Stellram®
Cutting Tool Systems

MILLING

Cutting Tool Products

stellram.com

Increase productivity and reduce tooling costs in today's most challenging applications with machining solutions from Stellram Cutting Tool Systems.

We, as Stellram employees, are responsible for achieving customer satisfaction by continually improving processes, products, deliveries and services to ensure they meet or exceed customer requirements. We strive for zero defects in everything we do while promoting a safe work environment for all employees at work and at home.

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

Milling Solutions

This milling catalogue is your best source for a broad range of advanced indexable and solid carbide machining solutions. These “best in class” milling products include …

- A complete range of PVD and CVD “First Choice” insert grades featuring the advanced and patented X Grade™ Technology that provides up to 3 times the metal removal rate with no sacrifice in tool life and less risk of tool failure and expensive component damage.
- Geometries that also offer a “First Choice” range from rough to finish machining to meet the increasing demands for greater chip control.
- A comprehensive range of milling products to choose from: facing, slotting, contouring, profiling, ramping, pocketing, helical Interpolation, plunging and chamfering applications.
- A solid carbide end mill program that features XE, XER and RSM technologies specifically designed for machining high performance metals. Their advanced geometric designs featuring deep flutes and robust high helix cutting edges are the result of Stellram’ s continuous improvement programme in Aerospace machining.
- Application and customer service support from our sales engineers ready to address your on-site needs and backed by an experienced customer service team.

Rely on Stellram to achieve “Best in Class” machining solutions for your high performance milling applications.

Please contact us for additional information on any of the products illustrated in this catalogue or any other part of Stellram’s comprehensive tooling programme.

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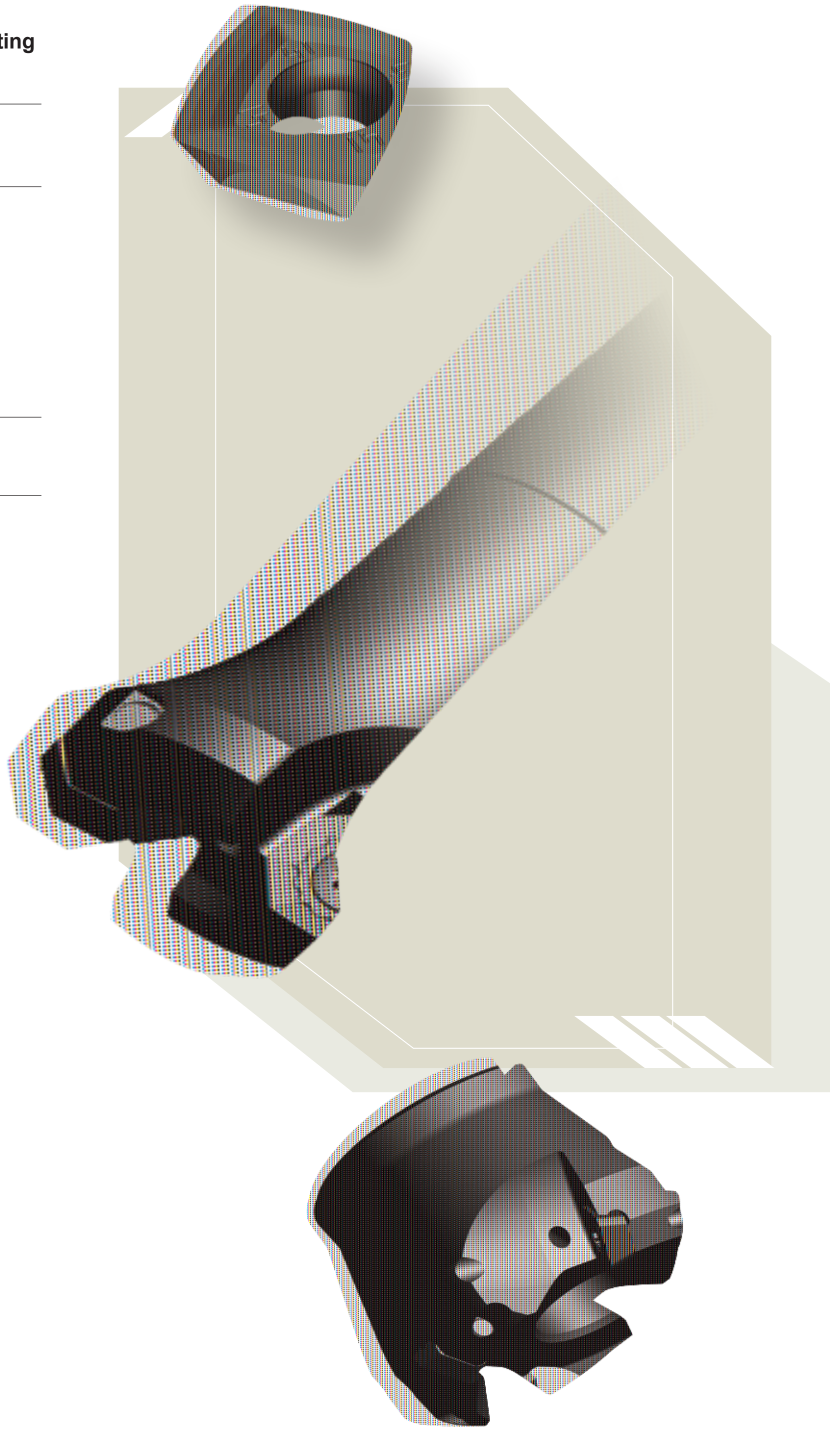

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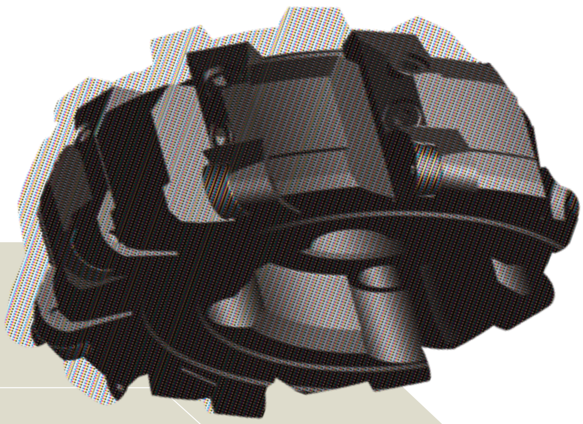

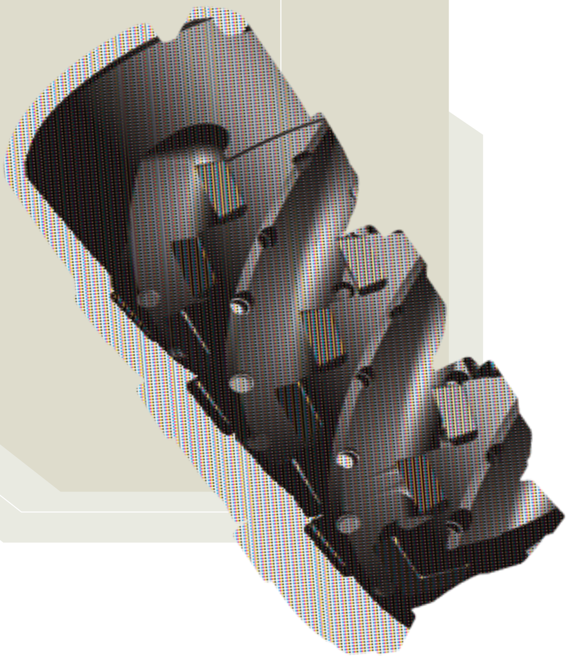

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This new Milling Selection Guide leads you easily to the tool selection and to the corresponding user information. 6 steps enable you to select the suitable cutter, insert geometry and grade in relation with recommended parameters for Feed and Speeds.

6 Step Tool Selection

1. Go to the ***Tool guide*** on pages 10 - 17. ***Select the milling family*** according to the application.

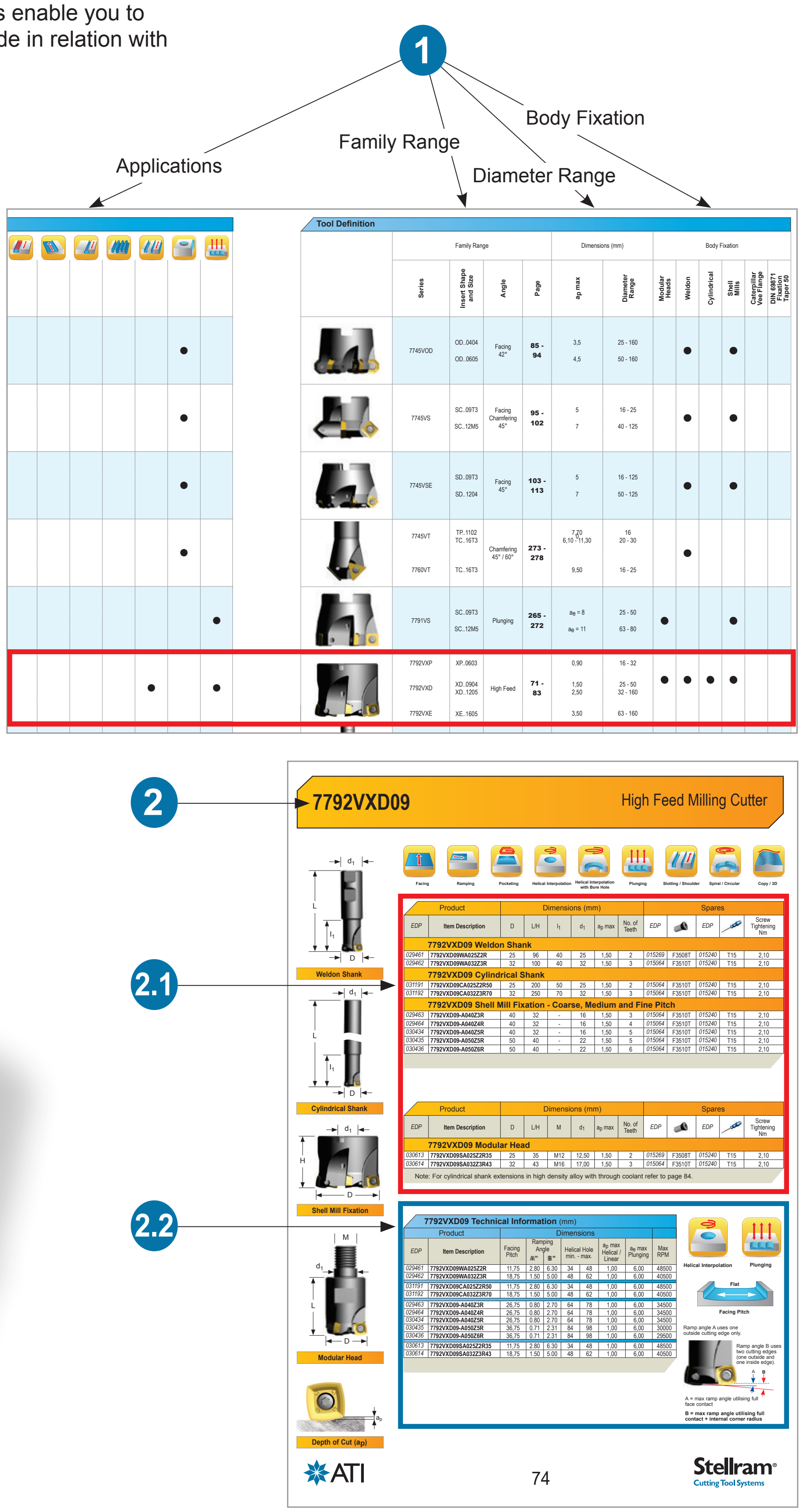
   Available diameters, body fixation and type of inserts can also be found. (7792VX family selected)

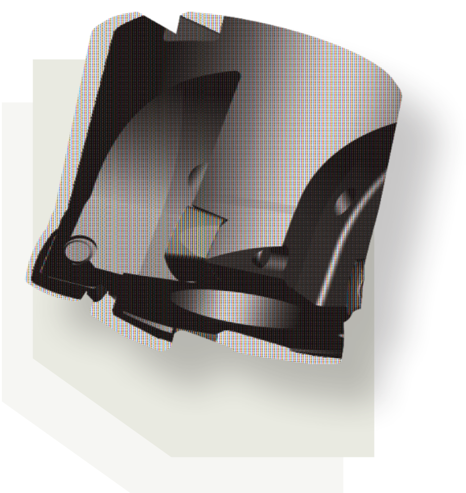
2. Go to the referred Family page with the ***entire product range*** and ***technical information***

   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





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.

