



MILLING

Indexable Milling Solutions

Indexable Milling

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This new Milling Selection Guide leads you easily to the tool selection and to the corresponding user information. 6 steps enable you to select the suitable cutter, insert geometry and grade in relation with recommended parameters for Feed and Speeds.

6 Step Tool Selection

- 1 Go to the **Tool guide** on pages A6 - A13. **Select the milling family** according to the application.

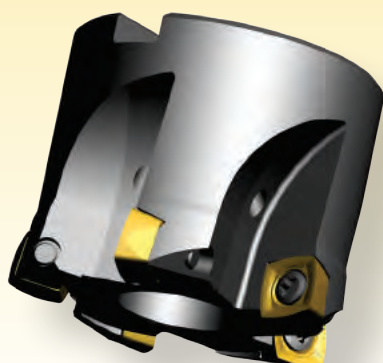
Available diameters, body fixation and type of inserts can also be found. (7792VX family selected)

- 2 Go to the referred Family page with the **entire product range** and **technical information**

- 2.1 Select a Cutter Body Diameter

- 2.2 Technical Information

- Facing pitch
- Ramping angles
- Helical hole (min - max)
- a_p max Helical / Linear
- a_e max plunging (for 7792VX and 7791VS only)
- RPM max



1									
Applications			Family Range			Diameter Range			Body Fixation
Turning	Drilling	Reaming	Turning	Drilling	Reaming	Turning	Drilling	Reaming	Body Fixation
Series	Insert Shape	Angle	Page	Ap max	Ap max	Ap max	Ap max	Ap max	Body Fixation
7792VX09	CO.0404	Facing 42°	A77 - A86	3.5	25 - 160	•	•	•	
7792VX09	CO.0404	Facing 42°	A77 - A86	4.5	50 - 160	•	•	•	
7792VX09	SC.0573	Facing Chatter 40°	A87 - A94	5	16 - 25	•	•	•	
7792VX09	SC.1305	Facing Chatter 40°	A87 - A94	7	40 - 125	•	•	•	
7792VX09	SD.0973	Facing 40°	A95 - A105	5	16 - 125	•	•	•	
7792VX09	SD.1304	Facing 40°	A95 - A105	7	50 - 125	•	•	•	
7792VX09	TP.1002	Chatter 40° / 180°	A265 - A270	7.0	6.10 - 11.30	•	•	•	
7792VX09	TC.1073	Chatter 40° / 180°	A265 - A270	9.50	16 - 25	•	•	•	
7792VX09	SC.0573	Plunging	A257 - A264	$a_p \leq 8$	25 - 50	•	•	•	
7792VX09	SC.1305	Plunging	A257 - A264	$a_p \leq 11$	63 - 80	•	•	•	
7792VX09	AP.0603	High Feed	A83 - A85	0.50	16 - 32	•	•	•	
7792VX09	XD.0804	High Feed	A83 - A85	1.50	25 - 50	•	•	•	
7792VX09	XD.1205	High Feed	A83 - A85	2.50	50 - 160	•	•	•	

2

7792VX09
High Feed Milling Cutter

2.1

Welded Shank

2.2

Modular Head

Depth of Cut (ap)

Product									
7792VX09 High Feed Milling Cutter									
Dimensions (mm)									
EDP	Item Description	D	LH	L	Ap max	Ap max	Ap max	Ap max	Ap max
7792VX09	Welded Shank	25	160	40	25	150	2	150	150
7792VX09	Cylindrical Shank	25	160	40	25	150	2	150	150
7792VX09	Shell Mill Fixation - Coarse, Medium and Fine Pitch	25	160	40	25	150	2	150	150
7792VX09	Modular Head	25	160	40	25	150	2	150	150
7792VX09	Depth of Cut (ap)	25	160	40	25	150	2	150	150

Product									
7792VX09 Technical Information (mm)									
Dimensions									
EDP	Item Description	Facing Pitch	Helical Pitch	Helical Hole	Ap max	Ap max	Ap max	Ap max	Ap max
7792VX09	Welded Shank	1.50	1.50	1.50	25	150	2	150	150
7792VX09	Cylindrical Shank	1.50	1.50	1.50	25	150	2	150	150
7792VX09	Shell Mill Fixation - Coarse, Medium and Fine Pitch	1.50	1.50	1.50	25	150	2	150	150
7792VX09	Modular Head	1.50	1.50	1.50	25	150	2	150	150
7792VX09	Depth of Cut (ap)	1.50	1.50	1.50	25	150	2	150	150



6 Step Tool Selection *(continued)*

- 3 **Select the *Insert*** according to the application and material to be machined.

3.1 Application Section

- Facing, Semi-Finishing and Finishing
- Or**
- Facing, Slotting and Plunging (7792VX series)

3.2 Material to be machined

For each insert, a colored symbol will advise you about the performance, as well as the materials which can be machined. The color of the symbol corresponds to the ISO Material designation.

Symbol explanation:

- ◆ 1st choice: Excellent performance
- 2nd choice: Good performance
- 3rd choice: Alternative option

ISO Material designation:

3

3.1

3.2



7772VXD001
Milling Inserts & Recommended Feeds





KOL 769-D-01

KOL 710-D-01

KOL 710-D-01S

KOL 710-D-01S



Product	Item Description	Application & Material			Dimensions (mm)				
		Facing	Bore	Purging	R (C)	I	F	F _{max} (H)	
		Depth of Cut (mm)							
		Up to 1.50	Up to 1.50	Up to 6.00					
02949	KDL709M6ER-D	K400			0.52	0.52	4.75	0.05	0.10
02949	KDL709M6ER-D	K500			0.52	0.52	4.75	0.05	0.10
02950	KDL709M6ER-D	SC3000			0.52	0.52	4.75	0.05	0.10
03985	KDL709M6ER-D41	K300			0.52	0.52	4.75	0.05	0.05
03985	KDL709M6ER-D41	SP624			0.52	0.52	4.75	0.05	0.05
03986	KDL709M6ER-D41	SC200			0.52	0.52	4.75	0.05	0.05
03987	KDL709M6ER-D721	G4E			0.52	0.52	4.75	0.05	0.05
03989	KDL709M12ER-D41S	K500			0.52	0.52	4.75	1.25	0.05
03989	KDL709M12ER-D41S	SC200			0.52	0.52	4.75	1.25	0.05

Machine Choice & 1° Choice  2° Choice  Material Guide for descriptions found on page A5.

KOL709M6ER-D K500 should be used for Alloyed Steel and Stainless Steel with heavy scale.

KOL709M12ER-D41 is a more positive geometry than the -D-41 with a larger radius which increases performance during similar radial engagements or where chipging may occur when using the -D-41 geometry.

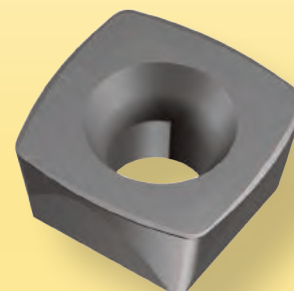
KOL709M12ER-D41 uses less toolpower than the -D-41 geometry.



End Mills & Face Mills

Example:

Material: Alloyed Steel
facing operation
XDLW090408SR-D X400
1st Choice grade /
geometry



Material Guide – Key to Recommended Inserts

Material Designation

- P** Unalloyed Steels **P** Alloyed Steels **M** Stainless Steels **M** PH Stainless **K** Cast Irons **N** Aluminum & Alloys **S** High Temp. Alloys **H** Hard Materials

- 4 Select the recommended Feed range according to the operation and the material to be machined.

Example:

Feed range for
XDLW090408SR-D X400
for **Facing** in **Alloyed Steel**
0.30 – 1.90 mm/tooth

4

[illegible]

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A72.



Unalloyed Steels



P

Alloyed Steels



Stainless Steels



M

PH Stainless



Cast Irons



K

Aluminium & Alloys



N

High Temperature Alloys



S

Hard Materials (42-45 HRC)



H

Material Guide – Key to Recommended Inserts

Material Designation

 Unalloyed Steels
  Alloyed Steels
  Stainless Steels
  PH Stainless
  Cast Irons
  Aluminum & Alloys
  High Temp. Alloys
  Hard Materials



Application

 Facing	 Shoulder / Profiling / Slotting	 Ramping	 Pocketing	 Helical Interpolation	 Helical Interpolation with Bore Hole	 Copy / 3D	 Spiral / Circular	 Trochoidal	 Shoulder / Profiling	 T-Slotting	 Contour Milling	 Slotting Shoulder	 Chamfering	 Plunging
									●					
	●													
	●													
										●				
						●					●			
						●					●			
●	●	●	●	●	●	●	●							

Tool Definition

	Family Range				Dimensions (mm)		Body Fixation					
	Series	Insert Shape and Size	Angle	Page	ap max	Diameter Range	Modular Heads	Weldon	Cylindrical	Shell Mills	Caterpillar Vee Flange	DIN 69871 Fixation Taper 50
	5210VS	SC..09T3 SO..12M6 SO..15M6	Long Edge Cutter (Porcupine) 90°	A165 - A170	57 68 - 77	32 80 - 100		●		●		
	5230VS	SD..09T3 SD..1204	Chevron Long Edge Cutter (Porcupine) 90°	A171 - A182	51 80 57 - 133	50 63 - 100				●		
	5315VA	AD..12T3 AP..1604	Long Edge Cutter (Porcupine) 90°	A183 - A194	23 - 45 31 - 61	25 - 40 50 - 80		●		●		●
	5400VM	MP..0402 MP..0602 MP..0803 MP..1104	T-Slotting	A271 - A277	8 - 9 11 14 18	18 - 21 25 32 40		●				
	5500V	RG.S 08, 10, 12 16, 20, 25	Finishing Ball Nose	A201 - A206	0,4 - 12,1	8 - 25	●		●			
	5505VX	XP..1603, XP..20T3, XP..2504, XP..3206, XP..40T7, XP..50T7	Ball Nose	A195 - A200	16 - 50	16 - 50	●	●	●			
	5702VZ	ZD..1403	Profiling Pocketing Shoulder 90°	A247 - A256	12	20			●			



Milling Introduction

Application

 Facing	 Shoulder / Profiling / Slotting	 Ramping	 Pocketing	 Helical Interpolation	 Helical Interpolation with Bore Hole	 Copy / 3D	 Spiral / Circular	 Trochoidal	 Shoulder / Profiling	 T-Slotting	 Contour Milling	 Slotting Shoulder	 Chamfering	 Plunging
●	●	●	●	●	●	●	●							
												●		
●	●	●	●	●	●		●	●						
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●		●	●	●	●	●	●				●			
●		●	●	●	●	●	●							
●		●	●	●	●	●	●							

Tool Definition

	Family Range				Dimensions (mm)		Body Fixation					
	Series	Insert Shape and Size	Angle	Page	ap max	Diameter Range	Modular Heads	Weldon	Cylindrical	Shell Mills	Caterpillar Vee Flange	DIN 69871 Fixation Taper 50
	5720VZ	ZD..16M5	Profiling Pocketing Shoulder 90°	A247 - A256	16	25 - 80	●		●	●		
	7220VM	MP..0402 MP..0602 MP..0803 MP..1104	Slotting Shoulder	A279 - A288	6 - 8 8 - 10 10 - 14 14 - 20	63 - 80 100 - 125 125 - 160 125 - 160				●		
	7690VA 7690VAP	AD..0903 AD..12T3 AP..1604	Facing Shoulder 90°	A45 - A62	8 11 16	10 - 63 20 - 80 25 - 125	●	●	●	●		
	7700VR	RP..0602 RP..0803 RP..10T3	Copy Contour	A207 - A216	3 4 5	14 - 20 16 - 32 20 - 32	●	●	●			
	7702VRD 7712VRD	RD..0702 RD..1003 RD..12T3 RD..1604	Copy Contour	A217 - A230	3, 5 5 6 8	15 - 20 20 - 35 25 - 80 32 - 100	●	●		●		
	7710VRD20	RD..2006	Copy Contour	A231 - A236	10	63 - 160				●		
	7713VR	RP..10T3 RP..1204	Copy Contour	A237 - A246	5 6	20 - 63 25 - 80	●		●	●		



Milling Introduction

Application

 Facing	 Shoulder / Profiling / Slotting	 Ramping	 Pocketing	 Helical Interpolation	 Helical Interpolation with Bore Hole	 Copy / 3D	 Spiral / Circular	 Trochoidal	 Shoulder / Profiling	 T-Slotting	 Contour Milling	 Slotting Shoulder	 Chamfering	 Plunging
•	•	•	•	•	•	•	•						•	
•													•	
•		•					•						•	
													•	
														•
•		•	•	•	•	•	•					•		•

Tool Definition

	Family Range				Dimensions (mm)		Body Fixation					
	Series	Insert Shape and Size	Angle	Page	ap max	Diameter Range	Modular Heads	Weldon	Cylindrical	Shell Mills	Caterpillar Vee Flange	DIN 69871 Fixation Taper 50
	7745VOD	OD..0404 OD..0605	Facing 42°	A77 - A86	3,5 4,5	25 - 160 50 - 160		●		●		
	7745VS	SC..09T3 SC..12M5	Facing Chamfering 45°	A87 - A94	5 7	16 - 25 40 - 125		●		●		
	7745VSE	SD..09T3 SD..1204	Facing 45°	A95 - A105	5 7	16 - 125 50 - 125		●		●		
	7745VT	TP..1102 TC..16T3	Chamfering 45° / 60°	A265 - A270	7,70 6,10 - 11,30	16 20 - 30		●				
	7760VT	TC..16T3			9,50	16 - 25						
	7791VS	SC..09T3 SC..12M5	Plunging	A257 - A264	ae = 8 ae = 11	25 - 50 63 - 80	●			●		
	7792VXP	XP..0603	High Feed	A63 - A75	0,90	16 - 32	●	●	●	●		
	7792VXD	XD..0904 XD..1205			1,50 2,50	25 - 50 32 - 160						
	7792VXE	XE..1605			3,50	63 - 160						
	Tungsten Cylindrical Shank Extensions	-	-	A76	-	16 - 32			●			



Application

 Facing	 Shoulder / Profiling / Slotting	 Ramping	 Pocketing	 Helical Interpolation	 Helical Interpolation with Bore Hole	 Copy / 3D	 Spiral / Circular	 Trochoidal	 Shoulder / Profiling	 T-Slotting	 Contour Milling	 Slotting Shoulder	 Chamfering	 Plunging
●	●													
●		●	●	●	●		●					●		
●	●	●	●	●	●		●						●	
●														
●							●							
●		●	●	●	●									
●		●	●	●	●									

Tool Definition

	Family Range				Dimensions (mm)		Body Fixation					
	Series	Insert Shape and Size	Angle	Page	ap max	Diameter Range	Modular Heads	Weldon	Cylindrical	Shell Mills	Caterpillar Vee Flange	DIN 69871 Fixation Taper 50
	80.00V-80.10V Bodies	-	Facing	A107 - A110	-	100 - 400				●		
	80.0VA90-R-16 Assembly	AP..1604	Facing 90°	A111 - A116	16	106 - 406				●		
	80.0VXD92-R-12 Assembly 80.0VXD92-R-16 Assembly	XD..1205 XE..1605	High Feed Facing	A117 - A124	2,5 3,5	106 - 256				●		
	80.0VOD45-R-04 Assembly 80.0VOD45-R-06 Assembly	OD..0404 OD..0605	Facing	A125 - A134	3,5 4,5	100 - 400				●		
	80.0VS45-R-12 Assembly	SC..12M5	Facing	A135 - A140	7	100 - 400				●		
	80.0VSE45-R-12 Assembly	SD..1204	Facing	A141 - A148	7	100 - 400				●		
	80.0VR00-R-16 Assembly	RP..1606	Facing	A149 - A154	8	116 - 416				●		
	80.0VRD00-R-20 Assembly	RD..2006	Facing	A155 - A159	10	116 - 416				●		

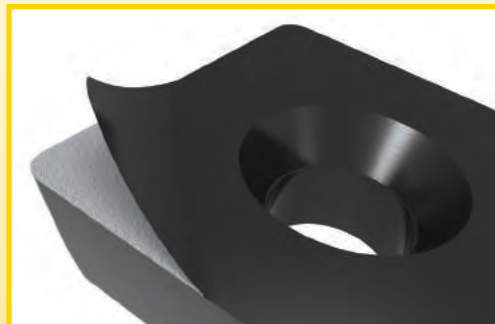


Grade descriptions are listed by toughness to most wear resistant.

SP5419

Coating Type: PVD, TiAlN

The combination of a tough substrate with a new generation of TiAlN super nano coating, makes this new PVD grade virtually free of residual stress and extremely hard for unmatched performance. Used in Steel and Steel Alloys.



X400

Coating Type: PVD, TiAlN, X-Grade™ Technology

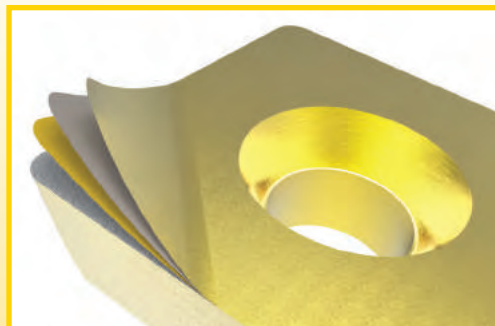
A patented high performance premium carbide grade with a high level of toughness and high wear resistant, thin layer PVD coating. For use in demanding conditions of high metal removal rates or interrupted cuts. This specifically designed grade allows high levels of cutting pressure and offers increased security of the cutting edge. For use on Steel and Steel Alloys, Tool Steels and Hardened Steel (415 - 480 HBN).



X500

Coating Type: CVD, TiN-TiC-TiN, X-Grade™ Technology

This high performance premium grade with a high level of shock resistance. This unique grade operates at the low to medium cutting speeds and is capable of high metal removal rates, while retaining a secure cutting edge. First choice for Stainless Steel and High Temperature Alloys as well as other materials where conditions are unstable.





X700

Coating Type: PVD, TiAlN, X-Grade™ Technology

This patented high performance premium carbide grade is the latest in the X-Grade™ Technology programme of coated milling inserts. It is designed for the toughest of applications in Nickel Based Alloys, Cobalt Based Alloys, Titanium and Titanium Alloys, as well as Stainless Steels. It is a combination of a highly durable TiAlN PVD coating and specially developed carbide substrate that gives an excellent tool life during long contact times of the cutting edge.



SP6519

Coating Type: PVD, TiAlN

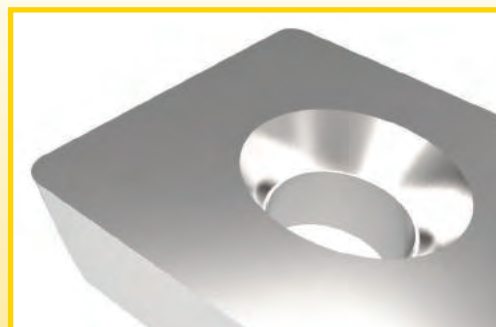
The combination of a tough substrate with a new generation of TiAlN super nano coating, makes this new PVD coating virtually free of residual stress and extremely hard for unmatched performance. Primarily used in Stainless Steel, High Temperature Alloys & Titanium with stable conditions. Also can be used in Steel, Steel Alloys and Cast Irons.



GH2

Uncoated, Micrograin

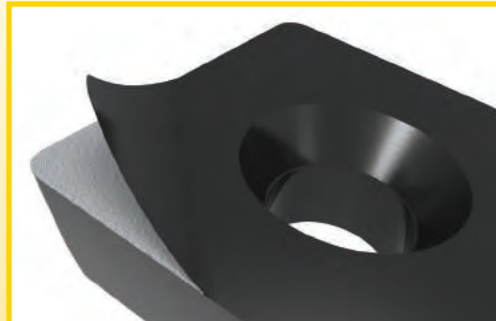
Micrograin grade designed for use on Cast Irons, Bronzes, Aluminiums, Kevlar, etc. This grade is tough and able to handle high pressure, vibration and shock.



**SP4019**

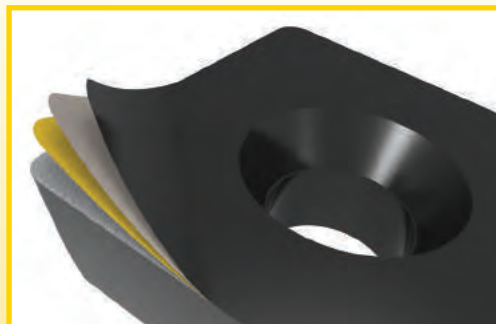
Coating Type - PVD TiAlN Micrograin

A hard grade for light roughing and finishing operations with lower chip sections. Principle applications are in Stainless Steels, High Temperature Alloys and Cast Irons. Can also be used in Steel, Steel Alloys and Hardened Steels.

**MP91M**

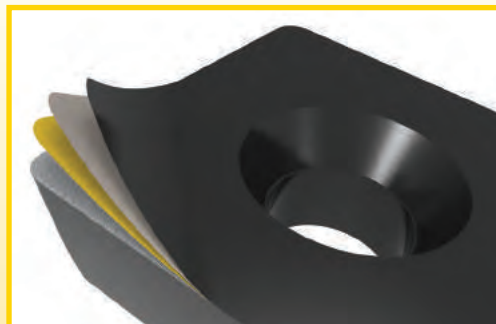
Coating Type: CVD, TiN-MT-TiCN-Al₂O₃

Primarily used on Steel, Steel Alloys and Cast Iron. Can also be used in Hardened Steels. With its aluminium oxide coating, this grade is recommended every time wear characteristics are more important than toughness.

**SC6525**

Coating Type: CVD, TiN-TiCN-Al₂O₃

SC6525 has a unique substrate/coating combination, designed specifically for high performance machining of Steel, Steel Alloys and Cast Irons at elevated surface speeds and feeds.

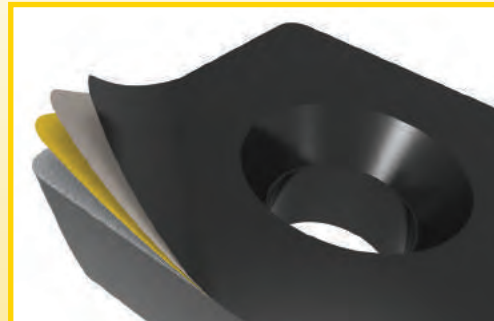




SC3025

Coating Type: CVD, TiN - TiCN - Al₂O₃

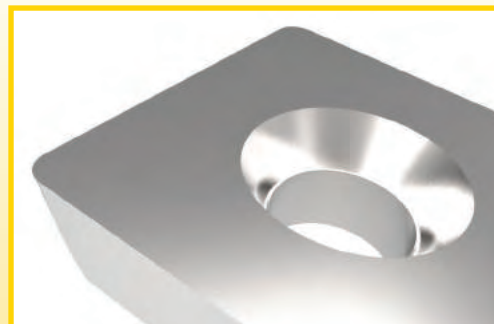
A high performance milling grade with multi-layer CVD coating designed to offer wear and abrasion resistance in Cast Iron materials.



GH1

Uncoated, Micrograin

This micrograin grade is designed for use on Cast Irons, and also Bronzes, Aluminiums, Kevlar, etc. The grade GH1 works well with or without coolant with low cutting pressure at high speeds due to sharp cutting edge.



SP1019

Coating Type: PVD, TiAlN, Micrograin

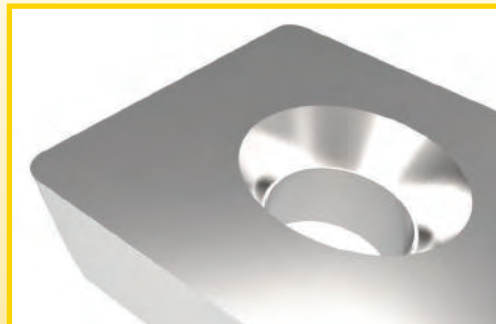
Micrograin carbide substrate with a new generation of TiAlN super nano coating, makes this PVD grade virtually free of residual stress and extremely hard for unmatched performance. Ideal for ball nose cutters at higher surface speeds, or for greater wear resistance. Used in finish machining all Alloys.



**SA9808**

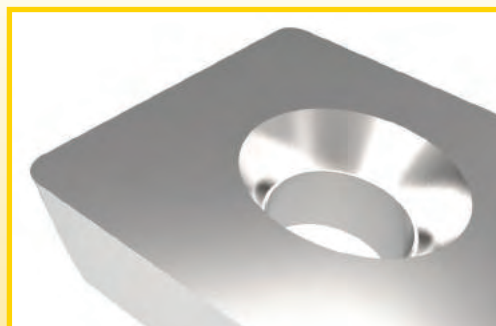
Uncoated Cermet (TiCN)

Uncoated Cermet for applications with limited interruptions. Excellent thermal conductivity and wear resistance, providing an excellent surface finish. For finish face milling of Steel, Steel Alloys, Stainless Steels and Cast Irons.

**SA9608**

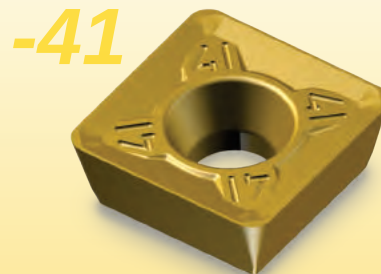
Uncoated, Cermet (TiCN)

Uncoated Cermet for finishing applications. Excellent thermal conductivity and wear resistance, providing an excellent surface finish. For finish face milling of Steel, Steel Alloys, Stainless Steel, Cast Irons and High Temperature Alloys with wiper insert SPHX12M512EN.

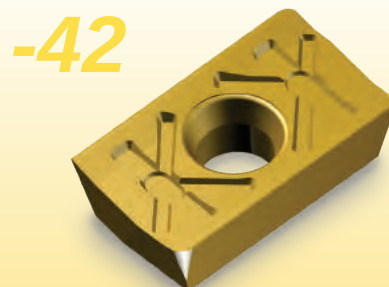


**-41**

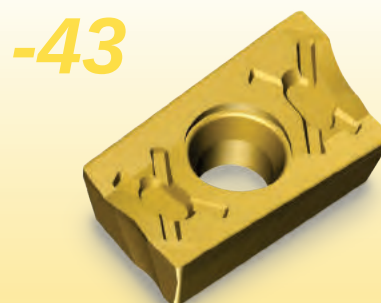
Is a general purpose geometry applied to utility ground inserts. This economical geometry is available with a number of insert styles for use in all approach angles. This geometry has positive cutting action and reinforced cutting edge for roughing applications in Steel, Steel Alloys, Stainless Steel and Cast Iron.

**-42**

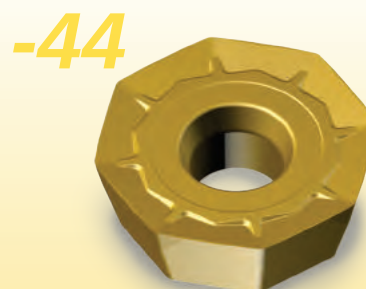
Is a general purpose geometry. The positive rake and T-land combine to create a strong cutting edge. The -42 geometry withstands high cutting forces and interrupted cuts. This geometry can be used for roughing and semi-finishing in Steel, Steel Alloys, Titanium, High Temperature Alloys and Stainless Steel with excellent results.

**-43**

This is a general purpose geometry designed to handle tough conditions and interrupted cuts with larger axial depth of cuts. It is applied to utility ground inserts with ground wiper edges for closer axial runout tolerance. This geometry is primarily used in Steel, Steel Alloys, Stainless Steels and Cast Irons.

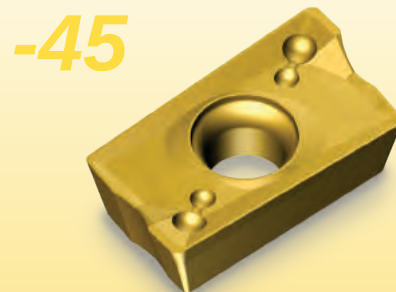
**-44**

This geometry is peripheral ground with a ground facet for producing the best surface quality in most materials while reducing cutting pressure and power consumption. For finishing applications in Steel, Steel Alloys, Stainless Steels, High Temperature Alloys and Cast Iron.

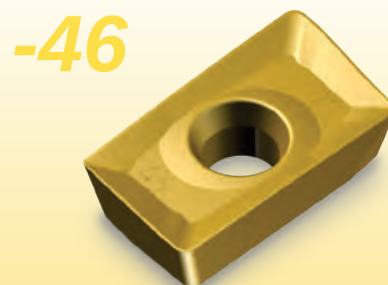


**-45**

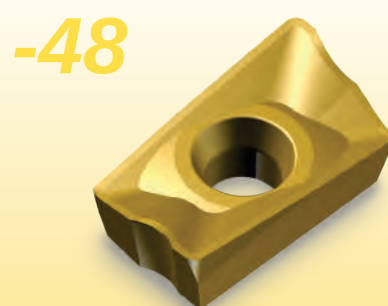
This geometry is designed for machining a wide range of materials and applications. It is available on utility ground inserts with ground wiper edges. The -45 geometry provides freer cutting operations and reduces the “suction effect” associated with higher helical geometries. This geometry is qualified for Steel, Steel Alloys, Stainless Steels, and Cast Iron.

**-46**

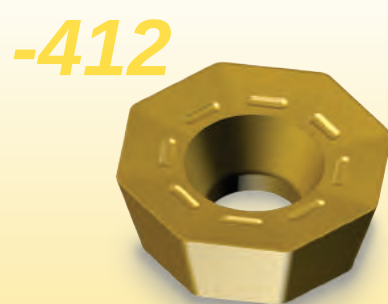
This positive geometry with high accuracy periphery grinding gives a positive cutting action. The precise treatment of the cutting edge ensures effective machining in roughing, semi-finishing and finishing applications, all materials.

**-48**

The geometry design of this insert provides a smooth cutting action with excellent chip control. Once positioned in the cutter body the combined effective cutting geometry produces lower radial forces, specifically in the direction of the feed, leading to a more stable cutting environment. For machining in Steel, Stainless Steel, Titanium and High Temperature Alloys.

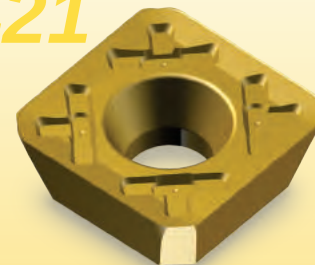
**-412**

This high positive geometry is slightly more positive than the -41. This geometry improves tool life on several applications when machining Stainless Steel and High Temperature Alloys.

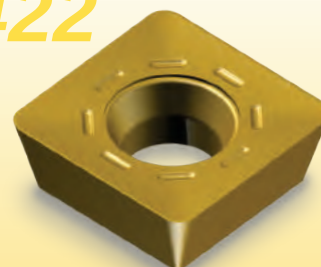


**-421**

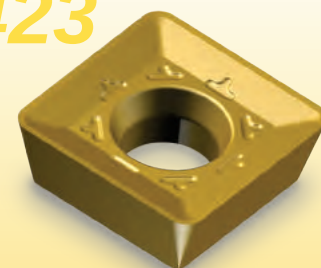
This high positive geometry with high accuracy periphery grinding. For use in semi-finishing and finishing applications. Due to the precise control of the cutting edge, this geometry provides excellent results when machining High Temperature Alloys.

-421**-422**

This positive geometry with a 11° chip angle and an “E” edge preparation for roughing and semi finishing applications. Primarily for machining of Stainless Steels and High Temperature Alloys. Also can be used in Steel, Steel Alloys and Cast Irons with very good results.

-422**-423**

A strong positive geometry first with a smaller primary angle and a small controlled hone to reduce cutting pressures, followed by a higher secondary angle to allow free cutting of the chip without rubbing on the insert rake face. Chip flow compresses the chip for easy evacuation. For roughing and semi-finishing of Nickel Based Alloys, Cobalt Alloys, Stainless Steels, Titanium Alloys and High Temperature Alloys.

-423**-441**

This geometry is a peripheral ground insert with a sharp cutting edge for use on Aluminium Alloys, Copper and Brass. The -441 geometry provides freer cutting operations and reduces the “suction effect” associated with higher helical geometries.

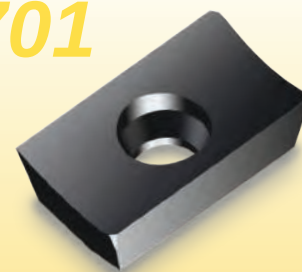
-441

**-442**

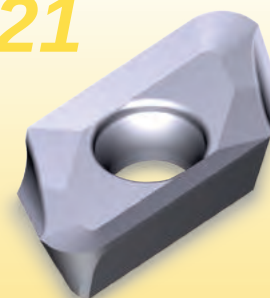
This NEW positive geometry minimizes the pressure from the chip formation. Utilising an 11° chip angle and an “E” edge preparation for roughing and semi finishing applications in Stainless Steel and High Temperature Alloys. This -442 geometry can also be used in machining Steel, Steel Alloys, and Cast Irons with very good results.

-442**-701**

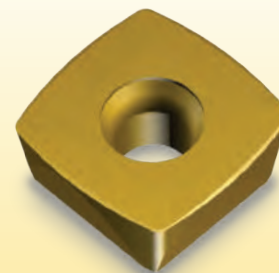
This extreme high positive geometry is highly suitable for finishing a wide range of materials at low feedrates. This geometry provides a freer cutting action particularly in Aluminium. Titanium and High Temperature Alloys can also be finished machined when the -701 geometry is combined with grade SP4019 or SP6519. This geometry is precision ground and gives excellent performance when machining thin-walled components.

-701**-721**

This geometry is periphery ground with a pressed, polished top rake face reducing built up edge. This economical geometry gives excellent results in machining Aluminium Alloys, Copper and Brass.

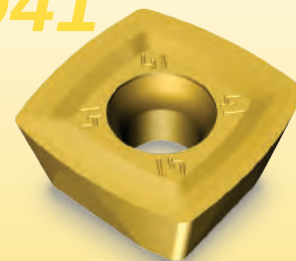
-721**-D**

This High Feed geometry fully ground with flat top and variable hone has been designed to machine Steel, Steel Alloys, Tool Steel, Cast Irons and Hardened Materials up to 534HBN.

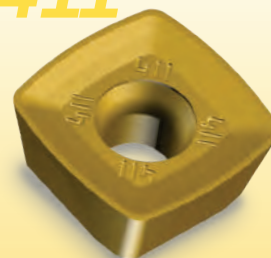
-D

**-D41**

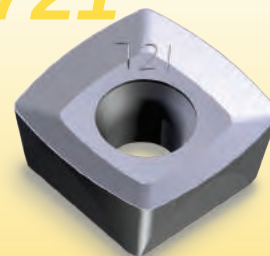
This positive High Feed geometry primarily used to machine Stainless Steel, High Temperature Alloys and Titanium. It can also be used for machining Steel, Steel Alloys and Cast Iron with excellent results. The -D41 geometry also reduces power consumption .

-D41**-D411**

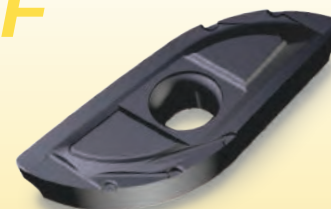
This positive High Feed geometry with larger corner radius 1,2mm reduces cutting energy and provides better edge protection during lower radial engagement applications. Mainly for machining Titanium, High Temperture Alloys and Stainless Steel. It can also be used for machining Steel, Steel Alloys and Cast Irons with extremely good results.

-D411**-D721**

This highly positive High Feed geometry is designed for machining Aluminium, Copper and Brass. The periphery ground, polished top rake face and sharp edge allows a freer cutting action and reduces built-up edge.

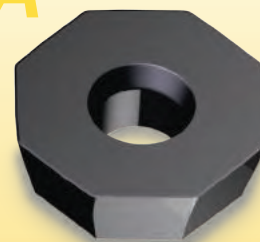
-D721**-F**

This geometry is a roughing ball nose fully ground insert for roughing and semi-finishing of all Materials except Aluminium. This geometry is designed with chip grooves for better chip control.

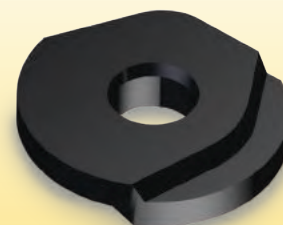
-F

**-RA**

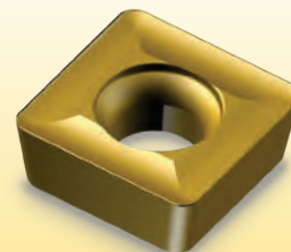
This geometry is a precision insert for milling Cast Iron. The extended wiper-facet on this insert geometry allows a 50% higher feed rate for higher productivity. This geometry is available with SC3025, our leading Cast Iron milling grade.

-RA**-RG..S**

This geometry is designed for finish machining of 3D profiles. It is extremely accurate and delivers a very long tool life. The RG..S is excellent when machining a side wall that is close to 90°. Suitable for machining of all materials.

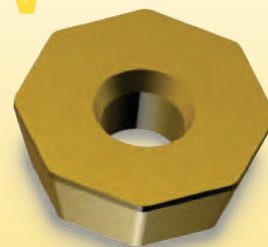
-RG..S**-T**

This geometry is for general purpose applications when a strong cutting and excellent chip breaking capability is required. This geometry is found on a wide range of Stellram inserts. The design is nearly as tough as flat-top inserts. Mainly to be used when machining Steel, Steel Alloys, Cast Irons and Hardened Steels.

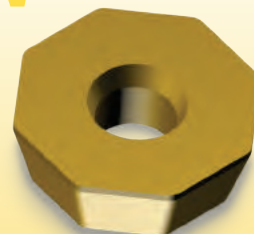
-T

**-TN**

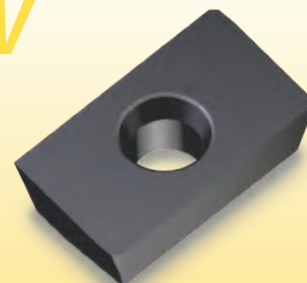
This geometry is a flat top design with a strong T-land edge preparation for preventing chipping in unstable conditions. This geometry is similar to the -SN geometry, but has a smaller edge preparation which reduces machine power consumption. For machining Steel, Steel Alloys and Cast Iron. Should also be used to machine Stainless Steel and Titanium with heavy scale.

-TN**-SN**

This geometry is our strongest cutting edge for general purpose applications and is ideal for unstable cutting conditions, long overhangs and very high feedrates. For heavy duty applications when machining Steel, Steel Alloys and Cast Iron. Ideal solution for heavy scale applications.

-SN**-W**

This geometry is offered in a number of flat-top inserts for numerous milling applications in a wide range of materials. The flat-top inserts are the best choice when toughness is required for all milling applications. This geometry offers a stronger cutting edge than a chip-groove insert.

-W

A

1

P

2

F

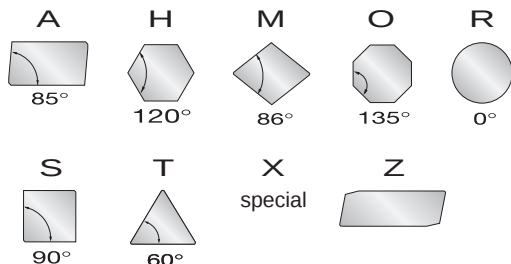
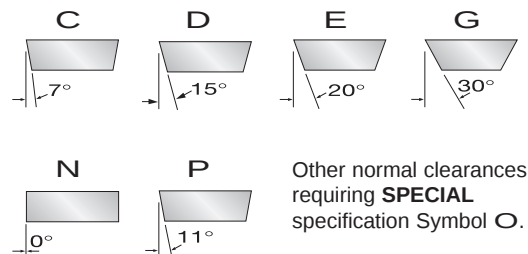
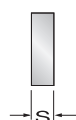
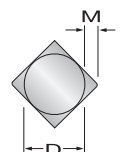
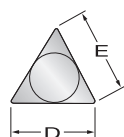
3

W

4

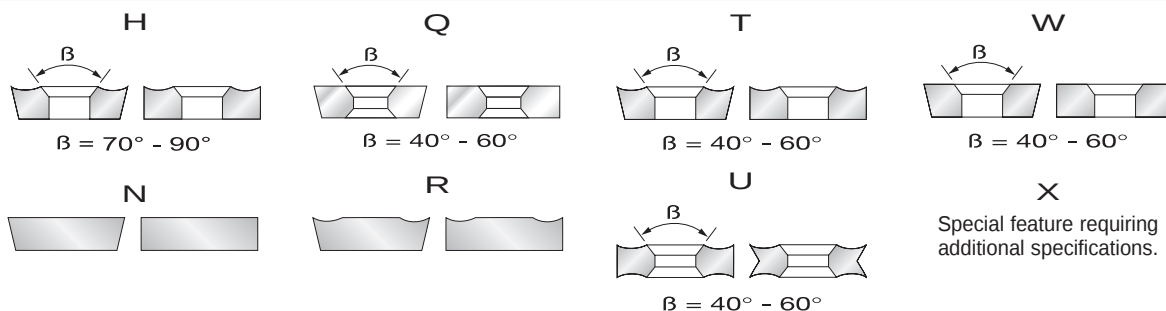
16

5

1 Shape**2 Clearance****3 Tolerance**

Class		D	M	S
A ⁽¹⁾	mm	±0,025	±0,005	±0,025
C ⁽¹⁾	mm	±0,025	±0,013	±0,025
E ⁽¹⁾	mm	±0,025	±0,025	±0,025
F ⁽¹⁾	mm	±0,013	±0,005	±0,025
G	mm	±0,025	±0,025	±0,130
H ⁽¹⁾	mm	±0,013	±0,013	±0,025
J ⁽¹⁾	mm	from ±0,050 to ±0,150	±0,005	±0,025
K ⁽¹⁾	mm	from ±0,050 to ±0,150	±0,013	±0,025
L ⁽¹⁾	mm	from ±0,050 to ±0,150	±0,025	±0,025
M	mm	from ±0,050 to ±0,150	from ±0,080 to ±0,200	±0,13
N	mm	from ±0,050 to ±0,150	from ±0,080 to ±0,200	±0,025
U	mm	from ±0,080 to ±0,250	from ±0,130 to ±0,380	±0,13

(1) Indexable inserts with ground wiper edges. (2) Dependent upon the insert size (see ISO 1832 standard)

4 Type

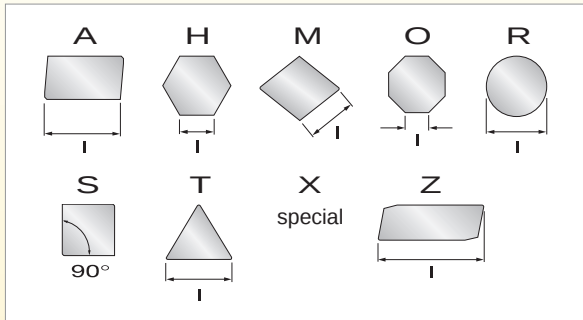
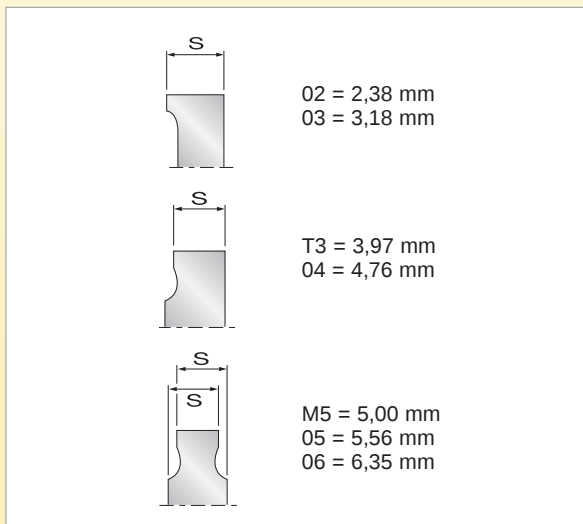
04
6

PD
7

T
8

R
9

-
10

5 Size

6 Thickness

7 Corner

Rounded Corner Inserts

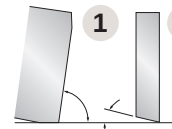
Value of corner radius given in 1/10 mm

Note: For sharp corner
Symbol = **00**

Rounded Inserts

Symbol = **00**
If the $\varnothing$ is converted from an inch value.

Symbol = **M0**
If the $\varnothing$ is converted from a metric value.

7 Corner continued

Inserts With Wiper Edges.

Two Letter Symbol:

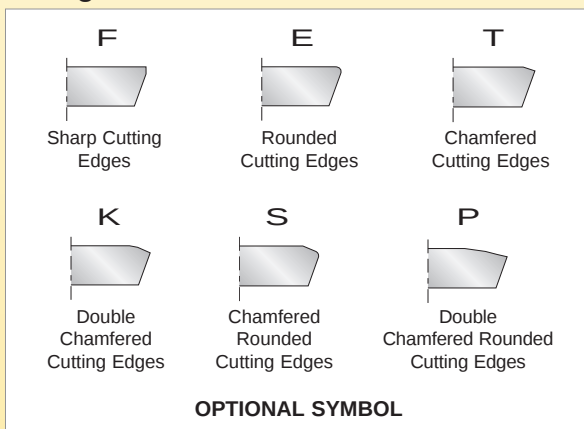
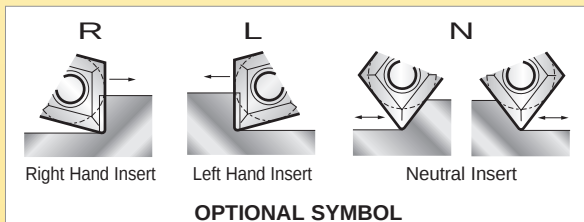
1 For cutting edge angle χ_r

A = 45°
D = 60°
E = 75°
F = 85°
P = 90°

2 For wiper edge normal clearance

A = 3°
B = 5°
C = 7°
D = 15°
E = 20°
F = 25°
G = 30°
N = 0°
P = 11°

Z = Any other wiper edge clearance.

8 Edge Condition

9 Cutting Direction

10 Optional

Manufacturers optional symbol consisting of numbers or letters; shall be separated from the standardized designation by a dash (-).

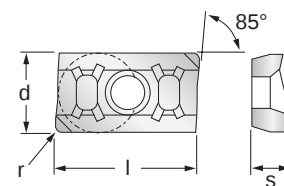
OPTIONAL SYMBOL

Alphabetical Index

AD Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	hm min
031075	ADET090308SR-42	SP6519	6,35	9,20	3,18	0,80	0,10
031076	ADET090308SR-42	X500	6,35	9,20	3,18	0,80	0,10
031094	ADET090310SR-42	SP6519	6,35	9,20	3,18	1,00	0,10
024913	ADET090310SR-42	X500	6,35	9,20	3,18	1,00	0,10
031096	ADET090312SR-42	SP6519	6,35	9,20	3,18	1,20	0,10
031095	ADET090312SR-42	X500	6,35	9,20	3,18	1,20	0,10
030980	ADET090316SR-42	SP6519	6,35	9,20	3,18	1,60	0,10
030942	ADET090316SR-42	X500	6,35	9,20	3,18	1,60	0,10
031098	ADET090320SR-42	SP6519	6,35	9,20	3,18	2,00	0,10
031097	ADET090320SR-42	X500	6,35	9,20	3,18	2,00	0,10
031100	ADET090324SR-42	SP6519	6,35	9,20	3,18	2,40	0,10
031099	ADET090324SR-42	X500	6,35	9,20	3,18	2,40	0,10
031102	ADET090330SR-42	SP6519	6,35	9,20	3,18	3,00	0,10
031101	ADET090330SR-42	X500	6,35	9,20	3,18	3,00	0,10
031104	ADET090332SR-42	SP6519	6,35	9,20	3,18	3,20	0,10
031103	ADET090332SR-42	X500	6,35	9,20	3,18	3,20	0,10
031093	ADET0903PDSR-42	SP6519	6,35	9,20	3,18	Facet	0,10
031092	ADET0903PDSR-42	X500	6,35	9,20	3,18	Facet	0,10
030857	ADET12T308ER-48	SP6519	7,87	12,70	3,76	0,80	0,04
030856	ADET12T308ER-48	X500	7,87	12,70	3,76	0,80	0,04
030800	ADET12T312ER-48	SP6519	7,87	12,70	3,76	1,20	0,04
030808	ADET12T312ER-48	X500	7,87	12,70	3,76	1,20	0,04
030771	ADET12T316ER-48	SP6519	7,87	12,70	3,76	1,60	0,04
030809	ADET12T316ER-48	X500	7,87	12,70	3,76	1,60	0,04
030909	ADET12T320ER-48	SP6519	7,87	12,70	3,76	2,00	0,04
030908	ADET12T320ER-48	X500	7,87	12,70	3,76	2,00	0,04
030859	ADET12T324ER-48	SP6519	7,87	12,70	3,76	2,40	0,04
030858	ADET12T324ER-48	X500	7,87	12,70	3,76	2,40	0,04
030911	ADET12T330ER-48	SP6519	7,87	12,70	3,76	3,00	0,04
030910	ADET12T330ER-48	X500	7,87	12,70	3,76	3,00	0,04
030772	ADET12T332ER-48	SP6519	7,87	12,70	3,76	3,20	0,04
030810	ADET12T332ER-48	X500	7,87	12,70	3,76	3,20	0,04
030913	ADET12T340ER-48	SP6519	7,87	12,70	3,76	4,00	0,04
030912	ADET12T340ER-48	X500	7,87	12,70	3,76	4,00	0,04
030770	ADET12T3PDER-48	SP6519	7,87	12,70	3,76	Facet	0,04
030807	ADET12T3PDER-48	X500	7,87	12,70	3,76	Facet	0,04
024916	ADET0903PDFR-441	GH1	6,35	9,20	3,18	Facet	0,03
029098	ADGT12T3PDFR-721	GH1	7,87	12,70	3,76	Facet	0,05



ADET_-42

Ground circumference X 90° one face pressed chip-breaker



ADET_-48

Ground circumference X 90° one face pressed chip-breaker



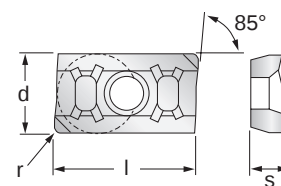
ADET_-441

Ground circumference X 90° one face pressed chip-breaker



ADGT_-721

Ground circumference X 90° one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	hm min
031526	ADHT12T308ER-46	SP6519	7,87	12,70	3,76	0,80	0,05
029329	ADHT12T308ER-46	X500	7,87	12,70	3,76	0,80	0,05
030406	ADHT12T308ER-46	X700	7,87	12,70	3,76	0,80	0,05
031527	ADHT12T316ER-46	SP6519	7,87	12,70	3,76	1,60	0,05
029331	ADHT12T316ER-46	X500	7,87	12,70	3,76	1,60	0,05
030407	ADHT12T316ER-46	X700	7,87	12,70	3,76	1,60	0,05
031530	ADHT12T320ER-46	SP6519	7,87	12,70	3,76	2,00	0,05
029337	ADHT12T320ER-46	X500	7,87	12,70	3,76	2,00	0,05
030408	ADHT12T320ER-46	X700	7,87	12,70	3,76	2,00	0,05
031528	ADHT12T324ER-46	SP6519	7,87	12,70	3,76	2,40	0,05
029333	ADHT12T324ER-46	X500	7,87	12,70	3,76	2,40	0,05
031531	ADHT12T330ER-46	SP6519	7,87	12,70	3,76	3,00	0,05
029339	ADHT12T330ER-46	X500	7,87	12,70	3,76	3,00	0,05
031515	ADHT12T332ER-46	SP6519	7,87	12,70	3,76	3,20	0,05
029036	ADHT12T332ER-46	X500	7,87	12,70	3,76	3,20	0,05
030409	ADHT12T332ER-46	X700	7,87	12,70	3,76	3,20	0,05
031529	ADHT12T340ER-46	SP6519	7,87	12,70	3,76	4,00	0,05
029335	ADHT12T340ER-46	X500	7,87	12,70	3,76	4,00	0,05
031525	ADHT12T3PDER-46	SP6519	7,87	12,70	3,76	Facet	0,05
029327	ADHT12T3PDER-46	X500	7,87	12,70	3,76	Facet	0,05



ADHT_-46

Ground circumference X 90° one face pressed chip-breaker

017286	ADKT0903PDER-43	MP91M	6,35	9,20	3,18	Facet	0,05
031463	ADKT0903PDER-43	SP6519	6,35	9,20	3,18	Facet	0,05
015150	ADKT0903PDER-43	X500	6,35	9,20	3,18	Facet	0,05



ADKT_-43

Ground wiper edges X 90° one face pressed chip-breaker

027915	ADKT12T3PDER-45	MP91M	7,87	12,70	3,76	Facet	0,05
027916	ADKT12T3PDER-45	SC3025	7,87	12,70	3,76	Facet	0,05
031514	ADKT12T3PDER-45	SP6519	7,87	12,70	3,76	Facet	0,05
027913	ADKT12T3PDER-45	X500	7,87	12,70	3,76	Facet	0,05
023082	ADKT1505PDER-45	MP91M	9,65	16,05	5,56	Facet	0,06
031464	ADKT1505PDER-45	SP6519	9,65	16,05	5,56	Facet	0,06
023083	ADKT1505PDER-45	X500	9,65	16,05	5,56	Facet	0,06



ADKT_-45

Ground wiper edges X 90° one face pressed chip-breaker

033179	APET160402TR-42	SP6519	9,52	16,66	4,76	0,20	0,10
033180	APET160408TR-42	SP6519	9,52	16,66	4,76	0,80	0,10
033181	APET160410TR-42	SP6519	9,52	16,66	4,76	1,00	0,10
033182	APET160415TR-42	SP6519	9,52	16,66	4,76	1,50	0,10
033183	APET160420TR-42	SP6519	9,52	16,66	4,76	2,00	0,10
033184	APET160425TR-42	SP6519	9,52	16,66	4,76	2,50	0,10
033185	APET160430TR-42	SP6519	9,52	16,66	4,76	3,00	0,10
033186	APET160440TR-42	SP6519	9,52	16,66	4,76	4,00	0,10
033187	APET160460TR-42	SP6519	9,52	16,66	4,76	6,00	0,10



APET_-42

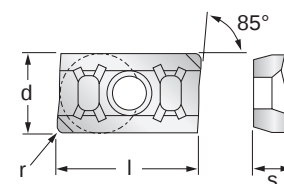
Ground circumference X 90° one face pressed chip-breaker

Alphabetical Index

AP Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	hm min
030861	APET160408ER-48	SP6519	9,52	16,66	4,76	0,80	0,04
030860	APET160408ER-48	X500	9,52	16,66	4,76	0,80	0,04
030799	APET160412ER-48	SP6519	9,52	16,66	4,76	1,20	0,04
030812	APET160412ER-48	X500	9,52	16,66	4,76	1,20	0,04
030774	APET160416ER-48	SP6519	9,52	16,66	4,76	1,60	0,04
030813	APET160416ER-48	X500	9,52	16,66	4,76	1,60	0,04
030915	APET160420ER-48	SP6519	9,52	16,66	4,76	2,00	0,04
030914	APET160420ER-48	X500	9,52	16,66	4,76	2,00	0,04
030917	APET160424ER-48	SP6519	9,52	16,66	4,76	2,40	0,04
030916	APET160424ER-48	X500	9,52	16,66	4,76	2,40	0,04
030919	APET160430ER-48	SP6519	9,52	16,66	4,76	3,00	0,04
030918	APET160430ER-48	X500	9,52	16,66	4,76	3,00	0,04
030775	APET160432ER-48	SP6519	9,52	16,66	4,76	3,20	0,04
030814	APET160432ER-48	X500	9,52	16,66	4,76	3,20	0,04
030906	APET160440ER-48	SP6519	9,52	16,66	4,76	4,00	0,04
030907	APET160440ER-48	X500	9,52	16,66	4,76	4,00	0,04
030921	APET160450ER-48	SP6519	9,52	16,66	4,76	5,00	0,04
030920	APET160450ER-48	X500	9,52	16,66	4,76	5,00	0,04
030923	APET160460ER-48	SP6519	9,52	16,66	4,76	6,00	0,04
030922	APET160460ER-48	X500	9,52	16,66	4,76	6,00	0,04
030925	APET160464ER-48	SP6519	9,52	16,66	4,76	6,40	0,04
030924	APET160464ER-48	X500	9,52	16,66	4,76	6,40	0,04
030773	APET1604PDER-48	SP6519	9,52	16,66	4,76	Facet	0,04
030811	APET1604PDER-48	X500	9,52	16,66	4,76	Facet	0,04



APET_-48

Ground circumference X 90° one face pressed chip-breaker

033188	APEX1604PDER-701	SP6519	9,52	16,66	4,76	Facet	0,02
017624	APEX1604PDFL-701	GH1	9,52	16,66	4,76	Facet	0,02
014066	APEX1604PDFR-701	GH1	9,52	16,66	4,76	Facet	0,02
033189	APEX1604PDFR-701	SP4019	9,52	16,66	4,76	Facet	0,02



APEX_-701

Completely ground X 90° concave cutting face

017291	APFW1604PDER	MP91M	9,52	16,66	4,76	Facet	0,04
017630	APFW1604PDTL	GH1	9,52	16,66	4,76	Facet	0,10
034692	APFW1604PDTL	SP4019	9,52	16,66	4,76	Facet	0,10
017628	APFW1604PDTR	GH1	9,52	16,66	4,76	Facet	0,10
027883	APFW1604PDTR	SC3025	9,52	16,66	4,76	Facet	0,10
033191	APFW1604PDTR	SP4019	9,52	16,66	4,76	Facet	0,10
033190	APFW1604PDTR	X400	9,52	16,66	4,76	Facet	0,10



APFW_

Ground circumference X 90° without chip-breaker

033192	APHT1604PDER	SP4019	9,52	16,66	4,76	Facet	0,04
015154	APHT1604PDFR	GH1	9,52	16,66	4,76	Facet	0,02



APHT_

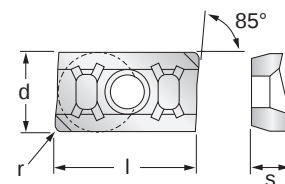
Ground circumference X 90° one face pressed chip-breaker

017292	APHT1604PDTL-42	MP91M	9,52	16,66	4,76	Facet	0,10
031513	APHT1604PDTL-42	SP6519	9,52	16,66	4,76	Facet	0,10
017635	APHT1604PDTL-42	X500	9,52	16,66	4,76	Facet	0,10
017293	APHT1604PDTR-42	MP91M	9,52	16,66	4,76	Facet	0,10
031466	APHT1604PDTR-42	SP6519	9,52	16,66	4,76	Facet	0,10
015155	APHT1604PDTR-42	X500	9,52	16,66	4,76	Facet	0,10



APHT_-42

Ground circumference X 90° one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	hm min
031495	APHT160408ER-46	SP6519	9,52	16,66	4,76	0,80	0,10
027869	APHT160408ER-46	X500	9,52	16,66	4,76	0,80	0,10
031496	APHT160416ER-46	SP6519	9,52	16,66	4,76	1,60	0,10
027870	APHT160416ER-46	X500	9,52	16,66	4,76	1,60	0,10
031497	APHT160424ER-46	SP6519	9,52	16,66	4,76	2,40	0,10
027871	APHT160424ER-46	X500	9,52	16,66	4,76	2,40	0,10
031397	APHT160432ER-46	SP6519	9,52	16,66	4,76	3,20	0,10
027872	APHT160432ER-46	X500	9,52	16,66	4,76	3,20	0,10
031542	APHT160440ER-46	SP6519	9,52	16,66	4,76	4,00	0,10
027873	APHT160440ER-46	X500	9,52	16,66	4,76	4,00	0,10
031498	APHT160450ER-46	SP6519	9,52	16,66	4,76	5,00	0,10
027874	APHT160450ER-46	X500	9,52	16,66	4,76	5,00	0,10
031541	APHT160464ER-46	SP6519	9,52	16,66	4,76	6,40	0,10
027875	APHT160464ER-46	X500	9,52	16,66	4,76	6,40	0,10
017861	APKT1003PDFR-3M	GH1	6,68	10,50	3,18	Facet	0,05



APHT_-46

Ground circumference χ 90° one face pressed chip-breaker



APKT_-3M

Ground wiper edges χ 90° one face pressed chip-breaker



APKT_-43

Ground wiper edges χ 90° one face pressed chip-breaker



APKT_-45

Ground wiper edges χ 90° one face pressed chip-breaker



MPEX_-701

Completely ground χ 90° concave cutting face



MPFW_

Ground circumference χ 90° without chip-breaker

017294	APKT1604PDER-43	MP91M	9,52	16,66	4,76	Facet	0,08
027887	APKT1604PDER-43	SC3025	9,52	16,66	4,76	Facet	0,08
031468	APKT1604PDER-43	SP6519	9,52	16,66	4,76	Facet	0,08
015156	APKT1604PDER-43	X500	9,52	16,66	4,76	Facet	0,08

023112	APKT1003PDER-45	MP91M	6,68	10,50	3,18	Facet	0,05
031467	APKT1003PDER-45	SP6519	6,68	10,50	3,18	Facet	0,05
023113	APKT1003PDER-45	X500	6,68	10,50	3,18	Facet	0,05
023114	APKT1604PDER-45	MP91M	9,52	16,66	4,76	Facet	0,06
031469	APKT1604PDER-45	SP6519	9,52	16,66	4,76	Facet	0,06
023115	APKT1604PDER-45	X500	9,52	16,66	4,76	Facet	0,06

024926	MPEX0602PPFL-701	GH1	6,35	6,35	2,38	Facet	0,02
024927	MPEX0602PPFR-701	GH1	6,35	6,35	2,38	Facet	0,02
024928	MPEX0803PPFL-701	GH1	7,94	7,94	3,18	Facet	0,02
017642	MPEX0803PPFR-701	GH1	7,94	7,94	3,18	Facet	0,02
034527	MPEX0803PPFL-701	SP4019	7,94	7,94	3,18	Facet	0,02
034528	MPEX0803PPFR-701	SP4019	7,94	7,94	3,18	Facet	0,02
017644	MPEX1104PPFL-701	GH1	11,11	11,11	4,76	Facet	0,02
017643	MPEX1104PPFR-701	GH1	11,11	11,11	4,76	Facet	0,02

034523	MPFW0402PPTL	SP4019	4,76	4,76	2,38	Facet	0,07
034524	MPFW0402PPTR	SP4019	4,76	4,76	2,38	Facet	0,07
031508	MPFW0402PPTL	SP6519	4,76	4,76	2,38	Facet	0,07
031507	MPFW0402PPTR	SP6519	4,76	4,76	2,38	Facet	0,07
034525	MPFW0602PPTL	SP4019	6,35	6,35	2,38	Facet	0,07
034526	MPFW0602PPTR	SP4019	6,35	6,35	2,38	Facet	0,07
031571	MPFW0602PPTL	SP6519	6,35	6,35	2,38	Facet	0,07
031570	MPFW0602PPTR	SP6519	6,35	6,35	2,38	Facet	0,07

Alphabetical Index

MP - OD Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
017658	MPFW0803PPTL	GH1	7,94	7,94	3,18	Facet	0,10
017655	MPFW0803PPTR	GH1	7,94	7,94	3,18	Facet	0,10
034529	MPFW0803PPTL	SP4019	7,94	7,94	3,18	Facet	0,10
034530	MPFW0803PPTR	SP4019	7,94	7,94	3,18	Facet	0,10
034532	MPFW0803PPTL	X400	7,94	7,94	3,18	Facet	0,10
034531	MPFW0803PPTR	X400	7,94	7,94	3,18	Facet	0,10
017439	MPFW1104PPTL	GH1	11,11	11,11	4,76	Facet	0,15
017440	MPFW1104PPTR	GH1	11,11	11,11	4,76	Facet	0,15
034533	MPFW1104PPTL	SP4019	11,11	11,11	4,76	Facet	0,15
034534	MPFW1104PPTR	SP4019	11,11	11,11	4,76	Facet	0,15

017296	MPHT0803PPTL-42	MP91M	7,94	7,94	3,18	Facet	0,10
017297	MPHT0803PPTR-42	MP91M	7,94	7,94	3,18	Facet	0,10
031510	MPHT0803PPTL-42	SP6519	7,94	7,94	3,18	Facet	0,10
031509	MPHT0803PPTR-42	SP6519	7,94	7,94	3,18	Facet	0,10
015138	MPHT0803PPTL-42	X500	7,94	7,94	3,18	Facet	0,10
015140	MPHT0803PPTR-42	X500	7,94	7,94	3,18	Facet	0,10
017298	MPHT1104PPTL-42	MP91M	11,11	11,11	4,76	Facet	0,10
017299	MPHT1104PPTR-42	MP91M	11,11	11,11	4,76	Facet	0,10
031512	MPHT1104PPTL-42	SP6519	11,11	11,11	4,76	Facet	0,10
031511	MPHT1104PPTR-42	SP6519	11,11	11,11	4,76	Facet	0,10
015141	MPHT1104PPTL-42	X500	11,11	11,11	4,76	Facet	0,10
015142	MPHT1104PPTR-42	X500	11,11	11,11	4,76	Facet	0,10

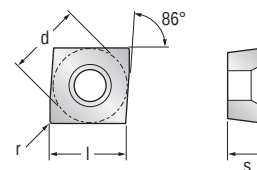
017667	MPHW0402PPTL	X500	4,76	4,76	2,38	Facet	0,07
017666	MPHW0402PPTR	X500	4,76	4,76	2,38	Facet	0,07
017669	MPHW0602PPTL	X500	6,35	6,35	2,38	Facet	0,07
017668	MPHW0602PPTR	X500	6,35	6,35	2,38	Facet	0,07

015180	MPMT060204EN-43	X500	6,35	6,35	2,38	0,40	0,04
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022199	ODET0404APEN-44	MP91M	12,70	4,00	4,76	Facet	0,04
031470	ODET0404APEN-44	SP6519	12,70	4,00	4,76	Facet	0,04
022198	ODET0404APEN-44	X500	12,70	4,00	4,76	Facet	0,04
026591	ODET0605APEN-44	MP91M	16,00	6,00	5,55	Facet	0,04
034513	ODET0605APEN-44	SP4019	16,00	6,00	5,55	Facet	0,04
031501	ODET0605APEN-44	SP6519	16,00	6,00	5,55	Facet	0,04
026592	ODET0605APEN-44	X500	16,00	6,00	5,55	Facet	0,04

024911	ODET0404APFN-441	GH1	12,70	4,00	4,76	Facet	0,02
026588	ODET0605APFN-441	GH1	16,00	6,00	5,55	Facet	0,02

027884	ODEW0404APTR-RA	SC3025	12,70	4,00	4,76	Facet	0,19
027885	ODEW0605APTR-RA	SC3025	16,00	6,00	5,55	Facet	0,19



MPFW_

Ground circumference X 90° without chip-breaker



MPHT_-42

Ground circumference X 90° one face pressed chip-breaker



MPH_

Ground circumference X 90° without chip-breaker



MPMT_

As pressed circumference X 90° one face pressed chip-breaker



ODET_-44

Ground circumference X 42° one face pressed chip-breaker



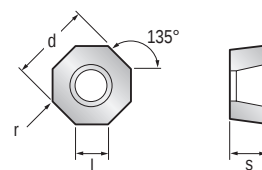
ODET_-441

Ground circumference X 42° one face pressed chip-breaker



ODEW_-RA

Ground circumference X 42° without chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
017303	ODMT040408EN-41	MP91M	12,70	4,00	4,76	0,80	0,04
031471	ODMT040408EN-41	SP6519	12,70	4,00	4,76	0,80	0,04
015143	ODMT040408EN-41	X500	12,70	4,00	4,76	0,80	0,04
030330	ODMT040408EN-41	X700	12,70	4,00	4,76	0,80	0,04
017775	ODMT0404APEN-41	MP91M	12,70	4,00	4,76	Facet	0,04
031472	ODMT0404APEN-41	SP6519	12,70	4,00	4,76	Facet	0,04
022061	ODMT0404APEN-41	X500	12,70	4,00	4,76	Facet	0,04
026589	ODMT0605APEN-41	MP91M	16,00	6,00	5,55	Facet	0,04
034514	ODMT0605APEN-41	SP4019	16,00	6,00	5,55	Facet	0,04
031502	ODMT0605APEN-41	SP6519	16,00	6,00	5,55	Facet	0,04
026590	ODMT0605APEN-41	X500	16,00	6,00	5,55	Facet	0,04
031540	ODMT040408EN-412	SP6519	12,70	4,00	4,76	0,80	0,06
030768	ODMT040408EN-412	X500	12,70	4,00	4,76	0,80	0,06
030769	ODMT040408EN-412	X700	12,70	4,00	4,76	0,80	0,06


ODMT_-41

As pressed circumference X 42° one face pressed chip-breaker


ODMT_-412

As pressed circumference X 42° one face pressed chip-breaker

017304	ODMW040408SN	MP91M	12,70	4,00	4,76	0,80	0,27
029096	ODMW040408SN	SC3025	12,70	4,00	4,76	0,80	0,27
031462	ODMW040408SN	SP6519	12,70	4,00	4,76	0,80	0,27
017672	ODMW040408SN	X500	12,70	4,00	4,76	0,80	0,27
025836	ODMW060512SN	MP91M	16,00	6,00	5,55	1,20	0,27
029097	ODMW060512SN	SC3025	16,00	6,00	5,55	1,20	0,27
031483	ODMW060512SN	SP6519	16,00	6,00	5,55	1,20	0,27
025838	ODMW060512SN	X500	16,00	6,00	5,55	1,20	0,27


ODMW_-SN

As pressed circumference X 42° without chip-breaker

026595	ODMW060512TN	MP91M	16,00	6,00	5,55	1,20	0,17
034515	ODMW060512TN	SP4019	16,00	6,00	5,55	1,20	0,17
031503	ODMW060512TN	SP6519	16,00	6,00	5,55	1,20	0,17
026596	ODMW060512TN	X500	16,00	6,00	5,55	1,20	0,17


ODMW_-TN

As pressed circumference X 42° without chip-breaker

034556	RDET0702M0E-701	SP4019	7,00	-	2,38	3,50	0,03
034558	RDET1003M0E-701	SP4019	10,00	-	3,18	5,00	0,05
034560	RDET12T3M0E-701-X6	SP4019	12,00	-	3,97	6,00	0,05
034563	RDET1604M0E-701-X8	SP4019	16,00	-	4,76	8,00	0,05


RDET_-701

Ground circumference one face pressed chip-breaker with concave cutting face

031533	RDHT2006M0E-42-X8	SP6519	20,00	-	6,35	10,00	0,08
029310	RDHT2006M0E-42-X8	X500	20,00	-	6,35	10,00	0,08


RDHT_-42

Ground circumference one face pressed chip-breaker

034557	RDHW0702M0T	SP4019	7,00	-	2,38	3,50	0,075
034559	RDHW1003M0T	SP4019	10,00	-	3,18	5,00	0,15
034561	RDHW12T3M0T-20-X6	SP4019	12,00	-	3,97	6,00	0,20
031519	RDHW12T3M0T-20-X6	SP5419	12,00	-	3,97	6,00	0,20
034562	RDHW12T3M0T-X6	SP4019	12,00	-	3,97	6,00	0,15
034564	RDHW1604M0T-30-X8	SP4019	16,00	-	4,76	8,00	0,30
031520	RDHW1604M0T-30-X8	SP5419	16,00	-	4,76	8,00	0,30
034565	RDHW1604M0T-X8	SP4019	16,00	-	4,76	8,00	0,15
031653	RDHW1604M0T-X8	SP5419	16,00	-	4,76	8,00	0,15
029309	RDHW2006M0E-X8	X500	20,00	-	6,35	10,00	0,10
031576	RDHW2006M0S-25-X8	SP6519	20,00	-	6,35	10,00	0,25
031660	RDHW2006M0S-25-X8	X500	20,00	-	6,35	10,00	0,25
031662	RDHW2006M0S-X8	SP6519	20,00	-	6,35	10,00	0,12
031661	RDHW2006M0S-X8	X500	20,00	-	6,35	10,00	0,12


RDHW_

Ground circumference without chip-breaker

Alphabetical Index

RD - RP Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
031523	RDMW12T3M0T-20-X6	SP5419	12,00	-	3,97	6,00	0,20
031524	RDMW12T3M0T-X6	SP5419	12,00	-	3,97	6,00	0,15
031522	RDMW1604M0T-30-X8	SP5419	16,00	-	4,76	8,00	0,30
031521	RDMW1604M0T-X8	SP5419	16,00	-	4,76	8,00	0,15
015183	RDMW1606M0S	X500	16,00	-	6,35	8,00	0,30

031484	RG08S	SP1019	8,00	-	1,75	4,00	0,02
031485	RG10S	SP1019	10,00	-	2,00	5,00	0,02
031486	RG12S	SP1019	12,00	-	2,50	6,00	0,02
031487	RG16S	SP1019	16,00	-	3,00	8,00	0,02
031488	RG20S	SP1019	20,00	-	3,50	10,00	0,02
031489	RG25S	SP1019	25,00	-	4,00	12,50	0,02

034549	RPET1204M0E-X4	SP4019	12,00	-	4,76	6,00	0,03
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024755	RPEW0602M0T	X500	6,00	-	2,38	3,00	0,10
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034540	RPEX0602M0E-701	SP6519	6,00	-	2,38	3,00	0,02
023313	RPEX0602M0F-701	GH2	6,00	-	2,38	3,00	0,02
034541	RPEX0602M0F-701	SP4019	6,00	-	2,38	3,00	0,02
034543	RPEX0803M3E-701	SP6519	8,00	-	3,18	4,00	0,02
031312	RPEX0803M3E-701	X500	8,00	-	3,18	4,00	0,02
023315	RPEX0803M3F-701	GH1	8,00	-	3,18	4,00	0,02
034544	RPEX0803M3F-701	SP4019	8,00	-	3,18	4,00	0,02
034545	RPEX10T3M0E-701-X4	SP6519	10,00	-	3,97	5,00	0,02
030456	RPEX10T3M0F-701-X4	GH1	10,00	-	3,97	5,00	0,02
034546	RPEX10T3M0F-701-X4	SP4019	10,00	-	3,97	5,00	0,02
029282	RPEX1204M0E-701-X4	X500	12,00	-	4,76	6,00	0,02
029284	RPEX1204M0F-701-X4	GH1	12,00	-	4,76	6,00	0,02

031555	RPHT10T3M0T-X4	SP6519	10,00	-	3,97	5,00	0,075
030329	RPHT10T3M0T-X4	X500	10,00	-	3,97	5,00	0,075
031516	RPHT1204M0T-X4	SP6519	12,00	-	4,76	6,00	0,10
029034	RPHT1204M0T-X4	X500	12,00	-	4,76	6,00	0,10
029699	RPHT1204M0T-X4	X700	12,00	-	4,76	6,00	0,10
030390	RPHT1606M0S	X400	16,00	-	6,35	8,00	0,15
034566	RPHT1606M0T	SP6519	16,00	-	6,35	8,00	0,10
017692	RPHT1606M0T	X500	16,00	-	6,35	8,00	0,10

030449	RPHT10T3M0E-421-X4	X500	10,00	-	3,97	5,00	0,04
030410	RPHT10T3M0E-421-X4	X700	10,00	-	3,97	5,00	0,04
029286	RPHT1204M0E-421-X4	X500	12,00	-	4,76	6,00	0,04
029700	RPHT1204M0E-421-X4	X700	12,00	-	4,76	6,00	0,04



RDMW_

As pressed circumference without chip-breaker



RG..S_

Completely ground



RPET_

Ground circumference one face pressed chip-breaker



RPEW_

Ground circumference without chip-breaker



RPEX_-701

Completely ground concave cutting face



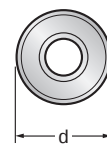
RPHT_

Ground circumference one face pressed chip-breaker



RPHT_-421

Ground circumference one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
031187	RPHT0803M3E-422	SP6519	8,00	-	3,18	4,00	0,03
031186	RPHT0803M3E-422	X500	8,00	-	3,18	4,00	0,03
031185	RPHT0803M3E-422	X700	8,00	-	3,18	4,00	0,03
030862	RPHT10T3M0E-422-X4	SP6519	10,00	-	3,97	5,00	0,03
030697	RPHT10T3M0E-422-X4	X500	10,00	-	3,97	5,00	0,03
030767	RPHT10T3M0E-422-X4	X700	10,00	-	3,97	5,00	0,03


RPHT_-422

 Ground circumference one face
 pressed chip-breaker

RPHT_-442

 Ground circumference one face
 pressed chip-breaker

RPMT_

 As pressed circumference one face
 pressed chip-breaker

RPMT_-41

 As pressed circumference one face
 pressed chip-breaker

RPMW_

 As pressed circumference without
 chip-breaker

SCCT_

 Ground circumference X 45° one
 face pressed chip-breaker

SCHT_

 Ground circumference X 45° one
 face pressed chip-breaker

SCHT_-422

 Ground circumference X 45° or 90° one
 face pressed chip-breaker

032128	RPHT1204M0E-442-X4	SP6519	12,00	-	4,76	6,00	0,04
032129	RPHT1204M0E-442-X4	X500	12,00	-	4,76	6,00	0,04
032130	RPHT1204M0E-442-X4	X700	12,00	-	4,76	6,00	0,04

030327	RPMT10T3M0T-X4	X500	10,00	-	3,97	5,00	0,06
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023327	RPMT0602M0E-41	MP91M	6,00	-	2,38	3,00	0,03
034542	RPMT0602M0E-41	SP6519	6,00	-	2,38	3,00	0,03
015219	RPMT0602M0E-41	X500	6,00	-	2,38	3,00	0,03
017308	RPMT0803M3E-41	MP91M	8,00	-	3,18	4,00	0,04
031473	RPMT0803M3E-41	SP6519	8,00	-	3,18	4,00	0,04
015220	RPMT0803M3E-41	X500	8,00	-	3,18	4,00	0,04
030451	RPMT10T3M0E-41-X4	MP91M	10,00	-	3,97	5,00	0,04
031539	RPMT10T3M0E-41-X4	SP6519	10,00	-	3,97	5,00	0,04
030452	RPMT10T3M0E-41-X4	X500	10,00	-	3,97	5,00	0,04
029291	RPMT1204M0E-41-X4	MP91M	12,00	-	4,76	6,00	0,05
031517	RPMT1204M0E-41-X4	SP6519	12,00	-	4,76	6,00	0,05
029272	RPMT1204M0E-41-X4	X500	12,00	-	4,76	6,00	0,05
017311	RPMT1606M0E-41	MP91M	16,00	-	6,35	8,00	0,05
015223	RPMT1606M0E-41	X500	16,00	-	6,35	8,00	0,05

030454	RPMW10T3M0T-X4	X500	10,00	-	3,97	5,00	0,13
029294	RPMW1204M0T-X4	MP91M	12,00	-	4,76	6,00	0,13
031518	RPMW1204M0T-X4	SP6519	12,00	-	4,76	6,00	0,13
029295	RPMW1204M0T-X4	X500	12,00	-	4,76	6,00	0,13

017312	SCCT12M5ACER	MP91M	12,70	12,70	5,00	Facet	0,03
017695	SCCT12M5ACTR	GH1	12,70	12,70	5,00	Facet	0,15
034552	SCCT12M5ACTR	SP4019	12,70	12,70	5,00	Facet	0,15
034591	SCCT12M5ACTR	X400	12,70	12,70	5,00	Facet	0,15

017313	SCHT12M5ACTN	MP91M	12,70	12,70	5,00	Facet	0,15
031504	SCHT12M5ACTN	SP6519	12,70	12,70	5,00	Facet	0,15
017698	SCHT12M5ACTN	X500	12,70	12,70	5,00	Facet	0,15

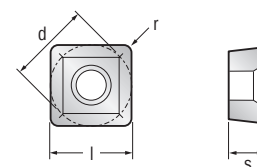
030671	SCHT12M512EN-422	X700	12,70	12,70	5,00	1,20	0,12
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Alphabetical Index

SC - SD Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
017314	SCKT12M5ACSN-41	MP91M	12,70	12,70	5,00	Facet	0,12
031556	SCKT12M5ACSN-41	SP6519	12,70	12,70	5,00	Facet	0,12
015144	SCKT12M5ACSN-41	X500	12,70	12,70	5,00	Facet	0,12



SCKT_-41

Ground wiper facet χ 45° one face pressed chip-breaker

034668	SCMT09T304T	SP6519	9,52	9,52	3,97	0,40	0,15
034551	SCMT09T308T	SP4019	9,52	9,52	3,97	0,80	0,15
031568	SCMT09T308T	SP6519	9,52	9,52	3,97	0,80	0,15
034550	SCMT09T308T	X400	9,52	9,52	3,97	0,80	0,15
034669	SCMT12M508E	SP6519	12,70	12,70	5,00	0,80	0,15
017316	SCMT12M512T	MP91M	12,70	12,70	5,00	1,20	0,15
034553	SCMT12M512T	SP4019	12,70	12,70	5,00	1,20	0,15
034555	SCMT12M512T	SP6519	12,70	12,70	5,00	1,20	0,15
034554	SCMT12M512T	X400	12,70	12,70	5,00	1,20	0,15
024129	SCMT12M512T	X500	12,70	12,70	5,00	1,20	0,15



SCMT_

As pressed circumference one face pressed chip-breaker

017315	SCMT09T308EN-41	MP91M	9,52	9,52	3,97	0,80	0,04
031474	SCMT09T308EN-41	SP6519	9,52	9,52	3,97	0,80	0,04
015147	SCMT09T308EN-41	X500	9,52	9,52	3,97	0,80	0,04
017317	SCMT12M512EN-41	MP91M	12,70	12,70	5,00	1,20	0,05
031475	SCMT12M512EN-41	SP6519	12,70	12,70	5,00	1,20	0,05
015226	SCMT12M512EN-41	X500	12,70	12,70	5,00	1,20	0,05



SCMT_-41

As pressed circumference one face pressed chip-breaker

031246	SDCT09T3AEEN	SP4019	9,52	9,52	3,97	Facet	0,03
017242	SDCT09T3AEFN	GH1	9,52	9,52	3,97	Facet	0,02
017243	SDCT1204AEFN	GH1	12,70	12,70	4,76	Facet	0,02



SDCT_

Ground circumference χ 45° one face pressed chip-breaker

025843	SDCW09T3EEFR	GH1	9,52	9,52	3,97	Facet	0,02
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SDCW_-FR

Ground circumference χ 75° without chip-breaker

031404	SDCW1204AETN	SA9808	12,70	12,70	4,76	Facet	0,17
034516	SDCW1204AETN	SP4019	12,70	12,70	4,76	Facet	0,17
034517	SDCW1204AETN	X400	12,70	12,70	4,76	Facet	0,17



Ground circumference χ 45° without chip-breaker

034520	SDET09T308EN	SP6519	9,52	9,52	3,97	0,80	0,03
017725	SDET09T308FN	GH1	9,52	9,52	3,97	0,80	0,02



SDET_

Ground circumference χ 45° one face chip-breaker

015148	SDEX09T3AEFN-701	GH1	9,52	9,52	3,97	Facet	0,02
034519	SDEX09T3AEFN-701	SP4019	9,52	9,52	3,97	Facet	0,02
015149	SDEX1204AEFN-701	GH1	12,70	12,70	4,76	Facet	0,02
034522	SDEX1204AEFN-701	SP4019	12,70	12,70	4,76	Facet	0,02



SDEX_-701

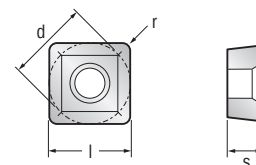
Completely ground χ 45° concave cutting face

017322	SDHT1204AETN-42	MP91M	12,70	12,70	4,76	Facet	0,15
031478	SDHT1204AETN-42	SP6519	12,70	12,70	4,76	Facet	0,15
017729	SDHT1204AETN-42	X500	12,70	12,70	4,76	Facet	0,15



SDHT_-42

Ground circumference χ 45° one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
017320	SDHT09T3AEEN-421	MP91M	9,52	9,52	3,97	Facet	0,03
031476	SDHT09T3AEEN-421	SP6519	9,52	9,52	3,97	Facet	0,03
015186	SDHT09T3AEEN-421	X500	9,52	9,52	3,97	Facet	0,03
017321	SDHT1204AEEN-421	MP91M	12,70	12,70	4,76	Facet	0,04
031477	SDHT1204AEEN-421	SP6519	12,70	12,70	4,76	Facet	0,04
015187	SDHT1204AEEN-421	X500	12,70	12,70	4,76	Facet	0,04

**SDHT_-421**

Ground circumference X 45° one face pressed chip-breaker

**SDHT_-422**

Ground circumference X 45° or 90° one face pressed chip-breaker

033075	SDHT09T308EN-422	SP6519	9,52	9,52	3,97	0,80	0,05
031261	SDHT09T308EN-422	X500	9,52	9,52	3,97	0,80	0,05
030890	SDHT09T3AEEN-422	SP6519	9,52	9,52	3,97	Facet	0,05
030766	SDHT09T3AEEN-422	X500	9,52	9,52	3,97	Facet	0,05
030728	SDHT120412EN-422	SP6519	12,70	12,70	4,76	1,20	0,06
030717	SDHT120412EN-422	X500	12,70	12,70	4,76	1,20	0,06

033074	SDHT09T308EN-423	SP6519	9,52	9,52	3,97	0,80	0,05
031260	SDHT09T308EN-423	X500	9,52	9,52	3,97	0,80	0,05
031321	SDHT120412EN-423	SP6519	12,70	12,70	4,76	1,20	0,06
031218	SDHT120412EN-423	X500	12,70	12,70	4,76	1,20	0,06

**SDHT_-423**

Ground circumference X 45° or 90° one face pressed chip-breaker

017323	SDHW09T3AETN	MP91M	9,52	9,52	3,97	Facet	0,10
031575	SDHW09T3AETN	SP6519	9,52	9,52	3,97	Facet	0,10
015231	SDHW09T3AETN	X500	9,52	9,52	3,97	Facet	0,10
017324	SDHW1204AETN	MP91M	12,70	12,70	4,76	Facet	0,15
017730	SDHW1204AETN	X500	12,70	12,70	4,76	Facet	0,15
017731	SDHW1505AETN	X500	15,88	15,88	5,56	Facet	0,15

**SDHW_**

Ground circumference X 45° without chip-breaker

026600	SDKT09T3AEEN-45	MP91M	9,52	9,52	3,97	Facet	0,05
031481	SDKT09T3AEEN-45	SP6519	9,52	9,52	3,97	Facet	0,05
026602	SDKT09T3AEEN-45	X500	9,52	9,52	3,97	Facet	0,05
029456	SDKT1204AEEN-45	MP91M	12,70	12,70	4,76	Facet	0,05
031532	SDKT1204AEEN-45	SP6519	12,70	12,70	4,76	Facet	0,05
029457	SDKT1204AEEN-45	X500	12,70	12,70	4,76	Facet	0,05

**SDKT_-45**

Ground wiper facet X 45° one face pressed chip-breaker

017325	SDMT09T308EN-41	MP91M	9,52	9,52	3,97	0,80	0,04
031479	SDMT09T308EN-41	SP6519	9,52	9,52	3,97	0,80	0,04
014410	SDMT09T308EN-41	X500	9,52	9,52	3,97	0,80	0,04
017326	SDMT120412EN-41	MP91M	12,70	12,70	4,76	1,20	0,05
031480	SDMT120412EN-41	SP6519	12,70	12,70	4,76	1,20	0,05
014411	SDMT120412EN-41	X500	12,70	12,70	4,76	1,20	0,05

**SDMT_-41**

As pressed circumference one face pressed chip-breaker

017327	SDMW09T308TN	MP91M	9,52	9,52	3,97	0,80	0,15
031482	SDMW09T308TN	SP6519	9,52	9,52	3,97	0,80	0,15
015232	SDMW09T308TN	X500	9,52	9,52	3,97	0,80	0,15
034518	SDMW120412TN	SP6519	12,70	12,70	4,76	1,20	0,15
015233	SDMW120412TN	X500	12,70	12,70	4,76	1,20	0,15

**SDMW_**

As pressed circumference without chip-breaker

012470	SEHT1204AFER	MP91M	12,70	12,70	4,76	Facet	0,12
034670	SEHT1204AFER	SP6519	12,70	12,70	4,76	Facet	0,12

**SEHT_**

Ground circumference X 45° one face pressed chip-breaker

012990	SEHW1204AFER	MP91M	12,70	12,70	4,76	Facet	0,12
012991	SEHW1504AFER	MP91M	15,88	15,88	4,76	Facet	0,12

**SEHW_**

Ground circumference X 45° without chip-breaker

Alphabetical Index

SE - SP Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
034699	SEKN1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,12
034671	SEKN1203AFEN	SP6519	12,70	12,70	3,18	Facet	0,12
034700	SEKN1204AFEN	MP91M	12,70	12,70	4,76	Facet	0,12
034701	SEKN1504AFEN	MP91M	15,88	15,88	4,76	Facet	0,12
034672	SEKN1504AFEN	SP6519	15,88	15,88	4,76	Facet	0,12

034702	SEKR1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,12
034673	SEKR1203AFEN	SP6519	12,70	12,70	3,18	Facet	0,12
017863	SEKR1203AFFN	GH1	12,70	12,70	3,18	Facet	0,03
031505	SEKR1203AFTN	SP6519	12,70	12,70	3,18	Facet	0,12
034703	SEKR1204AFEN	MP91M	12,70	12,70	4,76	Facet	0,12
034704	SEKR1504AFEN	MP91M	15,88	15,88	4,76	Facet	0,12

030387	SEKT13T3AZEN-41	MP91M	13,41	13,41	3,96	Facet	0,04
030386	SEKT13T3AZEN-41	SC3025	13,41	13,41	3,96	Facet	0,04
031537	SEKT13T3AZEN-41	SP6519	13,41	13,41	3,96	Facet	0,04
030384	SEKT13T3AZEN-41	X500	13,41	13,41	3,96	Facet	0,04

022114	SEKT1204AFER-45	MP91M	12,70	12,70	4,76	Facet	0,05
022113	SEKT1204AFER-45	X500	12,70	12,70	4,76	Facet	0,05

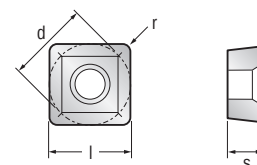
029693	SEMN1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,10
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029694	SEMR1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,10
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017329	SOMT12M612SN-B	MP91M	12,70	12,70	6,00	1,20	0,15
031506	SOMT12M612SN-B	SP6519	12,70	12,70	6,00	1,20	0,15
015190	SOMT12M612SN-B	X500	12,70	12,70	6,00	1,20	0,15
017330	SOMT15M612SN-B	MP91M	15,88	15,88	6,00	1,20	0,15
031557	SOMT15M612SN-B	SP6519	15,88	15,88	6,00	1,20	0,15
015192	SOMT15M612SN-B	X500	15,88	15,88	6,00	1,20	0,15

014413	SPEW060304SN	X500	6,35	6,35	3,18	0,40	0,15
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034674	SPGH120412E-2C	SP6519	12,70	12,10	4,76	1,20	0,04
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SEKN_

Ground wiper facet χ 45° one face pressed chip-breaker



SEKR_

Ground wiper facet χ 45° one face pressed chip-breaker



SEKT_-41

As pressed circumference with ground wiper facets χ 45° with one face pressed chip-breaker



SEKT_-45

As pressed circumference with ground wiper facets χ 45° with one face pressed chip-breaker



SEMN_

As pressed circumference without chip-breaker



SEMR_

As pressed circumference one face pressed chip-breaker



SOMT_

As pressed circumference one face pressed chip-breaker



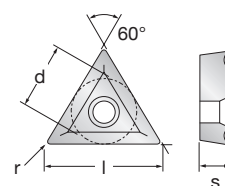
SPEW_

Ground circumference without chip-breaker



SPGH_-2C

Ground circumference without chip-breaker



Milling Introduction

Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
011341	SPGN090308E	MP91M	9,52	9,52	3,18	0,80	0,03
011342	SPGN120308E	MP91M	12,70	12,70	3,18	0,80	0,03
011343	SPGN120412E	MP91M	12,70	12,70	4,76	1,20	0,03
011641	SPGN190412E	MP91M	19,05	19,05	4,76	1,20	0,04


SPGN_

Ground circumference one face without chip-breaker


SPHX_

Ground circumference with ground chip-breaker—special wiper insert


SPKN_

As pressed circumference X 45° with ground facet without chip-breaker


SPUN_

As pressed circumference X 45° without chip-breaker


TCHW_

Ground circumference with ground chip-breaker


TCLT_

As pressed circumference one face pressed chip-breaker


TCMT_

As pressed circumference one face pressed chip-breaker


TCMX_-ZR

Ground clearance X 45° especially for 7745VT 16 WA020R, with pressed chip-breaker


TPGN_

Ground circumference without chip-breaker

017237	SPHX12M512EN	GH1	12,70	12,70	5,00	1,20	0,02
031455	SPHX12M512EN	SA9608	12,70	12,70	5,00	1,20	0,02

034675	SPKN1203EDR	SP6519	12,70	12,70	3,18	Facet	0,10
012476	SPKN1203EDKR	MP91M	12,70	12,70	3,18	Facet	0,20

011770	SPUN190412E	MP91M	19,05	19,05	4,76	1,20	0,05
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017740	TCHW2204PDTR	GH1	12,70	22,00	4,76	Facet	0,10
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034676	TCLT16T3PPTR	SP4019	9,52	16,50	3,97	Facet	0,15
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024139	TCMT16T308E	MP91M	9,52	16,50	3,97	0,80	0,05
031569	TCMT16T308E	SP6519	9,52	16,50	3,97	0,80	0,05
034536	TCMT16T308E	X400	9,52	16,50	3,97	0,80	0,05
024140	TCMT16T308E	X500	9,52	16,50	3,97	0,80	0,05
034537	TCMT16T308T	SP4019	9,52	16,50	3,97	0,80	0,15
034539	TCMT16T308T	SP6519	9,52	16,50	3,97	0,80	0,15
034538	TCMT16T308T	X400	9,52	16,50	3,97	0,80	0,15

034535	TCMX16T308E-ZR	SP4019	9,52	16,50	3,97	0,80	0,05
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011340	TPGN160308E	MP91M	9,52	16,50	3,18	0,80	0,05
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Alphabetical Index

TP - XE Milling Style Inserts



Milling Introduction



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
012499	TPKN1603PDTR	MP91M	9,52	16,50	3,18	Facet	0,05
034681	TPKN1603PDTR	SP6519	9,52	16,50	3,18	Facet	0,05
012501	TPKN2204PDTR	MP91M	12,70	22,00	4,76	Facet	0,05
034682	TPKN2204PDTR	SP6519	12,70	22,00	4,76	Facet	0,05

024947	TPMT110204E-M	X500	6,35	11,00	2,38	0,40	0,03
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012503	TPUN220408E	MP91M	12,70	22,00	4,76	0,80	0,05
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033067	XDLT090408ER-D41	SC6525	9,52	9,52	4,76	0,80	0,05
031535	XDLT090408ER-D41	SP6519	9,52	9,52	4,76	0,80	0,05
029685	XDLT090408ER-D41	X500	9,52	9,52	4,76	0,80	0,05
033068	XDLT120508ER-D41	SC6525	12,70	12,70	5,56	0,80	0,05
031534	XDLT120508ER-D41	SP6519	12,70	12,70	5,56	0,80	0,05
029682	XDLT120508ER-D41	X500	12,70	12,70	5,56	0,80	0,05

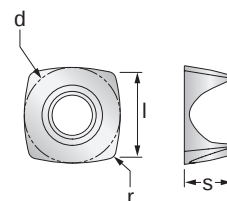
030854	XDLT090412ER-D411	SP6519	9,52	9,52	4,76	1,20	0,05
030853	XDLT090412ER-D411	X500	9,52	9,52	4,76	1,20	0,05
030792	XDLT120512ER-D411	SP6519	12,70	12,70	5,56	1,20	0,05
030783	XDLT120512ER-D411	X500	12,70	12,70	5,56	1,20	0,05

029637	XDLT090408ER-D721	GH2	9,52	9,52	4,76	0,80	0,03
029638	XDLT120508ER-D721	GH2	12,70	12,70	5,56	0,80	0,03

029486	XDLW090408SR-D	SC3025	9,52	9,52	4,76	0,80	0,25
029487	XDLW090408SR-D	X400	9,52	9,52	4,76	0,80	0,25
029485	XDLW090408SR-D	X500	9,52	9,52	4,76	0,80	0,25
029489	XDLW120508SR-D	SC3025	12,70	12,70	5,56	0,80	0,30
029490	XDLW120508SR-D	X400	12,70	12,70	5,56	0,80	0,30
029488	XDLW120508SR-D	X500	12,70	12,70	5,56	0,80	0,30

033069	XELT160512ER-D41	SC6525	16,80	16,80	5,56	1,20	0,10
031294	XELT160512ER-D41	SP6519	16,80	16,80	5,56	1,20	0,10
031293	XELT160512ER-D41	X500	16,80	16,80	5,56	1,20	0,10

031292	XELW160512SR-D	SC3025	16,80	16,80	5,56	1,20	0,30
031291	XELW160512SR-D	X400	16,80	16,80	5,56	1,20	0,30



TPKN_

As pressed circumference χ 60° with ground face and without chip-breaker



TPMT_-M

As pressed circumference one face pressed chip-breaker χ 45° and χ 60°.



