Sales: +66 2 642 3455
w-th.service@widia.com

Indexable Milling Icons

 Face Milling	 Slotting: Square End	 Side Milling/ Shoulder Milling: Ball Nose	 Side Milling/ Shoulder Milling: Square End	 3D Profiling
 Pocketing	 Plain Shank	 Weldon® Shank	 Weldon Shank: 2 Flat	 Screw-On Shank
 Shell Mill Shank	 Through Coolant: Radial: Indexable Milling			

Solid End Milling Icons

 Plunge Milling	 Ramping: Blank	 Ramping: 3°	 Slotting: Ball Nose	 Slotting: Ball Nose with AP Dimension
 Slotting: Square End	 Slotting: Square End with AP Dimension	 Trochoidal Milling	 Side Milling/ Shoulder Milling: Ball Nose	 Side Milling/ Shoulder Milling: Ball Nose with AE/AP Dimension
 Side Milling/ Shoulder Milling: Square End	 Side Milling/ Shoulder Milling: Square End with AE/AP Dimension	 3D Profiling	 Corner Style: Ball Nose	 Corner Style: Corner Chamfer
 Corner Style: Corner Radius	 Corner Style: Square End	 Shank: SK BT (MAS-403-BT)	 Shank: SK DV (DIN 69871)	 Shank: CAT: Drawbar Thread 5/8"–11 unc
 Shank: HSK Shank: A/DIN Number 69893	 Shank: Safe-Lock™ <h6	 Shank: Safe-Lock™ Shank	 Shank: PSC Shank	 Duo-Lock™ Connection
 Helix Angle: 30°	 Helix Angle: 38°	 Balance: G 2.5/25,000	DIN Number 6527	DIN Number 6528

(continued)

(continued)

Solid End Milling Icons

 Through Coolant: Axial: Drilling	 Tool Dimensions: Flute Configuration: 2	 Tool Dimensions: Flute Configuration: 3	 Tool Dimensions: Flute Configuration: 4	 Tool Dimensions: Flute Configuration: 5
 Tool Dimensions: Flute Configuration: 7	 Manufacturer's Specs: ISO 26622			

Holemaking Icons

 Reaming: Through Hole	 Reaming: Blind Hole	 Reaming: Through and Cross Holes	 Reaming: Blind and Cross Holes	 Shank: Cylindrical Plain
 Shank: Cylindrical Plain ≤h6	 Through Coolant: Radial Drilling	 Through Coolant: Axial: Drilling	 Through Coolant: Axial Reaming	

Tapping Icons

 Tapping: Through Hole	 Tapping: Blind Hole	 HSS-E: High-Speed Steel with Cobalt for Materials with Higher Hardness	 Square Shank	 Chamfer Form B (3.5–5)
 Chamfer Form C (2–3)	 Chamfer Form E (1.5–2)	 Plug Chamfer (3–5)	 Tapping Helix: Angle: 0°	 Tapping Helix: Angle: 42°
 Tapping Helix: Angle: 45°	 Multipurpose Taps: Spiral Point	 Tension/ Compression	 DIN Number 371	 DIN Number 374
 DIN Number 376	 DIN Number 5156	 Flood Coolant: Tapping	 ISO 2	 Manufacturer's Specs: JIS
 Class of Fit: 2B	 Class of Fit: 3B	 Class of Fit: 6H	 Class of Fit: 6G	Unified Fine Thread

(continued)

(continued)

Tapping Icons

UNC — Unified Course Thread	NPT — American Tapered Pipe Thread for Threads **with Dryseal Material**	NPTF — American Tapered Pipe Thread for Threads **without Dryseal Material**	G — Manufacturer's Specs: G	UNJC — Unified Course Thread: J Profile
UNJF — Unified Fine Thread: J Profile	M — ISO Metric Coarse Thread	MF — ISO Metric Fine Thread		