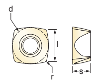
Symbol explanation:

◆ 1st choice: Excellent performance

■ 2nd choice: Good performance

● 3rd choice: Alternative option

7792VXD09   Milling Inserts & Recommended Feeds



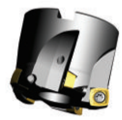
Product			Application & Material			Dimensions (mm)				
			Facing	Slotting	Plunging					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. 1,50	a_p max. 1,50	a_e max. 6,00	d (IC)	l	s	r	h_m min
029487	XDLW090408SR-D	X400				9,52	9,52	4,76	0,80	0,10
029485	XDLW090408SR-D	X500				9,52	9,52	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 9.

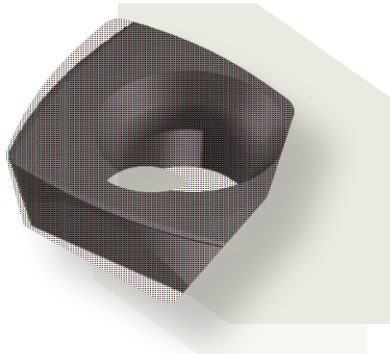
XDLW090408SR-D X500 should be used for Alloyed Steel and Stainless Steel with heavy scale.

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.



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



ISO Material designation:

Material Guide – Key to Recommended Inserts

Material Designation

P Unalloyed Steels	P Alloyed Steels	M Stainless Steels	M PH Stainless	K Cast Irons	N Aluminium & 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
XDLW090408**SR-D X400**
for **Facing** in **Alloyed Steel**
0,30 – 1,90 mm/tooth

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	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.
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	-	-

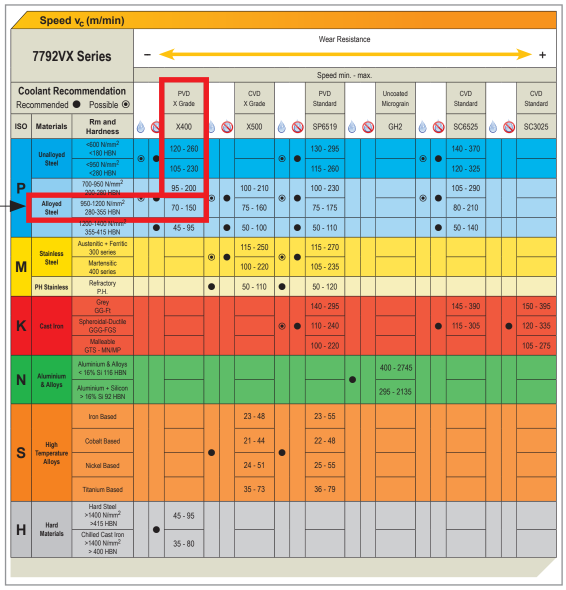
Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page 80.

6 Step Tool Selection *(continued)*

5 Select the recommended ***Cutting Speed (vc)*** and ***Coolant recommendations*** according to the material to be machined.

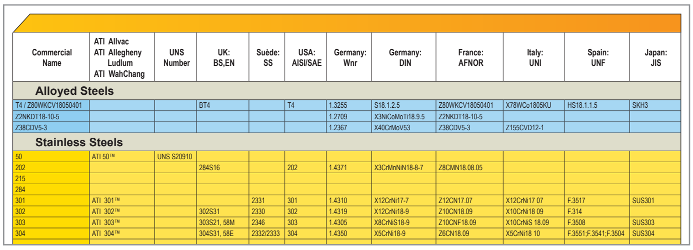
Example:
Speed range for XDLW090408SR-D ***X400*** for Facing in ***Alloyed Steel (Rm 950-1200 N/mm2 and 280-355 HBN)***
70 – 150 m/min



Speed v_c (m/min)

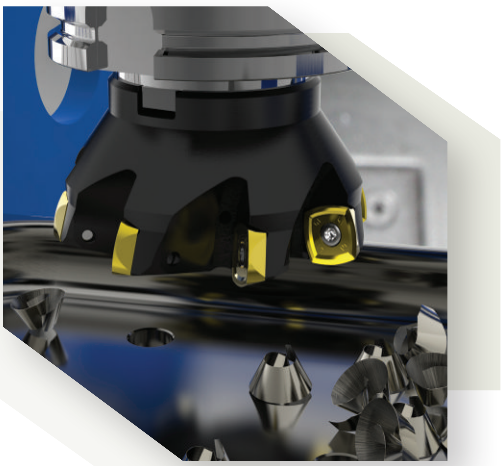
7792VX Series			Wear Resistance − → + (Speed min. - max.)															
Coolant Recommendation: Recommended ● Possible ⦿					PVD X Grade			CVD X Grade			PVD Standard			Uncoated Micrograin			CVD Standard			CVD Standard
ISO	Materials	Rm and Hardness	Wet	Dry	X400	Wet	Dry	X500	Wet	Dry	SP6519	Wet	Dry	GH2	Wet	Dry	SC6525	Wet	Dry	SC3025
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	120 - 260				⦿	●	130 - 295				⦿	●	140 - 370			
P	Unalloyed Steel	<950 N/mm² <280 HBN			105 - 230						115 - 260						120 - 325			
P		700-950 N/mm² 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230				⦿	●	105 - 290			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 210			
P		1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 140			
M	Stainless Steel	Austenitic + Ferritic 300 series				⦿	●	115 - 250	⦿	●	115 - 270									
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235									
M	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120									
K	Cast Iron	Grey GG-Ft							⦿	●	140 - 295					●	145 - 390		●	150 - 395
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240						115 - 305			120 - 335
K	Cast Iron	Malleable GTS - MN/MP									100 - 220									105 - 275
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2745						
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2135						
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55									
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48									
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55									
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79									
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		●	45 - 95															
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80															

Material specifications can be found in the Materials Reference Charts page 406 - 439.



Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Suède: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Alloyed Steels											
T4 / Z80WKCV18050401			BT4		T4	1.3255	S18.1.2.5	Z80WKCV18050401	X78WCo1805KU	HS18.1.1.5	SKH3
Z2NKDT18-10-5						1.2709	X3NiCoMoTi18.9.5	Z2NKDT18-10-5			
Z38CDV5-3						1.2367	X40CrMoV53	Z38CDV5-3	Z155CVD12-1		
Stainless Steels											
50	ATI 50™	UNS S20910									
202			284S16		202	1.4371	X3CrMnNiN18-8-7	Z8CMN18.08.05			
215											
284											
301	ATI 301™			2331	301	1.4310	X12CrNi17-7	Z12CN17.07	X12CrNi17 07	F.3517	SUS301
302	ATI 302™		302S31	2330	302	1.4319	X12CrNi18-9	Z10CN18.09	X10CrNi18 09	F.314	
303	ATI 303™		303S21, 58M	2346	303	1.4305	X8CrNiS18-9	Z10CNF18.09	X10CrNiS 18.09	F.3508	SUS303
304	ATI 304™		304S31, 58E	2332/2333	304	1.4350	X5CrNi18-9	Z6CN18.09	X5CrNi18 10	F.3551;F.3541;F.3504	SUS304

6 ***Technical information*** can be found at the end of each selected family which contains calculation formulas, mounting instructions, etc…



7792VX Technical Information

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.

Round insert

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

Machining Materials Guide

Unalloyed Steels	P	
Alloyed Steels	P	P
Stainless Steels	M	
PH Stainless	M	M
Cast Irons	K	K
Aluminium & Alloys	N	N
High Temperature Alloys	S	S
Hard Materials (42-45 HRC)	H	H

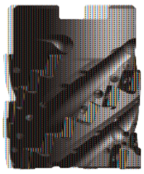
Material Guide – Key to Recommended Inserts

Material Designation							
P Unalloyed Steels	P Alloyed Steels	M Stainless Steels	M PH Stainless	K Cast Irons	N Aluminium & Alloys	S High Temp. Alloys	H Hard Materials

Application

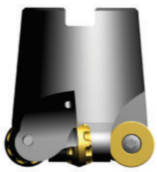
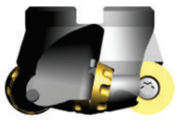
Facing	Shoulder / Profiling / Slotting	Ramping	Pocketing	Helical Interpolation	Helical Interpolation with Bore Hole	Copy / 3D	Spiral / Circular	Trochoidal	Shoulder / Profiling	T-Slotting	Contour Milling	Slotting Shoulder	Chamfering	Plunging
									●					
	●													
	●													
										●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

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°	**173 - 178**	57 68 - 77	32 80 - 100		●		●		
	5230VS	SD..09T3 SD..1204	Cheveron Long Edge Cutter (Porcupine) 90°	**179 - 190**	51 80 57 - 133	50 63 - 100				●		
	5315VA	AD..12T3 AP..1604	Long Edge Cutter (Porcupine) 90°	**191 - 202**	23 - 45 31 - 61	25 - 40 50 - 80		●		●		●
	5400VM	MP..0402 MP..0602 MP..0803 MP..1104	T-Slotting	**279 - 285**	8 - 9 11 14 18	18 - 21 25 32 40		●				
	5500V	RG.S 08, 10, 12 16, 20, 25	Finishing Ball Nose	**209 - 214**	0,4 - 12,1	8 - 25	●		●			
	5505VX	XP..1603, XP..20T3, XP..2504, XP..3206, XP..40T7, XP..50T7	Ball Nose	**203 - 208**	16 - 50	16 - 50	●	●	●			
	5702VZ	ZD..1403	Profiling Pocketing Shoulder 90°	**255 - 264**	12	20			●			

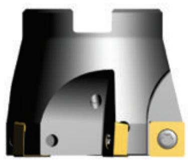
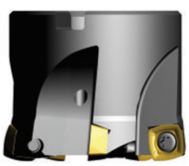
Application														
Facing	Shoulder / Profiling / Slotting	Ramping	Pocketing	Helical Interpolation	Helical Interpolation with Bore Hole	Copy / 3D	Spiral / Circular	Trochoidal	Shoulder / Profiling	T-Slotting	Contour Milling	Slotting Shoulder	Chamfering	Plunging
●	●	●	●	●	●	●	●							
										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

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**
	5720VZ	ZD..16M5	Profiling Pocketing Shoulder 90°	**255 - 264**	16	25 - 80	●		●	●		
	7220VM	MP..0402 MP..0602 MP..0803 MP..1104	Slotting Shoulder	**287 - 296**	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°	**53 - 70**	8 11 16	10 - 63 20 - 80 25 - 125	●	●	●	●		
	7700VR	RP..0602 RP..0803 RP..10T3	Copy Contour	**215 - 224**	3 4 5	14 - 20 16 - 32 20 - 32	●	●	●			
	7702VRD 7712VRD	RD..0702 RD..1003 RD..12T3 RD..1604	Copy Contour	**225 - 238**	3, 5 5 6 8	15 - 20 20 - 35 25 - 80 32 - 100	●	●		●		
	7710VRD20	RD..2006	Copy Contour	**239 - 244**	10	63 - 160				●		
	7713VR	RP..10T3 RP..1204	Copy Contour	**245 - 254**	5 6	20 - 63 25 - 80	●		●	●		