TPUN_

As pressed circumference without chip-breaker



XDLT_-D41

Ground circumference one face pressed chip-breaker



XDLT_-D411

Ground circumference one face pressed chip-breaker



XDLT_-D721

Ground circumference one face pressed chip-breaker



XDLW_-D

Ground circumference without chip-breaker



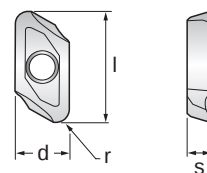
XELT_-D41

Ground circumference one face pressed chip-breaker



XELW_-D

Ground circumference without chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h _m min
033066	XPLT060308ER-D41	SC6525	7,00	7,00	3,18	0,80	0,04
031538	XPLT060308ER-D41	SP6519	7,00	7,00	3,18	0,80	0,04
030403	XPLT060308ER-D41	X400	7,00	7,00	3,18	0,80	0,04
030402	XPLT060308ER-D41	X500	7,00	7,00	3,18	0,80	0,04


XPLT_-D41

 Ground circumference one face
pressed chip-breaker

030737	XPNT16/160308.R-F	SP6519	7,39	17,40	3,18	8,00	0,04
030743	XPNT20/20T306.R-F	SP6519	9,00	20,85	3,97	10,00	0,04
030746	XPNT25/250408.R-F	SP6519	11,00	26,00	4,76	12,50	0,04
030749	XPNT32/320612.R-F	SP6519	14,10	33,40	6,35	16,00	0,04
030755	XPNT40/40T716.R-F	SP6519	18,00	41,84	7,95	20,00	0,04
030758	XPNT50/50T716.R-F	SP6519	22,25	52,86	7,95	25,00	0,04


XPNT_-F

 Ground circumference one face
pressed chip-breaker

029028	ZDCX140320FR-701	GH1	7,59	16,83	3,18	2,00	0,02
026019	ZDCX140325FR-701	GH1	7,59	16,83	3,18	2,50	0,02
029029	ZDCX140330FR-701	GH1	7,59	16,83	3,18	3,00	0,02
026020	ZDCX140340FR-701	GH1	7,59	16,83	3,18	4,00	0,02
029027	ZDCX1403PDFR-701	GH1	7,59	16,83	3,18	Facet	0,02


ZDCX_-701

 Completely ground χ 90° concave
cutting face

031384	ZDET16M504FR-721	GH1	11,30	22,92	5,00	0,40	0,02
030928	ZDET16M508FR-721	GH1	11,30	22,92	5,00	0,80	0,02
031385	ZDET16M512FR-721	GH1	11,30	22,92	5,00	1,20	0,02
030929	ZDET16M516FR-721	GH1	11,30	22,92	5,00	1,60	0,02
030930	ZDET16M520FR-721	GH1	11,30	22,92	5,00	2,00	0,02
030931	ZDET16M525FR-721	GH1	11,30	22,92	5,00	2,50	0,02
030932	ZDET16M530FR-721	GH1	11,30	22,92	5,00	3,00	0,02
030933	ZDET16M532FR-721	GH1	11,30	22,92	5,00	3,20	0,02
030934	ZDET16M540FR-721	GH1	11,30	22,92	5,00	4,00	0,02
030935	ZDET16M550FR-721	GH1	11,30	22,92	5,00	5,00	0,02
030936	ZDET16M560FR-721	GH1	11,30	22,92	5,00	6,00	0,02
030927	ZDET16M5PDFR-721	GH1	11,30	22,92	5,00	Facet	0,02


ZDET_-721

 Ground circumference χ 90° one face
pressed chip-breaker

4 Examples (continued on next page)

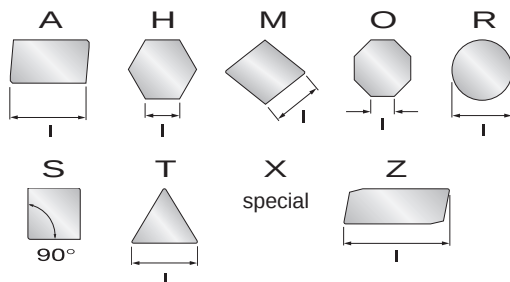
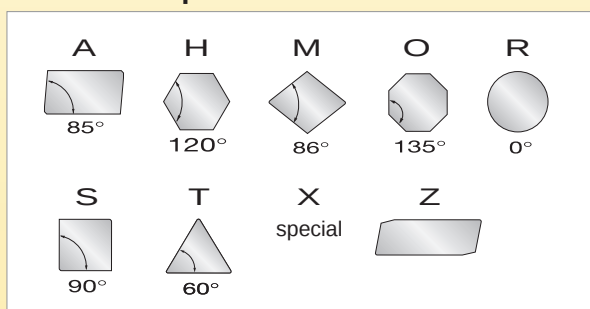
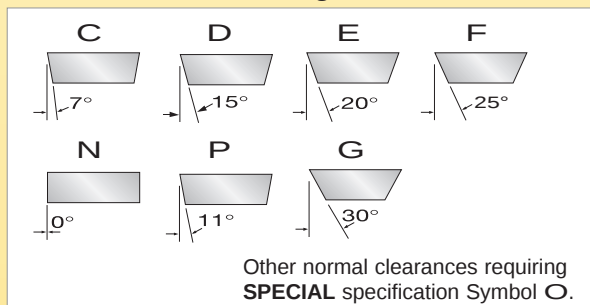
5720	V	Z	-	16	C	A
5505	V	X	-	16	C	A
7220	V	M	-	11	-	-
5230	V	S	-	12	-	A
1	2	3	4	5	6	7

1 Series Type

Series Number 5720

2 Insert Fixation

V = Screw

5 Insert SizeInsert Edge Length l = (mm).**3 Insert Shape****4 Insert Clearance Angle****6 Body Fixation**

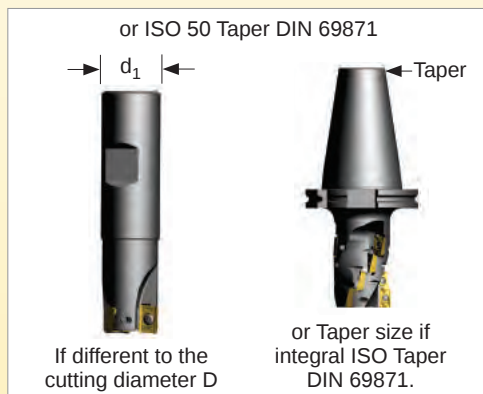
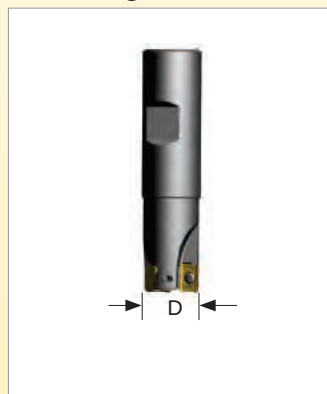
- = Shell Mill
- C = Cylindrical Shank
- F = Caterpillar Vee Flange
- G = ISO 50 Taper DIN 6987
- H = HSK
- S = Modular head
- W = Weldon Shank

7 Coolant

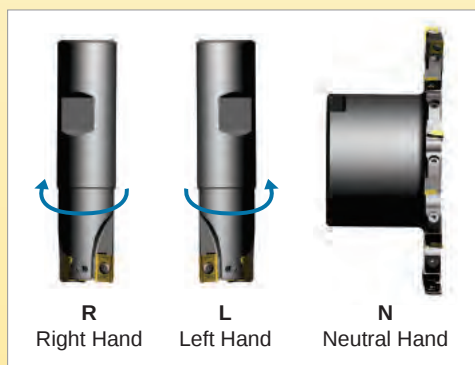
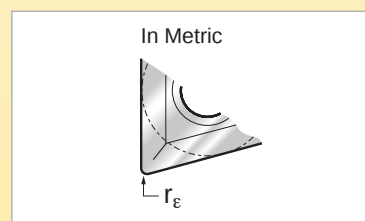
A = Through tool coolant

No "A" = without through tool coolant

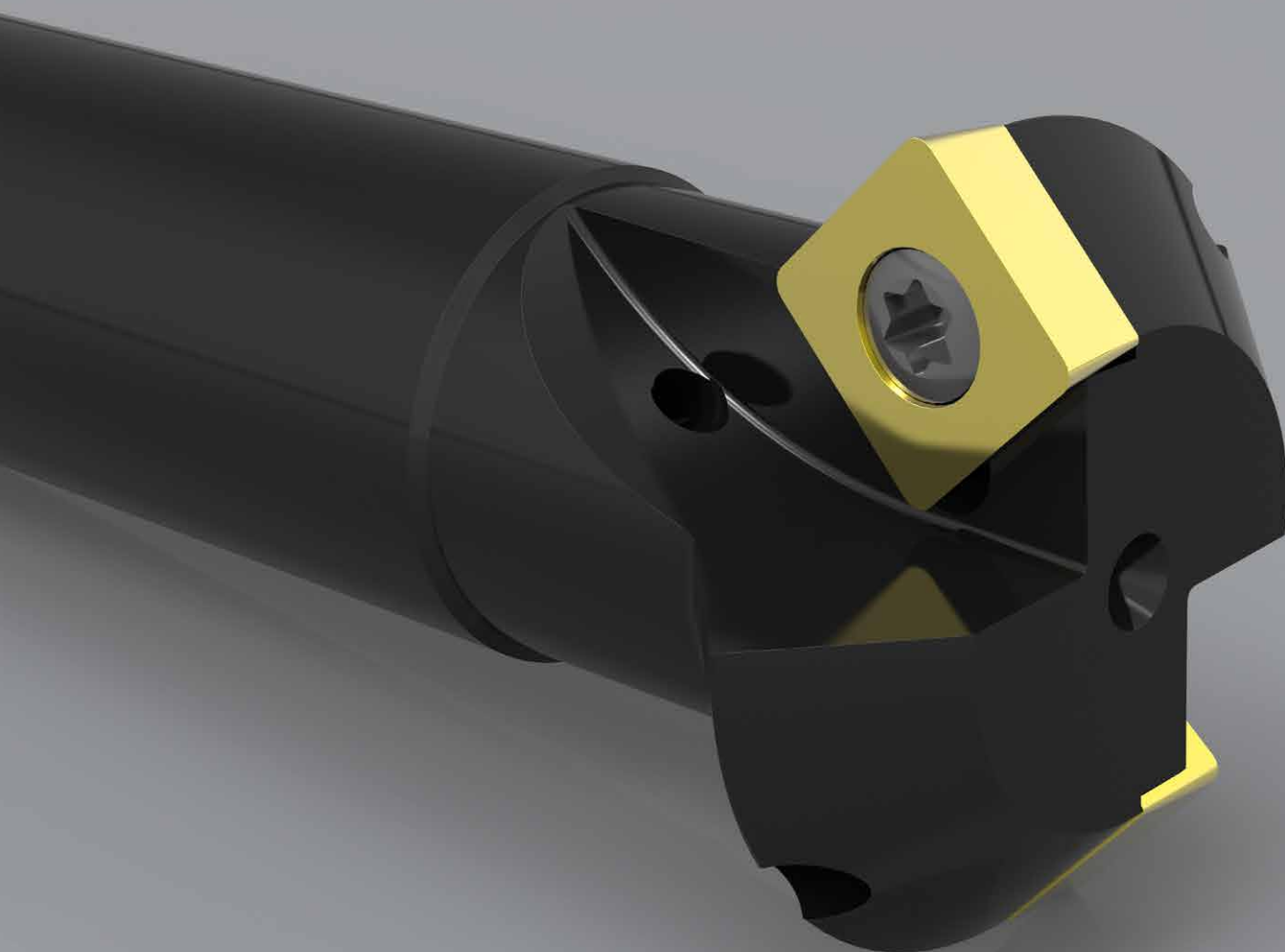
-	025	Z03	R	75	-	8	-
20 /	016	-	R	30	-	-	-
-	160	-	R	18/20	-	-	N
-	063	Z04	R	94	-	-	-
8	9	10	11	12	13	14	

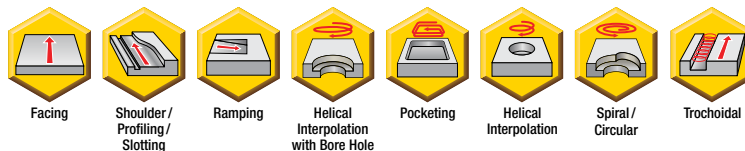
8 Shank Diameter**9 Cutting Diameter****10 Teeth**

Z = number of teeth

11 Position**12 Reach Length****13 Max. Insert Radius****14 Assembly**

R = Right hand
L = Left hand
N = Neutral





90 DEGREE CUTTERS

Kennametal offers a number of 90 degree cutters for shoulder milling, face milling and slotting.

7690VA cutters are available in a wide range of depth-of-cut variations. Inserts are available in 9mm, 12mm and 16mm sizes. An extensive range of geometries and grades are available for all applications.

Applications:

The 7690VA series are ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Stainless Steel, Cast Iron, High Temperature Alloys and Aluminium Alloys.

The **7690VAP** series are ideal for roughing, semi-finishing and finishing of Stainless Steel, High Temperature Alloys plus Low Carbon Steels. This cutter is designed to utilise one geometry of insert only - APET1604...ER-48

Note: When an approx. 90° shoulder is required then the following geometries need to be used.

7690VA09: Geometry -42
7690VA12: Geometry -46
7690VA16: Geometry -42, -46
and the flat insert APFW...
7690VAP16: Geometry -48

See the 90° deviations charts on pages A59 - A62.

7690VA

7690VA09:

Maximum a_p = 8,00mm
Diameter Range = 10mm to 63mm

7690VA12:

Maximum a_p = 11,00mm
Diameter Range = 20mm to 80mm

7690VA16:

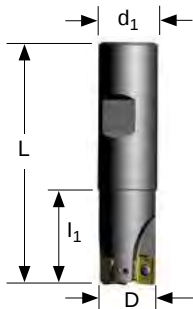
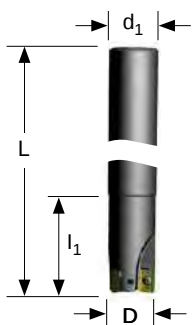
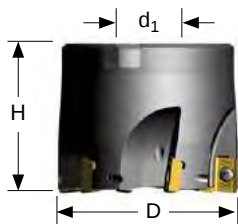
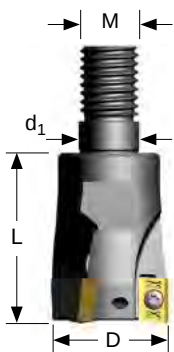
Maximum a_p = 16,00mm
Diameter Range = 25mm to 125mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A112

7690VAP16:

Maximum a_p = 15,80mm
Diameter Range = 40mm to 100mm



7690VA09**Shoulder Milling Cutter****End Mills & Face Mills****Weldon Shank****Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (ap)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA09 Weldon Shank												
021693	7690VA09WA010R	10	68	20	16	8,50	1	015267	F2505TP	018488	T7	0,80
021694	7690VA09WA012R	12	70	22	16	8,50	1	015267	F2505TP	018488	T7	0,80
021695	7690VA09WA014R	14	73	25	16	8,50	1	015267	F2505TP	018488	T7	0,80
021696	7690VA09WA016R	16	75	27	16	8,50	2	015267	F2505TP	018488	T7	0,80
021697	7690VA09WA018R	18	80	30	20	8,50	2	015267	F2505TP	018488	T7	0,80
021698	7690VA09WA020R	20	82	32	20	8,50	3	015267	F2505TP	018488	T7	0,80
021699	7690VA09WA025R	25	96	40	25	8,50	4	015268	F2506TP	018488	T7	0,80
023055	7690VA09WA032R	32	96	40	25	8,50	5	015268	F2506TP	018488	T7	0,80
7690VA09 Cylindrical Shank - Medium and Fine Pitch												
031084	7690VA09CA016Z2R30	16	150	30	16	8,50	2	015267	F2505TP	018488	T7	0,80
031107	7690VA09CA020Z2R40	20	180	40	20	8,50	2	015267	F2505TP	018488	T7	0,80
031108	7690VA09CA020Z3R40	20	180	40	20	8,50	3	015267	F2505TP	018488	T7	0,80
031109	7690VA09CA025Z3R50	25	200	50	25	8,50	3	015268	F2506TP	018488	T7	0,80
7690VA09 Shell Mill Fixation												
021690	7690VA09-A032R	32	28	-	13	8,50	5	015268	F2506TP	018488	T7	0,80
017986	7690VA09-A040R	40	32	-	16	8,50	6	015268	F2506TP	018488	T7	0,80
021691	7690VA09-A050R	50	40	-	22	8,50	7	015268	F2506TP	018488	T7	0,80
021692	7690VA09-A063R	63	40	-	22	8,50	8	015268	F2506TP	018488	T7	0,80

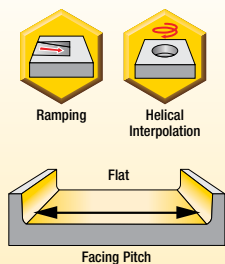
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA09 Modular Head - Medium and Fine Pitch												
031114	7690VA09SA016Z2R25	16	25	M8	8,50	8,50	2	015267	F2505TP	018488	T7	0,80
031115	7690VA09SA020Z3R35	20	35	M10	10,50	8,50	3	015267	F2505TP	018488	T7	0,80
031116	7690VA09SA025Z3R35	25	35	M12	12,50	8,50	3	015268	F2506TP	018488	T7	0,80
031117	7690VA09SA025Z4R35	25	35	M12	12,50	8,50	4	015268	F2506TP	018488	T7	0,80
031118	7690VA09SA032Z5R35	32	35	M16	17,00	8,50	5	015268	F2506TP	018488	T7	0,80

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

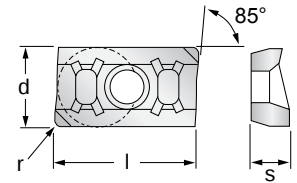
Note: To use radius larger than 1,20mm the cutter body needs to be modified for additional clearance by the end user.

7690VA09 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021693	7690VA09WA010R	10	9.60	9	18	1,00	85000
021694	7690VA09WA012R	12	8.60	13	22	1,00	83000
021695	7690VA09WA014R	14	6.60	17	26	1,00	71000
021696	7690VA09WA016R	16	5.10	21	30	1,00	63500
021697	7690VA09WA018R	18	4.10	25	34	1,00	57500
021698	7690VA09WA020R	20	3.40	29	38	1,00	53000
021699	7690VA09WA025R	25	2.40	39	48	1,00	45500
023055	7690VA09WA032R	32	1.70	53	62	1,00	38500
031084	7690VA09CA016Z2R30	16	5.10	21	30	1,00	63500
031107	7690VA09CA020Z2R40	20	3.40	29	38	1,00	53000
031108	7690VA09CA020Z3R40	20	3.40	29	38	1,00	53000
031109	7690VA09CA025Z3R50	25	2.40	39	48	1,00	45500
021690	7690VA09-A032R	32	1.70	53	62	1,00	38500
017986	7690VA09-A040R	40	1.25	69	78	1,00	34000
021691	7690VA09-A050R	50	1.00	89	98	1,00	29500
021692	7690VA09-A063R	63	0.80	115	124	1,00	26000
031114	7690VA09SA016Z2R25	16	5.10	21	30	1,00	63500
031115	7690VA09SA020Z3R35	20	3.40	29	38	1,00	53000
031116	7690VA09SA025Z3R35	25	2.40	39	48	1,00	45500
031117	7690VA09SA025Z4R35	25	2.40	39	48	1,00	45500
031118	7690VA09SA032Z5R35	32	1.70	53	62	1,00	38500



Note: If using a insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 8,50	a _p min - max 1,00 - 4,00	a _p min - max 0,10 - 1,00					
031076	ADET090308SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	0,80	0,10
031075	ADET090308SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	0,80	0,10
024913	ADET090310SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	1,00	0,10
031094	ADET090310SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	1,00	0,10
031095	ADET090312SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	1,20	0,10
031096	ADET090312SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	1,20	0,10
030942	ADET090316SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	1,60	0,10
030980	ADET090316SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	1,60	0,10
031097	ADET090320SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	2,00	0,10
031098	ADET090320SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	2,00	0,10
031099	ADET090324SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	2,40	0,10
031100	ADET090324SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	2,40	0,10
031101	ADET090330SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	3,00	0,10
031102	ADET090330SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	3,00	0,10
031103	ADET090332SR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	3,20	0,10
031104	ADET090332SR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	3,20	0,10
031092	ADET0903PDSR-42	X500	◆◆◆	◆◆◆	-	6,35	9,20	3,18	Facet	0,10
031093	ADET0903PDSR-42	SP6519	◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	6,35	9,20	3,18	Facet	0,10
024916	ADET0903PDFR-441	GH1	◆	◆	◆	6,35	9,20	3,18	Facet	0,03
015150	ADKT0903PDER-43	X500	●●●	●●●	-	6,35	9,20	3,18	Facet	0,07
031463	ADKT0903PDER-43	SP6519	◆◆◆●	◆◆◆●	-	6,35	9,20	3,18	Facet	0,07
017286	ADKT0903PDER-43	MP91M	◆◆	◆◆	-	6,35	9,20	3,18	Facet	0,07

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.**7690VA09 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SR-42	X500	Facing	-	-	0,06 - 0,14	0,06 - 0,12	-	-	-	-	-	0,06 - 0,10	0,06 - 0,10	0,06 - 0,10	0,06 - 0,11	-	-
SR-42	SP6519	Facing	0,06 - 0,14	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	0,06 - 0,10	0,06 - 0,10	0,06 - 0,10	0,06 - 0,11	-	-
FR-441	GH1	Facing	-	-	-	-	-	-	-	0,03 - 0,15	0,03 - 0,13	-	-	-	-	-	-
ER-43	X500	Facing	0,05 - 0,14	0,05 - 0,12	-	0,05 - 0,10	-	-	-	-	-	-	-	-	-	-	-
ER-43	SP6519	Facing	0,05 - 0,12	0,05 - 0,10	0,05 - 0,10	-	0,05 - 0,14	0,05 - 0,14	0,05 - 0,14	-	-	-	-	-	-	-	-
ER-43	MP91M	Facing	0,05 - 0,12	-	-	-	0,05 - 0,14	0,05 - 0,14	0,05 - 0,14	-	-	-	-	-	-	-	-

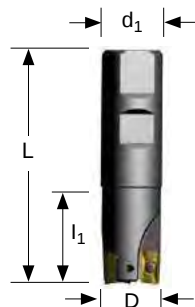
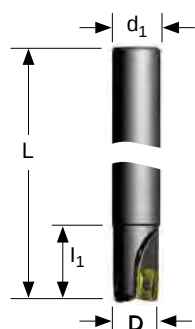
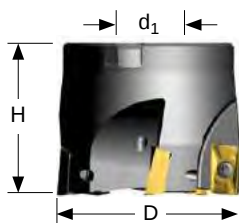
Note: HTA = High Temperature Alloys. | Speed recommendations can be found on page A58.

7690VA12

Shoulder Milling Cutter



End Mills & Face Mills

**Weldon Shank****Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (a_p)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA12 Weldon Shank - Medium and Fine Pitch												
027917	7690VA12WA020Z02R032	20	82	32	20	11,00	2	027860	F3007T	022157	T8	1,40
027918	7690VA12WA025Z02R040	25	96	40	25	11,00	2	027860	F3007T	022157	T8	1,40
027921	7690VA12WA025Z03R040	25	96	40	25	11,00	3	027860	F3007T	022157	T8	1,40
027919	7690VA12WA032Z03R040	32	100	40	32	11,00	3	027860	F3007T	022157	T8	1,40
027922	7690VA12WA032Z04R040	32	100	40	32	11,00	4	027860	F3007T	022157	T8	1,40
027920	7690VA12WA040Z04R050	40	110	50	32	11,00	4	027860	F3007T	022157	T8	1,40
027923	7690VA12WA040Z05R050	40	110	50	32	11,00	5	027860	F3007T	022157	T8	1,40
7690VA12 Cylindrical Shank - Medium and Fine Pitch												
031655	7690VA12CA020Z02R032	20	204	32	20	11,00	2	027860	F3007T	022157	T8	1,40
031646	7690VA12CA020Z02R32-3	20	115	32	20	11,00	2	027860	F3007T	022157	T8	1,40
031656	7690VA12CA025Z02R040	25	130	40	25	11,00	2	027860	F3007T	022157	T8	1,40
031648	7690VA12CA025Z03R040	25	210	40	25	11,00	3	027860	F3007T	022157	T8	1,40
031647	7690VA12CA025Z03R40-3	25	130	40	25	11,00	3	027860	F3007T	022157	T8	1,40
031649	7690VA12CA032Z03R040	32	250	40	32	11,00	3	027860	F3007T	022157	T8	1,40
031657	7690VA12CA032Z04R040	32	250	40	32	11,00	4	027860	F3007T	022157	T8	1,40
7690VA12 Shell Mill Fixation - Medium and Fine Pitch												
027927	7690VA12-A040Z04R	40	32	-	16	11,00	4	027860	F3007T	022157	T8	1,40
027931	7690VA12-A040Z05R	40	32	-	16	11,00	5	027860	F3007T	022157	T8	1,40
027928	7690VA12-A050Z05R	50	40	-	22	11,00	5	027860	F3007T	022157	T8	1,40
027932	7690VA12-A050Z06R	50	40	-	22	11,00	6	027860	F3007T	022157	T8	1,40
027929	7690VA12-A063Z06R	63	40	-	22	11,00	6	027860	F3007T	022157	T8	1,40
027933	7690VA12-A063Z08R	63	40	-	22	11,00	8	027860	F3007T	022157	T8	1,40
027930	7690VA12-A080Z07R	80	50	-	27	11,00	7	027860	F3007T	022157	T8	1,40
027934	7690VA12-A080Z10R	80	50	-	27	11,00	10	027860	F3007T	022157	T8	1,40

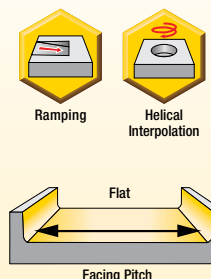
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA12 Modular Head - Medium and Fine Pitch												
031105	7690VA12SA020Z2R35	20	35	M10	10,50	11,00	2	027860	F3007T	022157	T8	1,40
031197	7690VA12SA025Z2R35	25	35	M12	12,50	11,00	2	027860	F3007T	022157	T8	1,40
031106	7690VA12SA025Z3R35	25	35	M12	12,50	11,00	3	027860	F3007T	022157	T8	1,40
031198	7690VA12SA032Z3R43	32	43	M16	17,00	11,00	3	027860	F3007T	022157	T8	1,40
031199	7690VA12SA032Z4R43	32	43	M16	17,00	11,00	4	027860	F3007T	022157	T8	1,40

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

Note: To use radius larger than 1,60mm the cutter body needs to be modified for additional clearance by the end user.

**7690VA12 Technical Information (mm)**

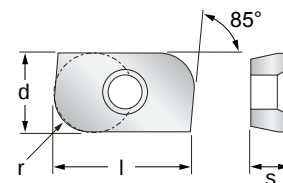
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
027917	7690VA12WA020Z02R032	20	5.58	26	38	1,50	43000
027918	7690VA12WA025Z02R040	25	3.67	36	48	1,50	36000
027921	7690VA12WA025Z03R040	25	3.67	36	48	1,50	36000
027919	7690VA12WA032Z03R040	32	2.30	50	62	1,50	30000
027922	7690VA12WA032Z04R040	32	2.30	50	62	1,50	30000
027920	7690VA12WA040Z04R050	40	1.60	66	78	1,50	26000
027923	7690VA12WA040Z05R050	40	1.60	66	78	1,50	26000
031655	7690VA12CA020Z02R032	20	5.58	26	38	1,50	43000
031646	7690VA12CA020Z02R32-3	20	5.58	26	38	1,50	43000
031656	7690VA12CA025Z02R040	25	3.67	36	48	1,50	36000
031648	7690VA12CA025Z03R040	25	3.67	36	48	1,50	36000
031647	7690VA12CA025Z03R40-3	25	3.67	36	48	1,50	36000
031649	7690VA12CA032Z03R040	32	2.30	50	62	1,50	30000
031657	7690VA12CA032Z04R040	32	2.30	50	62	1,50	30000
027927	7690VA12-A040Z04R	40	1.60	66	78	1,50	26000
027931	7690VA12-A040Z05R	40	1.60	66	78	1,50	26000
027928	7690VA12-A050Z05R	50	1.22	86	98	1,50	23000
027932	7690VA12-A050Z06R	50	1.22	86	98	1,50	23000
027929	7690VA12-A063Z06R	63	0.91	112	124	1,50	20000
027933	7690VA12-A063Z08R	63	0.91	112	124	1,50	20000
027930	7690VA12-A080Z07R	80	0.68	146	158	1,50	17500
027934	7690VA12-A080Z10R	80	0.68	146	158	1,50	17500
031105	7690VA12SA020Z2R35	20	5.58	26	38	1,50	43000
031197	7690VA12SA025Z2R35	25	3.67	36	48	1,50	36000
031106	7690VA12SA025Z3R35	25	3.67	36	48	1,50	36000
031198	7690VA12SA032Z3R43	32	2.30	50	62	1,50	30000
031199	7690VA12SA032Z4R43	32	2.30	50	62	1,50	30000



Note: If using an insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.

7690VA12

Milling Inserts



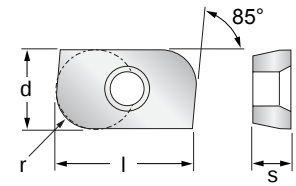
End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 11,00	a _p min - max 1,50 - 5,00	a _p min - max 0,10 - 1,50					
030856	ADET12T308ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	0,80	0,04
030857	ADET12T308ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	0,80	0,04
030808	ADET12T312ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	1,20	0,04
030800	ADET12T312ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	1,20	0,04
030809	ADET12T316ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	1,60	0,04
030771	ADET12T316ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	1,60	0,04
030908	ADET12T320ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	2,00	0,04
030909	ADET12T320ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	2,00	0,04
030858	ADET12T324ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	2,40	0,04
030859	ADET12T324ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	2,40	0,04
030910	ADET12T330ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	3,00	0,04
030911	ADET12T330ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	3,00	0,04
030810	ADET12T332ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	3,20	0,04
030772	ADET12T332ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	3,20	0,04
030912	ADET12T340ER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	4,00	0,04
030913	ADET12T340ER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	4,00	0,04
030807	ADET12T3PDER-48	X500	■□◆	■□◆	-	7,87	12,70	3,97	Facet	0,04
030770	ADET12T3PDER-48	SP6519	●●○■	●●○■	●■□◆	7,87	12,70	3,97	Facet	0,04
029098	ADGT12T3PDFR-721	GH1	◆	◆	◆	7,87	12,70	3,97	Facet	0,04
029329	ADHT12T308ER-46	X500	■◆■	■◆■	-	7,87	12,70	3,97	0,80	0,05
030406	ADHT12T308ER-46	X700	●○	■◆■	◆◆■	7,87	12,70	3,97	0,80	0,05
031526	ADHT12T308ER-46	SP6519	◆■	■◆■	◆◆■◆	7,87	12,70	3,97	0,80	0,05
029331	ADHT12T316ER-46	X500	■◆■	■◆■	-	7,87	12,70	3,97	1,60	0,05
030407	ADHT12T316ER-46	X700	●○	■◆■	◆◆■	7,87	12,70	3,97	1,60	0,05
031527	ADHT12T316ER-46	SP6519	◆■	■◆■	◆◆■◆	7,87	12,70	3,97	1,60	0,05
029337	ADHT12T320ER-46	X500	■◆■	■◆■	-	7,87	12,70	3,97	2,00	0,05
030408	ADHT12T320ER-46	X700	●○	■◆■	◆◆■	7,87	12,70	3,97	2,00	0,05
031530	ADHT12T320ER-46	SP6519	◆■	■◆■	◆◆■◆	7,87	12,70	3,97	2,00	0,05

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Feed recommendations can be found on page A51. Speed recommendations can be found on page A58.





End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m mil
			Depth of Cut (mm)							
			a _p max 11,00	a _p min - max 1,50 - 5,00	a _p min - max 0,10 - 1,50					
029333	ADHT12T324ER-46	X500			-	7,87	12,70	3,97	2,40	0,05
031528	ADHT12T324ER-46	SP6519				7,87	12,70	3,97	2,40	0,05
029339	ADHT12T330ER-46	X500			-	7,87	12,70	3,97	3,00	0,05
031531	ADHT12T330ER-46	SP6519				7,87	12,70	3,97	3,00	0,05
029036	ADHT12T332ER-46	X500			-	7,87	12,70	3,97	3,20	0,05
030409	ADHT12T332ER-46	X700				7,87	12,70	3,97	3,20	0,05
031515	ADHT12T332ER-46	SP6519				7,87	12,70	3,97	3,20	0,05
029335	ADHT12T340ER-46	X500			-	7,87	12,70	3,97	4,00	0,05
031529	ADHT12T340ER-46	SP6519				7,87	12,70	3,97	4,00	0,05
029327	ADHT12T3PDER-46	X500			-	7,87	12,70	3,97	Facet	0,05
031525	ADHT12T3PDER-46	SP6519				7,87	12,70	3,97	Facet	0,05
027913	ADKT12T3PDER-45	X500			-	7,87	12,70	3,97	Facet	0,08
031514	ADKT12T3PDER-45	SP6519				7,87	12,70	3,97	Facet	0,08
027915	ADKT12T3PDER-45	MP91M				7,87	12,70	3,97	Facet	0,08
027916	ADKT12T3PDER-45	SC3025				7,87	12,70	3,97	Facet	0,08

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: ADKT12T3PDER-45 X500 should only be used in steel applications for difficult conditions.

**7690VA12 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
ER-48	X500	Facing	-	-	0,04 - 0,18	0,04 - 0,14	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,14	-	-
ER-48	SP6519	Facing	0,04 - 0,20	-	0,04 - 0,16	0,04 - 0,12	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	0,04 - 0,12	-	-
FR-721	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,20	0,04 - 0,18	-	-	-	-	-	-
ER-46	X500	Facing	-	-	0,05 - 0,18	0,05 - 0,14	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,14	-	-
ER-46	X700	Facing	-	-	0,05 - 0,16	0,05 - 0,12	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,08	0,05 - 0,12	-	-
ER-46	SP6519	Facing	0,05 - 0,22	0,05 - 0,18	0,05 - 0,16	0,05 - 0,12	0,08 - 0,16	0,08 - 0,16	0,08 - 0,16	-	-	-	-	-	-	-	-
ER-45	X500	Facing	0,08 - 0,25	0,08 - 0,22	0,05 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	SP6519	Facing	0,08 - 0,25	0,08 - 0,22	-	-	0,08 - 0,16	0,08 - 0,16	0,08 - 0,16	-	-	-	-	-	-	-	-
ER-45	MP91M	Facing	0,08 - 0,25	0,08 - 0,22	-	-	0,08 - 0,20	0,08 - 0,20	0,08 - 0,20	-	-	-	-	-	-	-	-
ER-45	SC3025	Facing	-	-	-	-	0,08 - 0,16	0,08 - 0,16	0,08 - 0,16	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

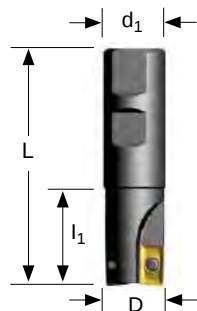
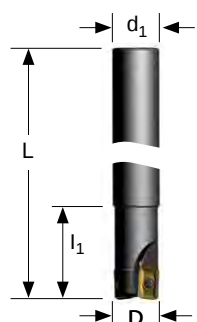
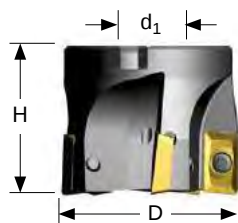
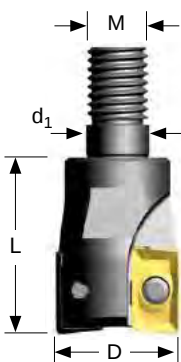
Note: Speed recommendations can be found on page A58.

7690VA16

Shoulder Milling Cutter



End Mills & Face Mills

**Weldon Shank****Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (a_p)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA16 Weldon Shank												
021707	7690VA16WA025R	25	96	40	25	16,00	2	015260	D4008T	015240	T15	3,10
021708	7690VA16WA032R	32	100	40	32	16,00	3	015262	D4010T	015240	T15	3,10
021709	7690VA16WA040R	40	110	50	32	16,00	4	015262	D4010T	015240	T15	3,10
7690VA16 Cylindrical Shank - Medium and Fine Pitch												
031168	7690VA16CA025Z2R50	25	200	50	25	16,00	2	015260	D4008T	015240	T15	3,10
031169	7690VA16CA032Z2R70	32	250	70	32	16,00	2	015262	D4010T	015240	T15	3,10
031170	7690VA16CA032Z3R70	32	250	70	32	16,00	3	015262	D4010T	015240	T15	3,10
7690VA16 Shell Mill Fixation												
017985	7690VA16-A040R	40	40	-	16	16,00	4	015262	D4010T	015240	T15	3,10
021700	7690VA16-A050R	50	40	-	22	16,00	5	015262	D4010T	015240	T15	3,10
021701	7690VA16-A063R	63	40	-	22	16,00	5	015262	D4010T	015240	T15	3,10
021702	7690VA16-A080R	80	50	-	27	16,00	6	015262	D4010T	015240	T15	3,10
021703	7690VA16-A100R	100	50	-	32	16,00	7	015262	D4010T	015240	T15	3,10
021704	7690VA16-A125R	125	63	-	40	16,00	8	015262	D4010T	015240	T15	3,10

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VA16 Modular Head - Medium and Fine Pitch												
031174	7690VA16SA025Z2R35	25	35	M12	12,50	16,00	2	015260	D4008T	015240	T15	3,10
031175	7690VA16SA032Z2R43	32	43	M16	17,00	16,00	2	015262	D4010T	015240	T15	3,10
031176	7690VA16SA032Z3R43	32	43	M16	17,00	16,00	3	015262	D4010T	015240	T15	3,10

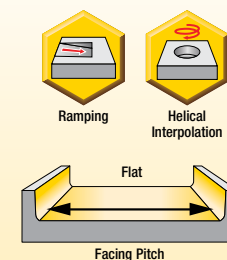
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

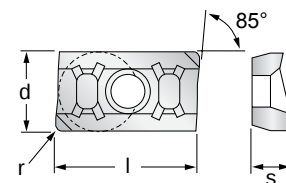
Note: To use radius larger than 2,00mm the cutter body needs to be modified for additional clearance by the end user.

7690VA16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
021707	7690VA16WA025R	25	2.50	33	48	2,00	38000
021708	7690VA16WA032R	32	1.50	47	62	2,00	31500
021709	7690VA16WA040R	40	1.00	63	78	2,00	27000
031168	7690VA16CA025Z2R50	25	2.50	33	48	2,00	38000
031169	7690VA16CA032Z2R70	25	1.50	47	62	2,00	31500
031170	7690VA16CA032Z3R70	32	1.50	47	62	2,00	31500
017985	7690VA16-A040R	40	1.00	63	78	2,00	27000
021700	7690VA16-A050R	50	0.70	83	98	2,00	23500
021701	7690VA16-A063R	63	0.50	109	124	2,00	20500
021702	7690VA16-A080R	80	0.30	143	158	2,00	18000
021703	7690VA16-A100R	100	0.20	183	198	2,00	15500
021704	7690VA16-A125R	125	0.10	233	248	2,00	14000
031174	7690VA16SA025Z2R35	25	2.50	33	48	2,00	38000
031175	7690VA16SA032Z2R43	32	1.50	47	62	2,00	31500
031176	7690VA16SA032Z3R43	32	1.50	47	62	2,00	31500

Note: If using a insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.





End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 16,00	a _p min - max 1,50 - 5,00	a _p min - max 0,10 - 1,50					
033179	APET160402TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	0,20	0,10
033180	APET160408TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	0,80	0,10
033181	APET160410TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	1,00	0,10
033182	APET160415TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	1,50	0,10
033183	APET160420TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	2,00	0,10
033184	APET160425TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	2,50	0,10
033185	APET160430TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	3,00	0,10
033186	APET160440TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	4,00	0,10
033187	APET160460TR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	6,00	0,10
015155	APHT1604PDTR-42	X500	●●	-	-	9,52	16,66	4,76	Facet	0,10
031466	APHT1604PDTR-42	SP6519	●●●●●	■●●●●	■●	9,52	16,66	4,76	Facet	0,10
017293	APHT1604PDTR-42	MP91M	-	■●	■●	9,52	16,66	4,76	Facet	0,10
033188	APEX1604PDER-701	SP6519	-	-	●	9,52	16,66	4,76	Facet	0,02
033189	APEX1604PDFR-701	SP4019	●	●	●	9,52	16,66	4,76	Facet	0,02
014066	APEX1604PDFR-701	GH1	◆	◆	◆	9,52	16,66	4,76	Facet	0,02
033190	APFW1604PDTR	X400	●	◆	●	9,52	16,66	4,76	Facet	0,10
033191	APFW1604PDTR	SP4019	●	■	◆	9,52	16,66	4,76	Facet	0,10
027883	APFW1604PDTR	SC3025	■	◆	◆	9,52	16,66	4,76	Facet	0,10
017628	APFW1604PDTR	GH1	-	●	●	9,52	16,66	4,76	Facet	0,10
033192	APHT1604PDER	SP4019	-	-	●	9,52	16,66	4,76	Facet	0,05
015154	APHT1604PDFR	GH1	■	■	■	9,52	16,66	4,76	Facet	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: APHT1604PDTR-42 X500 should be used for Stainless Steel with heavy scale

Note: APFW1604PDTR X400 should be used for Alloyed Steel with heavy scale

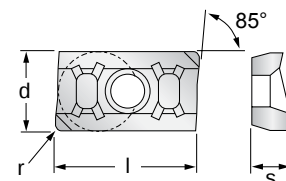
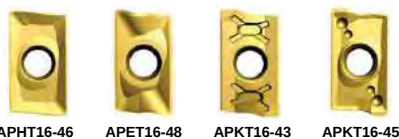
Note: APFW1604PDTR SP4019 should be used for High Temperature Alloys with heavy scale

Note: Feed recommendations can be found on page A55. Speed recommendations can be found on page A58.



7690VA16

Milling Inserts



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 16,00	a _p min - max 1,50 - 5,00	a _p min - max 0,10 - 1,50					
027869	APHT160408ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	0,80	0,05
031495	APHT160408ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	0,80	0,05
027870	APHT160416ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	1,60	0,05
031496	APHT160416ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	1,60	0,05
027871	APHT160424ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	2,40	0,05
031497	APHT160424ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	2,40	0,05
027872	APHT160432ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	3,20	0,05
031397	APHT160432ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	3,20	0,05
027873	APHT160440ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	4,00	0,05
031542	APHT160440ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	4,00	0,05
027874	APHT160450ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	5,00	0,05
031498	APHT160450ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	5,00	0,05
027875	APHT160464ER-46	X500	🟡🟡🟠	🟡🟡🟠	🟡	9,52	16,66	4,76	6,40	0,05
031541	APHT160464ER-46	SP6519	🟡🟡	🟡🟡	🟢🟢🟡🟡	9,52	16,66	4,76	6,40	0,05
030811	APET1604PDER-48	X500	🔴	🔴	🟠	9,52	16,66	4,76	Facet	0,04
030773	APET1604PDER-48	SP6519	🔴	🔴	🟢🟢🟡🟡🔴	9,52	16,66	4,76	Facet	0,04
030860	APET160408ER-48	X500	🔴	🔴	🟠	9,52	16,66	4,76	0,80	0,04
030861	APET160408ER-48	SP6519	🔴	🔴	🟢🟢🟡🟡🔴	9,52	16,66	4,76	0,80	0,04
015156	APKT1604PDER-43	X500	🟢	-	-	9,52	16,66	4,76	Facet	0,08
031468	APKT1604PDER-43	SP6519	🟢🟢	-	-	9,52	16,66	4,76	Facet	0,08
017294	APKT1604PDER-43	MP91M	🟢🟢🔴	-	-	9,52	16,66	4,76	Facet	0,08
027887	APKT1604PDER-43	SC3025	🔴	-	-	9,52	16,66	4,76	Facet	0,08
023115	APKT1604PDER-45	X500	-	🟢	-	9,52	16,66	4,76	Facet	0,08
031469	APKT1604PDER-45	SP6519	-	🟢🟢	-	9,52	16,66	4,76	Facet	0,08
023114	APKT1604PDER-45	MP91M	-	🟢	-	9,52	16,66	4,76	Facet	0,08

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: APKT1604PDER-43 X500 should be used for Steel with heavy scale.

Note: Feed recommendations can be found on page A55. Speed recommendations can be found on page A58.



7690VA16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <18% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
TR-42	X500	Facing	-	-	0,10 - 0,25	0,10 - 0,22	-	-	-	-	-	-	-	-	-	-	-
TR-42	SP6519	Facing	0,10 - 0,28	0,10 - 0,23	0,10 - 0,22	0,10 - 0,20	-	-	-	-	-	-	-	-	-	-	-
TR-42	MP91M	Facing	-	-	-	-	0,08 - 0,25	0,08 - 0,20	0,08 - 0,20	-	-	-	-	-	-	0,03 - 0,06	0,05 - 0,08
ER-701	SP6519	Facing	-	-	-	-	-	-	-	-	-	0,02 - 0,05	0,02 - 0,05	0,02 - 0,05	0,02 - 0,05	-	-
FR-701	SP4019	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
FR-701	GH1	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
TR	X400	Facing	-	0,10 - 0,25	-	-	-	-	-	-	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10
TR	SP4019	Facing	-	-	-	-	-	-	-	-	-	0,08 - 0,10	0,08 - 0,10	0,08 - 0,10	0,08 - 0,12	0,05 - 0,10	0,05 - 0,10
TR	SC3025	Facing	-	-	-	-	0,10 - 0,22	0,10 - 0,22	0,10 - 0,22	-	-	-	-	-	-	-	-
TR	GH1	Facing	-	-	-	-	0,10 - 0,22	0,10 - 0,22	0,10 - 0,22	-	-	-	-	-	-	-	-
ER	SP4019	Facing	-	-	0,05 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-
FR	GH1	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
ER-46	X500	Facing	-	-	0,04 - 0,25	0,04 - 0,22	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,14	-	-
ER-46	SP6519	Facing	0,04 - 0,25	0,04 - 0,20	0,04 - 0,24	0,04 - 0,20	-	-	-	-	-	-	-	-	-	-	-
ER-48	X500	Facing	-	-	-	-	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,14	-	-
ER-48	SP6519	Facing	0,05 - 0,20	0,05 - 0,18	0,04 - 0,16	0,04 - 0,12	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	0,04 - 0,12	-	-
ER-43	X500	Facing	0,08 - 0,30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	SP6519	Facing	0,05 - 0,28	0,05 - 0,23	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	MP91M	Facing	0,06 - 0,27	0,06 - 0,22	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-
ER-43	SC3025	Facing	-	-	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-
ER-45	X500	Facing	-	0,08 - 0,22	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	SP6519	Facing	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	MP91M	Facing	0,08 - 0,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

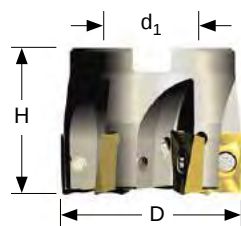
Speed recommendations can be found on page A58.

7690VAP16

Shoulder Milling Cutter



End Mills & Face Mills

**Shell Mill Fixation**

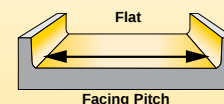
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7690VAP16 Shell Mill Fixation												
034573	7690VAP16-A040Z05R	40	40	-	16	15,8	5	015262	D4010T	015240	T15	3,10
034574	7690VAP16-A050Z06R	50	40	-	22	15,8	6	015262	D4010T	015240	T15	3,10
034575	7690VAP16-A063Z07R	63	40	-	22	15,8	7	015262	D4010T	015240	T15	3,10
034576	7690VAP16-A080Z08R	80	50	-	27	15,8	8	015262	D4010T	015240	T15	3,10
034584	7690VAP16-A100Z10R	100	55	-	32	15,8	10	015262	D4010T	015240	T15	3,10

Note: To use radius larger than 2,00mm the cutter body needs to be modified for additional clearance by the end user.
 The 7690VAP series are ideal for roughing, semi-finishing and finishing of Stainless Steel, High Temperature Alloys plus Low Carbon Steels. **This cutter is designed to utilise one geometry of insert only - APET1604...ER-48**

7690VAP16 Technical Information (mm)

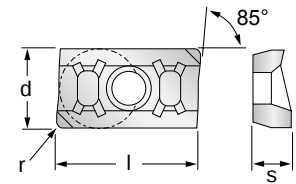
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
034573	7690VAP16-A040Z05R	40	-	-	-	-	27000
034574	7690VAP16-A050Z06R	50	-	-	-	-	23500
034575	7690VAP16-A063Z07R	63	-	-	-	-	20500
034576	7690VAP16-A080Z08R	80	-	-	-	-	18000
034584	7690VAP16-A100Z10R	100	-	-	-	-	15500

Note: If using a insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.

**Depth of Cut (a_p)**



APET16-48



End Mills & Face Mills



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 15,80	a _p min. - max. 1,50 - 5,00	a _p min. - max. 0,10 - 1,50					
030811	APET1604PDER-48	X500				9,52	16,66	4,76	Facet	0,04
030733	APET1604PDER-48	SP6519				9,52	16,66	4,76	Facet	0,04
030860	APET160408ER-48	X500				9,52	16,66	4,76	0,80	0,04
030861	APET160408ER-48	SP6519				9,52	16,66	4,76	0,80	0,04
030812	APET160412ER-48	X500				9,52	16,66	4,76	1,20	0,04
030799	APET160412ER-48	SP6519				9,52	16,66	4,76	1,20	0,04
030813	APET160416ER-48	X500				9,52	16,66	4,76	1,60	0,04
030774	APET160416ER-48	SP6519				9,52	16,66	4,76	1,60	0,04
030914	APET160420ER-48	X500				9,52	16,66	4,76	2,00	0,04
030915	APET160420ER-48	SP6519				9,52	16,66	4,76	2,00	0,04
030916	APET160424ER-48	X500				9,52	16,66	4,76	2,40	0,04
030917	APET160424ER-48	SP6519				9,52	16,66	4,76	2,40	0,04
030918	APET160430ER-48	X500				9,52	16,66	4,76	3,00	0,04
030919	APET160430ER-48	SP6519				9,52	16,66	4,76	3,00	0,04
030814	APET160432ER-48	X500				9,52	16,66	4,76	3,20	0,04
030775	APET160432ER-48	SP6519				9,52	16,66	4,76	3,20	0,04
030907	APET160440ER-48	X500				9,52	16,66	4,76	4,00	0,04
030906	APET160440ER-48	SP6519				9,52	16,66	4,76	4,00	0,04
030920	APET160450ER-48	X500				9,52	16,66	4,76	5,00	0,04
030921	APET160450ER-48	SP6519				9,52	16,66	4,76	5,00	0,04
030922	APET160460ER-48	X500				9,52	16,66	4,76	6,00	0,04
030923	APET160460ER-48	SP6519				9,52	16,66	4,76	6,00	0,04
030924	APET160464ER-48	X500				9,52	16,66	4,76	6,40	0,04
030925	APET160464ER-48	SP6519				9,52	16,66	4,76	6,40	0,04

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

The 7690VAP series are ideal for roughing, semi-finishing and finishing of Stainless Steel, High Temperature Alloys plus Low Carbon Steels. This cutter is designed to utilise one geometry of insert only - APET1604...ER-48

7690VAP16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
ER-48	X500	Facing	0,05 - 0,25	-	0,05 - 0,25	0,05 - 0,20	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,13	0,05 - 0,18	-	-
ER-48	SP6519	Facing	0,05 - 0,20	-	0,05 - 0,20	0,05 - 0,18	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	0,05 - 0,15	-	-

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A58.

7690VA & 7690VAP

Recommended Speeds



Speed v_c (m/min.)																	
7690VA & 7690VAP Series			Wear Resistance														
			Speed min. - max.														
			Coolant Recommendation														
Recommended ● Possible ○																	
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD X Grade		PVD Standard		PVD Standard		CVD Standard		CVD Standard		Uncoated Micrograin
			●	○	●	○	●	○	●	○	●	○	●	○	●	○	
P	Unalloyed Steel	<600 N/mm ² <180 HBN															
		<950 N/mm ² <280 HBN															
	Alloyed Steel	700-950 N/mm ² 200-280 HBN															
		950-1200 N/mm ² 280-355 HBN															
M	Stainless Steel	1200-1400 N/mm ² 355-415 HBN															
	PH Stainless	Austenitic + Ferritic 300 series															
		Martensitic 400 series															
K	Cast Iron	Refractory P.H.															
		Grey GG-Fl															
		Spheroidal-Ductile GGG-FGS															
		Malleable GTS - MN/MP															
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN															
		Aluminium + Silicon > 16% Si 92 HBN															
S	High Temperature Alloys	Iron Based															
		Cobalt Based															
		Nickel Based															
		Titanium Based															
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN															
		Chilled Cast Iron >1400 N/mm ² > 400 HBN															

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

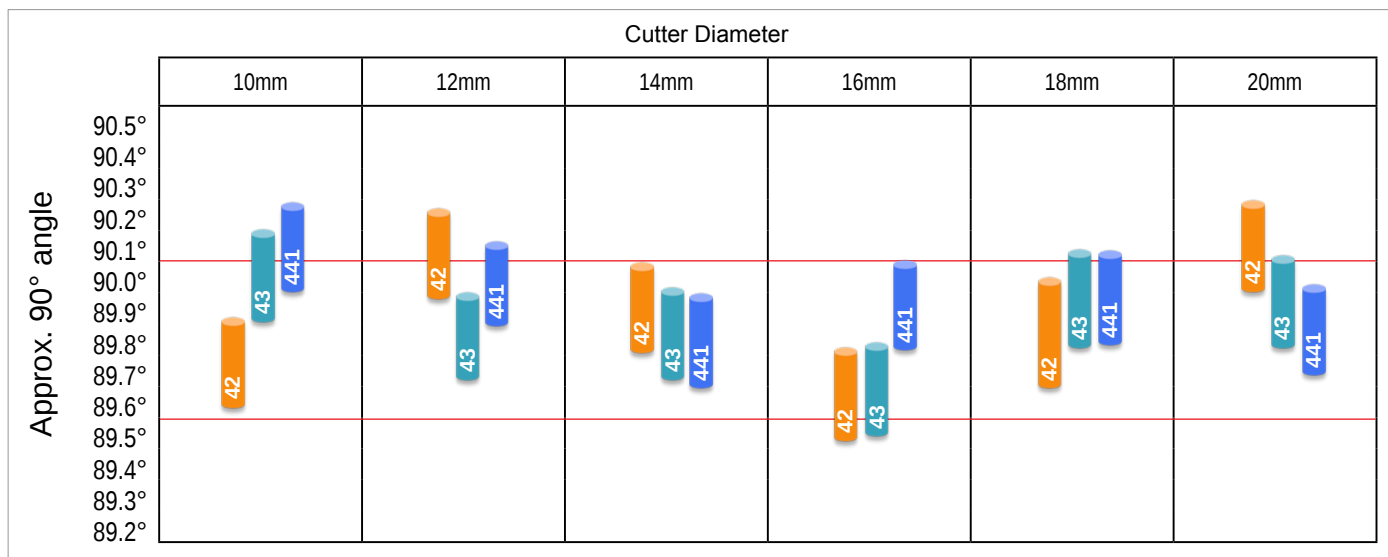
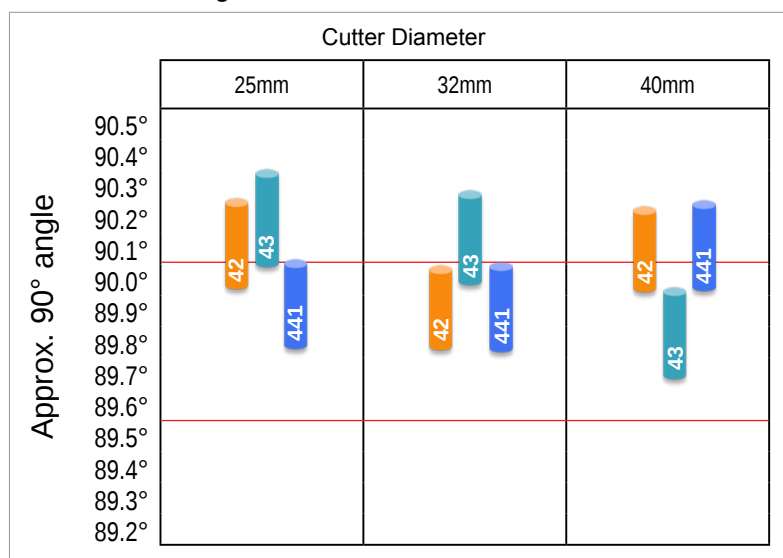
a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

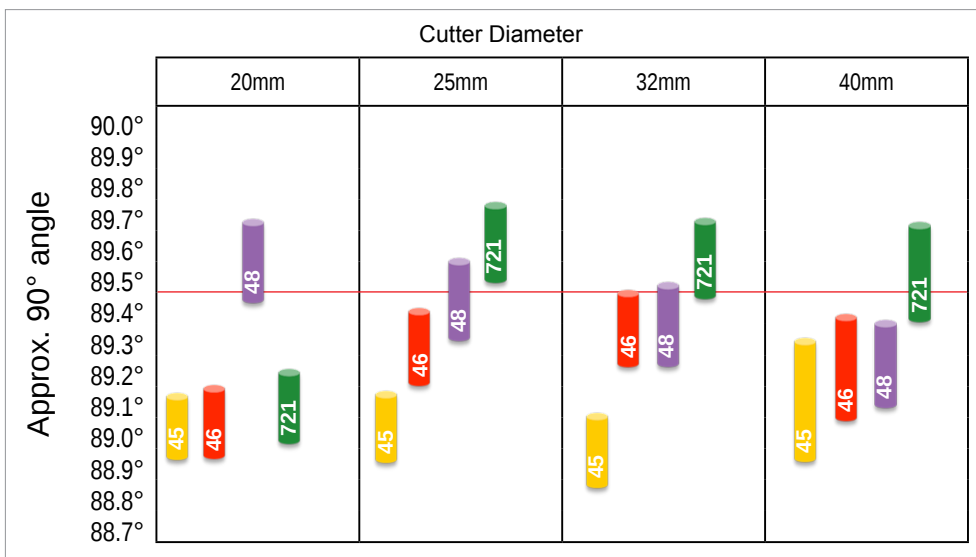
$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

**7690VA09 90° Angle Deviation****7690VA09 90° Angle Deviation**

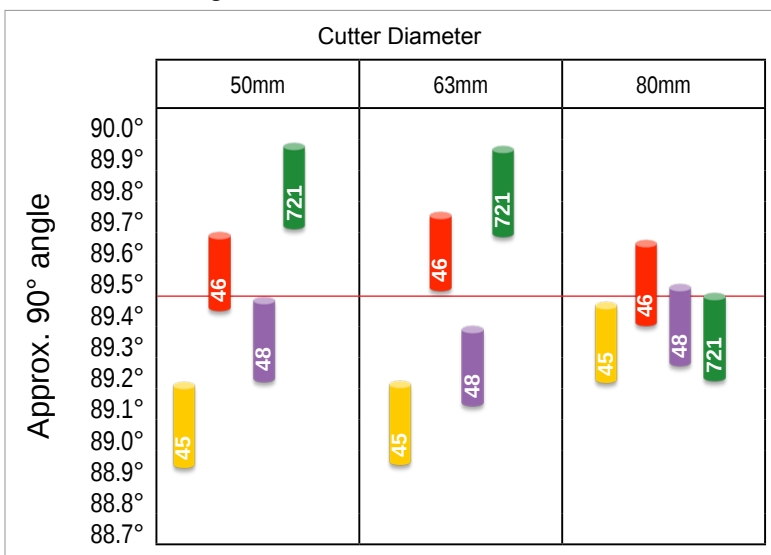
max angle_
 min angle_  ← geometry



7690VA12 90° Angle Deviation



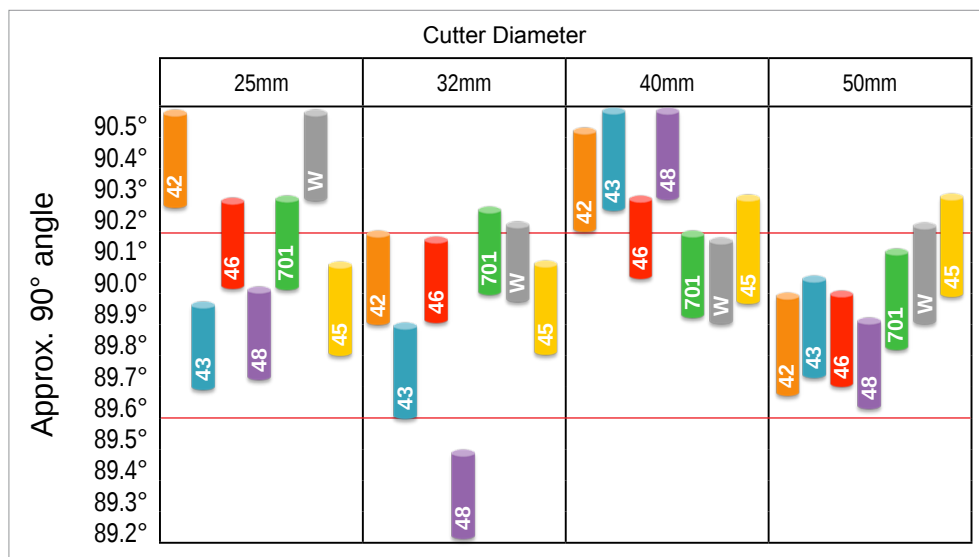
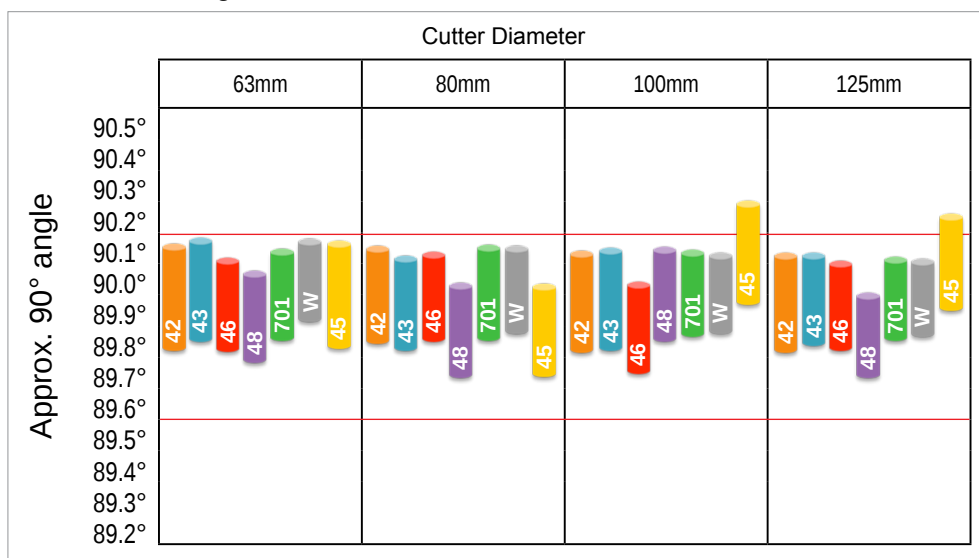
7690VA12 90° Angle Deviation



max angle_ 

min angle_ 

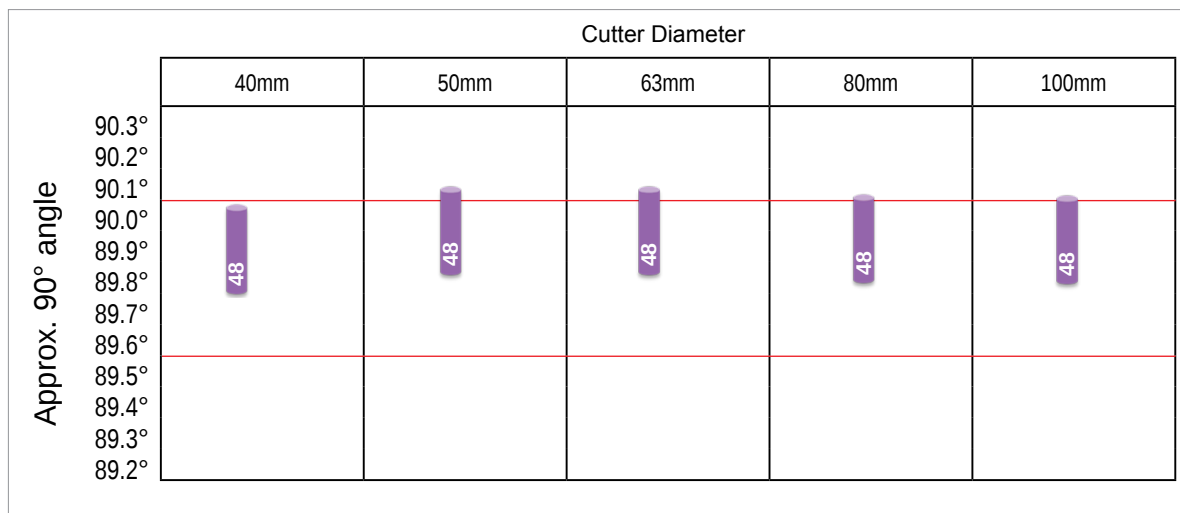
← geometry

**7690VA16 90° Angle Deviation****7690VA16 90° Angle Deviation**

max angle_  ← geometry
 min angle_ 



7690VAP16 90° Angle Deviation



max angle_

min angle_

← geometry





HIGH FEED CUTTERS

7792VX high feed milling cutters are capable of high metal removal in facing, plunging and slotting applications. The patented insert design offers better performance than round insert cutters.

The 7792VX high feed cutters are the best solution when specifically focusing on reducing cycle times or removing the maximum volume of material in the shortest time.

Our high feed cutter has the capacity to achieve 5 times higher feed rate than other existing cutters in the market. This is due to its unique design and insert positioning. 7792VX cutters also has a tremendous advantage, when used in a long (extended) toolholder. These cutters absorb vibration and greatly reduces the instability and deflection of the tool.

7792VX cutters are designed for a wide range of applications. Facing, pocketing, ramping, helical interpolation and plunging. They are capable of machining all materials such as, Steel, Stainless Steel, Cast Iron and High Temperature Alloys.

Also suitable for machining Aluminium Alloys.

7792VX

7792VXP06:

Maximum $a_p = 0,90\text{mm}$
 Diameter Range = 16mm to 32mm

7792VXD09:

Maximum $a_p = 1,50\text{mm}$
 Diameter Range = 25mm to 50mm

7792VXD12:

Maximum $a_p = 2,50\text{mm}$
 Diameter Range = 32mm to 160mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A118.

7792VXE16:

Maximum $a_p = 3,50\text{mm}$
 Diameter Range = 63mm to 160mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A120.

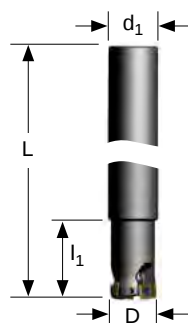
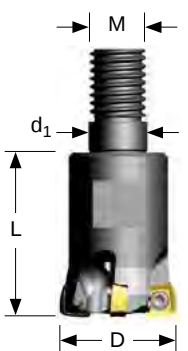


7792VXP06

High Feed Milling Cutter



End Mills & Face Mills

**Cylindrical Shank****Modular Head**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXP06 Cylindrical Shank												
031644	7792VXP06CA016Z2R140	16	188	25	16	0,90	2	031449	FP2506T	031452	TP7	1,00
031629	7792VXP06CA020Z3R154	20	204	32	20	0,90	3	031449	FP2506T	031452	TP7	1,00
031630	7792VXP06CA025Z4R154	25	210	40	25	0,90	4	031450	FP2507T	031452	TP7	1,00
031631	7792VXP06CA032Z5R190	32	250	40	32	0,90	5	031450	FP2507T	031452	TP7	1,00

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXP06 Modular Head - Medium and Fine Pitch												
031632	7792VXP06SA016Z2R25	16	25	M8	8,50	0,90	2	031449	FP2506T	031452	TP7	1,00
031633	7792VXP06SA020Z2R35	20	35	M10	10,50	0,90	2	031449	FP2506T	031452	TP7	1,00
031634	7792VXP06SA020Z3R35	20	35	M10	10,50	0,90	3	031449	FP2506T	031452	TP7	1,00
031636	7792VXP06SA025Z3R35	25	35	M12	12,50	0,90	3	031450	FP2507T	031452	TP7	1,00
031637	7792VXP06SA025Z4R35	25	35	M12	12,50	0,90	4	031450	FP2507T	031452	TP7	1,00
031638	7792VXP06SA032Z5R43	32	43	M16	17,00	0,90	5	031450	FP2507T	031452	TP7	1,00

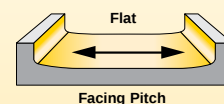
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

7792VXP06 Technical Information (mm)

Product		Dimensions							
EDP	Item Description	Facing Pitch	Ramping Angle		Helical Hole min. - max.		a _p max Helical / Linear	a _e max Plunging	Max RPM
			A °	B °					
031644	7792VXP06CA016Z2R140	7,60	5.94	8.03	22	30	0,60	3,00	65000
031629	7792VXP06CA020Z3R154	11,60	3.42	6.12	30	38	0,60	3,00	57000
031630	7792VXP06CA025Z4R154	16,60	2.23	4.24	40	48	0,60	3,00	49000
031631	7792VXP06CA032Z5R190	23,60	1.39	2.60	54	62	0,60	3,00	41500
031632	7792VXP06SA016Z2R25	7,60	5.94	8.03	22	30	0,60	3,00	65000
031633	7792VXP06SA020Z2R35	11,60	3.42	6.12	30	38	0,60	3,00	57000
031634	7792VXP06SA020Z3R35	11,60	3.42	6.12	30	38	0,60	3,00	57000
031636	7792VXP06SA025Z3R35	16,60	2.84	4.24	40	48	0,60	3,00	49000
031637	7792VXP06SA025Z4R35	16,60	2.23	4.24	40	48	0,60	3,00	49000
031638	7792VXP06SA032Z5R43	23,60	1.39	2.60	54	62	0,60	3,00	41500

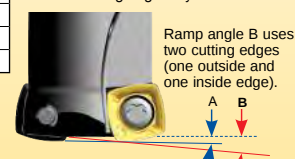


Helical Interpolation Plunging



Facing Pitch

Ramp angle A uses one outside cutting edge only.



Ramp angle B uses two cutting edges (one outside and one inside edge).

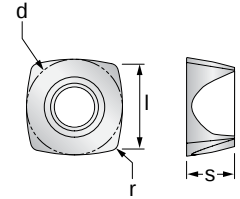
A = max ramp angle utilising full face contact

B = max ramp angle utilising full contact + internal corner radius

**Depth of Cut (a_p)**



XPLT06-D41



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 0,90	a _p max. 0,90	a _e max. 3,00					
030403	XPLT060308ER-D41	X400				7,00	7,00	3,18	0,80	0,04
030402	XPLT060308ER-D41	X500				7,00	7,00	3,18	0,80	0,04
031538	XPLT060308ER-D41	SP6519				7,00	7,00	3,18	0,80	0,04
033066	XPLT060308ER-D41	SC6525				7,00	7,00	3,18	0,80	0,04

Machining Choice:  1st Choice  2nd Choice  3rd Choice | Material Guide Key descriptions found on page A5.**7792VXP06 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
ER-D41	X400	Facing	0,20 - 1,10	0,20 - 0,90	-	-	-	-	-	-	-	-	-	-	-	0,20 - 0,60	0,20 - 0,60
ER-D41	X400	Slotting	0,20 - 0,90	0,20 - 0,80	-	-	-	-	-	-	-	-	-	-	-	0,20 - 0,50	0,20 - 0,50
ER-D41	X400	Plunging	0,04 - 0,30	0,04 - 0,20	-	-	-	-	-	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08
ER-D41	X500	Facing	-	-	0,15 - 1,00	0,15 - 0,90	-	-	-	-	-	0,15 - 0,50	0,15 - 0,50	0,15 - 0,50	0,15 - 0,60	-	-
ER-D41	X500	Slotting	-	-	0,15 - 0,80	0,15 - 0,75	-	-	-	-	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,45	-	-
ER-D41	X500	Plunging	-	-	0,04 - 0,20	0,04 - 0,15	-	-	-	-	-	0,04 - 0,06	0,04 - 0,06	0,04 - 0,06	0,04 - 0,06	-	-
ER-D41	SP6519	Facing	0,20 - 1,00	0,20 - 0,80	0,15 - 0,90	0,15 - 0,80	0,20 - 1,20	0,20 - 1,00	0,20 - 0,90	0,20 - 0,70	-	0,15 - 0,50	0,15 - 0,50	0,15 - 0,50	0,15 - 0,60	-	-
ER-D41	SP6519	Slotting	0,20 - 0,80	0,20 - 0,75	0,15 - 0,80	0,15 - 0,70	0,20 - 1,00	0,20 - 0,90	0,20 - 0,80	0,20 - 0,70	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,45	-	-
ER-D41	SP6519	Plunging	0,04 - 0,25	0,04 - 0,18	0,04 - 0,20	0,04 - 0,14	0,04 - 0,25	0,04 - 0,20	0,04 - 0,18	0,04 - 0,25	-	0,04 - 0,06	0,04 - 0,06	0,04 - 0,06	0,04 - 0,06	-	-
ER-D41	SC6525	Facing	0,20 - 0,95	0,20 - 0,78	-	-	0,20 - 1,20	0,20 - 1,00	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,20 - 0,78	0,20 - 0,72	-	-	0,20 - 1,00	0,20 - 0,90	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Plunging	0,04 - 0,23	0,04 - 0,17	-	-	0,04 - 0,25	0,04 - 0,20	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

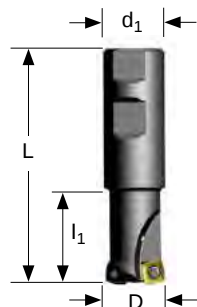
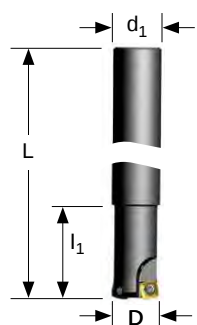
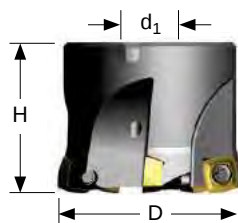
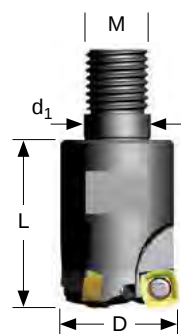
Note: Speed recommendations can be found on page A72.

7792VXD09

High Feed Milling Cutter



End Mills & Face Mills

**Weldon Shank****Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (ap)**

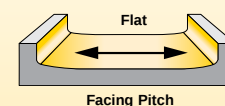
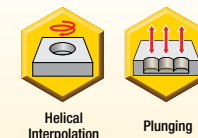
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXD09 Weldon Shank												
029461	7792VXD09WA025Z2R	25	96	40	25	1,50	2	015269	F3508T	015240	T15	2,10
029462	7792VXD09WA032Z3R	32	100	40	32	1,50	3	015064	F3510T	015240	T15	2,10
7792VXD09 Cylindrical Shank												
031191	7792VXD09CA025Z2R50	25	200	50	25	1,50	2	015064	F3510T	015240	T15	2,10
031192	7792VXD09CA032Z3R70	32	250	70	32	1,50	3	015064	F3510T	015240	T15	2,10
7792VXD09 Shell Mill Fixation - Coarse, Medium and Fine Pitch												
029463	7792VXD09-A040Z3R	40	32	-	16	1,50	3	015064	F3510T	015240	T15	2,10
029464	7792VXD09-A040Z4R	40	32	-	16	1,50	4	015064	F3510T	015240	T15	2,10
030434	7792VXD09-A040Z5R	40	32	-	16	1,50	5	015064	F3510T	015240	T15	2,10
030435	7792VXD09-A050Z5R	50	40	-	22	1,50	5	015064	F3510T	015240	T15	2,10
030436	7792VXD09-A050Z6R	50	40	-	22	1,50	6	015064	F3510T	015240	T15	2,10

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXD09 Modular Head												
030613	7792VXD09SA025Z2R35	25	35	M12	12,50	1,50	2	015269	F3508T	015240	T15	2,10
030614	7792VXD09SA032Z3R43	32	43	M16	17,00	1,50	3	015064	F3510T	015240	T15	2,10

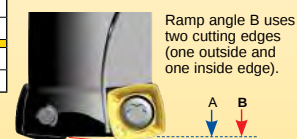
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

7792VXD09 Technical Information (mm)

Product			Dimensions						
EDP	Item Description	Facing Pitch	Ramping Angle A ° B °		Helical Hole min. - max.		a _p max Helical / Linear	a _e max Plunging	Max RPM
029461	7792VXD09WA025Z2R	11,75	2.80	6.30	34	48	1,00	6,00	48500
029462	7792VXD09WA032Z3R	18,75	1.50	5.00	48	62	1,00	6,00	40500
031191	7792VXD09CA025Z2R50	11,75	2.80	6.30	34	48	1,00	6,00	48500
031192	7792VXD09CA032Z3R70	18,75	1.50	5.00	48	62	1,00	6,00	40500
029463	7792VXD09-A040Z3R	26,75	0.80	2.70	64	78	1,00	6,00	34500
029464	7792VXD09-A040Z4R	26,75	0.80	2.70	64	78	1,00	6,00	34500
030434	7792VXD09-A040Z5R	26,75	0.80	2.70	64	78	1,00	6,00	34500
030435	7792VXD09-A050Z5R	36,75	0.71	2.31	84	98	1,00	6,00	30000
030436	7792VXD09-A050Z6R	36,75	0.71	2.31	84	98	1,00	6,00	29500
030613	7792VXD09SA025Z2R35	11,75	2.80	6.30	34	48	1,00	6,00	48500
030614	7792VXD09SA032Z3R43	18,75	1.50	5.00	48	62	1,00	6,00	40500

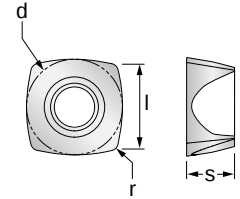


Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilising full face contact

B = max ramp angle utilising full contact + internal corner radius



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 1,50	a _p max. 1,50	a _e max. 6,00					
029487	XDLW090408SR-D	X400				9,52	9,52	4,76	0,80	0,10
029485	XDLW090408SR-D	X500				9,52	9,52	4,76	0,80	0,10
029486	XDLW090408SR-D	SC3025				9,52	9,52	4,76	0,80	0,10
029685	XDLT090408ER-D41	X500				9,52	9,52	4,76	0,80	0,05
031535	XDLT090408ER-D41	SP6519				9,52	9,52	4,76	0,80	0,05
033067	XDLT090408ER-D41	SC6525				9,52	9,52	4,76	0,80	0,05
029637	XDLT090408ER-D721	GH2				9,52	9,52	4,76	0,80	0,04
030853	XDLT090412ER-D411	X500				9,52	9,52	4,76	1,20	0,05
030854	XDLT090412ER-D411	SP6519				9,52	9,52	4,76	1,20	0,05

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

XDLW090408SR-D X500 should be used for Alloyed Steel and Stainless Steel with heavy scale.

XDLT090412ER-D411 is a more positive geometry than the -D-41 with a larger radius which increases performance during smaller radial engagements or where chipping may occur when using the -D-41 geometry.

XDLT090412ER-D411 uses less power than the -D-41 geometry.