Tooling Systems Icons

≤h6 — Shank: Cylinderical Plain ≤h6	BT — Shank: SK BT (MAS-403-BT)	CAT — SK Shank: CAT (ANSI B5.50)	DV — Shank: SK DV (DIN 69871)	BT — Shank: SK Shank: BT: Taper Face Contact
CAT — Shank: SK Shank: CAT: Taper Face Contact	A — Shank: HSK DIN Number 69893 Form A	DIN 69893 A — Shank: HSK DIN Number 69893 Form A	TS — Shank: KM-TS™ ISO 26622	XMZ — Shank: KM-XMZ
KM4X — Shank: KM4X™	≤h6 — Shank: Safe-Lock™ <h6	Axial Adjustments: End	G 2.5 25,000 min⁻¹ — Balance: G 2.5@ 25,000 min^{-1}	≤30,000 — Max RPM: 30,000
≤3µm — Accuracy: 3µm or Less	Through Coolant: Radial Drilling	100 bar — Through Coolant: 100 bar	1500 psi — Through Coolant: 1500 psi	Through Coolant: Adaptor Face
ISO 26622 — Manufacturer's Specs: ISO 26622				

DIN — German Institute for Standardisation

P	Steel	K	Cast Iron	S	High-Temp Alloys
M	Stainless Steel	N	Non-Ferrous	H	Hardened Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	–
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
M1	Austenitic Stainless Steel	–	<600	130–200	–	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
M3	Duplex Stainless Steel	–	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
K1	Grey Cast Iron	–	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	GGG40, GTS35
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	GGG60, GTW55, GTS65
N1	Wrought Aluminium	–	–	–	–	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
N2	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GAlSiCu4, GDAlSi10Mg
N3	High-Silicon Aluminium Alloys and Magnesium Alloys	Si >12,2%	–	–	–	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	–	–	–	–	Lexan®, Hostalen™, Polystyrol, Makralon®
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	CFK, GFK
N7	Metal Matrix Composites (MMC)	–	–	–	–	–
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 188, Stellite® 6,21,31
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, Nimonic® 75
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
H1	Hardened Materials	–	–	–	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
H2	Hardened Materials	–	–	–	48–55	–
H3	Hardened Materials	–	–	–	56–60	–
H4	Hardened Materials	–	–	–	>60	–

Get fast and reliable answers to your toughest metalcutting problems.

Our Customer Application Support (CAS) Team is the metalworking industry's leading help desk resource for tooling application solutions and problem resolution.

Customer Application Support (CAS)

- Easy access to proven metalworking expertise.
- Service level excellence.
- Best-in-class application support tools and technology.

Easy access to proven metalworking expertise!

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

Service Level Excellence:

- Fast telephone response.
- Quick technical solutions.
- Efficient case management.

Services Provided:

- Tooling selection.
- Operating parameters.
- Troubleshooting.
- Process optimisation.
- Hardware support.

Best-in-Class Support Tools and Technology:

- Tooling performance experts.
- Materials database.
- Application calculators.