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°	**85 - 94**	3,5 4,5	25 - 160 50 - 160		●		●		
	7745VS	SC..09T3 SC..12M5	Facing Chamfering 45°	**95 - 102**	5 7	16 - 25 40 - 125		●		●		
	7745VSE	SD..09T3 SD..1204	Facing 45°	**103 - 113**	5 7	16 - 125 50 - 125		●		●		
	7745VT 7760VT	TP..1102 TC..16T3 TC..16T3	Chamfering 45° / 60°	**273 - 278**	7,70 6,10 - 11,30 9,50	16 20 - 30 16 - 25		●				
	7791VS	SC..09T3 SC..12M5	Plunging	**265 - 272**	a_e = 8 a_e = 11	25 - 50 63 - 80	●			●		
	7792VXP 7792VXD 7792VXE	XP..0603 XD..0904 XD..1205 XE..1605	High Feed	**71 - 83**	0,90 1,50 2,50 3,50	16 - 32 25 - 50 32 - 160 63 - 160	●	●	●	●		
	Tungsten Cylindrical Shank Extensions	-	-	**84**	-	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
	8000V-8010V Bodies	-	Facing	**115 - 118**	-	100 - 400				●		
	80.0VA90-_R-16 Assembly	AP..1604	Facing 90°	**119 - 124**	16	106 - 406				●		
	80.0VXD92-_R-12 Assembly 80.0VXD92-_R-16 Assembly	XD..1205 XE..1605	High Feed Facing	**125 - 132**	2,5 3,5	106 - 256				●		
	80.0VOD45-_R-04 Assembly 80.0VOD45-_R-06 Assembly	OD..0404 OD..0605	Facing	**133 - 142**	3,5 4,5	100 - 400				●		
	80.0VS45-_R-12 Assembly	SC..12M5	Facing	**143 - 148**	7	100 - 400				●		
	80.0VSE45-_R-12 Assembly	SD..1204	Facing	**149 - 156**	7	100 - 400				●		
	80.0VR00-_R-16 Assembly	RP..1606	Facing	**157 - 162**	8	116 - 416				●		
	80.0VRD00-_R-20 Assembly	RD..2006	Facing	**163 - 167**	10	116 - 416				●		

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

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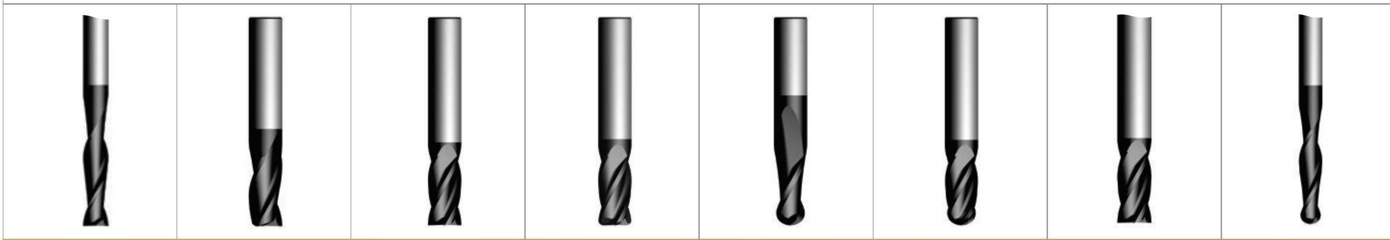
		Aerospace			Rapide© High Speed / High Performance Machining Series							
	Familiy Range	XE	XER	RSM	ERC	HE	HER	HB	HMR	HMN	EA	HPA
	Number of Flutes / Cutting Edges	4	4	6 - 8 - 10	3	4	4	2	6	6	2	2
	Length	Medium	Normal	Long	Normal/Long	Normal	Normal	Long	Normal	Normal	Normal	Normal
	Corner style	Radius			Chamfer	Sharp	Radius	Ball Nose	Radius	Sharp	Sharp	Sharp
	Helix angle	35° - 38°			45°	30°	30°	30°	45°	50°	30°	55°
	Coating	PVD		Uncoated	PVD						Uncoated	
	Shank Style	HA Cylindrical			HA Cylindrical							
	Manufacturing Standards	ATI	DIN³	ATI	DIN³ / ATI	ATI	ATI	ATI	ATI	ATI	ATI	ATI
mm	Diameter Range mm	2,00 - 20,00	2,00 - 20,00	10,00 - 25,00	3,00 - 20,00	2,00 - 16,00	6,00 - 12,00	3,00 - 12,00	3,00 - 20,00	6,00 - 20,00	2,00 - 20,00	3,00 - 20,00
	Page	**311 - 315**	**311 - 315**	**317 - 320**	**322 - 324**	**325 - 327**	**328 - 330**	**331 - 333**	**334 - 338**	**339 - 341**	**342 - 344**	**345 - 347**
General Application	Slotting - Square Ended	◆◆◆◆	◆◆◆◆		◆◆◆◆ ◆◆◆	◆◆◆	◆◆◆		◆◆◆◆◆	◆◆◆	◆	◆
	Slotting - Ball Nosed							◆◆◆◆				
	Shoulder Milling - Square Ended	◆◆◆◆	◆◆◆◆	◆	◆◆◆◆ ◆◆◆	◆◆◆	◆◆◆		◆◆◆◆◆		◆	◆
	Shoulder Milling - Ball Nosed							◆◆◆◆				
Tool Path Strategy	Pocketing	◆◆◆◆	◆◆◆◆		◆◆◆◆ ◆◆◆	◆◆◆	◆◆◆	◆◆◆◆	◆◆◆◆◆		◆	◆
	Drilling				◆◆◆◆ ◆◆◆						◆	◆
	Helical Interpolation	◆◆◆◆	◆◆◆◆		◆◆◆◆ ◆◆◆						◆	◆
	Ramping				◆◆◆◆ ◆◆◆						◆	◆
	Copy / 3D							◆◆◆◆				
	Facing	◆◆◆◆	◆◆◆◆	◆	◆◆◆◆ ◆◆◆	◆◆◆	◆◆◆		◆◆◆◆◆	◆◆◆	◆	◆
	Trochoidal	◆◆◆◆	◆◆◆◆		◆◆◆◆ ◆◆◆	◆◆◆	◆◆◆		◆◆◆◆◆	◆◆◆	◆	◆

Note: DIN¹ = DIN6535, DIN² = DIN6527L, DIN³ = DIN6535 and DIN 6527L.

General Purpose Milling Series



E			ER	B		E	B
2	3	4	4	2	4	4	2
Normal			Normal	Normal		Long	Long / X-Long
Sharp			Radius	Ball Nose		Sharp	Ball Nose
30°			30°	30°		30°	30°
PVD			PVD	PVD		PVD	PVD
HA Cylindrical			HA Cylindrical	HA Cylindrical		HA Cylindrical	HA Cylindrical
ATI			ATI	ATI		ATI	DIN 6535 / ATI
3,00 - 20,00	3,00 - 20,00	3,00 - 20,00	3,00 - 16,00	3,00 - 20,00	3,00 - 12,00	6,00 - 16,00	4,00 - 12,00
350 - 352	**353 - 355**	**356 - 358**	**359 - 361**	**362 - 364**	**365 - 367**	**368 - 370**	**371 - 373**
◆◆◆◆◆◆	◆◆◆◆◆◆						
				◆◆◆◆◆◆			
◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆			◆◆◆◆◆◆	
				◆◆◆◆◆◆	◆◆◆◆◆◆		◆◆◆◆◆◆
◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆
◆◆◆◆◆◆	◆◆◆◆◆◆						
◆◆◆◆◆◆	◆◆◆◆◆◆						
◆◆◆◆◆◆	◆◆◆◆◆◆						
				◆◆◆◆◆◆	◆◆◆◆◆◆		◆◆◆◆◆◆
◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆				
◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆			◆◆◆◆◆◆	

Note: DIN¹ = DIN6535, DIN² = DIN6527L, DIN³ = DIN6535 and DIN 6527L.

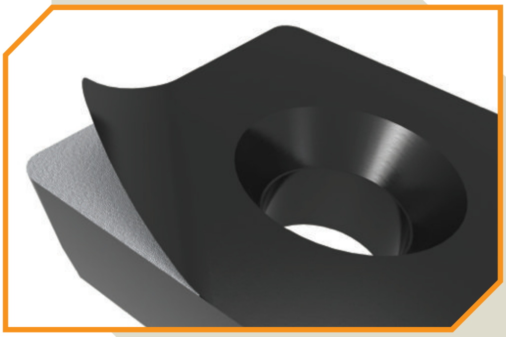
		Miniature Milling Series				
Familiy Range		E			B	
Number of Flutes / Cutting Edges		2	3	4	2	4
Length		Normal			Normal	
Corner style		Sharp			Ball Nose	
Helix angle		30°			30°	
Coating		PVD	PVD	PVD	PVD	PVD
Shank Style		HA Cylindrical			HA Cylindrical	
Manufacturing Standards		ATI			ATI	
mm Diameter Range mm		0,40 - 2,50	1,00 - 2,50	1,00 - 2,00	0,40 - 2,50	1,00 - 2,50
Page		**374 - 376**	**377 - 379**	**380 - 382**	**383 - 385**	**386 - 388**
General Application	Slotting - Square Ended	◆◆◆◆◆◆	◆◆◆◆◆◆			
	Slotting - Ball Nosed				◆◆◆◆◆◆	
	Shoulder Milling - Square Ended	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆		
	Shoulder Milling - Ball Nosed				◆◆◆◆◆◆	◆◆◆◆◆◆
Tool Path Strategy	Pocketing	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆	
	Drilling					
	Helical Interpolation	◆◆◆◆◆◆	◆◆◆◆◆◆			
	Ramping					
	Copy / 3D				◆◆◆◆◆◆	◆◆◆◆◆◆
	Facing					
	Trochoidal	◆◆◆◆◆◆	◆◆◆◆◆◆	◆◆◆◆◆◆		

Note: DIN¹ = DIN6535, DIN² = DIN6527L, DIN³ = DIN6535 and DIN 6527L.

Grade Descriptions

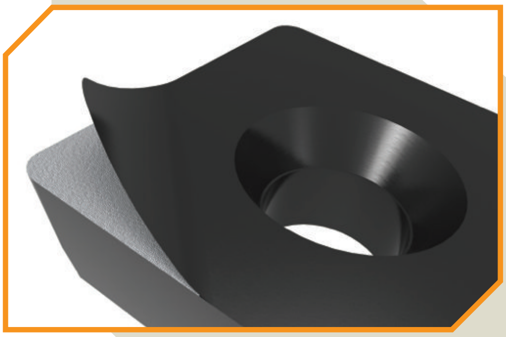
Grade descriptions are listed by toughness to most wear resistant.

SP5419



Coating Type: PVD, TiAIN
The combination of a tough substrate with a new generation of TiAIN 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.

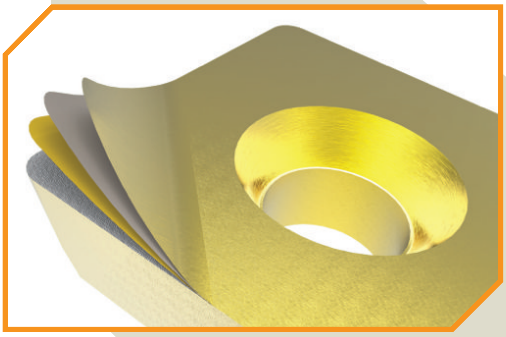
X400



Coating Type: PVD, TiAIN, 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).