7792VXD09 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SR-D	X400	Facing	0,30 - 2,00	0,30 - 1,90	-	-	-	-	-	-	-	-	-	-	-	0,30 - 1,00	0,30 - 1,00
SR-D	X400	Slotting	0,30 - 1,50	0,30 - 1,45	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,60	0,30 - 0,80
SR-D	X400	Plunging	0,10 - 0,25	0,10 - 0,23	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,12	0,10 - 0,12
SR-D	X500	Facing	-	0,30 - 1,90	0,30 - 1,20	0,30 - 1,00	-	-	-	-	-	-	-	-	-	-	-
SR-D	X500	Slotting	-	0,30 - 1,40	0,30 - 0,90	0,30 - 0,80	-	-	-	-	-	-	-	-	-	-	-
SR-D	X500	Plunging	-	0,10 - 0,22	0,10 - 0,20	0,10 - 0,15	-	-	-	-	-	-	-	-	-	-	-
SR-D	SC3025	Facing	-	-	-	-	0,30 - 2,00	0,30 - 1,80	0,30 - 1,50	-	-	-	-	-	-	-	-
SR-D	SC3025	Slotting	-	-	-	-	0,30 - 1,70	0,30 - 1,50	0,30 - 1,30	-	-	-	-	-	-	-	-
SR-D	SC3025	Plunging	-	-	-	-	0,10 - 0,25	0,10 - 0,22	0,10 - 0,20	-	-	-	-	-	-	-	-
ER-D41	X500	Facing	-	-	0,20 - 1,00	0,20 - 0,80	-	-	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	X500	Slotting	-	-	0,20 - 0,80	0,15 - 0,70	-	-	-	-	-	0,10 - 0,50	0,10 - 0,50	0,10 - 0,50	0,10 - 0,70	-	-
ER-D41	X500	Plunging	-	-	0,10 - 0,16	0,08 - 0,12	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	-	-
ER-D41	SP6519	Facing	0,30 - 1,50	0,30 - 1,30	0,20 - 1,00	0,20 - 0,60	0,30 - 1,50	0,30 - 1,30	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	SP6519	Slotting	0,30 - 1,30	0,30 - 1,00	0,20 - 0,80	0,15 - 0,50	0,30 - 1,30	0,30 - 1,00	-	-	-	0,10 - 0,50	0,10 - 0,50	0,10 - 0,50	0,10 - 0,70	-	-
ER-D41	SP6519	Plunging	0,10 - 0,20	0,10 - 0,16	0,10 - 0,16	0,05 - 0,08	0,10 - 0,20	0,10 - 0,16	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	-	-
ER-D41	SC6525	Facing	0,30 - 1,45	0,30 - 1,30	-	-	0,30 - 1,50	0,30 - 1,30	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,30 - 1,25	0,30 - 1,00	-	-	0,30 - 1,30	0,30 - 1,00	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Plunging	0,10 - 0,18	0,10 - 0,16	-	-	0,10 - 0,20	0,10 - 0,16	-	-	-	-	-	-	-	-	-
ER-D721	GH2	Facing	-	-	-	-	-	-	-	0,30 - 1,50	0,30 - 1,30	-	-	-	-	-	-
ER-D721	GH2	Slotting	-	-	-	-	-	-	-	0,30 - 1,30	0,30 - 1,00	-	-	-	-	-	-
ER-D721	GH2	Plunging	-	-	-	-	-	-	-	0,10 - 0,20	0,10 - 0,16	-	-	-	-	-	-
ER-D411	X500	Facing	-	-	0,20 - 1,00	0,20 - 0,80	-	-	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D411	X500	Slotting	-	-	0,20 - 0,80	0,15 - 0,70	-	-	-	-	-	0,10 - 0,50	0,10 - 0,50	0,10 - 0,50	0,10 - 0,70	-	-
ER-D411	X500	Plunging	-	-	0,10 - 0,16	0,08 - 0,12	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	-	-
ER-D411	SP6519	Facing	0,30 - 1,50	0,30 - 1,30	0,20 - 1,00	0,20 - 0,60	0,30 - 1,50	0,30 - 1,30	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D411	SP6519	Slotting	0,30 - 1,30	0,30 - 1,00	0,20 - 0,80	0,15 - 0,50	0,30 - 1,30	0,30 - 1,00	-	-	-	0,10 - 0,50	0,10 - 0,50	0,10 - 0,50	0,10 - 0,70	-	-
ER-D411	SP6519	Plunging	0,10 - 0,20	0,10 - 0,16	0,10 - 0,16	0,05 - 0,08	0,10 - 0,20	0,10 - 0,16	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	-	-

Note: HTA = High Temperature Alloys

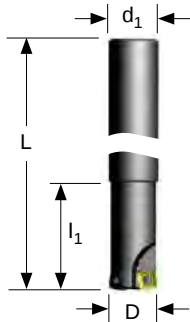
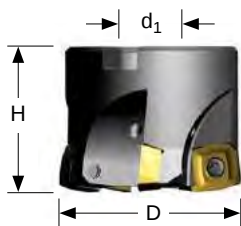
Note: Speed recommendations can be found on page A72.

7792VXD12

High Feed Milling Cutter



End Mills & Face Mills

**Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (ap)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXD12 Cylindrical Shank												
031195	7792VXD12CA032Z2R70	32	250	70	32	2,50	2	015262	D4010T	015240	T15	3,10
7792VXD12 Shell Mill Fixation - Coarse, Medium and Fine Pitch												
029467	7792VXD12-A052Z3R	52	40	-	22	2,50	3	015263	D4012T	015240	T15	3,10
029468	7792VXD12-A052Z4R	52	40	-	22	2,50	4	015263	D4012T	015240	T15	3,10
030489	7792VXD12-A052Z5R	52	40	-	22	2,50	5	015262	D4010T	015240	T15	3,10
029469	7792VXD12-A063Z4R	63	40	-	22	2,50	4	015263	D4012T	015240	T15	3,10
029470	7792VXD12-A063Z5R	63	40	-	22	2,50	5	015263	D4012T	015240	T15	3,10
031650	7792VXD12-A066Z4R	66	45	-	27	2,50	4	015263	D4012T	015240	T15	3,10
031651	7792VXD12-A066Z5R	66	45	-	27	2,50	5	015263	D4012T	015240	T15	3,10
029471	7792VXD12-A080Z5R	80	50	-	27	2,50	5	015263	D4012T	015240	T15	3,10
030490	7792VXD12-A080Z8R	80	50	-	27	2,50	8	015263	D4012T	015240	T15	3,10
030443	7792VXD12-A100Z6R	100	50	-	32	2,50	6	015263	D4012T	015240	T15	3,10
030444	7792VXD12-A100Z9R	100	50	-	32	2,50	9	015263	D4012T	015240	T15	3,10
030445	7792VXD12-A125Z8R	125	63	-	40	2,50	8	015263	D4012T	015240	T15	3,10
030446	7792VXD12-A125Z11R	125	63	-	40	2,50	11	015263	D4012T	015240	T15	3,10
033216	7792VXD12-160Z07R	160	63	-	40	2,50	7	015263	D4012T	015240	T15	3,10

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXD12 Modular Head												
030994	7792VXD12SA032Z2R43	32	43	M16	17,00	2,50	2	015262	D4010T	015240	T15	3,10

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

7792VXD12 Technical Information (mm)

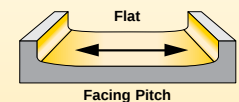
Product		Dimensions							
EDP	Item Description	Facing Pitch	Ramping Angle A ° B °		Helical Hole min. - max.		a _p max Helical / Linear	a _e max Plunging	Max RPM
031195	7792VXD12CA032Z2R70	10,60	1.80	2.60	42	62	1,80	9,00	31500
029467	7792VXD12-A052Z3R	33,60	0.80	2.70	82	102	1,80	9,00	22000
029468	7792VXD12-A052Z4R	33,60	0.80	2.70	82	102	1,80	9,00	22000
030489	7792VXD12-A052Z5R	33,60	0.80	2.70	82	102	1,80	9,00	22000
029469	7792VXD12-A063Z4R	44,60	0.60	1.80	104	124	1,80	9,00	19500
029470	7792VXD12-A063Z5R	44,60	0.60	1.80	104	124	1,80	9,00	19500
031650	7792VXD12-A066Z4R	47,60	0.45	1.80	110	130	1,80	9,00	19000
031651	7792VXD12-A066Z5R	47,60	0.45	1.80	110	130	1,80	9,00	19000
029471	7792VXD12-A080Z5R	61,60	0.45	0.90	138	158	1,80	9,00	17000
030490	7792VXD12-A080Z8R	61,60	0.45	0.90	138	158	1,80	9,00	17000
030443	7792VXD12-A100Z6R	81,60	0.32	1.45	178	198	1,80	9,00	15000
030444	7792VXD12-A100Z9R	81,60	0.32	1.45	178	198	1,80	9,00	15000
030445	7792VXD12-A125Z8R	106,60	0.24	1.06	228	248	1,80	9,00	13000
030446	7792VXD12-A125Z11R	106,60	0.24	1.06	228	248	1,80	9,00	13000
033216	7792VXD12-160Z07R	141,60	0.20	0.86	298	318	1,80	9,00	11500
030994	7792VXD12SA032Z2R43	10,60	1.80	2.60	42	62	1,80	9,00	31500



Helical Interpolation

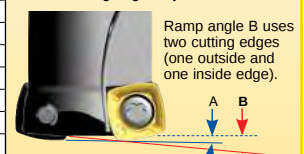


Plunging



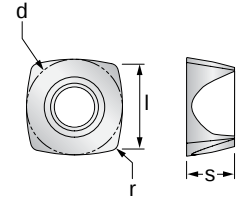
Facing Pitch

Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilizing full face contact

B = max ramp angle utilizing full contact + internal corner radius



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 2,50	a _p max. 2,00	a _e max. 9,00					
029490	XDLW120508SR-D	X400				12,70	12,70	5,56	0,80	0,10
029488	XDLW120508SR-D	X500				12,70	12,70	5,56	0,80	0,10
029489	XDLW120508SR-D	SC3025				12,70	12,70	5,56	0,80	0,10
029682	XDLT120508ER-D41	X500				12,70	12,70	5,56	0,80	0,05
031534	XDLT120508ER-D41	SP6519				12,70	12,70	5,56	0,80	0,05
033068	XDLT120508ER-D41	SC6525				12,70	12,70	5,56	0,80	0,05
029638	XDLT120508ER-D721	GH2				12,70	12,70	5,56	0,80	0,04
030783	XDLT120512ER-D411	X500				12,70	12,70	5,56	1,20	0,05
030792	XDLT120512ER-D411	SP6519				12,70	12,70	5,56	1,20	0,05

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

XDLW120508SR-D X500 should be used for Alloyed Steel and Stainless Steel with heavy scale.

XDLT120512ER-D411 is a more positive geometry than the -D41 with a larger radius which increases performance during smaller radial engagements or where chipping may occur when using the -D41 geometry.

XDLT120512ER-D411 uses less power than the -D41 geometry.

7792VXD12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SR-D	X400	Facing	0,30 - 2,70	0,30 - 2,50	-	-	-	-	-	-	-	-	-	-	-	0,30 - 1,20	0,30 - 1,50
SR-D	X400	Slotting	0,30 - 2,50	0,30 - 2,40	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,80	0,30 - 1,00
SR-D	X400	Plunging	0,10 - 0,30	0,10 - 0,25	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,13	0,10 - 0,15
SR-D	X500	Facing	-	0,30 - 2,50	0,20 - 1,70	0,20 - 1,20	-	-	-	-	-	-	-	-	-	-	-
SR-D	X500	Slotting	-	0,30 - 2,40	0,20 - 1,50	0,20 - 1,00	-	-	-	-	-	-	-	-	-	-	-
SR-D	X500	Plunging	-	0,10 - 0,24	0,10 - 0,25	0,10 - 0,18	-	-	-	-	-	-	-	-	-	-	-
SR-D	SC3025	Facing	-	-	-	-	0,30 - 3,00	0,30 - 2,80	0,30 - 2,50	-	-	-	-	-	-	-	-
SR-D	SC3025	Slotting	-	-	-	-	0,30 - 2,50	0,30 - 2,30	0,30 - 2,10	-	-	-	-	-	-	-	-
SR-D	SC3025	Plunging	-	-	-	-	0,10 - 0,30	0,10 - 0,28	0,10 - 0,25	-	-	-	-	-	-	-	-
ER-D41	X500	Facing	-	-	0,20 - 1,40	0,20 - 0,90	-	-	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D41	X500	Slotting	-	-	0,20 - 1,10	0,20 - 0,80	-	-	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D41	X500	Plunging	-	-	0,10 - 0,20	0,08 - 0,14	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-
ER-D41	SP6519	Facing	0,30 - 2,50	0,30 - 2,00	0,20 - 1,20	0,20 - 0,75	0,30 - 2,50	0,30 - 2,30	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D41	SP6519	Slotting	0,30 - 2,00	0,30 - 1,60	0,20 - 1,00	0,15 - 0,60	0,30 - 2,00	0,30 - 1,80	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D41	SP6519	Plunging	0,10 - 0,22	0,10 - 0,18	0,10 - 0,18	0,05 - 0,10	0,10 - 0,22	0,10 - 0,18	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-
ER-D41	SC6525	Facing	0,30 - 2,40	0,30 - 2,00	-	-	0,30 - 2,50	0,30 - 2,30	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,30 - 1,90	0,30 - 1,60	-	-	0,30 - 2,00	0,30 - 1,80	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Plunging	0,10 - 0,20	0,10 - 0,18	-	-	0,10 - 0,22	0,10 - 0,18	-	-	-	-	-	-	-	-	-
ER-D721	GH2	Facing	-	-	-	-	-	-	-	0,30 - 1,50	0,30 - 1,50	-	-	-	-	-	-
ER-D721	GH2	Slotting	-	-	-	-	-	-	-	0,30 - 1,50	0,30 - 1,50	-	-	-	-	-	-
ER-D721	GH2	Plunging	-	-	-	-	-	-	-	0,10 - 0,40	0,10 - 0,40	-	-	-	-	-	-
ER-D411	X500	Facing	-	-	0,20 - 1,40	0,20 - 0,90	-	-	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D411	X500	Slotting	-	-	0,20 - 1,10	0,20 - 0,80	-	-	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D411	X500	Plunging	-	-	0,10 - 0,20	0,08 - 0,14	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-
ER-D411	SP6519	Facing	0,30 - 2,50	0,30 - 2,30	0,20 - 1,20	0,20 - 0,75	0,30 - 2,50	0,30 - 2,30	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D411	SP6519	Slotting	0,30 - 2,00	0,30 - 1,80	0,20 - 1,00	0,15 - 0,60	0,30 - 2,00	0,30 - 1,80	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D411	SP6519	Plunging	0,10 - 0,22	0,10 - 0,18	0,10 - 0,18	0,05 - 0,10	0,10 - 0,22	0,10 - 0,18	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-

Note: HTA = High Temperature Alloys

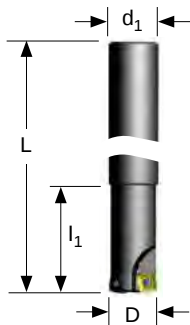
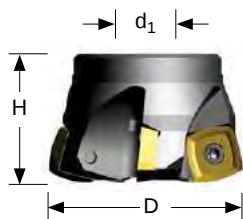
Note: Speed recommendations can be found on page A72.

7792VXE16

High Feed Milling Cutter



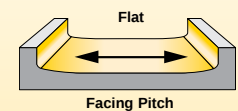
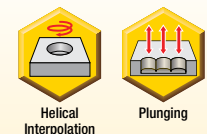
End Mills & Face Mills

**Cylindrical Shank****Shell Mill Fixation**

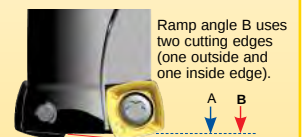
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7792VXE16 Cylindrical Shank												
034851	7792VXE16CA040Z2R102	40	172	102	40	3,50	2	031225	DP5013T	030819	TP20	6,10
034852	7792VXE16CA050Z3R102	50	172	102	40	3,50	3	031225	DP5013T	030819	TP20	6,10
7792VXE16 Shell Mill Fixation												
031277	7792VXE16-A063Z5R	63	40	-	22	3,50	5	031225	DP5013T	030819	TP20	6,10
031278	7792VXE16-A080Z6R	80	50	-	27	3,50	6	031225	DP5013T	030819	TP20	6,10
031279	7792VXE16-A100Z8R	100	50	-	32	3,50	8	031225	DP5013T	030819	TP20	6,10
031280	7792VXE16-A125Z10R	125	63	-	40	3,50	10	031225	DP5013T	030819	TP20	6,10
031281	7792VXE16-160Z12	160	63	-	40	3,50	12	031225	DP5013T	030819	TP20	6,10

7792VXE16 Technical Information (mm)

Product		Dimensions							
EDP	Item Description	Facing Pitch	Ramping Angle		Helical Hole min. - max.		ap max Helical / Linear	ae max Plunging	Max RPM
			A °	B °					
034851	7792VXE16CA040Z2R102	16.10	2.55	3.35	50	78	2.50	13.00	33000
034852	7792VXE16CA050Z3R102	25.83	1.36	2.85	70	98	2.50	13.00	27500
031277	7792VXE16-A063Z5R	37.45	0.86	1.00	96	124	2.50	13.00	22000
031278	7792VXE16-A080Z6R	54.45	0.58	0.65	130	158	2.50	13.00	19000
031279	7792VXE16-A100Z8R	74.45	0.42	0.51	170	198	2.50	13.00	16500
031280	7792VXE16-A125Z10R	99.45	0.32	0.37	220	248	2.50	13.00	14500
031281	7792VXE16-160Z12	134.50	0.23	0.27	290	318	2.50	13.00	12500



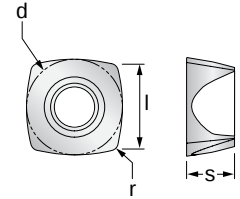
Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilising full face contact

B = max ramp angle utilising full contact + internal corner radius

**Depth of Cut (a_p)**



End Mills & Face Mills



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 3,50	a _p max. 3,00	a _e max.13,00					
031291	XELW160512SR-D	X400				16,80	16,80	5,56	1,20	0,12
031292	XELW160512SR-D	SC3025				16,80	16,80	5,56	1,20	0,12
031293	XELT160512ER-D41	X500				16,80	16,80	5,56	1,20	0,12
031294	XELT160512ER-D41	SP6519				16,80	16,80	5,56	1,20	0,12
033069	XELT160512ER-D41	SC6525				16,80	16,80	5,56	1,20	0,12

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.7792VXE16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SR-D	X400	Facing	0,30 - 2,00	0,30 - 1,80	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,80	0,30 - 1,00
SR-D	X400	Slotting	0,30 - 1,70	0,30 - 1,50	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,50	0,30 - 0,60
SR-D	X400	Plunging	0,10 - 0,27	0,10 - 0,22	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,10	0,10 - 0,12
SR-D	SC3025	Facing	-	-	-	-	0,30 - 2,00	0,30 - 1,80	0,30 - 1,50	-	-	-	-	-	-	-	-
SR-D	SC3025	Slotting	-	-	-	-	0,30 - 1,50	0,30 - 1,30	0,30 - 1,20	-	-	-	-	-	-	-	-
SR-D	SC3025	Plunging	-	-	-	-	0,10 - 0,20	0,10 - 0,18	0,10 - 0,15	-	-	-	-	-	-	-	-
ER-D41	X500	Facing	-	-	0,20 - 1,00	0,20 - 0,60	-	-	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	X500	Slotting	-	-	0,20 - 0,80	0,20 - 0,50	-	-	-	-	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,50	-	-
ER-D41	X500	Plunging	-	-	0,12 - 0,16	0,07 - 0,13	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-
ER-D41	SP6519	Facing	0,30 - 1,50	0,30 - 1,30	0,20 - 1,00	0,20 - 0,50	0,30 - 1,50	0,30 - 1,20	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	SP6519	Slotting	0,30 - 1,30	0,30 - 1,20	0,20 - 0,80	0,20 - 0,45	0,30 - 1,20	0,30 - 1,10	-	-	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,50	-	-
ER-D41	SP6519	Plunging	0,10 - 0,23	0,10 - 0,20	0,12 - 0,16	0,07 - 0,12	0,10 - 0,20	0,10 - 0,16	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,10	0,05 - 0,12	-	-
ER-D41	SC6525	Facing	0,30 - 1,40	0,30 - 1,20	-	-	0,30 - 1,50	0,30 - 1,20	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,30 - 1,20	0,30 - 1,10	-	-	0,30 - 1,20	0,30 - 1,10	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Plunging	0,10 - 0,20	0,10 - 0,18	-	-	0,10 - 0,20	0,10 - 0,16	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A72.

Speed v_c (m/min)

7792VX Series

Wear Resistance

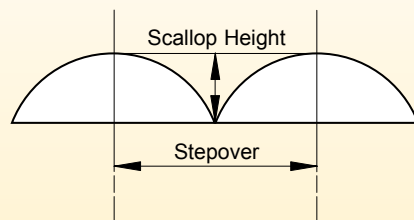
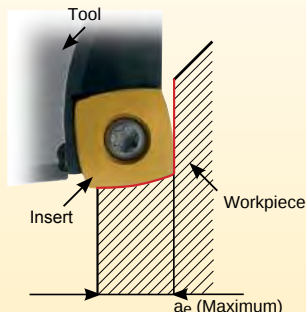
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Speed min. - max.

Coolant Recommendation

Recommended ● Possible ◎

			PVD X Grade		CVD X Grade		PVD Standard		Uncoated Micrograin		CVD Standard		CVD Standard	
ISO	Materials	Rm and Hardness	 		 		 		 		 		 	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●			◎	●			◎	●		
		<950 N/mm ² <280 HBN												
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	◎	●	◎	●			◎	●		
		950-1200 N/mm ² 280-355 HBN												
		1200-1400 N/mm ² 355-415 HBN		●		●		●			●			
M	Stainless Steel	Austenitic + Ferritic 300 series			◎	●	◎	●						
		Martensitic 400 series												
	PH Stainless	Refractory P.H.			●		●							
K	Cast Iron	Grey GG-Ft												
		Spheroidal-Ductile GGG-FGS					◎	●			●		●	
		Malleable GTS - MN/MP												
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN					●		●					
		Aluminium + Silicon > 16% Si 92 HBN												
S	High Temperature Alloys	Iron Based												
		Cobalt Based			●		●							
		Nickel Based												
		Titanium Based												
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●											
		Chilled Cast Iron >1400 N/mm ² > 400 HBN												


Plunging


The cutting edge should not be in contact with the material face after machining to maintain the cutting edge quality.

The scallop height is calculated in relation to the step over.



The maximum radial engagement is directly in relation to insert cutting edge length.

For insert type: XP...06 the a_e , max is 3mm.

For insert type: XD...09 the a_e , max is 6mm.

For insert type: XD...12 the a_e , max is 9mm.

For insert type: XE...16 the a_e , max is 13mm.

Plunging Information (mm) tool definition-scallop height and step over

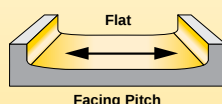
	Tool definition (mm)																				
	7792VXP06				7792VXD09				7792VXD12								7792VXE16				
Diameter	16	20	25	32	25	32	40	50	32	52	63	66	80	100	125	160	63	80	100	125	160
Insert size	6	6	6	6	9	9	9	9	12	12	12	12	12	12	12	12	16	16	16	16	16
a _e max	3	3	3	3	6	6	6	6	9	9	9	9	9	9	9	9	13	13	13	13	13
Scallop height	Step over (mm)																				
0,25	3,97	4,44	4,97	5,63	4,97	5,63	6,30	7,05	5,63	7,19	7,92	8,11	8,93	9,99	11,17	12,64	7,92	8,93	9,99	11,17	12,64
0,50	5,57	6,24	7,00	7,94	7,00	7,94	8,89	9,95	7,94	10,15	11,18	11,44	12,61	14,11	15,78	17,86	11,18	12,61	14,11	15,78	17,86
0,75	6,76	7,60	8,53	9,68	8,53	9,68	10,85	12,16	9,68	12,40	13,67	13,99	15,42	17,26	19,31	21,86	13,67	15,42	17,26	19,31	21,86
1,00	7,75	8,72	9,80	11,14	9,80	11,14	12,49	14,00	11,14	14,28	15,75	16,12	17,78	19,90	22,27	25,22	15,75	17,78	19,90	22,27	25,22
2,00	10,58	12,00	13,56	15,49	13,56	15,49	17,44	19,60	15,49	20,00	22,09	22,63	24,98	28,00	31,37	35,55	22,09	24,98	28,00	31,37	35,55
3,00	12,49	14,28	16,25	18,65	16,25	18,65	21,07	23,75	18,65	24,25	26,83	27,49	30,40	34,12	38,26	43,41	26,83	30,40	34,12	38,26	43,41
4,00					18,33	21,17	24,00	27,13	21,17	27,71	30,72	31,50	34,87	39,19	44,00	49,96	30,72	34,87	39,19	44,00	49,96
5,00					20,00	23,24	26,46	30,00	23,24	30,66	34,06	34,93	38,73	43,59	48,99	55,68	34,06	38,73	43,59	48,99	55,68
6,00					21,35	24,98	28,57	32,49	24,98	33,23	36,99	37,95	42,14	47,50	53,44	60,79	36,99	42,14	47,50	53,44	60,79
7,00									26,46	35,50	39,60	40,64	45,21	51,03	57,48	65,45	39,60	45,21	51,03	57,48	65,45
8,00									27,71	37,52	41,95	43,08	48,00	54,26	61,19	69,74	41,95	48,00	54,26	61,19	69,74
9,00									28,77	39,34	44,09	45,30	50,56	57,24	64,62	73,73	44,09	50,56	57,24	64,62	73,73
10,00																	46,04	52,92	60,00	67,82	77,46
11,00																	47,83	55,10	62,58	70,82	80,97
12,00																	49,48	57,13	64,99	73,65	84,29
13,00																	50,99	59,03	67,26	76,32	87,43

Max. flat surface (mm)

Insert size	Cutter dia.	Pitch
06	16	7,60
	20	11,60
	25	16,60
	32	23,60
09	25	11,75
	32	18,75
	40	26,75
	50	36,75
12	32	10,60
	52	33,60
	63	44,60
	66	47,60
	80	61,60
	100	81,60
16	125	106,60
	160	141,60
16	63	37,45
	80	54,45
	100	74,45
	125	99,45
	160	134,50



Helical Interpolation



Facing Pitch

Helical interpolation capacity for 7792VX (mm)

Insert Size	Cutter dia.	Hole min.	Hole max.
06	16	22	30
	20	30	38
	25	40	48
	32	54	62
09	25	34	48
	32	48	62
	40	64	78
	50	84	98
12	32	42	62
	52	82	102
	63	104	124
	66	110	130
	80	138	158
	100	178	198
	125	228	248
16	160	298	318
	63	96	124
	80	130	158
	100	170	198
	125	220	248
	160	290	318

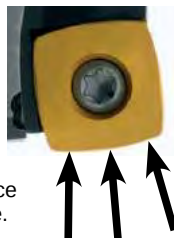


The advantages of face milling and producing cavities with Stellram's high feed face mill are numerous.

The unique design of the insert, approach angle and the cutter body ensure the cutting forces are predominantly directed in the axial direction. The example shown with a round insert tool shows complex forces which result in high levels of vibration and damage to the cutting edge.

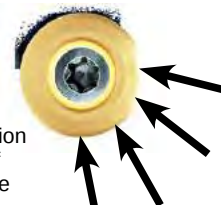
7792VX

- Cutting forces predominantly axial
- Relationship between cutting edge and work piece is at its most stable.
- Results in high feed rates and consistent tool life.



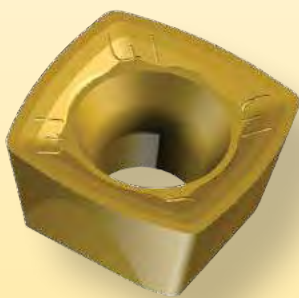
Round Insert Tools

- Tangential forces act around the radius
- Leads to vibration and damage of the cutting edge
- Leads to reduced feed and lower productivity



The 7792VX machines with a constant volume of chip throughout all aspects of producing cavities and produces a side wall that is close to profile.

Round insert tools have increasing chip volume through the process.



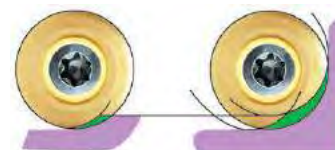
7792VX

- Constant cutting section (chip volume) irrespective of position in cavity.
- Producing a close to profile side wall.
- Near-square side walls possible.



Centre clearance

Side wall



Round insert

- Greater surface contact.
- Increased chip section for side wall machining.
- Vibration in corners.
- Undulating side wall cusps.



CNC Program - Corner Radius Definition

The use of common CAD / CAM systems requires a round insert dimension to be known for cavity machining. This is available with 7792VX cutters as shown to the right and in the reference table.

For finish pass applications:

Wiper Facet for finishing use max. feed 0,80mm/Revolution



Programming Data (mm)			
Insert size (mm)	Radius	R	L
06	0,80	1,37	0,40
09	0,80	2,01	0,73
	1,20	2,27	0,67
12	0,80	2,50	1,02
	1,20	2,73	0,97
16	1,20	4,18	1,46

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter 45mm

Theoretical Diameter for all high feed insert sizes = 45mm

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

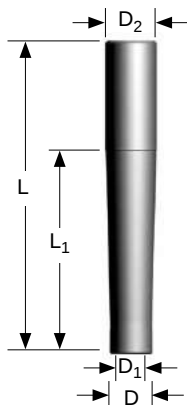
d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

Cylindrical Shank Extensions for Modular Heads

Anti-Vibration Tungsten Alloy with Through Coolant



Shank Extension

Product		Dimensions (mm)					
EDP	Item Description	L	L ₁	D ₂	D	D ₁	M
030624	M-13-M8-CA16-090	90	40	16	13	8,50	M8
030625	M-13-M8-CA16-110	110	60	16	13	8,50	M8
030626	M-13-M8-CA16-130	130	80	16	13	8,50	M8
030627	M-13-M8-CA16-170	170	120	16	13	8,50	M8
030628	M-18-M10-CA20-110	110	60	20	18	10,50	M10
030629	M-18-M10-CA20-130	130	80	20	18	10,50	M10
030630	M-18-M10-CA20-170	170	120	20	18	10,50	M10
030631	M-18-M10-CA20-190	190	140	20	18	10,50	M10
030632	M-21-M12-CA25-131	131	75	25	21	12,50	M12
030633	M-21-M12-CA25-156	156	100	25	21	12,50	M12
030634	M-21-M12-CA25-181	181	125	25	21	12,50	M12
030635	M-21-M12-CA25-206	206	150	25	21	12,50	M12
030636	M-21-M12-CA25-231	231	175	25	21	12,50	M12
030637	M-29-M16-CA32-160	160	100	32	29	17,00	M16
030638	M-29-M16-CA32-210	210	150	32	29	17,00	M16
030639	M-29-M16-CA32-260	260	200	32	29	17,00	M16
030640	M-29-M16-CA32-310	310	250	32	29	17,00	M16

Note: Order example with cylindrical shank: M-13-M8-CA16-090

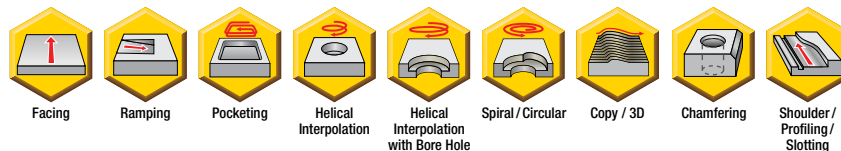


Cylindrical shank extensions can be used with all modular heads found in several product family series within this catalogue.

These extensions have the industry standard of metric threads.

Technical Advice

M	Modular adapter
13	Diameter in front of the modular shank (D)
M8	Metric Thread (M)
CA16	Cylindrical shank diameter 16mm with through coolant
90	Total length of the body



42° LEAD ANGLE - FACE MILLS

7745VOD cutters are designed for machining most materials. Octagonal inserts offer up to eight economical cutting edges.

These cutters are ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Stainless Steel, High Temperature Alloys, Cast Iron and Aluminium Alloys.

7745VOD cutters are also very robust when machining with tool holder extensions.

They are one of the first choice tools for machining component surfaces with scale as well as for machining of irregular stock.

Available in two insert sizes: OD..04 and OD..06. Both sizes are available in cutters with medium and fine tooth pitch, giving maximum efficiency and performance in order to reduce cycle times.

7745VOD

7745VOD04:

Maximum $a_p = 3,50\text{mm}$
 ($a_{p1} \text{ max} = 8\text{mm}$)

Diameter Range = 25mm to 160mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A126.

7745VOD06:

Maximum $a_p = 4,50\text{mm}$
 ($a_{p1} = 10\text{mm}$)

Diameter Range = 50mm to 160mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A130.

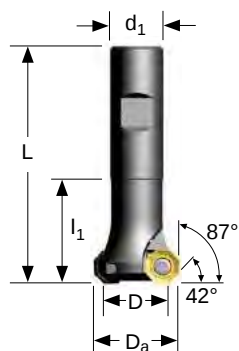


7745VOD04

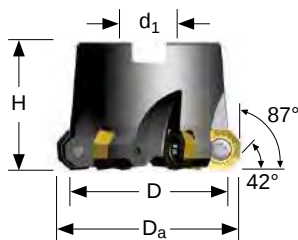
Face Milling Cutter



End Mills & Face Mills



Weldon Shank



Shell Mill Fixation

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	L/H	l1	d1	ap	ap 1 max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7745VOD04 Weldon Shank														
021758	7745VOD04WA025R	25	33	90	40	20	3,50	8,00	2	015270	F4011T	015241	T20	3,10
025379	7745VOD04WA025R095	25	33	145	95	20	3,50	8,00	2	015270	F4011T	015241	T20	3,10
021759	7745VOD04WA032R	32	40	96	40	25	3,50	8,00	3	015270	F4011T	015241	T20	3,10
025380	7745VOD04WA032R095	32	40	151	95	25	3,50	8,00	3	015270	F4011T	015241	T20	3,10
021760	7745VOD04WA040R	40	48	110	50	32	3,50	8,00	4	015270	F4011T	015241	T20	3,10
025381	7745VOD04WA040R095	40	48	165	95	32	3,50	8,00	4	015270	F4011T	015241	T20	3,10
7745VOD04 Shell Mill Fixation - Medium and Fine Pitch														
021754	7745VOD04-A040R	40	48	35	-	16	3,50	8,00	4	015270	F4011T	015241	T20	3,10
021755	7745VOD04-A050R	50	58	40	-	22	3,50	8,00	4	015270	F4011T	015241	T20	3,10
030971	7745VOD04-A050Z5R	50	58	40	-	22	3,50	8,00	5	015270	F4011T	015241	T20	3,10
023058	7745VOD04-A050Z6R	50	58	40	-	22	3,50	8,00	6	015270	F4011T	015241	T20	3,10
021756	7745VOD04-A063R	63	71	40	-	22	3,50	8,00	5	015270	F4011T	015241	T20	3,10
023059	7745VOD04-A063Z7R	63	71	40	-	22	3,50	8,00	7	015270	F4011T	015241	T20	3,10
017907	7745VOD04-A080R	80	88	50	-	27	3,50	8,00	6	015270	F4011T	015241	T20	3,10
023060	7745VOD04-A080Z9R	80	88	50	-	27	3,50	8,00	9	015270	F4011T	015241	T20	3,10
021757	7745VOD04-A100R	100	108	55	-	32	3,50	8,00	7	015270	F4011T	015241	T20	3,10
023061	7745VOD04-A100Z11R	100	108	55	-	32	3,50	8,00	11	015270	F4011T	015241	T20	3,10
023062	7745VOD04-A125R	125	133	63	-	40	3,50	8,00	8	015270	F4011T	015241	T20	3,10
023063	7745VOD04-A125Z12R	125	133	63	-	40	3,50	8,00	12	015270	F4011T	015241	T20	3,10
025382	7745VOD04-160R	160	168	63	-	40	3,50	8,00	10	015270	F4011T	015241	T20	3,10
025383	7745VOD04-160Z15R	160	168	63	-	40	3,50	8,00	15	015270	F4011T	015241	T20	3,10

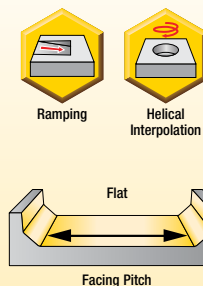
Da* = Outside Diameter



Depth of Cut (ap)

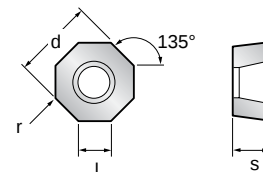

7745VOD04 Technical Information

EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021758	7745VOD04WA025R	25	17.00	46	64	2,00	38500
025379	7745VOD04WA025R095	25	17.00	46	64	2,00	38500
021759	7745VOD04WA032R	32	12.10	60	78	2,00	33200
025380	7745VOD04WA032R095	32	12.10	60	78	2,00	33200
021760	7745VOD04WA040R	40	8.50	76	94	2,00	29200
025381	7745VOD04WA040R095	40	8.50	76	94	2,00	29200
021754	7745VOD04-A040R	40	8.50	76	94	2,00	29200
021755	7745VOD04-A050R	50	6.10	96	114	2,00	25700
030971	7745VOD04-A050Z5R	50	6.10	96	114	2,00	25700
023058	7745VOD04-A050Z6R	50	6.10	96	114	2,00	25700
021756	7745VOD04-A063R	63	4.30	122	140	2,00	22700
023059	7745VOD04-A063Z7R	63	4.30	122	140	2,00	22700
017907	7745VOD04-A080R	80	3.00	156	174	2,00	20000
023060	7745VOD04-A080Z9R	80	3.00	156	174	2,00	20000
021757	7745VOD04-A100R	100	2.40	196	214	2,00	17700
023061	7745VOD04-A100Z11R	100	2.40	196	214	2,00	17700
023062	7745VOD04-A125R	125	2.00	246	264	2,00	15700
023063	7745VOD04-A125Z12R	125	2.00	246	264	2,00	15700
025382	7745VOD04-160R	160	1.40	316	334	2,00	14000
025383	7745VOD04-160Z15R	160	1.40	316	334	2,00	14000



7745V0D04

Milling Inserts



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 3,50	a _p min. - max. 1,00 - 2,00	a _p min. - max. 0,20 - 1,00					
024911	ODET0404APFN-441	GH1	◆	◆	◆	12,70	4,00	4,76	Facet	0,02
022198	ODET0404APEN-44	X500	-	-	●●●■	12,70	4,00	4,76	Facet	0,04
031470	ODET0404APEN-44	SP6519	-	-	■●●◆●◆	12,70	4,00	4,76	Facet	0,04
022199	ODET0404APEN-44	MP91M	-	-	◆●■	12,70	4,00	4,76	Facet	0,04
022061	ODMT0404APEN-41	X500	-	●●	-	12,70	4,00	4,76	Facet	0,06
031472	ODMT0404APEN-41	SP6519	-	◆●●	-	12,70	4,00	4,76	Facet	0,06
017775	ODMT0404APEN-41	MP91M	-	■●■	-	12,70	4,00	4,76	Facet	0,06
030768	ODMT040408EN-412	X500	-	●■	-	12,70	4,00	4,76	0,80	0,06
030769	ODMT040408EN-412	X700	-	◆◆●	-	12,70	4,00	4,76	0,80	0,06
031540	ODMT040408EN-412	SP6519	-	■●◆	-	12,70	4,00	4,76	0,80	0,06
015143	ODMT040408EN-41	X500	■◆◆	-	-	12,70	4,00	4,76	0,80	0,06
030330	ODMT040408EN-41	X700	●●●	◆◆●	-	12,70	4,00	4,76	0,80	0,06
031471	ODMT040408EN-41	SP6519	●◆■	-	-	12,70	4,00	4,76	0,80	0,06
017303	ODMT040408EN-41	MP91M	●	-	-	12,70	4,00	4,76	0,80	0,06
027884	ODEW0404APTR-RA	SC3025	-	◆	◆	12,70	4,00	4,76	Wiper Facet	0,19
017672	ODMW040408SN	X500	■●●	-	-	12,70	4,00	4,76	0,80	0,27
031462	ODMW040408SN	SP6519	■◆	-	-	12,70	4,00	4,76	0,80	0,27
017304	ODMW040408SN	MP91M	◆●■	-	-	12,70	4,00	4,76	0,80	0,27
029096	ODMW040408SN	SC3025	◆	-	-	12,70	4,00	4,76	0,80	0,27

-Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

ODMW040408SN X500 should be generally used for heavy duty applications as well as Stainless Steel and High Temperature Alloys with heavy scale.

ODMT040408EN-41 X700 should be used for Stainless Steel and High Temperature Alloys when a stronger cutting edge is required.

Note: Feed recommendations can be found on page A81. Speed recommendations can be found on page A85.




7745VOD04 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
FN-441	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,25	-	-	-	-	-	-
EN-44	X500	Facing	0,06 - 0,30	0,06 - 0,27	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP6519	Facing	0,06 - 0,30	0,06 - 0,27	0,06 - 0,25	0,06 - 0,20	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	MP91M	Facing	0,06 - 0,30	0,06 - 0,27	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
APEN-41	X500	Facing	0,06 - 0,35	0,06 - 0,32	-	-	-	-	-	-	-	-	-	-	-	-	-
APEN-41	SP6519	Facing	0,06 - 0,35	0,06 - 0,32	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
APEN-41	MP91M	Facing	0,06 - 0,35	0,06 - 0,32	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
EN-412	X500	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-412	X700	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-412	SP6519	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-41	X500	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	X700	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP6519	Facing	0,06 - 0,35	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	MP91M	Facing	-	-	-	-	0,06 - 0,35	0,06 - 0,35	0,06 - 0,35	-	-	-	-	-	-	-	-
TR-RA	SC3025	Facing	-	-	-	-	0,19 - 0,35	0,19 - 0,35	0,19 - 0,35	-	-	-	-	-	-	-	-
SN	X500	Facing	-	0,32 - 0,50	0,30 - 0,40	-	-	-	-	-	-	0,20 - 0,30	0,20 - 0,30	0,20 - 0,30	0,20 - 0,33	-	-
SN	SP6519	Facing	0,32 - 0,55	0,32 - 0,50	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	MP91M	Facing	0,32 - 0,55	0,32 - 0,50	-	-	0,32 - 0,50	0,32 - 0,50	0,32 - 0,50	-	-	-	-	-	-	-	-
SN	SC3025	Facing	-	-	-	-	0,32 - 0,50	0,32 - 0,50	0,32 - 0,50	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

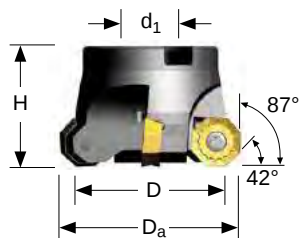
Speed recommendations can be found on page A85.

7745VOD06

Face Milling Cutter



End Mills & Face Mills



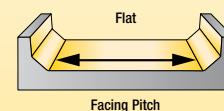
Shell Mill Fixation

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	L/H	l1	d1	ap	ap 1 max	No. of Teeth	EDP		EDP		Screw Tightening nm
7745VOD06 Shell Mill Fixation - Medium and Fine Pitch														
026581	7745VOD06-A050R	50	60	40	-	22	4,50	10	4	015270	F4011T	015241	T20	3,10
026582	7745VOD06-A063R	63	73	40	-	22	4,50	10	5	015270	F4011T	015241	T20	3,10
026583	7745VOD06-A080R	80	90	50	-	27	4,50	10	6	015270	F4011T	015241	T20	3,10
027911	7745VOD06-A080Z08R	80	90	50	-	27	4,50	10	8	015270	F4011T	015241	T20	3,10
026584	7745VOD06-A100R	100	110	55	-	32	4,50	10	7	015270	F4011T	015241	T20	3,10
027876	7745VOD06-A100Z09R	100	110	55	-	32	4,50	10	9	015270	F4011T	015241	T20	3,10
026585	7745VOD06-A125R	125	135	63	-	40	4,50	10	8	015270	F4011T	015241	T20	3,10
027877	7745VOD06-A125Z11R	125	135	63	-	40	4,50	10	11	015270	F4011T	015241	T20	3,10
026586	7745VOD06-160R	160	170	63	-	40	4,50	10	10	015270	F4011T	015241	T20	3,10
027878	7745VOD06-160Z14R	160	170	63	-	40	4,50	10	14	015270	F4011T	015241	T20	3,10

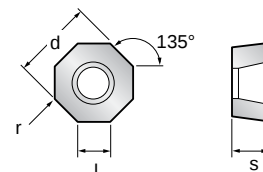
Da* = Outside Diameter

7745VOD06 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
026581	7745VOD06-A050R	50	6.00	94	118	2,60	18000
026582	7745VOD06-A063R	63	4.60	120	144	2,60	15600
026583	7745VOD06-A080R	80	3.30	154	178	2,60	13700
027911	7745VOD06-A080Z08R	80	3.30	154	178	2,60	13700
026584	7745VOD06-A100R	100	2.60	194	218	2,60	12100
027876	7745VOD06-A100Z09R	100	2.60	194	218	2,60	12100
026585	7745VOD06-A125R	125	2.00	244	268	2,60	10700
027877	7745VOD06-A125Z11R	125	2.00	244	268	2,60	10700
026586	7745VOD06-160R	160	1.50	314	338	2,60	9500
027878	7745VOD06-160Z14R	160	1.50	314	338	2,60	9500



Depth of Cut (ap)



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 4,50	ap min. - max. 1,00 - 2,00	ap min. - max. 0,20 - 1,00					
026588	ODET0605APFN-441	GH1	◆	◆	◆	16,00	6,00	5,55	Facet	0,02
026592	ODET0605APEN-44	X500	-	-	●●●●●	16,00	6,00	5,55	Facet	0,04
031501	ODET0605APEN-44	SP6519	-	-	◆◆■●●	16,00	6,00	5,55	Facet	0,04
034513	ODET0605APEN-44	SP4019	-	-	◆◆◆	16,00	6,00	5,55	Facet	0,04
026591	ODET0605APEN-44	MP91M	-	-	◆◆■	16,00	6,00	5,55	Facet	0,04
026590	ODMT0605APEN-41	X500	●●◆	●●●●●	-	16,00	6,00	5,55	Facet	0,06
031502	ODMT0605APEN-41	SP6519	■●●	◆◆■●●	-	16,00	6,00	5,55	Facet	0,06
034514	ODMT0605APEN-41	SP4019	◆◆◆	◆◆◆	-	16,00	6,00	5,55	Facet	0,06
026589	ODMT0605APEN-41	MP91M	-	◆◆■	-	16,00	6,00	5,55	Facet	0,06
027885	ODEW0605APTR-RA	SC3025	-	◆	◆	16,00	6,00	5,55	Facet	0,19
026596	ODMW060512TN	X500	●●●●●	-	-	16,00	6,00	5,55	1,20	0,17
031503	ODMW060512TN	SP6519	■◆	-	-	16,00	6,00	5,55	1,20	0,17
034515	ODMW060512TN	SP4019	●●●	-	◆	16,00	6,00	5,55	1,20	0,17
026595	ODMW060512TN	MP91M	◆◆■●	-	-	16,00	6,00	5,55	1,20	0,17
025838	ODMW060512SN	X500	●●	-	-	16,00	6,00	5,55	1,20	0,27
031483	ODMW060512SN	SP6519	■◆	-	-	16,00	6,00	5,55	1,20	0,27
025836	ODMW060512SN	MP91M	◆◆■	-	-	16,00	6,00	5,55	1,20	0,27
029097	ODMW060512SN	SC3025	◆	-	-	16,00	6,00	5,55	1,20	0,27

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

ODMW060512SN should be generally used for heavy duty applications.
 ODMW060512TN X500 and SP4019 should be used in Stainless Steel and High Temperature Alloys with heavy scale.
 ODMW060512TN should also be used when the machine tool has less power available.

Note: Feed recommendations can be found on page A84. Speed recommendations can be found on page A85.



7745VOD06

Recommended Feeds

**7745VOD06 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
FN-441	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,25	-	-	-	-	-	-
EN-44	X500	Facing	0,06 - 0,35	0,06 - 0,30	0,06 - 0,27	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP6519	Facing	0,06 - 0,35	0,06 - 0,30	0,06 - 0,27	0,06 - 0,20	0,06 - 0,30	0,06 - 0,30	0,06 - 0,30	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP4019	Facing	-	-	0,06 - 0,27	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	MP91M	Facing	0,06 - 0,35	0,06 - 0,27	-	-	0,06 - 0,30	0,06 - 0,30	0,06 - 0,30	-	-	-	-	-	-	-	-
EN-41	X500	Facing	0,06 - 0,38	0,06 - 0,35	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP6519	Facing	0,06 - 0,38	0,06 - 0,35	0,06 - 0,35	0,06 - 0,30	0,06 - 0,38	0,06 - 0,38	0,06 - 0,35	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP4019	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	MP91M	Facing	0,06 - 0,38	0,06 - 0,35	-	-	0,06 - 0,38	0,06 - 0,38	0,06 - 0,35	-	-	-	-	-	-	-	-
TR-RA	SC3025	Facing	-	-	-	-	0,19 - 0,40	0,19 - 0,40	0,19 - 0,40	-	-	-	-	-	-	-	-
TN	X500	Facing	0,24 - 0,55	0,24 - 0,50	0,24 - 0,40	0,24 - 0,32	-	-	-	-	-	0,17 - 0,25	0,17 - 0,25	0,17 - 0,25	0,20 - 0,28	-	-
TN	SP6519	Facing	0,24 - 0,55	0,24 - 0,50	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	SP4019	Facing	-	-	0,24 - 0,40	0,24 - 0,32	-	-	-	-	-	0,17 - 0,25	0,17 - 0,25	0,17 - 0,25	0,20 - 0,28	0,05 - 0,10	0,05 - 0,12
TN	MP91M	Facing	0,24 - 0,55	0,24 - 0,50	-	-	0,17 - 0,50	0,17 - 0,50	0,17 - 0,50	-	-	-	-	-	-	-	-
SN	X500	Facing	0,32 - 0,60	0,32 - 0,55	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	SP6519	Facing	0,32 - 0,60	0,32 - 0,55	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	MP91M	Facing	0,32 - 0,55	0,32 - 0,55	-	-	0,32 - 0,55	0,32 - 0,55	0,32 - 0,55	-	-	-	-	-	-	-	-
SN	SC3025	Facing	-	-	-	-	0,32 - 0,55	0,32 - 0,55	0,32 - 0,55	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A85.



Speed v_c (m/min)																								
7745VOD Series			Wear Resistance																					
			-  +																					
			Speed min. - max.																					
Coolant Recommendation																								
Recommended ● Possible ◎																								
ISO	Materials	Rm and Hardness			CVD X Grade			PVD X Grade			PVD Standard			PVD Standard			CVD Standard			CVD Standard			Uncoated Micrograin	
					X500			X700			SP6519			SP4019			MP91M			SC3025			GH1	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	130 - 270				◎	●	130 - 295				●		140 - 345							
		<950 N/mm ² <280 HBN			115 - 240						115 - 260						120 - 205							
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	100 - 210				◎	●	100 - 230				●		105 - 270							
		950-1200 N/mm ² 280-355 HBN			75 - 160						75 - 175						80 - 205							
		1200-1400 N/mm ² 355-415 HBN		●	50 - 100					●	50 - 110				●		50 - 130							
M	Stainless Steel	Austenitic + Ferritic 300 series	◎	●	115 - 250	◎	●	115 - 260	◎	●	115 - 270	◎	●	120 - 280										
		Martensitic 400 series			100 - 220			105 - 230			105 - 235			110 - 250										
	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120	●		50 - 130										
K	Cast Iron	Grey GG-Ft									140 - 295						145 - 365			150 - 395				
		Spheroidal-Ductile GGG-FGS							◎	●	110 - 240			●		115 - 285	●		120 - 335					
		Malleable GTS - MN/MP									100 - 220					105 - 260			105 - 275					
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																			●		400 - 3050	
		Aluminium + Silicon > 16% Si 92 HBN																					295 - 2440	
S	High Temperature Alloys	Iron Based			23 - 48			23 - 52			23 - 55			24 - 63										
		Cobalt Based		●	21 - 44		●	22 - 46		●	22 - 48		●	23 - 52										
		Nickel Based			24 - 51			25 - 53			25 - 55			26 - 59										
		Titanium Based			35 - 73			36 - 75			36 - 79			37 - 84										
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN											50 - 100			50 - 105								
		Chilled Cast Iron >1400 N/mm ² > 400 HBN									●		●	40 - 90			40 - 95							



775VOD Technical Information

Feed rate compensation: For 42° cutting, divide the h_m value by the sine of the approach angle (the sine of 42° = 0,669)

i.e.: $\frac{h_m}{0,669}$ or $\frac{0,08mm}{0,669} = 0,12mm$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



45° LEAD ANGLE – FACE MILLS

7745VS cutters are designed for machining Tool Steel and Cast Iron. They feature exceptionally thick square inserts and are ideal for tough cutting conditions. The upper edge of the insert does not rest against a pocket allowing for recessing operations.

Ideal for roughing, semi-finishing and finishing. These cutters are a very good choice for machining surfaces with heavy scale and are also ideal for machining surfaces with irregular stock.

This family is available in two different insert sizes: SC..09 and SC..12

7745 cutters using 12mm inserts with 5mm thickness are able to cover irregular surfaces up to 7mm a_p . With its 0° axial and a radial negative rake angle this cutter has an excellent chip evacuation particularly when using the full depth of cut capacity.

The smaller cutter series with 9mm inserts are ideal for facing small areas and chamfering any style component.

7745VS

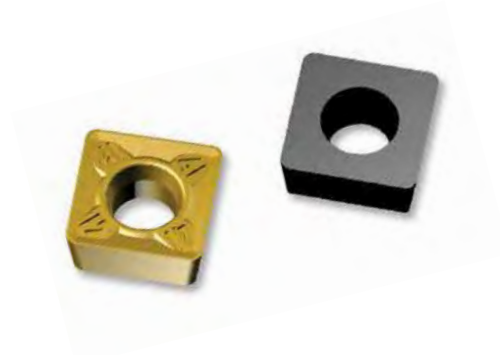
7745VS09:

Maximum a_p = 5mm
 Diameter Range = 16mm to 25mm

7745VS12:

Maximum a_p = 7mm
 Diameter Range = 40mm to 125mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A136.

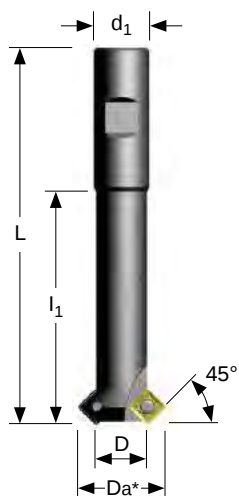


7745VS09

Face Milling and Chamfering Cutter



End Mills & Face Mills

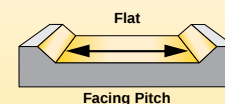
**Weldon Shank**

Product		Dimensions (mm)							Spares				
EDP	Item Description	D	Da*	L/H	L ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm.
7745VS09 Weldon Shank													
021762	7745VS09WA016R085	16	27	135	85	16	5,00	2	015262	D4010T	015240	T15	3,10
021763	7745VS09WA020R085	20	31	135	85	20	5,00	2	015262	D4010T	015240	T15	3,10
021764	7745VS09WA025R095	25	36	150	95	25	5,00	3	015262	D4010T	015240	T15	3,10

Da* = Outside Diameter

7745VS09 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021762	7745VS09WA016R085	16	-	-	-	-	56500
021763	7745VS09WA020R085	20	-	-	-	-	50500
021764	7745VS09WA025R095	25	-	-	-	-	45200

**Depth of Cut (a_p)**



SCMT09-E



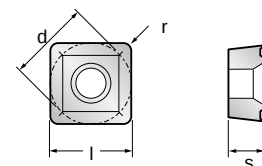
SCMT09-41



SCMT09-T

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 5,00	a _p min - max 1,00 - 2,50	a _p min - max -					
018186	SCMT09T308E	GH1	-	●	-	9,52	9,52	3,97	0,80	0,03
015147	SCMT09T308EN-41	X500	-	●●●◆	-	9,52	9,52	3,97	0,80	0,04
031474	SCMT09T308EN-41	SP6519	-	◆◆◆◆□◆	-	9,52	9,52	3,97	0,80	0,04
017315	SCMT09T308EN-41	MP91M	-	■□■●	-	9,52	9,52	3,97	0,80	0,04
034550	SCMT09T308T	X400	◆◆	◆	-	9,52	9,52	3,97	0,80	0,15
031568	SCMT09T308T	SP6519	■□◆◆□◆	-	-	9,52	9,52	3,97	0,80	0,15
034551	SCMT09T308T	SP4019	◆◆■	■	-	9,52	9,52	3,97	0,80	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.



End Mills & Face Mills

7745VS09 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E	GH1	Facing / Chamfering	-	-	-	-	0,05 - 0,10	0,05 - 0,10	-	-	-	-	-	-	-	-	-
EN-41	X500	Facing / Chamfering	0,12 - 0,30	0,12 - 0,25	0,12 - 0,26	0,12 - 0,23	-	-	-	-	-	-	-	-	-	-	-
EN-41	SP6519	Facing / Chamfering	0,12 - 0,30	0,12 - 0,25	0,12 - 0,26	0,12 - 0,23	0,12 - 0,30	0,12 - 0,30	0,12 - 0,25	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing / Chamfering	0,12 - 0,30	0,12 - 0,22	-	-	0,12 - 0,30	0,12 - 0,30	0,12 - 0,25	-	-	-	-	-	-	0,05 - 0,08	0,05 - 0,10
T	X400	Facing / Chamfering	0,12 - 0,33	0,12 - 0,30	-	-	-	-	-	-	-	-	-	-	-	0,05 - 0,08	0,05 - 0,10
T	SP6519	Facing / Chamfering	0,12 - 0,30	0,12 - 0,18	0,12 - 0,28	0,12 - 0,25	0,12 - 0,33	0,12 - 0,33	0,12 - 0,30	-	-	-	-	-	-	-	-
T	SP4019	Facing / Chamfering	-	-	0,12 - 0,28	0,12 - 0,25	0,12 - 0,33	0,12 - 0,33	0,12 - 0,30	-	-	-	-	-	-	0,05 - 0,07	0,05 - 0,10

Note: HTA = High Temperature Alloys

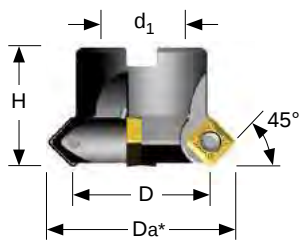
Note: Speed recommendations can be found on page A93.

7745VS12

Face Milling Cutter



End Mills & Face Mills

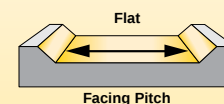
**Shell Mill Fixation**

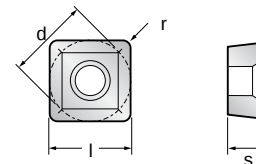
Product		Dimensions (mm)							Spares				
EDP	Item Description	D	Da*	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm.
7745VS12 Shell Mill Fixation													
021765	7745VS12-A040R	40	55	32	-	16	7,00	4	015266	D5013T	015241	T20	6,00
021766	7745VS12-A050R	50	65	40	-	22	7,00	4	015266	D5013T	015241	T20	6,00
021767	7745VS12-A063R	63	78	40	-	22	7,00	5	015266	D5013T	015241	T20	6,00
021768	7745VS12-A080R	80	95	50	-	27	7,00	6	015266	D5013T	015241	T20	6,00
021769	7745VS12-A100R	100	115	50	-	32	7,00	7	015266	D5013T	015241	T20	6,00
021770	7745VS12-A125R	125	140	63	-	40	7,00	8	015266	D5013T	015241	T20	6,00

Da* = Outside Diameter

7745VS12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021765	7745VS12-A040R	40	-	-	-	-	28100
021766	7745VS12-A050R	50	-	-	-	-	25100
021767	7745VS12-A063R	63	-	-	-	-	22300
021768	7745VS12-A080R	80	-	-	-	-	20000
021769	7745VS12-A100R	100	-	-	-	-	17700
021770	7745VS12-A125R	125	-	-	-	-	16000

**Depth of Cut (a_p)**



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade				d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 7,00	a _p min - max 1,00 - 3,50	a _p min - max 0,20 - 1,00					
Insert selection with facet										
017312	SCCT12M5ACER	MP91M	-			12,70	12,70	5,00	Facet	0,03
034591	SCCT12M5ACTR	X400				12,70	12,70	5,00	Facet	0,15
034552	SCCT12M5ACTR	SP4019				12,70	12,70	5,00	Facet	0,15
017695	SCCT12M5ACTR	GH1	-	-		12,70	12,70	5,00	Facet	0,15
017698	SCHT12M5ACTN	X500				12,70	12,70	5,00	Facet	0,15
031504	SCHT12M5ACTN	SP6519				12,70	12,70	5,00	Facet	0,15
017313	SCHT12M5ACTN	MP91M				12,70	12,70	5,00	Facet	0,15
015144	SCKT12M5ACSN-41	X500		-	-	12,70	12,70	5,00	Facet	0,12
031556	SCKT12M5ACSN-41	SP6519		-	-	12,70	12,70	5,00	Facet	0,12
017314	SCKT12M5ACSN-41	MP91M		-	-	12,70	12,70	5,00	Facet	0,12
Insert selection with corner radius										
015226	SCMT12M512EN-41	X500	-		-	12,70	12,70	5,00	1,20	0,06
031475	SCMT12M512EN-41	SP6519	-		-	12,70	12,70	5,00	1,20	0,06
017317	SCMT12M512EN-41	MP91M	-		-	12,70	12,70	5,00	1,20	0,06
034554	SCMT12M512T	X400		-	-	12,70	12,70	5,00	1,20	0,15
024129	SCMT12M512T	X500		-	-	12,70	12,70	5,00	1,20	0,15
034555	SCMT12M512T	SP6519		-	-	12,70	12,70	5,00	1,20	0,15
034553	SCMT12M512T	SP4019		-	-	12,70	12,70	5,00	1,20	0,15
017316	SCMT12M512T	MP91M		-	-	12,70	12,70	5,00	1,20	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SCMT12M512EN-41 and SCMT12M512T with radius are only for semi roughing application where a finished surface is not required.

Note: Feed recommendations can be found on page A92. Speed recommendations can be found on page A93.



7745VS12

Recommended Feeds

**7745VS12 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm² >1400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert selection with facet																	
ER	MP91M	Facing	0.05 - 0.25	0.05 - 0.23	-	-	0.05 - 0.25	0.05 - 0.25	0.05 - 0.23	-	-	-	-	-	-	-	-
TR	X400	Facing	0.15 - 0.50	0.12 - 0.45	-	-	-	-	-	-	-	-	-	-	-	0.06 - 0.10	0.08 - 0.10
TR	SP4019	Facing	-	-	0.12 - 0.33	0.12 - 0.22	0.15 - 0.36	0.15 - 0.36	0.15 - 0.36	-	-	-	-	-	-	0.06 - 0.10	0.08 - 0.10
TR	GH1	Facing	-	-	-	-	0.15 - 0.30	0.15 - 0.30	0.15 - 0.25	-	-	-	-	-	-	-	-
Insert selection with flat																	
TN	X500	Facing	-	-	0.15 - 0.33	0.15 - 0.22	-	-	-	-	-	-	-	-	-	-	-
TN	SP6519	Facing	0.15 - 0.45	0.15 - 0.40	0.15 - 0.33	0.15 - 0.22	0.15 - 0.36	0.15 - 0.36	0.15 - 0.36	-	-	-	-	-	-	-	-
TN	MP91M	Facing	0.15 - 0.40	0.15 - 0.35	-	-	0.12 - 0.40	0.12 - 0.40	0.12 - 0.40	-	-	-	-	-	-	0.06 - 0.10	0.08 - 0.10
Insert selection with chamfer																	
SN-41	X500	Facing	-	-	-	0.12 - 0.22	-	-	-	-	-	-	-	-	-	-	-
SN-41	SP6519	Facing	0.12 - 0.40	0.12 - 0.38	0.12 - 0.33	-	-	-	-	-	-	-	-	-	-	-	-
SN-41	MP91M	Facing	-	-	-	-	0.12 - 0.40	0.12 - 0.40	0.12 - 0.40	-	-	-	-	-	-	-	-
Insert selection with corner radius																	
EN-41	X500	Facing	-	-	0.06 - 0.30	0.06 - 0.20	0.06 - 0.30	0.06 - 0.25	-	-	-	-	-	-	-	-	-
EN-41	SP6519	Facing	0.06 - 0.30	0.06 - 0.28	0.06 - 0.30	0.06 - 0.20	0.06 - 0.30	0.06 - 0.25	0.06 - 0.25	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing	0.06 - 0.30	0.06 - 0.28	-	-	0.06 - 0.30	0.12 - 0.25	0.06 - 0.25	-	-	-	-	-	-	-	-
Insert selection with fillet																	
T	X400	Facing	0.15 - 0.38	0.15 - 0.35	-	-	-	-	-	-	-	-	-	-	-	-	-
T	X500	Facing	-	-	0.15 - 0.30	0.15 - 0.20	-	-	-	-	-	-	-	-	-	-	-
T	SP6519	Facing	0.15 - 0.35	0.15 - 0.33	0.15 - 0.30	0.15 - 0.20	0.12 - 0.36	0.12 - 0.36	0.12 - 0.36	-	-	-	-	-	-	-	-
T	SP4019	Facing	-	-	0.12 - 0.30	0.12 - 0.20	0.12 - 0.36	0.12 - 0.36	0.12 - 0.36	-	-	-	-	-	-	-	-
T	MP91M	Facing	0.12 - 0.38	0.12 - 0.32	-	-	0.12 - 0.36	0.12 - 0.36	0.12 - 0.36	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A93.



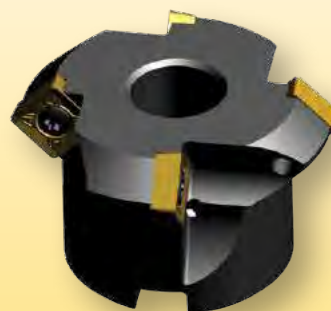
Speed v_c (m/min)														
7745VS Series			Wear Resistance											
			- ← → +											
			Speed min. - max.											
Coolant Recommendation														
Recommended ● Possible ○														
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD Standard		PVD Standard		CVD Standard		Uncoated Micrograin	
			⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	○	●	○	●			○	●		
		<950 N/mm ² <280 HBN												
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	○	●	○	●			○	●		
		950-1200 N/mm ² 280-355 HBN												
		1200-1400 N/mm ² 355-415 HBN		●		●		●			●			
M	Stainless Steel	Austenitic + Ferritic 300 series			○	●	○	●	○	●				
		Martensitic 400 series												
	PH Stainless	Refractory P.H.			●		●		●					
K	Cast Iron	Grey GG-Fl												
		Spheroidal-Ductile GGG-FGS		○	●	○	●		●		●		○	●
		Malleable GTS - MN/MP												
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN												
		Aluminium + Silicon > 16% Si 92 HBN												
S	High Temperature Alloys	Iron Based												
		Cobalt Based												
		Nickel Based												
		Titanium Based												
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●						●		●			
		Chilled Cast Iron >1400 N/mm ² > 400 HBN												



7745VS Technical Information

Feed rate compensation: For 45° cutting, divide the h_m value by the sine of the approach angle (the sine of 45° = 0,707)

i.e.: $\frac{h_m}{0,707}$ or $\frac{0,08}{0,707} = 0,11\text{mm}$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



45° LEAD ANGLE - FACE MILLS

7745VSE cutters are designed for Stainless Steels and High Temperature Alloys. Square inserts with a 15 degree clearance are used for reducing edge build-up.

7745VSE series are especially designed for roughing, semi-finishing and finishing of Stainless Steel and High Temperature Alloys. Also suitable for machining Aluminium.

This cutter series has an excellent smooth cutting action and requires low power. They are also perfect for unstable conditions.

Available in two different insert sizes: SD..09 and SD..12.



7745VSE

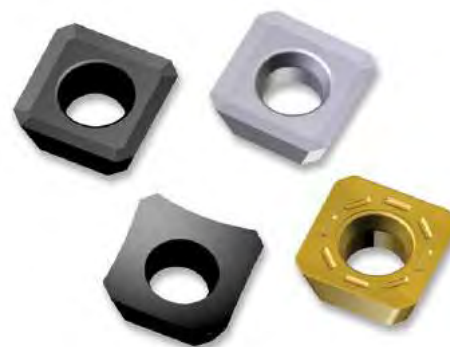
7745VSE09:

Maximum $a_p = 5,00\text{mm}$
 Diameter Range = 16mm to 125mm
 Available in medium and fine pitch.

7745VSE12:

Maximum $a_p = 7,00\text{mm}$
 Diameter Range = 50mm to 125mm
 Available in medium pitch only.

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A142.

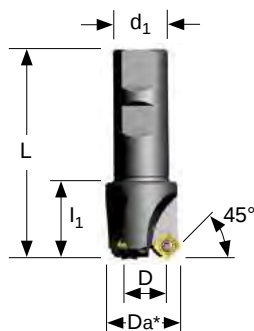


7745VSE09

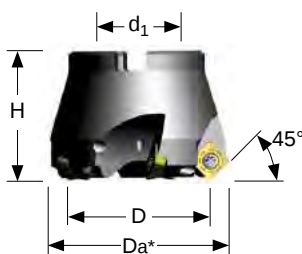
Face Milling Cutter



End Mills & Face Mills



Weldon Shank



Shell Mill Fixation

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	L/H	l1	d1	ap max	Max. plunging depth	No. of Teeth	EDP		EDP		Screw Tightening Nm
7745VSE09 Weldon Shank														
021783	7745VSE09WA016Z2R	16	27	75	22	16	5,00	4,00	2	015269	F3508T	015240	T15	2,10
021784	7745VSE09WA020Z2R	20	31	82	28	20	5,00	4,00	2	015269	F3508T	015240	T15	2,10
021785	7745VSE09WA025Z3R	25	36	96	35	25	5,00	4,00	3	015269	F3508T	015240	T15	2,10
021786	7745VSE09WA032Z3R	32	43	100	35	32	5,00	4,00	3	015269	F3508T	015240	T15	2,10
7745VSE09 Shell Mill Fixation - Medium and Fine Pitch														
021771	7745VSE09-A032Z4R	32	43	30	-	13	5,00	4,00	4	015064	F3510T	015240	T15	2,10
021772	7745VSE09-A040Z5R	40	51	40	-	16	5,00	4,00	5	015064	F3510T	015240	T15	2,10
021773	7745VSE09-A050Z5R	50	61	42	-	22	5,00	4,00	5	015064	F3510T	015240	T15	2,10
021774	7745VSE09-A050Z6R	50	61	42	-	22	5,00	4,00	6	015064	F3510T	015240	T15	2,10
021775	7745VSE09-A063Z5R	63	74	42	-	22	5,00	4,00	5	015064	F3510T	015240	T15	2,10
021776	7745VSE09-A063Z7R	63	74	42	-	22	5,00	4,00	7	015064	F3510T	015240	T15	2,10
021777	7745VSE09-A080Z6R	80	91	52	-	27	5,00	4,00	6	015064	F3510T	015240	T15	2,10
021778	7745VSE09-A080Z9R	80	91	52	-	27	5,00	4,00	9	015064	F3510T	015240	T15	2,10
021779	7745VSE09-A100Z7R	100	111	52	-	32	5,00	4,00	7	015064	F3510T	015240	T15	2,10
021780	7745VSE09-A100Z11R	100	111	52	-	32	5,00	4,00	11	015064	F3510T	015240	T15	2,10
021781	7745VSE09-A125Z8R	125	136	63	-	40	5,00	4,00	8	015064	F3510T	015240	T15	2,10

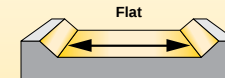
Da* = Outside Diameter

7745VSE09 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021783	7745VSE09WA016Z2R	16	24.60	-	-	3,00	50700
021784	7745VSE09WA020Z2R	20	17.90	-	-	3,00	41600
021785	7745VSE09WA025Z3R	25	13.00	-	-	3,00	41000
021786	7745VSE09WA032Z3R	32	8.90	-	-	3,00	36400
021771	7745VSE09-A032Z4R	32	8.90	-	-	3,00	36400
021772	7745VSE09-A040Z5R	40	6.75	-	-	3,00	32500
021773	7745VSE09-A050Z5R	50	5.10	-	-	3,00	29200
021774	7745VSE09-A050Z6R	50	5.10	-	-	3,00	29200
021775	7745VSE09-A063Z5R	63	4.00	-	-	3,00	26000
021776	7745VSE09-A063Z7R	63	4.00	-	-	3,00	26000
021777	7745VSE09-A080Z6R	80	3.00	-	-	3,00	23100
021778	7745VSE09-A080Z9R	80	3.00	-	-	3,00	23100
021779	7745VSE09-A100Z7R	100	2.35	-	-	3,00	20600
021780	7745VSE09-A100Z11R	100	2.35	-	-	3,00	20600
021781	7745VSE09-A125Z8R	125	1.85	-	-	3,00	18500



Ramping



Flat

Facing Pitch



Depth of Cut (ap)



SDDEX09-701



SDCT09



SDHT09-421



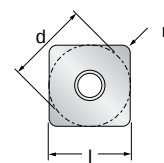
SDHT09-422



SDKT09-45



SDHW09



End Mills & Face Mills

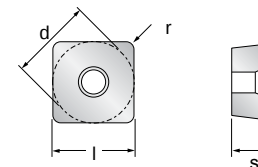
Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 5,00	ap min. - max. 1,00 - 2,50	ap min. - max. 0,20 - 1,00					
Insert selection with facet										
015148	SDEX09T3AEFN-701	GH1	◆	◆	◆	9,52	9,52	3,97	Facet	0,02
034519	SDEX09T3AEFN-701	SP4019	●	●	■ ■ ■ ◆	9,52	9,52	3,97	Facet	0,02
017242	SDCT09T3AEFN	GH1	■	■	■	9,52	9,52	3,97	Facet	0,02
031246	SDCT09T3AEEN	SP4019	-	-	◆ ◆ ● ■ ●	9,52	9,52	3,97	Facet	0,04
015186	SDHT09T3AEEN-421	X500	-	● ◆	● ●	9,52	9,52	3,97	Facet	0,03
031476	SDHT09T3AEEN-421	SP6519	-	● ■	◆ ◆ ● ● ■ ●	9,52	9,52	3,97	Facet	0,03
017320	SDHT09T3AEEN-421	MP91M	-	-	■ ■ ◆ ■	9,52	9,52	3,97	Facet	0,03
030766	SDHT09T3AEEN-422	X500	-	■ ◆ ●	-	9,52	9,52	3,97	Facet	0,05
030890	SDHT09T3AEEN-422	SP6519	-	■ ◆ ◆ ■ ●	-	9,52	9,52	3,97	Facet	0,05
026602	SDKT09T3AEEN-45	X500	■ ◆ ◆	-	-	9,52	9,52	3,97	Facet	0,05
031481	SDKT09T3AEEN-45	SP6519	● ● ◆ ■	● ■ ●	-	9,52	9,52	3,97	Facet	0,05
026600	SDKT09T3AEEN-45	MP91M	●	◆ ● ■	-	9,52	9,52	3,97	Facet	0,05
015231	SDHW09T3AETN	X500	● ● ●	-	-	9,52	9,52	3,97	Facet	0,10
031575	SDHW09T3AETN	SP6519	■ ◆ ● ● ■	-	-	9,52	9,52	3,97	Facet	0,10
017323	SDHW09T3AETN	MP91M	◆ ■ ●	-	■	9,52	9,52	3,97	Facet	0,10

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SDHW09T3AETN should be used in Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable.

Note: Feed recommendations can be found on page A99. Speed recommendations can be found on page A104.





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 5,00	ap min. - max. 1,00 - 2,50	ap min. - max. 0,20 - 1,00					
Insert selection with corner radius										
017725	SDET09T308FN	GH1	◆	◆	◆	9,52	9,52	3,97	0,80	0,02
034520	SDET09T308EN	SP6519	-	-	◆◆◆◆◆	9,52	9,52	3,97	0,80	0,03
031261	SDHT09T308EN-422	X500	◆◆◆	◆◆◆	◆◆◆◆◆	9,52	9,52	3,97	0,80	0,05
033075	SDHT09T308EN-422	SP6519	◆◆◆	◆◆◆	-	9,52	9,52	3,97	0,80	0,05
031260	SDHT09T308EN-423	X500	◆◆◆	◆◆◆	-	9,52	9,52	3,97	0,80	0,05
033074	SDHT09T308EN-423	SP6519	◆◆◆	◆◆◆	-	9,52	9,52	3,97	0,80	0,05
014410	SDMT09T308EN-41	X500	◆◆◆	◆◆◆◆◆	-	9,52	9,52	3,97	0,80	0,04
031479	SDMT09T308EN-41	SP6519	◆◆	◆◆◆	-	9,52	9,52	3,97	0,80	0,04
017325	SDMT09T308EN-41	MP91M	◆◆	◆◆◆	-	9,52	9,52	3,97	0,80	0,04
015232	SDMW09T308TN	X500	◆◆	-	-	9,52	9,52	3,97	0,80	0,15
031482	SDMW09T308TN	SP6519	◆◆	-	-	9,52	9,52	3,97	0,80	0,15
017327	SDMW09T308TN	MP91M	◆◆◆	-	◆	9,52	9,52	3,97	0,80	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SDHT09T308EN-423 should be used for unstable conditions.

SDMW09T308TN should be used in Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable. Inserts with radius are only for semi roughing applications where a finished surface is not required.

Note: Feed recommendations can be found on page A99. Speed recommendations can be found on page A104.


7745VSE09 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 Nmm ² >415 HBN	Chilled Cast Iron >1400 Nmm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert selection with facet																	
FN-701	GH1	Facing	-	-	-	-	-	-	-	0.04 - 0.30	0.04 - 0.30	-	-	-	-	-	-
FN-701	SP4019	Facing	-	-	0.04 - 0.20	0.05 - 0.15	-	-	-	0.04 - 0.30	0.04 - 0.30	0.04 - 0.12	0.04 - 0.12	0.04 - 0.12	0.04 - 0.15	-	-
FN	GH1	Facing	-	-	-	-	-	-	-	0.04 - 0.30	0.04 - 0.30	-	-	-	-	-	-
EN	SP4019	Facing	-	-	0.05 - 0.20	0.05 - 0.15	0.05 - 0.20	0.05 - 0.20	0.05 - 0.18	-	-	0.04 - 0.12	0.04 - 0.12	0.04 - 0.12	0.04 - 0.15	0.04 - 0.06	-
EN-421	X500	Facing	0.05 - 0.20	0.05 - 0.18	-	0.05 - 0.15	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.18	-	-
EN-421	SP6519	Facing	0.05 - 0.20	0.05 - 0.18	0.05 - 0.20	0.05 - 0.15	0.05 - 0.20	0.05 - 0.20	0.05 - 0.18	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.18	-	-
EN-421	MP91M	Facing	0.05 - 0.20	0.05 - 0.18	-	-	0.05 - 0.20	0.05 - 0.20	0.05 - 0.18	-	-	-	-	-	-	0.04 - 0.06	-
EN-422	X500	Facing	-	-	0.05 - 0.20	0.05 - 0.20	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.18	-	-
EN-422	SP6519	Facing	0.05 - 0.20	0.05 - 0.18	0.05 - 0.18	0.05 - 0.16	0.05 - 0.20	0.05 - 0.20	0.05 - 0.18	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.18	-	-
EN-45	X500	Facing	-	-	0.07 - 0.22	0.07 - 0.20	-	-	-	-	-	0.07 - 0.18	0.07 - 0.18	0.07 - 0.18	0.07 - 0.20	-	-
EN-45	SP6519	Facing	0.07 - 0.30	0.07 - 0.25	0.07 - 0.22	0.07 - 0.20	0.07 - 0.25	0.07 - 0.25	0.07 - 0.25	-	-	0.07 - 0.18	0.07 - 0.18	0.07 - 0.18	0.07 - 0.20	-	-
EN-45	MP91M	Facing	0.07 - 0.25	0.07 - 0.20	-	-	0.07 - 0.25	0.07 - 0.25	0.07 - 0.25	-	-	-	-	-	-	-	-
TN*	X500	Facing	-	-	0.15 - 0.25	0.15 - 0.23	-	-	-	-	-	0.15 - 0.18	0.15 - 0.18	0.15 - 0.18	0.15 - 0.20	-	-
TN	SP6519	Facing	0.15 - 0.33	0.15 - 0.28	0.15 - 0.25	0.15 - 0.23	0.07 - 0.25	0.07 - 0.25	0.07 - 0.25	-	-	-	-	-	-	-	-
TN	MP91M	Facing	0.15 - 0.33	0.15 - 0.28	-	-	0.15 - 0.28	0.15 - 0.28	0.15 - 0.28	-	-	-	-	-	-	0.04 - 0.08	0.04 - 0.08
Insert selection with corner radius																	
FN*	GH1	Facing	-	-	-	-	-	-	-	0.04 - 0.30	0.04 - 0.30	-	-	-	-	-	-
EN	SP6519	Facing	0.05 - 0.20	0.05 - 0.18	0.05 - 0.20	0.05 - 0.15	0.05 - 0.25	0.05 - 0.25	0.05 - 0.20	-	-	0.04 - 0.12	0.04 - 0.12	0.04 - 0.12	0.04 - 0.15	-	-
EN-422	X500	Facing	0.05 - 0.30	0.05 - 0.25	0.05 - 0.20	0.05 - 0.15	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.16	-	-
EN-422	SP6519	Facing	-	-	0.05 - 0.20	0.05 - 0.15	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.16	-	-
EN-423	X500	Facing	-	-	0.05 - 0.20	0.05 - 0.15	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.16	-	-
EN-423	SP6519	Facing	-	-	0.05 - 0.20	0.05 - 0.15	-	-	-	-	-	0.05 - 0.15	0.05 - 0.15	0.05 - 0.15	0.05 - 0.16	-	-
EN-41	X500	Facing	0.05 - 0.30	0.05 - 0.25	0.05 - 0.22	0.05 - 0.20	0.05 - 0.25	0.05 - 0.25	0.05 - 0.25	-	-	0.05 - 0.18	0.05 - 0.18	0.05 - 0.18	0.05 - 0.20	-	-
EN-41	SP6519	Facing	0.05 - 0.30	0.05 - 0.25	-	-	0.05 - 0.25	0.05 - 0.25	0.05 - 0.25	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing	0.05 - 0.30	0.05 - 0.25	-	-	0.05 - 0.25	0.05 - 0.25	0.05 - 0.25	-	-	-	-	-	-	-	-
TN	X500	Facing	-	-	-	0.15 - 0.23	-	-	-	-	-	0.15 - 0.18	0.15 - 0.18	0.15 - 0.18	0.15 - 0.20	-	-
TN	SP6519	Facing	0.15 - 0.33	0.15 - 0.28	-	-	0.15 - 0.28	0.15 - 0.28	0.15 - 0.28	-	-	-	-	-	-	-	-
TN	MP91M	Facing	0.15 - 0.33	0.15 - 0.28	-	-	0.15 - 0.28	0.15 - 0.28	0.15 - 0.28	-	-	-	-	-	-	0.06 - 0.10	0.06 - 0.10

Note: HTA = High Temperature Alloys

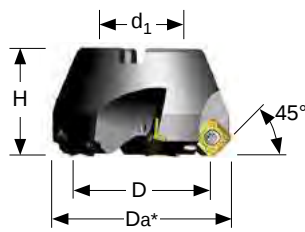
Speed recommendations can be found on page A104.

7745VSE12

Face Milling Cutter



End Mills & Face Mills

**Shell Mill Fixation**

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	H	l ₁	d ₁	a _p max	Max. plunging depth	No. of Teeth	EDP		EDP		Screw Tightening Nm.
7745VSE12 Shell Mill Fixation														
021788	7745VSE12-A050Z4R	50	65	45	-	22	7,00	6,00	4	015270	F4011T	015241	T20	3,10
021789	7745VSE12-A063Z5R	63	78	45	-	22	7,00	6,00	5	015270	F4011T	015241	T20	3,10
021790	7745VSE12-A080Z6R	80	95	50	-	27	7,00	6,00	6	015270	F4011T	015241	T20	3,10
021791	7745VSE12-A100Z7R	100	115	55	-	32	7,00	6,00	7	015270	F4011T	015241	T20	3,10
021792	7745VSE12-A125Z8R	125	140	63	-	40	7,00	6,00	8	015270	F4011T	015241	T20	3,10

Da* = Outside Diameter

7745VSE12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021788	7745VSE12-A050Z4R	50	7.60	-	-	4,00	21500
021789	7745VSE12-A063Z5R	63	5.80	-	-	4,00	19100
021790	7745VSE12-A080Z6R	80	4.40	-	-	4,00	17000
021791	7745VSE12-A100Z7R	100	3.50	-	-	4,00	15100
021792	7745VSE12-A125Z8R	125	2.70	-	-	4,00	13500



Ramping



Facing Pitch

**Depth of Cut (a_p)**



SDEX12-701



SDCT12



SDHT12-421



SDKT12-45



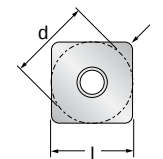
SDHT12-42



SDCW12



SDHW12



End Mills & Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 7,00	a _p min. - max. 1,00 - 3,00	a _p min. - max. 0,20 - 1,00					
Insert selection with facet										
034522	SDEX1204AEFN-701	SP4019	-	-		12,70	12,70	4,76	Facet	0,02
015149	SDEX1204AEFN-701	GH1				12,70	12,70	4,76	Facet	0,02
017243	SDCT1204AEFN	GH1				12,70	12,70	4,76	Facet	0,02
015187	SDHT1204AEEN-421	X500	-	-		12,70	12,70	4,76	Facet	0,04
031477	SDHT1204AEEN-421	SP6519	-	-		12,70	12,70	4,76	Facet	0,04
017321	SDHT1204AEEN-421	MP91M	-	-		12,70	12,70	4,76	Facet	0,04
029457	SDKT1204AEEN-45	X500	-		-	12,70	12,70	4,76	Facet	0,05
031532	SDKT1204AEEN-45	SP6519	-		-	12,70	12,70	4,76	Facet	0,05
029456	SDKT1204AEEN-45	MP91M	-		-	12,70	12,70	4,76	Facet	0,05
017729	SDHT1204AETN-42	X500			-	12,70	12,70	4,76	Facet	0,15
031478	SDHT1204AETN-42	SP6519			-	12,70	12,70	4,76	Facet	0,15
017322	SDHT1204AETN-42	MP91M				12,70	12,70	4,76	Facet	0,15
034517	SDCW1204AETN	X400		-		12,70	12,70	4,76	Facet	0,15
034516	SDCW1204AETN	SP4019		-		12,70	12,70	4,76	Facet	0,10
031404	SDCW1204AETN	SA9808	-	-		12,70	12,70	4,76	Facet	0,17
017730	SDHW1204AETN	X500		-	-	12,70	12,70	4,76	Facet	0,15
017324	SDHW1204AETN	MP91M		-	-	12,70	12,70	4,76	Facet	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

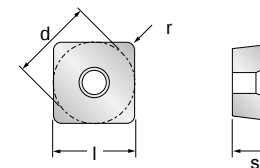
SDHW1204AETN X500 should be used in Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable.

Note: Feed recommendations can be found on page A103. Speed recommendations can be found on page A104.



7745VSE12

Milling Inserts



End Mills & Face Mills



SDHT12-422

SDHT12-423

SDHT12-41

SDMW12

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 7,00	a _p min. - max. 1,00 - 3,00	a _p min. - max. 0,20 - 1,00					
Insert selection with corner radius										
030717	SDHT120412EN-422	X500			-	12,70	12,70	4,76	1,20	0,05
030728	SDHT120412EN-422	SP6519			-	12,70	12,70	4,76	1,20	0,05
031218	SDHT120412EN-423	X500			-	12,70	12,70	4,76	1,20	0,06
031321	SDHT120412EN-423	SP6519			-	12,70	12,70	4,76	1,20	0,06
014411	SDMT120412EN-41	X500			-	12,70	12,70	4,76	1,20	0,05
031480	SDMT120412EN-41	SP6519			-	12,70	12,70	4,76	1,20	0,05
017326	SDMT120412EN-41	MP91M			-	12,70	12,70	4,76	1,20	0,05
015233	SDMW120412TN	X500		-	-	12,70	12,70	4,76	1,20	0,15
034518	SDMW120412TN	SP6519		-	-	12,70	12,70	4,76	1,20	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SDHT120412EN-423 should be used for unstable conditions.

SDMW120412TN X500 should be used in Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable. Inserts with radius are only for semi roughing applications where a finished surface is not required.

Note: Feed recommendations can be found on page A103. Speed recommendations can be found on page A104.


7745VSE12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert selection with facet																	
FN-701	SP4019	Facing	-	-	0,05 - 0,25	0,05 - 0,20	-	-	-	0,04 - 0,25	0,04 - 0,25	0,04 - 0,20	0,04 - 0,20	0,04 - 0,20	0,04 - 0,20	-	-
FN-701	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,30	-	-	-	-	-	-
FN	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,30	-	-	-	-	-	-
EN-421	X500	Facing	-	-	0,05 - 0,22	0,05 - 0,20	-	-	-	-	-	0,05 - 0,20	0,05 - 0,20	0,05 - 0,20	0,05 - 0,22	-	-
EN-421	SP6519	Facing	0,05 - 0,30	0,05 - 0,25	0,05 - 0,22	0,05 - 0,20	0,05 - 0,28	0,05 - 0,28	0,05 - 0,28	-	-	0,05 - 0,20	0,05 - 0,20	0,05 - 0,20	0,05 - 0,22	-	-
EN-421	MP91M	Facing	0,05 - 0,30	0,05 - 0,25	-	-	0,05 - 0,28	0,05 - 0,28	0,05 - 0,28	-	-	-	-	-	-	-	-
EN-45	X500	Facing	-	-	0,07 - 0,25	0,07 - 0,22	-	-	-	-	-	0,07 - 0,18	0,07 - 0,18	0,07 - 0,18	0,07 - 0,20	-	-
EN-45	SP6519	Facing	0,07 - 0,35	0,07 - 0,30	-	-	-	-	-	-	-	-	-	-	-	-	-
EN-45	MP91M	Facing	-	-	-	-	0,07 - 0,30	0,07 - 0,30	0,07 - 0,30	-	-	-	-	-	-	-	-
TN-42	X500	Facing	-	-	0,15 - 0,27	0,15 - 0,25	-	-	-	-	-	0,15 - 0,22	0,15 - 0,22	0,15 - 0,22	0,15 - 0,25	-	-
TN-42	SP6519	Facing	0,15 - 0,35	0,15 - 0,30	0,15 - 0,27	0,15 - 0,25	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	0,15 - 0,22	0,15 - 0,22	0,15 - 0,22	0,15 - 0,25	-	-
TN-42	MP91M	Facing	0,15 - 0,35	0,15 - 0,30	-	-	0,18 - 0,30	0,18 - 0,30	0,18 - 0,30	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	X400	Facing	0,15 - 0,38	0,15 - 0,33	-	-	-	-	-	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	X500	Facing	-	-	-	0,15 - 0,27	-	-	-	-	-	0,15 - 0,20	0,15 - 0,20	0,15 - 0,20	0,15 - 0,25	-	-
TN	SP4019	Facing	-	-	0,15 - 0,30	0,15 - 0,27	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	MP91M	Facing	0,15 - 0,38	0,15 - 0,33	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	-	-
TN	SA9808	Facing	0,17 - 0,25	0,17 - 0,23	-	-	-	-	-	-	-	-	-	-	-	-	-
Insert selection with corner radius																	
EN-422	X500	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-422	SP6519	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-423	X500	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-423	SP6519	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-41	X500	Facing	0,05 - 0,35	0,05 - 0,30	0,05 - 0,25	0,05 - 0,22	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-41	SP6519	Facing	0,05 - 0,35	0,05 - 0,30	-	-	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing	0,05 - 0,35	0,05 - 0,30	-	-	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	-	-	-	-	-	-
TN	X500	Facing	-	-	-	0,15 - 0,27	-	-	-	-	-	0,15 - 0,18	0,15 - 0,18	0,15 - 0,18	0,15 - 0,20	-	-
TN	SP6519	Facing	0,15 - 0,38	0,15 - 0,33	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A104.