ORIGINATING COUNTRY	LANGUAGE	TEL	FAX	EMAIL
Australia	English	001-724-539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Austria	German	0800 291630	0049-911-9735-429 *	eu.techsupport@widia.com
Belgium	English/French	0800 80410	0049-911-9735-429 *	eu.techsupport@widia.com
China	Chinese	400-889-2237	+86-21-58999985 *	w-cn.techsupport@widia.com
Denmark	English	808 89295	001-724-539-6830 *	na.techsupport@widia.com
Finland	English	0800 919413	001-724-539-6830 *	na.techsupport@widia.com
France	French	080 5540 379	0049-911-9735-429*	eu.techsupport@widia.com
Germany	German	0800 1015774	0911-9735-429 *	eu.techsupport@widia.com
India	English	1 800 103 5227	—	in.techsupport@widia.com
Israel	English	1809 449907	001-724-539-6830 *	na.techsupport@widia.com
Italy	Italian	800 916568	02 89512146 *	eu.techsupport@widia.com
Japan	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Korea (South)	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Malaysia	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Netherlands	English	0800 0201131	001-724-539-6830 *	na.techsupport@widia.com
New Zealand	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Norway	English	800 10081	001-724-539-6830 *	na.techsupport@widia.com
Poland	Polish	00800 4411943	06166 56504 *	eu.techsupport@widia.com
Russia (landline)	Russian	8800 5556395	0048 6166 56504 *	eu.techsupport@widia.com
Russia (cell phone)	Russian	+7 8005556395	0048 6166 56504 *	eu.techsupport@widia.com
Singapore	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
South Africa	English	0800 981644	001-724-539-6830 *	na.techsupport@widia.com
Sweden	English	020798794	001-724-539-6830 *	na.techsupport@widia.com
Taiwan	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
Thailand	English	001-724539-6921 *	001-724-539-6830 *	ap.techsupport@widia.com
United Kingdom	English	0800 028 2996	001-724-539-6830 *	na.techsupport@widia.com
Ukraine	Russian	800502665	0048 6166 56504 *	eu.techsupport@widia.com
USA	English	888 539 5145	001-724-539-6830 *	na.techsupport@widia.com

*Noted phone and fax numbers are not toll free.

Find your Local WIDIA Authorised Distributor

WIDIA™ brand cutting tools are available exclusively through a specialised network of Authorised Distributor partners whom you can count on to deliver much more than products. Our distributors know us, and more importantly, they know you. They know better than anyone in the industry how to put the global power of WIDIA to work for you — in your industry, in your region, and for your business.

WIDIA distributor partners provide technical expertise that you can count on. They will show you how to:

- Significantly reduce cycle time.
- Improve machine tool utilisation.
- Achieve measurable productivity improvements.
- Take advantage of proven supply chain solutions.
- Access local inventory and best-in-class technical support.
- Request onsite demonstrations of the latest tooling technology.

And with thousands of turning, milling, holemaking, tapping, and tooling systems products available from WIDIA, you'll find everything you need from one single source.

Find your Local WIDIA Authorised Distributor by accessing our distributor finder at **widia.com**.

IMPORTANT SAFETY INSTRUCTIONS: READ BEFORE USING THE TOOLS IN THIS CATALOGUE

METALCUTTING SAFETY

Projectile and Fragmentation Hazards

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

Breathing and Skin Contact Hazards

Grinding carbide or other advanced cutting tool materials produces dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

For more information, read the applicable Material Safety Data Sheet provided by WIDIA and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalogue and recommendations on machining practices may not apply to your particular operation.

For more information, consult the WIDIA Metalcutting Safety booklet, available free from WIDIA at +1 724 539 5747 or fax +1 724 539 5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at +1 724 539 5066 or fax +1 724 539 5372.

WORLD HEADQUARTERS
WIDIA Products Group
Kennametal Inc.
1600 Technology Way
Latrobe, PA 15650 USA
Tel: 1 800 979 4342
w-na.service@widia.com

EUROPEAN HEADQUARTERS
WIDIA Products Group
Kennametal Europe GmbH
Rheingoldstrasse 50
CH 8212 Neuhausen am Rheinfall
Switzerland
Tel: +41 52 6750 100
w-ch.service@widia.com

ASIA-PACIFIC HEADQUARTERS
WIDIA Products Group
Kennametal (Singapore) Pte. Ltd.
3A International Business Park
Unit #01-02/03/05, ICON@IBP
Singapore 609935
Tel: +65 6265 9222
w-sg.service@widia.com

INDIA HEADQUARTERS
WIDIA Products Group
Kennametal India Limited
CIN: L27109KA1964PLC001546
8/9th Mile, Tumkur Road
Bangalore - 560 073
Tel: +91 80 2839 4321
w-in.service@widia.com

2017 Advances Catalogue
METRIC

widia.com

WIDIA™