US Patent # 7,244,5129 & EP 01786954B1

X500



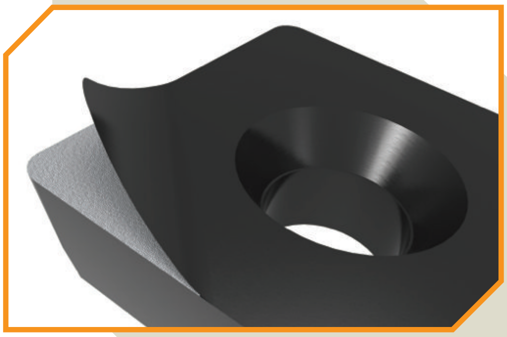
Coating Type: CVD, TiN-TiC-TiN, X-Grade™ Technology
This high performance premium grade with a high level of shock resistance. This unique grade operates at the low to medium cutting speeds and is capable of high metal removal rates, while retaining a secure cutting edge. First choice for Stainless Steel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

Grade Descriptions

X700

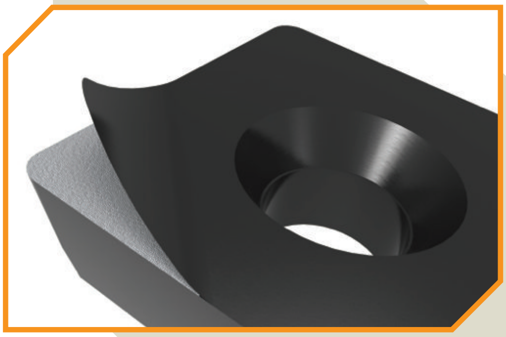
Coating Type: PVD, TiAIN, X-Grade™ Technology
This patented high performance premium carbide grade is the latest in the X-Grade™ Technology programme of coated milling inserts. It is designed for the toughest of applications in Nickel Based Alloys, Cobalt Based Alloys, Titanium and Titanium Alloys, as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

US Patent # 7,244,5129 & EP 01786954B1



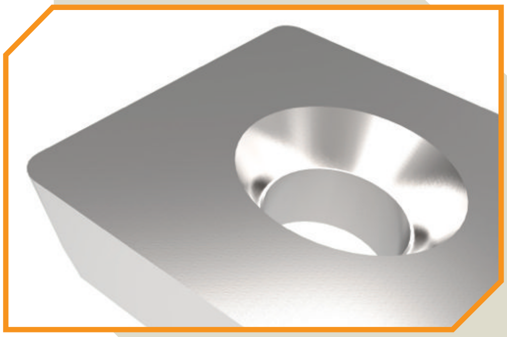
SP6519

Coating Type: PVD, TiAIN
The combination of a tough substrate with a new generation of TiAIN 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.

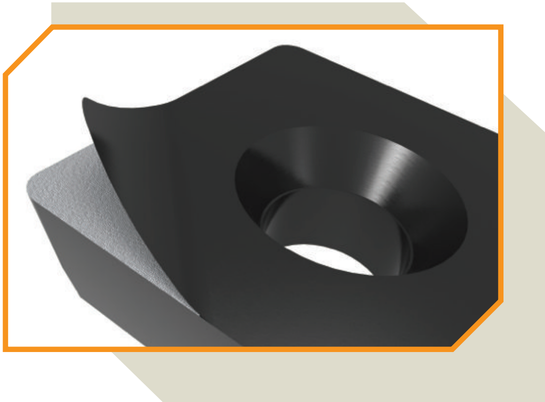


Grade Descriptions

SP4019

Coating Type - PVD TiAlN Micrograin

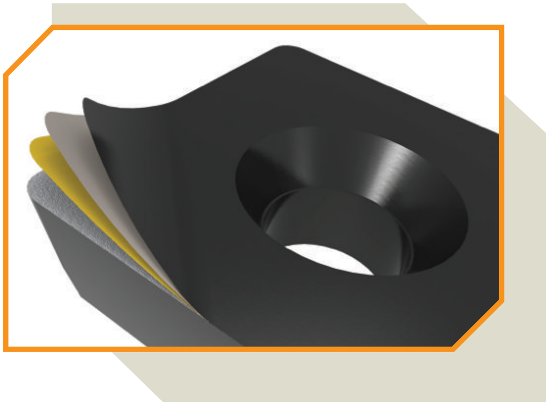
A hard grade for light roughing and finishing operations with lower chip sections. Principle applications are in Stainless Steels, High Temperature Alloys and Cast Irons. Can also be used in Steel, Steel Alloys and Hardened Steels.



MP91M

Coating Type: CVD, TiN-MT-TiCN-Al_2O_3

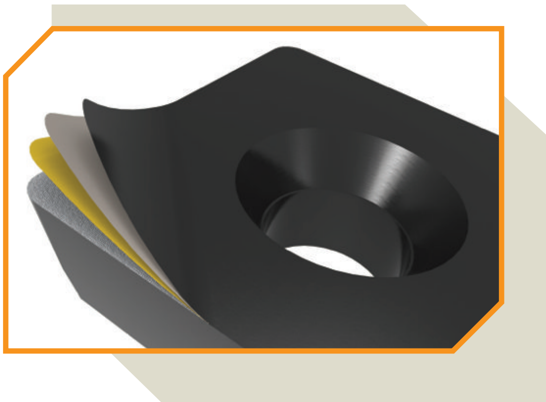
Primarily used on Steel, Steel Alloys and Cast Iron. Can also be used in Hardened Steels. With its aluminium oxide coating, this grade is recommended every time wear characteristics are more important than toughness.



SC6525

Coating Type: CVD, TiN-TiCN-Al_2O_3

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.

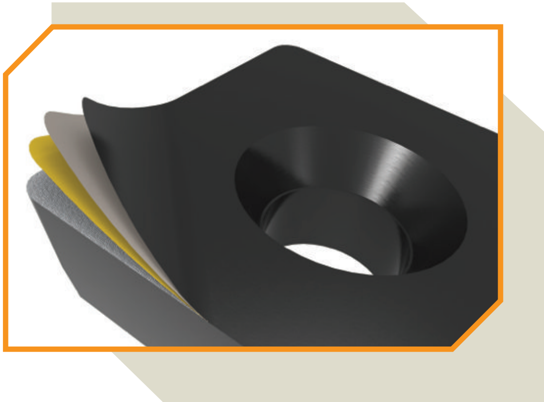


Grade Descriptions

SC3025

Coating Type: CVD, TiN - TiCN - Al_2O_3

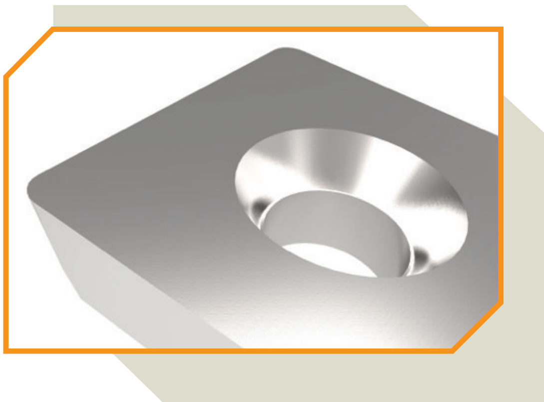
A high performance milling grade with multi-layer CVD coating designed to offer wear and abrasion resistance in Cast Iron materials.



GH1

Uncoated, Micrograin

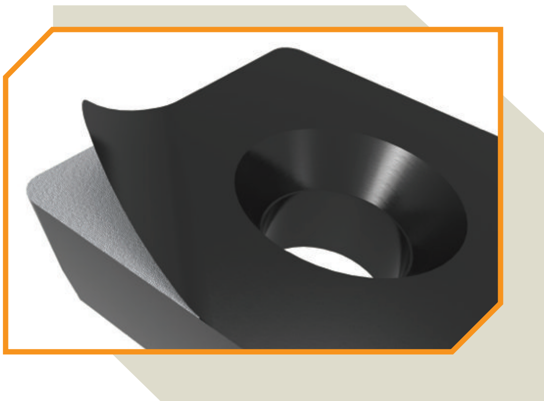
This micrograin grade is designed for use on Cast Irons, and also Bronzes, Aluminiums, Kevlar, etc. The grade GH1 works well with or without coolant with low cutting pressure at high speeds due to sharp cutting edge.



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.

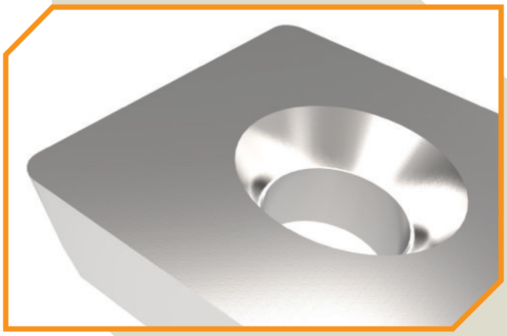


Grade Descriptions

SA9808

Uncoated Cermet (TiCN)

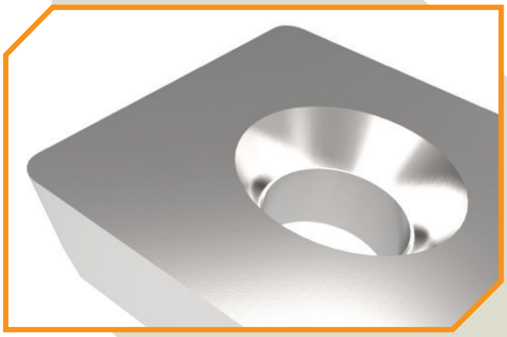
Uncoated Cermet for applications with limited interruptions. Excellent thermal conductivity and wear resistance, providing an excellent surface finish. For finish face milling of Steel, Steel Alloys, Stainless Steels and Cast Irons.



SA9608

Uncoated, Cermet (TiCN)

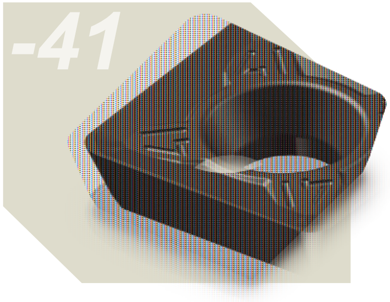
Uncoated Cermet for finishing applications. Excellent thermal conductivity and wear resistance, providing an excellent surface finish. For finish face milling of Steel, Steel Alloys, Stainless Steel, Cast Irons and High Temperature Alloys with wiper insert SPHX12M512EN.



Cutting Geometries

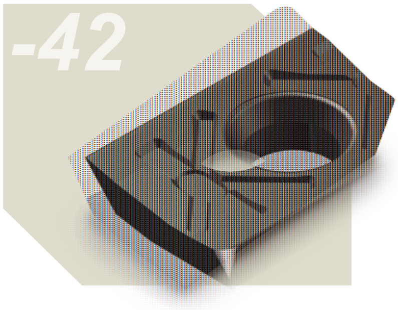
-41

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.



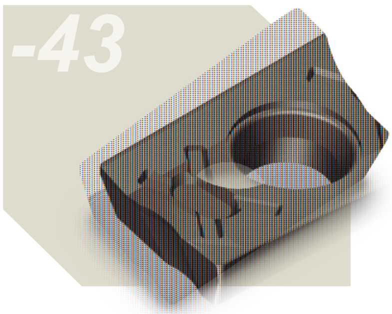
-42

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.



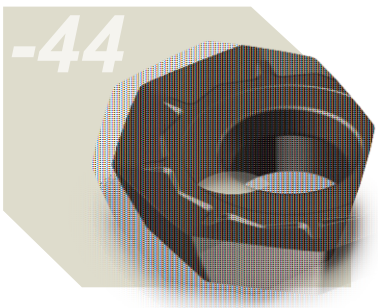
-43

This is a general purpose geometry designed to handle tough conditions and interruped 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

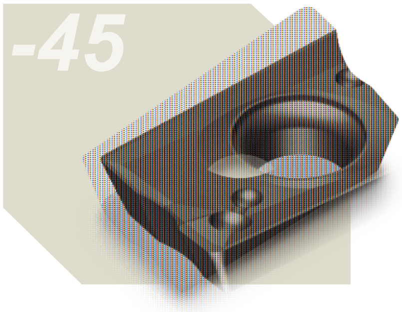
This geometry is peripheral ground with a ground facet for producing the best surface quality in most materials while reducing cutting pressure and power consumption. For finishing applications in Steel, Steel Alloys, Stainless Steels, High Temperature Alloys and Cast Iron.



Cutting Geometries

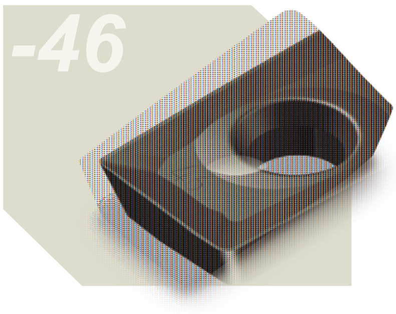
-45

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.