7745VSE

Recommended Speeds



End Mills & Face Mills

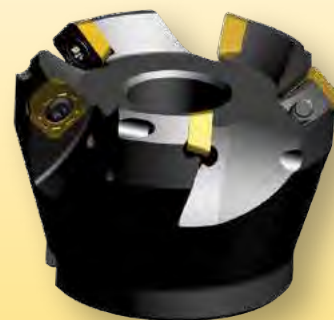
Speed v_c (m/min)																	
7745VSE Series			Wear Resistance														
			-  +														
			Speed min. - max.														
Coolant Recommendation																	
Recommended ● Possible ◎																	
ISO	Materials	Rm and Hardness	 	PVD X Grade	 	CVD X Grade	 	PVD Standard	 	PVD Standard	 	CVD Standard	 	Uncoated Micrograin	 	Uncoated Cermet	
				X400		X500		SP6519		SP4019		MP91M		GH1		SA9808	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎ ●	120 - 260	◎ ●	130 - 270	◎ ●	130 - 295				●	140 - 345			●	240 - 345
		<950 N/mm ² <280 HBN		105 - 230		115 - 240		115 - 260				●	120 - 305				190 - 270
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎ ●	95 - 200	◎ ●	100 - 210	◎ ●	100 - 230				●	105 - 270			●	140 - 205
		950-1200 N/mm ² 280-355 HBN		70 - 150		75 - 160		75 - 175				●	80 - 205				90 - 130
		1200-1400 N/mm ² 355-415 HBN	●	45 - 95	●	50 - 100	●	50 - 110		●	50 - 130				●	215 - 305	
M	Stainless Steel	Austenitic + Ferritic 300 series			◎ ●	115 - 250	◎ ●	115 - 270	◎ ●	200 - 335							
		Martensitic 400 series			◎ ●	100 - 220		105 - 235		180 - 305							
	PH Stainless	Refractory P.H.			●	50 - 110	●	50 - 120	●	85 - 145							
K	Cast Iron	Grey GG-Ft				120 - 280		140 - 295		240 - 400			145 - 365				
		Spheroidal-Ductile GGG-FGS		◎ ●	105 - 205	◎ ●	110 - 240	◎ ●	185 - 340	●	115 - 285						
		Malleable GTS - MN/MP			95 - 170		100 - 220		170 - 285		105 - 260						
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●	400 - 2745			●	400 - 3050			
		Aluminium + Silicon > 16% Si 92 HBN								295 - 2135				295 - 2440			
S	High Temperature Alloys	Iron Based				23 - 48		23 - 55		40 - 67							
		Cobalt Based			●	21 - 44	●	22 - 48	●	37 - 63							
		Nickel Based				24 - 51		25 - 55		42 - 72							
		Titanium Based				35 - 73		36 - 79		61 - 103							
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●	45 - 95					●	50 - 110	●	50 - 105					
		Chilled Cast Iron >1400 N/mm ² > 400 HBN		35 - 80						45 - 100		40 - 95					



775VSE Technical Information

Feed rate compensation: For 45° cutting, divide the h_m value by the sine of the approach angle (the sine of 45° = 0,707)

i.e.: $\frac{h_m}{0,707}$ or $\frac{0,08mm}{0,707} = 0,11mm$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

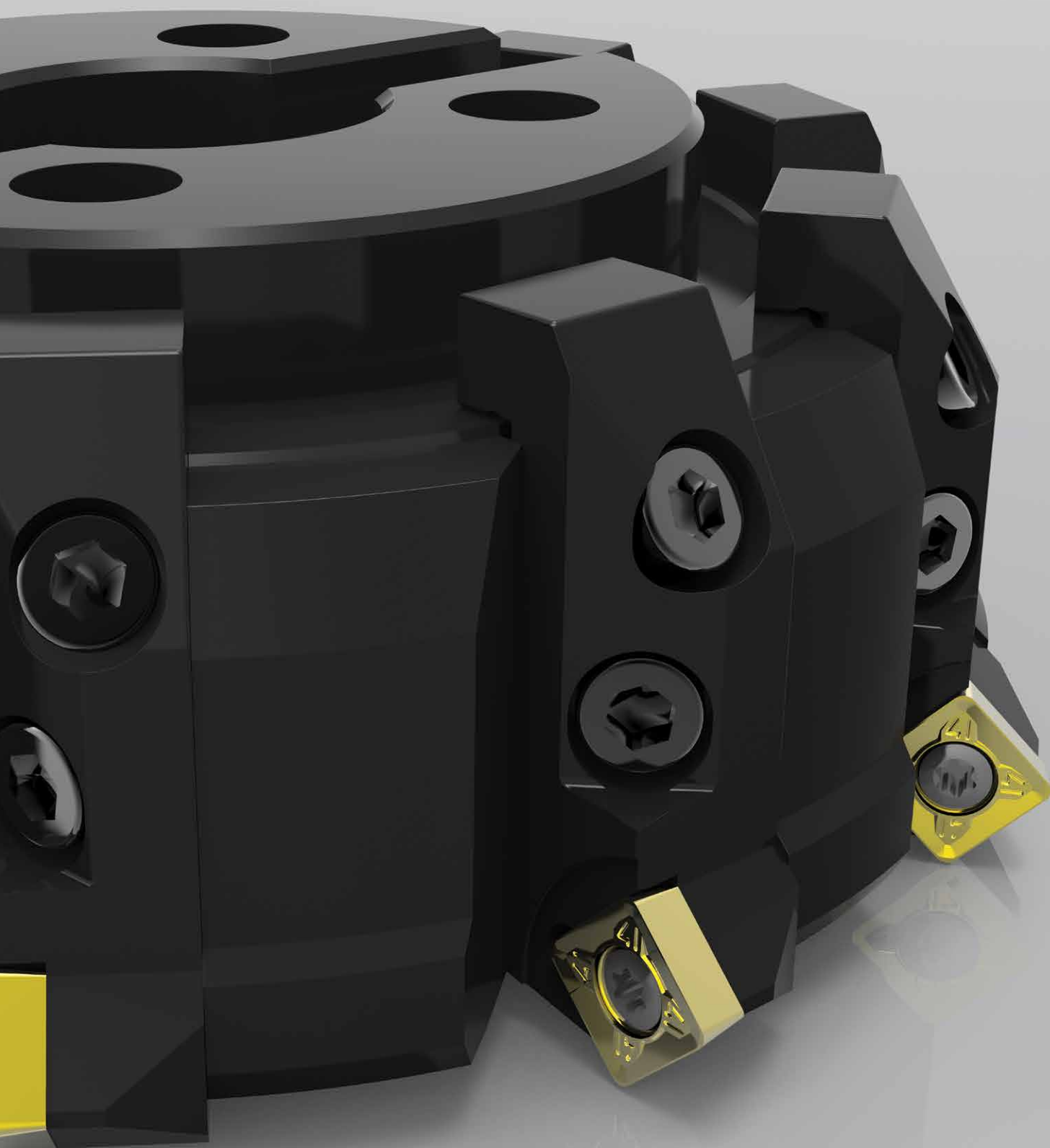
a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



**VERSATILE CARTRIDGE MILLING CUTTERS**

The **8000V-8010V** cutter series provides the opportunity to assemble the bodies with different cartridges for a wide range of applications.

This clamping design allows the adjusting screws to work in opposition to each other, to allow setting of each insert within 2-5 μm .

All Stellram cartridge face mills feature a unique design that maintains the accuracy of the cartridge location even after a collision.





8000V Cutter

8000V CUTTERS WITH UNEQUAL PITCH

The cutters in the 8000V series ($\varnothing$ 100 – 400mm) with interchangeable cartridges have a medium pitch and an unequal division of teeth. This design has been developed through extensive studies of their vibration phenomena. They are especially recommended for surfacing cast structures and all other parts with drilled holes or thin walled sections, as well as for square shoulder face milling. For a given table feed, the medium pitch allows a lower feed rate per tooth which avoids the risks of damage to sides or recesses of the machined parts.

These are quick-change cartridges thanks to a heel which comes up against a setting track. The runout achieved is in the order of 0,05mm. If a greater degree of precision is required, they can easily be adjusted individually with a runout of 2-5 μ m. In case of accidental shocks, the heel disengages automatically from the track and the tool body remains intact.



8010V Cutter

8010V CUTTERS WITH EQUAL PITCH

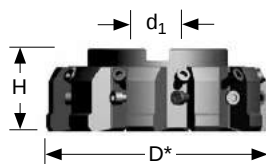
For machining High Temperature Alloys, we have modified our milling cutters with cartridges. Available in $\varnothing$ 100 – 200mm, the bodies of the 8010V milling cutters have the same characteristics as the 8000V body but the distribution of the teeth is regular. The number of teeth is equal to that of the 8000V series.

The 8010V is best used for rough milling, semi-finishing and finishing of Titanium and High Temperature Alloys.

Precautions

At speeds above 80 m/min., the differential pitch of the 8000V becomes essential to reduce the possibility of vibration.

The capability of the 8000V-8010V series is dependent on the different assembly options.



Cutter Body

Product		Dimensions (mm)				Cartridge Spares		
EDP	Item Description	D *	H	d1	No. of Teeth	EDP	Cartridge Screw	Weight incl. Cartridges kg
8000V Bodies with Unequal Pitch								
021921	8000V100RBODY	100	68	32	6	022646	7065	2,29
021922	8000V125RBODY	125	63	40	8	022646	7065	3,04
021923	8000V160RBODY	160	63	40	10	022646	7065	5,43
021924	8000V200RBODY	200	63	60	12	022646	7065	8,77
021925	8000V250RBODY	250	63	60	16	022646	7065	15,48
021926	8000V315RBODY**	315	80	60	20	022646	7065	29,85
021927	8000V400RBODY**	400	80	60	24	022646	7065	57,60
8010V Bodies with Equal Pitch								
023071	8010V100RBODY**	100	68	32	6	022646	7065	2,29
021973	8010V125RBODY**	125	63	40	8	022646	7065	3,04
021974	8010V160RBODY**	160	63	40	10	022646	7065	5,43
021975	8010V200RBODY**	200	63	60	12	022646	7065	8,77

** Denotes non stock items.

Note: Mounting instructions refer to pages A161 - A164.

Note: D* is nominal diameter for most cutter assemblies except for 90 degree A-Style, 16mm & 20mm button and 12mm & 16mm High Feed assemblies.

For these mentioned assemblies the cutter diameter will change, please see assembly pages for diameter detail.

Cartridge Face Mills



81 FS 00 Cartridge

Product		Spares							
EDP	Item Description	X" Adjustment Range (mm)	Insert Screw EDP		EDP		Adjustment Screw EDP		Insert Style
Finishing Cartridge & Spares									
014953	81FS00R-12	0.03-0.05	015266	D5013T	105241	T20	016858	72.602	SPHX12....

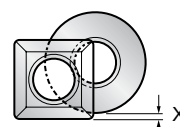
These cartridges, have a fine adjusting set screw and are set according to the dimension (axial shift) "X".

X = 0,03 - 0,05 mm

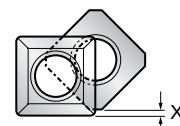
(X = 0,02 mm with a pressed insert with a nose radius).

The following series assemblies with a wiper insert are possible:

Cutter	Inserts
8000VR00...	RP.. 16 + Wiper
8000VOD45...	OD..04 + Wiper
8000VOD45...	OD..06 + Wiper
8000VS45...	SC..12 + Wiper
8000VSE45...	SD..12 + Wiper



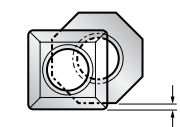
8000VR 00



8000VS / VSE 45

The following series assemblies with a wiper inserts are not possible:

Cutter	Inserts
8000VXD92...	Wiper not possible
8000VXE92...	Wiper not possible
8000VA90...	Wiper not possible

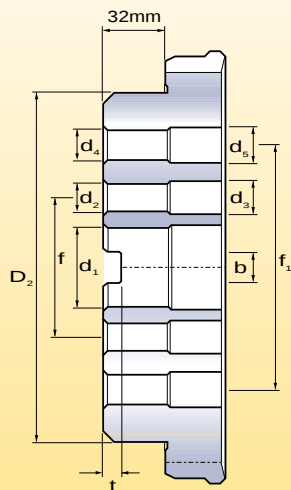


8000VOD 45

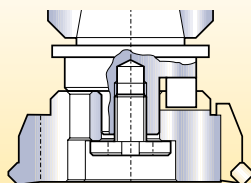
Also, all 8010V cutter series are not possible to assemble with a wiper insert.

8000V-8010V Milling Cutter Bodies

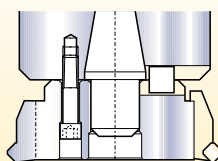
Mounting / Attachment

**80.0V Cutters Mounting & Attachment Dimensions (mm)**

Ø Cutter D	Fixation Bore / Pilot	d1 H7	D2	f	f1	d2	d3	d4	d5	b1	t
Ø 100	Ø 32 mm	32	53	-	-	-	-	-	-	14,40	8
Ø 125	Ø 40 mm	40	77	-	-	-	-	-	-	16,40	9
Ø 160	Ø 40 mm	40	100	66,70	-	14	20	-	-	16,40	9
Ø 200	Ø 60 mm	60	136	101,60	-	18	26	-	-	25,70	14
Ø 250	Ø 60 mm	60	180	101,60	-	18	26	-	-	25,70	14
Ø 315	Ø 60 mm	60	240	101,60	177,8	18	26	22	32	25,70	14
Ø 400	Ø 60 mm	60	320	101,60	177,8	18	26	22	32	25,70	14

**Locate Directly to Milling Arbor**

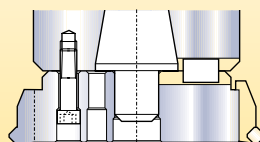
For cutter Ø 100, 125 & 160mm.

**Locate Directly to Spindle Nose 7/24 with Centreing Arbor**

Spindle 7/24 No. 40 for cutter Ø 160mm.

Spindle 7/24 No. 50 for cutter Ø 200mm to 400mm.

Spindle 7/24 No. 60 for cutter Ø 315mm to 400mm.





90° CARTRIDGE SHOULDER MILLING ASSEMBLIES

Applications:

80.0VA90 cutters series are assembled with cartridges for AP..16 milling inserts for face and shoulder milling applications.

This cutter series is available in two different versions, both with medium pitch.

The cutters series **8000VA90** has an **unequal** medium pitch for reducing vibration and is suitable for roughing, semi-finishing and finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron and Aluminium Alloys.

The **8010VA90** series has an **equal** medium pitch and is especially recommended for roughing, semi-finishing and finishing of High Temperature Alloys such as Iron Based Alloys, Cobalt Based Alloys, Nickel Based Alloys and Titaniums.

Note: The 80.0VA90 series when mounted with cartridge 80VA90R-16 using AP..1604.. A-Style inserts cannot utilise the wiper cartridge for finishing when a fine finished surface is required.

Note: When using inserts with a radius larger than 2,00mm the cartridges need to be modified for additional clearance by the end user.

80.0VA90- _R-16

8000VA90- _R-16:

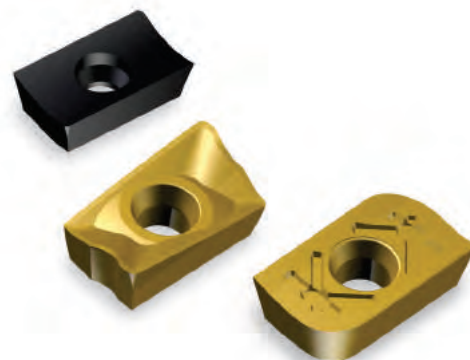
Maximum $a_p = 16\text{mm}$
 Effective Cutting Diameter
 Range = 106mm to 406mm

* Denotes non stock items diameter
 321mm - 406mm

8010VA90- _R-16:

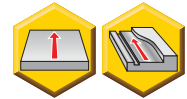
Maximum $a_p = 16\text{mm}$
 Effective Cutting Diameter
 Range = 106*mm to 206*mm

* Denotes non stock items.

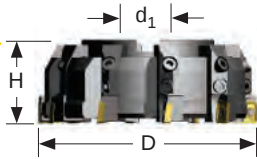


80.0VA90-_R-16

Shoulder Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VA90R-16**

Product		Dimensions (mm)					Spares				
EDP	Item Description	D Effective Cutting Diameter	H	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VA90-_ R-16 Bodies with Unequal Medium Pitch & Cartridges											
021817	8000VA90-100R-16	106	68	32	16	6	015262	D4010T	015240	T15	3,10
021819	8000VA90-125R-16	131	63	40	16	8					
021821	8000VA90-160R-16	166	63	40	16	10					
021823	8000VA90-200R-16	206	63	60	16	12					
021825	8000VA90-250R-16	256	63	60	16	16					
021827	8000VA90-315R-16*	321	80	60	16	20					
021829	8000VA90-400R-16*	406	80	60	16	24					
8010VA90-_ R-16 Bodies with Equal Medium Pitch & Cartridges											
021929	8010VA90-100R-16*	106	68	32	16	6	015262	D4010T	015240	T15	3,10
021931	8010VA90-125R-16*	131	63	40	16	8					
021933	8010VA90-160R-16*	166	63	40	16	10					
021935	8010VA90-200R-16*	206	63	60	16	12					

* Denotes non stock items.

Product		Spares								
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP	
Cartridge & Spares										
015390	80VA90R-16	015262	D4010T	015240	T15	3,10	022646	7065	-	-

Note: AP..1604.. A-Syle cutter assemblies cannot utilise the wiper cartridges.

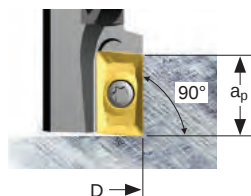
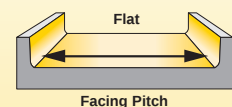
Note: When using inserts with a radius larger than 2,0mm the cartridges need to be modified for additional clearance by the end user.

Note: Mounting instructions refer to pages A161 - A164.

80.VA90-_R-16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021817	8000VA90-100R-16	106	-	-	-	-	10800
021819	8000VA90-125R-16	131	-	-	-	-	9200
021821	8000VA90-160R-16	166	-	-	-	-	7800
021823	8000VA90-200R-16	206	-	-	-	-	6200
021825	8000VA90-250R-16	256	-	-	-	-	5900
021827	8000VA90-315R-16*	321	-	-	-	-	5200
021829	8000VA90-400R-16*	406	-	-	-	-	4500
021929	8010VA90-100R-16*	106	-	-	-	-	10800
021931	8010VA90-125R-16*	131	-	-	-	-	9200
021933	8010VA90-160R-16*	166	-	-	-	-	7800
021935	8010VA90-200R-16*	206	-	-	-	-	6200

* Denotes non stock items.

**Depth of Cut (a_p)**



APET16-42



APHT16-42



APEX16-701



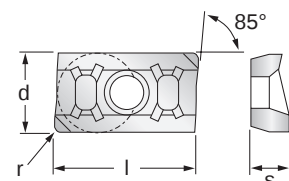
APFW16-TR



APHT16-ER



APHT16-FR



Cartridge Face Mills



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 16,00	ap min. - max. 1,50 - 5,00	ap min. - max. 0,10 - 1,50					
033179	APET160402TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	0,20	0,10
033180	APET160408TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	0,80	0,10
033181	APET160410TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	1,00	0,10
033182	APET160415TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	1,50	0,10
033183	APET160420TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	2,00	0,10
033184	APET160425TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	2,50	0,10
033185	APET160430TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	3,00	0,10
033186	APET160440TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	4,00	0,10
033187	APET160460TR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	6,00	0,10
015155	APHT1604PDTR-42	X500	●●	-	-	9,52	16,66	4,76	Facet	0,10
031466	APHT1604PDTR-42	SP6519	●●●●	■●●●	■●	9,52	16,66	4,76	Facet	0,10
017293	APHT1604PDTR-42	MP91M	-	■●	■●	9,52	16,66	4,76	Facet	0,10
033188	APEX1604PDER-701	SP6519	-	-	●	9,52	16,66	4,76	Facet	0,02
033189	APEX1604PDFR-701	SP4019	●	●	●	9,52	16,66	4,76	Facet	0,02
014066	APEX1604PDFR-701	GH1	◆	◆	◆	9,52	16,66	4,76	Facet	0,02
033190	APFW1604PDTR	X400	●	◆	●	9,52	16,66	4,76	Facet	0,10
033191	APFW1604PDTR	SP4019	●	■	◆	9,52	16,66	4,76	Facet	0,10
027883	APFW1604PDTR	SC3025	■	◆	◆	9,52	16,66	4,76	Facet	0,10
017628	APFW1604PDTR	GH1	-	●	●	9,52	16,66	4,76	Facet	0,10
033192	APHT1604PDER	SP4019	-	-	●	9,52	16,66	4,76	Facet	0,05
015154	APHT1604PDFR	GH1	■	■	■	9,52	16,66	4,76	Facet	0,02

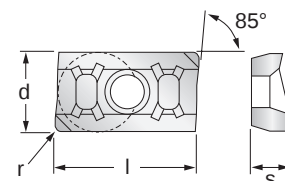
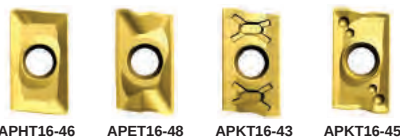
 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: APHT1604PDTR-42 X500 should be used for Stainless Steel with heavy scale.

Note: APFW1604PDTR X400 should be used for Alloyed Steel with heavy scale.

Note: APFW1604PDTR SP4019 should be used for High Temperature Alloys with heavy scale.

Note: Feed recommendations can be found on page A115. Speed recommendations can be found on page A116

80.0VA90-_R-16**Milling Inserts**

Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 16,00	a _p min - max 1,50 - 5,00	a _p min - max 0,10 - 1,50					
027869	APHT160408ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	0,80	0,05
031495	APHT160408ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	0,80	0,05
027870	APHT160416ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	1,60	0,05
031496	APHT160416ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	1,60	0,05
027871	APHT160424ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	2,40	0,05
031497	APHT160424ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	2,40	0,05
027872	APHT160432ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	3,20	0,05
031397	APHT160432ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	3,20	0,05
027873	APHT160440ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	4,00	0,05
031542	APHT160440ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	4,00	0,05
027874	APHT160450ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	5,00	0,05
031498	APHT160450ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	5,00	0,05
027875	APHT160464ER-46	X500	■◆■	■◆■	●	9,52	16,66	4,76	6,40	0,05
031541	APHT160464ER-46	SP6519	◆■	◆■	◆◆◆◆	9,52	16,66	4,76	6,40	0,05
030811	APET1604PDER-48	X500	◆	◆	■	9,52	16,66	4,76	Facet	0,04
030773	APET1604PDER-48	SP6519	●	●	●●■◆	9,52	16,66	4,76	Facet	0,04
030860	APET160408ER-48	X500	◆	◆	■	9,52	16,66	4,76	0,80	0,04
030861	APET160408ER-48	SP6519	●	●	●●■◆	9,52	16,66	4,76	0,80	0,04
015156	APKT1604PDER-43	X500	●	-	-	9,52	16,66	4,76	Facet	0,08
031468	APKT1604PDER-43	SP6519	◆◆	-	-	9,52	16,66	4,76	Facet	0,08
017294	APKT1604PDER-43	MP91M	■■●	-	-	9,52	16,66	4,76	Facet	0,08
027887	APKT1604PDER-43	SC3025	◆	-	-	9,52	16,66	4,76	Facet	0,08
023115	APKT1604PDER-45	X500	-	●	-	9,52	16,66	4,76	Facet	0,08
031469	APKT1604PDER-45	SP6519	-	◆◆	-	9,52	16,66	4,76	Facet	0,08
023114	APKT1604PDER-45	MP91M	-	●	-	9,52	16,66	4,76	Facet	0,08

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: APKT1604PDER-43 X500 should be used for Steel with heavy scale.

Note: Feed recommendations can be found on page A115. Speed recommendations can be found on page A116.




80.0VA90- _R-16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
TR-42	X500	Facing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TR-42	SP6519	Facing	0,10 - 0,28	0,10 - 0,23	0,10 - 0,22	0,10 - 0,20	-	-	-	-	-	-	-	-	-	-	-
TR-42	MP91M	Facing	-	-	-	-	0,08 - 0,25	0,08 - 0,20	0,08 - 0,20	-	-	-	-	-	-	0,03 - 0,06	0,05 - 0,08
ER-701	SP6519	Facing	-	-	-	-	-	-	-	-	-	0,02 - 0,05	0,02 - 0,05	0,02 - 0,05	0,02 - 0,05	-	-
FR-701	SP4019	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
FR-701	GH1	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
TR	X400	Facing	-	0,10 - 0,25	-	-	-	-	-	-	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10
TR	SP4019	Facing	-	-	-	-	-	-	-	-	-	0,08 - 0,10	0,08 - 0,10	0,08 - 0,10	0,08 - 0,12	0,05 - 0,10	0,05 - 0,10
TR	SC3025	Facing	-	-	-	-	0,10 - 0,22	0,10 - 0,22	0,10 - 0,22	-	-	-	-	-	-	-	-
TR	GH1	Facing	-	-	-	-	0,10 - 0,22	0,10 - 0,22	0,10 - 0,22	-	-	-	-	-	-	-	-
ER	SP4019	Facing	-	-	0,05 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-
FR	GH1	Facing	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
ER-46	X500	Facing	-	-	0,04 - 0,25	0,04 - 0,22	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,14	-	-
ER-46	SP6519	Facing	0,04 - 0,25	0,04 - 0,20	0,04 - 0,24	0,04 - 0,20	-	-	-	-	-	-	-	-	-	-	-
ER-48	X500	Facing	-	-	-	-	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,14	-	-
ER-48	SP6519	Facing	0,05 - 0,20	0,05 - 0,18	0,04 - 0,16	0,04 - 0,12	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	0,04 - 0,12	-	-
ER-43	X500	Facing	0,08 - 0,30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	SP6519	Facing	0,05 - 0,28	0,05 - 0,23	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	MP91M	Facing	0,06 - 0,27	0,06 - 0,22	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-
ER-43	SC3025	Facing	-	-	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-
ER-45	X500	Facing	-	0,08 - 0,22	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	SP6519	Facing	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	MP91M	Facing	0,08 - 0,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A116.

80.0VA90-_R-16

Recommended Speeds



Cartridge Face Mills

Speed v_c (m/min)			Wear Resistance													
80.0VA90-_R-16 Series			Speed min. - max.													
Coolant Recommendation																
Recommended ● Possible ○																
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD Standard		PVD Standard		CVD Standard		CVD Standard		Uncoated Micrograin	
			●	○	●	○	●	○	●	○	●	○	●	○	●	○
P	Unalloyed Steel	<600 N/mm ² <180 HBN														
		<950 N/mm ² <280 HBN														
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	●	○	●	○	●	○	●	○	●	○	●	○	●	○
		950-1200 N/mm ² 280-355 HBN	●	○	●	○	●	○	●	○	●	○	●	○	●	○
M	Stainless Steel	Austenitic + Ferritic 300 series			●	○	●	○	●	○						
		Martensitic 400 series			●	○	●	○	●	○						
	PH Stainless	Refractory P.H.			●	○	●	○	●	○						
K	Cast Iron	Grey GG-FT														
		Spheroidal-Ductile GGG-FGS														
		Malleable GTS - MN/MP														
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●						●	
		Aluminium + Silicon > 16% Si 92 HBN							●						●	
S	High Temperature Alloys	Iron Based														
		Cobalt Based			●		●		●							
		Nickel Based														
		Titanium Based														
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●						●		●					
		Chilled Cast Iron >1400 N/mm ² > 400 HBN	●						●		●					

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

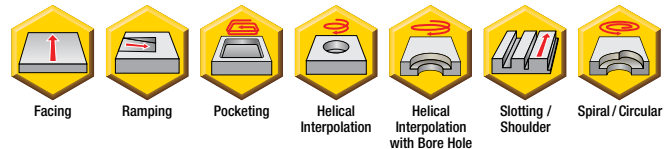
a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



CARTRIDGE HIGH FEED MILLING ASSEMBLIES

80.0VX.92 high feed milling cutters are capable of high metal removal in facing applications. The patented insert design offers better performance than round insert cutters.

The 80.0VX.92 high feed cutters are the best solution when specifically focusing on reducing cycle time or removing a maximum volume of material in the shortest time.

Our high feed cutter has the capacity to achieve 5 times higher feed rate than other existing cutters in the market. This is due to its unique design and insert positioning. 80.0VX.92 cutters also have a tremendous advantage, when used in a long (extended) toolholder.

These cutters absorb vibration and generally reduces the instability and deflection of the tool.

Applications:

The 80.0VX.92 cutters are assembled with cartridges for XD...or XE... high feed milling inserts and are ideal for a wide range of applications. Facing, slotting pocketing, ramping and helical interpolation. Available with medium pitch.

The cutter series **8000VX.92** has an unequal medium pitch for reducing vibration and is suitable for roughing and semi-finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron and Aluminium Alloys.

The cutters series **8010VX.92** has an equal medium pitch and is especially recommended for roughing and semi-finishing of High Temperature Alloys, such as Iron Based alloys, Cobalt Based Alloys, Nickel Based Alloys and Titanium.

NOTE: The 80.0VX.92 series when mounted with high feed cartridges 80VX.92R-12 or 80VX.92R-16 using XD... or XE... inserts cannot utilise the wiper cartridge for finishing when a fine finished surface is required.

80_0VX_92- _R-12 & -16

8000VXD92- _R-12:

Maximum $a_p = 2,50\text{mm}$
 Diameter Range =
 106mm to 256mm

8010VXD92- _R-12:

Maximum $a_p = 2,50\text{mm}$
 **Diameter Range =
 106mm to 206mm

8000VXE92- _R-16:

Maximum $a_p = 3,50\text{mm}$
 Diameter Range =
 106mm to 256mm

8010VXE92- _R-16:

Maximum $a_p = 3,50\text{mm}$
 **Diameter Range =
 106mm to 206mm

**Denotes non stock

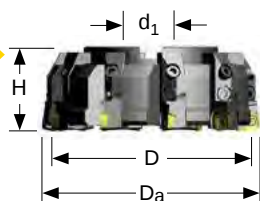


80.0VXD92-_R-12

Cartridge High Feed Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VX92-R12**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VXD92-_ R-12 Bodies with Unequal Medium Pitch & Cartridges												
033161	8000VXD92-100R-12	87,95	106	68	32	2,5	6	015263		015240	T15	3,10
033162	8000VXD92-125R-12	112,95	131	63	40	2,5	8					
033163	8000VXD92-160R-12	147,95	166	63	40	2,5	10					
033164	8000VXD92-200R-12	187,95	206	63	60	2,5	12					
033165	8000VXD92-250R-12	237,95	256	63	60	2,5	16					
8010VXD92-_ R-12 Bodies with Equal Medium Pitch & Cartridges												
033166	8010VXD92-100R-12**	87,95	106	68	32	2,5	6	015263		015240	T15	3,10
033167	8010VXD92-125R-12**	112,95	131	63	40	2,5	8					
033168	8010VXD92-160R-12**	147,95	166	63	40	2,5	10					
033169	8010VXD92-200R-12**	187,95	206	63	60	2,5	12					

** Denotes non stock items.

Da* = Outside Diameter

Product		Spares							
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP
Cartridge & Spares									
030378	80VX92R-12	015263	D4012T	015240	T15	3,10	022646	7065	-

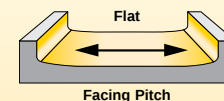
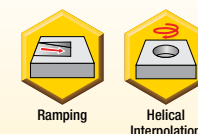
Note: Mounting instructions refer to pages A161 - A164.

Note: XD..1205.., X-Style cutter assemblies cannot utilise the finishing wiper cartridges.

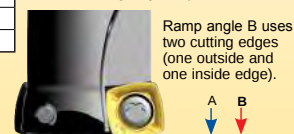
80.0VXD92-_ R-12 Technical Information (mm)

Product		Dimensions						Max RPM
EDP	Item Description	Facing Pitch	Ramping Angle		Helical Hole min. - max.		ap max Helical / Linear	
			A °	B °				
033161	8000VXD92-100R-12	87,95	0,31	0,47	192	210	1,80	10800
033162	8000VXD92-125R-12	112,95	0,24	0,36	242	260	1,80	9200
033163	8000VXD92-160R-12	147,95	0,18	0,28	312	330	1,80	7800
033164	8000VXD92-200R-12	187,95	0,14	0,21	392	410	1,80	6800
033165	8000VXD92-250R-12	237,95	0,11	0,17	492	510	1,80	5900
033166	8010VXD92-100R-12**	87,95	0,31	0,47	192	210	1,80	10800
033167	8010VXD92-125R-12**	112,95	0,24	0,36	242	260	1,80	9200
033168	8010VXD92-160R-12**	147,95	0,18	0,28	312	330	1,80	7800
033169	8010VXD92-200R-12**	187,95	0,14	0,21	392	410	1,80	6800

** Denotes non stock items.

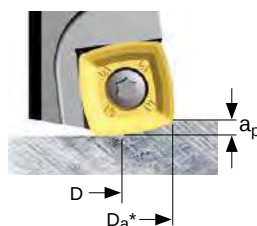


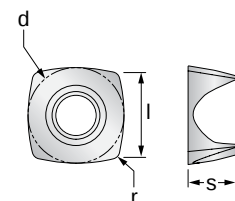
Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilizing full face contact

B = max ramp angle utilizing full contact + internal corner radius

**Depth of Cut (ap)**



Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 2,50	a _p max. 2,00	a _e max. 9,00					
029490	XDLW120508SR-D	X400				12,70	12,70	5,56	0,80	0,10
029488	XDLW120508SR-D	X500				12,70	12,70	5,56	0,80	0,10
029489	XDLW120508SR-D	SC3025				12,70	12,70	5,56	0,80	0,10
029682	XDLT120508ER-D41	X500				12,70	12,70	5,56	0,80	0,05
031534	XDLT120508ER-D41	SP6519				12,70	12,70	5,56	0,80	0,05
033068	XDLT120508ER-D41	SC6525				12,70	12,70	5,56	0,80	0,05
029638	XDLT120508ER-D721	GH2				12,70	12,70	5,56	0,80	0,04
030783	XDLT120512ER-D411	X500				12,70	12,70	5,56	1,20	0,05
030792	XDLT120512ER-D411	SP6519				12,70	12,70	5,56	1,20	0,05

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

XDLW120508SR-D X500 should be used for Alloyed Steel and Stainless Steel with heavy scale.

XDLT120512ER-D411 is a more positive geometry than the -D41 with a larger radius which increases performance during smaller radial engagements or where chipping may occur when using the -D41 geometry.

XDLT120512ER-D411 uses less power than -D41.

80.0VXD92_R12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ²
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SR-D	X400	Facing	0,30 - 2,70	0,30 - 2,50	-	-	-	-	-	-	-	-	-	-	-	0,30 - 1,20	0,30 - 1,50
SR-D	X400	Slotting	0,30 - 2,50	0,30 - 2,40	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,80	0,30 - 1,00
SR-D	X500	Facing	-	0,30 - 2,50	0,20 - 1,70	0,20 - 1,20	-	-	-	-	-	-	-	-	-	-	-
SR-D	X500	Slotting	-	0,30 - 2,40	0,20 - 1,50	0,20 - 1,00	-	-	-	-	-	-	-	-	-	-	-
SR-D	SC3025	Facing	-	-	-	-	0,30 - 3,00	0,30 - 2,80	0,30 - 2,50	-	-	-	-	-	-	-	-
SR-D	SC3025	Slotting	-	-	-	-	0,30 - 2,50	0,30 - 2,30	0,30 - 2,10	-	-	-	-	-	-	-	-
ER-D41	X500	Facing	-	-	0,20 - 1,40	0,20 - 0,90	-	-	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D41	X500	Slotting	-	-	0,20 - 1,10	0,20 - 0,80	-	-	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D41	SP6519	Facing	0,30 - 2,50	0,30 - 2,30	0,20 - 1,20	0,20 - 0,75	0,30 - 2,50	0,30 - 2,30	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D41	SP6519	Slotting	0,30 - 2,00	0,30 - 1,80	0,20 - 1,00	0,15 - 0,60	0,30 - 2,00	0,30 - 1,80	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D41	SC6525	Facing	0,20 - 2,00	0,20 - 1,65	-	-	0,30 - 2,50	0,30 - 2,30	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,20 - 1,75	0,20 - 1,55	-	-	0,30 - 2,00	0,30 - 1,80	-	-	-	-	-	-	-	-	-
ER-D721	GH2	Facing	-	-	-	-	-	-	-	0,30 - 1,50	0,30 - 1,50	-	-	-	-	-	-
ER-D721	GH2	Slotting	-	-	-	-	-	-	-	0,30 - 1,50	0,30 - 1,50	-	-	-	-	-	-
ER-D411	X500	Facing	-	-	0,20 - 1,40	0,20 - 0,90	-	-	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D411	X500	Slotting	-	-	0,20 - 1,10	0,20 - 0,80	-	-	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-
ER-D411	SP6519	Facing	0,30 - 2,50	0,30 - 2,30	0,20 - 1,20	0,20 - 0,75	0,30 - 2,50	0,30 - 2,30	-	-	-	0,20 - 0,85	0,20 - 0,85	0,20 - 0,85	0,20 - 1,00	-	-
ER-D411	SP6519	Slotting	0,30 - 2,00	0,30 - 1,80	0,20 - 1,00	0,15 - 0,60	0,30 - 2,00	0,30 - 1,80	-	-	-	0,10 - 0,70	0,10 - 0,70	0,10 - 0,70	0,10 - 0,80	-	-

Note: HTA = High Temperature Alloys

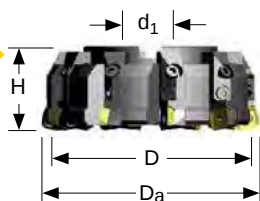
Speed recommendations can be found on page A122.

80.0VXE92-_R-16

Face Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VX92R-16**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VXE92-_ R-16 Bodies with Unequal Medium Pitch & Cartridges												
033207	8000VXE92-100R-16	82,15	106	68	32	3,5	6	031225	DP5013T	030819	TP20	6,10
033208	8000VXE92-125R-16	107,15	131	63	40	3,5	8					
033209	8000VXE92-160R-16	142,15	166	63	40	3,5	10					
033210	8000VXE92-200R-16	182,15	206	63	60	3,5	12					
033211	8000VXE92-250R-16	232,15	256	63	60	3,5	16					
8010VXE92-_ R-16 Bodies with Equal Medium Pitch & Cartridges												
033212	8010VXE92-100R-16**	82,15	106	68	32	3,5	6	031225	DP5013T	030819	TP20	6,10
033213	8010VXE92-125R-16**	107,15	131	63	40	3,5	8					
033214	8010VXE92-160R-16**	142,15	166	63	40	3,5	10					
033215	8010VXE92-200R-16**	182,15	206	63	60	3,5	12					

** Denotes non stock items.

Da* = Outside Diameter

Product		Spares							
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP
Cartridge & Spares									
031308	80VX92R-16	031225	DP5013T	030819	TP20	6,10	022646	7065	-

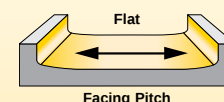
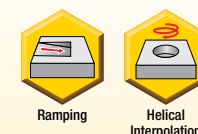
Note: Mounting instructions refer to pages A161 - A164.

Note: XE..1605.., X-Style cutter assemblies cannot utilise the finishing wiper cartridges.

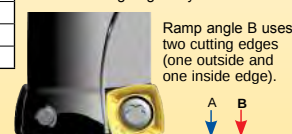
80.0VXE92-_R-16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle		Helical Hole min. - max.		ap max Helical / Linear
			A °	B °			
033207	8000VXE92-100R-16	82,15	0.39	0.47	186	210	2,50
033208	8000VXE92-125R-16	107,15	0.29	0.36	236	260	2,50
033209	8000VXE92-160R-16	142,15	0.22	0.27	306	330	2,50
033210	8000VXE92-200R-16	182,15	0.17	0.20	386	410	2,50
033211	8000VXE92-250R-16	232,15	0.13	0.16	486	510	2,50
033212	8010VXE92-100R-16**	82,15	0.39	0.47	186	210	2,50
033213	8010VXE92-125R-16**	107,15	0.29	0.36	236	260	2,50
033214	8010VXE92-160R-16**	142,15	0.22	0.27	306	330	2,50
033215	8010VXE92-200R-16**	182,15	0.17	0.20	386	410	2,50

** Denotes non stock items.

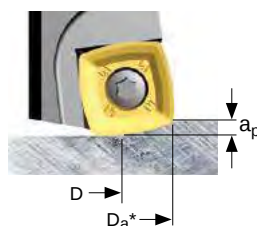


Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilizing full face contact

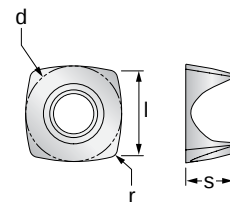
B = max ramp angle utilizing full contact + internal corner radius

**Depth of Cut (ap)**



XELW16-D

XELT16-D41



Cartridge Face Mills



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Facing	Slotting	Plunging	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 3,50	a _p max. 3,00	a _e max. -					
031291	XELW160512SR-D	X400			-	16,80	16,80	5,56	1,20	0,12
031292	XELW160512SR-D	SC3025			-	16,80	16,80	5,56	1,20	0,12
031293	XELT160512ER-D41	X500			-	16,80	16,80	5,56	1,20	0,12
031294	XELT160512ER-D41	SP6519			-	16,80	16,80	5,56	1,20	0,12
033069	XELT160512ER-D41	SC6525			-	16,80	16,80	5,56	1,20	0,12

 Machining Choice: 1st Choice 2nd Choice 3rd Choice | Material Guide Key descriptions found on page A5.

80.0VXE92-_R-16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si	Aluminum & Alloys >16% Si	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >44 HRC	Chilled Cast Iron >1400 N/mm²
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Facing																	
SR-D	X400	Slotting	0,30 - 1,70	0,30 - 1,50	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,50	0,30 - 0,60
SR-D	SC3025	Facing	-	-	-	-	0,30 - 2,00	0,30 - 1,80	0,30 - 1,50	-	-	-	-	-	-	-	-
SR-D	SC3025	Slotting	-	-	-	-	0,30 - 1,50	0,30 - 1,30	0,30 - 1,20	-	-	-	-	-	-	-	-
ER-D41	X500	Facing	-	0,30 - 1,40	0,20 - 1,00	0,20 - 0,60	-	-	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	X500	Slotting	-	0,30 - 1,00	0,20 - 0,80	0,20 - 0,50	-	-	-	-	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,50	-	-
ER-D41	SP6519	Facing	0,30 - 1,50	0,30 - 1,20	0,20 - 1,00	0,20 - 0,50	0,30 - 1,50	0,30 - 1,20	-	-	-	0,20 - 0,60	0,20 - 0,60	0,20 - 0,60	0,20 - 0,80	-	-
ER-D41	SP6519	Slotting	0,30 - 1,20	0,30 - 1,10	0,20 - 0,80	0,20 - 0,45	0,30 - 1,20	0,30 - 1,10	-	-	-	0,10 - 0,40	0,10 - 0,40	0,10 - 0,40	0,10 - 0,50	-	-
ER-D41	SC6525	Facing	0,20 - 1,20	0,20 - 1,00	-	-	0,30 - 1,50	0,30 - 1,20	-	-	-	-	-	-	-	-	-
ER-D41	SC6525	Slotting	0,20 - 1,15	0,20 - 0,90	-	-	0,30 - 1,20	0,30 - 1,10	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A122.

80.0VX.92

Recommended Speeds



Cartridge Face Mills

Speed v_c (m/min)														
80.0VX.92 Series			Wear Resistance											
			- ← → +											
			Speed min. - max.											
Coolant Recommendation														
Recommended ● Possible ◎														
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD Standard		Uncoated Micrograin		CVD Standard		CVD Standard	
			●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
P	Unalloyed Steel	<600 N/mm ² <180 HBN	●	◎			◎	●			◎	●		
		<950 N/mm ² <280 HBN												
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	◎	●	◎	●			◎	●		
		950-1200 N/mm ² 280-355 HBN												
		1200-1400 N/mm ² 355-415 HBN												
M	Stainless Steel	Austenitic + Ferritic 300 series			◎	●	◎	●						
		Martensitic 400 series												
	PH Stainless	Refractory P.H.			●		●							
K	Cast Iron	Grey GG-Ft												
		Spheroidal-Ductile GGG-FGS					◎	●			●		●	
		Malleable GTS - MN/MP												
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●					
		Aluminium + Silicon > 16% Si 92 HBN												
S	High Temperature Alloys	Iron Based												
		Cobalt Based												
		Nickel Based												
		Titanium Based												
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●											
		Chilled Cast Iron >1400 N/mm ² > 400 HBN												



The advantages of face milling and producing cavities with Stellram's high feed face milling are numerous.

The unique design of the insert, approach angle and the cutter body ensure the cutting forces are predominantly directed in the axial direction. The example shown with a round insert tool shows complex forces which result in high levels of vibration and damage to the cutting edge.

80.0VX.92

- Cutting forces predominantly axial.
- Relationship between cutting edge and work piece is at its most stable.
- Results in high feed rates and consistent tool life.



Round Insert Tools

- Tangential forces act around the radius.
- Leads to vibration and damage of the cutting edge.
- Leads to reduced feed and lower productivity.



The 80.0VX.92 (12mm & 16mm) high feed face mill machines with a constant volume of chip throughout all aspects of producing cavities and produces a side wall that is close to profile.

Round insert tools have increasing chip volume through the process.

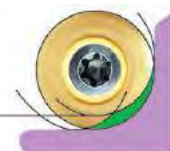
80.0VX.92

- Constant cutting section (chip volume) irrespective of position in cavity.
- Producing a close to profile side wall.
- Near-square side walls possible.



Centre clearance

Side wall



Round insert

- Greater surface contact.
- Increased chip section for side wall machining.
- Vibration in corners.
- Undulating side wall cusps.

CNC Programme - Corner Radius Definition 80.0VX.92

The use of common CAD / CAM systems requires a round insert dimension to be known for cavity machining. This is available with 80.0VX92 cutters as shown to the right and in the reference table.



Programming Data (mm)			
Insert size (mm)	Radius	R	L
12	0,8	2,50	1,02
	1,2	2,73	0,97
16	1,2	4,18	1,46

For finish pass applications:

Wiper Facet for finishing use max. feed 0,8 mm/revolution



Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter (45mm)

Theoretical Diameter for all high feed insert sizes = 45mm

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

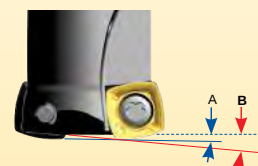
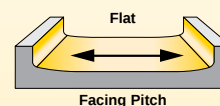
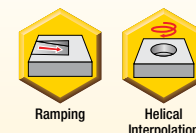
Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

Facing Pitch, Ramp Angle, Helical Interpolation and Max RPM Capacity for 80.0VX.92 Series (mm)

Product		Dimensions								Max RPM
Insert Size	Item Description	D Effective Cutting Diameter	D_a^*	Facing Pitch	Ramping Angle		Helical Hole min. - max.		a_p max Helical / Linear	
12mm	8000VXD92-100R-12	87,95	106,00	87,95	0.31	0.47	192	210	1,80	10800
	8000VXD92-125R-12	112,95	131,00	112,95	0.24	0.36	242	260	1,80	9200
	8000VXD92-160R-12	147,95	166,00	147,95	0.18	0.28	312	330	1,80	7800
	8000VXD92-200R-12	187,95	206,00	187,95	0.14	0.21	392	410	1,80	6800
	8000VXD92-250R-12	237,95	256,00	237,95	0.11	0.17	492	510	1,80	5900
16mm	8000VXE92-100R-16	82,15	106,00	82,15	0.39	0.47	186	210	2,50	10800
	8000VXE92-125R-16	107,15	131,00	107,15	0.29	0.36	236	260	2,50	9200
	8000VXE92-160R-16	142,15	166,00	142,15	0.22	0.27	306	330	2,50	7800
	8000VXE92-200R-16	182,15	206,00	182,15	0.17	0.20	386	410	2,50	6800
	8000VXE92-250R-16	232,15	256,00	232,15	0.13	0.16	486	510	2,50	5900

* Denotes non stock items.

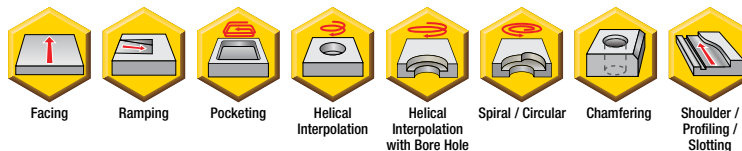


Ramp angle A uses one outside cutting edge only.

Ramp angle B uses two cutting edges (one outside and one inside edge).

A = max ramp angle utilising full face contact

B = max ramp angle utilising full contact + internal corner radius



42° CARTRIDGE FACE MILLING ASSEMBLIES

The **80.0VOD45** cutters are designed to machine all materials. Octagonal inserts offer up to eight economical cutting edges.

80.0VOD45 cutters are assembled with cartridges for OD..0404.. or OD..0605.. milling inserts for face milling applications.

The cutters series **8000VOD45** has an unequal medium pitch for reducing vibration and is for roughing, semi-finishing and finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron and Aluminium Alloys.

The **8010VOD45** series has an equal medium pitch and is especially recommended for roughing, semi-finishing and finishing of High Temperature Alloys such as Iron Based Alloys, Cobalt Based Alloys, Nickel Based Alloys and Titanium.

The **8000VOD45** series can be assembled with a particular wiper cartridge for finishing when a fine finished surface is required. The corresponding pocket on the body for the finishing cartridge is marked with a "F".

Note: The 8010 series are not possible to assemble with a wiper cartridge.

80_0VOD45- _R-04 & -06

80.0VOD45- _R-04:

Maximum $a_p = 3,50\text{mm}$
 $(a_{p1} \text{ max} = 8\text{mm})$
 Effective Cutting Diameter
 Range = 100mm to 400mm

** Denotes non stock items 8000VOD45 diameter 315 - 400mm

** Denotes non stock items 8010VOD45 diameter 100 - 200mm

80.0VOD45- _R-06:

Maximum $a_p = 4,50\text{mm}$
 $(a_{p1} = 10\text{mm})$
 Effective Cutting Diameter
 Range = 100mm to 400mm

** Denotes non stock items 8000VOD45 diameter 315 - 400mm

** Denotes non stock items 8010VOD45 diameter 100 - 200mm

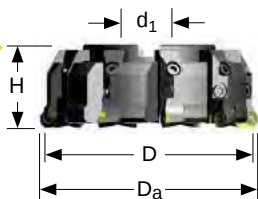


80.0VOD45-_R-04

Face Milling Cutter Assemblies



Cartridge Face Mills



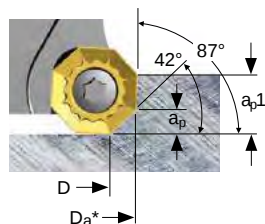
Cutter Body & Cartridges



80VOD45R-04



81FS00R-12



Depth of Cut (ap)

Product		Dimensions (mm)							Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d1	ap max	ap1 max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VOD45-_ R-04 Bodies with Unequal Medium Pitch & Cartridges													
021837	8000VOD45-100R-04	100	108	68	32	3,50	8,00	6	015270	F4011T	015241	T20	3,10
021838	8000VOD45-125R-04	125	133	63	40	3,50	8,00	8					
021839	8000VOD45-160R-04	160	168	63	40	3,50	8,00	10					
021840	8000VOD45-200R-04	200	208	63	60	3,50	8,00	12					
021841	8000VOD45-250R-04	250	258	63	60	3,50	8,00	16					
021842	8000VOD45-315R-04**	315	323	80	60	3,50	8,00	20					
021843	8000VOD45-400R-04**	400	408	80	60	3,50	8,00	24					
8010VOD45-_ R-04 Bodies with Equal Medium Pitch & Cartridges													
021936	8010VOD45-100R-04**	100	108	68	32	3,50	8,00	6	015270	F4011T	015241	T20	3,10
021937	8010VOD45-125R-04**	125	133	63	40	3,50	8,00	8					
021938	8010VOD45-160R-04**	160	168	63	40	3,50	8,00	10					
021939	8010VOD45-200R-04**	200	208	63	60	3,50	8,00	12					

** Denotes non stock items.

Da* = Outside Diameter

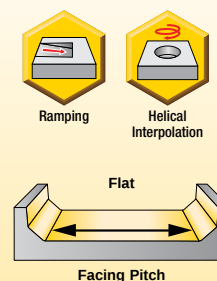
Product		Spares								
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Mounting Screw EDP		Adjustment Screw EDP	
Cartridge & Spares										
014313	80VOD45R-04	015270	F4011T	015241	T20	3,10	022646	7065	-	-
Finishing Cartridge & Spares										
014953	81FS00R-12	015266	D5013T	015241	T20	6,00	022646	7065	016858	72.602

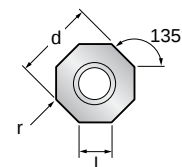
Note: Mounting instructions refer to pages A161 - A164.

80.0VOD45-_R-04 Technical Information (mm)

Product		Dimensions				
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		Max RPM
021837	8000VOD45-100R-04	100	0.17	196	214	10800
021838	8000VOD45-125R-04	125	0.14	246	264	10000
021839	8000VOD45-160R-04	160	0.11	316	334	8000
021840	8000VOD45-200R-04	200	0.09	396	414	6800
021841	8000VOD45-250R-04	250	0.07	496	514	5900
021842	8000VOD45-315R-04**	315	-	-	-	5200
021843	8000VOD45-400R-04**	400	-	-	-	4500
021936	8010VOD45-100R-04**	100	0.17	196	214	10800
021937	8010VOD45-125R-04**	125	0.14	246	264	10000
021938	8010VOD45-160R-04**	160	0.11	316	334	8000
021939	8010VOD45-200R-04**	200	0.09	396	414	6800

** Denotes non stock items.





Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 3,50	ap min. - max. 1,00 - 2,00	ap min. - max. 0,20 - 1,00					
024911	ODET0404APFN-441	GH1	◆	◆	◆	12,70	4,00	4,76	Facet	0,02
022198	ODET0404APEN-44	X500	-	-	●●●■●■	12,70	4,00	4,76	Facet	0,04
031470	ODET0404APEN-44	SP6519	-	-	■●◆◆◆●◆	12,70	4,00	4,76	Facet	0,04
022199	ODET0404APEN-44	MP91M	-	-	◆◆■●■	12,70	4,00	4,76	Facet	0,04
022061	ODMT0404APEN-41	X500	-	●●	-	12,70	4,00	4,76	Facet	0,06
031472	ODMT0404APEN-41	SP6519	-	◆◆◆●	-	12,70	4,00	4,76	Facet	0,06
017775	ODMT0404APEN-41	MP91M	-	■●■●■	-	12,70	4,00	4,76	Facet	0,06
030768	ODMT040408EN-412	X500	-	●●■●■	-	12,70	4,00	4,76	0,80	0,06
030769	ODMT040408EN-412	X700	-	◆◆◆●	-	12,70	4,00	4,76	0,80	0,06
031540	ODMT040408EN-412	SP6519	-	■●●◆	-	12,70	4,00	4,76	0,80	0,06
015143	ODMT040408EN-41	X500	■◆◆	-	-	12,70	4,00	4,76	0,80	0,06
030330	ODMT040408EN-41	X700	●●●●	◆◆◆●	-	12,70	4,00	4,76	0,80	0,06
031471	ODMT040408EN-41	SP6519	●◆◆■●■	-	-	12,70	4,00	4,76	0,80	0,06
017303	ODMT040408EN-41	MP91M	●	-	-	12,70	4,00	4,76	0,80	0,06
027884	ODEW0404APTR-RA	SC3025	-	◆	◆	12,70	4,00	4,76	Wiper Facet	0,19
017672	ODMW040408SN	X500	■●●●●	-	-	12,70	4,00	4,76	0,80	0,27
031462	ODMW040408SN	SP6519	■◆	-	-	12,70	4,00	4,76	0,80	0,27
017304	ODMW040408SN	MP91M	◆●■●■	-	-	12,70	4,00	4,76	0,80	0,27
029096	ODMW040408SN	SC3025	◆	-	-	12,70	4,00	4,76	0,80	0,27

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Feed recommendations can be found on page A127. Speed recommendations can be found on page A128.

INSERT APPLICATION NOTES:
ODMW040408SN X500 should be used on Stainless Steel and High Temperature Alloys with heavy scale.

ODMW040408SN inserts should generally be used for heavy duty applications only.

ODMT040408EN-41 and ODMT040408EN-412 in Grade X700 is recommended for medium roughing of Stainless Steel and High Temperature Alloys when a stronger cutting edge is required.

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. -	ap min. - max. -	ap min. - max. 0,20 - 1,00					
Wiper Inserts										
017237	SPHX12M512EN	GH1	-	-		12,70	12,70	5,00	1,20	0,02
031455	SPHX12M512N	SA9608	-	-		12,70	12,70	5,00	1,20	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Mounting instruction for wiper inserts refer to pages A161 - A164.

80.0VOD45- R-04
Recommended Feeds

Cartridge Face Mills

80.0VOD45- R-04 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
FN-441	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,25	-	-	-	-	-	-
EN-44	X500	Facing	0,06 - 0,30	0,06 - 0,27	0,06 - 0,25	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP6519	Facing	0,06 - 0,30	0,06 - 0,27	0,06 - 0,25	0,06 - 0,20	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	MP91M	Facing	0,06 - 0,30	0,06 - 0,27	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
APEN-41	X500	Facing	0,06 - 0,35	0,06 - 0,22	-	-	-	-	-	-	-	-	-	-	-	-	-
APEN-41	SP6519	Facing	0,06 - 0,35	0,06 - 0,22	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
APEN-41	MP91M	Facing	0,06 - 0,35	0,06 - 0,22	-	-	0,06 - 0,25	0,06 - 0,25	0,06 - 0,23	-	-	-	-	-	-	-	-
EN-412	X500	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,15	0,06 - 0,15	0,06 - 0,15	0,06 - 0,25	-	-
EN-412	X700	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,15	0,06 - 0,15	0,06 - 0,15	0,06 - 0,25	-	-
EN-412	SP6519	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,15	0,06 - 0,15	0,06 - 0,15	0,06 - 0,25	-	-
EN-41	X500	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	X700	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP6519	Facing	0,06 - 0,35	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	MP91M	Facing	-	-	-	-	0,06 - 0,35	0,06 - 0,35	0,06 - 0,35	-	-	-	-	-	-	-	-
TR-RA	SC3025	Facing	-	-	-	-	0,19 - 0,35	0,19 - 0,35	0,19 - 0,35	-	-	-	-	-	-	-	-
SN	X500	Facing	-	0,32 - 0,50	0,30 - 0,40	0,30 - 0,40	-	-	-	-	-	0,20 - 0,30	0,20 - 0,30	0,20 - 0,30	0,20 - 0,33	-	-
SN	SP6519	Facing	0,32 - 0,55	0,32 - 0,50	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	MP91M	Facing	0,32 - 0,55	0,32 - 0,50	-	-	0,32 - 0,50	0,32 - 0,50	0,32 - 0,50	-	-	-	-	-	-	-	-
SN	SC3025	Facing	-	-	-	-	0,32 - 0,50	0,32 - 0,50	0,32 - 0,50	-	-	-	-	-	-	-	-

Wiper Inserts Feed /revolution (f_n in mm)

SPHX	GH1	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-
SPHX	SA9608	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	0,50 - 1,50	0,50 - 1,50	0,50 - 1,50	0,50 - 1,80	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A128.



Speed v_c (m/min)																	
80.0VOD45- _R-04 Series			Wear Resistance														
			Speed min. - max..														
			Coolant Recommendation														
Recommended ● Possible ◎																	
ISO	Materials	Rm and Hardness	CVD X Grade		PVD X Grade		PVD Standard		CVD Standard		CVD Standard		Uncoated Micrograin		Uncoated Cermet		
			Blue	Red	Blue	Red	Blue	Red	Blue	Red	Blue	Red	Blue	Red	Blue	Red	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●													
		<950 N/mm ² <280 HBN															
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●													
		950-1200 N/mm ² 280-355 HBN															
		1200-1400 N/mm ² 355-415 HBN															
M	Stainless Steel	Austenitic + Ferritic 300 series	◎	●													
		Martensitic 400 series															
	PH Stainless	Refractory P.H.	●														
K	Cast Iron	Grey GG-Ft															
		Spheroidal-Ductile GGG-FGS															
		Malleable GTS - MN/MP															
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN															
		Aluminium + Silicon > 16% Si 92 HBN															
S	High Temperature Alloys	Iron Based															
		Cobalt Based															
		Nickel Based															
		Titanium Based															
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN															
		Chilled Cast Iron >1400 N/mm ² > 400 HBN															

* Note: ODET04...441 in Grade GH1 can only be used for Aluminium.

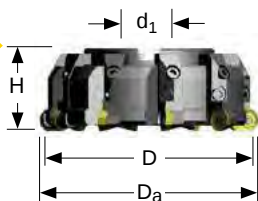
* Note: Wiper Insert SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel, Cast Iron and High Temperature Alloys.

80.0VOD45-_R-06

Face Milling Cutter Assemblies



Cartridge Face Mills



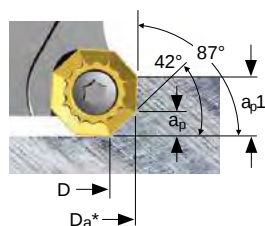
Cutter Body & Cartridges



80VOD45R-06



81FS00R-12



Depth of Cut (ap)

Product		Dimensions (mm)							Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d1	ap max	ap1 max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VOD45-_ R-06 Bodies with Unequal Medium Pitch & Cartridges													
026638	8000VOD45-100R-06	100	110	68	32	4,50	10,00	6	015270	F4011T	015241	T20	3,10
026639	8000VOD45-125R-06	125	135	63	40	4,50	10,00	8					
026640	8000VOD45-160R-06	160	170	63	40	4,50	10,00	10					
026641	8000VOD45-200R-06	200	210	63	60	4,50	10,00	12					
026642	8000VOD45-250R-06	250	260	63	60	4,50	10,00	16					
026643	8000VOD45-315R-06**	315	325	80	60	4,50	10,00	20					
026644	8000VOD45-400R-06**	400	410	80	60	4,50	10,00	24					
8010VOD45-_ R-06 Bodies with Equal Medium Pitch & Cartridges													
026645	8010VOD45-100R-06**	100	110	68	32	4,50	10,00	6	015270	F4011T	015241	T20	3,10
026646	8010VOD45-125R-06**	125	135	63	40	4,50	10,00	8					
026647	8010VOD45-160R-06**	160	170	63	40	4,50	10,00	10					
026648	8010VOD45-200R-06**	200	210	63	60	4,50	10,00	12					

* Denotes non stock items.

Da* = Outside Diameter

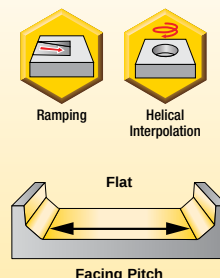
Product		Spares									
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP		
Cartridge & Spares											
026587	80VOD45R-06	015270	F4011T	015241	T20	3,10	022646	7065	-	-	
Finishing Cartridge & Spares											
014953	81FS00R-12	015266	D5013T	015241	T20	6,00	022646	7065	016858	72.602	

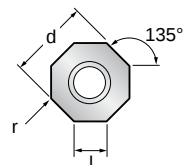
Note: Mounting instructions refer to pages A161 - A164.

80.0VOD45-_R-06 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
026638	8000VOD45-100R-06	100	0.22	194	218	2,60	10800
026639	8000VOD45-125R-06	125	0.18	244	268	2,60	10000
026640	8000VOD45-160R-06	160	0.14	314	338	2,60	8000
026641	8000VOD45-200R-06	200	0.11	394	418	2,60	6800
026642	8000VOD45-250R-06	250	0.09	494	518	2,60	5900
026643	8000VOD45-315R-06**	315	-	-	-	-	5200
026644	8000VOD45-400R-06**	400	-	-	-	-	4500
026645	8010VOD45-100R-06**	100	0.22	194	218	2,60	10800
026646	8010VOD45-125R-06**	125	0.18	244	268	2,60	10000
026647	8010VOD45-160R-06**	160	0.14	314	338	2,60	8000
026648	8010VOD45-200R-06**	200	0.11	394	418	2,60	6800

** Denotes non stock items.





Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 4,50	ap min. - max. 1,00 - 2,00	ap min. - max. 0,20 - 1,00					
026588	ODET0605APFN-441	GH1	◆	◆	◆	16,00	6,00	5,55	Facet	0,02
026592	ODET0605APEN-44	X500	-	-	●●●●●	16,00	6,00	5,55	Facet	0,04
031501	ODET0605APEN-44	SP6519	-	-	◆●■●●	16,00	6,00	5,55	Facet	0,04
034513	ODET0605APEN-44	SP4019	-	-	◆◆◆	16,00	6,00	5,55	Facet	0,04
026591	ODET0605APEN-44	MP91M	-	-	◆●■	16,00	6,00	5,55	Facet	0,04
026590	ODMT0605APEN-41	X500	●●◆	●●●●●	-	16,00	6,00	5,55	Facet	0,06
031502	ODMT0605APEN-41	SP6519	■●●	■◆■●●	-	16,00	6,00	5,55	Facet	0,06
034514	ODMT0605APEN-41	SP4019	◆◆■	◆◆◆	-	16,00	6,00	5,55	Facet	0,06
026589	ODMT0605APEN-41	MP91M	-	◆●■	-	16,00	6,00	5,55	Facet	0,06
027885	ODEW0605APTR-RA	SC3025	-	◆	◆	16,00	6,00	5,55	Facet	0,19
026596	ODMW060512TN	X500	●●●●●	-	-	16,00	6,00	5,55	1,20	0,17
031503	ODMW060512TN	SP6519	■◆	-	-	16,00	6,00	5,55	1,20	0,17
034515	ODMW060512TN	SP4019	●●●	-	◆	16,00	6,00	5,55	1,20	0,17
026595	ODMW060512TN	MP91M	◆●■	-	-	16,00	6,00	5,55	1,20	0,17
025838	ODMW060512SN	X500	●●	-	-	16,00	6,00	5,55	1,20	0,27
031483	ODMW060512SN	SP6519	■◆	-	-	16,00	6,00	5,55	1,20	0,27
025836	ODMW060512SN	MP91M	◆●■	-	-	16,00	6,00	5,55	1,20	0,27
029097	ODMW060512SN	SC3025	◆	-	-	16,00	6,00	5,55	1,20	0,27

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Feed recommendations can be found on page A132. Speed recommendations can be found on page A133.

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. -	ap min. - max. -	ap min. - max. 0,20 - 1,00					
Wiper Inserts										
017237	SPHX12M512EN	GH1	-	-		12,70	12,70	5,00	1,20	0,02
031455	SPHX12M512EN	SA9608	-	-		12,70	12,70	5,00	1,20	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page a5.

Note: Mounting instruction for wiper inserts refer to page A161.

INSERT APPLICATION NOTES:
 ODMW060512TN X500 or SP4019 should be used in Stainless Steel and High Temperature Alloys with heavy scale.

ODMW060512TN should be used when the machine tool has low power available.

ODMW060512SN Geometry should be used for heavy duty applications.

80.0VOD45-_R-06
Recommended Feeds**80.0VOD45-_R-06 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
FN-441	GH1	Facing	-	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,25	-	-	-	-	-
EN-44	X500	Facing	0,06 - 0,35	0,06 - 0,30	0,06 - 0,27	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP6519	Facing	0,06 - 0,35	0,06 - 0,30	0,06 - 0,27	0,06 - 0,20	0,06 - 0,30	0,06 - 0,30	0,06 - 0,30	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	SP4019	Facing	-	-	0,06 - 0,27	0,06 - 0,20	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,25	-	-
EN-44	MP91M	Facing	0,06 - 0,35	0,06 - 0,27	-	-	0,06 - 0,30	0,06 - 0,30	0,06 - 0,30	-	-	-	-	-	-	-	-
EN-41	X500	Facing	0,06 - 0,38	0,06 - 0,35	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP6519	Facing	0,06 - 0,38	0,06 - 0,35	0,06 - 0,35	0,06 - 0,30	0,06 - 0,38	0,06 - 0,38	0,06 - 0,35	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	SP4019	Facing	-	-	0,06 - 0,35	0,06 - 0,30	-	-	-	-	-	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	0,06 - 0,30	-	-
EN-41	MP91M	Facing	0,06 - 0,38	0,06 - 0,35	-	-	0,06 - 0,38	0,06 - 0,38	0,06 - 0,35	-	-	-	-	-	-	-	-
TR-RA	SC3025	Facing	-	-	-	-	0,19 - 0,40	0,19 - 0,40	0,19 - 0,40	-	-	-	-	-	-	-	-
TN	X500	Facing	0,24 - 0,55	0,24 - 0,50	0,24 - 0,40	0,24 - 0,32	-	-	-	-	-	0,17 - 0,25	0,17 - 0,25	0,17 - 0,25	0,20 - 0,28	-	-
TN	SP6519	Facing	0,24 - 0,55	0,24 - 0,50	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	SP4019	Facing	-	-	0,24 - 0,40	0,24 - 0,32	-	-	-	-	-	0,17 - 0,25	0,17 - 0,25	0,17 - 0,25	0,20 - 0,28	0,05 - 0,10	0,05 - 0,12
TN	MP91M	Facing	0,24 - 0,55	0,24 - 0,50	-	-	0,24 - 0,50	0,24 - 0,50	0,17 - 0,50	-	-	-	-	-	-	-	-
SN	X500	Facing	0,32 - 0,60	0,32 - 0,55	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	SP6519	Facing	0,32 - 0,60	0,32 - 0,55	-	-	-	-	-	-	-	-	-	-	-	-	-
SN	MP91M	Facing	0,32 - 0,55	0,32 - 0,55	-	-	0,32 - 0,55	0,32 - 0,55	0,32 - 0,55	-	-	-	-	-	-	-	-
SN	SC3025	Facing	-	-	-	-	0,32 - 0,55	0,32 - 0,55	0,32 - 0,55	-	-	-	-	-	-	-	-

Wiper Inserts Feed /revolution (f_n in mm)

SPHX	GH1	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-
SPHX	SA9608	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	0,50 - 1,50	0,50 - 1,50	0,50 - 1,50	0,50 - 1,80	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A133.



Speed v_c (m/min)																
80.0VOD45-_R-06 Series			Wear Resistance													
			Speed min. - max..													
			Coolant Recommendation													
Recommended ● Possible ○																
ISO	Materials	Rm and Hardness	Water	Oil	CVD X Grade	Water	Oil	PVD Standard	Water	Oil	PVD Standard	Water	Oil	CVD Standard	Water	Oil
			Blue	Red		Blue	Red		Blue	Red		Blue	Red		Blue	Red
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	130 - 270	○	●	130 - 295				●		140 - 345		
		<950 N/mm ² <280 HBN			115 - 240			115 - 260						120 - 305		
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	100 - 210	○	●	100 - 230				●		105 - 270		
		950-1200 N/mm ² 280-355 HBN			75 - 160			75 - 175						80 - 205		
M	Stainless Steel	1200-1400 N/mm ² 355-415 HBN		●	50 - 100		●	50 - 110				●		50 - 130		
		Austenitic + Ferritic 300 series	○	●	115 - 250	○	●	115 - 270	○	●	120 - 280				○	●
	PH Stainless	Martensitic 400 series			100 - 220			105 - 235			110 - 250					
		Refractory P.H.	●		50 - 110	●		50 - 120	●		50 - 130				●	
K	Cast Iron	Grey GG-Ft						140 - 295						145 - 365		
		Spheroidal-Ductile GGG-FGS				○	●	110 - 240				●		115 - 285	●	
		Malleable GTS - MN/MP						100 - 220						105 - 260		
														120 - 335	○	●
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN													●	
		Aluminium + Silicon > 16% Si 92 HBN														
S	High Temperature Alloys	Iron Based			23 - 48			23 - 55			24 - 63					
		Cobalt Based	●		21 - 44	●		22 - 48	●		23 - 52					
		Nickel Based			24 - 51			25 - 55			26 - 59					
		Titanium Based			35 - 73			36 - 79			37 - 84					
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN									50 - 100					
		Chilled Cast Iron >1400 N/mm ² > 400 HBN							●		40 - 90					

* Note: ODET04...441 in Grade GH1 can only be used for Aluminium.

* Note: SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel, Cast Iron and High Temperature Alloys.



80_0VOD45 Technical Information

Feed rate compensation: For 42° cutting, divide the h_m value by the sine of the approach angle (the sine of 42° = 0,669)

i.e.: $\frac{h_m}{0,669}$ or $\frac{0,08}{0,669} = 0,12\text{mm}$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



45° CARTRIDGE FACE MILLING ASSEMBLIES

The robust cutter series 8000VS45- _R-12 is combined with SC..12M5.. square insert.

8000VS45- _R-12 cutters are assembled with 45° cartridges for face milling applications.

This type of cutter utilises 5mm thick and 7° degrees clearance inserts. Due to this feature, these cutters are capable of running higher feed rates compared to other cutters with 45° lead angle.

8000VS45- _R-12 is ideal for applications when machining surfaces with rough scale or irregular stock. These cutters feature a negative rake angle which provide excellent chip evacuation.

The cutter series 8000VS45- _R-12 has an unequal medium pitch for reducing vibration and are suitable for roughing, semi-finishing and finishing of Steel, Steel Alloys, Cast Iron, and Stainless Steel.

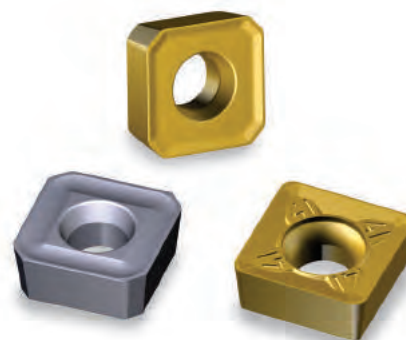
8000VS45.. series can be assembled with a particular wiper cartridge for finishing when a fine finished surface is required. The corresponding pocket on the body for the finishing cartridge is marked with a "F" .

8000VS45- _R-12

8000VS45- _R-12:

Maximum $a_p = 7\text{mm}$
 Effective Cutting Diameter
 Range = 100mm to 400mm

** Denotes non stock items
 diameter 315mm - 400mm

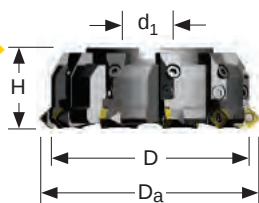
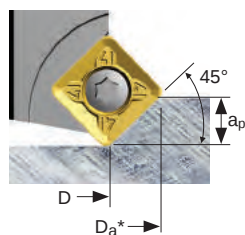


8000VS45-_R-12

Face Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VS45R-12****81FS00R-12****Depth of Cut (ap)**

Product		Dimensions (mm)						Spares					
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm	
8000VS45- R-12 Bodies with Unequal Medium Pitch & Cartridge													
021851	8000VS45-100R-12	100	115	68	32	7	6	015266		D5013T	015241	T20	6,00
021852	8000VS45-125R-12	125	140	63	40	7	8						
021853	8000VS45-160R-12	160	175	63	40	7	10						
021854	8000VS45-200R-12	200	215	63	60	7	12						
021855	8000VS45-250R-12	250	265	63	60	7	16						
021856	8000VS45-315R-12**	315	330	80	60	7	20						
021857	8000VS45-400R-12**	400	415	80	60	7	24						

* Denotes non stock items.

Da* = Outside Diameter

Note: 8000VS45 series are only available in 8000V.

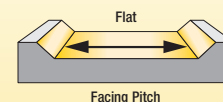
Product		Spares								
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP	
Cartridge & Spares										
014946	80VS45R-12	015266	D5013T	015241	T20	6,00	022646	7065	-	-
Finishing Cartridge & Spares										
014953	81FS00R-12	015266	D5013T	015241	T20	6,00	022646	7065	016858	72.602

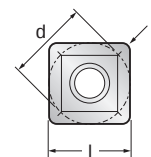
Note: Mounting instructions refer to pages A161 - A164.

8000VS45-_R-12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021851	8000VS45-100R-12	100	-	-	-	-	10800
021852	8000VS45-125R-12	125	-	-	-	-	9200
021853	8000VS45-160R-12	160	-	-	-	-	7800
021854	8000VS45-200R-12	200	-	-	-	-	6800
021855	8000VS45-250R-12	250	-	-	-	-	5900
021856	8000VS45-315R-12**	315	-	-	-	-	5200
021857	8000VS45-400R-12**	400	-	-	-	-	4500

** Denotes non stock items.





Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 7,00	ap min. - max. 1,00 - 3,50	ap min. - max. 0,20 -1,00					

Insert selection with facet

034591	SCCT12M5ACTR	X400	◆◆	●●	◆	12,7	12,7	5,00	Facet	0,15
034552	SCCT12M5ACTR	SP4019	◆◆	◆◆	◆◆	12,7	12,7	5,00	Facet	0,15
017695	SCCT12M5ACTR	GH1	-	-	■	12,7	12,7	5,00	Facet	0,15
017312	SCCT12M5ACER	MP91M	-	●●●	◆◆◆	12,7	12,7	5,00	Facet	0,03
017698	SCHT12M5ACTN	X500	◆◆	●●	●●	12,70	12,70	5,00	Facet	0,15
031504	SCHT12M5ACTN	SP6519	◆◆◆	◆◆◆	◆◆◆	12,70	12,70	5,00	Facet	0,15
017313	SCHT12M5ACTN	MP91M	■	◆	●●●	12,70	12,70	5,00	Facet	0,15
015144	SCKT12M5ACSN-41	X500	●	-	-	12,70	12,70	5,00	Facet	0,12
031556	SCKT12M5ACSN-41	SP6519	●●●	-	-	12,70	12,70	5,00	Facet	0,12
017314	SCKT12M5ACSN-41	MP91M	◆	-	-	12,70	12,70	5,00	Facet	0,12

Insert selection with corner radius

015226	SCMT12M512EN-41	X500	-	◆◆◆	-	12,70	12,70	5,00	1,20	0,06
031475	SCMT12M512EN-41	SP6519	-	◆◆◆	-	12,70	12,70	5,00	1,20	0,06
017317	SCMT12M512EN-41	MP91M	-	◆◆	-	12,70	12,70	5,00	1,20	0,06
034554	SCMT12M512T	X400	◆◆	-	-	12,70	12,70	5,00	1,20	0,15
024129	SCMT12M512T	X500	◆◆	-	-	12,70	12,70	5,00	1,20	0,15
034555	SCMT12M512T	SP6519	◆◆◆	-	-	12,70	12,70	5,00	1,20	0,15
034553	SCMT12M512T	SP4019	◆◆	-	-	12,70	12,70	5,00	1,20	0,15
017316	SCMT12M512T	MP91M	◆◆	-	-	12,70	12,70	5,00	1,20	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Feed recommendations can be found on page A138. Speed recommendations can be found on page A139.

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. -	a _p min. - max. -	a _p min. - max. 0.20 -1.00					

Wiper Inserts

017237	SPHX12M512EN	GH1	-	-	◆◆◆	12,55	12,55	5,00	Wiper Facet	0,02
031455	SPHX12M512EN	SA9608	-	-	◆◆◆	12,55	12,55	5,00	Wiper Facet	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Mounting instruction for wiper inserts refer to page A161.

8000VS45-_R-12
Recommended Feeds**8000VS45-_R-12 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert selection with facet																	
TR	X400	Facing	0,15 - 0,50	0,12 - 0,45	-	-	-	-	-	-	-	-	-	-	-	0,06 - 0,10	0,08 - 0,10
TR	SP4019	Facing	-	-	0,12 - 0,33	0,12 - 0,22	0,15 - 0,36	0,15 - 0,36	0,15 - 0,36	-	-	-	-	-	-	0,06 - 0,10	0,08 - 0,10
TR	GH1	Facing	-	-	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,25	-	-	-	-	-	-	-	-
ER	MP91M	Facing	0,05 - 0,25	0,05 - 0,23	-	-	0,05 - 0,25	0,05 - 0,25	0,05 - 0,23	-	-	-	-	-	-	-	-
TN	X500	Facing	-	-	0,15 - 0,33	0,15 - 0,22	-	-	-	-	-	-	-	-	-	-	-
TN	SP6519	Facing	0,15 - 0,45	0,15 - 0,40	0,15 - 0,33	0,15 - 0,22	0,15 - 0,36	0,15 - 0,36	0,15 - 0,36	-	-	-	-	-	-	-	-
TN	MP91M	Facing	0,15 - 0,40	0,15 - 0,35	-	-	0,12 - 0,40	0,12 - 0,40	0,12 - 0,40	-	-	-	-	-	-	0,06 - 0,10	0,08 - 0,10
SN-41	X500	Facing	-	-	-	0,12 - 0,22	-	-	-	-	-	-	-	-	-	-	-
SN-41	SP6519	Facing	0,12 - 0,40	0,12 - 0,38	0,12 - 0,33	-	-	-	-	-	-	-	-	-	-	-	-
SN-41	MP91M	Facing	-	-	-	-	0,12 - 0,40	0,12 - 0,40	0,12 - 0,40	-	-	-	-	-	-	-	-
Insert selection with corner radius																	
EN-41	X500	Facing	-	-	0,06 - 0,30	0,06 - 0,20	0,06 - 0,30	0,06 - 0,25	-	-	-	-	-	-	-	-	-
EN-41	SP6519	Facing	0,06 - 0,30	0,06 - 0,28	0,06 - 0,30	0,06 - 0,20	0,06 - 0,30	0,06 - 0,25	0,06 - 0,25	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing	0,06 - 0,30	0,06 - 0,28	-	-	0,06 - 0,30	0,12 - 0,25	0,06 - 0,25	-	-	-	-	-	-	-	-
T	X400	Facing	0,15 - 0,38	0,15 - 0,35	-	-	-	-	-	-	-	-	-	-	-	-	-
T	X500	Facing	-	-	0,15 - 0,30	0,15 - 0,20	-	-	-	-	-	-	-	-	-	-	-
T	SP6519	Facing	0,15 - 0,35	0,15 - 0,33	0,15 - 0,30	0,15 - 0,20	0,12 - 0,36	0,12 - 0,36	0,12 - 0,36	-	-	-	-	-	-	-	-
T	SP4019	Facing	-	-	0,12 - 0,30	0,12 - 0,20	0,12 - 0,36	0,12 - 0,36	0,12 - 0,36	-	-	-	-	-	-	-	-
T	MP91M	Facing	0,12 - 0,38	0,12 - 0,32	-	-	0,12 - 0,36	0,12 - 0,36	0,12 - 0,36	-	-	-	-	-	-	-	-
Wiper Inserts Feed /revolution f _n (mm / rev.)																	
SPHX	GH1	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 0,20	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-
SPHX	SA9608	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 0,20	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A139.



Speed v_c (m/min)																							
8000VS45-_R-12 Series			Wear Resistance																				
			-  +																				
			Speed min. - max.																				
Coolant Recommendation																							
Recommended ● Possible ◎																							
ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin			Uncoated Cermets
					X400			X500			SP6519			SP4019			MP91M			GH1*			SA9608
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	120 - 260				◎	●	130 - 295				●	140 - 345		●	230 - 345		●	265 - 380	
		<950 N/mm ² <280 HBN			105 - 230				◎	●	115 - 260				●	120 - 305		●	215 - 305		●	235 - 335	
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	95 - 200				◎	●	100 - 230				●	105 - 270		●	190 - 270		●	205 - 295	
		950-1200 N/mm ² 280-355 HBN	◎	●	70 - 150				◎	●	75 - 175				●	80 - 205		●	140 - 205		●	155 - 225	
		1200-1400 N/mm ² 355-415 HBN		●	45 - 95					●	50 - 110				●	50 - 130		●	90 - 130		●	100 - 145	
M	Stainless Steel	Austenitic + Ferritic 300 series				◎	●	115 - 250	◎	●	115 - 270	◎	●	120 - 280				◎	●	215 - 305	◎	●	235 - 335
		Martensitic 400 series				◎	●	100 - 220	◎	●	105 - 235	◎	●	110 - 250				◎	●	195 - 275	◎	●	215 - 305
	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120	●		50 - 130				●		90 - 180	●		100 - 200
K	Cast Iron	Grey GG-Ft						120 - 280			140 - 295			145 - 330			145 - 365			135 - 290			280 - 400
		Spheroidal-Ductile GGG-FGS				◎	●	105 - 205	◎	●	110 - 240	●		115 - 255	●		115 - 285	◎	●	120 - 245	●		220 - 315
		Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260			115 - 200			200 - 285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																					
		Aluminium + Silicon > 16% Si 92 HBN																					
S	High Temperature Alloys	Iron Based																					
		Cobalt Based																					
		Nickel Based																					
		Titanium Based																					
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105						
		Chilled Cast Iron >1400 N/mm ² > 400 HBN			35 - 80								●	40 - 90		●	40 - 95						

Note: SCCT12M5ACTR in grade GH1 should only be used for machining Cast Iron.

Note: Wiper Insert SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel and Cast Iron.

**8000VS45- _R-12 Technical Information**

Feed rate compensation: For 45° cutting, divide the h_m value by the sine of the approach angle (the sine of 45° = 0,707)

i.e.: $\frac{h_m}{0,707}$ or $\frac{0,08}{0,707} = 0,113\text{mm}$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



45° CARTRIDGE FACE MILLING ASSEMBLIES

The **80.0VSE45** cutter series is primarily designed to machine Stainless Steel and High Temperature Alloys. Also Steel, Steel Alloys, Cast Iron and Aluminium can be machined. Especially, if thin wall components need to be machined. Due to its very positive design requires this cutter series lower power.

The square inserts design with 15° degrees clearance and very positive chip geometry is ideal for reducing build-up edge on tough materials.

Applications:

The 80.0VSE45 cutters are assembled with cartridges for SD..1204.. milling inserts. These cutters are ideal for face milling applications. Available with medium pitch.

The **8000VSE45** cutter series has an **unequal** medium pitch for reducing vibration and are mainly for roughing, semi-finishing and finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron and Aluminium.

The **8010VSE45** cutters series has an **equal** medium pitch and is especially recommended for roughing, semi-finishing and finishing of High Temperature Alloys such as Iron Based Alloys, Cobalt Based Alloys, Nickel Based Alloys and Titanium.

Also, the 8000VSE45 cutter series can be mounted with a particular wiper cartridge for finishing when a fine finished surface is required. The corresponding pocket on the body for the finishing cartridge is marked with a "F".

Note: The 8010 series are not possible to assemble with a wiper cartridge.

80_0VSE-45- _R-12

8000VSE45- _R-12:

Maximum $a_p = 7,00\text{mm}$
 Effective Cutting Diameter
 Range = 100mm to 400mm

** Denotes non stock items diameter
 315mm - 400mm

8010VSE45- _R-12:

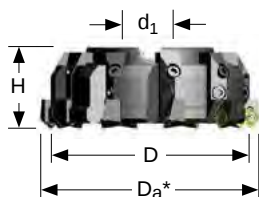
Maximum $a_p = 7,00\text{mm}$
 Effective Cutting Diameter
 Range = = 100mm to 200mm

** Denotes non stock items diameter
 100mm - 200mm



80.0VSE45-_R-12

Face Milling Cutter Assemblies



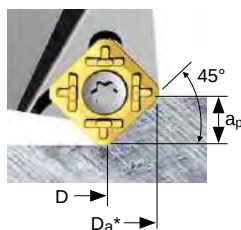
Cutter Body & Cartridges



80_VSE45_R12



81FS00R-12



Depth of Cut (a_p)

Product		Dimensions (mm)						Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VSE45-_ R-12 Bodies with Unequal Medium Pitch & Cartridges												
021859	8000VSE45-100R-12	100	115	68	32	7	6	015270	F4011T	015241	T20	3,10
021862	8000VSE45-125R-12	125	140	63	40	7	8					
021865	8000VSE45-160R-12	160	175	63	40	7	10					
021868	8000VSE45-200R-12	200	215	63	60	7	12					
021871	8000VSE45-250R-12	250	265	63	60	7	16					
021874	8000VSE45-315R-12**	315	330	80	60	7	20					
021877	8000VSE45-400R-12**	400	415	80	60	7	24					
8010VSE45-_ R-12 Bodies with Equal Medium Pitch & Cartridges												
021945	8010VSE45-100R-12**	100	115	68	32	7	6	015270	F4011T	015241	T20	3,10
021948	8010VSE45-125R-12**	125	140	63	40	7	8					
021951	8010VSE45-160R-12**	160	175	63	40	7	10					
021954	8010VSE45-200R-12**	200	215	63	60	7	12					

* Denotes non stock items.