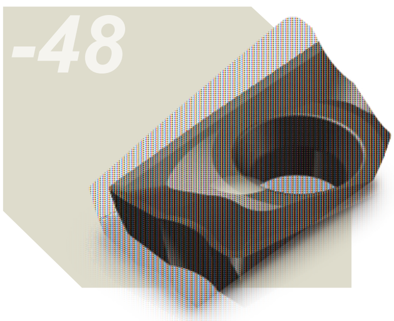
-46

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.



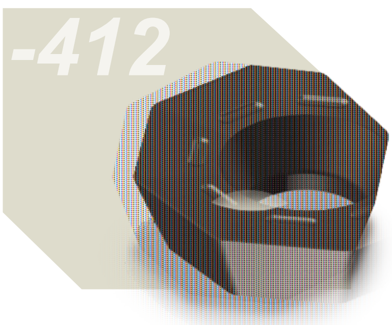
-48

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

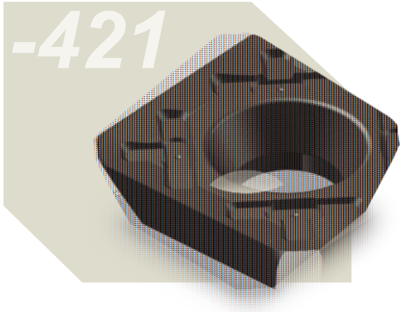
This high positive gometry is slightly more positive than the -41. This geometry improves tool life on several applications when machining Stainless Steel and High Temperature Alloys.



Cutting Geometries

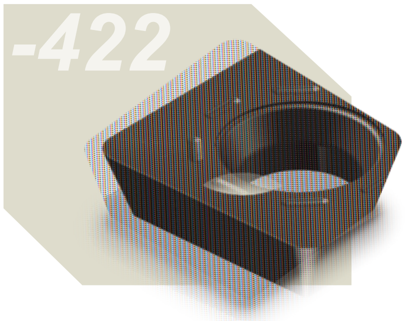
-421

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.



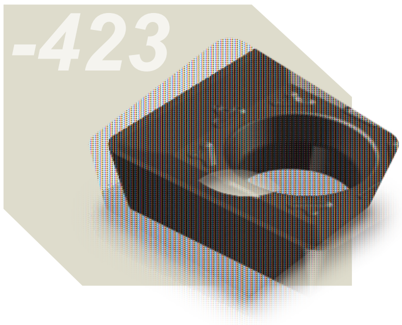
-422

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.



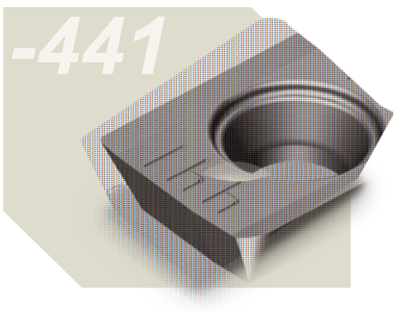
-423

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.



-441

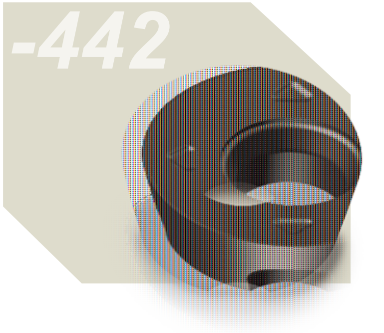
This geometry is a peripheral ground insert with a sharp cutting edge for use on Aluminium Alloys, Copper and Brass. The –441 geometry provides freer cutting operations and reduces the “suction effect” associated with higher helical geometries.



Cutting Geometries

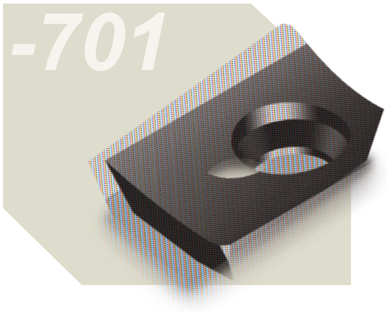
-442

This NEW positive geometry minimizes the pressure from the chip formation. Utilising an 11° chip angle and and "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.



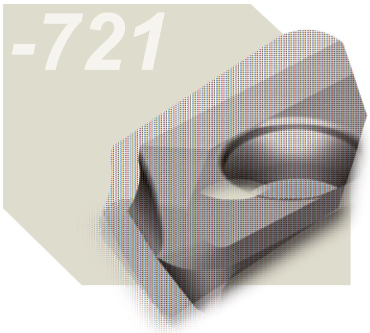
-701

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 particulary 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.



-721

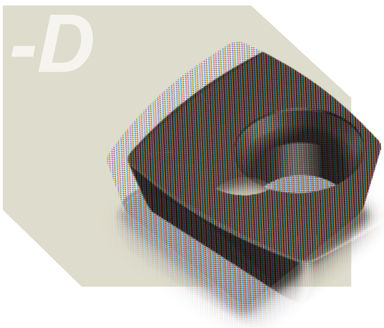
This geometry is periphery ground with a pressed, polished top rake face reducing built up edge. This economical geometry gives excellent results in machining Aluminium Alloys, Copper and Brass.



-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.

US Patent # 7,220,083 & EP1689548.

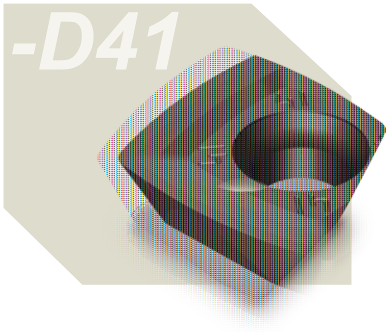


Cutting Geometries

-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 consumtion .

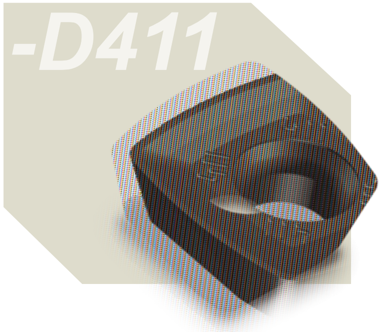
US Patent # 7,220,083 & EP1689548.



-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.

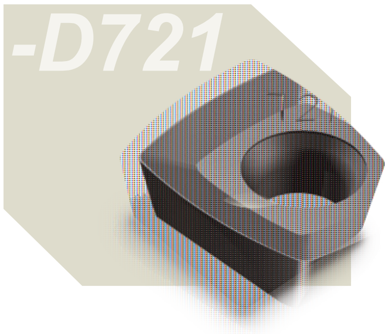
US Patent # 7,220,083 & EP1689548.



-D721

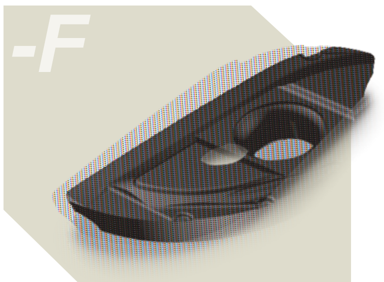
This highly positive High Feed geometry is designed for machining Aluminium, Copper and Brass. The periphery ground, polished top rake face and sharp edge allows a freer cutting action and reduces built-up edge.

US Patent # 7,220,083 & EP1689548.



-F

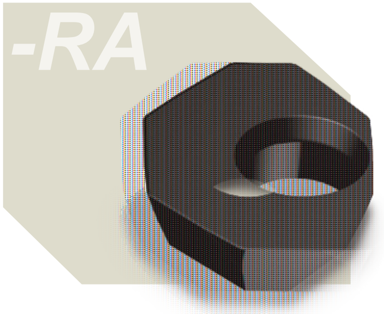
This geometry is a roughing ball nose fully ground insert for roughing and semi-finishing of all Materials except Aluminium. This geometry is designed with chip grooves for better chip control.



Cutting Geometries

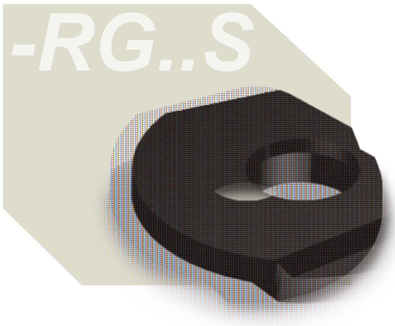
-RA

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.



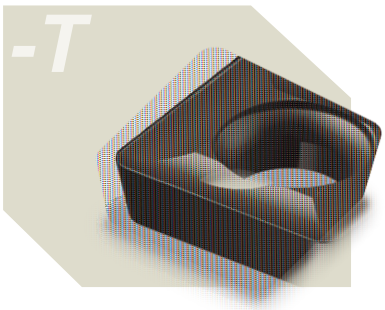
-RG..S

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.



-T

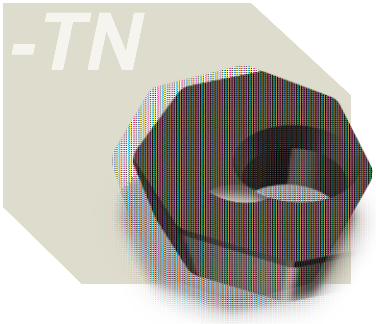
This geometry is for general purpose applications when a strong cutting and excellent chip breaking capibility is required. This geometry is found on a wide range of Stellram inserts. The design is nearly as tough as flat-top inserts. Mainly to be used when machining Steel, Steel Alloys, Cast Irons and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



Cutting Geometries

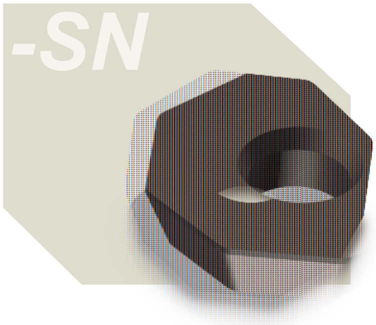
-TN

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.



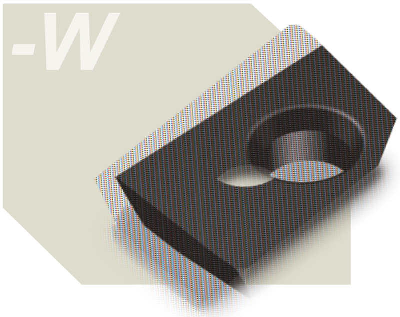
-SN

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.



-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.

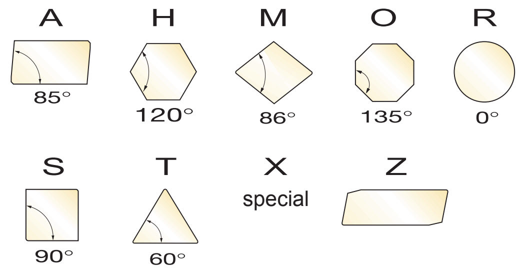


Insert ISO Designation

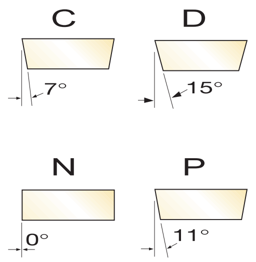
Metric

A	P	F	W	16
1	2	3	4	5

1 Shape

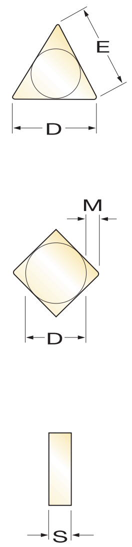


2 Clearance



Other normal clearances requiring **SPECIAL** specification Symbol O.