Da* = Outside Diameter

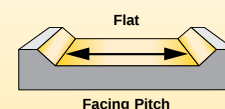
Product		Spares							
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP
Cartridge & Spares									
014948	80VSE45R-12	015270	F4011T	015241	T20	3,10	022646	7065	-
Finishing Cartridge & Spares									
014953	81FS00R-12	015266	D5013T	015241	T20	6,00	022646	7065	016858

Note: Mounting instructions refer to pages A161 - A164.


80.0VSE45-_R-12 Technical Information (mm)

Product		Dimensions					Max RPM
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	
021859	8000VSE45-100R12	100	-	-	-	-	10800
021862	8000VSE45-125R12	125	-	-	-	-	9200
021865	8000VSE45-160R12	160	-	-	-	-	7800
021868	8000VSE45-200R12	200	-	-	-	-	6800
021871	8000VSE45-250R12	250	-	-	-	-	5900
021874	8000VSE45-315R12**	315	-	-	-	-	5200
021877	8000VSE45-400R12**	400	-	-	-	-	4500
021945	8010VSE45-100R12**	100	-	-	-	-	10800
021948	8010VSE45-125R12**	125	-	-	-	-	9200
021951	8010VSE45-160R12**	160	-	-	-	-	7800
021954	8010VSE45-200R12**	200	-	-	-	-	6800

** Denotes non stock items.



80.0VSE45-_R-12
Milling Inserts

SDEX12-701



SDCT12-FN



SDHT12-421



SDKT12-45



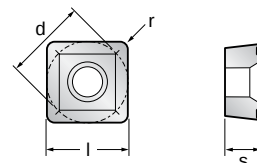
SDHT12-42



SDCW12-TN



SDHW12-TN



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 7,00	a _p min. - max. 1,00 - 3,00	a _p min. - max. 0,20 -1,00					
Insert selection with facet										
034522	SDEX1204AEFN-701	SP4019	-	-	◆◆◆	12,70	12,70	4,76	Facet	0,02
015149	SDEX1204AEFN-701	GH1	◆	◆	◆	12,70	12,70	4,76	Facet	0,02
017243	SDCT1204AEFN	GH1	■	■	■	12,70	12,70	4,76	Facet	0,02
015187	SDHT1204AEEN-421	X500	-	-	●●●	12,70	12,70	4,76	Facet	0,04
031477	SDHT1204AEEN-421	SP6519	-	-	●●●●●	12,70	12,70	4,76	Facet	0,04
017321	SDHT1204AEEN-421	MP91M	-	-	●●◆	12,70	12,70	4,76	Facet	0,04
029457	SDKT1204AEEN-45	X500	-	●●●	-	12,70	12,70	4,76	Facet	0,05
031532	SDKT1204AEEN-45	SP6519	-	●●	-	12,70	12,70	4,76	Facet	0,05
029456	SDKT1204AEEN-45	MP91M	-	●	-	12,70	12,70	4,76	Facet	0,05
017729	SDHT1204AETN-42	X500	◆◆◆	◆◆◆	-	12,70	12,70	4,76	Facet	0,15
031478	SDHT1204AETN-42	SP6519	●●◆◆◆	●●◆◆◆	-	12,70	12,70	4,76	Facet	0,15
017322	SDHT1204AETN-42	MP91M	●	◆◆◆	●●	12,70	12,70	4,76	Facet	0,15
034517	SDCW1204AETN	X400	◆◆	-	◆	12,70	12,70	4,76	Facet	0,15
034516	SDCW1204AETN	SP4019	●●◆	-	■	12,70	12,70	4,76	Facet	0,10
031404	SDCW1204AETN	SA9808	-	-	◆◆	12,70	12,70	4,76	Facet	0,17
017730	SDHW1204AETN	X500	●●	-	-	12,70	12,70	4,76	Facet	0,15
017324	SDHW1204AETN	MP91M	●◆	-	-	12,70	12,70	4,76	Facet	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page 9.**INSERT APPLICATION NOTES:**

SDHW1204AETN X500 should be used for machining Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable.

Note: Feed recommendations can be found on page A146. Speed recommendations can be found on page A147.





SDHT12-422



SDHT12-423



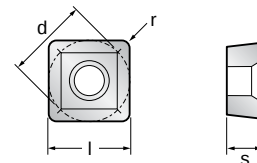
SDMT12-41



SDMW12



SPHX12-EN (wiper)



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 7,00	a _p min. - max. 1,00 - 3,00	a _p min. - max. 0,20 -1,00					
Insert selection with corner radius										
030717	SDHT120412EN-422	X500			-	12,70	12,70	4,76	1,20	0,05
030728	SDHT120412EN-422	SP6519			-	12,70	12,70	4,76	1,20	0,05
031218	SDHT120412EN-423	X500			-	12,70	12,70	4,76	1,20	0,06
031321	SDHT120412EN-423	SP6519			-	12,70	12,70	4,76	1,20	0,06
014411	SDMT120412EN-41	X500			-	12,70	12,70	4,76	1,20	0,05
031480	SDMT120412EN-41	SP6519			-	12,70	12,70	4,76	1,20	0,05
017326	SDMT120412EN-41	MP91M			-	12,70	12,70	4,76	1,20	0,05
015233	SDMW120412TN	X500		-	-	12,70	12,70	4,76	1,20	0,15
034518	SDMW120412TN	SP6519		-	-	12,70	12,70	4,76	1,20	0,15

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.


Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. -	ap min. - max. -	ap min. - max. 0,20 -1,00					
Wiper Inserts										
017237	SPHX12M512EN	GH1	-	-		12,55	12,55	5,00	Wiper Facet	0,02
031455	SPHX12M512N	SA9608	-	-		12,55	12,55	5,00	Wiper Facett	0,02

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Mounting instruction for wiper inserts refer to page A161.

INSERT APPLICATION NOTES:

SDMW120412TN X500 should be used for machining Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable.

SDHT120412EN-423 X500 and SP6519 are recommended for Stainless Steel and High Temperature Alloys when machining conditions are unstable.

Radius inserts are only for semi-roughing applications where a finished surface is not required.

Note: Feed recommendations can be found on page A146. Speed recommendations can be found on page A147.

80.0VSE45- R-12
Recommended Feeds**80.0VSE45_R12 Feeds f_z (mm/tooth)**

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert selection with facet																	
FN-701	SP4019	Facing	-	-	0,05 - 0,25	0,05 - 0,20	-	-	-	0,04 - 0,25	0,04 - 0,25	0,04 - 0,15	0,04 - 0,15	0,04 - 0,15	0,04 - 0,18	-	-
FN-701	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,30	-	-	-	-	-	-
FN	GH1	Facing	-	-	-	-	-	-	-	0,04 - 0,30	0,04 - 0,30	-	-	-	-	-	-
EN-421	X500	Facing	-	-	0,05 - 0,22	0,05 - 0,20	-	-	-	-	-	0,05 - 0,20	0,05 - 0,20	0,05 - 0,20	0,05 - 0,22	-	-
EN-421	SP6519	Facing	0,05 - 0,30	0,05 - 0,25	0,05 - 0,22	0,05 - 0,20	0,05 - 0,28	0,05 - 0,28	0,05 - 0,28	-	-	0,05 - 0,20	0,05 - 0,20	0,05 - 0,20	0,05 - 0,22	-	-
EN-421	MP91M	Facing	0,05 - 0,30	0,05 - 0,25	-	-	0,05 - 0,28	0,05 - 0,28	0,05 - 0,28	-	-	-	-	-	-	-	-
EN-45	X500	Facing	-	-	0,07 - 0,25	0,07 - 0,22	-	-	-	-	-	0,07 - 0,18	0,07 - 0,18	0,07 - 0,18	0,07 - 0,20	-	-
EN-45	SP6519	Facing	0,07 - 0,35	0,07 - 0,30	-	-	-	-	-	-	-	-	-	-	-	-	-
EN-45	MP91M	Facing	-	-	-	-	0,07 - 0,30	0,07 - 0,30	0,07 - 0,30	-	-	-	-	-	-	-	-
TN-42	X500	Facing	-	-	0,15 - 0,27	0,15 - 0,25	-	-	-	-	-	0,15 - 0,20	0,15 - 0,20	0,15 - 0,20	0,15 - 0,23	-	-
TN-42	SP6519	Facing	0,15 - 0,35	0,15 - 0,30	0,15 - 0,27	0,15 - 0,25	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	0,15 - 0,20	0,15 - 0,20	0,15 - 0,20	0,15 - 0,23	-	-
TN-42	MP91M	Facing	0,15 - 0,35	0,15 - 0,30	-	-	0,18 - 0,30	0,18 - 0,30	0,18 - 0,30	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	X400	Facing	0,15 - 0,38	0,15 - 0,33	-	-	-	-	-	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	SP4019	Facing	-	-	0,15 - 0,30	0,15 - 0,27	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	0,08 - 0,12	0,08 - 0,12
TN	SA9808	Facing	0,17 - 0,25	0,17 - 0,23	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	X500	Facing	-	-	-	0,15 - 0,27	-	-	-	-	-	0,15 - 0,18	0,15 - 0,18	0,15 - 0,18	0,15 - 0,20	-	-
TN	MP91M	Facing	0,15 - 0,38	0,15 - 0,33	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	-	-
Insert selection with corner radius																	
EN-422	X500	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-422	SP6519	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-423	X500	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-423	SP6519	Facing	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-41	X500	Facing	0,05 - 0,35	0,05 - 0,30	0,05 - 0,25	0,05 - 0,22	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	0,05 - 0,18	0,05 - 0,18	0,05 - 0,18	0,05 - 0,20	-	-
EN-41	SP6519	Facing	0,05 - 0,35	0,05 - 0,30	-	-	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	-	-	-	-	-	-
EN-41	MP91M	Facing	0,05 - 0,35	0,05 - 0,30	-	-	0,05 - 0,30	0,05 - 0,30	0,05 - 0,30	-	-	-	-	-	-	-	-
TN	X500	Facing	-	-	-	0,15 - 0,27	-	-	-	-	-	0,15 - 0,18	0,15 - 0,18	0,15 - 0,18	0,15 - 0,20	-	-
TN	SP6519	Facing	0,15 - 0,38	0,15 - 0,33	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,30	-	-	-	-	-	-	-	-
Wiper Inserts Feed /revolution fn (mm / rev.)																	
SPHX	GH1	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-
SPHX	SA9608	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	0,50 - 1,50	0,50 - 1,50	0,5 - 1,50	0,50 - 1,80	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A147.



Speed v_c (m/min.)																										
80_0VSE45- R-12 Series			Wear Resistance																							
			-  +																							
			Speed min. - max.																							
Coolant Recommendation Recommended ● Possible ○																										
ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin			Uncoated Cermet			Uncoated Cermet
					X400			X500			SP6519			SP4019			MP91M			GH1*			SA9808			SA9608
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	120 - 260	○	●	130 - 270	○	●	130 - 295					●	140 - 345		●	240 - 345		●	240 - 345		●	265 - 380
		<950 N/mm ² <280 HBN			105 - 230			115 - 240			115 - 260					●	120 - 305		●	215 - 305		●	215 - 305		●	235 - 330
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	95 - 200	○	●	100 - 210	○	●	100 - 230					●	105 - 270		●	190 - 270		●	190 - 270		●	205 - 290
		950-1200 N/mm ² 280-355 HBN			70 - 150			75 - 160			75 - 175					●	80 - 205		●	140 - 205		●	140 - 205		●	155 - 220
		1200-1400 N/mm ² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110				●	50 - 130		●	90 - 130		●	90 - 130		●	100 - 140	
M	Stainless Steel	Austenitic + Ferritic 300 series				○	●	115 - 250	○	●	115 - 270	○	●	120 - 280				○	●	215 - 305				○	●	235 - 330
		Martensitic 400 series				○	●	100 - 220	○	●	105 - 235	○	●	110 - 250				○	●	195 - 275				○	●	215 - 300
	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120	●		50 - 130				●		90 - 180				●		100 - 200
K	Cast Iron	Grey GG-Ft						120 - 280			140 - 295			145 - 330			145 - 365			135 - 290						280 - 400
		Spheroidal-Ductile GGG-FGS				○	●	105 - 205	○	●	110 - 240	●		115 - 255	●		115 - 285	○	●	120 - 245				●		220 - 315
		Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260			115 - 200						200 - 285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●	400-2895				●		400-3050							
		Aluminium + Silicon > 16% Si 92 HBN											●	295-2320				●		295-2440						
S	High Temperature Alloys	Iron Based						23 - 48			23 - 55			24 - 63												50 - 75
		Cobalt Based				●		21 - 44	●		22 - 48	●		23 - 52									●			48 - 70
		Nickel Based						24 - 51			25 - 55			26 - 59												52 - 75
		Titanium Based						35 - 73			36 - 79			37 - 84												60 - 95
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN			45 - 95							●	50 - 100		●	50 - 105										
		Chilled Cast Iron >1400 N/mm ² > 400 HBN	●		35 - 80								●	40 - 90		●	40 - 95									

* Note: SDXE1204AEFN-701 and SDCT1204AEFN GH1 can only be used for Aluminium.

* Note: SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel, and Cast Iron.

**80.0VSE45 Technical Information**

Feed rate compensation: For 45° cutting, divide the h_m value by the sine of the approach angle (the sine of 45° = 0,707)

i.e.: $\frac{h_m}{0,707}$ or $\frac{0,08}{0,707} = 0,113\text{mm}$ programmed feed rate



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



CARTRIDGE ROUND INSERT MILLING ASSEMBLIES

The **80.0VR00- _R-16** cutter series with 6,35mm thick round button inserts is suitable to machine very efficiently irregular surfaces and rough scale. This cutter can also be used for heavy duty applications up to 8mm depth of cut.

Applications:

80.0VR00- _R-16 cutters are assembled with cartridges for RP..1606.. milling inserts for face milling applications. Available with medium pitch.

The cutter series **8000VR00- _R-16** has an unequal medium pitch for reducing vibration and is for roughing of Steel, Steel Alloys, Stainless Steel and Cast Iron.

The cutter series **8010VR00** has an equal medium pitch and is especially recommended for roughing of High Temperature Alloys such as, Iron Based Alloys, Cobalt Based Alloys, Nickel Based Alloys and Titanium.

Also, the 8000VR00- _R-16 series can be mounted with a particular wiper cartridge for finishing, when a fine finished surface is required. The corresponding pocket at the body for the finishing cartridge is marked with an "F".

Note: The 8010 series are not possible to assemble with wiper cartridge.



80.0VR00- _R-16

8000VR00- _R-16:

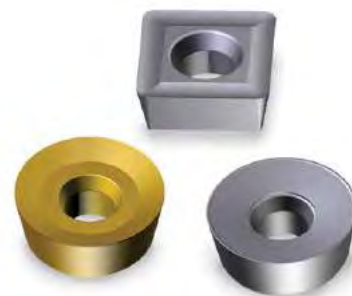
Maximum $a_p = 8,00\text{mm}$
 Diameter Range $D_{a^*} = 116\text{mm}$ to 416mm

**Denotes non stock items
 Diameter 331mm - 416mm

8010VR00- _R-16:

Maximum $a_p = 8,00\text{mm}$
 Diameter Range $D_{a^*} = 116\text{mm}$ to 216mm

**Denotes non stock items
 Diameter 116mm - 216mm

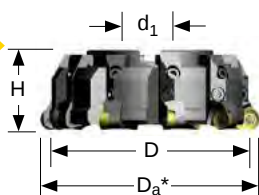
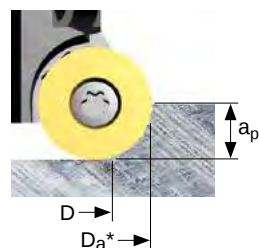


80.0VR00-_R-16

Face Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VRP00R-16****81FS00R-12****Depth of Cut (ap)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
8000VR00-_ R-16 Bodies with Unequal Medium Pitch & Cartridges												
021844	8000VR00-100R-16	100	116	68	32	8	6	015266	D5013T	015241	T20	6,00
021845	8000VR00-125R-16	125	141	63	40	8	8					
021846	8000VR00-160R-16	160	176	63	40	8	10					
021847	8000VR00-200R-16	200	216	63	60	8	12					
021848	8000VR00-250R-16	250	266	63	60	8	16					
021849	8000VR00-315R-16**	315	331	80	60	8	20					
021850	8000VR00-400R-16**	400	416	80	60	8	24					
8010VR00-_ R-16 Bodies with Equal Medium Pitch & Cartridges												
021940	8010VR00-100R-16**	100	116	68	32	8	6	015266	D5013T	015241	T20	6,00
021941	8010VR00-125R-16**	125	141	63	40	8	8					
021942	8010VR00-160R-16**	160	176	63	40	8	10					
021943	8010VR00-200R-16**	200	216	63	60	8	12					

** Denotes non stock items.

Da* = Outside Diameter

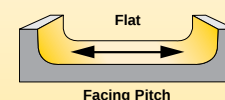
Product		Spares								
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP	
Cartridge & Spares										
014316	80VRP00R-16	015266	D5013T	015241	T20	6,00	022646	7065	-	-
Finishing Cartridge & Spares										
014953	81FS00R-12	015266	D5013T	015241	T20	6,00	022646	7065	016858	72.602

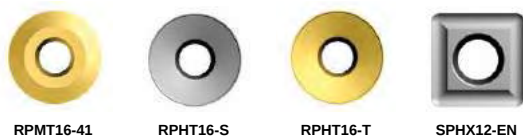
Note: Mounting instructions refer to pages A161 - A164.

80.0VR00-_R-16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021844	8000VR00-100R-16	100	0.32	202	230	4,00	10800
021845	8000VR00-125R-16	125	0.26	252	280	4,00	9200
021846	8000VR00-160R-16	160	0.21	322	350	4,00	7800
021847	8000VR00-200R-16	200	0.17	402	430	4,00	6800
021848	8000VR00-250R-16	250	0.14	502	530	4,00	5900
021849	8000VR00-315R-16**	315	-	-	-	-	5200
021850	8000VR00-400R-16**	400	-	-	-	-	4500
021940	8010VR00-100R-16**	100	0.32	202	230	4,00	10800
021941	8010VR00-125R-16**	125	0.26	252	280	4,00	9200
021942	8010VR00-160R-16**	160	0.21	322	350	4,00	7800
021943	8010VR00-200R-16**	200	0.17	402	430	4,00	6800

** Denotes non stock items.



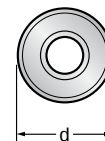


RPMT16-41

RPHT16-S

RPHT16-T

SPHX12-EN



Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 8,00	ap min. - max. 1,00 - 3,00	ap min. - max. 0,20 -1,00					
015223	RPMT1606M0E-41	X500	●●	●●●●	-	16,00	-	6,35	8,00	0,05
017311	RPMT1606M0E-41	MP91M	●	■	-	16,00	-	6,35	8,00	0,05
030390	RPHT1606M0S	X400	◆◆	◆◆◆◆	-	16,00	-	6,35	8,00	0,15
017692	RPHT1606M0T	X500	●●■◆●	●●■◆●◆	-	16,00	-	6,35	8,00	0,10
034566	RPHT1606M0T	SP6519	■◆◆■◆	■◆◆◆◆■	-	16,00	-	6,35	8,00	0,10

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

RPHT1606M0S and RPHT1606M0T should be used for heavy duty applications.



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. -	ap min. - max. -	ap min. - max. 0,20 - 1,00					
Wiper Inserts										
017237	SPHX12M512EN	GH1	-	-		12,55	12,55	5,00	Wiper	0,02
031455	SPHX12M512EN	SA9608	-	-		12,55	12,55	5,00	Wiper	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

Note: Mounting instruction for wiper inserts refer to page A164.

80.0VR00-_R-16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-41	X500	Facing	-	-	0,04 - 0,27	0,04 - 0,16	-	-	-	-	-	0,04 - 0,13	0,04 - 0,13	0,04 - 0,13	0,04 - 0,16	-	-
E-41	MP91M	Facing	-	-	-	-	0,10 - 0,35	0,10 - 0,35	0,10 - 0,30	-	-	-	-	-	-	-	-
S	X400	Facing	0,15 - 0,50	0,15 - 0,45	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15
T	X500	Facing	0,15 - 0,45	0,10 - 0,40	0,10 - 0,40	0,10 - 0,35	0,10 - 0,40	0,10 - 0,40	0,10 - 0,35	-	-	0,10 - 0,28	0,10 - 0,28	0,10 - 0,28	0,10 - 0,30	-	-
T	SP6519	Facing	0,15 - 0,45	0,10 - 0,40	0,10 - 0,40	0,10 - 0,35	0,10 - 0,40	0,10 - 0,40	0,10 - 0,35	-	-	0,10 - 0,28	0,10 - 0,28	0,10 - 0,28	0,10 - 0,30	-	-

Wiper Inserts Feed /revolution f_n (mm / rev.)

SPHX	GH1	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	-	-	-	-	-	-
SPHX	SA9608	Facing	1,00 - 4,00	1,00 - 3,00	0,80 - 2,50	0,80 - 2,00	1,00 - 2,50	0,80 - 2,20	0,80 - 2,00	-	-	0,50 - 1,50	0,50 - 1,50	0,50 - 1,50	0,50 - 1,80	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A152.

80.0VR00- R-16

Recommended Speeds



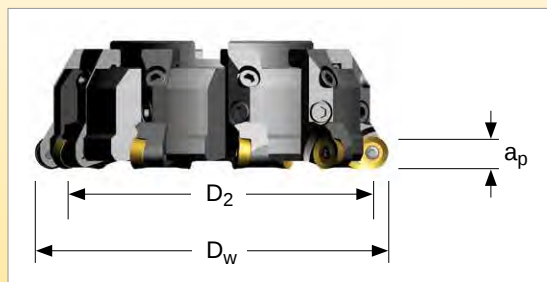
Cartridge Face Mills

Speed v_c (m/min)																				
80.0VR00- R-16 Series			Wear Resistance																	
			-  +																	
			Speed min. - max.																	
Coolant Recommendation																				
Recommended ● Possible ◎																				
ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			CVD Standard			Uncoated Micrograin			Uncoated Cermet
					X400			X500			SP6519			MP91M			GH1*			SA9608
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	120 - 260	◎	●	130 - 270	◎	●	130 - 295						240 - 345		●	265 - 380
		<950 N/mm ² <280 HBN			105 - 230			115 - 240			115 - 260						215 - 305			235 - 335
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	95 - 200	◎	●	100 - 210	◎	●	100 - 230						190 - 270		●	205 - 295
		950-1200 N/mm ² 280-355 HBN			70 - 150			75 - 160			75 - 175						140 - 205			155 - 225
		1200-1400 N/mm ² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	90 - 130		●	100 - 145
M	Stainless Steel	Austenitic + Ferritic 300 series				◎	●	115 - 250	◎	●	115 - 270						215 - 305	◎		235 - 335
		Martensitic 400 series						100 - 220			105 - 235						195 - 275			215 - 305
	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120				●		90 - 180	●		100 - 200
K	Cast Iron	Grey GG-Ft						120 - 280			140 - 295			145 - 365			135 - 290			280 - 400
		Spheroidal-Ductile GGG-FGS				◎	●	105 - 205	◎	●	110 - 240	●		115 - 285	◎	●	120 - 245		●	220 - 315
		Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 260			115 - 200			200 - 285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																		
		Aluminium + Silicon > 16% Si 92 HBN																		
S	High Temperature Alloys	Iron Based						23 - 48			23 - 55									50 - 75
		Cobalt Based						21 - 44			22 - 48									48 - 70
		Nickel Based			●			24 - 51		●	25 - 55								●	52 - 75
		Titanium Based						35 - 73			36 - 79									60 - 95
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		●	45 - 95															
		Chilled Cast Iron >1400 N/mm ² > 400 HBN			35 - 80															

* Note: Wiper Insert SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel and Cast Iron.



80.0VR00-_R-16 Technical Information



Working Diameter:

Formula to evaluate the correct working diameter based on axial depth of cut (a_p).

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

- D_w = Working Diameter
- D_2 = Diameter of cutter insert centre to centre
- r = Insert radius
- a_p = Axial Depth of Cut

80.0VR00-_R-16 Technical Information

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$



Simplified formulas to evaluate h_m and f_z based on axial depth of cut or radial engagement.

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

With round inserts, the thickness of the chip varies depending on the axial depth of cut (a_p) and is related to the size of the cutting edge-preparation. For best tool life it is important to maintain the proper chip thickness as shown below. This chart calculates in relation with axial depth of cut (a_p) only and not radial cut (a_e).

RP..1606.. Insert

Insert	Insert size (mm)	a_p d.o.c. (mm)	h_m (mm)		f_z (mm/z)	
			min.	max.	min.	max.
RPMT1606M0E-41	16	2,00	0,05	0,20	0,14	0,56
	16	3,00	0,05	0,20	0,12	0,46
	16	4,00	0,05	0,20	0,11	0,40
	16	5,00	0,05	0,20	0,09	0,36
	16	6,00	0,05	0,20	0,08	0,33
	16	8,00	0,05	0,20	0,07	0,28
RPHT1606M0S	16	4,00	0,15	0,28	0,30	0,56
	16	5,00	0,15	0,28	0,27	0,50
	16	6,00	0,15	0,28	0,24	0,46
	16	8,00	0,15	0,28	0,21	0,40
RPHT1606M0T	16	2,00	0,10	0,25	0,28	0,71
	16	3,00	0,10	0,25	0,23	0,58
	16	4,00	0,10	0,25	0,20	0,50
	16	5,00	0,10	0,25	0,18	0,45
	16	6,00	0,10	0,25	0,16	0,41
	16	8,00	0,10	0,25	0,14	0,35



CARTRIDGE ROUND INSERT MILLING ASSEMBLIES

The **80.0VR00- _R-20** cutter series with 6,35mm thick round button inserts is one of our strongest cutters.

These cutters machine very efficiently irregular surfaces and rough scale. They can also be used in heavy duty applications up to 10mm depth of cut.

This cutter series has an anti-rotation design which ensures a precise number of indexes per insert. This gives a maximum possible usage of the available edges for roughing applications.

This unique patented pocket system prevents the inserts from rotating in the pocket, during heavy feed machining and unstable conditions.

Applications:

The **80.0VR00- _R-20** cutters are assembled with cartridges for RD..2006.. milling inserts for face milling applications. Available with medium pitch.

The cutters series **8000VR00- _R-20** has an unequal medium pitch for reducing vibration and are for roughing of Steel, Steel Alloys, Stainless Steel and Cast Iron.

The cutter series **8010VR00- _R-20** has an equal medium pitch and is especially recommended for roughing, of High Temperature Alloys such as Iron Based Alloys, Cobalt Based Alloys, Nickel Based Alloys and Titanium.

NOTE: The **80.0VR00- _R-20** series when mounted with cartridge 80VR00- _R-20 using RD..2006.. round button inserts cannot utilise the wiper cartridge for finishing, when a fine finished surface is required.



80.0VR00- _R-20

8000VR00- _R-20:

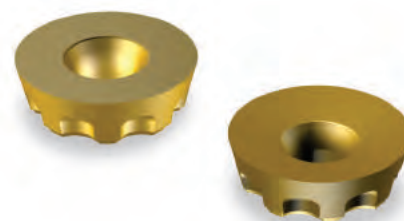
Maximum $a_p = 10,00\text{mm}$
 Diameter Range $D_{a^*} =$
 116mm to 416mm

**Denotes non stock items diameter
 331mm - 416mm

8010VR00- _R-20:

Maximum $a_p = 10,00\text{mm}$
 Diameter Range $D_{a^*} =$
 116mm to 216mm

**Denotes non stock items diameter
 116mm - 216mm

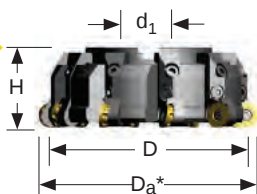


80.0VR00-_R-20

Face Milling Cutter Assemblies



Cartridge Face Mills

**Cutter Body & Cartridges****80VRD00R-20**

Product		Dimensions (mm)						Spares					
EDP	Item Description	D Effective Cutting Diameter	Da*	H	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm	
8000VR00-_ R-20 Bodies with Unequal Medium Pitch & Cartridges													
033139	8000VR00-100R-20	96	116	68	32	10,00	6	029640		D6014T	015241	T20	10,50
033140	8000VR00-125R-20	121	141	63	40	10,00	8						
033141	8000VR00-160R-20	156	176	63	40	10,00	10						
033142	8000VR00-200R-20	196	216	63	60	10,00	12						
033143	8000VR00-250R-20	246	266	63	60	10,00	16						
033144	8000VR00-315R-20**	311	331	80	60	10,00	20						
033145	8000VR00-400R-20**	396	416	80	60	10,00	24						
8010VR00-_ R-20 Bodies with Equal Medium Pitch & Cartridges													
033146	8010VR00-100R-20**	96	116	68	32	10,00	6	029640		D6014T	015241	T20	10,50
033147	8010VR00-125R-20**	121	141	63	40	10,00	8						
033148	8010VR00-160R-20**	156	176	63	40	10,00	10						
033149	8010VR00-200R-20**	196	216	63	60	10,00	12						

** Denotes non stock items.

Da* = Outside Diameter

Product		Spares							
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Cartridge Screw EDP		Adjustment Screw EDP
Cartridge & Spares									
030969	80VRD00R-20	029640	D6014T	015241	T20	10,50	022646	7065	-

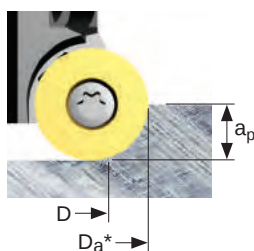
Note: Mounting instructions refer to pages A161 - A164.

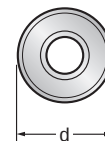
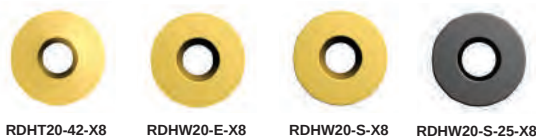
Note: RD..2006.. Round button cutter assemblies cannot utilise the finishing wiper cartridges.

80.0VR00-_R-20 Technical Information (mm)

Product		Dimensions				
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear
033139	8000VR00-100R-20	96	3.30	194	230	5,00
033140	8000VR00-125R-20	121	2.35	244	280	5,00
033141	8000VR00-160R-20	156	1.80	314	350	5,00
033142	8000VR00-200R-20	196	1.40	396	430	5,00
033143	8000VR00-250R-20	246	1.10	494	530	5,00
033144	8000VR00-315R-20**	311	1.00	624	660	5,00
033145	8000VR00-400R-20**	396	0.75	794	830	5,00
033146	8010VR00-100R-20**	96	3.30	194	230	5,00
033147	8010VR00-125R-20**	121	2.35	244	280	5,00
033148	8010VR00-160R-20**	156	1.80	314	350	5,00
033149	8010VR00-200R-20**	196	1.40	396	430	5,00

** Denotes non stock items.

**Depth of Cut (ap)**



Cartridge Face Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 10,00	a _p min. - max. 1,00 - 3,00	a _p min. - max. 0,20 - 1,00					
029310	RDHT2006M0E-42-X8	X500	■◆■	■◆■	-	20,00	-	6,35	10,00	0,08
031533	RDHT2006M0E-42-X8	SP6519	◆■●	◆■●	-	20,00	-	6,35	10,00	0,08
029309	RDHW2006M0E-X8	X500	-	●●●●◆	-	20,00	-	6,35	10,00	0,10
031661	RDHW2006M0S-X8	X500	●●◆	■■■	-	20,00	-	6,35	10,00	0,15
031662	RDHW2006M0S-X8	SP6519	■■■	◆◆◆	-	20,00	-	6,35	10,00	0,15
031660	RDHW2006M0S-25-X8	X500	●●●	-	-	20,00	-	6,35	10,00	0,25
031576	RDHW2006M0S-25-X8	SP6519	◆◆◆	-	-	20,00	-	6,35	10,00	0,25

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.**INSERT APPLICATION NOTES:**

RDHW2006M0E-X8 X500 should be your first choice for medium roughing application when machining Titanium without heavy scale.

RDHW2006M0S-X8 SP6519 should be used when machining Stainless Steel with heavy scale.

RDHW2006M0S-X8 X500 should be used when machining High Temperature Alloys with heavy scale.

RDHT2006M0E-42-X8 should be used when the machine tool has low power available and when the conditions are stable.

RDHW2006M0S-25-X8 should be used for heavy duty applications.

**80.0VR00-_R-20 Feeds f_z (mm/tooth)**

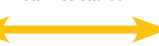
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <18% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-42-X8	X500	Facing	-	-	0,15 - 0,35	0,15 - 0,30	-	-	-	-	-	0,12 - 0,25	0,12 - 0,25	0,12 - 0,25	0,12 - 0,30	-	-
E-42-X8	SP6519	Facing	-	-	0,15 - 0,35	0,15 - 0,28	-	-	-	-	-	0,12 - 0,25	0,12 - 0,25	0,12 - 0,25	0,12 - 0,30	-	-
E-X8	X500	Facing	0,20 - 0,30	0,18 - 0,28	0,20 - 0,40	0,20 - 0,30	0,20 - 0,35	0,20 - 0,35	0,20 - 0,30	-	-	0,20 - 0,28	0,20 - 0,28	0,20 - 0,28	0,20 - 0,32	-	-
S-X8	X500	Facing	0,25 - 0,45	0,25 - 0,35	0,25 - 0,45	0,25 - 0,32	0,25 - 0,45	0,25 - 0,45	0,25 - 0,40	-	-	0,25 - 0,32	0,25 - 0,32	0,25 - 0,32	0,25 - 0,35	-	-
S-X8	SP6519	Facing	0,25 - 0,45	0,25 - 0,35	-	-	0,25 - 0,45	0,25 - 0,45	0,25 - 0,40	-	-	-	-	-	-	-	-
S-25-X8	X500	Facing	0,35 - 0,60	0,35 - 0,50	-	-	0,35 - 0,60	0,35 - 0,55	0,35 - 0,45	-	-	-	-	-	-	-	-
S-25-X8	SP6519	Facing	0,35 - 0,55	0,35 - 0,45	-	-	0,35 - 0,55	0,35 - 0,50	0,35 - 0,40	-	-	-	-	-	-	-	-

Speed recommendations can be found on page A158.

80.0VR00- R-20

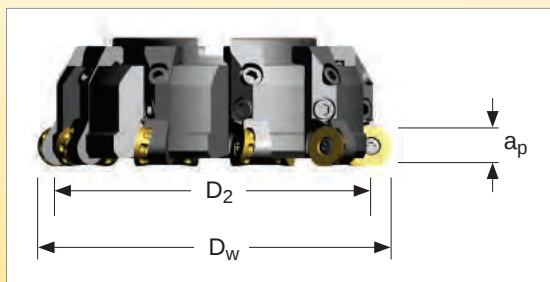
Recommended Speeds



Speed v_c (m/min)									
80_VR00_R20 Series				Wear Resistance					
				-  +					
				Speed min. - max.					
Coolant Recommendation									
Recommended ● Possible ○				CVD X Grade		PVD Standard			
ISO	Materials	Rm and Hardness			X500		SP6519		
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	130 - 270	○	●	130 - 295	
		<950 N/mm ² <280 HBN			115 - 240			115 - 260	
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	100 - 210	○	●	100 - 230	
		950-1200 N/mm ² 280-355 HBN			75 - 160			75 - 175	
		1200-1400 N/mm ² 355-415 HBN		●	50 - 100		●	50 - 110	
M	Stainless Steel	Austenitic + Ferritic 300 series	○	●	115 - 250	○	●	115 - 270	
		Martensitic 400 series			100 - 220			105 - 235	
	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 120	
K	Cast Iron	Grey GG-Ft			120 - 280			140 - 295	
		Spheroidal-Ductile GGG-FGS	○	●	105 - 205	○	●	110 - 240	
		Malleable GTS - MN/MP			95 - 170			100 - 220	
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							
		Aluminium + Silicon > 16% Si 92 HBN							
S	High Temperature Alloys	Iron Based			23 - 48			23 - 55	
		Cobalt Based	●		21 - 44	●		22 - 48	
		Nickel Based			24 - 51			25 - 55	
		Titanium Based			35 - 73			36 - 79	
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN							
		Chilled Cast Iron >1400 N/mm ² > 400 HBN							



80.0VR00-_R-20 Technical Information



Working Diameter:

Formula to evaluate the correct working diameter based on axial depth of cut (a_p).

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

D_w = Working Diameter
 D_2 = Diameter of cutter insert centre to centre
 r = Insert radius
 a_p = Axial Depth of Cut

80.0VR00-_R-20 Technical Information

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$



Simplified formulas to evaluate h_m and f_z based on axial depth of cut or radial engagement.

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

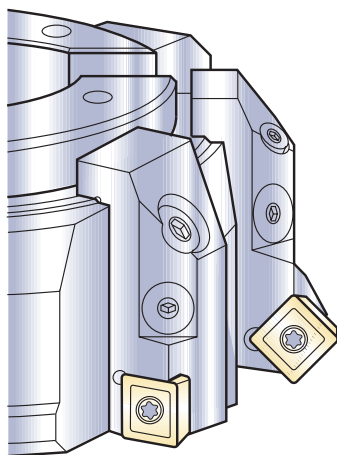
Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

With round inserts, the thickness of the chip varies depending on the axial depth of cut (a_p) and is related to the size of the cutting edge preparation. For best tool life it is important to maintain the proper chip thickness as shown below. This chart calculates in relation with axial depth of cut (a_p) only and not radial cut (a_e).

RD..2006.. Inserts

Insert	Insert size (mm)	a_p d.o.c. (mm)	h_m (mm)		f_z (mm/Z)	
			min.	max.	min.	max.
RDHT2006M0E-42-X8	20	1,00	0,08	0,18	0,36	0,80
	20	2,00	0,08	0,18	0,25	0,57
	20	3,00	0,08	0,18	0,21	0,46
	20	4,00	0,08	0,18	0,18	0,40
	20	5,00	0,08	0,18	0,16	0,36
	20	6,00	0,08	0,18	0,15	0,33
	20	8,00	0,08	0,18	0,13	0,28
	20	10,00	0,08	0,18	0,11	0,25
RDHW2006M0E-X8	20	1,00	0,10	0,20	0,45	0,89
	20	2,00	0,10	0,20	0,32	0,63
	20	3,00	0,10	0,20	0,26	0,52
	20	4,00	0,10	0,20	0,22	0,45
	20	5,00	0,10	0,20	0,20	0,40
	20	6,00	0,10	0,20	0,18	0,37
	20	8,00	0,10	0,20	0,16	0,32
	20	10,00	0,10	0,20	0,14	0,28
RDHW2006M0S-X8	20	3,00	0,15	0,25	0,39	0,65
	20	4,00	0,15	0,25	0,34	0,56
	20	5,00	0,15	0,25	0,30	0,50
	20	6,00	0,15	0,25	0,27	0,46
	20	8,00	0,15	0,25	0,24	0,40
RDHW2006M0S-25-X8	20	4,00	0,25	0,30	0,56	0,67
	20	5,00	0,25	0,30	0,50	0,60
	20	6,00	0,25	0,30	0,46	0,55
	20	8,00	0,25	0,30	0,40	0,47



Surface Finishing with 81FS00 Cartridges

The cartridge 81 FS 00 R-12 is intended to perform finishing operations when used in conjunction with other cartridges as shown in the diagram opposite. They have a fine adjusting set screw to enable the cartridge to be pulled back and pushed forward again to the initial preset position.

Stock removal for finishing should be no more than 1 mm and preferably 0,5 mm. The finishing insert actually removing a maximum 0,03 mm due to it trailing the main cutting inserts.

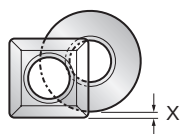
On the cutter series 8000V one, two or even three (according to diameter) of the roughing cartridges may be replaced by an 81 FS 00 R-12 finishing cartridge. One corresponding pocket for a wiper cartridge is marked with an "F".

These cartridges, having a fine adjusting set screw, are set according to the dimension (axial shift) "X".

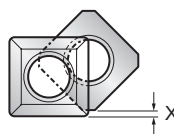
$X = 0,03 - 0,05 \text{ mm}$

($X = 0,02 \text{ mm}$ with a pressed insert with a nose radius)

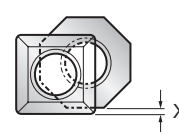
Maximum feed up to 3 mm/rev.



8000VR00 (R-16 only)



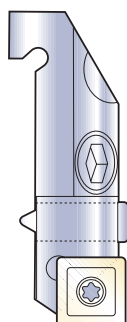
8000VS / VSE45



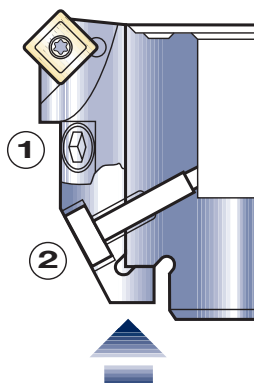
8000VOD45

Note: 8000V Series assemblies that cannot use wiper cartridges are 90 degree A-Style, 20mm Round Button and 12mm and 16mm High Feed Mills.

Also, all 8010V cutter series are not possible to assemble with a wiper insert cartridge.



Product	Spares				
Finishing Insert Part Number	Finishing Cartridge	Cartridge Fixing Screw	Adjusting Cartridge Screw	Fixing Insert Screw	Screwdriver
SPHX 12 M5 12-EN	81 FS 00 R-12	7065	72.602	D5013T	T20



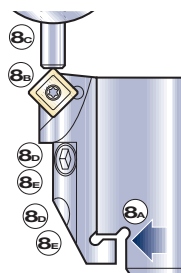
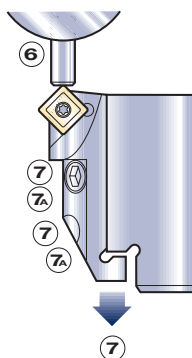
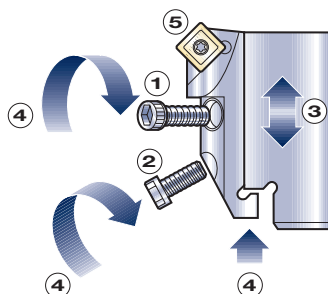
General Cartridge Mounting Instructions

For the majority of current applications, 8000V and 8010V cutters with interchangeable cartridges do not have to be adjusted. The cartridges therefore are mounted by pressing the calibrated heel up against the setting track on the tool body (runout 0,05 mm max., with inserts with ground wiper edges). However, if greater accuracy is required, they may be adjusted individually with a runout of 2- μ m.

A Mounting of Cartridges without Adjustment

1. Lubricate the screw under the head and on the thread (preferably with copper paste).
2. Clean cartridges and their pockets located in the milling cutter.
3. Introduce the first cartridge into its pocket and check if it moves freely.
4. Introduce screw No. 1 and tighten it moderately whilst pushing the cartridge against its axial setting track; mount all the cartridges in the same way.
5. Introduce screw No. 2 and lock it (tightening torque 10 Nm).
6. Lock screw No. 1 well with an extended allen key (tightening torque 18 Nm).
7. Mount the indexable inserts.





B Mounting of Cartridges with Adjustment

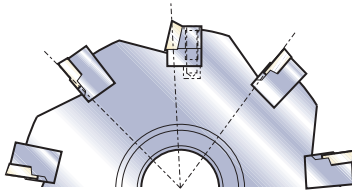
1. Lubricate the screws under the head and on the thread (preferably with copper paste).
2. Clean the cartridges and their pockets located in the milling cutter.
3. Introduce the first cartridge into its pocket and check it moves freely.
4. Introduce screws No. 1 and No. 2 while pushing the cartridge against its axial setting track, tighten screw No. 1.
5. Mount an insert with ground periphery which will serve as a gauge.
6. Gauge the height of the first mounted cartridge, then set the pre-setter to zero. Set the pre-setter so that the measuring system indicates +0,02 mm.
7. Slightly loosen both screws; reverse the cartridge to just below zero in relation to pre-set +0,02mm and again moderately tighten screw No. 1. Using screw No. 2 advance the cartridge to zero. Then loosen screw No. 2.

Instructions for Tightening

After height zero has been reached:

- A Lock screw No. 1 securely with the extended allen key (tightening torque 14 Nm). When doing this it is possible that the cartridge may reverse a little.
- B Re-tighten screw No. 2 to jack cartridge back to zero position.
8. To adjust the other cartridges, proceed as follows:
 - A Mount the cartridge using screw No. 1 which must be moderately tightened.
 - B Mark, as a reference face with a red felt-tipped pen, the insert from the preceding cartridge and introduce it so as to use the same wiper edge.
 - C Rotate the cutter (8A) with the mounted insert (8B) in the position of the lens (8C) on the pre-setter to measure the height.
 - D Introduce screw No. 2 which will help push the cartridge up to position zero on the dial. Loosen the screw.
 - E From this point onwards, follow the tightening instructions described above
 - F Then tighten all screws Nr.2 moderately.
9. Once the mounting of the cartridges is complete, mount the indexable inserts.

NOTE: By proceeding in this way with the mounting of cartridges, the insert seats should all be at a precise height ($\pm 0,002$); only variations in the insert dimensions will then influence the axial runout of the milling cutter.



C Mounting & Setting of the Finishing Cartridges

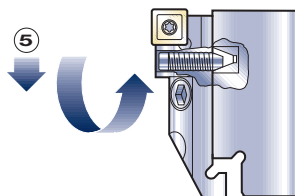
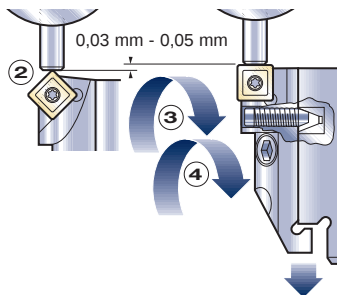
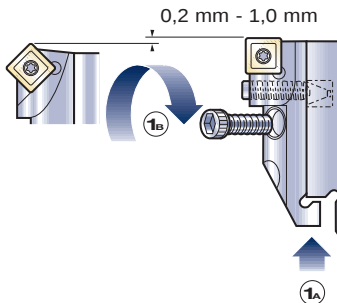
The 8000V series of milling cutters have no additional and independent pockets, but according to their diameter one, two or even three roughing cartridges can be replaced by one finishing cartridge - 81 FS 00 R-12. One corresponding pocket is marked with an "F".

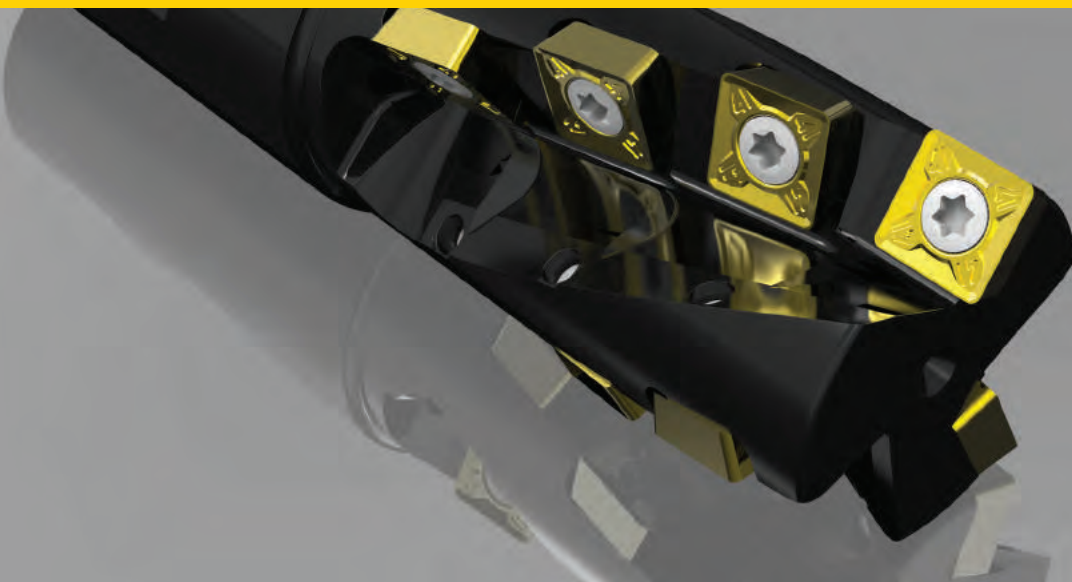
NOTE: When using two or even three finishing cartridges, their equal spacing on the milling cutter circumference must be ensured and the axial runout between the edges of the wiper inserts must be as small as possible.

MOUNTING & SETTING INSTRUCTIONS

1. **A** After the 81 FS 00 R-12 cartridge and its pocket in the cutter body have been cleaned, place the cartridge into its pocket and locate the heel against the setting track.
- B** Introduce the cartridge fixing screw and lightly tighten. The finishing inserts will protrude from the cutting plane of the roughing cartridges 0,2 to 1mm depending upon the roughing inserts being used.
2. Check each insert on the roughing cartridges, whose mounting is described in **A** and **B** so that the highest insert can be marked and used to set the pre-setter to zero.
3. **A** Rotate the cutter until the plunger / lens is placed above the centre of the finishing insert cutting edge.
- B** Screw in the set screw, which will move the 81 FS 00 R-12 finishing cartridge off the setting track until the measuring system indicates +0,03 to 0,05 mm from the zero already set. If the roughing cartridges are equipped with SCMT utility inserts (with as pressed periphery), the offset should only be +0,02mm.
- C** Loosen the cartridge fixing screw and move the cartridge up and down to verify the dimension already set. If necessary, correct the preset dimension by adjusting the set screw.
4. Lightly tighten the cartridge fixing screw.
5. The 81 FS 00 R-12 finishing cartridges are able to be pulled back or pushed forward as necessary to allow for roughing or finishing work as they will always return to the dimension as preset in 3 B and C. So, simply unscrew the fixing screw, push the finishing cartridge either forward or backwards, then lock the screw again.

Note: Not suitable for use on 8010 V cutter bodies.





LONG EDGE MILLING CUTTER

The teeth on **5210 VS** cutters are set with a pronounced left hand helix angle. The chosen angle allows, in most cases, at least two teeth to be engaged in the material continuously allowing a progressive attack on the material by each cutting stroke, thereby reducing insert fracture.

A cutter with a left hand helix has the added advantage of absorbing any looseness in the spindle thus reducing vibration. Cutting starts with the top of each tooth which decreases torsion and initial bending of the tool body.

The negative helix allows a large area for chip formation and chip flow. The indexable inserts used on these tools are particularly thick for high shock resistance and also protection of the tool body.

The 5210VS09/12 series is specifically designed for roughing applications on Steel and Cast Iron.



5210VS

5210VS09:

Maximum a_p = 50mm
Diameter Range = 32mm only

5210VS12:

Maximum a_p = 68mm for Diameter 80mm
77mm for Diameter 100mm
Diameter Range = 80mm to 100mm

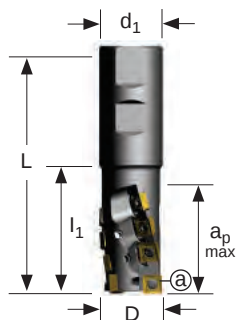
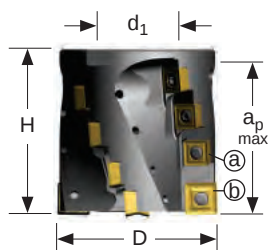


5210VS

Shoulder Milling Cutter



Shoulder Mills

**Weldon Shank****Shell Mill Fixation**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
5210VS09 Weldon Shank												
015235	5210VS09WA032R50	32	119	57	32	50	3	015262	F4010T	015240	T15	3,10
5210VS12 Shell Mill Fixation												
021656	5210VS12-080R68	80	82	-	32	68	4	015266	D5013T	015241	T20	6,00
021657	5210VS12-100R77	100	92	-	40	77	6	015266	D5013T	015241	T20	6,00

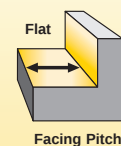
5210VS Assembly Information

Product		Necessary inserts to assemble the cutter	
EDP	Item Description	No. of inserts Pos. a	No. of inserts Pos. b
5210VS09 Weldon Shank			
015235	5210VS09WA032R50	11 x SC 09 only	-
5210VS12 Shell Mill Fixation			
021656	5210VS12-080R68	14 x SO..12M6	2 x SO..15M6
021657	5210VS12-100R77	27 x SO..12M6	2 x SO..15M6

For the 5210VS12 Both inserts (a) and (b) are required to complete each cutter.

5210VS Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
015235	5210VS09WA032R50	32,00	-	-	-	-	35500
021656	5210VS12-080R68	80,00	-	-	-	-	20500
021657	5210VS12-100R77	100,00	-	-	-	-	18000





SCMT09-41



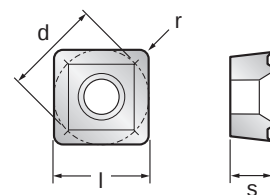
SCMT09-T



SOMT12-B



SOMT15-B



Shoulder Mills

Product			Application & Material				Dimensions (mm)				
EDP	Item Description	Grade	Insert Letter a. or b. for 12mm Inserts	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _{min}
				Depth of Cut (mm)							
				ap max.*	ap min. - max.	ap min. - max.					
SCMT09T308											
015147	SCMT09T308EN-41	X500	-		-	-	9,52	9,52	3,97	0,80	0,04
031474	SCMT09T308EN-41	SP6519	-		-	-	9,52	9,52	3,97	0,80	0,04
017315	SCMT09T308EN-41	MP91M	-		-	-	9,52	9,52	3,97	0,80	0,04
SCMT09T308T											
034550	SCMT09T308T	X400	-		-	-	9,52	9,52	3,97	0,80	0,15
031568	SCMT09T308T	SP6519	-		-	-	9,52	9,52	3,97	0,80	0,15
034551	SCMT09T308T	SP4019	-		-	-	9,52	9,52	3,97	0,80	0,15
SOMT12M612											
015190	SOMT12M612SN-B	X500	a.		-	-	12,70	12,70	6,00	1,20	0,15
031506	SOMT12M612SN-B	SP6519	a.		-	-	12,70	12,70	6,00	1,20	0,15
017329	SOMT12M612SN-B	MP91M	a.		-	-	12,70	12,70	6,00	1,20	0,15
SOMT15M612											
015192	SOMT15M612SN-B	X500	b.		-	-	15,88	15,88	6,00	1,20	0,15
031557	SOMT15M612SN-B	SP6519	b.		-	-	15,88	15,88	6,00	1,20	0,15
017330	SOMT15M612SN-B	MP91M	b.		-	-	15,88	15,88	6,00	1,20	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Determined by selection of cutter

INSERT APPLICATION NOTES:

If the insert SCMT09T308EN-41 Grade SP6519 chips prematurely then use alternative Grade X500

Note: Feed recommendations can be found on page A168. Speed recommendations can be found on page A169.



5210VS

Recommended Feeds



Shoulder Mills

5210VS Feeds f_z (mm/rev)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
SCMT09																	
EN-41	X500	Profiling	0,10 - 0,30	0,10 - 0,28	-	-	-	-	-	-	-	-	-	-	-	-	-
EN-41	SP6519	Profiling	0,10 - 0,30	0,10 - 0,28	-	-	-	-	-	-	-	-	-	-	-	-	-
EN-41	MP91M	Profiling	-	-	-	-	0,12 - 0,33	0,12 - 0,33	0,12 - 0,33	-	-	-	-	-	-	0,08 - 0,13	0,08 - 0,15
T	X400	Profiling	0,20 - 0,40	0,20 - 0,35	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,15	-
T	SP6519	Profiling	0,20 - 0,38	0,20 - 0,33	-	-	0,20 - 0,40	0,20 - 0,35	0,20 - 0,30	-	-	-	-	-	-	-	-
T	SP4019	Profiling	-	-	-	-	0,20 - 0,40	0,20 - 0,35	0,20 - 0,30	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15
SOMT12																	
SN-B	X500	Profiling	0,50 - 0,90	0,40 - 0,70	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	-	-
SN-B	SP6519	Profiling	0,50 - 0,90	0,40 - 0,70	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	-	-
SN-B	MP91M	Profiling	0,50 - 0,90	0,40 - 0,90	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	0,30 - 0,40	0,30 - 0,40
SOMT15																	
SN-B	X500	Profiling	0,50 - 0,90	0,40 - 0,70	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	-	-
SN-B	SP6519	Profiling	0,50 - 0,90	0,40 - 0,70	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	-	-
SN-B	MP91M	Profiling	0,50 - 0,90	0,40 - 0,70	-	-	0,50 - 0,90	0,50 - 0,90	0,40 - 0,70	-	-	-	-	-	-	0,30 - 0,40	0,30 - 0,40

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A169.



Speed v_c (m/min)												
5210VS Series			Wear Resistance									
			-  +									
			Speed min. - max.									
Coolant Recommendation												
Recommended ● Possible ○				PVD X Grade		CVD X Grade		PVD Standard		PVD Standard		CVD Standard
ISO	Materials	Rm and Hardness	 	X400	 	X500	 	SP6519	 	SP4019	 	MP91M
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○ ●	120 - 260	○ ●	130 - 270	○ ●	130 - 295				140 - 345
		<950 N/mm ² <280 HBN		105 - 230		115 - 240		115 - 260			●	120 - 305
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○ ●	95 - 200	○ ●	100 - 210	○ ●	100 - 230				105 - 270
		950-1200 N/mm ² 280-355 HBN		70 - 150		75 - 160		75 - 175			●	80 - 205
		1200-1400 N/mm ² 355-415 HBN		● 45 - 95		● 50 - 100		● 50 - 110			●	50 - 130
M	Stainless Steel	Austenitic + Ferritic 300 series										
		Martensitic 400 series										
	PH Stainless	Refractory P.H.										
K	Cast Iron	Grey GG-Ft				120 - 280		140 - 295		145 - 330		145 - 365
		Spheroidal-Ductile GGG-FGS			○ ●	105 - 205	○ ●	110 - 240	●	115 - 255	●	115 - 285
		Malleable GTS - MN/MP				95 - 170		100 - 220		105 - 235		105 - 260
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										
		Aluminium + Silicon > 16% Si 92 HBN										
S	High Temperature Alloys	Iron Based										
		Cobalt Based										
		Nickel Based										
		Titanium Based										
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		● 45 - 95						● 50 - 100		● 50 - 105
		Chilled Cast Iron >1400 N/mm ² > 400 HBN		● 35 - 80						● 40 - 90		● 40 - 95

Shoulder Mills



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

Multiplication factor for the feed rate based on the percentage of radial engagement of the cutter diameter

Cutter Ø 32mm			Cutter Ø 80mm			Cutter Ø 100mm		
a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor
5	1,60	2,30	5	4,00	2,30	5	5,00	2,30
10	3,20	1,66	10	8,00	1,66	10	10,00	1,66
15	4,80	1,40	15	12,00	1,40	15	15,00	1,40
20	6,40	1,25	20	16,00	1,25	20	20,00	1,25
25	8,00	1,16	25	20,00	1,16	25	25,00	1,16
35	11,20	1,05	35	28,00	1,05	35	35,00	1,05
50 - 100	16,00 - 32,00	1,00	50 - 100	40,00 - 80,00	1,00	50 - 100	50,00 - 100,00	1,00

Example: 80mm diameter cutter using a 8,0mm radial engagement (a_e) = 10% of the cutter diameter.

At 10%, your coefficient is 1,66 (see chart); therefore you must multiply your feed rate by 1,66 for correcting the feed for profiling.



HIGH PERFORMANCE LONG EDGE MILLING CUTTERS

The Stellram **5230VS09** and **VS12** Cutter Series is perfectly qualified for profiling and full slotting.

Designed for high material removal rates in Titanium and High Temperature Alloys. Several applications have shown metal removal rates of up to two times greater than the previous operating cutting parameters.

The advanced Chevron design ensures that one cutting point is always in contact with the material during entrance and exit. This provides optimum harmonic stability - resulting in maximum tool life and a 30% improvement in surface finish. A generous flute capacity coupled with each individual cutting edge having its own jet of coolant, provides for excellent chip evacuation. This works to further enhance surface finish and increases metal removal rates to a higher level of productivity.

The advanced 5230VS series is ideal for rough machining of Steel, Alloyed Steel, Stainless Steel and particular for Titanium and High Temperature Alloys.

Features and Benefits

- Insert positioning provides smooth progressive penetration and cutting action for extended tool life.
- Individual coolant jets to each insert provides constant chip evacuation and temperature stability in the cutting zone.
- The advanced Chevron design improves stability and lowers power consumption, increasing tool life up to 2 times greater than comparable cutter in today's market.
- Proven versatility in a wide application area in Titanium and High Temperature Alloys increasing productivity.

5230VS

5230VS09:

(a_p max is determined by selection of Cutter Diameter)
 Diameter Range and Maximum a_p =
 50mm Dia. with a_p 51mm or 80mm

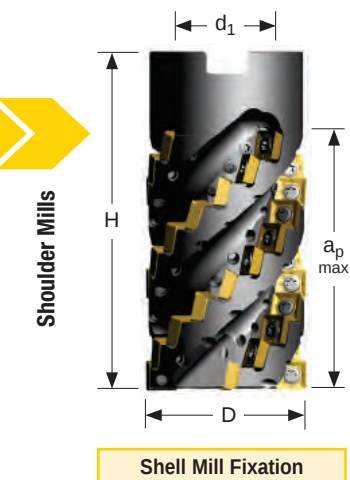
5230VS12:

(a_p max is determined by selection of Cutter Diameter)
 Diameter Range and Maximum a_p =
 63mm Dia. with a_p 57mm or 94mm
 80mm Dia. with a_p 65mm or 110mm
 100mm Dia. with a_p 76mm or 133mm



5230VS09

Chevron Long Edge Milling Cutter (Porcupine)



Product		Dimensions (mm)								Spares				
EDP	Item Description	D	L/H	l1	d1	ap max	ap max Slotting*	No. of flutes	No. of inserts	EDP		EDP		Screw Tightening Nm
5230VS09 Shell Mill Fixation														
031419	5230VS09-A050Z4R51	50	76	-	27	51	44	4	28	015269	F3508T	015240	T15	2,10
031603	5230VS09-A050Z4R80	50	106	-	27	80	-	4	44	015269	F3508T	015240	T15	2,10

* Note: Please do not surpass the recommended max. ap for slotting.

Shell Mills are supplied with inserts screws, coolant control screws, steel coolant plug, nord-lock washer and mounting screw.

5230VS09 Spare Parts

Cutter	Coolant Control Screw			Screwdriver EDP		Steel Coolant Plug		Coolant Plug tightening Nm
	Screw EDP	Screw	Qty.			EDP	Description	
5230VS09-A050Z4R51	015062	F3006T	8	013214	T9	031436	SB-3413	34
5230VS09-A050Z4R80			12			031582	SB-3621	

5230VS09 Torque Values and Spare Parts

Cutter	Nord Lock Washer		Mounting Bolt		**Torque Values in Nm	
	EDP	Description	EDP	Description	Normal Condition	Excessive Condition
5230VS09-A050Z4R51	031258	NLW-0.375	031268	M12-1.75 ISO x 30mm SHCS	80	100
5230VS09-A050Z4R80						

** Torque values for mounting bolts. Excessive condition is when long reach extensions are required or when cutting parameters are elevated to extreme parameters.

5230VS09 Technical Information (mm)

Product		Dimensions					Max RPM
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	
031419	5230VS09-A050Z4R51	50	-	-	-	-	32500
031603	5230VS09-A050Z4R80	50	-	-	-	-	32500





SDHT09-422



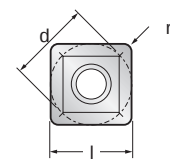
SDHT09-423



SDMT09-41



SDMW09-TN



Shoulder Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max* or a _e max.*	a _p max. and a _e max. 15% D**	a _p min. - max.					
031261	SDHT09T308EN-422	X500	◆	●●●	-	9,52	9,52	3,97	0,80	0,03
033075	SDHT09T308EN-422	SP6519	◆●	◆◆	-	9,52	9,52	3,97	0,80	0,03
031260	SDHT09T308EN-423	X500	◆	-	-	9,52	9,52	3,97	0,80	0,04
033074	SDHT09T308EN-423	SP6519	◆●	◆◆	-	9,52	9,52	3,97	0,80	0,04
014410	SDMT09T308EN-41	X500	●	■	-	9,52	9,52	3,97	0,80	0,04
031479	SDMT09T308EN-41	SP6519	■	■	-	9,52	9,52	3,97	0,80	0,04
017325	SDMT09T308EN-41	MP91M	■	●◆	-	9,52	9,52	3,97	0,80	0,04
015232	SDMW09T308TN	X500	●●	-	-	9,52	9,52	3,97	0,80	0,15
031482	SDMW09T308TN	SP6519	◆◆	-	-	9,52	9,52	3,97	0,80	0,15
017327	SDMW09T308TN	MP91M	◆	-	-	9,52	9,52	3,97	0,80	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page A172.

* Note: a_p max. for profiling is only possible when a_e < 75% of the Diameter.

** Note: For semi finishing, axial engagement a_p for slotting and radial engagement a_e for profiling should be max. 15% of the Diameter. SDHT09T308EN-423 to be used in unstable conditions.

Note: Feed recommendations can be found on page A174. Speed recommendations can be found on page A175.



5230VS09

Recommended Feeds



Shoulder Mills

5230VS09 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
EN-422	X500	Shoulder/Profiling	-	-	0,05 - 0,13	0,05 - 0,12	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	0,05 - 0,11	-	-
		Slotting	-	-	0,04 - 0,11	0,04 - 0,10	-	-	-	-	-	0,05 - 0,07	0,05 - 0,07	0,05 - 0,08	0,05 - 0,09	-	-
EN-422	SP6519	Shoulder/Profiling	-	-	0,05 - 0,12	0,05 - 0,11	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	0,05 - 0,11	-	-
		Slotting	-	-	0,04 - 0,10	0,04 - 0,09	-	-	-	-	-	0,05 - 0,07	0,05 - 0,07	0,05 - 0,08	0,05 - 0,09	-	-
EN-423	X500	Shoulder/Profiling	-	-	-	0,05 - 0,12	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	0,05 - 0,11	-	-
		Slotting	-	-	-	0,05 - 0,10	-	-	-	-	-	0,05 - 0,07	0,05 - 0,07	0,05 - 0,08	0,05 - 0,09	-	-
EN-423	SP6519	Shoulder/Profiling	-	-	0,05 - 0,13	0,05 - 0,11	-	-	-	-	-	0,05 - 0,08	0,05 - 0,08	0,05 - 0,10	0,05 - 0,11	-	-
		Slotting	-	-	0,04 - 0,10	0,04 - 0,09	-	-	-	-	-	0,05 - 0,07	0,05 - 0,07	0,05 - 0,08	0,05 - 0,09	-	-
EN-41	X500	Shoulder/Profiling	0,05 - 0,15	0,05 - 0,14	0,05 - 0,13	-	0,05 - 0,15	0,05 - 0,15	0,05 - 0,13	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,12	0,05 - 0,11	0,05 - 0,11	-	0,05 - 0,12	0,05 - 0,12	0,05 - 0,11	-	-	-	-	-	-	-	-
EN-41	SP6519	Shoulder/Profiling	0,05 - 0,15	0,05 - 0,14	-	-	0,05 - 0,15	0,05 - 0,15	0,05 - 0,13	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,12	0,05 - 0,11	-	-	0,05 - 0,12	0,05 - 0,12	0,05 - 0,11	-	-	-	-	-	-	-	-
EN-41	MP91M	Shoulder/Profiling	0,05 - 0,13	0,05 - 0,13	-	-	0,05 - 0,15	0,05 - 0,15	0,05 - 0,13	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,11	0,05 - 0,10	-	-	0,05 - 0,12	0,05 - 0,12	0,05 - 0,11	-	-	-	-	-	-	-	-
TN	X500	Shoulder/Profiling	0,15 - 0,18	0,15 - 0,17	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	SP6519	Shoulder/Profiling	0,15 - 0,18	0,15 - 0,17	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	MP91M	Shoulder/Profiling	-	-	-	-	0,15 - 0,18	0,15 - 0,18	0,15 - 0,17	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Note: Above feed rates are calculated on centreline.

Speed recommendations can be found on page A175.

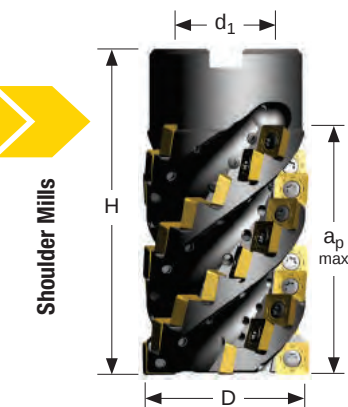


Speed v_c (m/min)								
5230VS Series			Wear Resistance					
			-  +					
			Speed min. - max.					
Coolant Recommendation			CVD X Grade		PVD Standard		CVD Standard	
Recommended ● Possible ◎								
ISO	Materials	Rm and Hardness						
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	◎	●		●
		<950 N/mm ² <280 HBN						●
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	◎	●		●
		950-1200 N/mm ² 280-355 HBN						●
M	Stainless Steel	Austenitic + Ferritic 300 series	◎	●	◎	●		
		Martensitic 400 series						
	PH Stainless	Refractory P.H.	●		●			
K	Cast Iron	Grey GG-Ft						
		Spheroidal-Ductile GGG-FGS	◎	●	◎	●		●
		Malleable GTS - MN/MP						
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN						
		Aluminium + Silicon > 16% Si 92 HBN						
S	High Temperature Alloys	Iron Based						
		Cobalt Based	●		●			
		Nickel Based						
		Titanium Based						
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN						
		Chilled Cast Iron >1400 N/mm ² > 400 HBN						

Shoulder Mills

5230VS12

Chevron Long Edge Milling Cutter (Porcupine)

**Shell Mill Fixation**

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	ap max	ap max Slotting*	No. of flutes	No. of inserts	EDP		EDP		Screw Tightening Nm
5230VS12 Shell Mill Fixation														
031228	5230VS12-A063Z4R57	63	85	-	27	57	52	4	24	015270	F4011T	015241	T20	3,10
031229	5230VS12-A063Z4R94	63	124	-	27	94	-	4	40	015270	F4011T	015241	T20	3,10
031604	5230VS12-A080Z5R65	80	95	-	32	65	60	5	35	015270	F4011T	015241	T20	3,10
031605	5230VS12-A080Z5R110	80	143	-	32	110	-	5	60	015270	F4011T	015241	T20	3,10
031232	5230VS12-A100Z6R76	100	106	-	40	76	70	6	48	015270	F4011T	015241	T20	3,10
031233	5230VS12-A100Z6R133	100	165	-	40	133	-	6	84	015270	F4011T	015241	T20	3,10

* Note: Please do not surpass the recommended max. ap for slotting.

Shell Mills are supplied with inserts screws, coolant control screws, steel coolant plug, nord-lock washer and mounting screw.

5230VS12 Spare Parts

Cutter	Coolant control screw			Screwdriver EDP		Steel Coolant Plug		Coolant Plug tightening Nm
	Screw EDP	Screw	Qty.			EDP	Description	
5230VS12-A063Z4R57	015062	F3006T	8	013214	T9	031262	SB-3229	34
5230VS12-A063Z4R94			12			031263	SB-3230	
5230VS12-A080Z5R65			10			031264	SB-3231	61
5230VS12-A080Z5R110			15			031265	SB-3232	
5230VS12-A100Z6R76			12			031266	SB-3233	61
5230VS12-A100Z6R133			18			031267	SB-3234	

5230VS12 Torque Values and Spare Parts

Cutter	Nord Lock Washer		Mounting Bolt		**Torque Values in Nm	
	EDP	Description	EDP	Description	Normal Condition	Excessive Condition
5230VS12-A063Z4R57	031258	NLW-0.375	031268	M12-1.75 ISO x 30mm SHCS	80	100
5230VS12-A063Z4R94						
5230VS12-A080Z5R65	031226	NLW-12SP	031269	M16-2 ISO x 40mm SHCS	110	150
5230VS12-A080Z5R110						
5230VS12-A100Z6R76	031259	NLW-16SP	031270	M20-2.5 ISO x 50mm SHCS	120	180
5230VS12-A100Z6R133						

** Torque values for mounting bolts. Excessive condition is when long reach extensions are required or when cutting parameters are elevated to extreme parameters.

5230VS12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
031228	5230VS12-A063Z4R57	63	-	-	-	-	21000
031229	5230VS12-A063Z4R94	63	-	-	-	-	21000
031604	5230VS12-A080Z5R65	80	-	-	-	-	18500
031605	5230VS12-A080Z5R110	80	-	-	-	-	18500
031232	5230VS12-A100Z6R76	100	-	-	-	-	16000
031233	5230VS12-A100Z6R133	100	-	-	-	-	16000





SDHT12-422



SDHT12-423



SDMT12-41



SDMW12

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max* or a _e max.*	a _p max. and a _e max. 15% D**	a _p min. - max.					
030717	SDHT120412EN-422	X500	◆◆	●●●	-	12,70	12,70	4,76	1,20	0,05
030728	SDHT120412EN-422	SP6519	◆●	◆◆◆	-	12,70	12,70	4,76	1,20	0,05
031218	SDHT120412EN-423	X500	□■	-	-	12,70	12,70	4,76	1,20	0,06
031321	SDHT120412EN-423	SP6519	■●	■□■	-	12,70	12,70	4,76	1,20	0,06
014411	SDMT120412EN-41	X500	●	■□●	-	12,70	12,70	4,76	1,20	0,05
031480	SDMT120412EN-41	SP6519	■□●	◆◆■	-	12,70	12,70	4,76	1,20	0,05
017326	SDMT120412EN-41	MP91M	■	●●◆	-	12,70	12,70	4,76	1,20	0,05
015233	SDMW120412TN	X500	●●	-	-	12,70	12,70	4,76	1,20	0,15
034518	SDMW120412TN	SP6519	◆◆	-	-	12,70	12,70	4,76	1,20	0,15
017328	SDMW120412TN	MP91M	◆	-	-	12,70	12,70	4,76	1,20	0,15

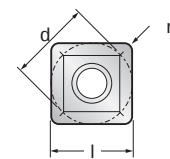
Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page A176.

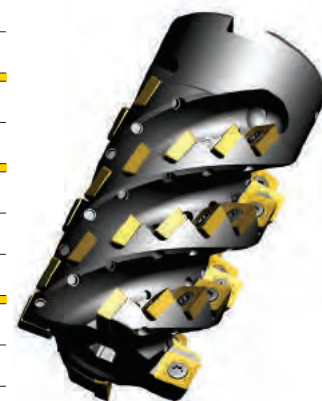
* Note: a_p max. for profiling is only possible when a_e < 75% of the Diameter.

** Note: For semi finishing, axial engagement a_p for slotting and radial engagement a_e for profiling should be max. 15% of the Diameter. SDHT120412EN-423 to be used in unstable conditions.

Note: Feed recommendations can be found on page A178. Speed recommendations can be found on page A179.



Shoulder Mills



5230VS12

Recommended Feeds



Shoulder Mills

5230VS12 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
EN-422	X500	Shoulder/Profiling	-	-	0,05 - 0,15	0,05 - 0,14	-	-		-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,11	0,05 - 0,14	-	-
		Slotting	-	-	0,05 - 0,12	0,05 - 0,11	-	-		-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,09	0,05 - 0,11	-	-
EN-422	SP6519	Shoulder/Profiling	-	-	0,05 - 0,15	0,05 - 0,14	-	-		-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,11	0,05 - 0,14	-	-
		Slotting	-	-	0,05 - 0,12	0,05 - 0,11	-	-		-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,09	0,05 - 0,11	-	-
EN-423	X500	Shoulder/Profiling	-	-	-	0,05 - 0,14	-	-		-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,11	0,05 - 0,14	-	-
		Slotting	-	-	-	0,05 - 0,11	-	-		-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,09	0,05 - 0,11	-	-
EN-423	SP6519	Shoulder/Profiling	-	-	0,05 - 0,15	0,05 - 0,14	-	-		-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,11	0,05 - 0,14	-	-
		Slotting	-	-	0,05 - 0,12	0,05 - 0,11	-	-		-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,09	0,05 - 0,11	-	-
EN-41	X500	Shoulder/Profiling	0,05 - 0,17	0,05 - 0,16	0,05 - 0,15	-	0,05 - 0,17	0,05 - 0,17	0,05 - 0,16	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,14	0,05 - 0,13	0,05 - 0,12	-	0,05 - 0,14	0,05 - 0,14	0,05 - 0,13	-	-	-	-	-	-	-	-
EN-41	SP6519	Shoulder/Profiling	0,05 - 0,17	0,05 - 0,16	-	-	0,05 - 0,17	0,05 - 0,17	0,05 - 0,16	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,14	0,05 - 0,13	-	-	0,05 - 0,14	0,05 - 0,14	0,05 - 0,13	-	-	-	-	-	-	-	-
EN-41	MP91M	Shoulder/Profiling	0,05 - 0,17	0,05 - 0,16	-	-	0,05 - 0,17	0,05 - 0,17	0,05 - 0,16	-	-	-	-	-	-	-	-
		Slotting	0,05 - 0,14	0,05 - 0,13	-	-	0,05 - 0,14	0,05 - 0,14	0,05 - 0,13	-	-	-	-	-	-	-	-
TN	X500	Shoulder/Profiling	0,15 - 0,20	0,15 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	SP6519	Shoulder/Profiling	0,15 - 0,20	0,15 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	MP91M	Shoulder/Profiling	-	-	-	-	0,15 - 0,20	0,15 - 0,20	0,15 - 0,18	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Note: Above feed rates are calculated on centreline.

Speed recommendations can be found on page A179.



Speed v_c (m/min)									
5230VS Series			Wear Resistance						
			-  +						
			Speed min. - max.						
Coolant Recommendation									
Recommended ● Possible ○									
ISO	Materials	Rm and Hardness	 	CVD X Grade	 	PVD Standard	 	CVD Standard	
				X500		SP6519		MP91M	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○ ●	130 - 270	○ ●	130 - 295		140 - 345	
		<950 N/mm ² <280 HBN		115 - 240		115 - 260	●	120 - 305	
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○ ●	100 - 210	○ ●	100 - 230		105 - 270	
		950-1200 N/mm ² 280-355 HBN		75 - 160		75 - 175	●	80 - 205	
M	Stainless Steel	Austenitic + Ferritic 300 series	○ ●	115 - 250	○ ●	115 - 270			
		Martensitic 400 series		100 - 220		105 - 235			
	PH Stainless	Refractory P.H.	●	50 - 110	●	50 - 120			
K	Cast Iron	Grey GG-Ft	○ ●	120 - 280	○ ●	140 - 295		145 - 365	
		Spheroidal-Ductile GGG-FGS		105 - 205		110 - 240	●	115 - 285	
		Malleable GTS - MN/MP		95 - 170		100 - 220		105 - 260	
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							
		Aluminium + Silicon > 16% Si 92 HBN							
S	High Temperature Alloys	Iron Based		23 - 48		23 - 55			
		Cobalt Based	●	21 - 44	●	22 - 48			
		Nickel Based		24 - 51		25 - 55			
		Titanium Based		35 - 73		36 - 79			
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN							
		Chilled Cast Iron >1400 N/mm ² > 400 HBN							

Shoulder Mills



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

h_m Correction Coefficient Chart

Cutter Ø 50mm			Cutter Ø 63mm			Cutter Ø 80mm			Cutter Ø 100mm		
a_e %	a_e (mm)	Coefficient Factor	a_e %	a_e (mm)	Coefficient Factor	a_e %	a_e (mm)	Coefficient Factor	a_e %	a_e (mm)	Coefficient Factor
5	2,50	2,30	5	3,15	2,30	5	4,00	2,30	5	5,00	2,30
10	5,00	1,66	10	6,30	1,66	10	8,00	1,66	10	10,00	1,66
15	7,5	1,40	15	9,45	1,40	15	12,00	1,40	15	15,00	1,40
20	10,00	1,25	20	12,60	1,25	20	16,00	1,25	20	20,00	1,25
25	12,50	1,16	25	15,75	1,16	25	20,00	1,16	25	25,00	1,16
35	17,50	1,05	35	22,05	1,05	35	28,00	1,05	35	35,00	1,05
50 - 100	25,00 - 50,00	1,00	50 - 100	31,50 - 63,00	1,00	50 - 100	40,00 - 80,00	1,00	50 - 100	50,00 - 100,00	1,00

Example: A 50mm diameter cutter using 5,00mm radial engagement (a_e) = 10% of the cutter diameter.

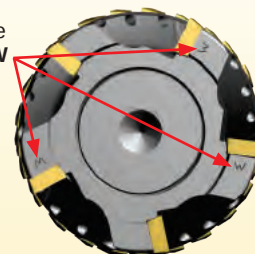
At 10%, your coefficient is 1,66 (see above table); therefore you must multiply your feed rate by 1,66 for correcting the feed for profiling.



The chart above shows the multiplication factor for the feed rate based on the percentage of the radial engagement of the cutter diameter.



Wiper pockets are identified with a **W** engraved on the face of the body.



The 5230VS cutter series is designed with wiper pockets which provide a much better face surface finish. The non-wiper pockets generate the 90° corner. The same inserts can be utilised in all pockets.



Pockets setting difference between wiper and non-wiper inserts.

Note: The true cutter diameter is measured at the non-wiper pockets.



Non wiper pocket positions are set back & square to axis to give a true 90 degree approach.

Wiper pocket positions are in front and angled to allow facing.

Cutter Diameter (mm)	No. of Wiper Inserts
50	2
63	2
80	3
100	3



5230VS09 and VS12 Fitting Instructions for Shell Mill Cutters

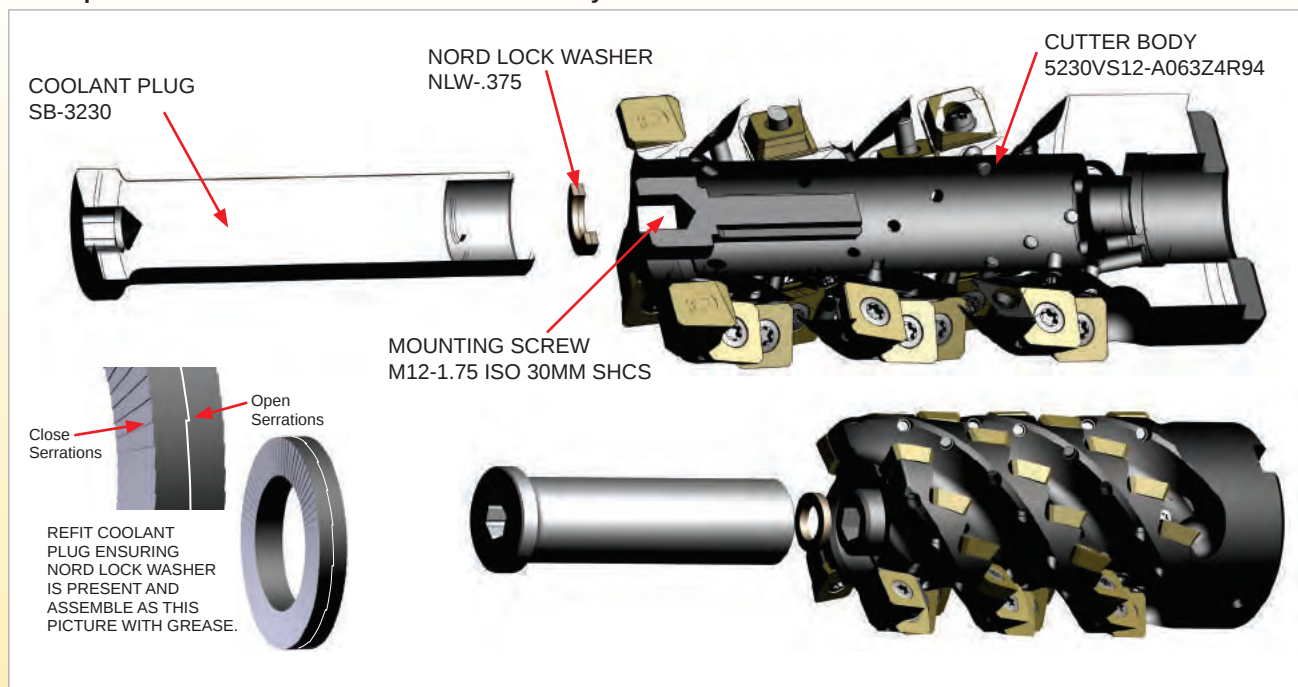
NOTE: All Shell Mill 5230VS09 and VS12 Chevron Porcupine Cutters are supplied assembled with mounting bolt, nord lock washer and steel coolant plug.

Please follow the instructions below to disassemble the cutter, attach the cutter to a shell mill adapter and reassemble coolant plug. It is very important to use the proper torque when reassembling the cutter with the mounting bolt, nord lock washer and coolant plug.



Shoulder Mills

Example of cutter: 5230VS12-A063Z4R94 assembly



1. Remove coolant plug. (Note: Ensure the nord lock washer is retained to the bottom of the coolant plug.)
2. Fit the cutter body to the shell mill adapter and secure using the mounting bolt supplied with the cutter.
Note: The mounting bolt must be properly torqued to the specified torque setting shown in the above chart in (page A182) Detail 1.
3. Refit coolant plug ensuring nord lock washer is present and in the proper location on the bottom of the coolant plug.
A small amount of grease can be used to hold the nord lock washer in place.
4. Tighten coolant plug with specified torque setting shown in the above chart in (page A182) Detail 2.
5. Note: If axial depth of cut (a_p) is less than maximum a_p of the cutter, then F3006T coolant control screws supplied separately can be used to block coolant holes forcing more coolant to the front of the cutter. If these screws are used, please secure with loctite or similar product.

**Torque values for mounting bolts**

Excessive condition is when long reach extensions are required or when cutting parameters are elevated to extreme parameters.

5230VS09		Detail 1		Detail 2	
Cutter	Mounting Bolt Description	**Torque Values in Nm for Mounting Bolt		Coolant Plug Description	Coolant Plug tightening Nm
		Normal Condition	Excessive Condition		
5230VS09-A050Z4R51	M12-1.75 ISO x 30mm SHCS	80	100	SB-3413	34
5230VS09-A050Z4R80				SB-3621	

5230VS12		Detail 1		Detail 2	
Cutter	Mounting Bolt Description	**Torque Values in Nm for Mounting Bolt		Coolant Plug Description	Coolant Plug tightening Nm
		Normal Condition	Excessive Condition		
5230VS12-A063Z4R57	M12-1.75 ISO x 30mm SHCS	80	100	SB-3229	34
5230VS12-A063Z4R94				SB-3230	
5230VS12-A080Z5R65	M16-2 ISO x 40mm SHCS	110	150	SB-3231	61
5230VS12-A080Z5R110				SB-3232	
5230VS12-A100Z6R76	M20-2.5 ISO x 50mm SHCS	120	180	SB-3233	61
5230VS12-A100Z6R133				SB-3234	

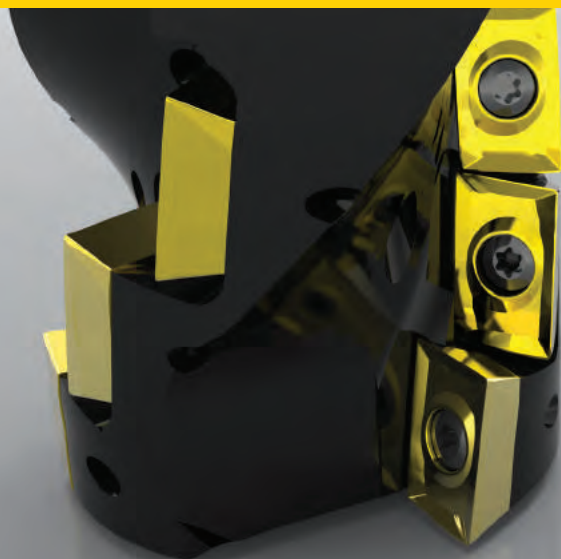
Hex Keys



M12 = Hex Key Size 10

M16 = Hex Key Size 14

M20 = Hex Key Size 17



LONG EDGE MILLING CUTTER

The 5315VA family is the long edge cutter version of our versatile 7690VA shoulder milling series.

This 5315VA series offers full effective flutes with right-hand helix angle for high feed rates.

This cutter is ideal for side milling and slotting applications.

The main characteristic of this cutter family is it's, lower cutting force due to the high helix design.

The 5315VA series are designed for roughing and semi-finishing applications, in Steel, Alloyed Steel, Stainless Steel, High Temperature Alloys, Cast Iron and Aluminium Alloys.



5315VA

5315VA12:

Maximum a_p = 23mm to 45mm
 Diameter Range = 25mm to 40mm

5315VA16:

Maximum a_p = 31mm to 61mm
 Diameter Range = 50mm to 80mm

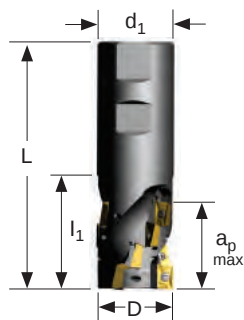
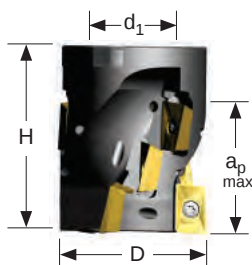


5315VA12

Long Edge Milling Cutter (Porcupine)



Shoulder Mills

**Weldon Shank****Shell Mill Fixation**

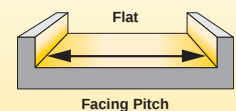
Product		Dimensions (mm)								Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	a _{p1} max Slotting*	No. of flutes	No. of inserts	EDP		EDP		Screw Tightening Nm
5315VA12 Weldon Shank														
029106	5315VA12WA025R23	25	96	40	25	23	15	2	4	027860	F3007T	022157	T8	1,40
029107	5315VA12WA025R35	25	106	50	25	35	-	2	6	027860	F3007T	022157	T8	1,40
029108	5315VA12WA032R35	32	110	50	32	35	20	3	9	027860	F3007T	022157	T8	1,40
029109	5315VA12WA040R45	40	130	60	40	45	22	3	12	027860	F3007T	022157	T8	1,40
5315VA12 Shell Mill Fixation														
029110	5315VA12-A040R34	40	50	-	16	34	25	3	9	027860	F3007T	022157	T8	1,40

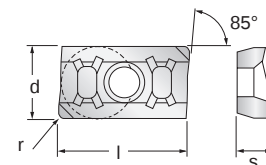
* Note: Please do not surpass the recommended max. a_p for slotting.

Note: Please note that a maximum of 0,8mm insert radius is allowed on the 5315VA12 range of cutters.
Larger radii inserts can be used on the leading pocket only if the body is modified by the end user.

5315VA12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
029106	5315VA12WA025R23	25,00	-	-	-	-	36100
029107	5315VA12WA025R35	25,00	-	-	-	-	36100
029108	5315VA12WA032R35	32,00	-	-	-	-	36100
029109	5315VA12WA040R45	40,00	-	-	-	-	30400
029110	5315VA12-A040R34	40,00	-	-	-	-	26400





Shoulder Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max* or ae max.*	ap max. and ae max. 15% D**	ap min. - max.					
029098	ADGT12T3PDR-721	GH1	◆	◆	-	7,87	12,70	3,97	Facet	0,04
030856	ADET12T308ER-48	X500	◆	◆	-	7,87	12,70	3,97	0,80	0,04
030857	ADET12T308ER-48	SP6519	●	●●	-	7,87	12,70	3,97	0,80	0,04
030807	ADET12T3PDER-48	X500	◆	◆	-	7,87	12,70	3,97	Facet	0,04
030770	ADET12T3PDER-48	SP6519	●	●●	-	7,87	12,70	3,97	Facet	0,04
029329	ADHT12T308ER-46	X500	■◆●	-	-	7,87	12,70	3,97	0,80	0,05
030406	ADHT12T308ER-46	X700	-	◆◆●	-	7,87	12,70	3,97	0,80	0,05
031526	ADHT12T308ER-46	SP6519	◆■	■	-	7,87	12,70	3,97	0,80	0,05
029327	ADHT12T3PDER-46	X500	■◆●	-	-	7,87	12,70	3,97	Facet	0,05
031525	ADHT12T3PDER-46	SP6519	◆■	■	-	7,87	12,70	3,97	Facet	0,05
027913	ADKT12T3PDER-45	X500	●■●	●●	-	7,87	12,70	3,97	Facet	0,08
031514	ADKT12T3PDER-45	SP6519	◆◆■	◆◆■	-	7,87	12,70	3,97	Facet	0,08
027915	ADKT12T3PDER-45	MP91M	■●●	■●●	-	7,87	12,70	3,97	Facet	0,08
027916	ADKT12T3PDER-45	SC3025	◆	◆	-	7,87	12,70	3,97	Facet	0,08

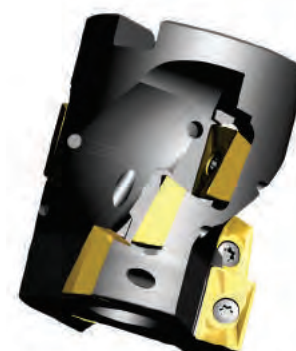
Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page A184.

* Note: Please respect the following rule for profiling with a_p max:

for Weldon shank cutter Diameter 25mm	a _e < 25% D
for Weldon shank cutter Diameter 32mm	a _e < 35% D
for Weldon shank cutter Diameter 40mm	a _e < 40% D
for Shell mill cutter Diameter 40mm	a _e < 75% D

** Note: For semi finishing, axial engagement a_p for slotting and radial engagement a_e for profiling should be max. 15% of the Diameter.

Note: Feed recommendations can be found on page A186. Speed recommendations can be found on page A187.



5315VA12

Recommended Feeds



Shoulder Mills

5315VA12 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
FR-721	GH1	Shoulder / Profiling	-	-	-	-	-	-	-	0,04 - 0,20	0,04 - 0,18	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	0,04 - 0,15	0,04 - 0,14	-	-	-	-	-	-
ER-48	X500	Shoulder / Profiling	-	-	-	-	-	-	-	-	-	0,04 - 0,09	0,04 - 0,09	0,04 - 0,10	0,04 - 0,14	-	-
		Slotting	-	-	-	-	-	-	-	-	-	0,04 - 0,07	0,04 - 0,07	0,04 - 0,08	0,04 - 0,12	-	-
ER-48	SP6519	Shoulder / Profiling	-	-	0,04 - 0,16	0,04 - 0,12	-	-	-	-	-	0,04 - 0,09	0,04 - 0,09	0,04 - 0,10	0,04 - 0,14	-	-
		Slotting	-	-	0,04 - 0,14	0,04 - 0,10	-	-	-	-	-	0,04 - 0,07	0,04 - 0,07	0,04 - 0,08	0,04 - 0,12	-	-
ER-46	X500	Shoulder / Profiling	-	-	0,05 - 0,16	0,05 - 0,14	-	-	-	-	-	0,04 - 0,09	0,04 - 0,09	0,04 - 0,10	0,04 - 0,14	-	-
		Slotting	-	-	0,05 - 0,13	0,05 - 0,11	-	-	-	-	-	0,04 - 0,07	0,04 - 0,07	0,04 - 0,08	0,04 - 0,12	-	-
ER-46	X700	Shoulder / Profiling	-	-	0,05 - 0,14	0,05 - 0,12	-	-	-	-	-	0,04 - 0,09	0,04 - 0,09	0,04 - 0,10	0,04 - 0,14	-	-
		Slotting	-	-	0,05 - 0,11	0,05 - 0,10	-	-	-	-	-	0,04 - 0,07	0,04 - 0,07	0,04 - 0,08	0,04 - 0,12	-	-
ER-46	SP6519	Shoulder / Profiling	-	-	0,05 - 0,16	0,05 - 0,12	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	0,05 - 0,13	0,05 - 0,10	-	-	-	-	-	-	-	-	-	-	-
ER-45	X500	Shoulder / Profiling	0,08 - 0,18	0,08 - 0,16	0,08 - 0,16	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,14	0,08 - 0,12	0,08 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	SP6519	Shoulder / Profiling	0,08 - 0,18	0,08 - 0,16	-	-	0,08 - 0,18	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,14	0,08 - 0,12	-	-	0,08 - 0,14	0,08 - 0,12	0,08 - 0,10	-	-	-	-	-	-	-	-
ER-45	MP91M	Shoulder / Profiling	0,08 - 0,16	0,08 - 0,14	-	-	0,08 - 0,18	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,12	0,08 - 0,10	-	-	0,08 - 0,14	0,08 - 0,12	0,08 - 0,10	-	-	-	-	-	-	-	-
ER-45	SC3025	Shoulder / Profiling	-	-	-	-	0,08 - 0,18	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	0,08 - 0,14	0,08 - 0,12	0,08 - 0,10	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A187.



Speed v_c (m/min)																				
5315VA12 Series				Wear Resistance																
				-  +																
				Speed min. - max.																
Coolant Recommendation																				
Recommended ● Possible ○																				
ISO	Materials	Rm and Hardness			CVD X Grade			X700			SP6519			MP91M			SC3025			GH1
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	130 - 270				○	●	130 - 295		●	140 - 345						
		<950 N/mm ² <280 HBN			115 - 240						115 - 260			120 - 305						
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	100 - 210				○	●	100 - 230		●	105 - 270						
		950-1200 N/mm ² 280-355 HBN			75 - 160						75 - 175			80 - 205						
		1200-1400 N/mm ² 355-415 HBN		●	50 - 100					●	50 - 110		●	50 - 130						
M	Stainless Steel	Austenitic + Ferritic 300 series	○	●	115 - 250	○	●	115 - 260	○	●	115 - 270									
		Martensitic 400 series			100 - 220			105 - 230			105 - 235									
	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120									
K	Cast Iron	Grey GG-Ft									140 - 235			145 - 365			150 - 395			
		Spheroidal-Ductile GGG-FGS							○	●	110 - 240		●	115 - 285		●	120 - 335			
		Malleable GTS - MN/MP									100 - 220			105 - 260			105 - 275			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																●	400 - 3050	
		Aluminium + Silicon > 16% Si 92 HBN																	295 - 2440	
S	High Temperature Alloys	Iron Based			23 - 48			23 - 52			23 - 55									
		Cobalt Based	●		21 - 44	●		22 - 46	●		22 - 48									
		Nickel Based			24 - 51			25 - 53			25 - 55									
		Titanium Based			35 - 73			36 - 75			36 - 79									
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN																		
		Chilled Cast Iron >1400 N/mm ² > 400 HBN																		

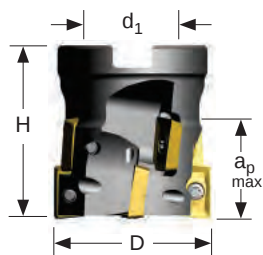
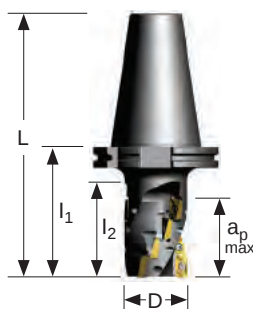
Shoulder Mills

5315VA16

Long Edge Milling Cutter (Porcupine)



Shoulder Mills

**Shell Mill Fixation****DIN 69871 Fixation**

Product		Dimensions (mm)									Spares				
EDP	Item Description	D	L/H	l ₁	l ₂	d ₁	ap max	ap1 max Slotting*	No. of flutes	No. of inserts	EDP		EDP		Screw Tightening in. lbs.
5315VA16 Shell Mill Fixation - Medium and Fine Pitch															
025670	5315VA16-A050Z3R31	50	55	-	-	27	31	26	3	6	015262	D4010T	015240	T15	3,10
025671	5315VA16-A050Z4R31	50	55	-	-	27	31	26	4	8	015262	D4010T	015240	T15	3,10
025674	5315VA16-A063Z4R31	63	55	-	-	27	31	26	4	8	015262	D4010T	015240	T15	3,10
025675	5315VA16-A063Z5R31	63	55	-	-	27	31	26	5	10	015262	D4010T	015240	T15	3,10
025678	5315VA16-A080Z4R31	80	55	-	-	32	31	26	4	8	015262	D4010T	015240	T15	3,10
025679	5315VA16-A080Z5R31	80	55	-	-	32	31	26	5	10	015262	D4010T	015240	T15	3,10
5315VA16 DIN 69871 Fixation Taper 50															
025669	5315VA16GA50/050R61	50	207	105	75	-	61	48	3	12	015262	D4010T	015240	T15	3,10
025673	5315VA16GA50/063R61	63	207	105	75	-	61	52	3	12	015262	D4010T	015240	T15	3,10

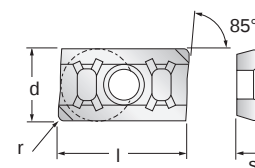
Note: Please note that a maximum of 2,5mm insert radius is allowed on the 5315VA16 range of cutters.

Larger radii inserts can be used on the leading pocket only if the body is modified by the end user.

5315VA16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
025670	5315VA16-A050Z3R31	50	-	-	-	-	23700
025671	5315VA16-A050Z4R31	50	-	-	-	-	23700
025674	5315VA16-A063Z4R31	63	-	-	-	-	20600
025675	5315VA16-A063Z5R31	63	-	-	-	-	20600
025678	5315VA16-A080Z4R31	80	-	-	-	-	18000
025679	5315VA16-A080Z5R31	80	-	-	-	-	18000
025669	5315VA16GA50/050R61	50	-	-	-	-	23700
025673	5315VA16GA50/063R61	63	-	-	-	-	20600





Shoulder Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max* or ae max.*	ap max. and ae max. 15% D**	ap min. - max.					
033180	APET160408TR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	0,80	0,10
033181	APET160410TR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	1,00	0,10
033182	APET160415TR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	1,50	0,10
033183	APET160420TR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	2,00	0,10
033184	APET160425TR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	2,50	0,10
015155	APHT1604PDTR-42	X500	●●	-	-	9,52	16,66	4,76	Facet	0,10
031466	APHT1604PDTR-42	SP6519	●●●●	■●●●	-	9,52	16,66	4,76	Facet	0,10
017293	APHT1604PDTR-42	MP91M	-	■●	-	9,52	16,66	4,76	Facet	0,10
033189	APEX1604PDR-701	SP4019	●	●	-	9,52	16,66	4,76	Facet	0,02
014066	APEX1604PDR-701	GH1	◆	◆	-	9,52	16,66	4,76	Facet	0,02
015154	APHT1604PDR	GH1	■	■	-	9,52	16,66	4,76	Facet	0,02
033190	APFW1604PDTR	X400	●	◆	-	9,52	16,66	4,76	Facet	0,10
033191	APFW1604PDTR	SP4019	●	■	-	9,52	16,66	4,76	Facet	0,10
027883	APFW1604PDTR	SC3025	■	◆	-	9,52	16,66	4,76	Facet	0,10
017628	APFW1604PDTR	GH1	-	●	-	9,52	16,66	4,76	Facet	0,10

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page A188.

* Note: Please respect the following rule for profiling with a_p max:

for Shell mill cutter $a_e < 75\%$ of the Diameter

for Taper 50 cutter $a_e < 60\%$ of the Diameter

** Note: For semi finishing, axial engagement a_p for slotting and radial engagement a_e for profiling should be max. 15% of the Diameter.

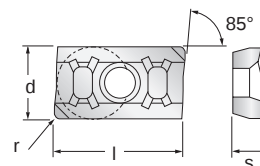
APHT1604PDTR-42 X500 to be used for Stainless Steel with heavy scale or for unstable conditions.

APFW1604PDTR X400 should be used for Alloyed Steel with heavy scale or hardened steel.

APFW1604PDTR SP4019 should be used for High Temperature Alloys with heavy scale or hardened steel.

Note: Feed recommendations can be found on page A191. Speed recommendations can be found on page A193.





Shoulder Mills

Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max* or a _e max.*	a _p max. and a _e max. 15% D**	a _p min. - max.					
027869	APHT160408ER-46	X500	◆◆◆	◆◆◆	-	9,52	16,66	4,76	0,80	0,05
031495	APHT160408ER-46	SP6519	◆◆◆	◆◆◆	-	9,52	16,66	4,76	0,80	0,05
027870	APHT160416ER-46	X500	◆◆◆	◆◆◆	-	9,52	16,66	4,76	1,60	0,05
031496	APHT160416ER-46	SP6519	◆◆◆	◆◆◆	-	9,52	16,66	4,76	1,60	0,05
027871	APHT160424ER-46	X500	◆◆◆	◆◆◆	-	9,52	16,66	4,76	2,40	0,05
031497	APHT160424ER-46	SP6519	◆◆◆	◆◆◆	-	9,52	16,66	4,76	2,40	0,05
030811	APET1604PDER-48	X500	◆	◆	-	9,52	16,66	4,76	Facet	0,04
030773	APET1604PDER-48	SP6519	●	●	-	9,52	16,66	4,76	Facet	0,04
030860	APET160408ER-48	X500	◆	◆	-	9,52	16,66	4,76	0,80	0,04
030861	APET160408ER-48	SP6519	●	●	-	9,52	16,66	4,76	0,80	0,04
015156	APKT1604PDER-43	X500	●	-	-	9,52	16,66	4,76	Facet	0,08
031468	APKT1604PDER-43	SP6519	◆◆	-	-	9,52	16,66	4,76	Facet	0,08
017294	APKT1604PDER-43	MP91M	◆◆◆	-	-	9,52	16,66	4,76	Facet	0,08
027887	APKT1604PDER-43	SC3025	◆	-	-	9,52	16,66	4,76	Facet	0,08
023115	APKT1604PDER-45	X500	-	●	-	9,52	16,66	4,76	Facet	0,08
031469	APKT1604PDER-45	SP6519	-	◆◆	-	9,52	16,66	4,76	Facet	0,08
023114	APKT1604PDER-45	MP91M	-	●	-	9,52	16,66	4,76	Facet	0,08

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page A188.* Note: Please respect the following rule for profiling with a_p max:for Shell mill cutter a_e < 75% of the Diameterfor Taper 50 cutter a_e < 60% of the Diameter** Note: For semi finishing, axial engagement a_p for slotting and radial engagement a_e for profiling should be max. 15% of the Diameter.

APKT1604PDER-43 X500 to be used for steel when unstable conditions

Note: Feed recommendations can be found on page A192. Speed recommendations can be found on page A193.



5315VA16 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
TR-42	X500	Shoulder / Profiling	-	-	0,10 - 0,25	0,10 - 0,22	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	0,10 - 0,18	0,10 - 0,15	-	-	-	-	-	-	-	-	-	-	-
TR-42	SP6519	Shoulder / Profiling	0,10 - 0,25	0,10 - 0,22	0,10 - 0,25	0,10 - 0,22	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,10 - 0,18	0,10 - 0,16	0,10 - 0,18	0,10 - 0,15	-	-	-	-	-	-	-	-	-	-	-
TR-42	MP91M	Shoulder / Profiling	-	-	-	-	0,08 - 0,25	0,08 - 0,20	0,08 - 0,20	-	-	-	-	-	-	0,08 - 0,10	-
		Slotting	-	-	-	-	0,08 - 0,18	0,08 - 0,15	0,08 - 0,15	-	-	-	-	-	-	-	-
FR-701	SP4019	Shoulder / Profiling	-	-	-	-	-	-	-	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	0,03 - 0,07	0,03 - 0,17	-	-	-	-	-	-
FR-701	GH1	Shoulder / Profiling	-	-	-	-	-	-	-	0,03 - 0,18	0,03 - 0,16	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	0,03 - 0,15	0,03 - 0,14	-	-	-	-	-	-
FR	GH1	Shoulder / Profiling	-	-	-	-	-	-	-	0,03 - 0,18	0,03 - 0,18	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	0,03 - 0,15	0,03 - 0,14	-	-	-	-	-	-
TR	X400	Shoulder / Profiling	-	0,10 - 0,24	-	-	-	-	-	-	-	-	-	-	-	0,08 - 0,12	-
		Slotting	-	0,10 - 0,16	-	-	-	-	-	-	-	-	-	-	-	-	-
TR	SP4019	Shoulder / Profiling	-	-	-	-	-	-	-	-	-	0,10 - 0,11	0,11 - 0,11	0,10 - 0,13	0,10 - 0,15	0,08 - 0,12	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TR	SC3025	Shoulder / Profiling	-	-	-	-	0,10 - 0,25	0,10 - 0,25	0,10 - 0,20	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	0,10 - 0,17	0,10 - 0,17	0,10 - 0,15	-	-	-	-	-	-	-	-
TR	GH1	Shoulder / Profiling	-	-	-	-	0,10 - 0,20	0,10 - 0,20	0,10 - 0,18	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A193.

5315VA16

Recommended Feeds



Shoulder Mills

5315VA16 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
ER-46	X500	Shoulder / Profiling	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	0,05 - 0,11	0,05 - 0,11	0,05 - 0,12	0,05 - 0,14	-	-
		Slotting	-	-	0,05 - 0,18	0,05 - 0,15	-	-	-	-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,10	0,05 - 0,12	-	-
ER-46	SP6519	Shoulder / Profiling	-	-	0,05 - 0,25	0,05 - 0,22	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	-	0,05 - 0,18	0,05 - 0,15	-	-	-	-	-	-	-	-	-	-	-
ER-48	X500	Shoulder / Profiling	-	-	-	-	-	-	-	-	-	0,05 - 0,11	0,05 - 0,11	0,05 - 0,12	0,05 - 0,14	-	-
		Slotting	-	-	-	-	-	-	-	-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,10	0,05 - 0,12	-	-
ER-48	SP6519	Shoulder / Profiling	-	-	-	-	-	-	-	-	-	0,05 - 0,11	0,05 - 0,11	0,05 - 0,12	0,05 - 0,14	-	-
		Slotting	-	-	-	-	-	-	-	-	-	0,05 - 0,09	0,05 - 0,09	0,05 - 0,10	0,05 - 0,12	-	-
ER-43	X500	Shoulder / Profiling	0,08 - 0,25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	SP6519	Shoulder / Profiling	0,08 - 0,25	0,08 - 0,22	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,18	0,08 - 0,16	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-43	MP91M	Shoulder / Profiling	0,08 - 0,23	0,08 - 0,20	-	-	0,08 - 0,23	0,08 - 0,23	0,08 - 0,20	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,16	0,08 - 0,14	-	-	0,08 - 0,16	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-
ER-43	SC3025	Shoulder / Profiling	-	-	-	-	0,08 - 0,23	0,08 - 0,23	0,08 - 0,20	-	-	-	-	-	-	-	-
		Slotting	-	-	-	-	0,08 - 0,16	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-
ER-45	X500	Shoulder / Profiling	-	0,08 - 0,20	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	-	0,08 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	SP6519	Shoulder / Profiling	0,08 - 0,22	0,08 - 0,20	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,16	0,08 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-	-
ER-45	MP91M	Shoulder / Profiling	0,08 - 0,20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Slotting	0,08 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys



Speed v_c (m/min)																								
5315VA16 Series			Wear Resistance																					
			Speed min. - max.																					
			Coolant Recommendation																					
Recommended ● Possible ○					PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin				
ISO	Materials	Rm and Hardness			X400			X500			SP6519			SP4019			MP91M			SC3025			GH1	
P	Unalloyed Steel	<600 N/mm ² <180 HBN																						
		<950 N/mm ² <280 HBN																						
	Alloyed Steel	700-950 N/mm ² 200-280 HBN																						
		950-1200 N/mm ² 280-355 HBN																						
		1200-1400 N/mm ² 355-415 HBN																						
M	Stainless Steel	Austenitic + Ferritic 300 series																						
		Martensitic 400 series																						
	PH Stainless	Refractory P.H.																						
K	Cast Iron	Grey GG-Ft																						
		Spheroidal-Ductile GGG-FGS																						
		Malleable GTS - MN/MP																						
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																						
		Aluminium + Silicon > 16% Si 92 HBN																						
S	High Temperature Alloys	Iron Based																						
		Cobalt Based																						
		Nickel Based																						
		Titanium Based																						
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN																						
		Chilled Cast Iron >1400 N/mm ² > 400 HBN																						



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

Multiplication factor for the feed rate based on the percentage of radial engagement of the cutter diameter

Cutter Ø 25mm			Cutter Ø 32mm			Cutter Ø 40mm		
a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor
5	1,25	2,30	5	1,60	2,30	5	2,00	2,30
10	2,50	1,66	10	3,20	1,66	10	4,00	1,66
15	3,75	1,40	15	4,80	1,40	15	6,00	1,40
20	5,00	1,25	20	6,40	1,25	20	8,00	1,25
25	6,25	1,16	25	8,00	1,16	25	10,00	1,16
35	8,75	1,05	35	11,20	1,05	35	14,00	1,05
50 - 100	12,50 - 25,00	1,00	50 - 100	16,00 - 32,00	1,00	50 - 100	20,00 - 40,00	1,00

Multiplication factor for the feed rate based on the percentage of radial engagement of the cutter diameter

Cutter Ø 50mm			Cutter Ø 63mm			Cutter Ø 80mm		
a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor	a_e %	a_e mm	Coefficient Factor
5	2,50	2,30	5	3,15	2,30	5	4,00	2,30
10	5,00	1,66	10	6,30	1,66	10	8,00	1,66
15	7,50	1,40	15	9,45	1,40	15	12,00	1,40
20	10,00	1,25	20	12,60	1,25	20	16,00	1,25
25	12,50	1,16	25	15,75	1,16	25	20,00	1,16
35	17,50	1,05	35	22,05	1,05	35	28,00	1,05
50 - 100	25,00 - 50,00	1,00	50 - 100	31,50 - 63,00	1,00	50 - 100	40,00 - 80,00	1,00

Example: 50mm diameter cutter using a 5,0mm radial engagement (a_e) = 10% of the cutter diameter.

At 10%, your coefficient is 1,66 (see chart); therefore you must multiply your feed rate by 1,66 for correcting the feed for profiling.

**BALL NOSE CONTOUR MILLING CUTTER**

The 5505VX.. Ball Nose Cutters have a reinforced design feature, which delivers a high volume of chip removal.

The chip breaker geometry provides excellent chip control and evacuation during machining and prevents edge build-up.

5505VX Roughing Ball Nose Cutters are ideal for roughing and semi-finishing profiles and complex contours.

One grade and one geometry are qualified to machine Steel, Alloyed Steel, Stainless Steel, High Temperature Alloys and Cast Iron.

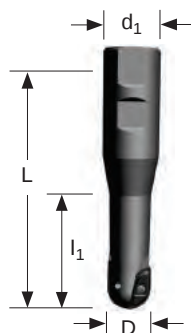
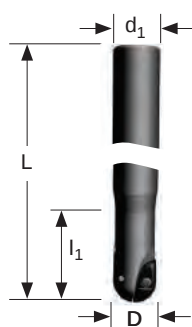
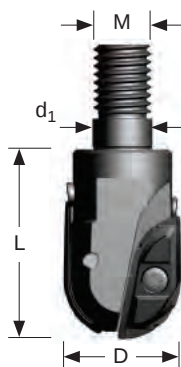
5505VX**5505VX:**

Diameter Range = 16mm to 50mm



5505VX**Ball Nose Milling Cutter**

Contour Mills

**Weldon Shank****Cylindrical Shank****Modular Head****Depth of Cut (ap)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
5505VX Weldon Shank												
032133	5505VX20WA020R34	20	106	34	25	20	2	030672	FP3007T	031451	TP8	1,80
030840	5505VX25WA025R60	25	116	60	25	25	2	015262	D4010T	015240	T15	3,10
032132	5505VX25WA025R69	25	150	69	32	25	2	015262	D4010T	015240	T15	3,10
030842	5505VX32WA032R75	32	130	75	32	32	2	015266	D5013T	015241	T20	6,00
030843	5505VX32WA032R100	32	160	100	32	32	2	015266	D5013T	015241	T20	6,00
030844	5505VX40WA040R100	40	170	100	40	40	2	029640	D6014T	015241	T20	10,50
030845	5505VX40WA040R150	40	220	150	40	40	2	029640	D6014T	015241	T20	10,50
030846	5505VX50WA050R100	50	170	100	40	50	2	029641	F8017S	018288	KH5005	24,50
030847	5505VX50WA050R150	50	230	150	50	50	2	029641	F8017S	018288	KH5005	24,50
5505VX Cylindrical Shank												
030982	5505VX16CA20/016R30	16	180	30	20	16	2	031448	FP3006T	031451	TP8	1,80
030983	5505VX20CA25/020R40	20	200	40	25	20	2	030672	FP3007T	031451	TP8	1,80
030984	5505VX25CA025R55	25	250	55	25	25	2	015262	D4010T	015240	T15	3,10
030985	5505VX25CA32/025R55	25	250	55	32	25	2	015262	D4010T	015240	T15	3,10
030986	5505VX32CA032R65	32	250	65	32	32	2	015266	D5013T	015241	T20	6,00

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d ₁	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
5505VX Modular Head												
030849	5505VX16SA016R25	16	25	M8	8.5	16	2	031448	FP3006T	031451	TP8	1,80
030850	5505VX20SA020R35	20	35	M10	10.5	20	2	030672	FP3007T	031451	TP8	1,80
030851	5505VX25SA025R40	25	40	M12	12.5	25	2	015262	D4010T	015240	T15	3,10
030852	5505VX32SA032R50	32	50	M16	17.0	32	2	015266	D5013T	015241	T20	6,00

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

Note: Do not remove the radial screw; this is a fixed location for the insert see page A200.


5505VX Technical Information (mm)

Product		Dimensions					Max RPM
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	
032133	5505VX20WA020R34	-	85	-	-	-	34750
030840	5505VX25WA025R60	-	85	-	-	-	30500
032132	5505VX25WA025R69	-	85	-	-	-	30500
030842	5505VX32WA032R75	-	85	-	-	-	23250
030843	5505VX32WA032R100	-	85	-	-	-	23250
030844	5505VX40WA040R100	-	85	-	-	-	17250
030845	5505VX40WA040R150	-	85	-	-	-	17250
030846	5505VX50WA050R100	-	85	-	-	-	17250
030847	5505VX50WA050R150	-	85	-	-	-	17250
030982	5505VX16CA20/016R30	-	85	-	-	-	54000
030983	5505VX20CA25/020R40	-	85	-	-	-	34750
030984	5505VX25CA025R55	-	85	-	-	-	30500
030985	5505VX25CA32/025R55	-	85	-	-	-	30500
030986	5505VX32CA032R65	-	85	-	-	-	23250
030849	5505VX16SA016R25	-	85	-	-	-	54000
030850	5505VX20SA020R35	-	85	-	-	-	34750
030851	5505VX25SA025R40	-	85	-	-	-	30500
030852	5505VX32SA032R50	-	85	-	-	-	23250



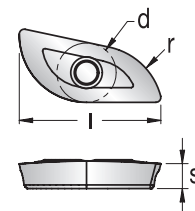
Contour Mills

5505VX

Milling Inserts & Recommended Feeds



XPNT-F



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max.*	a _e / a _p max. 10% of the cutter diameter	a _e / a _p max. -					
030737	XPNT16/160308.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	7,40	17,40	3,18	8,00	0,04
030743	XPNT20/20T306.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	9,00	20,85	3,97	10,00	0,04
030746	XPNT25/250408.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	11,00	26,00	4,76	12,50	0,04
030749	XPNT32/320612.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	14,10	33,40	6,35	16,00	0,04
030755	XPNT40/40T716.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	18,00	41,84	7,95	20,00	0,04
030758	XPNT50/50T716.R-F	SP6519	◆◆◆◆◆	◆◆◆◆◆	-	22,25	52,86	7,95	25,00	0,04

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.* Note: a_p max. is dependent on several insert sizes, see steel cutter pages 204 for a_p max.**5505VX Feeds f_z (mm/tooth)**

Tool Diameter	Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
				Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
16	R-F	SP6519	Contouring	0,06 - 0,15	0,06 - 0,13	0,04 - 0,11	0,04 - 0,10	0,06 - 0,15	0,06 - 0,15	0,06 - 0,15	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	0,04 - 0,10	-	-
20	R-F	SP6519	Contouring	0,06 - 0,17	0,06 - 0,15	0,04 - 0,13	0,04 - 0,12	0,06 - 0,17	0,06 - 0,17	0,06 - 0,17	-	-	0,04 - 0,10	0,04 - 0,10	0,04 - 0,10	0,04 - 0,12	-	-
25	R-F	SP6519	Contouring	0,06 - 0,20	0,06 - 0,18	0,04 - 0,16	0,04 - 0,15	0,06 - 0,20	0,06 - 0,20	0,06 - 0,20	-	-	0,04 - 0,13	0,04 - 0,13	0,04 - 0,13	0,04 - 0,15	-	-
32	R-F	SP6519	Contouring	0,06 - 0,22	0,06 - 0,20	0,04 - 0,18	0,04 - 0,17	0,06 - 0,22	0,06 - 0,22	0,06 - 0,22	-	-	0,04 - 0,15	0,04 - 0,15	0,04 - 0,15	0,04 - 0,17	-	-
40	R-F	SP6519	Contouring	0,06 - 0,24	0,06 - 0,22	0,04 - 0,20	0,04 - 0,19	0,06 - 0,24	0,06 - 0,24	0,06 - 0,24	-	-	0,04 - 0,17	0,04 - 0,17	0,04 - 0,17	0,04 - 0,19	-	-
50	R-F	SP6519	Contouring	0,06 - 0,27	0,06 - 0,25	0,04 - 0,23	0,04 - 0,22	0,06 - 0,27	0,06 - 0,27	0,06 - 0,27	-	-	0,04 - 0,20	0,04 - 0,20	0,04 - 0,20	0,04 - 0,22	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A199.

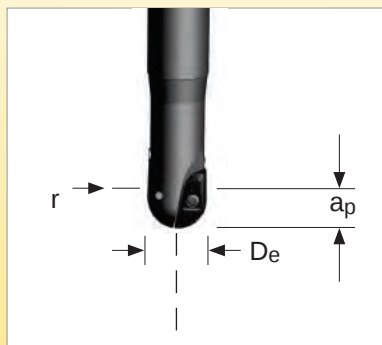


Speed v_c (m/min)					
5505VX Series			Speed min. - max.		
			Coolant Recommendation		PVD Standard
Recommended ● Possible ◎					
ISO	Materials	Rm and Hardness			SP6519
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	130 - 295
		<950 N/mm ² <280 HBN			115 - 260
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	100 - 230
		950-1200 N/mm ² 280-355 HBN			75 - 175
		1200-1400 N/mm ² 355-415 HBN			50 - 110
M	Stainless Steel	Austenitic + Ferritic 300 series	◎	●	115 - 270
		Martensitic 400 series			105 - 235
	PH Stainless	Refractory P.H.	●		50 - 120
K	Cast Iron	Grey GG-Ft	◎	●	140 - 295
		Spheroidal-Ductile GGG-FGS			110 - 240
		Malleable GTS - MN/MP			100 - 220
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●		23 - 55
		Cobalt Based			22 - 48
		Nickel Based			25 - 55
		Titanium Based			36 - 79
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN			
		Chilled Cast Iron >1400 N/mm ² > 400 HBN			





5505VX Technical Information



Working Diameter:

$$D_e = 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

D_e = Working Diameter
 r = Cutter radius
 a_p = Axial Depth of Cut



5505VX Technical Information

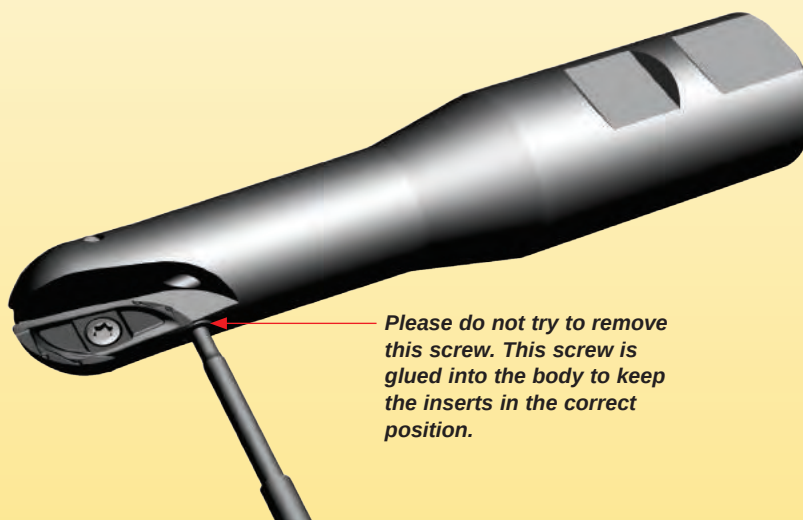
where:

 f_z = Feed per tooth h_m = Average chip thickness r = Insert radius a_e = Radial Depth of Cut a_p = Axial Depth of CutAverage chip thickness: h_m

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

To find programmed feedrate: f_z

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$



Please do not try to remove this screw. This screw is glued into the body to keep the inserts in the correct position.

**BALL NOSE FINISHING CONTOUR MILLING CUTTERS**

5500V cutters are for profiling and finishing operations. A centrally located screw and vee-shaped insert base provide a very precise position in the tool body.

This precise insert position gives a max. run out of less than 0,02mm.

This cutter is ideal for contour and copy milling.

This specific insert geometry design allows finishing applications up to 90°

One grade for all applications. Grade SP1019 is a micrograin carbide substrate with a new generation TiAlN coating, that makes this new PVD grade virtually free of residual stress and extremely hard for unmatched performance. Ideal for finishing ball nose applications at higher surface speeds, or for greater wear resistance.

Qualified for a wide range of materials: Steels, Tool Steels, Stainless Steels, Cast Iron, High Temperature Alloys and Hardened Steel.

5500V**5000V:**

Diameter Range = 8mm to 25mm

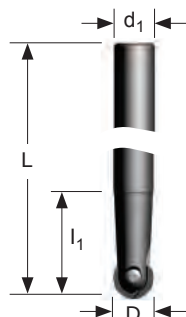


5500V

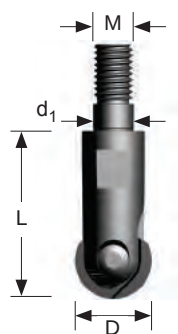
Contour Milling Cutter



Contour Mills



Cylindrical Shank



Modular Head

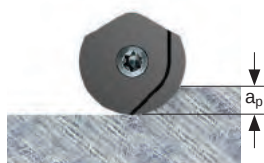
Product		Dimensions (mm)					Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	No. of Inserts*	EDP		EDP		Screw Tightening Nm
5500V Cylindrical Shank											
021666	5500V08CR	8	160	20	12	1	022149	55.671	018487	T6	0,40
021667	5500V10CR	10	160	25	12	1	015250	55.672	018488	T7	0,80
021668	5500V12CR	12	180	30	12	1	015251	55.674	013215	T10	2,10
021670	5500V16CR	16	200	40	16	1	022150	55.675	015240	T15	3,10
021672	5500V20CR	20	200	50	20	1	015252	55.676	015241	T20	6,00
021674	5500V25CR	25	200	50	25	1	015253	55.677	015241	T20	6,00

* Denotes: 5500V cutter bodies take one insert with a full ball nose insert designed with two cutting edges. When programming feed rates use two cutting edges and not one.

Product		Dimensions (mm)					Spares				
EDP	Item Description	D	L/H	M	d ₁	No. of Inserts*	EDP		EDP		Screw Tightening Nm
5500V Modular Head											
029128	5500V08SR25	8	25	M8	8.5	1	022149	55.671	018487	T6	0,40
029129	5500V10SR25	10	25	M8	8.5	1	015250	55.672	018488	T7	0,80
029130	5500V12SR35	12	35	M8	8.5	1	015251	55.674	013215	T10	2,10
029131	5500V16SR35	16	35	M8	8.5	1	022150	55.675	015240	T15	3,10
029132	5500V20SR35	20	35	M10	10.5	1	015252	55.676	015241	T20	6,00
029133	5500V25SR43	25	43	M12	12.5	1	015253	55.677	015241	T20	6,00

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76. 5500V modular heads do not have through coolant capability.

* Denotes: 5500V cutter bodies take one insert with a full ball nose insert designed with two cutting edges. When programming feed rates use two cutting edges and not one.



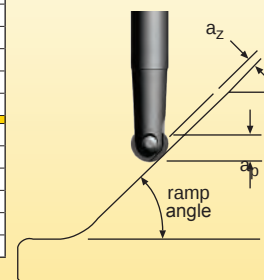
Depth of Cut (ap)


5500V Technical Information

Product		Angles ° / Dimensions (mm)													Max RPM
EDP	Item Description	Ramping Data													
		15°		30°		45°		60°		75°		85°			
		a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max		
021666	5500V08CR	3,0	3,9	2,0	3,5	1,2	2,0	0,5	2,0	0,1	1,1	0,1	0,4	71500	
021667	5500V10CR	3,7	4,8	2,5	4,4	1,5	3,6	0,7	2,6	0,2	1,4	0,1	0,5	62000	
021668	5500V12CR	4,5	5,8	3,0	5,2	1,8	4,2	0,8	3,0	0,2	1,4	0,1	0,6	60000	
021670	5500V16CR	6,0	7,7	4,0	6,9	2,4	5,6	1,1	4,0	0,3	2,0	0,1	0,7	39500	
021672	5500V20CR	7,4	9,6	5,0	8,6	3,0	7,1	1,3	5,0	0,4	2,9	0,1	0,9	33500	
021674	5500V25CR	9,3	12,1	6,3	10,8	3,7	8,8	1,7	6,3	0,4	3,2	0,1	1,1	22000	
029128	5500V08SR25	3,0	3,9	2,0	3,5	1,2	2,0	0,5	2,0	0,1	1,1	0,1	0,4	71500	
029129	5500V10SR25	3,7	4,8	2,5	4,4	1,5	3,6	0,7	2,6	0,2	1,4	0,1	0,5	62000	
029130	5500V12SR35	4,5	5,8	3,0	5,2	1,8	4,2	0,8	3,0	0,2	1,4	0,1	0,6	60000	
029131	5500V16SR35	6,0	7,7	4,0	6,9	2,4	5,6	1,1	4,0	0,3	2,0	0,1	0,7	39500	
029132	5500V20SR35	7,4	9,6	5,0	8,6	3,0	7,1	1,3	5,0	0,4	2,9	0,1	0,9	33500	
029133	5500V25SR43	9,3	12,1	6,3	10,8	3,7	8,8	1,7	6,3	0,4	3,2	0,1	1,1	22000	



Ramping



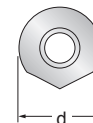
Contour Mills

5500V

Milling Inserts & Recommended Feeds



RG_S



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
					a _p / a _e min. - max. 0,10 - < 1,00					
031484	RG08S	SP1019	-	-		8,00	-	1,75	4,00	0,02
031485	RG10S	SP1019	-	-		10,00	-	2,00	5,00	0,02
031486	RG12S	SP1019	-	-		12,00	-	2,50	6,00	0,02
031487	RG16S	SP1019	-	-		16,00	-	3,00	8,00	0,02
031488	RG20S	SP1019	-	-		20,00	-	3,50	10,00	0,02
031489	RG25S	SP1019	-	-		25,00	-	4,00	12,50	0,02

Machining Choice: 1st Choice 2nd Choice 3rd Choice | Material Guide Key descriptions found on page A5.

Speed recommendations can be found on page A205.

**5500V Feeds f_z (mm/tooth)**

Insert Diameter	Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <18% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
				Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
8	S	SP1019	Contouring	0,02 - 0,06	0,02 - 0,06	0,02 - 0,05	0,02 - 0,04	0,02 - 0,07	0,02 - 0,07	0,02 - 0,07	0,02 - 0,08	0,02 - 0,07	0,02 - 0,04	0,02 - 0,04	0,02 - 0,04	0,02 - 0,05	0,02 - 0,04	0,02 - 0,04
10	S	SP1019	Contouring	0,02 - 0,08	0,02 - 0,08	0,02 - 0,07	0,02 - 0,06	0,02 - 0,09	0,02 - 0,07	0,02 - 0,09	0,02 - 0,10	0,02 - 0,09	0,02 - 0,06	0,02 - 0,06	0,02 - 0,06	0,02 - 0,07	0,02 - 0,06	0,02 - 0,06
12	S	SP1019	Contouring	0,02 - 0,10	0,02 - 0,10	0,02 - 0,09	0,02 - 0,08	0,02 - 0,11	0,02 - 0,11	0,02 - 0,11	0,02 - 0,12	0,02 - 0,11	0,02 - 0,08	0,02 - 0,08	0,02 - 0,08	0,02 - 0,09	0,02 - 0,08	0,02 - 0,08
16	S	SP1019	Contouring	0,02 - 0,14	0,02 - 0,14	0,02 - 0,13	0,02 - 0,12	0,02 - 0,15	0,02 - 0,15	0,02 - 0,15	0,02 - 0,16	0,02 - 0,15	0,02 - 0,12	0,02 - 0,12	0,02 - 0,12	0,02 - 0,13	0,02 - 0,12	0,02 - 0,12
20	S	SP1019	Contouring	0,02 - 0,18	0,02 - 0,18	0,02 - 0,17	0,02 - 0,16	0,02 - 0,19	0,02 - 0,19	0,02 - 0,19	0,02 - 0,20	0,02 - 0,18	0,02 - 0,16	0,02 - 0,16	0,02 - 0,16	0,02 - 0,17	0,02 - 0,16	0,02 - 0,16
25	S	SP1019	Contouring	0,02 - 0,23	0,02 - 0,23	0,02 - 0,22	0,02 - 0,21	0,02 - 0,24	0,02 - 0,24	0,02 - 0,24	0,02 - 0,25	0,02 - 0,22	0,02 - 0,21	0,02 - 0,21	0,02 - 0,21	0,02 - 0,22	0,02 - 0,21	0,02 - 0,21

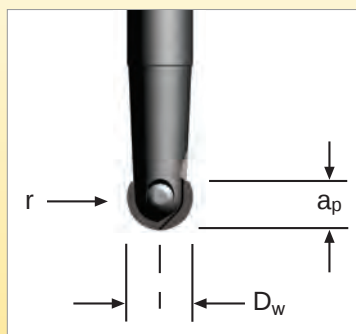
Note: HTA = High Temperature Alloys



Speed v_c (m/min)					
5500V Series			Speed min. - max.		
Coolant Recommendation					
Recommended ● Possible ◎					
ISO	Materials	Rm and Hardness			PVD Micrograin SP1019
P	Unalloyed Steel	<600 N/mm ² <180 HBN		●	225 - 380
		<950 N/mm ² <280 HBN			200 - 335
		700-950 N/mm ² 200-280 HBN			175 - 295
	Alloyed Steel	950-1200 N/mm ² 280-355 HBN		●	130 - 225
		1200-1400 N/mm ² 355-415 HBN			85 - 145
M	Stainless Steel	Austenitic + Ferritic 300 series	◎	●	200 - 335
		Martensitic 400 series			180 - 305
	PH Stainless	Refractory P.H.	●		85 - 145
K	Cast Iron	Grey GG-Fl	◎	●	240 - 400
		Spheroidal-Ductile GGG-FGS			185 - 340
		Malleable GTS - MN/MP			170 - 285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●		400 - 2745
		Aluminium + Silicon > 16% Si 92 HBN			295 - 2135
S	High Temperature Alloys	Iron Based	●		40 - 67
		Cobalt Based			37 - 63
		Nickel Based			42 - 72
		Titanium Based			61 - 103
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		●	50 - 110
		Chilled Cast Iron >1400 N/mm ² > 400 HBN			40 - 90



5500V Technical Information



Working Diameter:

$$D_w = 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

D_w = Working Diameter
 r = Cutter radius
 a_p = Axial Depth of Cut

5500V Technical Information

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

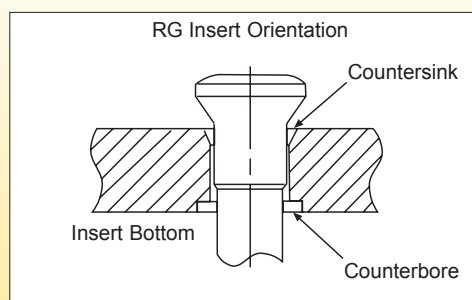
Average chip thickness: h_m

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

To find programmed feedrate: f_z

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

Insert Assembly Information



Insert through hole has a countersink on one side and a counterbore on the other side. Assemble as shown to create proper pull back against the cutter pocket.



ROUND INSERT MILLING CUTTERS WITHOUT INDEXATION

The **7700VR** series is mainly for medium roughing and semi-finishing with low axial depth of cut as well as for finishing of Steel, Tool Steel, Stainless Steel, High Temperature Alloys and Aluminium Alloys.

This series is without an anti-rotation pocket, which allows a maximum number of insert indexing according to the axial depth of cut requirement. This is an advantage when the cutter is being used for semi-finishing and finishing.

7700VR

7700VR06:

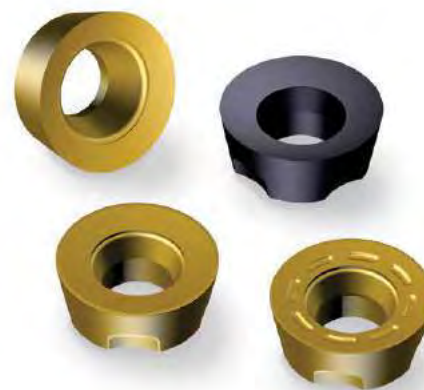
Maximum a_p = 3mm
Diameter Range = 14mm to 20mm

7700VR08:

Maximum a_p = 4mm
Diameter Range = 16mm to 32mm

7700VR10:

Maximum a_p = 5mm
Diameter Range = 20mm to 32mm

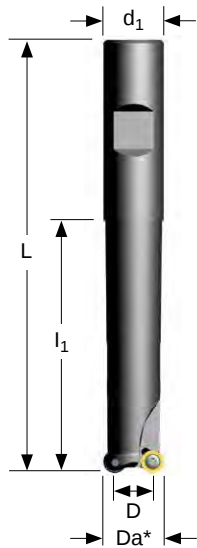


7700VR06

Copy Milling Cutter



Contour Mills



Weldon Shank



Modular Head

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L	l ₁	d ₁	ap max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR06 Weldon Shank													
021727	7700VR06WA016R067	16	10	115	67	16	3	2	015060	F2505T	018488	T7	0,80
021728	7700VR06WA016R102	16	10	150	102	16	3	2	015060	F2505T	018488	T7	0,80
021729	7700VR06WA020R060	20	14	110	60	20	3	3	015060	F2505T	018488	T7	0,80
021730	7700VR06WA020R090	20	14	140	90	20	3	3	015060	F2505T	018488	T7	0,80
021731	7700VR06WA020R120	20	14	170	120	20	3	3	015060	F2505T	018488	T7	0,80

D = Effective Diameter (Axis) from insert centreline to centreline.

Da* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L	M	d ₁	ap max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR06 Modular Head													
033732	7700VR06SA014Z2R35	14	8	35	M10	10,50	3	2	015060	F2505T	018488	T7	0,80
033733	7700VR06SA016Z3R35	16	10	35	M10	10,50	3	3	015060	F2505T	018488	T7	0,80
033734	7700VR06SA020Z4R35	20	14	35	M10	10,50	3	4	015060	F2505T	018488	T7	0,80

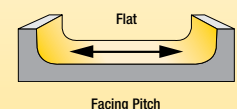
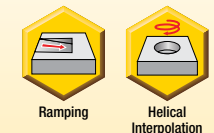
D = Effective Diameter (Axis) from insert centreline to centreline.

Da* = Outside Diameter

Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page A76.

7700VR06 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021727	7700VR06WA016R067	10	9.3	22	30	2,00	124000
021728	7700VR06WA016R102	10	9.3	22	30	2,00	110000
021729	7700VR06WA020R060	14	5.4	30	38	2,00	90000
021730	7700VR06WA020R090	14	5.4	30	38	2,00	90000
021731	7700VR06WA020R120	14	5.4	30	38	2,00	90000
033732	7700VR06SA014Z2R35	8	7.8	18	26	2,00	124000
033733	7700VR06SA016Z3R35	10	9.3	22	30	2,00	110000
033734	7700VR06SA020Z4R35	14	5.4	30	38	2,00	90000



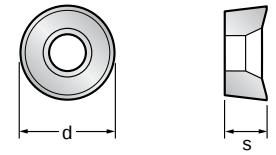
Depth of Cut (ap)



RPEX06-701

RPMT06-41

RPEW06-T



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max -	a _p min - max 0,50- 1,50	a _p min - max 0,10 - ,50					
034540	RPEX0602M0F-701	SP6519	-	●	◆◆□□□■□	6,00	-	2,38	3,00	0,02
023313	RPEX0602M0F-701	GH2	-	◆	◆	6,00	-	2,38	3,00	0,02
034541	RPEX0602M0F-701	SP4019	-	■	□□◆◆◆◆■	6,00	-	2,38	3,00	0,02
015219	RPMT0602M0E-41	X500	-	●□□◆◆●◆	-	6,00	-	2,38	3,00	0,03
034542	RPMT0602M0E-41	SP6519	-	□●□◆◆□■□	-	6,00	-	2,38	3,00	0,03
023327	RPMT0602M0E-41	MP91M	-	◆	-	6,00	-	2,38	3,00	0,03
024755	RPEW0602M0T	X500	-	◆◆	-	6,00	-	2,38	3,00	0,06

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.


Contour Mills

7700VR06 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
F-701	SP6519	Contouring	0,02 - 0,10	0,02 - 0,08	0,02 - 0,10	0,02 - 0,08	0,02 - 0,10	0,02 - 0,10	0,02 - 0,07	0,02 - 0,10	0,02 - 0,07	0,02 - 0,05	0,02 - 0,05	0,02 - 0,06	0,02 - 0,07	-	-
F-701	GH2	Contouring	-	-	-	-	-	-	-	0,02 - 0,10	0,02 - 0,07	-	-	-	-	-	-
F-701	SP4019	Contouring	0,02 - 0,08	0,02 - 0,06	0,02 - 0,08	0,02 - 0,06	0,02 - 0,08	0,02 - 0,08	0,02 - 0,05	0,02 - 0,10	0,02 - 0,07	0,02 - 0,04	0,02 - 0,04	0,02 - 0,05	0,02 - 0,06	-	-
E-41	X500	Contouring	0,03 - 0,12	0,03 - 0,10	0,03 - 0,12	0,03 - 0,10	0,03 - 0,12	0,03 - 0,12	0,03 - 0,10	-	-	0,03 - 0,06	0,03 - 0,05	0,02 - 0,05	0,03 - 0,07	-	-
E-41	SP6519	Contouring	0,03 - 0,12	0,03 - 0,10	0,03 - 0,12	0,03 - 0,10	0,03 - 0,12	0,03 - 0,12	0,03 - 0,10	-	-	0,03 - 0,06	0,03 - 0,05	0,02 - 0,05	0,03 - 0,07	-	-
E-41	MP91M	Contouring	-	-	-	-	0,03 - 0,12	0,03 - 0,12	0,03 - 0,10	-	-	-	-	-	-	-	-
T	X500	Contouring	0,10 - 0,13	0,10 - 0,12	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

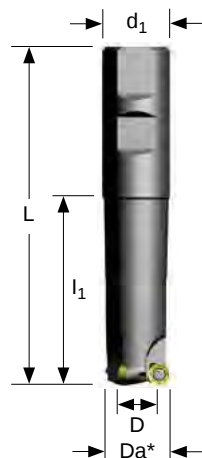
Note: Speed recommendations can be found on page A214.

7700VR08

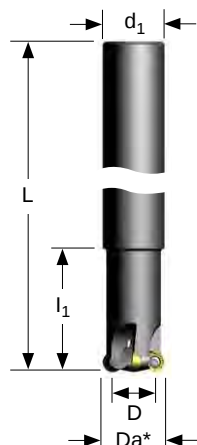
Copy Milling Cutter



Contour Mills



Weldon Shank



Cylindrical Shank



Modular Head



Depth of Cut (a_p)

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	l ₁	d ₁	a _p max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR08 Weldon Shank													
021732	7700VR08WA025R070-M3	25	17	126	70	25	4	3	015062	F3006T	013214	T9	1,40
021733	7700VR08WA025R124-M3	25	17	180	124	25	4	3	015062	F3006T	013214	T9	1,40
7700VR08 Cylindrical Shank - Medium and Fine Pitch													
031134	7700VR08CA020Z3R40	20	12	180	40	20	4	3	015062	F3006T	013214	T9	1,40
031135	7700VR08CA025Z3R50	25	17	200	50	25	4	3	015062	F3006T	013214	T9	1,40
031602	7700VR08CA025Z4R50	25	17	200	50	25	4	4	015062	F3006T	013214	T9	1,40
031137	7700VR08CA032Z4R70	32	24	250	70	32	4	4	015062	F3006T	013214	T9	1,40
031081	7700VR08CA032Z5R70	32	24	250	70	32	4	5	015062	F3006T	013214	T9	1,40

D = Effective Diameter (Axis) from insert centreline to centreline.

Da* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	M	d ₁	a _p max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR08 Modular Head - Medium and Fine Pitch													
031124	7700VR08SA016Z2R25	16	8	25	M8	8.5	4	2	015062	F3006T	013214	T9	1,40
031125	7700VR08SA020Z3R25	20	12	25	M10	10.5	4	3	015062	F3006T	013214	T9	1,40
031126	7700VR08SA025Z3R35	25	17	35	M12	12.5	4	3	015062	F3006T	013214	T9	1,40
031127	7700VR08SA025Z4R35	25	17	35	M12	12.5	4	4	015062	F3006T	013214	T9	1,40
031080	7700VR08SA032Z5R35	32	24	35	M16	17.0	4	5	015062	F3006T	013214	T9	1,40

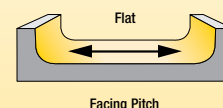
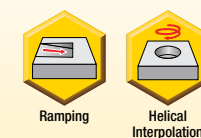
D = Effective Diameter (Axis) from insert centreline to centreline.

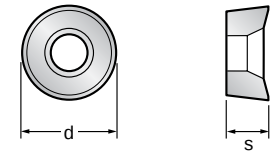
Da* = Outside Diameter

Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page A76.

7700VR08 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
021732	7700VR08WA025R070-M3	17	7.85	36	48	2,67	68000
021733	7700VR08WA025R124-M3	17	7.85	36	48	2,67	68000
031134	7700VR08CA020Z3R40	12	9.10	26	38	2,67	81000
031135	7700VR08CA025Z3R50	17	7.85	36	48	2,67	68000
031602	7700VR08CA025Z4R50	17	7.85	36	48	2,67	68000
031137	7700VR08CA032Z4R70	24	6.75	50	62	2,67	57000
031081	7700VR08CA032Z5R70	24	6.75	50	62	2,67	57000
031124	7700VR08SA016Z2R25	8	32.60	18	30	2,67	99000
031125	7700VR08SA020Z3R25	12	12.70	26	38	2,67	81000
031126	7700VR08SA025Z3R35	17	7.85	36	48	2,67	68000
031127	7700VR08SA025Z4R35	17	7.85	36	48	2,67	68000
031080	7700VR08SA032Z5R35	24	7.20	50	62	2,67	57000





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _M min
			Depth of Cut (mm)							
			a _p max -	a _p min - max 0,80 - 1,50	a _p min - max 0,10 - 0,80					
034544	RPEX0803M3F-701	SP4019	-	■	■ ■	8,00	-	3,18	4,00	0,02
023315	RPEX0803M3F-701	GH1	-	◆	◆	8,00	-	3,18	4,00	0,02
031312	RPEX0803M3E-701	X500	-	●	-	8,00	-	3,18	4,00	0,02
034543	RPEX0803M3E-701	SP6519	-	-	◆ ◆ ◆	8,00	-	3,18	4,00	0,02
015220	RPMT0803M3E-41	X500	-	● ●	-	8,00	-	3,18	4,00	0,02
031473	RPMT0803M3E-41	SP6519	-	■ ■ ■	■ ■ ■ ● ■	8,00	-	3,18	4,00	0,02
017308	RPMT0803M3E-41	MP91M	-	● ◆	● ◆	8,00	-	3,18	4,00	0,02
031186	RPHT0803M3E-422	X500	-	● ■ ◆ ◆	●	8,00	-	3,18	4,00	0,03
031187	RPHT0803M3E-422	SP6519	-	◆ ◆ ◆ ■ ■ ■	◆ ◆ ■ ■ ● ●	8,00	-	3,18	4,00	0,03

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.


Contour Mills

7700VR08 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
F-701	SP4019	Contouring	-	-	-	-	-	-	-	0,02 - 0,08	0,02 - 0,06	0,02 - 0,06	0,02 - 0,06	0,02 - 0,07	0,02 - 0,09	-	-
F-701	GH1	Contouring	-	-	-	-	-	-	-	0,02 - 0,08	0,02 - 0,06	-	-	-	-	-	-
E-701	X500	Contouring	-	-	-	-	-	-	-	-	-	0,02 - 0,06	0,02 - 0,06	0,02 - 0,07	0,02 - 0,09	-	-
E-701	SP6519	Contouring	-	-	0,02 - 0,10	0,02 - 0,08	-	-	-	-	-	0,02 - 0,06	0,02 - 0,06	0,02 - 0,07	0,02 - 0,09	-	-
E-41	X500	Contouring	-	-	0,03 - 0,12	0,03 - 0,10	-	-	-	-	-	-	-	-	-	-	-
E-41	SP6519	Contouring	0,03 - 0,14	0,03 - 0,12	0,03 - 0,12	0,03 - 0,10	0,03 - 0,14	0,03 - 0,14	0,03 - 0,12	-	-	-	-	-	-	-	-
E-41	MP91M	Contouring	0,03 - 0,13	-	-	-	0,03 - 0,13	0,03 - 0,13	0,03 - 0,11	-	-	-	-	-	-	-	-
E-422	X500	Contouring	-	0,03 - 0,12	0,03 - 0,14	0,03 - 0,11	-	-	-	-	-	0,03 - 0,08	0,03 - 0,08	0,03 - 0,09	0,03 - 0,11	-	-
E-422	SP6519	Contouring	0,03 - 0,14	0,03 - 0,12	0,03 - 0,14	0,03 - 0,11	0,03 - 0,14	0,03 - 0,14	0,03 - 0,12	-	-	0,03 - 0,08	0,03 - 0,08	0,03 - 0,09	0,03 - 0,11	-	-

Note: HTA = High Temperature Alloys

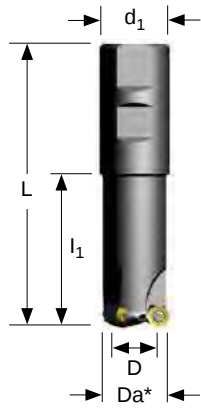
Note: Speed recommendations can be found on page A214.

7700VR10

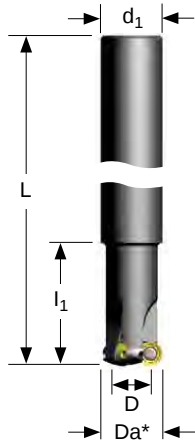
Copy Milling Cutter



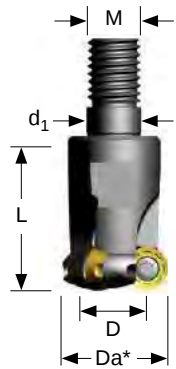
Contour Mills



Weldon Shank



Cylindrical Shank



Modular Head



Depth of Cut (ap)

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	l ₁	d ₁	ap max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR10 Weldon Shank - Medium and Fine Pitch													
021737	7700VR10WA032R070	32	22	130	70	32	5	3	015260	D4008T	015240	T15	3,10
027820	7700VR10WA032Z4R070	32	22	130	70	32	5	4	015260	D4008T	015240	T15	3,10
021738	7700VR10WA032R140	32	22	200	140	32	5	3	015260	D4008T	015240	T15	3,10
021739	7700VR10WA032R190	32	22	250	190	32	5	3	015260	D4008T	015240	T15	3,10
7700VR10 Cylindrical Shank - Medium and Fine Pitch													
031203	7700VR10CA020Z2R40	20	10	180	40	20	5	2	031223	D4007T	015240	T15	3,10
031204	7700VR10CA025Z3R50	25	15	200	50	25	5	3	031223	D4007T	015240	T15	3,10
031205	7700VR10CA032Z3R70	32	22	200	70	32	5	3	015260	D4008T	015240	T15	3,10
031206	7700VR10CA032Z4R70	32	22	250	70	32	5	4	015260	D4008T	015240	T15	3,10

D = Effective Diameter (Axis) from insert centreline to centreline.

Da* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	M	d ₁	ap max	No. of teeth	EDP		EDP		Screw Tightening Nm
7700VR10 Modular Head - Medium and Fine Pitch													
031210	7700VR10SA020Z2R25	20	10	25	M10	10.5	5	2	031223	D4007T	015240	T15	3,10
031211	7700VR10SA025Z3R35	25	15	35	M12	12.5	5	3	031223	D4007T	015240	T15	3,10
031212	7700VR10SA032Z3R35	32	22	35	M16	17.0	5	3	015260	D4008T	015240	T15	3,10
031213	7700VR10SA032Z4R35	32	22	35	M16	17.0	5	4	015260	D4008T	015240	T15	3,10

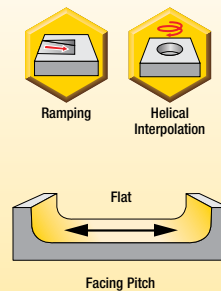
D = Effective Diameter (Axis) from insert centreline to centreline.

Da* = Outside Diameter

Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page A76.

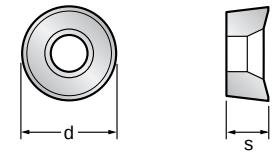
7700VR10 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021737	7700VR10WA032R070	22	7.55	46	62	3.33	53000
027820	7700VR10WA032Z4R070	22	7.55	46	62	3.33	53000
021738	7700VR10WA032R140	22	7.55	46	62	3.33	53000
021739	7700VR10WA032R190	22	7.55	46	62	3.33	53000
031203	7700VR10CA020Z2R40	10	26.80	22	38	3.33	79000
031204	7700VR10CA025Z3R50	15	17.70	32	48	3.33	65000
031205	7700VR10CA032Z3R70	22	7.55	46	62	3.33	53000
031206	7700VR10CA032Z4R70	22	7.55	46	62	3.33	53000
031210	7700VR10SA020Z2R25	10	26.80	22	38	3.33	79000
031211	7700VR10SA025Z3R35	15	17.70	32	48	3.33	65000
031212	7700VR10SA032Z3R35	22	7.55	46	62	3.33	53000
031213	7700VR10SA032Z4R35	22	7.55	46	62	3.33	53000





RPEX10-701 RPHT10-421 RPMT10-41 RPHT10-422 RPHT10-T RPMW10-T



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max -	a _p min - max 1,00 - 2,00	a _p min - max 0,20 - 1,00					
034546	RPEX10T3M0F-701-X4	SP4019	-	■	■◆	10,00	-	3,97	5,00	0,02
030456	RPEX10T3M0F-701-X4	GH1	-	◆	◆	10,00	-	3,97	5,00	0,02
034545	RPEX10T3M0E-701-X4	SP6519	-	-	■	10,00	-	3,97	5,00	0,02
030449	RPHT10T3M0E-421-X4	X500	-	●	-	10,00	-	3,97	5,00	0,04
030410	RPHT10T3M0E-421-X4	X700	-	-	●	10,00	-	3,97	5,00	0,04
030452	RPMT10T3M0E-41-X4	X500	-	●	-	10,00	-	3,97	5,00	0,04
031539	RPMT10T3M0E-41-X4	SP6519	-	-	■□●●	10,00	-	3,97	5,00	0,04
030451	RPMT10T3M0E-41-X4	MP91M	-	■	●●◆	10,00	-	3,97	5,00	0,04
030697	RPHT10T3M0E422-X4	X500	-	■◆	●	10,00	-	3,97	5,00	0,03
030767	RPHT10T3M0E-422-X4	X700	-	●	◆◆	10,00	-	3,97	5,00	0,03
030862	RPHT10T3M0E-422-X4	SP6519	-	●●◆□●■	◆◆■□■	10,00	-	3,97	5,00	0,03
030329	RPHT10T3M0T-X4	X500	-	■□	-	10,00	-	3,97	5,00	0,08
031555	RPHT10T3M0T-X4	SP6519	-	◆◆◆	-	10,00	-	3,97	5,00	0,08
030454	RPMW10T3M0T-X4	X500	-	◆◆◆◆	-	10,00	-	3,97	5,00	0,13

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

RPMW10T3M0T-X4 X500 is recommended for materials with heavy scale.



Contour Mills

7700VR10 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
F-701-X4	SP4019	Contouring	-	-	-	-	-	-	-	0,02 - 0,10	0,02 - 0,08	0,02 - 0,07	0,02 - 0,07	0,03 - 0,08	0,03 - 0,09	-	-
F-701-X4	GH1	Contouring	-	-	-	-	-	-	-	0,02 - 0,10	0,02 - 0,08	-	-	-	-	-	-
E-701-X4	SP6519	Contouring	-	-	-	-	-	-	-	-	-	0,02 - 0,07	0,02 - 0,07	0,03 - 0,08	0,03 - 0,09	-	-
E-421-X4	X500	Contouring	-	-	-	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,09	0,04 - 0,11	-	-
E-421-X4	X700	Contouring	-	-	-	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,09	0,04 - 0,11	-	-
E-41-X4	X500	Contouring	-	-	0,04 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-
E-41-X4	SP6519	Contouring	0,04 - 0,18	0,04 - 0,16	0,04 - 0,18	-	0,04 - 0,18	0,04 - 0,18	0,04 - 0,16	-	-	-	-	-	-	-	-
E-41-X4	MP91M	Contouring	0,04 - 0,18	0,04 - 0,16	-	-	0,04 - 0,16	0,04 - 0,16	0,04 - 0,14	-	-	-	-	-	-	-	-
E-422-X4	X500	Contouring	-	-	0,06 - 0,30	0,06 - 0,25	-	-	-	-	-	0,06 - 0,14	0,06 - 0,14	0,06 - 0,16	0,06 - 0,18	-	-
E-422-X4	X700	Contouring	-	-	0,06 - 0,28	0,06 - 0,22	-	-	-	-	-	-	-	-	-	-	-
E-422-X4	SP6519	Contouring	0,06 - 0,30	0,06 - 0,25	0,06 - 0,28	0,06 - 0,22	0,06 - 0,25	0,06 - 0,25	0,06 - 0,22	-	-	0,06 - 0,12	0,06 - 0,12	0,06 - 0,14	0,06 - 0,16	-	-
T-X4	X500	Contouring	0,15 - 0,33	0,15 - 0,28	-	-	-	-	-	-	-	-	-	-	-	-	-
T-X4	SP6519	Contouring	0,15 - 0,32	0,15 - 0,27	-	-	0,15 - 0,30	0,15 - 0,30	0,15 - 0,28	-	-	-	-	-	-	-	-
T-X4	X500	Contouring	0,22 - 0,35	0,22 - 0,33	0,22 - 0,35	0,22 - 0,30	-	-	-	-	-	0,13 - 0,18	0,13 - 0,18	0,13 - 0,20	0,13 - 0,22	-	-

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A214.

7700VR

Recommended Speeds

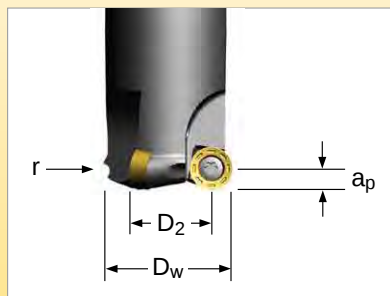


Contour Mills

Speed v_c (m/min)																
7700VR Series			Wear Resistance													
			Speed min. - max.													
			Coolant Recommendation													
Recommended ● Possible ○																
ISO	Materials	Rm and Hardness	CVD X Grade		PVD X Grade		PVD Standard		Uncoated Micrograin		PVD Standard		CVD Standard		Uncoated Micrograin	
			●	○	●	○	●	○	●	○	●	○	●	○	●	○
P	Unalloyed Steel	<600 N/mm ² <180 HBN	●	○			●	○			●	○	●	○		
		<950 N/mm ² <280 HBN														
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	●	○			●	○			●	○	●	○		
		950-1200 N/mm ² 280-355 HBN														
M	Stainless Steel	1200-1400 N/mm ² 355-415 HBN	●	○			●	○			●	○	●	○		
		Austenitic + Ferritic 300 series	●	○			●	○			●	○	●	○		
	PH Stainless	Martensitic 400 series														
		Refractory P.H.														
K	Cast Iron	Grey GG-Ft	●	○			●	○			●	○	●	○		
		Spheroidal-Ductile GGG-FGS														
		Malleable GTS - MN/MP														
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●		●				●	
		Aluminium + Silicon > 16% Si 92 HBN														
S	High Temperature Alloys	Iron Based														
		Cobalt Based														
		Nickel Based														
		Titanium Based														
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN														
		Chilled Cast Iron >1400 N/mm ² > 400 HBN														



7700VR Technical Information



Working Diameter:

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

- D_w = Working Diameter
- D_2 = Diameter of cutter insert centre to centre
- r = Insert radius
- a_p = Axial Depth of Cut

7710VR Technical Information

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

Simplified formulas to evaluate h_m and f_z based on radial engagement or depth of cut.

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness
 a_p = Depth of cut
 f_z = Feed per tooth
 d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness
 a_e = Radial engagement
 f_z = Feed per tooth
 d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



With round inserts, the thickness of the chip varies depending on the axial depth of cut (a_p) and is related to the size of the cutting edge-preparation.
For best tool life it is important to maintain the proper chip thickness as shown below.

7700VR06 Inserts RP..0603..

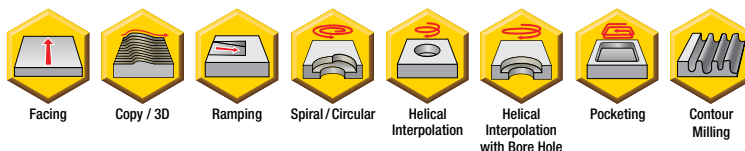
Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
F-701	6,00	0,25	0,02	0,05	0,10	0,24
	6,00	0,50	0,02	0,05	0,07	0,17
	6,00	0,75	0,02	0,05	0,06	0,14
	6,00	1,00	0,02	0,05	0,05	0,12
	6,00	1,25	0,02	0,05	0,04	0,11
	6,00	1,50	0,02	0,05	0,04	0,10
E-41	6,00	0,25	0,03	0,06	0,15	0,29
	6,00	0,50	0,03	0,06	0,10	0,21
	6,00	0,75	0,03	0,06	0,08	0,17
	6,00	1,00	0,03	0,06	0,07	0,15
	6,00	1,25	0,03	0,06	0,07	0,13
	6,00	1,50	0,03	0,06	0,06	0,12
T	6,00	0,25	0,05	0,08	0,24	0,39
	6,00	0,50	0,05	0,08	0,17	0,28
	6,00	0,75	0,05	0,08	0,14	0,23
	6,00	1,00	0,05	0,08	0,12	0,20
	6,00	1,25	0,05	0,08	0,11	0,18
	6,00	1,50	0,05	0,08	0,10	0,16

7700VR08 Inserts RP..0803..

Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
F-701	8,00	0,25	0,02	0,05	0,11	0,28
	8,00	0,50	0,02	0,05	0,08	0,20
	8,00	0,75	0,02	0,05	0,07	0,16
	8,00	1,00	0,02	0,05	0,06	0,14
	8,00	1,25	0,02	0,05	0,05	0,13
	8,00	1,50	0,02	0,05	0,05	0,12
E-701	8,00	0,25	0,02	0,05	0,11	0,28
	8,00	0,50	0,02	0,05	0,08	0,20
	8,00	0,75	0,02	0,05	0,07	0,16
	8,00	1,00	0,02	0,05	0,06	0,14
	8,00	1,25	0,02	0,05	0,05	0,13
	8,00	1,50	0,02	0,05	0,05	0,12
E-41	8,00	0,25	0,03	0,06	0,17	0,34
	8,00	0,50	0,03	0,06	0,12	0,24
	8,00	0,75	0,03	0,06	0,10	0,20
	8,00	1,00	0,03	0,06	0,08	0,17
	8,00	1,25	0,03	0,06	0,08	0,15
	8,00	1,50	0,03	0,06	0,07	0,14
E-422	8,00	0,25	0,03	0,07	0,17	0,40
	8,00	0,50	0,03	0,07	0,12	0,28
	8,00	0,75	0,03	0,07	0,10	0,23
	8,00	1,00	0,03	0,07	0,08	0,20
	8,00	1,25	0,03	0,07	0,08	0,18
	8,00	1,50	0,03	0,07	0,07	0,16

7700VR10 Inserts RP..10T3..

Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
F-701-X4	10,00	0,25	0,02	0,06	0,13	0,38
	10,00	0,50	0,02	0,06	0,09	0,27
	10,00	0,75	0,02	0,06	0,07	0,22
	10,00	1,00	0,02	0,06	0,06	0,19
	10,00	1,25	0,02	0,06	0,06	0,17
	10,00	1,50	0,02	0,06	0,05	0,15
	10,00	2,00	0,02	0,06	0,04	0,13
	10,00	0,25	0,03	0,07	0,19	0,44
E-701-X4	10,00	0,50	0,03	0,07	0,13	0,31
	10,00	0,75	0,03	0,07	0,11	0,26
	10,00	1,00	0,03	0,07	0,09	0,22
	10,00	1,25	0,03	0,07	0,08	0,20
	10,00	1,50	0,03	0,07	0,08	0,18
	10,00	2,00	0,03	0,07	0,07	0,16
	10,00	0,25	0,04	0,08	0,25	0,51
	10,00	0,50	0,04	0,08	0,18	0,36
E-421-X4	10,00	0,75	0,04	0,08	0,15	0,29
	10,00	1,00	0,04	0,08	0,13	0,25
	10,00	1,25	0,04	0,08	0,11	0,23
	10,00	1,50	0,04	0,08	0,10	0,21
	10,00	2,00	0,04	0,08	0,09	0,18
	10,00	0,25	0,04	0,08	0,25	0,51
	10,00	0,50	0,04	0,08	0,18	0,36
	10,00	0,75	0,04	0,08	0,15	0,29
E-41-X4	10,00	1,00	0,04	0,08	0,13	0,25
	10,00	1,25	0,04	0,08	0,11	0,23
	10,00	1,50	0,04	0,08	0,10	0,21
	10,00	2,00	0,04	0,08	0,09	0,18
	10,00	0,25	0,03	0,13	0,19	0,82
	10,00	0,50	0,03	0,13	0,13	0,58
	10,00	0,75	0,03	0,13	0,11	0,47
	10,00	1,00	0,03	0,13	0,09	0,41
E-422-X4	10,00	1,25	0,03	0,13	0,08	0,37
	10,00	1,50	0,03	0,13	0,08	0,34
	10,00	2,00	0,03	0,13	0,07	0,29
	10,00	0,25	0,07	0,14	0,44	0,89
	10,00	0,50	0,07	0,14	0,31	0,63
	10,00	0,75	0,07	0,14	0,26	0,51
	10,00	1,00	0,07	0,14	0,22	0,44
	10,00	1,25	0,07	0,14	0,20	0,40
RPHT_T-X4	10,00	1,50	0,07	0,14	0,18	0,36
	10,00	2,00	0,07	0,14	0,16	0,31
	10,00	0,25	0,10	0,16	0,63	1,01
	10,00	0,50	0,10	0,16	0,45	0,72
	10,00	0,75	0,10	0,16	0,37	0,58
	10,00	1,00	0,10	0,16	0,32	0,51
	10,00	1,25	0,10	0,16	0,28	0,45
	10,00	1,50	0,10	0,16	0,26	0,41
RPMW_T-X4	10,00	2,00	0,10	0,16	0,22	0,36



ROUND INSERT MILLING CUTTERS WITH AND WITHOUT INDEXATION

The **77.2VRD** series is specifically designed for the Die & Mould industry. This cutter family is especially qualified for medium-roughing, semi-finishing and finishing of Steel, Alloy Steel, Tool Steel and Aluminium Alloys, as well as for Hardened Steel.

The cutter series **7702VRD** is without an anti-rotation pocket, which allows a maximum number of insert indexing according to the axial depth of cut (a_p) requirement. This is an advantage when this cutter is used for semi-finishing and finishing with low axial depth of cut (a_p).

The series **7712VRD** is ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Tool Steel and Aluminium as well as for Hardened Steel. This cutter series has an anti-rotation design which ensures a precise number of indexes per insert.

This unique patented pocket design prevents the inserts from rotating in the pocket, during heavy feed machining and unstable conditions.

The insert for the **7712VRD12** cutter is six times indexable and the insert for the **7712VRD16** cutter is eight times indexable. This gives a maximum possible usage of the available edges for roughing applications.

Also, the axial negative rake cutting angle greatly reduces the vibration when using long extensions.

This robust design provides savings within the production process, under unstable conditions.

7702VRD

7702VRD07:

Maximum a_p = 3,5mm
Diameter Range = 15mm to 20mm

7702VRD10:

Maximum a_p = 5mm
Diameter Range = 20mm to 35mm

7702VRD12 and 7712VRD12:

Maximum a_p = 6mm
Diameter Range = 25mm to 80mm

7702VRD16 and 7712VRD16:

Maximum a_p = 8mm
Diameter Range = 32mm to 100mm

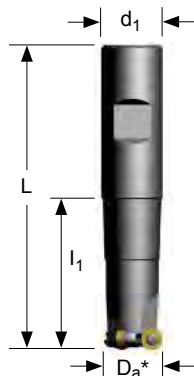
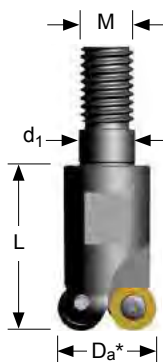


7702VRD07

Copy/Contour Milling Cutter



Contour Mills

**Weldon Shank****Modular Head**

Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	l1	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD07 Weldon Shank												
025691	7702VRD07WA016R50	16	98	50	16	3,5	2	015060	F2505T	018488	T7	0,80
025693	7702VRD07WA020R50	20	100	50	20	3,5	3	015060	F2505T	018488	T7	0,80

Da* = Outside Diameter

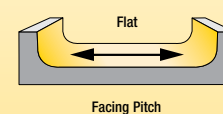
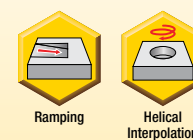
Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	M	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD07 Modular Head												
030863	7702VRD07SA015R25	15	25	M8	8,5	3,5	2	015060	F2505T	018488	T7	0,80

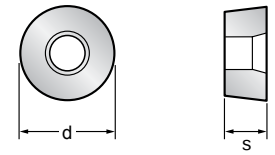
Note: For Cylindrical shanks extensions in high density alloy with through coolant refer to page A76.

Da* = Outside Diameter

7702VR07 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
025691	7702VRD07WA016R50	9	13.0	20	30	2,33	99000
025693	7702VRD07WA020R50	13	14.5	28	38	2,33	82500
030863	7702VRD07SA015R25	8	25.7	18	28	2,33	105000

**Depth of Cut (ap)**



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max -	a _p min - max 0,30 - 1,30	a _p min - max 0,10 - 0,50					
034556	RDET0702M0E-701	SP4019	-	-	   	7,00	-	2,38	3,50	0,03
034557	RDHW0702M0T	SP4019	-	   	   	7,00	-	2,38	3,50	0,07

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.


Contour Mills

7702VRD07 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-701	SP4019	Contouring	0,05 - 0,12	0,05 - 0,10	-	-	0,05 - 0,12	0,05 - 0,12	0,05 - 0,10	0,03 - 0,10	0,03 - 0,08	-	-	-	-	0,03 - 0,05	0,03 - 0,05
T	SP4019	Contouring	0,12 - 0,20	0,12 - 0,18	-	-	0,12 - 0,20	0,12 - 0,20	0,12 - 0,18	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08

Note: HTA = High Temperature Alloys

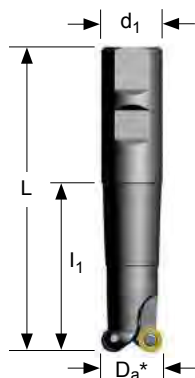
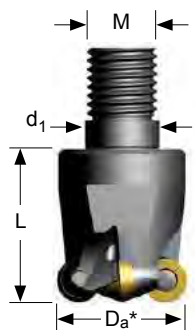
Speed recommendations can be found on page A226.

7702VRD10

Shoulder Milling Cutter



Contour Mills

**Weldon Shank****Modular Head**

Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	l1	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD10 Weldon Shank												
025697	7702VRD10WA020R70	20	120	70	20	5	2	022056	F3507T	015240	T15	2,10
025699	7702VRD10WA025R70	25	126	70	25	5	2	015269	F3508T	015240	T15	2,10

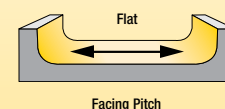
Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	M	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD10 Modular Head												
031238	7702VRD10SA020R30	20	30	M10	10,5	5	2	022056	F3507T	015240	T15	2,10
031290	7702VRD10SA025R35	25	35	M12	12,5	5	3	015269	F3508T	015240	T15	2,10
031222	7702VRD10SA030R35	30	35	M16	17,0	5	4	015269	F3508T	015240	T15	2,10
031440	7702VRD10SA032R35	32	35	M16	17,0	5	4	015269	F3508T	015240	T15	2,10
031289	7702VRD10SA035R35	35	35	M16	17,0	5	5	015269	F3508T	015240	T15	2,10

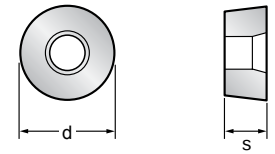
Note: For Cylindrical shanks extensions in high density alloy with through coolant refer to page A76.

Da* = Outside Diameter

7702VRD10 Technical Information (mm)

Product		Dimensions					Max RPM
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	
025697	7702VRD10WA020R70	10	17.5	22	38	3,33	74500
025699	7702VRD10WA025R70	15	10.7	32	48	3,33	60500
031238	7702VRD10SA020R30	10	17.5	22	38	3,33	74500
031290	7702VRD10SA025R35	15	10.7	32	48	3,33	60500
031222	7702VRD10SA030R35	20	15.5	42	58	3,33	52500
031440	7702VRD10SA032R35	22	14.0	46	62	3,33	50000
031289	7702VRD10SA035R35	25	10.7	52	68	3,33	47000

**Depth of Cut (ap)**



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 2,50*	a _p min - max 0,40 - 2,00	a _p min - max 0,10 - 0,80					
034558	RDET1003M0E-701	SP4019	-	-	   	10,00	-	3,18	5,00	0,05
034559	RDHW1003M0T	SP4019	   	   	   	10,00	-	3,18	5,00	0,12

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

 * Max. recommended a_p = 2,5mm (depending on the application)


Contour Mills

7702VRD10 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-701	SP4019	Contouring	0,07 - 0,15	0,07 - 0,12	-	-	0,07 - 0,15	0,07 - 0,15	0,12 - 0,10	0,05 - 0,12	0,05 - 0,10	-	-	-	-	0,04 - 0,07	0,04 - 0,07
T	SP4019	Contouring	0,18 - 0,28	0,18 - 0,25	-	-	0,18 - 0,28	0,18 - 0,28	0,18 - 0,25	-	-	-	-	-	-	0,06 - 0,10	0,06 - 0,10

Note: HTA = High Temperature Alloys

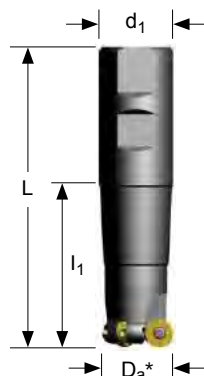
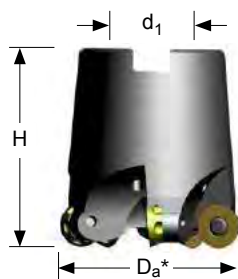
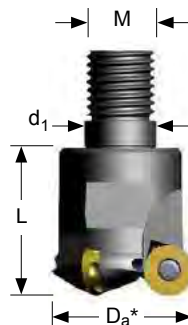
Speed recommendations can be found on page A226.

7702VRD12 & 7712VRD12

Copy/Contour Milling Cutter



Contour Mills

**Weldon Shank****Shell Mill Fixation****Modular Head****Depth of Cut (a_p)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a^*	L	l_1	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD12 Weldon Shank												
025703	7702VRD12WA025R70	25	126	70	25	6	2	015269	F3508T	015240	T15	2,10
025705	7702VRD12WA032R70	32	130	70	32	6	3	015269	F3508T	015240	T15	2,10
7712VRD12 Shell Mill Fixation												
029054	7712VRD12-A052R	52	55	-	22	6	5	015269	F3508T	015240	T15	2,10
029055	7712VRD12-A066R	66	55	-	27	6	6	015269	F3508T	015240	T15	2,10
029056	7712VRD12-A080R	80	55	-	27	6	7	015269	F3508T	015240	T15	2,10

 D_a^* = Outside Diameter

The cutter series 7702VRD is a without a anti-rotation pocket, which allows a maximum number of insert indexing according to the axial depth of cut (a_p) requirement.

This is an advantage when the cutter is used for semi-finishing and finishing with low axial depth of cut (a_p).

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a^*	L	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
031383	7712VRD12SA035R35	35	35	M16	17,0	6	3	022056	F3507T	015240	T15	2,10

Note: For Cylindrical shank extensions in high density alloy with through coolant refer to page A76.

 D_a^* = Outside Diameter

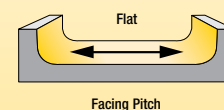
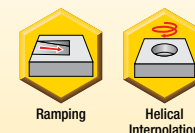
The 7712VRD series with anti-rotation pocket ensures a precise number indexes per insert.

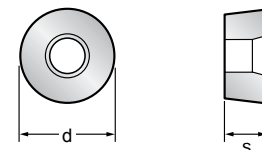
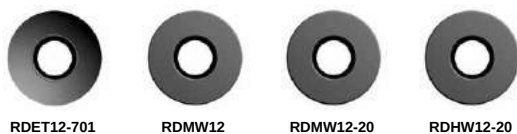
This unique patented pocket design prevents the inserts from rotating in the pocket during heavy feed machining and unstable conditions.

The insert for the 7712VRD12 cutter is 6 times indexable.

7702VRD12 & 7712VRD12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
025703	7702VRD12WA025R70	13	16,50	28	48	4,00	50000
025705	7702VRD12WA032R70	20	12,00	42	62	4,00	40000
029054	7712VRD12-A052R	40	5,00	82	102	4,00	28500
029055	7712VRD12-A066R	54	3,70	110	130	4,00	24500
029056	7712VRD12-A080R	68	2,80	138	158	4,00	21500
031383	7712VRD12SA035R35	23	18,60	48	68	4,00	37500





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 3,50*	a _p min - max 0,50 - 2,50	a _p min - max 0,10 - 0,80					
034560	RDET12T3M0E-701-X6	SP4019	-	-	◆◆◆◆◆	12,00	-	3,97	6,00	0,05
031524	RDMW12T3M0T-X6	SP5419	-	■ ■	-	12,00	-	3,97	6,00	0,15
034562	RDHW12T3M0T-X6	SP4019	-	◆◆◆◆◆	■ ■ ■ ◆	12,00	-	3,97	6,00	0,15
031523	RDMW12T3M0T-20-X6	SP5419	● ■	-	-	12,00	-	3,97	6,00	0,20
031519	RDHW12T3M0T-20-X6	SP5419	■ ◆	-	-	12,00	-	3,97	6,00	0,20
034561	RDHW12T3M0T-20-X6	SP4019	◆ ● ■ ◆	-	-	12,00	-	3,97	6,00	0,20

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

 * Max. recommended a_p = 3,5mm (depending on the application)

RDMW12T3MOT-20-X6 and RDHW12T3MOT-20-X6 are for heavy roughing applications.