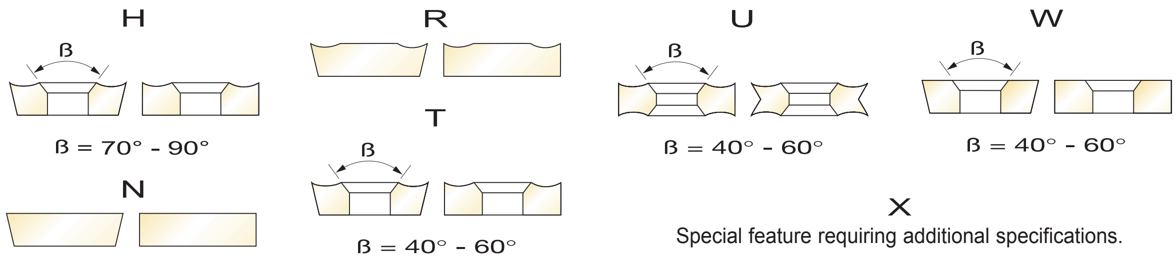
3 Tolerance



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



X

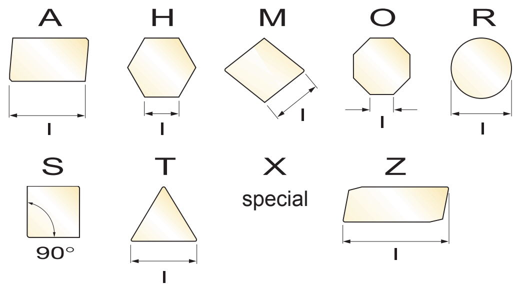
Special feature requiring additional specifications.

Insert ISO Designation

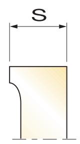
Metric

04	PD	T	R	-
6	7	8	9	10

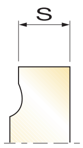
5 Size



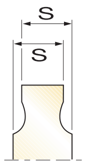
6 Thickness



02 = 2,38 mm
03 = 3,18 mm

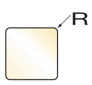


T3 = 3,97 mm
04 = 4,76 mm



M5 = 5,00 mm
05 = 5,56 mm
06 = 6,35 mm

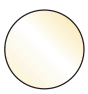
7 Corner



Rounded Corner Inserts

Value of corner radius given in 1/10 mm

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

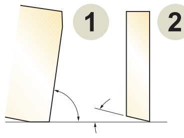


Rounded Inserts

Symbol = **00**
If the Ø is converted from an inch value.

Symbol = **M0**
If the Ø is converted from a metric value.

7 Corner *continued*



1 **2** **Inserts With Wiper Edges.**

Two Letter Symbol:

1 **For cutting edge angle** χ_r

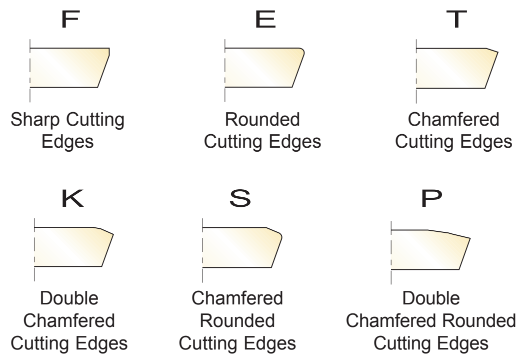
A = 45°
D = 60°
E = 75°
F = 85°
P = 90°

2 **For wiper edge normal clearance**

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

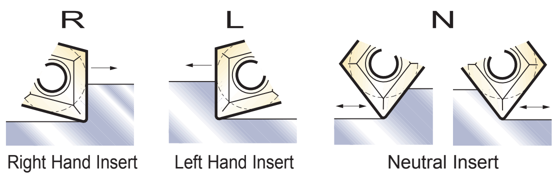
Z = Any other wiper edge clearance.

8 Edge Condition



OPTIONAL SYMBOL

9 Cutting Direction

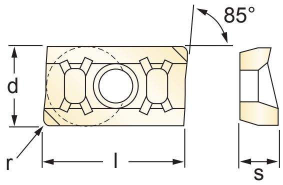


OPTIONAL SYMBOL

10 Optional

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

OPTIONAL SYMBOL



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h_m 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 χ 90° one face pressed chip-breaker

ADET_-48

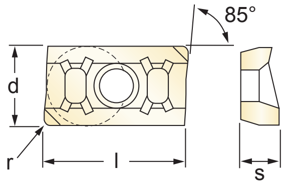
Ground circumference χ 90° one face pressed chip-breaker

ADET_-441

Ground circumference χ 90° one face pressed chip-breaker

ADGT_-721

Ground circumference χ 90° one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	**Item Description**	**Grade**	d (IC)	l	s	r	h_m 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
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
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
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

ADHT_-46

Ground circumference χ 90° one face pressed chip-breaker

ADKT_-43

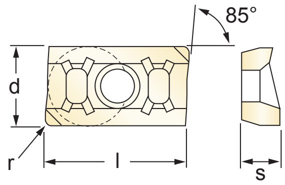
Ground wiper edges χ 90° one face pressed chip-breaker

ADKT_-45

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

APET_-42

Ground circumference χ 90° one face pressed chip-breaker



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 χ 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 χ 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 χ 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

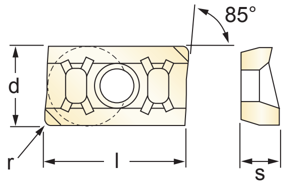
APHT_

Ground circumference χ 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 χ 90° one face pressed chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	h_m 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

APHT_-46

Ground circumference χ 90° one face pressed chip-breaker

017861	APKT1003PDFR-3M	GH1	6,68	10,50	3,18	Facet	0,05

APKT_-3M

Ground wiper edges χ 90° one face pressed 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

APKT_-43

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

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

APKT_-45

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

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

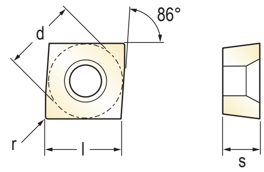
MPEX_-701

Completely ground χ 90° concave cutting face

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

MPFW_

Ground circumference χ 90° without chip-breaker



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

MPFW_

Ground circumference χ 90°
without chip-breaker

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

MPHT_-42

Ground circumference χ 90° one
face pressed chip-breaker

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

MPHW_

Ground circumference χ 90°
without chip-breaker

015180	MPMT060204EN-43	X500	6,35	6,35	2,38	0,40	0,04

MPMT_

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

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

ODET_-44

Ground circumference χ 42° one
face pressed chip-breaker

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

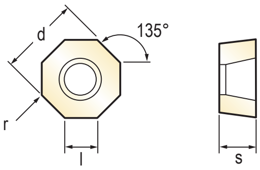
ODET_-441

Ground circumference χ 42° one
face pressed chip-breaker

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

ODEW_-RA

Ground circumference χ 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

ODMT_-41

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

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_-412

As pressed circumference χ 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 χ 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 χ 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

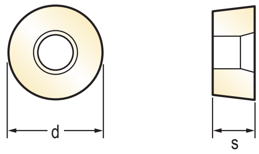
RDHT_-42

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



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

RDMW_

As pressed circumference without chip-breaker

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

RG..S_

Completely ground

034549	**RPET1204M0E-X4**	SP4019	12,00	-	4,76	6,00	0,03

RPET_

Ground circumference one face pressed chip-breaker

024755	**RPEW0602M0T**	X500	6,00	-	2,38	3,00	0,10

RPEW_

Ground circumference without chip-breaker

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

RPEX_-701

Completely ground concave cutting face

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

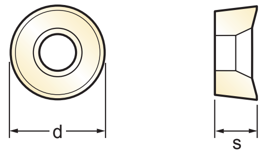
RPHT_

Ground circumference one face pressed chip-breaker

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

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
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
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

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_

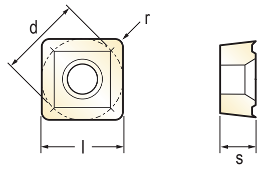
Ground circumference χ 45° one face pressed chip-breaker

SCHT_

Ground circumference χ 45° one face pressed chip-breaker

SCHT_-422

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



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

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

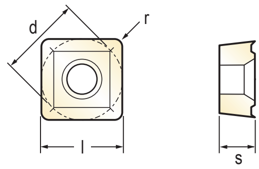
SDEX_-701

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 χ 45° one face pressed chip-breaker

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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

SDHT_-422

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

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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 χ 45° or 90° one face pressed chip-breaker

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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 χ 45° without chip-breaker

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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 χ 45° one face pressed chip-breaker

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
012470	SEHT1204AFER	MP91M	12,70	12,70	4,76	Facet	0,12
034670	SEHT1204AFER	SP6519	12,70	12,70	4,76	Facet	0,12

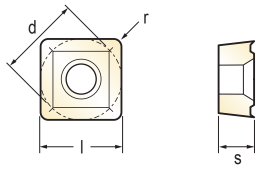
SEHT_

Ground circumference χ 45° one face pressed chip-breaker

EDP	Item Description	Grade	d (IC)	l	s	r	h_m min
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 χ 45° without chip-breaker



Product			Dimensions (mm)				
EDP	Item Description	Grade	d (IC)	l	s	r	hm 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

SEKN_

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

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

SEKR_

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

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

SEKT_-41

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

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

SEKT_-45

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

029693	SEMN1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,10

SEMN_

As pressed circumference without chip-breaker

029694	SEMR1203AFEN	MP91M	12,70	12,70	3,18	Facet	0,10

SEMR_

As pressed circumference one face pressed chip-breaker

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

SOMT_

As pressed circumference one face pressed chip-breaker

014413	SPEW060304SN	X500	6,35	6,35	3,18	0,40	0,15

SPEW_

Ground circumference without chip-breaker

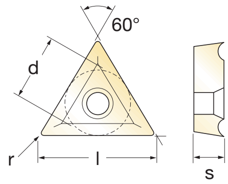
034674	SPGH120412E-2C	SP6519	12,70	12,10	4,76	1,20	0,04

SPGH_-2C

Ground circumference without chip-breaker

Alphabetical Index

SP - TP Milling Style Inserts



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 circumferenceone face 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

SPHX_

Ground circumference with ground chip-breaker–special wiper insert

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

SPKN_

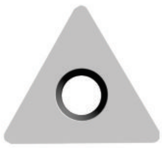
As pressed circumference χ 45° with ground facet without chip-breaker

011770	**SPUN190412E**	MP91M	19,05	19,05	4,76	1,20	0,05

SPUN_

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

017740	**TCHW2204PDTR**	GH1	12,70	22,00	4,76	Facet	0,10



TCHW_

Ground circumference with ground chip-breaker

034676	**TCLT16T3PPTR**	SP4019	9,52	16,50	3,97	Facet	0,15

TCLT_

As pressed circumference one face pressed chip-breaker

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

TCMT_

As pressed circumference one face pressed chip-breaker

034535	**TCMX16T308E-ZR**	SP4019	9,52	16,50	3,97	0,80	0,05

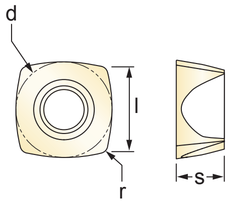
TCMX_-ZR

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

011340	**TPGN160308E**	MP91M	9,52	16,50	3,18	0,80	0,05

TPGN_

Ground circumference without chip-breaker



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

TPKN_

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

024947	**TPMT110204E-M**	X500	6,35	11,00	2,38	0,40	0,03

TPMT_-M

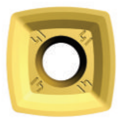
As pressed circumference one face pressed chip-breaker χ 45° and χ 60°.