Contour Mills

7702VRD12 & 7712VRD12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-701-X6	SP4019	Contouring	0,07 - 0,20	0,07 - 0,18	-	-	0,07 - 0,20	0,07 - 0,20	0,07 - 0,18	0,05 - 0,14	0,05 - 0,12	-	-	-	-	0,04 - 0,08	0,04 - 0,08
RDMW...T-X6	SP5419	Contouring	0,20 - 0,32	0,20 - 0,30	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW...T-X6	SP4019	Contouring	0,20 - 0,30	0,20 - 0,28	-	-	0,20 - 0,30	0,20 - 0,30	0,20 - 0,25	-	-	-	-	-	-	0,10 - 0,12	0,10 - 0,12
RDMW...T-20-X6	SP5419	Contouring	0,30 - 0,45	0,30 - 0,42	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW...T-20-X6	SP5419	Contouring	0,30 - 0,45	0,30 - 0,42	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW...T-20-X6	SP4019	Contouring	0,30 - 0,42	0,30 - 0,40	-	-	0,30 - 0,45	0,30 - 0,45	0,30 - 0,42	-	-	-	-	-	-	0,10 - 0,14	0,10 - 0,14

Note: HTA = High Temperature Alloys

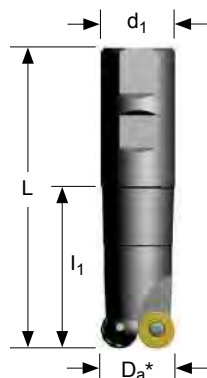
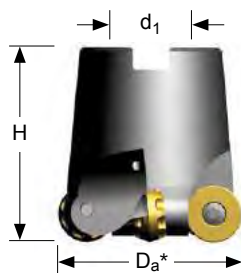
Note: Speed recommendations can be found on page A226.

7702VRD16 & 7712VRD16

Copy/Contour Milling Cutter



Contour Mills

**Weldon Shank****Shell Mill Fixation****Modular Head****Depth of Cut (a_p)**

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a^*	L	l_1	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD16 Weldon Shank												
025709	7702VRD16WA032R70	32	130	70	32	8	2	015270	F4011T	015241	T20	3,10
7712VRD16 Shell Mill Fixation												
029057	7712VRD16-A052R	52	55	-	22	8	4	015270	F4011T	015241	T20	3,10
029058	7712VRD16-A066R	66	55	-	27	8	5	015270	F4011T	015241	T20	3,10
029059	7712VRD16-A080R	80	55	-	27	8	6	015270	F4011T	015241	T20	3,10
029060	7712VRD16-A100R	100	55	-	32	8	7	015270	F4011T	015241	T20	3,10

 D_a^* = Outside Diameter

The cutter series 7702VRD is a without a anti-rotation pocket, which allows a maximum number of insert indexing according to the axial depth of cut (a_p) requirement.

This is an advantage when the cutter is used for semi-finishing and finishing with low axial depth of cut (a_p).

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a^*	L	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7712VRD16 Modular Head												
031300	7712VRD16SA032R43	32	43	M16	17,0	8	2	015270	F4011T	015241	T20	3,10

Note: For Cylindrical shank extensions in high density alloy with through coolant refer to page A76.

 D_a^* = Outside Diameter

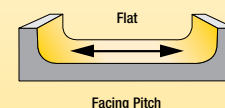
The 7712VRD series with anti-rotation pocket ensures a precise number indexes per insert.

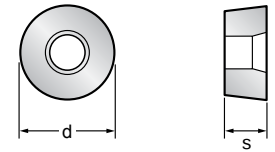
This unique patented pocket design prevents the inserts from rotating in the pocket during heavy feed machining and unstable conditions.

The insert for the 7712VRD16 cutter is 8 times indexable.

7702VRD16 & 7712VRD16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
025709	7702VRD16WA032R70	16	17.50	34	62	5,33	34000
029057	7712VRD16-A052R	36	5.20	74	102	5,33	22500
029058	7712VRD16-A066R	50	4.10	102	130	5,33	19000
029059	7712VRD16-A080R	64	3.35	130	158	5,33	17000
029060	7712VRD16-A100R	84	2.65	170	198	5,33	14500
031300	7712VRD16SA032R43	16	10.85	34	62	5,33	34000





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max 5,00*	a _p min - max 0,50 - 2,50	a _p min - max 0,10 - 0,80					
034563	RDET1604M0E-701-X8	SP4019	-	-	◆◆◆◆◆	16,00	-	4,76	8,00	0,05
031521	RDMW1604M0T-X8	SP5419	-	●●	-	16,00	-	4,76	8,00	0,15
031653	RDHW1604M0T-X8	SP5419	-	■	-	16,00	-	4,76	8,00	0,15
034565	RDHW1604M0T-X8	SP4019	-	◆◆◆◆◆	■	16,00	-	4,76	8,00	0,15
031522	RDMW1604M0T-30-X8	SP5419	◆◆	-	-	16,00	-	4,76	8,00	0,30
031520	RDHW1604M0T-30-X8	SP5419	■	-	-	16,00	-	4,76	8,00	0,30
034564	RDHW1604M0T-30-X8	SP4019	●●◆	-	-	16,00	-	4,76	8,00	0,30

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

 * Max. recommended a_p = 5mm (depending on the application)

RDMW1604MOT-30-X8 and RDHW1604MOT-30-X8 are for heavy roughing applications.



Contour Mills

7702VRD16 & 7712VRD16 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-701-X8	SP4019	Contouring	0,07 - 0,22	0,07 - 0,20	-	-	0,07 - 0,22	0,07 - 0,22	0,07 - 0,20	0,05 - 0,20	0,05 - 0,18	-	-	-	-	0,04 - 0,08	0,04 - 0,08
RDMW... T-X8	SP5419	Contouring	0,25 - 0,45	0,25 - 0,42	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW... T-X8	SP5419	Contouring	0,25 - 0,45	0,25 - 0,42	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW... T-X8	SP4019	Contouring	0,25 - 0,40	0,25 - 0,38	-	-	0,25 - 0,42	0,25 - 0,42	0,25 - 0,38	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15
RDMW... T-30-X8	SP5419	Contouring	0,45 - 0,70	0,42 - 0,60	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW... T-30-X8	SP5419	Contouring	0,45 - 0,70	0,42 - 0,60	-	-	-	-	-	-	-	-	-	-	-	-	-
RDHW... T-30-X8	SP4019	Contouring	0,42 - 0,55	0,40 - 0,50	-	-	0,45 - 0,60	0,45 - 0,60	0,42 - 0,55	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A226.

7702VRD & 7712VRD Series

Recommended Speeds

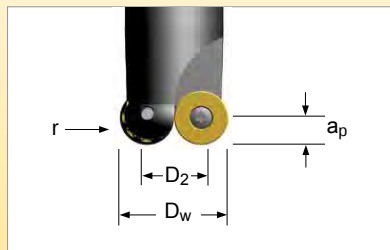


Contour Mills

Speed v_c (m/min)							
7702VRD & 7712VRD Series			Wear Resistance				
			- ← → +				
Coolant Recommendation			Speed min. - max.				
Recommended ● Possible ◎							
ISO	Materials	Rm and Hardness			PVD Standard		
			☹	☹	SP5419	☹	☹
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	115 - 205	●	140 - 315
		<950 N/mm ² <280 HBN	◎	●	105 - 185	●	120 - 275
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	90 - 160	●	105 - 245
		950-1200 N/mm ² 280-355 HBN	◎	●	70 - 120	●	80 - 190
		1200-1400 N/mm ² 355-415 HBN	◎	●	45 - 80	●	50 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series					
		Martensitic 400 series					
	PH Stainless	Refractory P.H.					
K	Cast Iron	Grey GG-Ft				●	145 - 330
		Spheroidal-Ductile GGG-FGS				●	115 - 255
		Malleable GTS - MN/MP				●	105 - 235
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN				●	400 - 2895
		Aluminium + Silicon > 16% Si 92 HBN				●	295 - 2320
S	High Temperature Alloys	Iron Based					
		Cobalt Based					
		Nickel Based					
		Titanium Based					
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN				●	50 - 100
		Chilled Cast Iron >1400 N/mm ² > 400 HBN				●	40 - 90



7702VRD & 7712VRD Technical Information



Working Diameter:

Formula to evaluate the correct working diameter based on axial depth of cut (a_p).

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

D_w = Working Diameter
 D_2 = Diameter of cutter insert centre to centre
 r = Insert radius
 a_p = Axial Depth of Cut

7702VRD & 7712VRD Technical Information

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

Simplified formulas to evaluate h_m and f_z based on radial engagement or depth of cut.

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



With round inserts, the thickness of the chip varies depending on the axial depth of cut.
For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RD..0702...

Dimensions (mm)						
Inserts Geometry	Insert Size	ap Axial d.o.c.	hm min.	hm max.	fz min.	fz max.
E-701	7,00	0,10	0,02	0,06	0,17	0,50
	7,00	0,25	0,02	0,06	0,11	0,32
	7,00	0,50	0,02	0,06	0,07	0,22
	7,00	0,75	0,02	0,06	0,06	0,18
	7,00	1,00	0,02	0,06	0,05	0,16
	7,00	1,25	0,02	0,06	0,05	0,14
	7,00	1,30	0,02	0,06	0,05	0,14
T	7,00	0,10	0,05	0,08	0,42	0,67
	7,00	0,25	0,05	0,08	0,26	0,42
	7,00	0,50	0,05	0,08	0,19	0,30
	7,00	0,75	0,05	0,08	0,15	0,24
	7,00	1,00	0,05	0,08	0,13	0,21
	7,00	1,25	0,05	0,08	0,12	0,19
	7,00	1,30	0,05	0,08	0,12	0,19

With round inserts, the thickness of the chip varies depending on the axial depth of cut.
For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RD..1003..

Dimensions (mm)						
Inserts Geometry	Insert Size	ap Axial d.o.c.	hm min.	hm max.	fz min.	fz max.
E-701	10,00	0,10	0,04	0,07	0,40	0,70
	10,00	0,25	0,04	0,07	0,25	0,44
	10,00	0,50	0,04	0,07	0,18	0,31
	10,00	0,75	0,04	0,07	0,15	0,26
	10,00	1,00	0,04	0,07	0,13	0,22
	10,00	1,25	0,04	0,07	0,11	0,20
	10,00	1,50	0,04	0,07	0,10	0,18
	10,00	1,75	0,04	0,07	0,10	0,17
	10,00	2,00	0,04	0,07	0,09	0,16
	10,00	2,25	0,04	0,07	0,08	0,15
	10,00	2,50	0,04	0,07	0,08	0,14
T	10,00	0,10	0,10	0,15	1,00	1,50
	10,00	0,25	0,10	0,15	0,63	0,95
	10,00	0,50	0,10	0,15	0,45	0,67
	10,00	0,75	0,10	0,15	0,37	0,55
	10,00	1,00	0,10	0,15	0,32	0,47
	10,00	1,25	0,10	0,15	0,28	0,42
	10,00	1,50	0,10	0,15	0,26	0,39
	10,00	1,75	0,10	0,15	0,24	0,36
	10,00	2,00	0,10	0,15	0,22	0,34
	10,00	2,25	0,10	0,15	0,21	0,32
	10,00	2,50	0,10	0,15	0,20	0,30



With round inserts, the thickness of the chip varies depending on the axial depth of cut.
 For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RD..12T3..

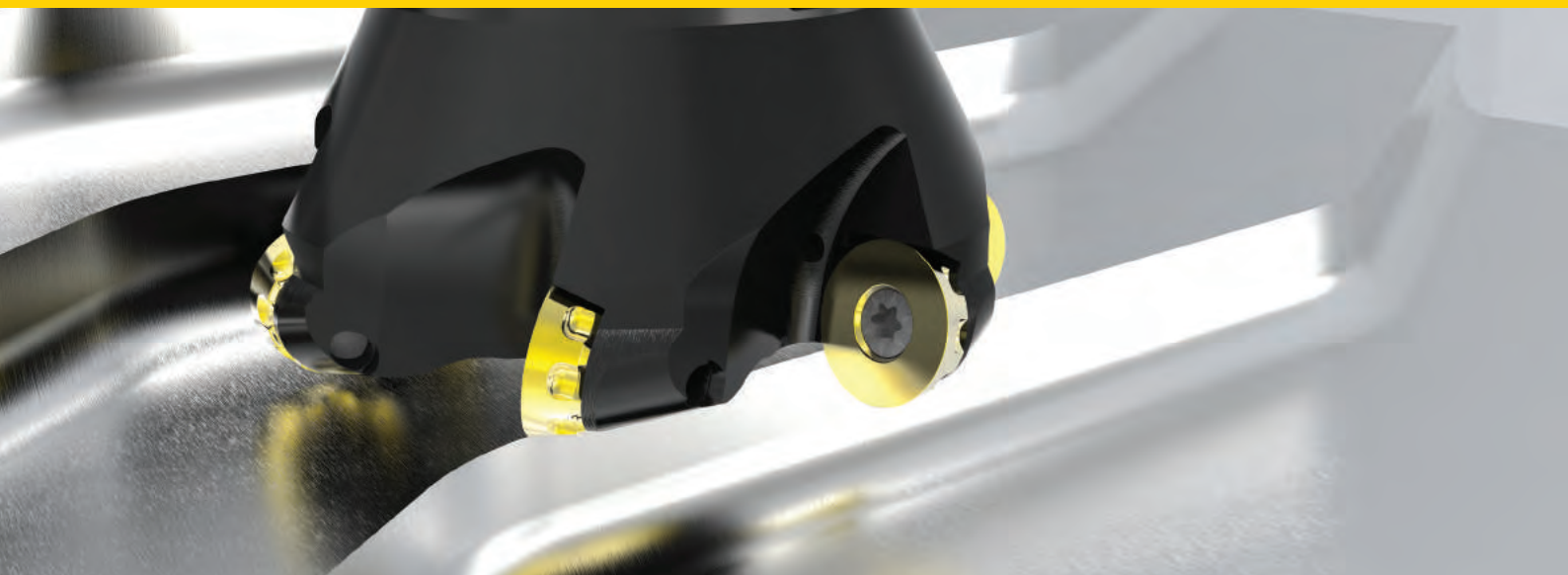
Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
E-701-X6	12,00	0,25	0,04	0,09	0,28	0,62
	12,00	0,50	0,04	0,09	0,20	0,44
	12,00	0,75	0,04	0,09	0,16	0,36
	12,00	1,00	0,04	0,09	0,14	0,31
	12,00	1,25	0,04	0,09	0,12	0,28
	12,00	1,50	0,04	0,09	0,11	0,25
	12,00	1,75	0,04	0,09	0,10	0,24
	12,00	2,00	0,04	0,09	0,10	0,22
	12,00	2,50	0,04	0,09	0,09	0,20
	12,00	3,00	0,04	0,09	0,08	0,18
T-X6	12,00	0,25	0,13	0,18	0,90	1,25
	12,00	0,50	0,13	0,18	0,64	0,88
	12,00	0,75	0,13	0,18	0,52	0,72
	12,00	1,00	0,13	0,18	0,45	0,62
	12,00	1,25	0,13	0,18	0,40	0,56
	12,00	1,50	0,13	0,18	0,37	0,51
	12,00	1,75	0,13	0,18	0,34	0,47
	12,00	2,00	0,13	0,18	0,32	0,44
	12,00	2,50	0,13	0,18	0,28	0,39
	12,00	3,00	0,13	0,18	0,26	0,36
T-20-X6	12,00	0,25	0,18	0,22	1,25	1,52
	12,00	0,50	0,18	0,22	0,88	1,08
	12,00	0,75	0,18	0,22	0,72	0,88
	12,00	1,00	0,18	0,22	0,62	0,76
	12,00	1,25	0,18	0,22	0,56	0,68
	12,00	1,50	0,18	0,22	0,51	0,62
	12,00	1,75	0,18	0,22	0,47	0,58
	12,00	2,00	0,18	0,22	0,44	0,54
	12,00	2,50	0,18	0,22	0,39	0,48
	12,00	3,00	0,18	0,22	0,36	0,44
	12,00	3,50	0,18	0,22	0,33	0,41



With round inserts, the thickness of the chip varies depending on the axial depth of cut.
For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RD..1604..

Dimensions (mm)						
Inserts Geometry	Insert Size	ap Axial d.o.c.	hm min.	hm max.	fz min.	fz max.
E-701-X8	16,00	0,25	0,04	0,10	0,32	0,80
	16,00	0,50	0,04	0,10	0,23	0,57
	16,00	0,75	0,04	0,10	0,18	0,46
	16,00	1,00	0,04	0,10	0,16	0,40
	16,00	1,25	0,04	0,10	0,14	0,36
	16,00	1,50	0,04	0,10	0,13	0,33
	16,00	1,75	0,04	0,10	0,12	0,30
	16,00	2,00	0,04	0,10	0,11	0,28
	16,00	2,50	0,04	0,10	0,10	0,25
	16,00	3,00	0,04	0,10	0,09	0,23
	16,00	3,50	0,04	0,10	0,09	0,21
	16,00	4,00	0,04	0,10	0,08	0,20
	16,00	4,50	0,04	0,10	0,08	0,19
	16,00	5,00	0,04	0,10	0,07	0,18
	16,00	0,25	0,14	0,20	1,12	1,60
T-X8	16,00	0,50	0,14	0,20	0,79	1,13
	16,00	0,75	0,14	0,20	0,65	0,92
	16,00	1,00	0,14	0,20	0,56	0,80
	16,00	1,25	0,14	0,20	0,50	0,72
	16,00	1,50	0,14	0,20	0,46	0,65
	16,00	1,75	0,14	0,20	0,42	0,60
	16,00	2,00	0,14	0,20	0,40	0,57
	16,00	2,50	0,14	0,20	0,35	0,51
	16,00	3,00	0,14	0,20	0,32	0,46
	16,00	3,50	0,14	0,20	0,30	0,43
	16,00	4,00	0,14	0,20	0,28	0,40
	16,00	4,50	0,14	0,20	0,26	0,38
	16,00	5,00	0,14	0,20	0,25	0,36
	16,00	0,25	0,25	0,30	2,00	2,40
	16,00	0,50	0,25	0,30	1,41	1,70
T-30-X8	16,00	0,75	0,25	0,30	1,15	1,39
	16,00	1,00	0,25	0,30	1,00	1,20
	16,00	1,25	0,25	0,30	0,89	1,07
	16,00	1,50	0,25	0,30	0,82	0,98
	16,00	1,75	0,25	0,30	0,76	0,91
	16,00	2,00	0,25	0,30	0,71	0,85
	16,00	2,50	0,25	0,30	0,63	0,76
	16,00	3,00	0,25	0,30	0,58	0,69
	16,00	3,50	0,25	0,30	0,53	0,64
	16,00	4,00	0,25	0,30	0,50	0,60
	16,00	4,50	0,25	0,30	0,47	0,57
	16,00	5,00	0,25	0,30	0,45	0,54



ROUND INSERT MILLING CUTTERS WITH INDEXATION

The **7710VRD** cutter series is excellent for heavy roughing and semi-finishing of all materials. Specifically for Stainless Steels, High Temperature Alloys as well as for Unalloyed Steel, Alloyed Steel and Cast Iron.

This cutter design is perfectly suited for face milling forgings where material allowance is unpredictable.

The 7710VRD cutter series with anti-rotation ensures a precise number of indexes per insert.

This unique patented pocket design prevents the inserts from rotating in the pocket, during heavy feed machining and unstable conditions.

This 20mm insert size is 8 times indexable that gives a maximum possible usage of the available edges.

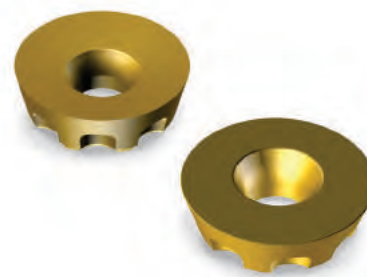
7710VRD20

7710VRD20:

Maximum a_p = 10mm

Diameter Range = 63 to 160mm

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page A156.

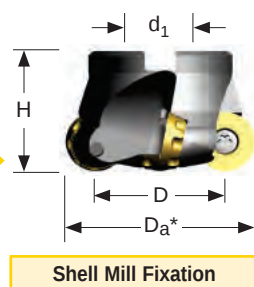


7710VRD20

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Contour Mills



Shell Mill Fixation

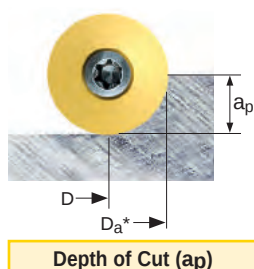
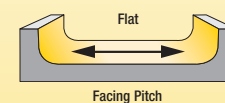
Product		Dimensions (mm)							Spares					
EDP	Item Description	Da*	D Effective Cutting Diameter	H	l1	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm	
7710VRD20 Shell Mill Fixation														
031443	7710VRD20-A063Z4R	63	43	40	40	22	10	4	029640		D6014T	015241	T20	10,50
031444	7710VRD20-A080Z5R	80	60	50	50	27	10	5						
031445	7710VRD20-A100Z6R	100	80	50	50	32	10	6						
031446	7710VRD20-A125Z7R	125	105	63	63	40	10	7						
031447	7710VRD20-160Z08R	160	140	63	63	40	10	8						

D = Effective Diameter (Axis) from Insert centreline to centreline

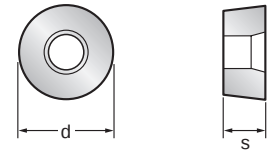
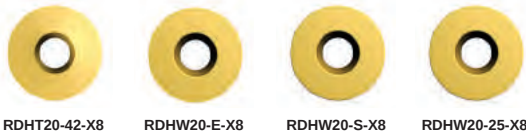
Da* = Outside Diameter

7710VRD20 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
031443	7710VRD20-A063Z4R	43	8.30	88	124	6,60	14850
031444	7710VRD20-A080Z5R	60	5.40	122	158	6,60	18500
031445	7710VRD20-A100Z6R	80	3.80	162	198	6,60	16000
031446	7710VRD20-A125Z7R	105	2.80	212	248	6,60	14000
031447	7710VRD20-160Z08R	140	2.20	282	318	6,60	12100



Depth of Cut (ap)



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m mm
			Depth of Cut (mm)							
			a _p max 10,0*	a _p min. - max. 1,0 - 3,0	a _p min. - max. 0,2 - 1,0					
029310	RDHT2006M0E-42-X8	X500			-	20,00	-	6,35	10,00	0,08
031533	RDHT2006M0E-42-X8	SP6519			-	20,00	-	6,35	10,00	0,08
029309	RDHW2006M0E-X8	X500	-		-	20,00	-	6,35	10,00	0,10
031661	RDHW2006M0S-X8	X500			-	20.00	-	6.35	10.00	0.15
031662	RDHW2006M0S-X8	SP6519			-	20.00	-	6.35	10.00	0.15
031660	RDHW2006M0S-25-X8	X500		-	-	20,00	-	6,35	10,00	0,25
031576	RDHW2006M0S-25-X8	SP6519		-	-	20,00	-	6,35	10,00	0,25

 Machining Choice: 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

 * Max. recommended a_p = 7,5mm (depending on the application)

INSERT APPLICATION NOTES:

RDHW2006M0E-X8 X500 should be your first choice for medium roughing application when machining Titanium without heavy scale.

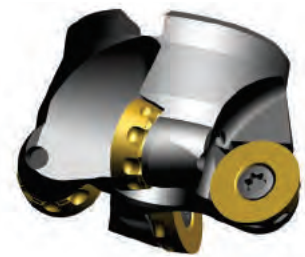
RDHW2006M0S-X8 SP6519 should be used when machining Stainless Steel with heavy scale.

RDHW2006M0S-X8 X500 should be used when machining High Temperature Alloys with heavy scale.

RDHT2006M0E-42-X8 should be used when the machine tool has low power available and when the conditions are stable.

RDHW2006M0S-25-X8 should be used for heavy duty applications.

Contour Mills


7710VRD20 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
E-42-X8	X500	Facing	-	-	0,15 - 0,35	0,15 - 0,30	-	-	-	-	-	0,12 - 0,25	0,12 - 0,25	0,12 - 0,25	0,12 - 0,30	-	-
E-42-X8	SP6519	Facing	-	-	0,15 - 0,35	0,15 - 0,28	-	-	-	-	-	0,12 - 0,25	0,12 - 0,25	0,12 - 0,25	0,12 - 0,30	-	-
E-X8	X500	Facing	0,20 - 0,30	0,18 - 0,28	0,20 - 0,40	0,20 - 0,30	0,20 - 0,35	0,20 - 0,35	0,20 - 0,30	-	-	0,20 - 0,28	0,20 - 0,28	0,20 - 0,28	0,20 - 0,32	-	-
S-X8	X500	Facing	0,25 - 0,45	0,25 - 0,35	0,25 - 0,45	0,25 - 0,32	0,25 - 0,45	0,25 - 0,45	0,25 - 0,40	-	-	0,25 - 0,32	0,25 - 0,32	0,25 - 0,32	0,25 - 0,35	-	-
S-X8	SP6519	Facing	0,25 - 0,45	0,25 - 0,35	-	-	0,25 - 0,45	0,25 - 0,45	0,25 - 0,40	-	-	-	-	-	-	-	-
S-25-X8	X500	Facing	0,35 - 0,60	0,35 - 0,50	-	-	0,35 - 0,60	0,35 - 0,55	0,35 - 0,45	-	-	-	-	-	-	-	-
S-25-X8	SP6519	Facing	0,35 - 0,55	0,35 - 0,45	-	-	0,35 - 0,55	0,35 - 0,50	0,35 - 0,40	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page A234.

7710VRD20

Recommended Speeds

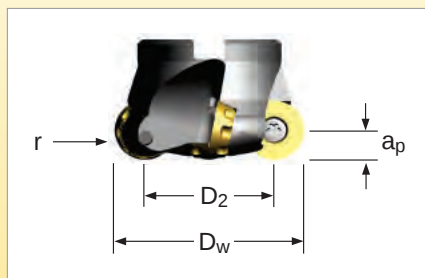


Contour Mills

Speed v_c (m/min)									
7710VRD20 Series				Wear Resistance					
				- +					
Coolant Recommendation				Speed min. - max.					
Recommended ● Possible ○				CVD X Grade		PVD Standard			
ISO	Materials	Rm and Hardness			X500			SP6519	
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	130 - 270	○	●	130 - 295	
		<950 N/mm ² <280 HBN	○	●	115 - 240	○	●	115 - 260	
		700-950 N/mm ² 200-280 HBN	○	●	100 - 210	○	●	100 - 230	
	Alloyed Steel	950-1200 N/mm ² 280-355 HBN	○	●	75 - 160	○	●	75 - 175	
		1200-1400 N/mm ² 355-415 HBN	○	●	50 - 100	○	●	50 - 110	
M	Stainless Steel	Austenitic + Ferritic 300 series	○	●	115 - 250	○	●	115 - 270	
		Martensitic 400 series	○	●	100 - 220	○	●	105 - 235	
	PH Stainless	Refractory P.H.	●	○	50 - 110	●	○	50 - 120	
K	Cast Iron	Grey GG-Ft	○	●	120 - 280	○	●	140 - 295	
		Spheroidal-Ductile GGG-FGS	○	●	105 - 205	○	●	110 - 240	
		Malleable GTS - MN/MP	○	●	95 - 170	○	●	100 - 220	
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	○	○		○	○		
		Aluminium + Silicon > 16% Si 92 HBN	○	○		○	○		
S	High Temperature Alloys	Iron Based	●	○	23 - 48	●	○	23 - 55	
		Cobalt Based	●	○	21 - 44	●	○	22 - 48	
		Nickel Based	●	○	24 - 51	●	○	25 - 55	
		Titanium Based	●	○	35 - 73	●	○	36 - 79	
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	○	○		○	○		
		Chilled Cast Iron >1400 N/mm ² > 400 HBN	○	○		○	○		



7710VRD20 Technical Information



Working Diameter:

Formula to evaluate the correct working diameter based on axial depth of cut (a_p).

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

D_w = Working Diameter
 D_2 = Diameter of cutter insert centre to centre
 r = Insert radius
 a_p = Axial Depth of Cut

7710VRD20 Technical Information

where:

f_z = Feed per tooth
 h_m = Average chip thickness
 r = Insert radius
 a_e = Radial Depth of Cut
 a_p = Axial Depth of Cut

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$



Simplified formulas to evaluate h_m and f_z based on axial depth of cut (a_p) or radial engagement (a_e).

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

With round inserts, the thickness of the chip varies depending on the axial depth of cut (a_p) and is related to the size of the cutting edge-preparation. For best tool life it is important to maintain the proper chip thickness as shown below. This chart calculates in relation with axial depth of cut (a_p) only and not radial cut (a_e).

RD..2006..insert

Insert	Insert size (mm)	a_p d.o.c. (mm)	h_m (mm)		f_z (mm/Z)	
			min.	max.	min.	max.
RDHT2006M0E-42-X8	20,00	1,00	0,08	0,18	0,36	0,80
	20,00	2,00	0,08	0,18	0,25	0,57
	20,00	3,00	0,08	0,18	0,21	0,46
	20,00	4,00	0,08	0,18	0,18	0,40
	20,00	5,00	0,08	0,18	0,16	0,36
	20,00	6,00	0,08	0,18	0,15	0,33
	20,00	8,00	0,08	0,18	0,13	0,28
	20,00	10,00	0,08	0,18	0,11	0,25
RDHW2006M0E-X8	20,00	1,00	0,10	0,20	0,45	0,89
	20,00	2,00	0,10	0,20	0,32	0,63
	20,00	3,00	0,10	0,20	0,26	0,52
	20,00	4,00	0,10	0,20	0,22	0,45
	20,00	5,00	0,10	0,20	0,20	0,40
	20,00	6,00	0,10	0,20	0,18	0,37
	20,00	8,00	0,10	0,20	0,16	0,32
	20,00	10,00	0,10	0,20	0,14	0,28
RDHW2006M0S-X8	20,00	2,00	0,15	0,25	0,47	0,79
	20,00	3,00	0,15	0,25	0,39	0,65
	20,00	4,00	0,15	0,25	0,34	0,56
	20,00	5,00	0,15	0,25	0,30	0,50
	20,00	6,00	0,15	0,25	0,27	0,46
	20,00	8,00	0,15	0,25	0,24	0,40
	20,00	10,00	0,15	0,25	0,21	0,35
RDHW2006M0S-25-X8	20,00	4,00	0,25	0,30	0,56	0,67
	20,00	5,00	0,25	0,30	0,50	0,60
	20,00	6,00	0,25	0,30	0,46	0,55
	20,00	8,00	0,25	0,30	0,40	0,47
	20,00	10,00	0,25	0,30	0,35	0,42



ROUND INSERT MILLING CUTTER WITH INDEXATION

The **7713VR** is our newest round insert cutter series. Designed with a new nickel plated surface treatment that reduces the body degradation during high performance applications and enhances the body tool life.

This cutter series has an anti-rotation design which ensures a precise number of indexes per insert. This gives a maximum possible usage of the available edges for roughing applications.

This unique patented pocket system prevents the inserts from rotating in the pocket, during heavy feed machining and unstable conditions.

This 7713VR cutter is excellent for roughing and semi-finishing of all materials, specifically for Stainless Steel and High Temperature Alloys as well as for Steel, Tool Steel and Aluminium Alloys.

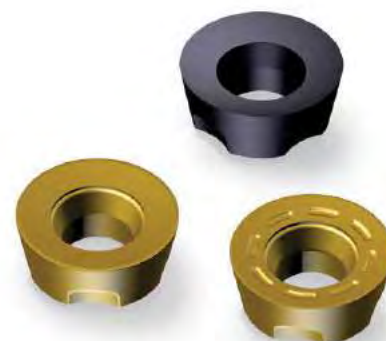
7713VR

7713VR10:

Maximum a_p = 5mm
Diameter Range = 20 to 63mm

7713VR12:

Maximum a_p = 6mm
Diameter Range = 25 to 80mm

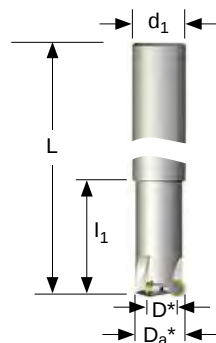
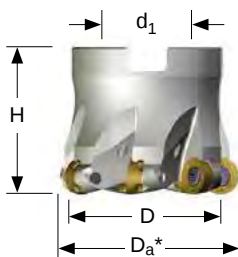
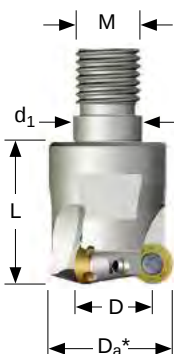


7713VR10

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Contour Mills

**Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (ap)**

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L/H	l1	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7713VR10 Cylindrical Shank - Medium and Fine Pitch													
033100	7713VR10CA020Z2R40	20	10	180	40	20	5	2	031233	D4007T	031654	TB15	3,10
033101	7713VR10CA025Z3R50	25	15	200	50	25	5	3	031233	D4007T	031654	TB15	3,10
033102	7713VR10CA032Z3R70	32	22	250	70	32	5	3	015260	D4008T	031654	TB15	3,10
033103	7713VR10CA032Z4R70	32	22	250	70	32	5	4	015260	D4008T	031654	TB15	3,10

7713VR10 Shell Mill Fixation - Medium and Fine Pitch

EDP	Item Description	Da*	D Effective Diameter	L	M	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
033104	7713VR10-A040Z05R	40	30	40	-	16	5	5	015260	D4008T	031654	TB15	3,10
033105	7713VR10-A042Z06R	42	32	40	-	16	5	6	018481	D4006T	031654	TB15	3,10
033106	7713VR10-A050Z06R	50	40	40	-	22	5	6	015260	D4008T	031654	TB15	3,10
033107	7713VR10-A050Z07R	50	40	40	-	22	5	7	015260	D4008T	031654	TB15	3,10
033108	7713VR10-A063Z08R	63	53	40	-	22	5	8	015260	D4008T	031654	TB15	3,10

D = Effective Diameter (Axis) from Insert centreline to centreline

Da* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L	M	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7713VR10 Modular Head - Medium and Fine Pitch													
033109	7713VR10SA020Z2R25	20	10	25	M10	10.5	5	2	031233	D4007T	031654	TB15	3,10
033110	7713VR10SA025Z2R35	25	15	35	M12	12.5	5	2	031233	D4007T	031654	TB15	3,10
033111	7713VR10SA025Z3R35	25	15	35	M12	12.5	5	3	031233	D4007T	031654	TB15	3,10
033112	7713VR10SA032Z3R35	32	22	35	M16	17.0	5	3	015260	D4008T	031654	TB15	3,10
033113	7713VR10SA032Z4R35	32	22	35	M16	17.0	5	4	015260	D4008T	031654	TB15	3,10
033114	7713VR10SA035Z5R35	35	25	35	M16	17.00	5	5	031233	D4007T	031654	TB15	3,10

D = Effective Diameter (Axis) from Insert centreline to centreline

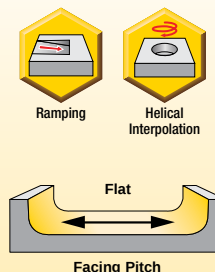
Da* = Outside Diameter

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.
The 7713VR10 series with anti-rotation pocket ensures a precise number of indexes per insert.

This unique patented pocket design prevents the inserts from rotating in the pocket during heavy feed machining and unstable conditions.

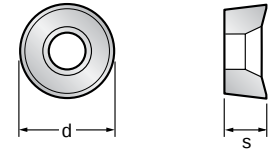
7713VR10 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
033100	7713VR10CA020Z2R40	10	1.89	22	38	3,33	64500
033101	7713VR10CA025Z3R50	15	5.22	32	48	3,33	53500
033102	7713VR10CA032Z3R70	22	8.64	46	62	3,33	53500
033103	7713VR10CA032Z4R70	22	8.64	46	62	3,33	53500
033104	7713VR10-A040Z05R	30	7.28	62	78	3,33	47000
033105	7713VR10-A042Z06R	32	6.71	66	82	3,33	39500
033106	7713VR10-A050Z06R	40	5.22	82	98	3,33	39500
033107	7713VR10-A050Z07R	40	5.31	82	98	3,33	39500
033108	7713VR10-A063Z08R	53	3.79	108	124	3,33	34000
033109	7713VR10SA020Z2R25	10	1.89	22	38	3,33	64000
033110	7713VR10SA025Z2R35	15	5.22	32	48	3,33	64000
033111	7713VR10SA025Z3R35	15	5.22	32	48	3,33	64000
033112	7713VR10SA032Z3R35	22	8.64	46	62	3,33	64000
033113	7713VR10SA032Z4R35	22	8.64	46	62	3,33	53500
033114	7713VR10SA035Z5R35	25	7.20	52	68	3,33	53500





RPEX10-701 RPHT10-421 RPMT10-41 RPHT10-422 RPHT10-T RPMW10-T



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max 5,00*	ap min. - max. 1,00 - 2,0	ap min. - max. 0,20 - 1,00					
034546	RPEX10T3M0F-701-X4	SP4019	■	■	■◆	10,00	-	3,97	5,00	0,02
030456	RPEX10T3M0F-701-X4	GH1	◆	◆	◆	10,00	-	3,97	5,00	0,02
034545	RPEX10T3M0E-701-X4	SP6519	-	-	■	10,00	-	3,97	5,00	0,02
030449	RPHT10T3M0E-421-X4	X500	-	●	-	10,00	-	3,97	5,00	0,04
030410	RPHT10T3M0E-421-X4	X700	-	-	●	10,00	-	3,97	5,00	0,04
030452	RPMT10T3M0E-41-X4	X500	-	●	-	10,00	-	3,97	5,00	0,04
031539	RPMT10T3M0E-41-X4	SP6519	-	-	■□●●	10,00	-	3,97	5,00	0,04
030451	RPMT10T3M0E-41-X4	MP91M	-	■	●●◆	10,00	-	3,97	5,00	0,04
030697	RPHT10T3M0E422-X4	X500	■◆◆	■◆◆	●	10,00	-	3,97	5,00	0,03
030767	RPHT10T3M0E-422-X4	X700	●●●	●	◆◆	10,00	-	3,97	5,00	0,03
030862	RPHT10T3M0E-422-X4	SP6519	●●◆□●■	●●◆□●■	◆◆□□■	10,00	-	3,97	5,00	0,03
030329	RPHT10T3M0T-X4	X500	■□	■□	-	10,00	-	3,97	5,00	0,08
031555	RPHT10T3M0T-X4	SP6519	◆◆◆	◆◆◆	-	10,00	-	3,97	5,00	0,08
030454	RPMW10T3M0T-X4	X500	◆◆◆◆◆	◆◆◆◆◆	-	10,00	-	3,97	5,00	0,13

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

RPMW10T3M0T-X4 X500 is recommended for materials with heavy scale.

*Max. recommended ap = 2,5mm (depending on the application)

7713VR10 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
F-701-X4	SP4019	Contouring	-	-	-	-	-	-	-	0,02 - 0,10	0,02 - 0,08	0,02 - 0,07	0,02 - 0,07	0,03 - 0,08	0,03 - 0,09	-	-
F-701-X4	GH1	Contouring	-	-	-	-	-	-	-	0,02 - 0,10	0,02 - 0,08	-	-	-	-	-	-
E-701-X4	SP6519	Contouring	-	-	-	-	-	-	-	-	-	0,02 - 0,07	0,02 - 0,07	0,03 - 0,08	0,03 - 0,09	-	-
E-421-X4	X500	Contouring	-	-	-	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,09	0,04 - 0,11	-	-
E-421-X4	X700	Contouring	-	-	-	-	-	-	-	-	-	0,04 - 0,08	0,04 - 0,08	0,04 - 0,09	0,04 - 0,11	-	-
E-41-X4	X500	Contouring	-	-	0,04 - 0,18	-	-	-	-	-	-	-	-	-	-	-	-
E-41-X4	SP6519	Contouring	0,04 - 0,18	0,04 - 0,16	0,04 - 0,18	-	0,04 - 0,18	0,04 - 0,18	0,04 - 0,16	-	-	-	-	-	-	-	-
E-41-X4	MP91M	Contouring	0,04 - 0,18	0,04 - 0,16	-	-	0,04 - 0,16	0,04 - 0,16	0,04 - 0,14	-	-	-	-	-	-	-	-
E-422-X4	X500	Contouring	-	-	0,06 - 0,30	0,06 - 0,25	-	-	-	-	-	0,06 - 0,14	0,06 - 0,14	0,06 - 0,16	0,06 - 0,18	-	-
E-422-X4	X700	Contouring	-	-	0,06 - 0,28	0,06 - 0,22	-	-	-	-	-	0,06 - 0,12	0,06 - 0,12	0,06 - 0,14	0,06 - 0,16	-	-
E-422-X4	SP6519	Contouring	0,06 - 0,30	0,06 - 0,25	0,06 - 0,28	0,03 - 0,22	0,06 - 0,25	0,06 - 0,25	0,06 - 0,22	-	-	0,06 - 0,12	0,06 - 0,12	0,06 - 0,14	0,06 - 0,16	-	-
T-X4	X500	Contouring	0,08 - 0,33	0,08 - 0,28	-	-	-	-	-	-	-	-	-	-	-	-	-
T-X4	SP6519	Contouring	0,08 - 0,32	0,08 - 0,27	-	-	0,08 - 0,30	0,08 - 0,30	0,08 - 0,28	-	-	-	-	-	-	-	-
T-X4	X500	Contouring	0,13 - 0,35	0,13 - 0,33	0,13 - 0,35	0,13 - 0,30	-	-	-	-	-	0,13 - 0,18	0,13 - 0,18	0,13 - 0,20	0,13 - 0,22	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A243.

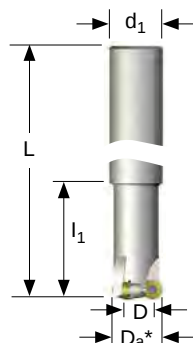


7713VR12

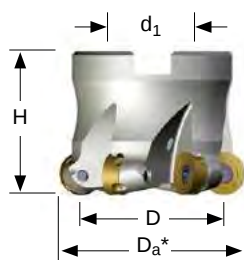
Contour Milling Cutter



Contour Mills



Cylindrical Shank



Shell Mill Fixation



Modular Head



Depth of Cut (ap)

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L/H	l1	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7713VR12 Cylindrical Shank													
033126	7713VR12CA025Z2R50	25	13	200	50	25	6	2	015260	D4008T	015240	T15	3,10
033127	7713VR12CA032Z3R70	32	20	250	70	32	6	3	015260	D4008T	015240	T15	3,10
7713VR12 Shell Mill Fixation - Medium and Fine Pitch													
033115	7713VR12-A040Z04R	40	28	40	-	16	6	4	015262	D4010T	015240	T15	3,10
033116	7713VR12-A040Z05R	40	28	40	-	16	6	5	015262	D4010T	015240	T15	3,10
033117	7713VR12-A050Z05R	50	38	40	-	22	6	5	015262	D4010T	015240	T15	3,10
033118	7713VR12-A050Z06R	50	38	40	-	22	6	6	015262	D4010T	015240	T15	3,10
033119	7713VR12-A052Z05R	52	40	40	-	22	6	5	015262	D4010T	015240	T15	3,10
033120	7713VR12-A052Z06R	52	40	40	-	22	6	6	015262	D4010T	015240	T15	3,10
033121	7713VR12-A063Z06R	63	51	50	-	22	6	6	015262	D4010T	015240	T15	3,10
033122	7713VR12-A063Z07R	63	51	50	-	22	6	7	015262	D4010T	015240	T15	3,10
033123	7713VR12-A066Z06R	66	54	50	-	27	6	6	015262	D4010T	015240	T15	3,10
033124	7713VR12-A066Z07R	66	54	50	-	27	6	7	015262	D4010T	015240	T15	3,10
033125	7713VR12-A080Z08R	80	68	50	-	27	6	8	015262	D4010T	015240	T15	3,10

D = Effective Diameter (Axis) from Insert centreline to centreline

Da* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L	M	d1	ap max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7713VR12 Modular Head - Medium and Fine Pitch													
033128	7713VR12SA025Z2R35	25	13	35	M12	12,50	6	2	015260	D4008T	015240	T15	3,10
033129	7713VR12SA032Z3R35	32	20	35	M16	17,00	6	3	015260	D4008T	015240	T15	3,10
033130	7713VR12SA040Z4R43	40	28	43	M16	17,00	6	4	015260	D4008T	015240	T15	3,10
033131	7713VR12SA040Z5R43	40	28	43	M16	17,00	6	5	015260	D4008T	015240	T15	3,10

D = Effective Diameter (Axis) from Insert centreline to centreline

Da* = Outside Diameter

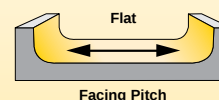
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.

The 7713VR12 series with anti-rotation pocket ensures a precise number of indexes per insert.

This unique patented pocket design prevents the inserts from rotating in the pocket during heavy feed machining and unstable conditions.

7713VR12 Technical Information (mm)

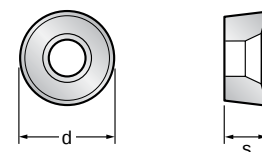
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
033126	7713VR12CA025Z2R50	13	11.20	28	48	4,00	50000
033127	7713VR12CA032Z3R70	20	10.80	42	62	4,00	40000
033115	7713VR12-A040Z04R	28	7.90	58	78	4,00	34000
033116	7713VR12-A040Z05R	28	7.90	58	78	4,00	34000
033117	7713VR12-A050Z05R	38	5.50	78	98	4,00	29000
033118	7713VR12-A050Z06R	38	5.50	78	98	4,00	29000
033119	7713VR12-A052Z05R	40	5.15	82	102	4,00	28500
033120	7713VR12-A052Z06R	40	5.15	82	102	4,00	28500
033121	7713VR12-A063Z06R	51	3.85	104	124	4,00	25000
033122	7713VR12-A063Z07R	51	3.85	104	124	4,00	25000
033123	7713VR12-A066Z06R	54	3.60	110	130	4,00	24500
033124	7713VR12-A066Z07R	54	3.60	110	130	4,00	24500
033125	7713VR12-A080Z08R	68	2.75	138	158	4,00	21500
033128	7713VR12SA025Z2R35	13	11.20	28	48	4,00	50000
033129	7713VR12SA032Z3R35	20	10.80	42	62	4,00	40000
033130	7713VR12SA040Z4R43	28	7.90	58	78	4,00	34000
033131	7713VR12SA040Z5R43	28	7.90	58	78	4,00	34000



Facing Pitch



RPEX12-701 RPHT12-421 RPMT12-41 RPHT12-442 RPHT12-T RPMW12-T



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max 6,00*	ap min. - max. 1,00 - 2,50	ap min. - max. 0,20 - 1,00					
029284	RPEX1204M0F-701-X4	GH1	◆	◆	◆	12,00		4,76	6,00	0,02
029282	RPEX1204M0E-701-X4	X500	-	-	●	12,00	-	4,76	6,00	0,03
029286	RPHT1204M0E-421-X4	X500	-	●	■	12,00	-	4,76	6,00	0,04
029700	RPHT1204M0E-421-X4	X700	-	-	◆◆◆	12,00	-	4,76	6,00	0,04
029272	RPMT1204M0E-41-X4	X500	●	●	-	12,00	-	4,76	6,00	0,05
031517	RPMT1204M0E-41-X4	SP6519	-	■ ■ ●	● ● ●	12,00	-	4,76	6,00	0,05
029291	RPMT1204M0E-41-X4	MP91M	-	■	● ● ■	12,00	-	4,76	6,00	0,05
032129	RPHT1204M0E-442-X4	X500	◆◆◆	◆◆◆	-	12,00	-	4,76	6,00	0,04
032130	RPHT1204M0E-442-X4	X700	●	● ●	● ●	12,00	-	4,76	6,00	0,04
032128	RPHT1204M0E-442-X4	SP6519	◆ ■ ■	◆◆◆ ■ ■	◆◆ ■ ■ ◆	12,00	-	4,76	6,00	0,04
029034	RPHT1204M0T-X4	X500	●	-	-	12,00	-	4,76	6,00	0,10
029699	RPHT1204M0T-X4	X700	●	-	-	12,00	-	4,76	6,00	0,10
031516	RPHT1204M0T-X4	SP6519	● ■ ●	-	-	12,00	-	4,76	6,0	0,10
029295	RPMW1204M0T-X4	X500	◆◆◆	-	-	12,00	-	4,76	6,00	0,13
031518	RPMW1204M0T-X4	SP6519	■ ◆ ■	-	-	12,00	-	4,76	6,00	0,13
029294	RPMW1204M0T-X4	MP91M	◆ ◆	-	◆	12,00	-	4,76	6,00	0,13

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

RPMW1204M0T-X4 should be used for materials with heavy scale

* Max. recommended a_p = 3,5mm (depending on the application)

Note: Feed recommendations can be found on page 250. Speed recommendations can be found on page A243.



Contour Mills

7713VR12

Recommended Feeds



Contour Mills

7713VR12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
F-701-X4	GH1	Contouring	-	-	-	-	-	-	-	0,03 - 0,12	0,03 - 0,10	-	-	-	-	-	-
E-701-X4	X500	Contouring	-	-	-	-	-	-	-	-	-	0,03 - 0,08	0,03 - 0,08	0,03 - 0,10	0,03 - 0,11	-	-
E-421-X4	X500	Contouring	-	-	-	-	-	-	-	-	-	0,04 - 0,20	0,04 - 0,20	0,04 - 0,22	0,04 - 0,24	-	-
E-421-X4	X700	Contouring	-	-	0,05 - 0,25	0,04 - 0,12	-	-	-	-	-	0,04 - 0,20	0,04 - 0,20	0,04 - 0,21	0,04 - 0,23	-	-
E-41-X4	X500	Contouring	-	0,05 - 0,22	0,05 - 0,25	-	-	-	-	-	-	-	-	-	-	-	-
E-41-X4	SP6519	Contouring	0,05 - 0,25	0,05 - 0,22	-	-	0,05 - 0,25	0,05 - 0,25	0,05 - 0,20	-	-	-	-	-	-	-	-
E-41-X4	MP91M	Contouring	0,05 - 0,25	0,05 - 0,22	-	-	0,05 - 0,25	0,05 - 0,25	0,05 - 0,20	-	-	-	-	-	-	-	-
E-442-X4	X500	Contouring	-	-	0,06 - 0,40	0,06 - 0,33	-	-	-	-	-	0,06 - 0,24	0,06 - 0,24	0,06 - 0,24	0,06 - 0,26	-	-
E-442-X4	X700	Contouring	-	-	0,06 - 0,38	0,06 - 0,31	-	-	-	-	-	0,06 - 0,23	0,06 - 0,23	0,06 - 0,23	0,06 - 0,25	-	-
E-442-X4	SP6519	Contouring	0,06 - 0,45	0,06 - 0,38	0,06 - 0,38	0,06 - 0,31	0,06 - 0,40	0,06 - 0,40	0,06 - 0,35	-	-	0,06 - 0,23	0,06 - 0,23	0,06 - 0,23	0,06 - 0,25	-	-
RPHT-T-X4	X500	Contouring	-	0,15 - 0,40	-	-	-	-	-	-	-	-	-	-	-	-	-
RPHT-T-X4	X700	Contouring	-	-	-	0,15 - 0,35	-	-	-	-	-	-	-	-	-	-	-
RPHT-T-X4	SP6519	Contouring	0,15 - 0,45	0,15 - 0,40	-	-	0,15 - 0,45	0,15 - 0,45	0,15 - 0,40	-	-	-	-	-	-	-	-
RPMW-T-X4	X500	Contouring	-	-	0,13 - 0,35	0,13 - 0,30	-	-	-	-	-	0,13 - 0,25	0,13 - 0,25	0,13 - 0,27	0,13 - 0,29	-	-
RPMW-T-X4	SP6519	Contouring	0,13 - 0,45	0,13 - 0,40	-	-	0,13 - 0,45	0,13 - 0,45	0,13 - 0,40	-	-	-	-	-	-	-	-
RPMW-T-X4	MP91M	Contouring	0,13 - 0,42	-	-	-	0,13 - 0,42	0,13 - 0,42	0,13 - 0,35	-	-	-	-	-	-	0,09 - 0,15	0,09 - 0,15

Note: HTA = High Temperature Alloys

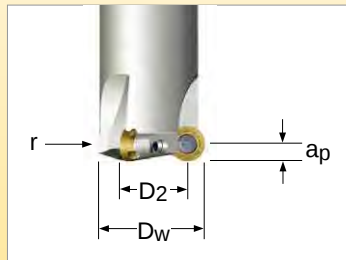
Speed recommendations can be found on page A243.



Speed v_c (m/min)														
7713VR Series			Wear Resistance											
			-  +											
			Speed min. - max.											
Coolant Recommendation														
Recommended ● Possible ◎														
ISO	Materials	Rm and Hardness	 	CVD X Grade	 	PVD X Grade	 	PVD Standard	 	PVD Standard	 	CVD Standard	 	Uncoated Micrograin
				X500		X700		SP6519		SP4019		MP91M		GH1
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎ ●	130 - 270			◎ ●	130 - 295				●	140 - 345	
		<950 N/mm ² <280 HBN		115 - 240				115 - 260					120 - 305	
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎ ●	100 - 210			◎ ●	100 - 230				●	105 - 270	
		950-1200 N/mm ² 280-355 HBN		75 - 160				75 - 175					80 - 205	
		1200-1400 N/mm ² 355-415 HBN		●	50 - 100			●	50 - 110			●	50 - 130	
M	Stainless Steel	Austenitic + Ferritic 300 series	◎ ●	115 - 250	◎ ●	115 - 260	◎ ●	115 - 270						
		Martensitic 400 series		100 - 220		105 - 230		105 - 235						
	PH Stainless	Refractory P.H.	●	50 - 110	●	50 - 115	●	50 - 120						
K	Cast Iron	Grey GG-Ft					140 - 295					145 - 365		
		Spheroidal-Ductile GGG-FGS					◎ ●	110 - 240			●	115 - 285		
		Malleable GTS - MN/MP						100 - 220				105 - 260		
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN						●	400 - 2895			●	400 - 3050	
		Aluminium + Silicon > 16% Si 92 HBN							295 - 2320				295 - 2440	
S	High Temperature Alloys	Iron Based		23 - 48		23 - 52		23 - 55		24 - 63				
		Cobalt Based	●	21 - 44	●	22 - 46	●	22 - 48	●	23 - 52				
		Nickel Based		24 - 51		25 - 53		25 - 55		26 - 59				
		Titanium Based		35 - 73		36 - 75		36 - 79		37 - 84				
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN									●	50 - 105		
		Chilled Cast Iron >1400 N/mm ² > 400 HBN											40 - 95	



7713VR Technical Information



Working Diameter:

Formula to evaluate the correct working diameter based on axial depth of cut (a_p).

$$D_w = D_2 + 2 \times \sqrt{r^2 - (r - a_p)^2}$$

where:

- D_w = Working Diameter
- D_2 = Diameter of cutter insert centre to centre
- r = Insert radius
- a_p = Axial Depth of Cut

7713VR Technical Information

Formula to find programmed feed rate based on radial engagement and axial depth of cut.

$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

where:

f_z = Feed per tooth

h_m = Average chip thickness

r = Insert radius

a_e = Radial Depth of Cut

a_p = Axial Depth of Cut

Formula to calculate the average chip thickness h_m in relation with radial engagement and depth of cut.

$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

Simplified formulas to evaluate h_m and f_z based on axial depth of cut or radial engagement.

Calculation of the average chip thickness in relation with the D.O.C. (Axial)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_p}}$$

h_m = Average chip thickness

a_p = Depth of cut

f_z = Feed per tooth

d = Insert diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_p}{d}}$$

Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$



With round inserts, the thickness of the chip varies depending on the axial depth of cut and is related to the size of the cutting edge preparation. For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RP..10T3..

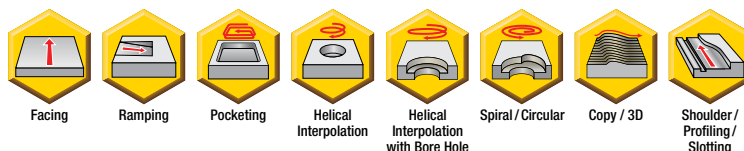
Dimensions (mm)						
Inserts Geometry	Insert Size	ap Axial d.o.c.	hm min.	hm max.	fz min.	fz max.
F-701-X4	10,00	0,25	0,02	0,08	0,13	0,51
	10,00	0,50	0,02	0,08	0,09	0,36
	10,00	0,75	0,02	0,08	0,07	0,29
	10,00	1,00	0,02	0,08	0,06	0,25
	10,00	1,25	0,02	0,08	0,06	0,23
	10,00	1,50	0,02	0,08	0,05	0,21
	10,00	2,00	0,02	0,08	0,04	0,18
	10,00	2,50	0,02	0,08	0,04	0,16
E-701-X4	10,00	0,25	0,03	0,09	0,19	0,57
	10,00	0,50	0,03	0,09	0,13	0,40
	10,00	0,75	0,03	0,09	0,11	0,33
	10,00	1,00	0,03	0,09	0,09	0,28
	10,00	1,25	0,03	0,09	0,08	0,25
	10,00	1,50	0,03	0,09	0,08	0,23
	10,00	2,00	0,03	0,09	0,07	0,20
	10,00	2,50	0,03	0,09	0,06	0,18
E-421-X4	10,00	0,25	0,04	0,10	0,25	0,63
	10,00	0,50	0,04	0,10	0,18	0,45
	10,00	0,75	0,04	0,10	0,15	0,37
	10,00	1,00	0,04	0,10	0,13	0,32
	10,00	1,25	0,04	0,10	0,11	0,28
	10,00	1,50	0,04	0,10	0,10	0,26
	10,00	2,00	0,04	0,10	0,09	0,22
	10,00	2,50	0,04	0,10	0,08	0,20
E-41-X4	10,00	0,25	0,04	0,12	0,25	0,76
	10,00	0,50	0,04	0,12	0,18	0,54
	10,00	0,75	0,04	0,12	0,15	0,44
	10,00	1,00	0,04	0,12	0,13	0,38
	10,00	1,25	0,04	0,12	0,11	0,34
	10,00	1,50	0,04	0,12	0,10	0,31
	10,00	2,00	0,04	0,12	0,09	0,27
	10,00	2,50	0,04	0,12	0,08	0,24
E-422-X4	10,00	0,25	0,04	0,16	0,25	1,01
	10,00	0,50	0,04	0,16	0,18	0,72
	10,00	0,75	0,04	0,16	0,15	0,58
	10,00	1,00	0,04	0,16	0,13	0,51
	10,00	1,25	0,04	0,16	0,11	0,45
	10,00	1,50	0,04	0,16	0,10	0,41
	10,00	2,00	0,04	0,16	0,09	0,36
	10,00	2,50	0,04	0,16	0,08	0,32
RPHT-T-X4	10,00	0,25	0,08	0,18	0,51	1,14
	10,00	0,50	0,08	0,18	0,36	0,80
	10,00	0,75	0,08	0,18	0,29	0,66
	10,00	1,00	0,08	0,18	0,25	0,57
	10,00	1,25	0,08	0,18	0,23	0,51
	10,00	1,50	0,08	0,18	0,21	0,46
	10,00	2,00	0,08	0,18	0,18	0,40
	10,00	2,50	0,08	0,18	0,16	0,36
RPMW-T-X4	10,00	0,25	0,13	0,19	0,82	1,20
	10,00	0,50	0,13	0,19	0,58	0,85
	10,00	0,75	0,13	0,19	0,47	0,69
	10,00	1,00	0,13	0,19	0,41	0,60
	10,00	1,25	0,13	0,19	0,37	0,54
	10,00	1,50	0,13	0,19	0,34	0,49
	10,00	2,00	0,13	0,19	0,29	0,42
	10,00	2,50	0,13	0,19	0,26	0,38



With round inserts, the thickness of the chip varies depending on the axial depth of cut and is related to the size of the cutting edge preparation. For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RP..1204..

Dimensions (mm)						
Inserts Geometry	Insert Size	ap Axial d.o.c.	hm min.	hm max.	fz min.	fz max.
F-701-X4	12,00	0,25	0,02	0,11	0,14	0,76
	12,00	0,50	0,02	0,11	0,10	0,54
	12,00	1,00	0,02	0,11	0,07	0,38
	12,00	1,50	0,02	0,11	0,06	0,31
	12,00	2,00	0,02	0,11	0,05	0,27
	12,00	2,50	0,02	0,11	0,04	0,24
	12,00	3,00	0,02	0,11	0,04	0,22
E-701-X4	12,00	3,50	0,02	0,11	0,04	0,20
	12,00	0,25	0,03	0,12	0,21	0,83
	12,00	0,50	0,03	0,12	0,15	0,59
	12,00	1,00	0,03	0,12	0,10	0,42
	12,00	1,50	0,03	0,12	0,08	0,34
	12,00	2,00	0,03	0,12	0,07	0,29
	12,00	2,50	0,03	0,12	0,07	0,26
E-421-X4	12,00	3,00	0,03	0,12	0,06	0,24
	12,00	3,50	0,03	0,12	0,06	0,22
	12,00	0,25	0,04	0,14	0,28	0,97
	12,00	0,50	0,04	0,14	0,20	0,69
	12,00	1,00	0,04	0,14	0,14	0,48
	12,00	1,50	0,04	0,14	0,11	0,40
	12,00	2,00	0,04	0,14	0,10	0,34
E-41-X4	12,00	2,50	0,04	0,14	0,09	0,31
	12,00	3,00	0,04	0,14	0,08	0,28
	12,00	3,50	0,04	0,14	0,07	0,26
	12,00	0,25	0,05	0,16	0,35	1,11
	12,00	0,50	0,05	0,16	0,24	0,78
	12,00	1,00	0,05	0,16	0,00	0,55
	12,00	1,50	0,05	0,16	0,14	0,45
E-442-X4	12,00	2,00	0,05	0,16	0,12	0,39
	12,00	2,50	0,05	0,16	0,11	0,35
	12,00	3,00	0,05	0,16	0,10	0,32
	12,00	3,50	0,05	0,16	0,09	0,30
	12,00	0,25	0,06	0,20	0,42	1,39
	12,00	0,50	0,06	0,20	0,29	0,98
	12,00	1,00	0,06	0,20	0,21	0,69
RPHT-T-X4	12,00	1,50	0,06	0,20	0,17	0,57
	12,00	2,00	0,06	0,20	0,15	0,49
	12,00	2,50	0,06	0,20	0,13	0,44
	12,00	3,00	0,06	0,20	0,12	0,40
	12,00	3,50	0,06	0,20	0,11	0,37
	12,00	0,25	0,10	0,21	0,69	1,45
	12,00	0,50	0,10	0,21	0,49	1,03
RPMW-T-X4	12,00	1,00	0,10	0,21	0,35	0,73
	12,00	1,50	0,10	0,21	0,28	0,59
	12,00	2,00	0,10	0,21	0,24	0,51
	12,00	2,50	0,10	0,21	0,22	0,46
	12,00	3,00	0,10	0,21	0,20	0,42
	12,00	3,50	0,10	0,21	0,19	0,39
	12,00	0,25	0,13	0,22	0,90	1,52
RPMW-T-X4	12,00	0,50	0,13	0,22	0,64	1,08
	12,00	1,00	0,13	0,22	0,45	0,76
	12,00	1,50	0,13	0,22	0,37	0,62
	12,00	2,00	0,13	0,22	0,32	0,54
	12,00	2,50	0,13	0,22	0,28	0,48
	12,00	3,00	0,13	0,22	0,26	0,44
	12,00	3,50	0,13	0,22	0,24	0,41



ALUMINUM HIGH SPEED MILLING CUTTERS

Stellram's **5702VZD14** cutter is designed, manufactured and tested in accordance with EN ISO 15641:2001 to ensure maximum stability in high speed applications. The tool is capable of 43,000 RPM.

This cutter is specially designed for machining pockets and profiles on Aluminium and Aluminium alloys. This cutter design also performs contouring operations (finishing) in composite materials and titanium alloys, due to the fully ground 701 geometry.

Stellram's **5720VZ16** cutters are our latest design for high metal removal in Aluminium applications. This tool is designed manufactured and tested in accordance with EN ISO 15641:2001 for maximum stability in high speed applications. The tools are capable of 51,000 RPM depending on the cutter diameter.

This new patented design allows each body to hold all inserts with different radii without losing any gauge height of the cutter length.

Features and Benefits of the 5702VZD and 5720VZ:

All Stellram profile and pocketing cutters feature through-tool coolant allowing better chip evacuation and higher feed rates.

Cylindrical Shank and special HSK Integral Shanks on any 5702VZD14 and 5720VZ16 are designed and balanced to G6.3 at 30,000 rpm for diameters 50mm and below. Diameters larger than 50mm are balanced to G6.3 at 24,000 rpm.

The pockets are reinforced to allow for heavy feed, safe ramping and more line contact when utilising a larger radius insert for more stability during machining. These features increase tool life and productivity.

These unique ZDCX14...FR-701 and ZDET16...FR-721 insert designs allow machining in thin-walled applications due to very low cutting pressure.

For the 5702VZD: 5 different radii are available. For the 5720VZ: 12 different radii are available, each with the same cutting depth capacity of 16mm.

Standard radii are available from facet to 4,00mm, for the 5702VZD14 and facet to 6,00mm for the 5720VZ16.

HSK specials are available upon request with specific shank and reach lengths

57_VZ.

5702VZD14:

Maximum a_p = 12mm
 Diameter Range = 20mm only

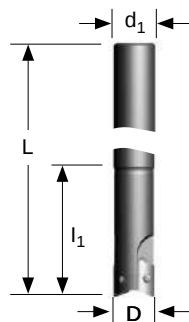
5720VZ16:

Maximum a_p = 16mm
 Diameter Range = 25mm - 80mm

Note: Shell mill and modular head cutters are not balanced. It is recommended to balance the cutter and adapter as an assembly for high speed machining at 8,000 rpm or above. See detailed notes on the following product pages.

5702VZD14

Profiling / Pocketing Milling Cutter

**Cylindrical Shank**

Product		Dimensions (mm)							Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	a _p max	No. of Teeth	Insert radius range	EDP		EDP		Screw Tightening Nm*
5702VZD14 Cylindrical Shank													
028998	5702VZD14CA020R58-2	20	108	58	20	12	2	< 2,00	015060	F2505T	018488	T7	0,80
028999	5702VZD14CA020R58-4	20	108	58	20	12	2	2,50 to 4,00	015060	F2505T	018488	T7	0,80

* It is important to change the screw each time the insert is changed to ensure the highest security.
A dynamometric key and the right torque value are important. See above for the correct torque information.

5702VZD Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a _p max Helical / Linear	Max RPM
028998	5702VZD14CA020R58-2	20	11.0*	26,8	38,0	3,00	43000
028999	5702VZD14CA020R58-4	20	11.0*	26,8	38,0	3,00	43000

* Max. ramping angle for insert is calculated with facet

Find the different ramping angles for all available insert radii on technical information page A254.

Radial depth of cut 0,20mm up to full cutter diameter.

These tools have been designed, manufactured and tested in accordance with EN ISO standard 15641:2001.

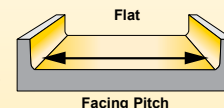
These tools are stocked without an electronic chip.

Note: If using a insert with radius, then the facing pitch for the 5702VZD cutter is equal to the cutting diameter (D) minus 2 x chosen radius.

Cylindrical Shanks or Special HSK Integral Shanks are designed and balanced to G6.3 at 30,000 RPM for diameters 50mm and below. Diameters larger then 50mm are balanced to G6.3 at 24,000 rpm.

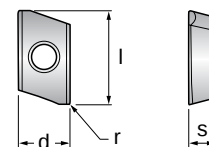
Cylindrical Shank tools mounted in a shrink fit holder or any other mill chuck holder + inserts + screws must be re-inspected for balance as an assembly by the end user when at or exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Additional Balancing and Torque values can be found in the technical section pages A256.

**Depth of Cut (a_p)**



ZDCX14-701



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 12*	ap min. - max. 1,00 - 4,00	ap min. - max. 0,20 - 1,00					
029027	ZDCX1403PDFR-701	GH1	◆	◆	◆	7,59	16,83	3,18	Facet	0,02
029028	ZDCX140320FR-701	GH1	◆	◆	◆	7,59	16,83	3,18	2,0	0,02
026019	ZDCX140325FR-701	GH1	◆	◆	◆	7,59	16,83	3,18	2,5	0,02
029029	ZDCX140330FR-701	GH1	◆	◆	◆	7,59	16,83	3,18	3,0	0,02
026020	ZDCX140340FR-701	GH1	◆	◆	◆	7,59	16,83	3,18	4,0	0,02

Machining Choice: 1st Choice 2nd Choice 3rd Choice | Material Guide Key descriptions found on page A5.

* Max. possible a_p of 12mm and a_e the full diameter (depending on the application).

* For Slotting applications with 5702VZD14 series the maximum a_p is 6mm.



Profiling & Pocketing Mills

5702VZD Feeds f_z (mm/tooth)					
Size	Geometry	Grade	Operation	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN
				Min. - Max.	Min. - Max.
14mm	FR-701	GH1	Profile/ Pocketing	0.02 - 0.25	0.02 - 0.20

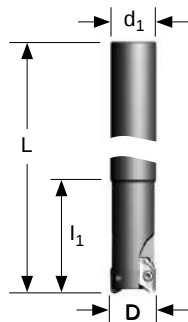
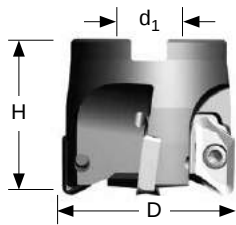
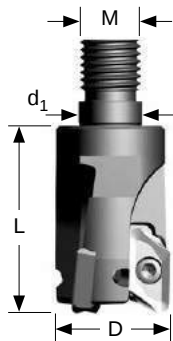
Speed v_c (m/min)						
5702VZD Series			K10-K20/C3 - C2 ISO / ANSI			
			Speed min. - max.			
Coolant Recommendation			Uncoated Micrograin			
Recommended ● Possible ◎						
ISO	Materials	Rm and Hardness	 		GH1	
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●		400 - 3050	
		Aluminium & Silicon > 16% Si 92 HBN			295 - 2440	

5720VZ16

Profiling / Pocketing Milling Cutters



Profiling & Pocketing Mills

**Cylindrical Shank****Shell Mill Fixation****Modular Head****Depth of Cut (ap)**

Product		Dimensions (mm)							Spares				
EDP	Item Description	D	L/H	l ₁	d ₁	ap max	No. of Teeth	Insert radius range	EDP		EDP		Screw Tightening Nm*
5720VZ16 Cylindrical Shank - Coarse and Medium Pitch													
034614	5720VZ16CA025Z2R75	25	131	75	25	16	2	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
034617	5720VZ16CA032Z2R75	32	135	75	32	16	2	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
034640	5720VZ16CA032Z3R75	32	135	75	32	16	3	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
5720VZ16 Shell Mill Fixation - Coarse and Medium Pitch													
034619	5720VZ16-A040Z03R	40	45	-	16	16	3	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031325	5720VZ16-A050Z03R	50	45	-	22	16	3	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031326	5720VZ16-A050Z04R	50	45	-	22	16	4	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031328	5720VZ16-A063Z05R	63	45	-	22	16	4	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031327	5720VZ16-A063Z04R	63	45	-	22	16	5	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031329	5720VZ16-A080Z04R	80	50	-	27	16	4	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031330	5720VZ16-A080Z05R	80	50	-	27	16	5	Facet to 6,00	030820	DP5009A	030819	TP20	6,00

* It is important to change the screw each time the insert is changed to ensure the highest security.
A dynamometric key and the right torque value are important. See above for the correct torque information.

Product		Dimensions (mm)							Spares				
EDP	Item Description	D	L/H	M	d ₁	ap max	No. of Teeth	Insert radius range	EDP		EDP		Screw Tightening Nm*
5720VZ16 Modular Head - Coarse and Medium Pitch													
034616	5720VZ16SA025Z2R50	25	50	M12	12,50	16	2	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
034618	5720VZ16SA032Z2R50	32	50	M16	17	16	2	Facet to 6,00	030820	DP5009A	030819	TP20	6,00
031639	5720VZ16SA032Z3R50	32	50	M16	17	16	3	Facet to 6,00	030820	DP5009A	030819	TP20	6,00

* It is important to change the screw each time the insert is changed to ensure the highest security.
A dynamometric key and the right torque value are important. See above for the correct torque information.

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page A76.


5720VZ Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
034614	5720VZ16CA025Z2R75	25	14.5*	29,5	48,0	4,00	50000
034617	5720VZ16CA032Z2R75	32	11.4*	43,5	62,0	4,00	41500
034640	5720VZ16CA032Z3R75	32	11.4*	43,5	62,0	4,00	41500
034619	5720VZ16-A040Z3R	40	7.6*	59,5	78,0	4,00	36500
031325	5720VZ16-A050Z03R	50	7.9*	79,5	98,0	4,00	30000
031326	5720VZ16-A050Z4R	50	7.9*	79,5	98,0	4,00	30000
031328	5720VZ16-A063Z05R	63	5.9*	105,5	124,0	4,00	26000
031327	5720VZ16-A063Z4R	63	5.9*	105,5	124,0	4,00	26000
031329	5720VZ16-A080Z04R	80	4.4*	139,5	158,0	4,00	23000
031330	5720VZ16-A080Z05R	80	4.4*	139,5	158,0	4,00	23000
034616	5720VZ16SA025Z2R50	25	14.5*	29,5	48,0	4,00	50000
034618	5720VZ16SA032Z2R50	32	11.4*	43,5	62,0	4,00	41500
031639	5720VZ16SA032Z3R50	32	11.4*	43,5	62,0	4,00	41500

* Max. ramping angle for insert is calculated with facet

Find the different ramping angles for all available insert radii on technical information page A254

Radial depth of cut 0,20mm up to full cutter diameter.

These tools have been designed, manufactured and tested in accordance with EN ISO standard 15641:2001.

These tools are stocked without an electronic chip.

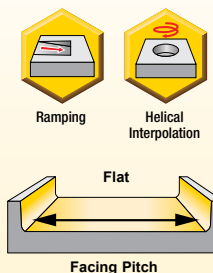
Note: If using a insert with radius, then the facing pitch for the 5702VZ cutter is equal to the cutting diameter (D) minus 2 x chosen radius.

Cylindrical Shanks or Special HSK Integral Shanks are designed and balanced to G6.3 at 30,000 RPM for diameters 50mm and below. Diameters larger then 50mm are balanced to G6.3 at 24,000 rpm.

Cylindrical Shank tools mounted in a shrink fit holder or any other mill chuck holder + inserts + screws must be re-inspected for balance as an assembly by the end user when at or exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Shell Mills and Modular Heads are not balanced. These tools must be re-inspected for balance as an assembly, cutter + adapter + inserts + screws by the end user when at or exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Additional Balancing and Torque values can be found in the technical section pages A256.

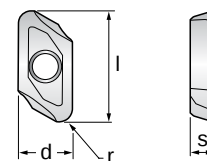


5720VZ16

Milling Inserts, Recommended Feeds & Speeds



ZDET16-721



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p max. 16*	a _p min. - max. 1,00 - 5,00	a _p min. - max. 0,20 - 1,00					
030927	ZDET16M5PDR-721	GH1	◆	◆	◆	11,30	22,92	5,00	Facet	0,02
031384	ZDET16M504FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	0,40	0,02
030928	ZDET16M508FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	0,80	0,02
031385	ZDET16M512FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	1,20	0,02
030929	ZDET16M516FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	1,60	0,02
030930	ZDET16M520FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	2,00	0,02
030931	ZDET16M525FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	2,50	0,02
030932	ZDET16M530FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	3,00	0,02
030933	ZDET16M532FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	3,20	0,02
030934	ZDET16M540FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	4,00	0,02
030935	ZDET16M550FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	5,00	0,02
030936	ZDET16M560FR-721	GH1	◆	◆	◆	11,30	22,92	5,00	6,00	0,02

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Max. possible ap of 16mm and ae the full diameter (depending on the application).

* For Slotting applications with 5720VZ16 series please see recommendations for maximum ap on page A254.

**5720VZ Feeds f_z (mm/tooth)**

Size	Geometry	Grade	Operation	Aluminium & Alloys <116% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN
				Min. - Max.	Min. - Max.
14mm	FR-721	GH1	Profile/ Pocketing	0,02 - 0,25	0,02 - 0,20

Speed v_c (m/min)

5720VZ Series			K10-K20/C3 - C2 ISO / ANSI	
			Speed min. - max.	
Coolant Recommendation				Uncoated Micrograin GH1
ISO	Materials	Rm and Hardness		
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●	400 - 3050
		Aluminium + Silicon > 16% Si 92 HBN		295 - 2440



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

5702VZD14 Ramp Angle °					
Insert ZDCX1403...FR-701 (Radius mm)					
Cutter dia.	Facet	2,0mm	2,50mm	3,00mm	4,00mm
20mm	11.0	9.8	9.0	8.0	6.3

*For Slotting applications with 5702VZD14 series the maximum a_p is 6mm.

These tools are designed, manufactured, tested and balanced in accordance with EN ISO 15641:2001 for maximum stability in high speed applications.

Metal Removal		
Calculated with 24000 RPM		
Cutter	Z	Qmax - cm ³ /min
20	2	720

The chart above shows total metal removal capacity (based on 24,000 RPM) by cutter diameter and number of teeth (2).

The maximum RPM is engraved on all cutter bodies.



Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

5720VZ16 Ramp Angle °

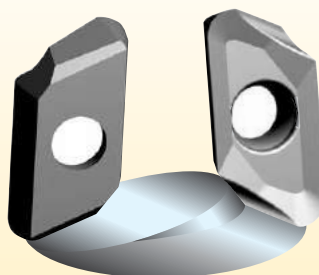
Cutter Dia. (mm)	Insert ZDET16M5...FR-721 (Radius mm)								
	PDFR to R1,20	R1,60	R2,00	R2,50	R3,00	R3,20	R4,00	R5,00	R6,00
25,0	14.50	17.30	9.40	9.60	18.80	18.90	9.00	11.20	7.30
32,0	11.40	11.90	11.90	12.20	12.40	12.40	13.10	13.80	13.40
40,0	7.60	7.80	7.80	8.00	8.10	8.10	8.50	8.80	9.10
50,0	7.90	7.20	7.30	7.90	7.60	7.60	8.90	9.00	9.25
63,0	5.90	5.40	5.50	5.80	5.60	5.60	6.90	6.60	6.65
80,0	4.40	4.00	4.10	4.30	4.20	4.20	5.10	4.80	4.90

Possible Max. a_p Slotting

Chart for maximum a_p when slotting with 5720VZ16 series

Diameter (mm)	No. of Inserts	a_p max (mm)
25	2	7,50
32	2	11,00
32	3	6,00
40	3	9,00
50	3	11,00
50	4	9,00
63	4	11,00
63	5	9,00
80	4	11,00
80	5	11,00

a_p max in connection with: The cutter diameter, rigidity of the cutter, rigidity of the machine and the size of the flute.



Possible Metal Removal

Calculated with 24000 RPM

Cutter dia.	Z	Qcm ³ /min
25	2	1560
32	2	3226
32	3	2056
40	3	5184
50	3	7921
50	4	8641
63	4	13307
63	5	13609
80	4	16898
80	5	21123

The chart above shows total metal removal capacity (based on 24,000 RPM) by cutter diameter and number of teeth.

The maximum RPM is engraved on all cutter bodies.


Machinability by Materials (Aluminium)

Alloy Group	Alloy Designation	CHEMICAL COMPOSITION LIMITS (WT%)												Typical temper	Rm (Mpa)	Machinability Chip formation	Machinability	Typical Applications	v _C m/min min. - max.	f _Z mm/Z max.
		Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others							
Al	1050	0.05	0.25	0.4	0.5	0.05	0.05	-	-	-	-	99.50min	-	H14	105	D	A	Chemical equipment	600 - 3000	0,2
	1100	0.05-0.20	Si+Fe1.0max		0.05	-	0.1	-	-	-	-	99.00min	-	H14	90	D	A	Sheet metal work Coiled tube		
Al-Cu	2011	50.-60.	0.4	0.7	-	-	0.3	-	-	0.2	0.6	remaining	-	T3	310	A	A	Screw machine products. Tuck frame. Aircraft structure. Jet engine impellers. Aircraft engine cylinder heads.	400 - 2500	0,25
	2014	3.9-5.0	0.5-1.2	0.7	0.4-1.2	0.2-0.8	0.25	0.1	0.15	-	-	remaining	-	T6	430	B	A			
	2017	3.5-4.5	0.2-0.8	0.7	0.4-1.0	0.4-0.8	0.25	0.1	0.15	-	-	remaining	-	T4	390	B	A			
	2024	3.8-4.9	0.5	0.5	0.3-0.9	1.2-1.8	0.25	0.1	0.15	-	-	remaining	-	T4	465	B	A			
	2218	3.5-4.5	0.9	1	0.2	1.2-1.8	0.25	0.1	-	-	-	remaining	Ni1.7-2.3	T72	331	B	B			
	2224	3.8-4.4	0.12	0.15	0.30-0.9	1.2-1.8	0.25	0.1	0.15	-	-	remaining	-			A	A			
Al-Mn	3003	0.05-0.20	0.6	0.7	1.0-1.5	-	0.1	-	-	-	-	remaining	-	H14	140	D	B	Cooking utensils. Chemical equipment.	200 - 2500	0,2
Al-Si	4032	0.5-1.3	11.0-13.5	1	-	0.8-1.3	0.25	0.1	-	-	-	remaining	Ni0.5-1.3	T6	379	B	D	Pistons.	200 - 1000	0,18
Al-Mg	5052	0.1	0.25	0.4	0.1	2.2-2.8	0.1	0.15-0.35	-	-	-	remaining	-	H14	260	C	A	Architectural. Cable Sheeting. Welded pressure vessels. Hydraulic tubes.	400 - 3000	0,25
	5056	0.1	0.3	0.4	0.05-0.20	4.5-5.6	0.1	0.05-0.20	-	-	-	remaining	H34	H12	300	C	A			
	5083	0.1	0.4	0.4	0.4-1.0	4.0-4.9	0.25	0.05-0.25	0.15	-	-	remaining	H32	H112	335	C	A			
	5086	0.1	0.4	0.5	0.20-0.7	3.5-4.5	0.25	0.05-0.25	0.15	-	-	remaining	-	H32	300	C	A			
													H116							
Al-Mg-Si	6061	0.15-0.40	0.4-0.8	0.7	0.15	0.8-1.2	0.25	0.04-0.35	0.15	-	-	remaining	-	T6	300	C	B	Heavy duty structure. Furniture. Architectural. Heavy duty welded structure. Pipeline. Heat Sink.	400 - 2500	0,2
	6063	0.1	0.2-0.6	0.35	0.1	0.45-0.9	0.1	0.1	0.1	-	-	remaining	-	T5	200	C	B			
	6070	0.15-0.40	1.0-1.7	0.5	0.40-1.0	0.50-1.2	0.25	0.1	0.15	-	-	remaining	-	T6	379	C	C			
	6151	0.35	0.6-1.2	1	0.2	0.45-0.8	0.25	0.15-0.35	0.15	-	-	remaining	-	T6		C	C			
	6262	0.15-0.40	0.4-0.8	0.7	0.15	0.8-1.2	0.25	0.04-0.14	0.15	0.4	0.7	remaining	-	T9	400	B	B			
	6351	0.1	0.7-1.3	0.5	0.4-0.8	0.40-0.8	0.2	-	0.2	-	-	remaining	-	T6	310	D	C			
	6463	0.2	0.20-0.6	0.15	0.05	0.45-0.9	0.05	-	-	-	-	remaining	-	T6	241	C	B			
Al-Zn	7001	1.6-2.6	0.35	0.4	0.2	2.6-3.4	6.8-8.0	0.18-0.35	0.2	-	-	remaining	-	O		B	A	High strength structure. Aircraft structure. Bat.	400 - 3000	0,25
	7003	0.2	0.3	0.35	0.3	0.50-1.0	5.0-6.5	0.2	0.2	-	-	remaining	Zr0.05-0.25	T5	400	B	A			
	7050	2.0-2.6	0.12	0.15	0.1	1.9-2.6	5.7-6.7	0.04	0.06	-	-	remaining	Zr0.08-0.15	T73	530	B	A			
	7075	1.2-2.0	0.4	0.5	0.3	2.1-2.9	5.1-6.1	0.18-0.28	0.2	-	-	remaining	-	T6	570	B	A			
	7178	1.6-2.4	0.4	0.5	0.3	2.4-3.1	6.3-7.3	0.18-0.35	0.2	-	-	remaining	-	T6	600	B	A			
	7475	1.2-1.9	0.1	0.12	0.06	1.9-2.6	5.2-6.2	0.18-0.25	0.06	-	-	remaining	-	T61	565	B	A			

Profiling & Pocketing Mills

Machinability

- A** EXCELLENT
B GOOD-TO-EXCELLENT
C GOOD
D NOT GOOD

$$V_C = \pi \times D \times n / 1000 \quad \text{m/min} = \text{mm} \times \text{RPM}$$

D: Tool diameter, N: RPM, V_C: Cutting speed, $\pi = 3.1416$

Choose a cutting speed in the range of values, compatible with the cutter max rotation capacity (engraved on the body) and your spindle stability.

**Recommendations for High Speed Machining at 8,000 rpm or above.**

- Check spindle condition:
 - Runout
 - Balancing
 - Clamping of the attachment in traction
 - Marking and cleanliness
- Check that the tool is suitable for the required use.
- Inserts must be locked positively in the pocket and secured using the torx screw provided. The screw must be torqued to the correct value as indicated in our charts on the steel product pages A248 & A250 .
For security use a new screw each time.
- Check the balancing of the – assembled tool – cutter body, inserts and attachment.
- Before start up, note the maximum RPM engraved on the tool or in our technical documents. The maximum RPM is linked to a precise balancing value.
- Ensure that the field of application of the tool shown in our technical documents and technological parameters is observed:

a_e (mm)	width of cut, lateral engagement (radial)
a_p (mm)	Axial depth of cut
f_z (mm/tooth)	Feed per tooth
n (rpm)	RPM

Stellram cannot accept responsibility for misuse of this product:

- Non observance of the above instructions
- Machine without casing
- Incorrect clamping of workpieces
- No safety device on the machine
- Any misuse or incorrect clamping

The optimum rotation must be determined by condition of the spindle. The spindle must be rigid to run at these higher RPMs.

Under no circumstances must any attempt be made to repair this tool. The only permitted maintenance is the indexing or replacement of the inserts. Use a new screw for each insert replacement.

When assembling the cutter to a shrink fit holder, the maximum protrusion can not exceed 10% of the reach of tool.

The Cutter Nomenclature Code:**Example:** 5702VZD14CA020R58-2

5702	=	Stellram Product Family
V	=	Screw fixation
Z	=	Insert shape (parallelogram)
D	=	ISO insert clearance ($D = 15^\circ$)
14	=	Insert edge length (mm)
C	=	Plain straight shank (No flats)
A	=	Through the tool coolant
020	=	Cutting diameter (mm)
R	=	Right hand tool
58	=	Reach of tool in mm
-2	=	Maximum value of the insert radius in 1/10mm increments

This tool must only be used for the following applications: Face milling, shoulder milling, slotting and pocketing.

Cylindrical shanks & HSK shanks (special): 5702VZD14 and 5720VZ16 are designed and balanced to G6.3 at 30,000 rpm for diameters 50mm and below. Diameters larger than 50mm are balanced to G6.3 at 24,000 rpm. Cylindrical shank tools mounted in a shrink fit holder or any other mill chuck holder + inserts + screws must be re-inspected for balance by the end user when exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Shell Mills and Modular Heads: 5720VZ16 Shell Mills and Modular Heads are not balanced. These tools must be re-inspected for balance as an assembly, cutter + adapter + inserts + screws by the end user when at or exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Balancing requires removing some material by drilling or milling operations. To avoid making modular heads weaker, limit these operations by avoiding high rpm.

For each new modular head added to the same extension, re-balance the assembly. For each new Shell Mill installed on the same toolholder, re-balance the assembly.

Tighten the Modular Head to the Extension, with lubricant, apply the torque value of:

Thread sizes (mm)	Torque Values Nm
M6	10
M8	30
M10	50
M12	80
M16	110

Tighten the bolt between the shell mill and tool holder, with lubricant apply the torque value of:

Thread sizes (mm)	Cutter Bore Size (mm)	Torque Values Nm
M6	13	10
M8	16	30
M10	22	50
M12	27	80
M16	32	110
M20	40	120



HIGH PERFORMANCE LONG EDGE MILLING CUTTERS

The **7791VS** cutters are designed for high metal removal rates particularly for rough machining. A wide range of indexable inserts and plunge milling cutters are available.