012503	**TPUN220408E**	MP91M	12,70	22,00	4,76	0,80	0,05

TPUN_

As pressed circumference without chip-breaker

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



XDLT_-D41

Ground circumference one face pressed chip-breaker

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

XDLT_-D411

Ground circumference one face pressed chip-breaker

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

XDLT_-D721

Ground circumference one face pressed chip-breaker

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

XDLW_-D

Ground circumference without chip-breaker

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

XELT_-D41

Ground circumference one face pressed chip-breaker

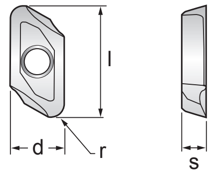
031292	**XELW160512SR-D**	SC3025	16,80	16,80	5,56	1,20	0,30
031291	**XELW160512SR-D**	X400	16,80	16,80	5,56	1,20	0,30

XELW_-D

Ground circumference without chip-breaker

Alphabetical Index

XP - ZD Milling Style Inserts



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

Nomenclature

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

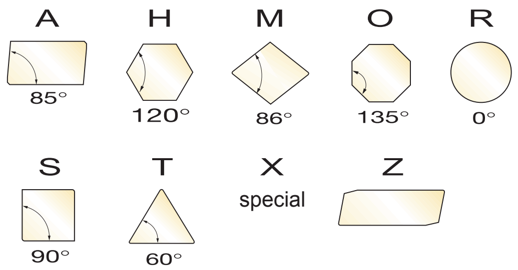
1 Series Type

Series Number 5720

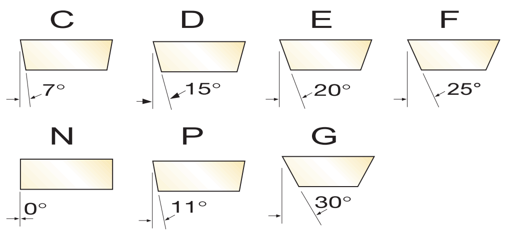
2 Insert Fixation

V = Screw

3 Insert Shape



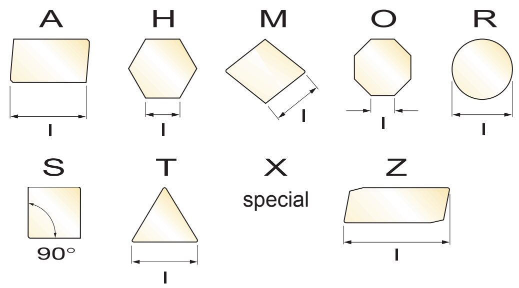
4 Insert Clearance Angle



Other normal clearances requiring **SPECIAL** specification Symbol O.

5 Insert Size

Insert Edge Length l = (mm).



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

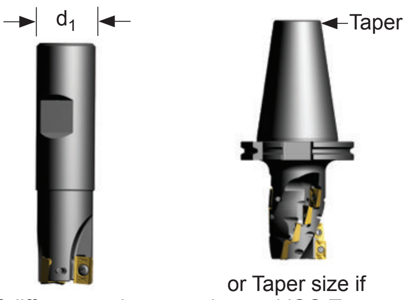
No "A" = without through tool coolant

Nomenclature

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

8 Shank Diameter

or ISO 50 Taper DIN 69871



If different to the cutting diameter D

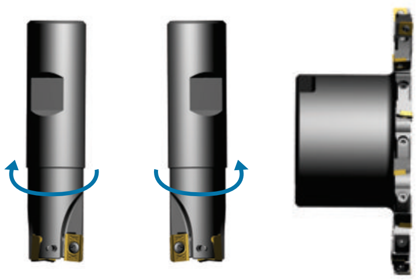
or Taper size if integral ISO Taper DIN 69871.

9 Cutting Diameter

10 Teeth

Z = number of teeth

11 Position

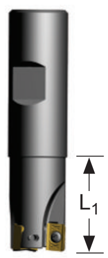


R Right Hand

L Left Hand

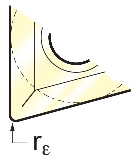
N Neutral Hand

12 Reach Length



13 Max. Insert Radius

In Metric



14 Assembly

R = Right hand
L = Left hand
N = Neutral

Milling

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

stellram.com

90 DEGREE CUTTERS
Stellram 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.

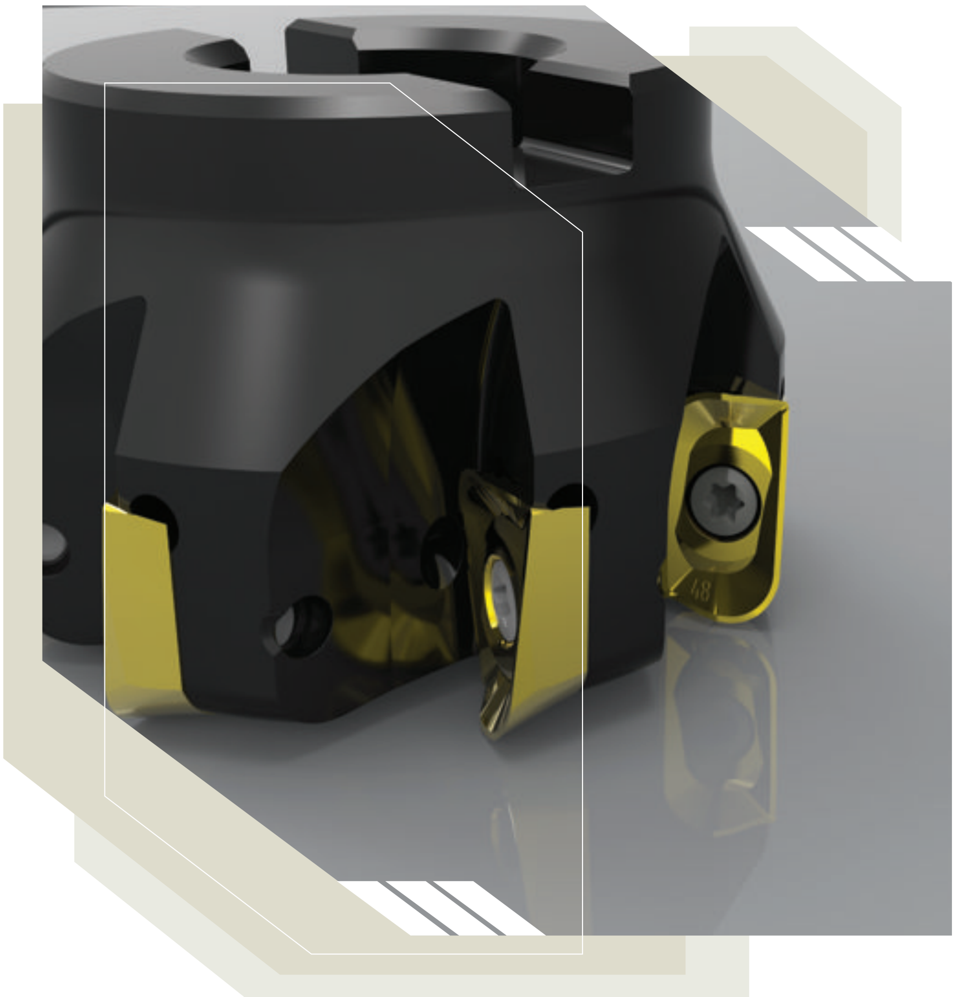
Applications:
The 7690VA series are ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Stainless Steel, Cast Iron, High Temperature Alloys and Aluminium Alloys.

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 67-70.

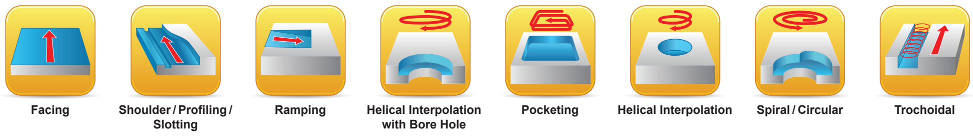


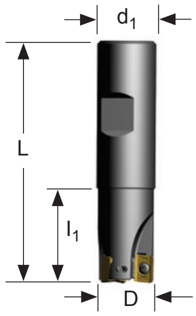
7690VA09:
Maximum a_p = 8,00mm
Diameter Range = 10mm to 63mm

7690VA12:
Maximum a_p = 11,00mm
Diameter Range = 20mm to 80mm

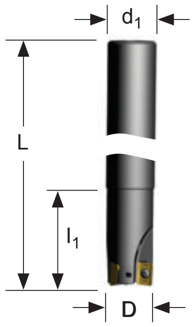
7690VA16:
Maximum a_p = 16,00mm
Diameter Range = 25mm to 125mm
Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 120.

7690VAP16:
Maximum a_p = 15,80mm
Diameter Range = 40mm to 100mm

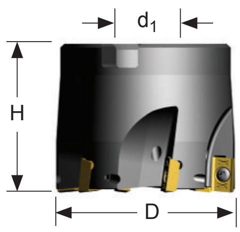




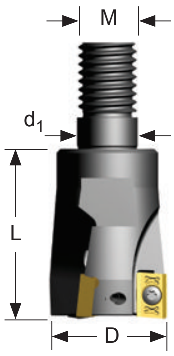
Weldon Shank



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	Screw	EDP	Key	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	Screw	EDP	Key	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 84.

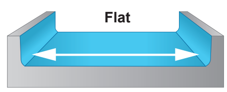
Note: To use radius larger than 1,20mm the cutter body needs to be modified for additional clearance by the end user.

7690VA09 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole 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

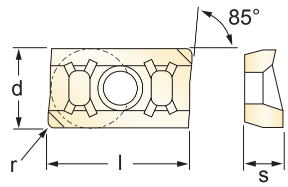
Ramping

Helical Interpolation



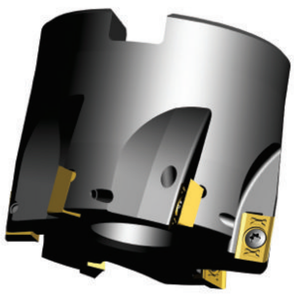
Facing Pitch

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.



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	Item Description	Grade	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			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

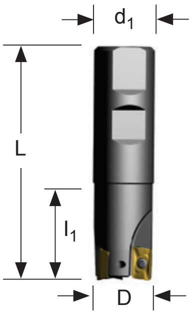
Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page 9.



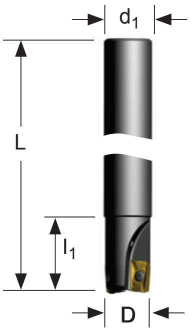
7690VA09 Feeds f_z (mm/tooth)

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/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.
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	-	-	-	-	-	-	-	-

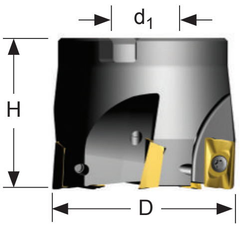
Note: HTA = High Temperature Alloys. | Speed recommendations can be found on page 66.



Weldon Shank

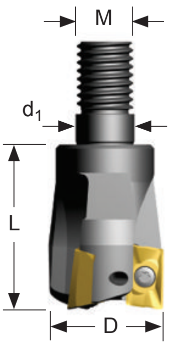


Cylindrical Shank



Shell Mill Fixation

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	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



Modular Head

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	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 84.

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

Depth of Cut (a_p)

7690VA12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole 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


Ramping


Facing Pitch

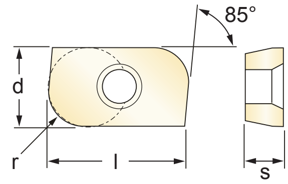
Note: If using a insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.

7690VA12


ADET12-48

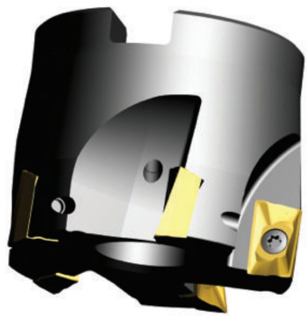

ADGT12-721


ADHT12-46

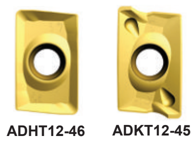


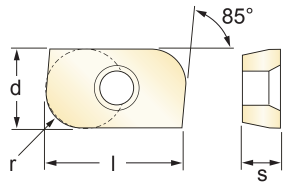
Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	Item Description	Grade	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			a_p max 11,00	a_p min - max 1,50 - 5,00	a_p min - max 0,10 - 1,50					
030856	ADET12T308ER-48	X500	■■◆	■■◆	-	7,87	12,70	3,97	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 9.



Note: Feed recommendations can be found on page 59. Speed recommendations can be found on page 66.





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					
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 9.