These robust plunge milling cutters are ideal for machining a variety of materials such as Steel, Alloyed Steel, Stainless Steel, Cast Iron, High Temperature Alloys and Aluminium Alloys.

Utilising plunge milling techniques may increase productivity 2 to 5 times over traditional profiling operations.

Stellram's 7791VS family utilises square inserts with 4 cutting edges. The available insert range takes either a 8mm or 11mm maximum possible radial cut.

The capability of this cutter design allows plunging vertically, horizontally down a slope or a profile.

7791VS

7791VS09:

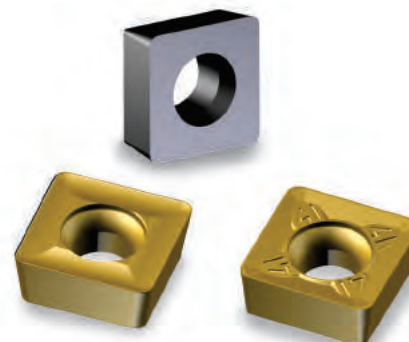
Maximum $a_p = 8\text{mm}$

Diameter Range = 25mm - 50mm

7791VS12:

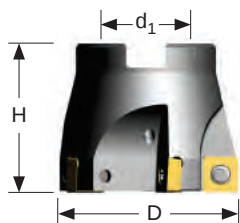
Maximum $a_p = 11\text{mm}$

Diameter Range = 63mm - 80mm



7791VS09 & 7791VS12

Plunge Milling Cutter

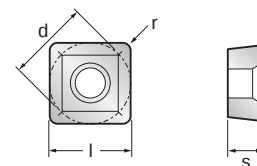
**Shell Mill Fixation****Modular Head**

Plunging Mills

Product		Dimensions (mm)						Spares					
EDP	Item Description	D	L/H	l ₁	d ₁	a _e max plunging	No. of Teeth	EDP		EDP		Screw Tightening Nm	Max RPM
7791VS09 Shell Mill Fixation													
029092	7791VS09-A040Z04R	40	32	-	16	8	4	015262	D4010T	015240	T15	3,10	41100
029101	7791VS09-A050Z05R	50	40	-	22	8	5	015262	D4010T	015240	T15	3,10	35600
7791VS12 Shell Mill Fixation													
029102	7791VS12-A063Z05R	63	40	-	22	11	5	015270	F4011T	015240	T20	3,10	31000
029103	7791VS12-A080Z06R	80	50	-	27	11	6	015270	F4011T	015240	T20	3,10	27000

Product		Dimensions (mm)						Spares					
EDP	Item Description	D	L/H	l ₁	d ₁	a _e max plunging	No. of Teeth	EDP		EDP		Screw Tightening Nm	Max RPM
7791VS09 Modular Head													
031350	7791VS09SA025Z2R35	25	35	M12	12,5	8	2	015262	D4008T	015240	T15	3,10	57700
031405	7791VS09SA032Z3R43	32	43	M16	17	8	3	015262	D4008T	015240	T15	3,10	47800

Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page A76.



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _e max. 8,00	a _e min. - max. 1,00 - 3,00	a _e min. - max. -					
7791VS09 Milling Inserts										
018186	SCMT09T308E	GH1	●	●●	-	9,52	9,52	3,97	0,8	0,12
015147	SCMT09T308EN-41	X500	■◆	●●■◆	-	9,52	9,52	3,97	0,8	0,04
031474	SCMT09T308EN-41	SP6519	●●◆■	◆◆◆■	-	9,52	9,52	3,97	0,8	0,04
017315	SCMT09T308EN-41	MP91M	-	■■●●	-	9,52	9,52	3,97	0,8	0,04
034550	SCMT09T308T	X400	■◆	◆	-	9,52	9,52	3,97	0,8	0,12
031568	SCMT09T308T	SP6519	◆■◆	-	-	9,52	9,52	3,97	0,8	0,12
034551	SCMT09T308T	SP4019	●●■	■	-	9,52	9,52	3,97	0,8	0,12

 Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SCMT09T308E GH1 has limited usage for Aluminium Alloys.

SCMT09T308T SP4019 is for Stainless Steel with heavy scale.

Note: Feed recommendations can be found on page A261. Speed recommendations can be found on page A262.



Plunging Mills

7791VS09 & 7791VS12

Milling Inserts



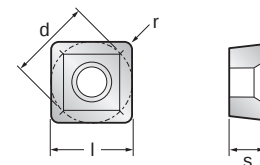
SCHT12-422



SCMT12-41



SCMT12



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _e max. 11,00	a _e min. - max. 1,00 - 4,00	a _e min. - max. -					
7791VS12 Milling Inserts										
030671	SCHT12M512EN-422	X700	-	◆◆◆	-	12,70	12,70	5,00	1,20	0,08
015226	SCMT12M512EN-41	X500	■◆	●●●■	-	12,70	12,70	5,00	1,20	0,05
031475	SCMT12M512EN-41	SP6519	◆■	◆◆●■◆●	-	12,70	12,70	5,00	1,20	0,05
017317	SCMT12M512EN-41	MP91M	-	■■	-	12,70	12,70	5,00	1,20	0,05
034554	SCMT12M512T	X400	■◆	◆	-	12,70	12,70	5,00	1,20	0,12
024129	SCMT12M512T	X500	●■	-	-	12,70	12,70	5,00	1,20	0,12
034555	SCMT12M512T	SP6519	◆●●	-	-	12,70	12,70	5,00	1,20	0,12
034553	SCMT12M512T	SP4019	●●■	■	-	12,70	12,70	5,00	1,20	0,12
017316	SCMT12M512T	MP91M	◆	●	-	12,70	12,70	5,00	1,20	0,12

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

SCMT12M512T SP4019 is for Stainless Steel with heavy scale.

Note: Feed recommendations can be found on page A261. Speed recommendations can be found on page A262.



Plunging Mills


7791VS Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
7791VS09 Insert Size																	
E	GH1	Plunging	-	-	-	-	0,12 - 0,25	0,12 - 0,25	0,12 - 0,20	0,12 - 0,25	-	-	-	-	-	-	-
EN-41	X500	Plunging	0,05 - 0,33	0,05 - 0,30	0,05 - 0,28	0,05 - 0,25	-	-	-	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,13	0,05 - 0,15	-	-
EN-41	SP6519	Plunging	0,05 - 0,33	0,05 - 0,30	0,05 - 0,28	0,05 - 0,25	0,05 - 0,30	0,05 - 0,30	0,05 - 0,25	-	-	0,05 - 0,10	0,05 - 0,10	0,05 - 0,13	0,05 - 0,15	-	-
EN-41	MP91M	Plunging	0,05 - 0,30	0,12 - 0,28	-	-	0,05 - 0,30	0,05 - 0,30	0,05 - 0,22	-	-	-	-	-	-	0,04 - 0,10	0,04 - 0,10
T	X400	Plunging	0,12 - 0,35	0,12 - 0,33	-	-	-	-	-	-	-	-	-	-	-	0,08 - 0,14	0,08 - 0,14
T	SP6519	Plunging	0,10 - 0,35	0,12 - 0,33	-	-	0,12 - 0,35	0,12 - 0,35	0,12 - 0,30	-	-	-	-	-	-	-	-
T	SP4019	Plunging	-	-	0,15 - 0,30	0,15 - 0,28	0,12 - 0,35	0,12 - 0,35	0,12 - 0,30	-	-	-	-	-	-	0,08 - 0,14	0,08 - 0,14
7791VS12 Insert Size																	
EN-422	X700	Plunging	-	-	0,08 - 0,28	0,08 - 0,25	-	-	-	-	-	0,07 - 0,10	0,07 - 0,10	0,07 - 0,13	0,07 - 0,15	-	-
EN-41	X500	Plunging	0,06 - 0,40	0,06 - 0,35	0,06 - 0,33	0,06 - 0,30	-	-	-	-	-	0,06 - 0,10	0,06 - 0,10	0,06 - 0,13	0,06 - 0,15	-	-
EN-41	SP6519	Plunging	0,06 - 0,40	0,06 - 0,36	0,06 - 0,33	0,06 - 0,30	0,06 - 0,40	0,06 - 0,40	0,06 - 0,30	-	-	0,06 - 0,10	0,06 - 0,10	0,06 - 0,13	0,06 - 0,15	-	-
EN-41	MP91M	Plunging	0,06 - 0,36	0,06 - 0,30	-	-	0,06 - 0,40	0,06 - 0,40	0,06 - 0,30	-	-	-	-	-	-	-	-
T	X400	Plunging	0,12 - 0,45	0,12 - 0,40	-	-	-	-	-	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15
T	X500	Plunging	0,12 - 0,45	0,12 - 0,40	-	-	-	-	-	-	-	-	-	-	-	-	-
T	SP6519	Plunging	0,12 - 0,45	0,12 - 0,40	-	-	0,12 - 0,45	0,12 - 0,45	0,12 - 0,40	-	-	-	-	-	-	-	-
T	SP4019	Plunging	-	-	0,12 - 0,35	0,12 - 0,30	0,12 - 0,45	0,12 - 0,45	0,12 - 0,40	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15
T	MP91M	Plunging	-	-	-	-	0,12 - 0,45	0,12 - 0,45	0,12 - 0,40	-	-	-	-	-	-	0,10 - 0,15	0,10 - 0,15

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A262.

7791VS09 & 7791VS12

Recommended Speeds

**Speed v_c (m/min)****7791VS Series**

Wear Resistance

-

+

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ◎

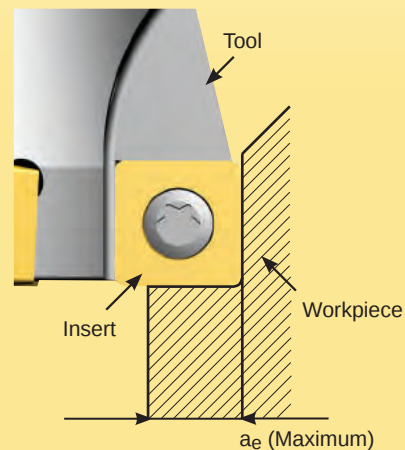
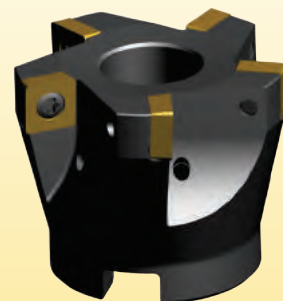
ISO	Materials	Rm and Hardness	 		X400	 		X500	 		X700	 		SP6519	 		SP4019	 		MP91M	 		GH1																															
P	Unalloyed Steel	<600 N/mm ² <180 HBN	 	 	120 - 260	 	 	130 - 270	 	 	 	 	 	130 - 295	 	 	 	 	 	 	 	 	 																															
		<950 N/mm ² <280 HBN			105 - 230			115 - 240						115 - 260										140 - 345	120 - 305																													
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	 	 	95 - 200	 	 	100 - 210	 	 	 	 	 	 	100 - 230	 	 	 	 	 	 	 	 	 																														
		950-1200 N/mm ² 280-355 HBN			70 - 150			75 - 160							75 - 175										105 - 270	80 - 205																												
		1200-1400 N/mm ² 355-415 HBN			 			 							45 - 95										 	50 - 100	 	 	50 - 110	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 

Plunging Mills

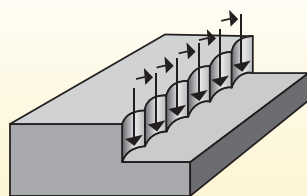

Tool Definition

Scallop height and step over - Dimensions (mm)				
Diameter	25	32	40	50
Insert size	9	9	9	9
a_e max	8,00	8,00	8,00	8,00
Scallop height	Step over (mm)			
0,25	4,97	5,63	6,30	7,05
0,50	7,00	7,94	8,89	9,95
0,75	8,53	9,68	10,85	12,16
1,00	9,80	11,14	12,49	14,00
2,00	13,56	15,49	17,44	19,60
3,00	16,25	18,65	21,07	23,75
4,00	18,33	21,17	24,00	27,13
5,00	20,00	23,24	26,46	30,00
6,00	21,35	24,98	28,57	32,50
7,00	-	-	30,40	34,70
8,00	-	-	32,00	36,66

The scallop height is calculated in relation with the step over.

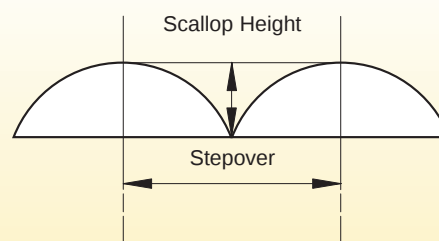


Plunging Mills



The maximum radial engagement is directly in relation with insert cutting edge length.

For insert type: **SC...09** the a_e , max is 8mm.



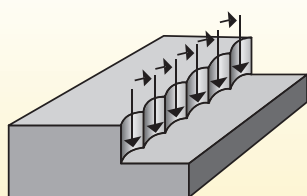
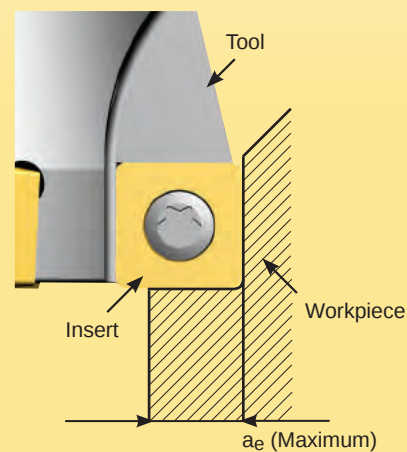
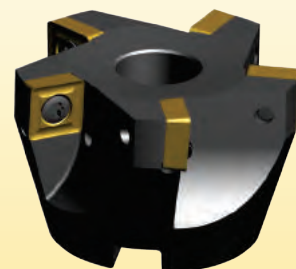
The cutting edge should not be in contact with the material face after machining to maintain the cutting edge quality.



Tool Definition

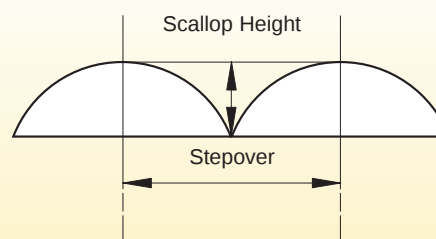
Scallop height and step over - Dimensions (mm)		
Diameter	63	80
Insert size	12	12
a_e max	11,00	11,00
Scallop height	Step over (mm)	
0,25	7,92	8,93
0,50	11,18	12,61
0,75	13,67	15,42
1,00	15,75	17,78
2,00	22,09	24,98
3,00	26,83	30,40
4,00	30,72	34,87
5,00	34,06	38,73
6,00	36,99	42,14
7,00	39,60	45,21
8,00	41,95	48,00
9,00	44,09	50,56
10,00	46,04	52,92
11,00	47,83	55,10

The scallop height is calculated in relation with the step over.

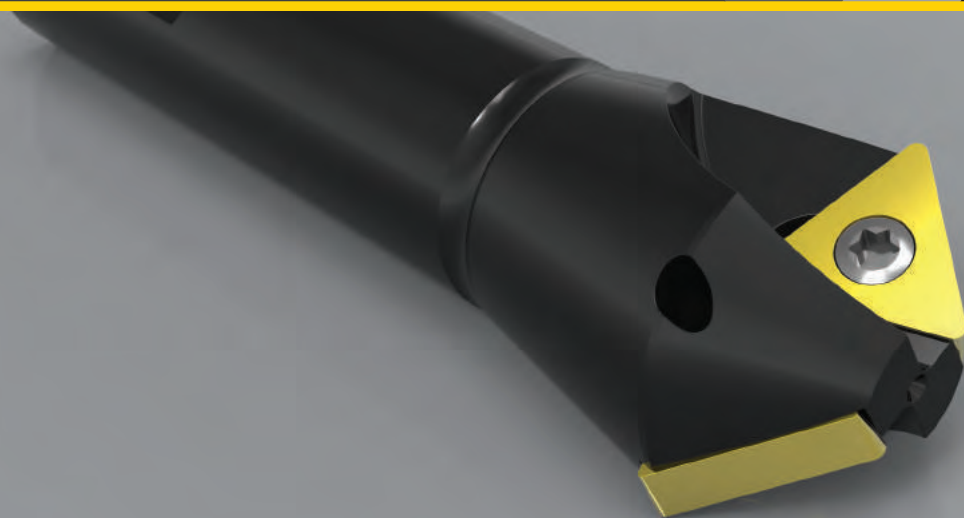


The maximum radial engagement is directly in relation with insert cutting edge length.

For insert type: SC...12 the a_e , max is 11mm.



The cutting edge should not be in contact with the material face after machining to maintain the cutting edge quality.


7745VT & 7760VT CHAMFER MILLING CUTTER

The cutter **7745VT11** is designed for removing heavy burrs and for machining small 45 degree chamfers.

The cutter series **7745VT16** contains two different cutter versions. One version utilises two inserts for machining heavy chamfers. The other version utilises one insert and is particularly qualified for spot drilling as well as for machining of small chamfers.

The cutter series **7760VT** contains two diameters, both for 60 degree chamfer milling.

Due to a wide range of available geometries and grades all these cutters are suitable for machining all materials.



Chamfering

7745VT & 7760VT
7745VT11:

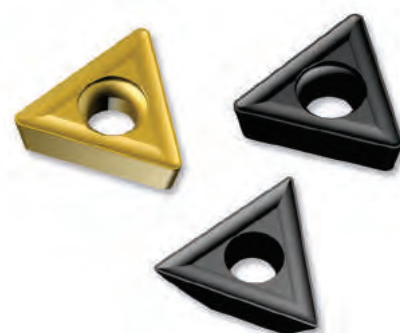
Diameter Range = 16mm

7745VT16:

Diameter Range = 20mm to 30mm

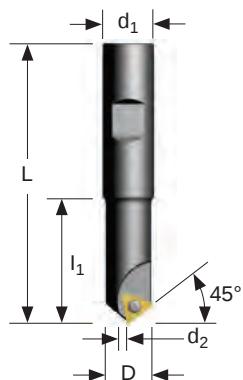
7760VT:

Diameter Range = 16mm to 25mm

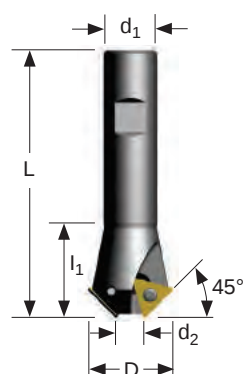


7745VT & 7760VT

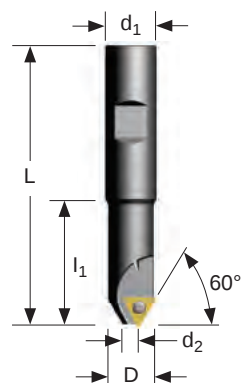
Chamfer Milling Cutter



45° VT11 Weldon Shank



45° VT16 Weldon Shank



60° VT11 Weldon Shank



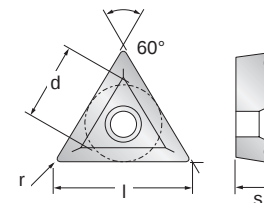
Depth of Cut (a_p)

Product		Dimensions (mm)						
EDP	Item Description	D	L/H	l_1	d_1	d_2	a_p max	No. of Teeth
45° Degrees Cutter - Weldon Shank								
023065	7745VT11WA016R	16	88	38	16	4,00	7,70	1
023066	7745VT16WA020R*	20	110	50	20	0,00	6,00	1
023067	7745VT16WA030R	30	100	32	20	12,00	11,30	2
60° Degrees Cutter - Weldon Shank								
023068	7760VT11WA016R	16	88	38	16	7,00	9,50	1
023069	7760VT11WA025R	24,5	90	40	20	15,00	9,50	2

* Denotes the cutter for spot drilling. For Spot Drilling the a_p max. is 6,00mm and for linear movement the a_p max. is 11,00mm.

7745VT & 7760VT Spares & Max RPM

Product		Dimensions (mm)					
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Max RPM
023065	7745VT11WA016R	015060	F2505T	015069	T7F	0,80	107000
023066	7745VT16WA020R*	015260	D4008T	015240	T15	3,10	84000
023067	7745VT16WA030R	015260	D4008T	015240	T15	3,10	55500
023068	7760VT11WA016R	015060	F2505T	015069	T7F	0,80	107000
023069	7760VT11WA025R	015060	F2505T	015069	T7F	0,80	75000



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			ap max. 9,00	ap min. - max. 1,00 - 7,00	ap min. - max. 0,50 - 3,00m					
Insert size 11mm for Chamfering only										
024947	TPMT110204E-M	X500	-		-	6,35	11,00	2,38	0,40	0,03
032277	TPMT110204E-M	SP4019	-		-	6,35	11,00	2,38	0,40	0,03
024948	TPMT110204E-M	GH1	-			6,35	11,00	2,38	0,40	0,03
Insert size 16mm for Spot Drilling and Chamfering										
034535	TCMX16T308E-ZR*	SP4019	-	-		9,52	16,50	3,97	0,80	0,05
Insert size 16mm for Chamfering only										
034536	TCMT16T308E	X400	-		-	9,52	16,50	3,97	0,80	0,05
024140	TCMT16T308E	X500	-		-	9,52	16,50	3,97	0,80	0,05
031569	TCMT16T308E	SP6519	-		-	9,52	16,50	3,97	0,80	0,05
024139	TCMT16T308E	MP91M	-		-	9,52	16,50	3,97	0,80	0,05
034538	TCMT16T308T	X400		-		9,52	16,50	3,97	0,80	0,15
034539	TCMT16T308T	SP6519		-	-	9,52	16,50	3,97	0,80	0,15
034537	TCMT16T308T	SP4019		-		9,52	16,50	3,97	0,80	0,15
023393	TCMW16T308E	GH1	-		-	9,52	16,50	3,97	0,80	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* TCMX16T308E-ZR SP4019 has to be used for spot drilling and can also be used for chamfer milling.

Note: The feed for spot drilling needs to be reduced by 50%.

Note: Feed recommendations can be found on page A268. Speed recommendations can be found on page A269.



Chamfering Mills

7745VT & 7760VT

Recommended Feeds



7745VT & 7760VT Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert size 11mm for Chamfering only																	
E-M	X500	Chamfering	0,03 - 0,20	0,03 - 0,15	0,03 - 0,15	0,03 - 0,12	0,03 - 0,20	0,03 - 0,20	0,03 - 0,20	-	-	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
E-M	SP4019	Chamfering	0,03 - 0,20	0,03 - 0,15	0,03 - 0,15	0,03 - 0,12	0,03 - 0,20	0,03 - 0,20	0,03 - 0,20	0,03 - 0,20	0,02 - 0,15	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
E-M	GH1	Chamfering	-	-	-	-	-	-	-	0,03 - 0,20	0,02 - 0,15	-	-	-	-	-	-
Insert size 16mm for Spot Drilling and Chamfering																	
E-ZR	SP4019	Spot drilling / Chamfering	0,03 - 0,20	0,03 - 0,15	0,03 - 0,15	0,03 - 0,10	0,03 - 0,15	0,03 - 0,12	0,03 - 0,10	0,03 - 0,20	0,03 - 0,15	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
Insert size 16mm for Chamfering only																	
E	X400	Chamfering	0,03 - 0,20	0,03 - 0,15	-	-	-	-	-	-	-	-	-	-	-	-	-
E	X500	Chamfering	-	-	0,03 - 0,15	0,03 - 0,12	-	-	-	-	-	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
E	SP6519	Chamfering	0,03 - 0,20	0,03 - 0,15	0,03 - 0,15	0,03 - 0,12	0,03 - 0,15	0,03 - 0,15	0,03 - 0,15	-	-	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
E	MP91M	Chamfering	0,03 - 0,18	0,03 - 0,12	-	-	0,03 - 0,15	0,03 - 0,15	0,03 - 0,15	-	-	-	-	-	-	-	-
T	X400	Chamfering	0,03 - 0,20	0,03 - 0,15	-	-	-	-	-	-	-	-	-	-	-	0,03 - 0,10	0,03 - 0,10
T	SP6519	Chamfering	0,03 - 0,20	0,03 - 0,15	0,03 - 0,15	0,03 - 0,12	0,03 - 0,20	0,03 - 0,20	0,03 - 0,18	-	-	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	-	-
T	SP4019	Chamfering	0,04 - 0,20	0,04 - 0,14	0,03 - 0,15	0,03 - 0,12	0,03 - 0,20	0,03 - 0,20	0,03 - 0,18	-	-	0,03 - 0,10	0,03 - 0,10	0,03 - 0,10	0,03 - 0,12	0,03 - 0,10	0,03 - 0,10
E	GH1	Chamfering	-	-	-	-	0,03 - 0,20	0,03 - 0,20	0,03 - 0,18	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A269.



Speed v_c (m/min)													
7745VT & 7760VT Series			Wear Resistance										
			- ← → +										
			Speed min. - max.										
Coolant Recommendation													
Recommended ● Possible ◎													
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD Standard		PVD Standard		CVD Standard		Uncoated Micrograin
			⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	GH1
P	Unalloyed Steel	<600 N/mm ² <180 HBN	◎	●	◎	●	◎	●	◎	●	◎	●	
		<950 N/mm ² <280 HBN											
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	◎	●	◎	●	◎	●	◎	●	◎	●	
		950-1200 N/mm ² 280-355 HBN											
M	Stainless Steel	Austenitic + Ferritic 300 series			◎	●	◎	●	◎	●			
		Martensitic 400 series											
	PH Stainless	Refractory P.H.			●		●		●				
K	Cast Iron	Grey GG-Ft											135 - 290
		Spheroidal-Ductile GGG-FGS			◎	●	◎	●	◎	●	◎	●	120 - 245
		Malleable GTS - MN/MP											115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●			●	400 - 3050
		Aluminium & Silicon > 16% Si 92 HBN											295 - 2440
S	High Temperature Alloys	Iron Based											
		Cobalt Based			●		●		●				
		Nickel Based											
		Titanium Based											
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●						●				
		Chilled Cast Iron >1400 N/mm ² > 400 HBN											





Calculation of the average chip thickness in relation with the a_e (Radial Engagement) if a_e is less than 50% of Dia.

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

7745VT16 Technical Information

Feed rate compensation: For 45° cutting, divide the h_m value by the sine of the approach angle (the sine of 45° = 0,707)

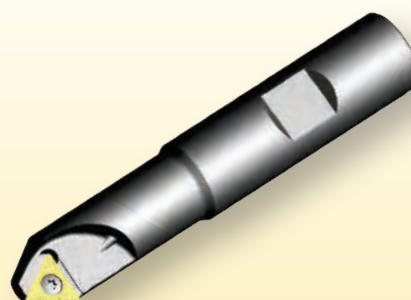
i.e.: $\frac{h_m}{0,707}$ or $\frac{0,08mm}{0,707} = 0,11mm$ programmed feed rate



7760VT11 Technical Information

Feed rate compensation: For 60° cutting, divide the h_m value by the sine of the approach angle (the sine of 60° = 0,866)

i.e.: $\frac{h_m}{0,866}$ or $\frac{0,08mm}{0,866} = 0,092mm$ programmed feed rate



**T-SLOT MILLING CUTTERS**

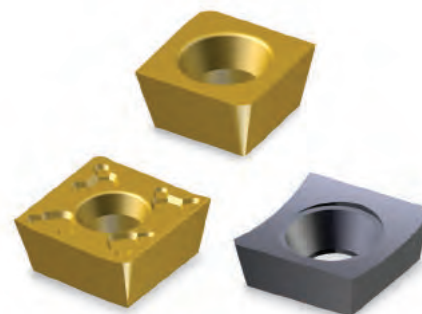
The **5400VM** cutter is specifically designed for producing T-slots after machining the tenon slot. This particular design places two inserts slightly higher on the body to machine the top of the slot while the other two machine the bottom of the slot.

The unique design with reinforced insert support and shallow machined chip flutes, allows this cutter design to run at higher feed rates.

The design allows chips to evacuate through the slot already machined. When possible the tool shank passage should be only 1mm below the top of the T-slot, allowing the chips to evacuate through the slot produced by this cutter.

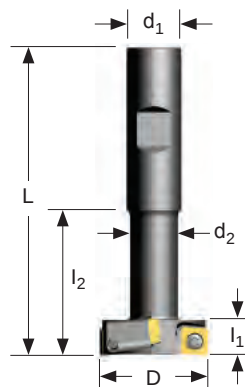
**5400VM****5400VM:**

Diameter Range = 18mm to 40mm



5400VM

T-Slot Milling Cutter

**Weldon Shank**

Product		Dimensions (mm)								
EDP	Item Description	D	L	Slot Height l ₁	l ₂	d ₁	d ₂	No of Teeth (right/left)	Insert Type	Insert Size
5400VM Weldon Shank										
021662	5400VM04WA018R	18	70	8	25	12	8	2R + 2L	MP	04 R/L
021663	5400VM04WA021R	21	75	9	30	12	10	2R + 2L	MP	04 R/L
021664	5400VM06WA025R	25	83	11	35	16	12	2R + 2L	MP	06 R/L
018313	5400VM08WA032R	32	91	14	43	16	15	2R + 2L	MP	08 R/L
021665	5400VM11WA040R	40	106	18	50	25	19	2R + 2L	MP	11 R/L

Product		Spares					
EDP	Item Description	EDP		EDP		Screw Tightening Nm	Max RPM
5400VM Weldon Shank							
021662	5400VM04WA018R	015059	F2004T	018487	T6	0,40	10000
021663	5400VM04WA021R	015059	F2004T	018487	T6	0,40	10000
021664	5400VM06WA025R	015060	F2505T	018488	T7	0,80	10000
018313	5400VM08WA032R	015063	F3008T	013214	T9	1,40	10000
021665	5400VM11WA040R	015062	D4010T	015240	T15	3,10	10000

T-Slot Mills



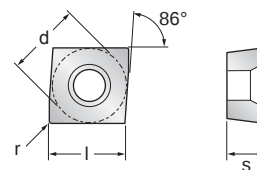
MPHW04

MPFW04

MPEX06-701

MPHW06

MPFW06



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▽	Semi-Finishing ▽▽	Finishing ▽▽▽	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _e / a _p max. *	a _e min. - max. -	a _e min. - max. -					
Insert Size 04										
017667	MPHW0402PPTL	X500		-	-	4,76	4,76	2,38	Facet	0,07
017666	MPHW0402PPTR	X500		-	-	4,76	4,76	2,38	Facet	0,07
031508	MPFW0402PPTL	SP6519		-	-	4,76	4,76	2,38	Facet	0,07
031507	MPFW0402PPTR	SP6519		-	-	4,76	4,76	2,38	Facet	0,07
034523	MPFW0402PPTL	SP4019		-	-	4,76	4,76	2,38	Facet	0,07
034524	MPFW0402PPTR	SP4019		-	-	4,76	4,76	2,38	Facet	0,07
Insert Size 06										
024926	MPEX0602PPFL-701	GH1		-	-	6,35	6,35	2,38	Facet	0,02
024927	MPEX0602PPFR-701	GH1		-	-	6,35	6,35	2,38	Facet	0,02
017669	MPHW0602PPTL	X500		-	-	6,35	6,35	2,38	Facet	0,07
017668	MPHW0602PPTR	X500		-	-	6,35	6,35	2,38	Facet	0,07
031571	MPFW0602PPTL	SP6519		-	-	6,35	6,35	2,38	Facet	0,07
031570	MPFW0602PPTR	SP6519		-	-	6,35	6,35	2,38	Facet	0,07
034525	MPFW0602PPTL	SP4019		-	-	4,76	4,76	2,38	Facet	0,07
034526	MPFW0602PPTR	SP4019		-	-	4,76	4,76	2,38	Facet	0,07

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Max a_p and a_e is determined by selection of the cutter.

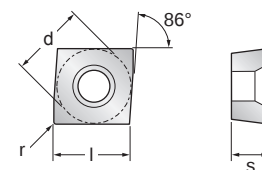
Note: Feed recommendations can be found on page A275. Speed recommendations can be found on page A276.



T-Slot Mills

5400VM

Milling Inserts



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _e / a _p max.*	a _e min. - max. -	a _e min. - max. -					
Insert Size 08										
034527	MPEX0803PPFL-701	SP4019	●■	-	-	7,94	7,94	3,18	Facet	0,02
034528	MPEX0803PPFR-701	SP4019	●■	-	-	7,94	7,94	3,18	Facet	0,02
024928	MPEX0803PPFL-701	GH1	◆	-	-	7,94	7,94	3,18	Facet	0,02
017642	MPEX0803PPFR-701	GH1	◆	-	-	4,76	4,76	2,38	Facet	0,02
Insert Size 10										
015138	MPHT0803PPTL-42	X500	■◆	-	-	7,94	7,94	3,18	Facet	0,10
015140	MPHT0803PPTR-42	X500	■◆	-	-	7,94	7,94	3,18	Facet	0,10
031510	MPHT0803PPTL-42	SP6519	◆■◆■	-	-	7,94	7,94	3,18	Facet	0,10
031509	MPHT0803PPTR-42	SP6519	◆■◆■	-	-	7,94	7,94	3,18	Facet	0,10
017296	MPHT0803PPTL-42	MP91M	●■◆	-	-	7,94	7,94	3,18	Facet	0,10
017297	MPHT0803PPTR-42	MP91M	●■◆	-	-	7,94	7,94	3,18	Facet	0,10
Insert Size 12										
034532	MPFW0803PPTL	X400	■◆	-	-	7,94	7,94	3,18	Facet	0,10
034531	MPFW0803PPTR	X400	■◆	-	-	7,94	7,94	3,18	Facet	0,10
Insert Size 16										
034529	MPFW0803PPTL	SP4019	◆	-	-	7,94	7,94	3,18	Facet	0,10
034530	MPFW0803PPTR	SP4019	◆	-	-	7,94	7,94	3,18	Facet	0,10
017658	MPFW0803PPTL	GH1	●	-	-	7,94	7,94	3,18	Facet	0,10
017655	MPFW0803PPTR	GH1	●	-	-	7,94	7,94	3,18	Facet	0,10
Insert Size 11										
017644	MPEX1104PPFL-701	GH1	◆	-	-	11,11	11,11	4,76	Facet	0,02
017643	MPEX1104PPFR-701	GH1	◆	-	-	11,11	11,11	4,76	Facet	0,02
Insert Size 20										
015141	MPHT1104PPTL-42	X500	■◆■◆	-	-	11,11	11,11	4,76	Facet	0,10
015142	MPHT1104PPTR-42	X500	■◆■◆	-	-	11,11	11,11	4,76	Facet	0,10
031512	MPHT1104PPTL-42	SP6519	◆■◆■	-	-	11,11	11,11	4,76	Facet	0,10
031511	MPHT1104PPTR-42	SP6519	◆■◆■	-	-	11,11	11,11	4,76	Facet	0,10
017298	MPHT1104PPTL-42	MP91M	●■◆	-	-	11,11	11,11	4,76	Facet	0,10
017299	MPHT1104PPTR-42	MP91M	●■◆	-	-	11,11	11,11	4,76	Facet	0,10
Insert Size 25										
034533	MPFW1104PPTL	SP4019	◆	-	-	11,11	11,11	4,76	Facet	0,15
034534	MPFW1104PPTR	SP4019	◆	-	-	11,11	11,11	4,76	Facet	0,15
017439	MPFW1104PPTL	GH1	●	-	-	11,11	11,11	4,76	Facet	0,15
017440	MPFW1104PPTR	GH1	●	-	-	11,11	11,11	4,76	Facet	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page A275. Speed recommendations can be found on page A276.



T-Slot Mills


5400VM Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert Size 04																	
TR/TL	X500	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,05 - 0,07	0,05 - 0,10	0,05 - 0,10	0,05 - 0,08	-	-	-	-	-	-	-	-
TR/TL	SP6519	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,04 - 0,06	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,04 - 0,06	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	-	-	-	-	-	-	-	-
Insert Size 06																	
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
TR/TL	X500	Slotting	0,06 - 0,13	0,06 - 0,11	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
TR/TL	SP6519	Slotting	0,06 - 0,13	0,06 - 0,11	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
Insert Size 08																	
FR/FL-701	SP4019	Slotting	-	-	0,04 - 0,10	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
TL/TL-42	X500	Slotting	-	-	0,10 - 0,15	0,10 - 0,14	-	-	-	-	-	-	-	-	-	-	-
TR/TL-42	SP6519	Slotting	0,10 - 0,16	0,10 - 0,14	0,10 - 0,15	0,10 - 0,14	-	-	-	-	-	-	-	-	-	-	-
TR/TL-42	MP91M	Slotting	0,10 - 0,15	0,10 - 0,13	-	-	0,10 - 0,15	0,10 - 0,15	0,10 - 0,13	-	-	-	-	-	-	-	-
TR/TL	X400	Slotting	0,10 - 0,16	0,10 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	-	-	-	-	0,10 - 0,15	0,10 - 0,15	0,10 - 0,13	-	-	-	-	-	-	-	-
TR/TL	GH1	Slotting	-	-	-	-	0,10 - 0,14	0,10 - 0,14	-	-	-	-	-	-	-	-	-
Insert Size 11																	
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
TR/TL-42	X500	Slotting	0,10 - 0,18	0,10 - 0,15	0,10 - 0,16	0,10 - 0,15	-	-	-	-	-	-	-	-	-	-	-
TR/TL-42	SP6519	Slotting	0,10 - 0,18	0,10 - 0,15	0,10 - 0,16	0,10 - 0,15	-	-	-	-	-	-	-	-	-	-	-
TR/TL-42	MP91M	Slotting	0,10 - 0,17	0,10 - 0,14	-	-	0,10 - 0,16	0,10 - 0,16	0,10 - 0,14	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	-	-	-	-	0,10 - 0,16	0,10 - 0,16	0,10 - 0,14	-	-	-	-	-	-	-	-
TR/TL	GH1	Slotting	-	-	-	-	0,10 - 0,14	0,10 - 0,14	-	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A276.

Speed v_c (m/min)

5400VM Series

Wear Resistance

-  +

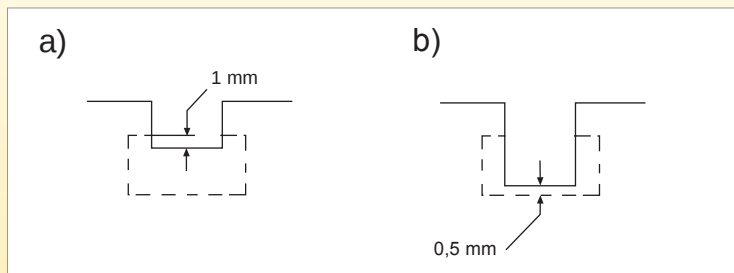
Speed min. - max.

Coolant Recommendation

Recommended ● Possible ○

ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			MP91M			GH1
P	Unalloyed Steel	<600 N/mm ² <180 HBN	○	●	120 - 260	○	●	130 - 270	○	●	130 - 295	○	●	140 - 315	○	●	140 - 345						
		<950 N/mm ² <280 HBN			105 - 230			115 - 240			115 - 260			120 - 275			120 - 305						
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	○	●	95 - 200	○	●	100 - 210	○	●	100 - 230	○	●	105 - 245	○	●	105 - 270						
		950-1200 N/mm ² 280-355 HBN			70 - 150			75 - 160			75 - 175			80 - 190			80 - 205						
		1200-1400 N/mm ² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110		●	50 - 120		●	50 - 130						
M	Stainless Steel	Austenitic + Ferritic 300 series				○	●	115 - 250	○	●	115 - 270	○	●	120 - 280									
		Martensitic 400 series						100 - 220			105 - 235			110 - 250									
	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120	●		50 - 130									
K	Cast Iron	Grey GG-Ft						120 - 280			140 - 295			145 - 330			145 - 365						135 - 290
		Spheroidal-Ductile GGG-FGS				○	●	105 - 205	○	●	110 - 240	○	●	115 - 255	○	●	115 - 285	○	●	120 - 245			
		Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260						
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2895				●					400 - 3050
		Aluminium & Silicon > 16% Si 92 HBN												295 - 2320									295 - 2440
S	High Temperature Alloys	Iron Based																					
		Cobalt Based																					
		Nickel Based																					
		Titanium Based																					
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN																					
		Chilled Cast Iron >1400 N/mm ² > 400 HBN																					

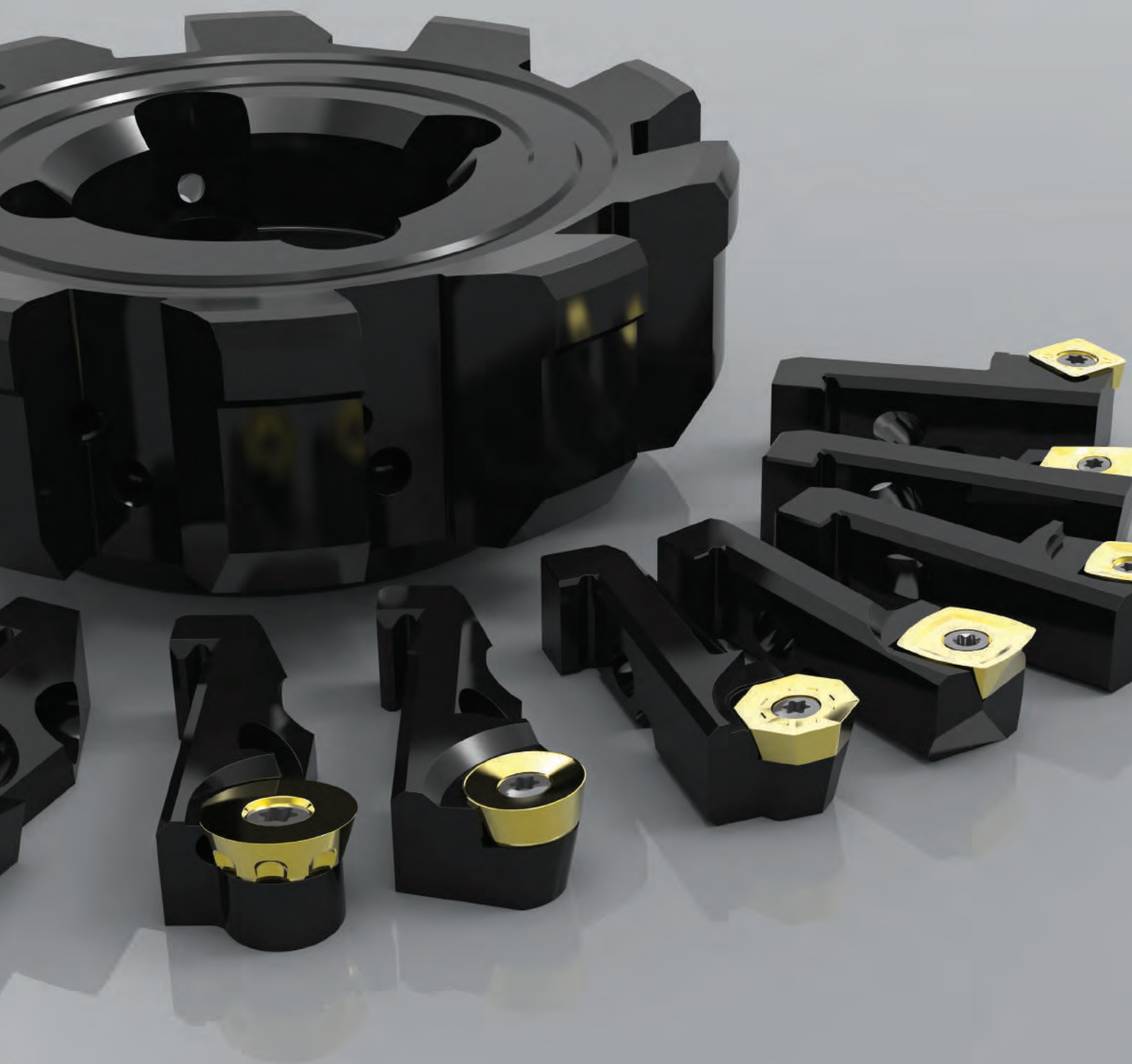
T-Slot Mills

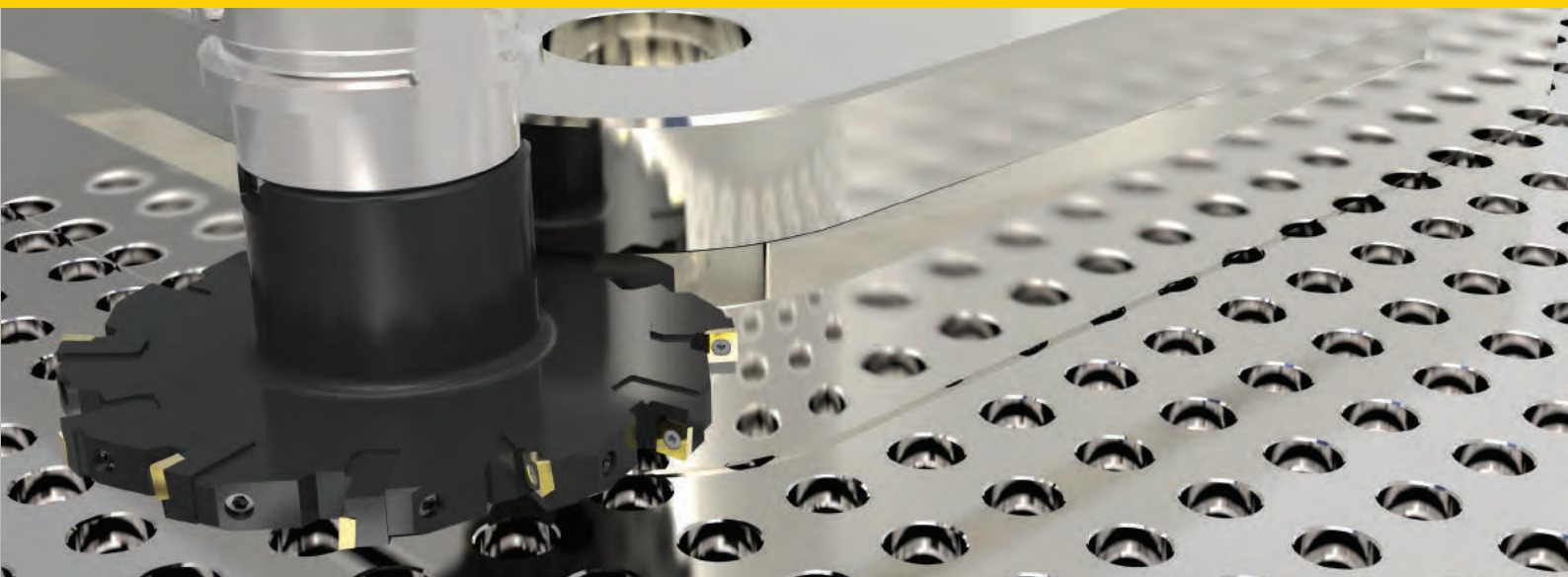
**5400VM Technical Information**

Stellram recommends the use of method a) whenever possible.
Compressed air or sufficient coolant is used to ensure adequate chip evacuation.

Note: Machining method a) is preferred as this method greatly reduces vibration.







DISK MILL CARTRIDGE CUTTERS

7220VM Disk Mill Cutter series with adjustable cartridges are designed for machining deep slots or side shoulder milling operations. They are equipped with interchangeable cartridges with width adjustment.

The cartridges are fixed to the cutter body by an efficient clamping system which works in the same direction as the cutting force.

Due to the adjustable cartridges, these cutters are perfectly qualified to machine precision slots.

This cutter series is designed for roughing, semi-finishing and finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron, Aluminium Alloys, and High Temperature Alloys.

This Stellram® 72VM .. cartridge system is noted for its simplicity, reliability and precision. The minimal size of the cartridge means it has a larger area for chip flow – a major factor for full-side cutters where chips cannot be released when teeth are engaged. Stellram's cutters can achieve deep slotting operations without the chip flow problems of other systems.

The cutter bodies can be adapted for different milling operations. They can be fitted with alternating left/right cartridges (full-side cutters) mainly for slotting, or only right or left cartridges (half-side cutters) for maximum side cutting performance.

Note: The 7220VM series cutters in this section are assembled as Full Side Disc Cutters (Slotting) which is called Neutral (N). They are set with 50 percent right hand and 50 percent left hand cartridges for slotting applications.

For applications as a right hand or left hand Half Side Disc Mills, please order the necessary cartridges depending on the hand cutter you require.

7220VM

The 7220VM range with width adjustment is as follows:

Dia. 63mm to 125mm is 1mm adjustable.
 Available width of cut: 6/7; 7/8; 8/9; 9/10

Example: Cartridge 72VM_6/7 = 6mm to 7mm
 +/- 0,2mm; = 5,8mm to 7,2mm

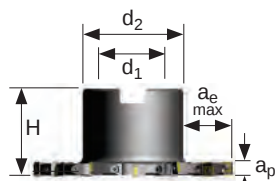
Dia. 125mm to 160mm is 2mm adjustable.
 Available width of cut: 10/12; 12/14; 14/16;
 16/18; 18/20

Example: Cartridge 72VM_10/12 = 10mm to
 12mm +/- 0,2mm; = 9,8mm to 12,2mm



7220VM

Disk Mill Cutters Assemblies

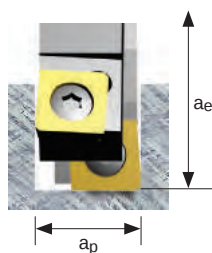


Disc Cutter & Cartridge

Product		Dimensions (mm)											
EDP	Assembled Description	D	L/H	d1	d2	No. of Teeth (right / left)	a _e max	a _p adjustment range		Screw Tightening Nm	Insert type	Insert size metric	
								a _p min	a _p max				
7220VM04 Disk Mill Cutters with Shell Mill Fixation													
016700	7220VM04-063R06/07N	63	40	22	35	4R + 4L	14,00	6,00	7,00	0,40	MP	04	
016701	7220VM04-063R07/08N	63	40	22	35	4R + 4L	14,00	7,00	8,00	0,40			
016702	7220VM04-080R06/07N	80	45	27	45	5R + 5L	17,50	6,00	7,00	0,40			
016703	7220VM04-080R07/08N	80	45	27	45	5R + 5L	17,50	7,00	8,00	0,40			
7220VM06 Disk Mill Cutters with Shell Mill Fixation													
016704	7220VM06-100R08/09N	100	50	32	48	6R + 6L	26,00	8,00	9,00	0,80	MP	06	
016705	7220VM06-100R09/10N	100	50	32	48	6R + 6L	26,00	9,00	10,00	0,80			
033233	7220VM06-125R08/09N	125	55	40	62	7R + 7L	30,50	8,00	9,00	0,80			
016706	7220VM06-125R09/10N	125	55	40	62	7R + 7L	30,50	9,00	10,00	0,80			
7220VM08 Disk Mill Cutters with Shell Mill Fixation													
016707	7220VM08-125R10/12N	125	55	40	62	5R + 5L	30,50	10,00	12,00	2,10	MP	08	
033234	7220VM08-125R12/14N	125	55	40	62	5R + 5L	30,50	12,00	14,00	2,10			
033235	7220VM08-160R10/12N	160	60	40	66	6R + 6L	44,10	10,00	12,00	2,10			
033236	7220VM08-160R12/14N	160	60	40	66	6R + 6L	44,10	12,00	14,00	2,10			
7220VM11 Disk Mill Cutters with Shell Mill Fixation													
033237	7220VM11-125R14/16N	125	55	40	62	4R + 4L	30,50	14,00	16,00	3,10	MP	11	
033238	7220VM11-125R16/18N	125	55	40	62	4R + 4L	30,50	16,00	18,00	3,10			
033239	7220VM11-160R16/18N	160	60	40	66	5R + 5L	44,10	16,00	18,00	3,10			
033240	7220VM11-160R18/20N	160	60	40	66	5R + 5L	44,10	18,00	20,00	3,10			

The 7220VM series cutters in this section are assembled as Full Side Disc Cutters (Slotting) which is called Neutral (N).

Product		Mounting Bolt	
EDP	Assembled Description	EDP	Bolt
7220VM04 Disk Mill Cutters			
016700	7220VM04-063R06/07N	031299	M10 1.5 X 25 SHCS
016701	7220VM04-063R07/08N	031299	M10 1.5 X 25 SHCS
016702	7220VM04-080R06/07N	031268	M12 X 1.75 X 30 SHCS
016703	7220VM04-080R07/08N	031268	M12 X 1.75 X 30 SHCS
7220VM06 Disk Mill Cutters			
016704	7220VM06-100R08/09N	031269	M16 X 2 X 40 SHCS
016705	7220VM06-100R09/10N	031269	M16 X 2 X 40 SHCS
033233	7220VM06-125R08/09N	031270	M20 X 2.5 X 50 SHCS
016706	7220VM06-125R09/10N	031270	M20 X 2.5 X 50 SHCS
7220VM08 Disk Mill Cutters			
016707	7220VM08-125R10/12N	031270	M20 X 2.5 X 50 SHCS
033234	7220VM08-125R12/14N	031270	M20 X 2.5 X 50 SHCS
033235	7220VM08-160R10/12N	031270	M20 X 2.5 X 50 SHCS
033236	7220VM08-160R12/14N	031270	M20 X 2.5 X 50 SHCS
7220VM11 Disk Mill Cutters			
033237	7220VM11-125R14/16N	031270	M20 X 2.5 X 50 SHCS
033238	7220VM11-125R16/18N	031270	M20 X 2.5 X 50 SHCS
033239	7220VM11-160R16/18N	031270	M20 X 2.5 X 50 SHCS
033240	7220VM11-160R18/20N	031270	M20 X 2.5 X 50 SHCS



Depth of Cut (ap)



Disc Cutter & Cartridge

Product				Hardware Spares			
EDP	Right hand Cartridge	EDP	Left hand Cartridge	Insert Screw EDP		Insert Screwdriver EDP	
7220VM04 Disk Mill Cutters							
016759	72VMR06/07	016751	72VML06/07	015059	F2004T	018487	T6
016760	72VMR07/08	016752	72VML07/08	015059	F2004T	018487	T6
7220VM06 Disk Mill Cutters							
016761	72VMR08/09	016753	72VML08/09	015060	F2505T	018488	T7
016762	72VMR09/10	016754	72VML09/10	015060	F2505T	018488	T7
7220VM08 Disk Mill Cutters							
016763	72VMR10/12	016755	72VML10/12	015063	F3008T	013214	T9
016764	72VMR12/14	016756	72VML12/14	015063	F3008T	013214	T9
7220VM11 Disk Mill Cutters							
016765	72VMR14/16	016757	72VML14/16	015262	D4010T	015240	T15
016766	72VMR16/18	016758	72VML16/18	015262	D4010T	015240	T15
015445	72VMR18/20	015444	72VML18/20	015262	D4010T	015240	T15



Left & Right Cartridges

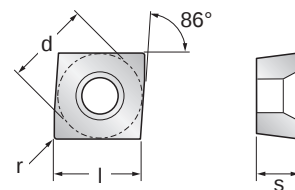
Product				Cartridge Spares					
EDP	Right hand Cartridge	EDP	Left hand Cartridge	Cartridge Adjustment Screw EDP		Cartridge Fixation Screw EDP		Cartridge Screwdriver EDP	
7220VM04 Disk Mill Cutters									
016759	72VMR06/07	016751	72VML06/07	-	-	015259	72.698T	013214	T9
016760	72VMR07/08	016752	72VML07/08	-	-	015259	72.698T	013214	T9
7220VM06 Disk Mill Cutters									
016761	72VMR08/09	016753	72VML08/09	-	-	015258	72.697T	015240	T15
016762	72VMR09/10	016754	72VML09/10	-	-	015258	72.697T	015240	T15
7220VM08 Disk Mill Cutters									
016763	72VMR10/12	016755	72VML10/12	-	-	015256	72.693T	015273	T20
016764	72VMR12/14	016756	72VML12/14	-	-	015256	72.693T	015273	T20
7220VM11 Disk Mill Cutters									
016765	72VMR14/16	016757	72VML14/16	016858	72.602	015257	72.694T	015273	T20
016766	72VMR16/18	016758	72VML16/18	016858	72.602	015257	72.694T	015273	T20
015445	72VMR18/20	015444	72VML18/20	016858	72.602	015257	72.694T	015273	T20

Note: Adjusting screw is only supplied for the 7220VM11 size Disk Mills. All other Disk Mills do not have an adjusting screw, the smaller sizes are adjusted manually.

The 7220VM series cutters in this section are assembled as Full Side Disc Cutters (Slotting) which is called Neutral (N).

The Cartridges are set-staggered with 50 percent right hand and 50 percent left hand cartridges for slotting applications.

For applications as a Right hand or Left hand Half Side Disc Mill please order the necessary cartridges depending on the hand cutter you require.



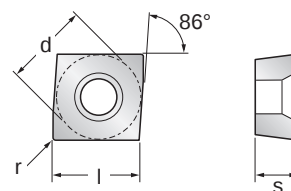
Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p / a _e max*	a _p / a _e min - max 1,00 - 3,00	a _p / a _e min - max 0,20 - 1,00					
Insert size 04										
017667	MPHW0402PPTL	X500			-	4,76	4,76	2,38	Facet	0,07
017666	MPHW0402PPTR	X500			-	4,76	4,76	2,38	Facet	0,07
Insert size 06										
031508	MPFW0402PPTL	SP6519				4,76	4,76	2,38	Facet	0,07
031507	MPFW0402PPTR	SP6519				4,76	4,76	2,38	Facet	0,07
034523	MPFW0402PPTL	SP4019				4,76	4,76	2,38	Facet	0,07
034524	MPFW0402PPTR	SP4019				4,76	4,76	2,38	Facet	0,07
Insert size 06										
024926	MPEX0602PPFL-701	GH1				6,35	6,35	2,38	Facet	0,02
024927	MPEX0602PPFR-701	GH1				6,35	6,35	2,38	Facet	0,02
017669	MPHW0602PPTL	X500			-	6,35	6,35	2,38	Facet	0,07
017668	MPHW0602PPTR	X500			-	6,35	6,35	2,38	Facet	0,07
031571	MPFW0602PPTL	SP6519				6,35	6,35	2,38	Facet	0,07
031570	MPFW0602PPTR	SP6519				6,35	6,35	2,38	Facet	0,07
034525	MPFW0602PPTL	SP4019				4,76	4,76	2,38	Facet	0,07
034526	MPFW0602PPTR	SP4019				4,76	4,76	2,38	Facet	0,07

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page A284. Speed recommendations can be found on page A285.





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h _m min
			Depth of Cut (mm)							
			a _p / a _e max*	a _p / a _e min - max 1,00 - 3,00	a _p / a _e min - max 0,20 - 1,00					
Insert size 08										
034527	MPEX0803PPFL-701	SP4019	■	● ■	◆ ◆ ◆	7,94	7,94	3,18	Facet	0,02
034528	MPEX0803PPFR-701	SP4019	■	● ■	◆ ◆ ◆	7,94	7,94	3,18	Facet	0,02
024928	MPEX0803PPFL-701	GH1	◆	◆	◆	7,94	7,94	3,18	Facet	0,02
017642	MPEX0803PPFR-701	GH1	◆	◆	◆	7,94	7,94	3,18	Facet	0,02
Insert size 10										
015138	MPHT0803PPTL-42	X500	■ ◆	● ■ ◆	-	7,94	7,94	3,18	Facet	0,10
015140	MPHT0803PPTR-42	X500	■ ◆	● ■ ◆	-	7,94	7,94	3,18	Facet	0,10
031510	MPHT0803PPTL-42	SP6519	◆ ■ ◆	◆ ◆ ◆ ◆	◆ ◆ ◆ ◆	7,94	7,94	3,18	Facet	0,10
031509	MPHT0803PPTR-42	SP6519	◆ ■ ◆	◆ ◆ ◆ ◆	◆ ◆ ◆ ◆	7,94	7,94	3,18	Facet	0,10
017296	MPHT0803PPTL-42	MP91M	● ■ ◆	● ■ ◆	● ■ ◆	7,94	7,94	3,18	Facet	0,10
017297	MPHT0803PPTR-42	MP91M	● ■ ◆	● ■ ◆	● ■ ◆	7,94	7,94	3,18	Facet	0,10
Insert size 12										
034532	MPFW0803PPTL	X400	■ ◆	-	-	7,94	7,94	3,18	Facet	0,10
034531	MPFW0803PPTR	X400	■ ◆	-	-	7,94	7,94	3,18	Facet	0,10
034529	MPFW0803PPTL	SP4019	◆	◆	■ ◆	7,94	7,94	3,18	Facet	0,10
034530	MPFW0803PPTR	SP4019	◆	◆	■ ◆	7,94	7,94	3,18	Facet	0,10
017658	MPFW0803PPTL	GH1	-	●	■	7,94	7,94	3,18	Facet	0,10
017655	MPFW0803PPTR	GH1	-	●	■	7,94	7,94	3,18	Facet	0,10
Insert size 11										
017644	MPEX1104PPFL-701	GH1	◆	◆	◆	11,11	11,11	4,76	Facet	0,02
017643	MPEX1104PPFR-701	GH1	◆	◆	◆	11,11	11,11	4,76	Facet	0,02
Insert size 16										
015141	MPHT1104PPTL-42	X500	● ■ ◆	● ■ ◆	● ○ ■	11,11	11,11	4,76	Facet	0,10
015142	MPHT1104PPTR-42	X500	● ■ ◆	● ■ ◆	● ○ ■	11,11	11,11	4,76	Facet	0,10
031512	MPHT1104PPTL-42	SP6519	◆ ◆ ◆	◆ ◆ ◆ ◆	◆ ◆ ◆ ◆	11,11	11,11	4,76	Facet	0,10
031511	MPHT1104PPTR-42	SP6519	◆ ◆ ◆	◆ ◆ ◆ ◆	◆ ◆ ◆ ◆	11,11	11,11	4,76	Facet	0,10
017298	MPHT1104PPTL-42	MP91M	■ ◆	■ ◆	● ■ ◆	11,11	11,11	4,76	Facet	0,10
017299	MPHT1104PPTR-42	MP91M	■ ◆	■ ◆	● ■ ◆	11,11	11,11	4,76	Facet	0,10
Insert size 20										
034533	MPFW1104PPTL	SP4019	● ○ ◆	● ○ ◆	■ ◆ ◆ ◆	11,11	11,11	4,76	Facet	0,15
034534	MPFW1104PPTR	SP4019	● ○ ◆	● ○ ◆	■ ◆ ◆ ◆	11,11	11,11	4,76	Facet	0,15
017439	MPFW1104PPTL	GH1	-	●	■	11,11	11,11	4,76	Facet	0,15
017440	MPFW1104PPTR	GH1	-	●	■	11,11	11,11	4,76	Facet	0,15

Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page A5.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page A284. Speed recommendations can be found on page A285.



Disc Mills & Cartridges

7220VM

Recommended Feeds

7220VM Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminum & Alloys <16% Si 116 HBN	Aluminum & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm ² >415 HBN	Chilled Cast Iron >1400 N/mm ² >400 HBN
			Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
Insert size 04																	
TR/TL	X500	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,05 - 0,07	0,05 - 0,10	0,05 - 0,10	0,05 - 0,08	-	-	-	-	-	-	-	-
TR/TL	SP6519	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,04 - 0,06	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,06 - 0,10	0,05 - 0,08	0,06 - 0,08	0,04 - 0,06	0,04 - 0,08	0,04 - 0,08	0,04 - 0,08	-	-	-	-	-	-	-	-
Insert size 06																	
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
TR/TL	X500	Slotting	0,06 - 0,13	0,06 - 0,11	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
TR/TL	SP6519	Slotting	0,06 - 0,13	0,06 - 0,11	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,10	0,06 - 0,12	0,06 - 0,12	0,06 - 0,10	-	-	-	-	-	-	-	-
Insert size 08																	
FR/FL-701	SP4019	Slotting	-	-	0,04 - 0,10	0,04 - 0,08	-	-	-	0,05 - 0,12	0,05 - 0,10	0,03 - 0,07	0,03 - 0,07	0,04 - 0,08	0,04 - 0,09	-	-
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,12	0,05 - 0,10	-	-	-	-	-	-
TL/TL-42	X500	Slotting	0,10 - 0,16	0,10 - 0,14	0,10 - 0,15	0,10 - 0,14	-	-	-	-	-	0,09 - 0,12	0,09 - 0,12	0,09 - 0,13	0,09 - 0,14	-	-
TR/TL-42	SP6519	Slotting	0,10 - 0,16	0,10 - 0,14	0,10 - 0,15	0,10 - 0,14	-	-	-	-	-	0,09 - 0,12	0,09 - 0,12	0,09 - 0,13	0,09 - 0,14	-	-
TR/TL-42	MP91M	Slotting	0,10 - 0,15	0,10 - 0,13	-	-	0,10 - 0,15	0,10 - 0,15	0,10 - 0,13	-	-	-	-	-	-	-	-
TR/TL	X400	Slotting	0,10 - 0,16	0,10 - 0,14	-	-	-	-	-	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,10 - 0,15	0,10 - 0,13	-	-	0,10 - 0,15	0,10 - 0,15	0,10 - 0,13	-	-	-	-	-	-	-	-
TR/TL	GH1	Slotting	-	-	-	-	0,10 - 0,14	0,10 - 0,14	-	-	-	-	-	-	-	-	-
Insert size 11																	
FR/FL-701	GH1	Slotting	-	-	-	-	-	-	-	0,05 - 0,15	0,05 - 0,15	-	-	-	-	-	-
TR/TL-42	X500	Slotting	0,10 - 0,20	0,10 - 0,18	0,10 - 0,20	0,10 - 0,17	-	-	-	-	-	0,10 - 0,14	0,10 - 0,14	0,10 - 0,15	0,10 - 0,16	-	-
TR/TL-42	SP6519	Slotting	0,10 - 0,20	0,10 - 0,18	0,10 - 0,20	0,10 - 0,17	-	-	-	-	-	0,10 - 0,14	0,10 - 0,14	0,10 - 0,15	0,10 - 0,16	-	-
TR/TL-42	MP91M	Slotting	0,10 - 0,19	0,10 - 0,17	-	-	0,10 - 0,20	0,10 - 0,20	0,10 - 0,18	-	-	-	-	-	-	-	-
TR/TL	SP4019	Slotting	0,13 - 0,22	0,13 - 0,19	0,13 - 0,22	0,13 - 0,19	0,13 - 0,22	0,13 - 0,22	0,13 - 0,20	-	-	-	-	-	-	-	-
TR/TL	GH1	Slotting	-	-	-	-	0,13 - 0,22	0,13 - 0,22	0,13 - 0,20	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page A285.

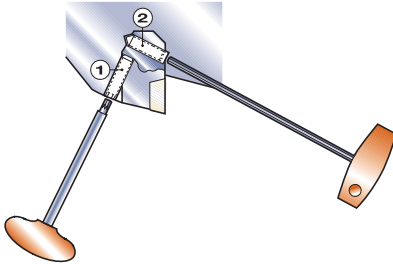


Speed v_c (m/min)														
7220VM Series			Wear Resistance											
			- ← → +											
			Speed min. - max.											
Coolant Recommendation														
Recommended ● Possible ◎														
ISO	Materials	Rm and Hardness	PVD X Grade		CVD X Grade		PVD Standard		PVD Standard		CVD Standard		Uncoated Micrograin	
			●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
P	Unalloyed Steel	<600 N/mm ² <180 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		<950 N/mm ² <280 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		950-1200 N/mm ² 280-355 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
M	Stainless Steel	Austenitic + Ferritic 300 series	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Martensitic 400 series	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
	PH Stainless	Refractory P.H.	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
			●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
K	Cast Iron	Grey GG-Fl	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Spheroidal-Ductile GGG-FGS	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Malleable GTS - MN/MP	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
			●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Aluminium + Silicon > 16% Si 92 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
S	High Temperature Alloys	Iron Based	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Cobalt Based	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Nickel Based	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Titanium Based	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎
		Chilled Cast Iron >1400 N/mm ² > 400 HBN	●	◎	●	◎	●	◎	●	◎	●	◎	●	◎





“A” Adjusting 7220VM11 with Adjusting Screw



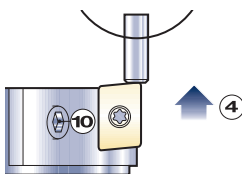
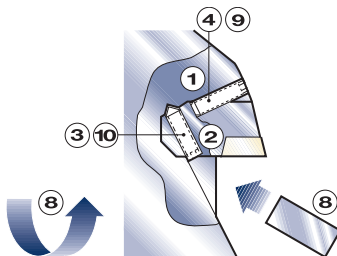
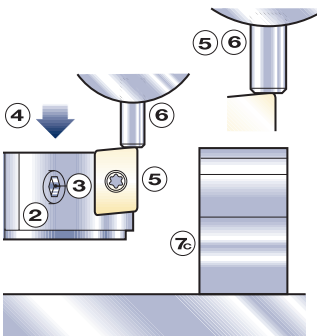
1. Mount the cutter body on the pre-setter.
2. Before mounting the cartridge into the cutter body seat, turn back adjustment screw No. 2 of the first cartridge.
3. Gently loosen fixing screw No. 1. Then fit this cartridge into the seat and push the cartridge downwards.
4. Mount the insert on the cartridge to be adjusted

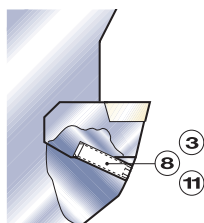
IMPORTANT!

Be sure to use a RH insert on a right cartridge and LH insert on a left cartridge; to do this it is sufficient to ensure that the wiper edge is positioned laterally on the outer side of the tool.

5. Re-tighten, but do not lock screw No.1
6. Turn adjustment screw No.2 to move the cartridge so that the wiper edge reaches the reticle of the previously set up with of cut on the pre-setter.
7. Lock screw No.1; in doing so the cartridge will tend to move by about 0,01mm up or down. Having again unlocked screw No.1 repeat the mounting instruction point 6, talking account of the value and direction of the observed displacement. In this way the final locking of the cartridge will tend towards the required zero reading.
8. It is recommended to adjust all cartridges on one side first and afterwards the cartridges on the opposite side.
9. Repeat point 2 to 7 until all cartridges are mounted and adjusted.
10. Proceed with a final checking and be sure to lock the fixing screw No.1 on all cartridges.
11. Gently re-tighten the adjustment screw No.2 against the bottom of the seat.

***NOTE:** “Half-side” cutters, with non-staggered teeth, need only be adjusted on one side.

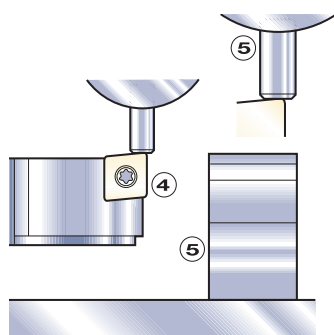



“B” Adjusting 7220VM 04, 06 & 08 Cutters without Adjusting Screw


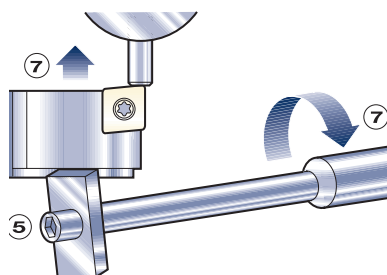
1. Mount the cutter body on the pre-setter.
2. Gently loosen fixing screw No. 1. Then fit this cartridge into the seat and push the cartridge downwards.
3. Mount the insert on the cartridge to be adjusted.

IMPORTANT!

Be sure to use a RH insert on a right cartridge and LH insert on a left cartridge; to do this it is sufficient to ensure that the wiper edge is positioned laterally on the outer side of the tool.



4. Re-tighten, but do not lock screw No.1.
5. Move the cartridge by using the blunt end of the screw driver and tap lightly the side of the cartridge so that the wiper edge reaches the reticle of the previously set up with of cut on the pre-setter.
6. Tighten the fixing screw No.1 of the cartridge but do not lock completely, while making sure that the dial hand remains on the pre-set mark.
7. It is recommended to adjust all cartridges on one side first and afterwards the cartridges on the opposite side.
8. Repeat point 2 to 6 until all cartridges are mounted and adjusted.
9. Proceed with a final checking and be sure to lock the fixing screw No.1 on all cartridges.



***NOTE:** “Half-side” cutters, with non-staggered teeth, need only be adjusted on one side.



Calculation of the average chip thickness in relation with the a_e (Radial Engagement)

Formula: Programme Feed Rate (f_z)

$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness

a_e = Radial engagement

f_z = Feed per tooth

d = Cutter diameter

Formula: Average Chip Thickness (h_m)

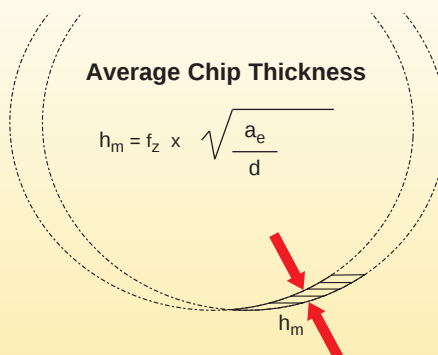
$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

7220VM Technical Information

Important

For a given f_z (mm/tooth) feed rate, **the thickness of the chip h_m** (effective feed rate per tooth) **decreases with the radial depth of cut a_e** .

It is imperative that this parameter be taken into account when selecting the machine feed rate, calculated in accordance with the formula above:




ISO Grade Classification

Groups	Materials	Code	Uncoated		Cermet		CVD				PVD						Code
			GH1	GH2	SA9608	SA9808	SC3025	SC6525	MP91M	X500	SP1019	SP4019	SP6519	X700	X400	SP5419	
			Uncoated	Uncoated	Uncoated	Uncoated	TiN-TiCN-Al ₂ O ₃	TiN-TiCN-Al ₂ O ₃	TiN-MT-TiCN-Al ₂ O ₃	TiN-TiC-TiN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	
	Unalloyed and Alloyed Steel	P01			SA9608						SP1019						P01
		P05				SA9808											P05
		P10						SC6525									P10
		P15							MP91M			SP4019					P15
		P20											SP6519				P20
		P25															P25
		P30								X500						X400	P30
		P35															P35
		P40														SP5419	P40
		P45															P45
P50															P50		
	Stainless Steels	M01			SA9608												M01
		M05				SA9808					SP1019						M05
		M10										SP4019					M10
		M15															M15
		M20											SP6519	X700			M20
		M25															M25
		M30								X500							M30
		M35															M35
		M40															M40
		M40															M40
	Cast Irons	K01															K01
		K05			SA9608												K05
		K10	GH1			SA9808		SC3025	SC6525		MP91M		SP1019				K10
		K15															K15
		K20		GH2									SP4019				K20
		K25												SP6519			K25
		K30									X500						K30
		K35															K35
		K40															K40
		K40															K40
	Aluminum & Alloys	N01	GH1														N01
		N05										SP1019					N05
		N10											SP4019				N10
		N15		GH2													N15
		N20															N20
		N25															N25
		N30															N30
		N30															N30
	High Temperature Alloys	S01			SA9608						SP1019						S01
		S05											SP4019				S05
		S10															S10
		S15												SP6519			S15
		S20													X700		S20
		S25									X500						S25
		S30															S30
		S30															S30
	Hard Materials	H01															H01
		H05										SP1019					H05
		H10															H10
		H15															H15
		H20								MP91M			SP4019				H20
		H25														X400	H25
		H30															H30
		H30															H30
			GH1	GH2	SA9608	SA9808	SC3025	SC6525	MP91M	X500	SP1019	SP4019	SP6519	X700	X400	SP5419	

Increasing - wear resistance - Increasing cutting speed

Increasing - shock resistance - Increasing - feed

Technical

Cutting ConditionsSpeed v_c (m/min)**Speed v_c (m/min)**

Wear Resistance

-

+

For all Families

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ○

ISO	Materials	Rm and Hardness	SP5419	X400	X500	X700	SP6519	GH2	SP4019
P	Unalloyed Steel	<600 N/mm ² <180 HBN	115 - 205	120 - 260	130 - 270		130 - 295		140 - 315
		<950 N/mm ² <280 HBN	105 - 185	105 - 230	115 - 240		115 - 260		120 - 275
	Alloyed Steel	700-950 N/mm ² 200-280 HBN	90 - 160	95 - 200	100 - 210		100 - 230		105 - 245
		950-1200 N/mm ² 280-355 HBN	70 - 120	70 - 150	75 - 160		75 - 175		80 - 190
		1200-1400 N/mm ² 355-415 HBN	45 - 80	45 - 95	50 - 100		50 - 110		50 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series			115 - 250	115 - 260	115 - 270		120 - 280
		Martensitic 400 series			100 - 220	105 - 230	105 - 235		110 - 250
	PH Stainless	Refractory P.H.			50 - 110	50 - 115	50 - 120		50 - 130
K	Cast Iron	Grey GG-Ft			120 - 280		140 - 295	120 - 250	145 - 330
		Spheroidal-Ductile GGG-FGS			105 - 205		110 - 240	105 - 215	115 - 255
		Malleable GTS - MN/MP			95 - 170		100 - 220	100 - 185	105 - 235
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN						400 - 2745	400 - 2895
		Aluminium + Silicon > 16% Si 92 HBN						295 - 2135	295 - 2320
S	High Temperature Alloys	Iron Based			23 - 48	23 - 52	23 - 55		24 - 63
		Cobalt Based			21 - 44	22 - 46	22 - 48		23 - 52
		Nickel Based			24 - 51	25 - 53	25 - 55		26 - 59
		Titanium Based			35 - 73	36 - 75	36 - 79		37 - 84
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		45 - 95					50 - 100
		Chilled Cast Iron >1400 N/mm ² > 400 HBN		35 - 80					40 - 90

Technical



Speed v_c (m/min)																							
For all Families			Wear Resistance																				
			-  +																				
			Speed min. - max.																				
Coolant Recommendation																							
Recommended ● Possible ◎																							
ISO	Materials	Rm and Hardness			CVD Standard			CVD Standard			CVD Standard			Uncoated Micrograin			PVD Micrograin			Uncoated Cermet			Uncoated Cermet
					MP91M			SC6525			SC3025			GH1*			SP1019			SA9808			SA9608
P	Unalloyed Steel	<600 N/mm ² <180 HBN		●	140 - 345		◎	●	140 - 370				●	240 - 345		●	225 - 380		●	240 - 345		●	265 - 380
		<950 N/mm ² <280 HBN			120 - 305			120 - 325				●	215 - 305		●	200 - 335		●	215 - 305		●	235 - 335	
	Alloyed Steel	700-950 N/mm ² 200-280 HBN		●	105 - 270		◎	●	105 - 290				●	190 - 270		●	175 - 295		●	190 - 270		●	205 - 295
		950-1200 N/mm ² 280-355 HBN			80 - 205			80 - 210					●	140 - 205			130 - 225		●	140 - 205			155 - 225
		1200-1400 N/mm ² 355-415 HBN		●	50 - 130		●	50 - 140				●	90 - 130		●	85 - 145		●	90 - 130		●	100 - 145	
M	Stainless Steel	Austenitic + Ferritic 300 series										◎	●	215 - 305		◎	●	200 - 335			◎	●	235 - 335
		Martensitic 400 series									◎	●	195 - 275		◎	●	180 - 305			◎	●	215 - 305	
	PH Stainless	Refractory P.H.										●	90 - 180		●	85 - 145				●		100 - 200	
K	Cast Iron	Grey GG-Fl			145 - 365			145 - 390			150 - 395			135 - 290			240 - 400						280 - 400
		Spheroidal-Ductile GGG-FGS		●	115 - 285		●	115 - 305		●	120 - 335	◎	●	120 - 245	◎	●	185 - 340				●		220 - 315
		Malleable GTS - MN/MP			105 - 260					105 - 275			115 - 200			170 - 285						200 - 285	
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●	400 - 3050		●	400 - 2745							
		Aluminium + Silicon > 16% Si 92 HBN												295 - 2440			295 - 2135						
S	High Temperature Alloys	Iron Based															40 - 67						50 - 75
		Cobalt Based													●		37 - 63				●		48 - 70
		Nickel Based															42 - 72						52 - 75
		Titanium Based															61 - 103						60 - 95
H	Hard Materials	Hard Steel >1400 N/mm ² >415 HBN		●	50 - 105											●	50 - 110						
		Chilled Cast Iron >1400 N/mm ² > 400 HBN			40 - 95													45 - 100					

Technical

* Note: Wiper Insert SPHX12M512EN GH1 can be used for Steel, Steel Alloys, Stainless Steel and Cast Iron.

* Note: All other GH1 Grade Inserts are only for Aluminium or Cast Iron depending on the selected Geometry.

**Speed-Spindle Rotation (rpm)**

$$n = \frac{V_c \times 1000}{D_c \times \pi}$$

Cutting Speed (m/min.)

$$V_c = \frac{D_c \times \pi \times n}{1000}$$

Feed Rate (mm/min.)

$$V_f = f_z \times Z \times n$$

Feed Per Tooth (mm/z)

$$f_z = \frac{V_f}{Z \times n}$$

Feed Per Revolution (mm/rev.)

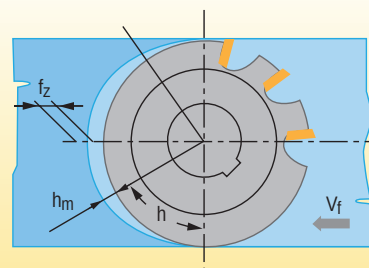
$$f_n = f_z \times Z$$

Metal Removal Rate (cm³/min.)

$$Q = \frac{a_e \times a_p \times V_f}{1000}$$

Medium Chip Thickness

$$h_m = f_z \times \sqrt{\frac{a_e}{D_c}} \quad \text{or} \quad f_z = h_m \times \sqrt{\frac{D_c}{a_e}}$$

**Terminology**

n	Spindle speed	rpm
D _c	Cutting diameter	mm
a _p	Cut depth	mm
a _e	Cut width	mm
Z	No. of teeth	
V _c	Cutting speed	m/min
V _f	Feed rate	mm/min
f _z	Feed per tooth	mm/Z
f _n	Feed per revolution	mm/rev.
Q	Metal removal rate	cm ³ /min
h _m	Medium chip thickness	mm
π	Pi Symbol (3.1416)	pi



Feed Rate Compensation

V_f	feed rate of tool	[mm/min]
V_{fa}	feed rate of tool axis	[mm/min]
D_c	cutter diameter	[mm]
D_w	workpiece diameter	[mm]
n	rotation	[rpm]
f_z	feed per tooth	[mm/z]
Z	number of teeth	

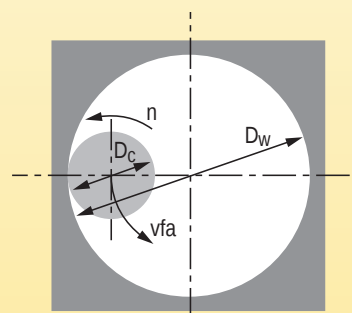
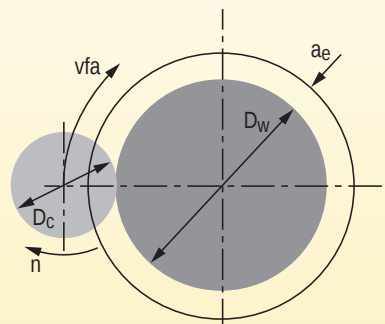
$$V_f = n \times f_z \times Z$$

External

$$V_{fa} = V_f \times \left(\frac{D_w + D_c}{D_w} \right)$$

Internal

$$V_{fa} = V_f \times \left(\frac{D_w - D_c}{D_w} \right)$$



Hardness Conversions

Technical Information



Brinell	Rockwell		Vickers	Tensile Strength	
HBN Hardness	HRC Hardness	HRB Hardness	HV Hardness	Rm Tensile Strength	Rm Tensile Strength
Brinell 3000 Kgf	Diamond penetrator	Ball 1/16"	Vickers 30	N / mm ² MPa	KSI
92	-	49	-	320	46
94	-	51	-	330	48
-	-	54	-	-	-
100	-	55	100	340	49
101	-	56	101	-	-
103	-	57	103	350	51
104	-	58	104	-	-
106	-	59	106	360	52
107	-	60	107	-	-
108	-	61	108	-	-
110	-	62	110	370	54
112	-	63	112	-	-
114	-	64	114	-	-
116	-	65	116	385	56
117	-	66	117	395	57
119	-	67	119	400	58
121	-	68	121	405	59
123	-	69	123	415	60
125	-	70	125	420	61
127	-	71	127	425	62
130	-	72	130	435	63
132	-	73	132	440	64
135	-	74	135	450	65
137	-	75	137	455	66
139	-	76	139	460	67
141	-	77	141	470	68
144	-	78	144	475	69
147	-	79	147	485	70
150	-	80	150	495	72
153	-	81	153	505	73
156	-	82	156	530	77
159	-	83	159	550	80
162	-	84	162	560	81
165	-	85	165	565	82
169	-	86	169	570	83
172	-	87	172	580	84
176	-	88	176	590	86
180	-	89	180	605	88
185	-	90	185	615	89
190	-	91	190	620	90
195	-	92	195	635	92
200	-	93	200	650	94
205	-	94	205	675	98
210	-	95	210	690	100
216	-	96	216	705	102
222	-	97	222	715	104
228	-	98	228	750	109
234	-	99	234	785	114
240	-	100	240	800	116

Brinell	Rockwell		Vickers	Tensile Strength	
HBN Hardness	HRC Hardness	HRB Hardness	HV Hardness	Rm Tensile Strength	Rm Tensile Strength
Brinell 3000 Kgf	Diamond penetrator	Ball 1/16"	Vickers 30	N / mm ² MPa	KSI
226	20	-	238	760	110
231	21	-	243	770	112
237	22	-	248	790	115
243	23	-	254	810	117
247	24	-	260	820	119
253	25	-	266	850	123
258	26	-	272	860	125
264	27	-	279	880	128
271	28	-	286	900	131
279	29	-	294	930	135
286	30	-	302	950	138
294	31	-	310	970	141
301	32	-	318	1010	146
311	33	-	327	1050	149
319	34	-	336	1080	152
327	35	-	345	1110	157
336	36	-	354	1140	161
344	37	-	363	1140	165
353	38	-	372	1180	171
362	39	-	382	1220	177
371	40	-	392	1250	181
381	41	-	402	1300	189
390	42	-	412	1340	194
400	43	-	423	1390	202
409	44	-	434	1430	207
421	45	-	446	1480	215
432	46	-	458	1520	220
442	47	-	471	1580	229
455	48	-	484	1640	238
468	49	-	498	1700	247
482	50	-	513	1760	255
496	51	-	528	1820	264
512	52	-	544	1880	273
525	53	-	560	1950	283
543	54	-	577	2010	292
560	55	-	595	2070	300
577	56	-	613	2160	313
595	57	-	633	2240	325
615	58	-	653	2330	338
634	59	-	674	2420	351
654	60	-	697	-	-
670	61	-	720	-	-
688	62	-	746	-	-
706	63	-	772	-	-
722	64	-	800	-	-
739	65	-	832	-	-
-	66	-	865	-	-
-	67	-	900	-	-
-	68	-	940	-	-

HV = Vickers hardness
HBN = Brinell hardness

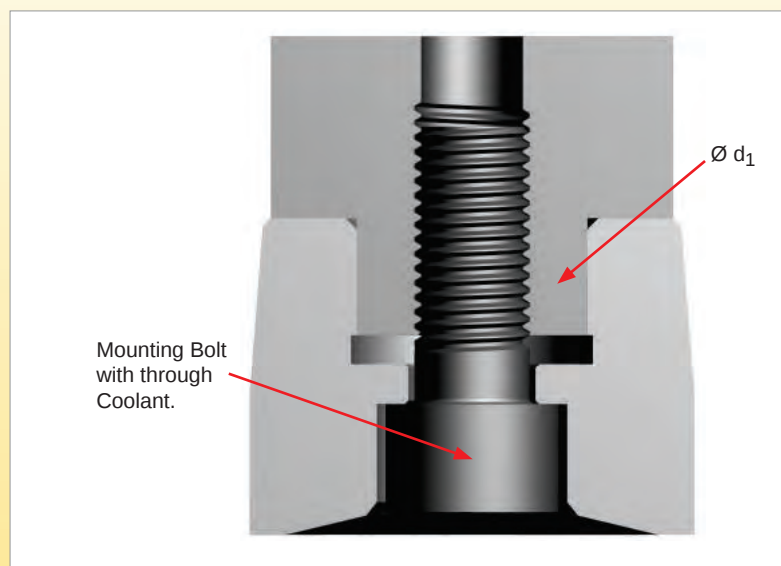
HRC = Rockwell hardness, C scale
HRB = Rockwell hardness, B scale



Mounting Bolts and Torque Values for Shell Mill Cutters

Replacement bolts for Metric Shell Mills, please use the chart below.

Chart is based on Bore Size of the Shell Mill Cutter



			**Torque Values in Nm	
EDP	Socket Head Cap Screw	Metric Bore d_1	Normal Condition	Excessive Condition
031297	M6-1x20 SHCS	13	10	12
031298	M8-1.25x25 SHCS	16	30	32
031299	M10-1.5x25 SHCS	22	50	60
031268	M12-1.75x30 SHCS	27	80	100
031269	M16-2x40 SHCS	32	110	150
031270	M20-2.5x50 SHCS	40	120	180

** Torque values for mounting bolts.

Excessive condition is when long reach extensions are required or when cutting parameters are elevated to extreme parameters.

Hex Keys

M6 = Hex Key Size 5
M8 = Hex Key Size 86
M10 = Hex Key Size 8
M12 = Hex Key Size 10
M16 = Hex Key Size 14
M20 = Hex Key Size 17