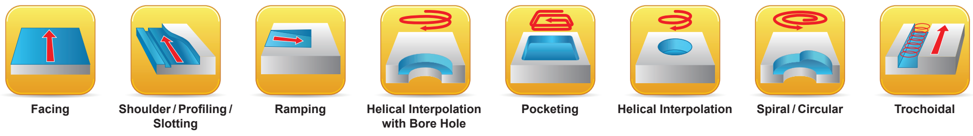
Note: ADKT12T3PDER-45 X500 should only be used in steel applications for difficult conditions.

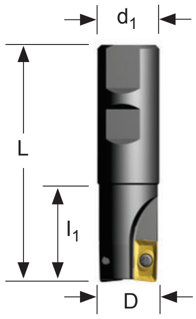
7690VA12 Feeds f_z (mm/tooth)

Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	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.
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	-	-	-	-	-	-	-	-

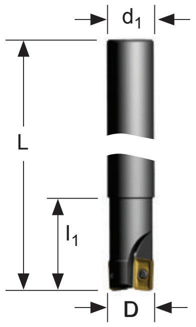
Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page 66.



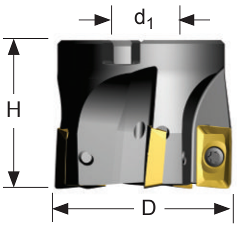


Weldon Shank



Cylindrical Shank

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	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

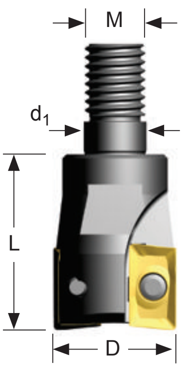


Shell Mill Fixation

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	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 84.

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

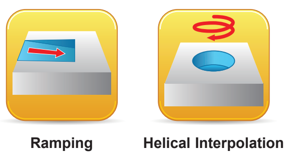


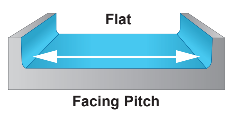
Modular Head

Depth of Cut (a_p)

7690VA16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole 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

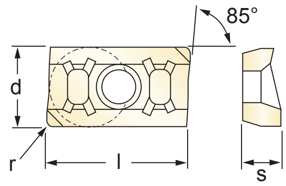




Note: If using a insert with radius, then the facing pitch for all 7690VA series cutters is equal to the cutting diameter (D) minus 2 x chosen radius.

7690VA16

APET16-42 APHT16-42 APEX16-701 APFW16-TR APHT16-ER APHT16-FR

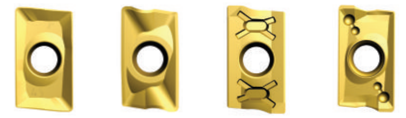


Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼ Depth of Cut (mm) a_p max 16,00	Semi-Finishing ▼▼ a_p min - max 1,50 - 5,00	Finishing ▼▼▼ a_p min - max 0,10 - 1,50	d (IC)	l	s	r	h_m min
033179	APET160402TR-42	SP6519	●●●●	■■●●	■■	9,52	16,66	4,76	0,20	0,10
033180	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

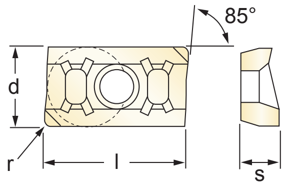
Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page 9.

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 63. Speed recommendations can be found on page 66.



APHT16-46 APET16-48 APKT16-43 APKT16-45



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	Item Description	Grade	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			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 9.

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

Note: Feed recommendations can be found on page 63. Speed recommendations can be found on page 66.

7690VA16 Feeds f_z (mm/tooth)

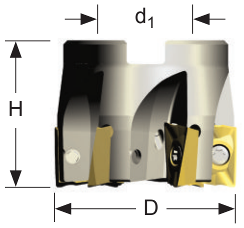
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 66.

7690VAP16

Shoulder Milling Cutter



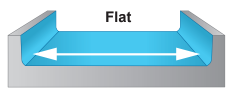
Shell Mill Fixation

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

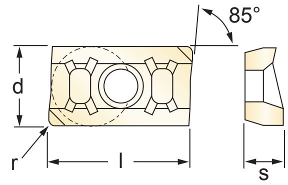


Facing Pitch

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.

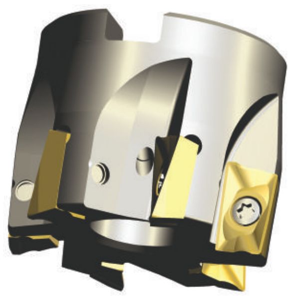
Depth of Cut (a_p)

APET16-48



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. 15,80	a_p min. - max. 1,50 - 5,00	a_p min. - max. 0,10 - 1,50	d (IC)	l	s	r	h_m min
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 9.



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 geometery 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	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.
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 66.

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 X400			CVD X Grade X500			PVD X Grade X700			PVD Standard SP6519			PVD Standard SP4019			CVD Standard MP91M			CVD Standard SC3025			Uncoated Micrograin 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	◉	●	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				◉	●	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												
K	Cast Iron	Grey GG-Ft										◉	●	140 - 295					●	145 - 365		●	150 - 395	◉	●	135 - 290
		Spheroidal-Ductile GGG-FGS												110 - 240						115 - 285			120 - 335			120 - 245
		Malleable GTS - MN/MP												100 - 220						105 - 260			105 - 275			115 - 200
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		●	45 - 95											●	50 - 100		●	50 - 105						
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			35 - 80												40 - 90			40 - 95						

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)

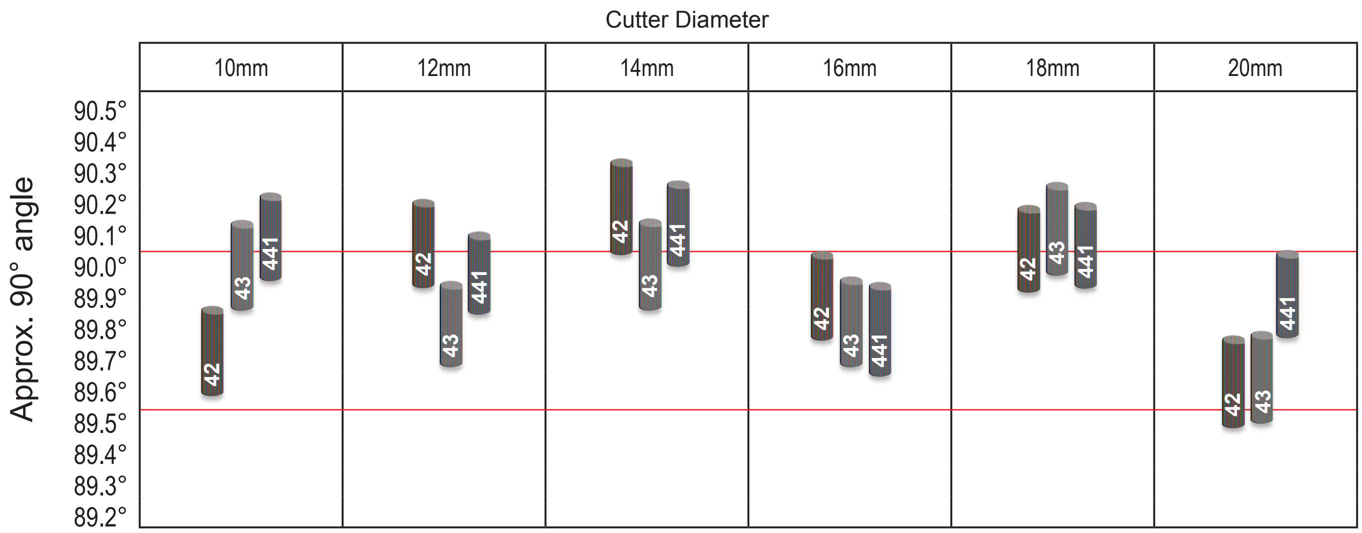
$$f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

h_m = Average chip thickness
a_e = Radial engagement
f_z = Feed per tooth
d = Cutter diameter

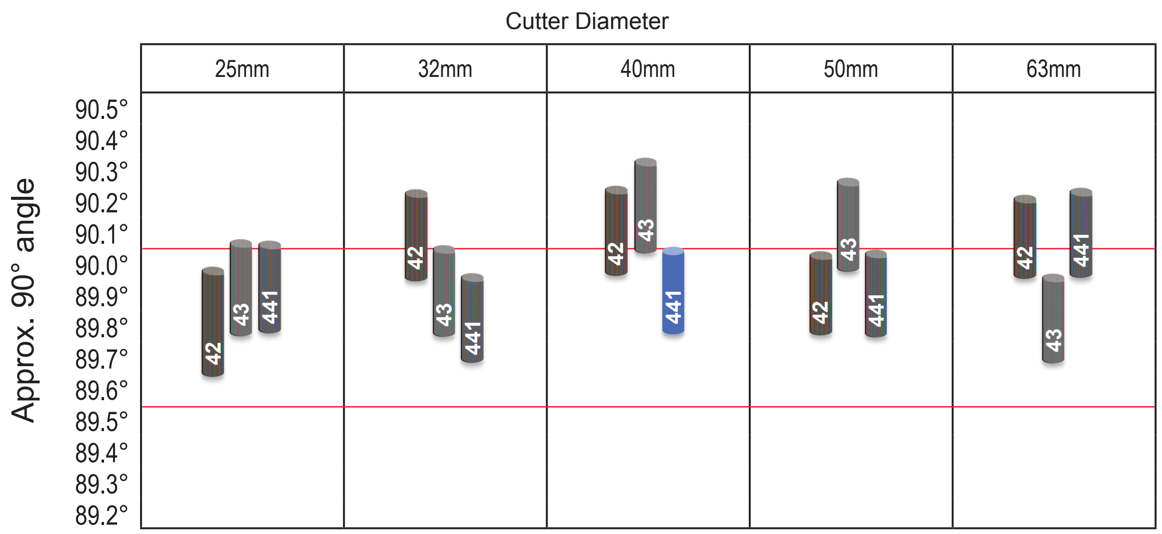
Formula: Average Chip Thickness (h_m)

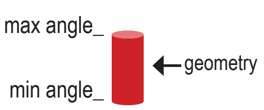
$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

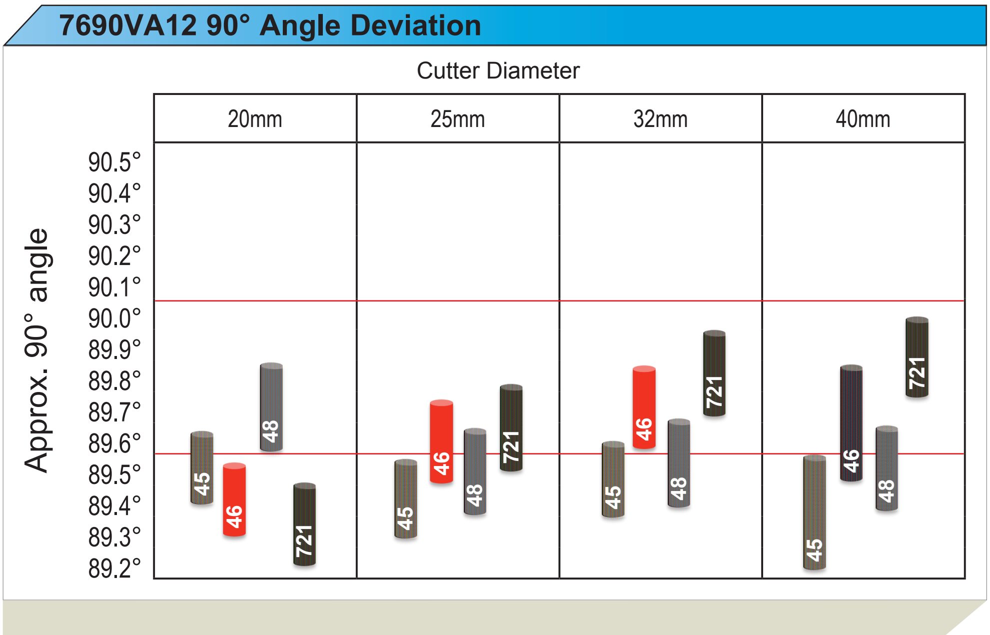
7690VA09 90° Angle Deviation

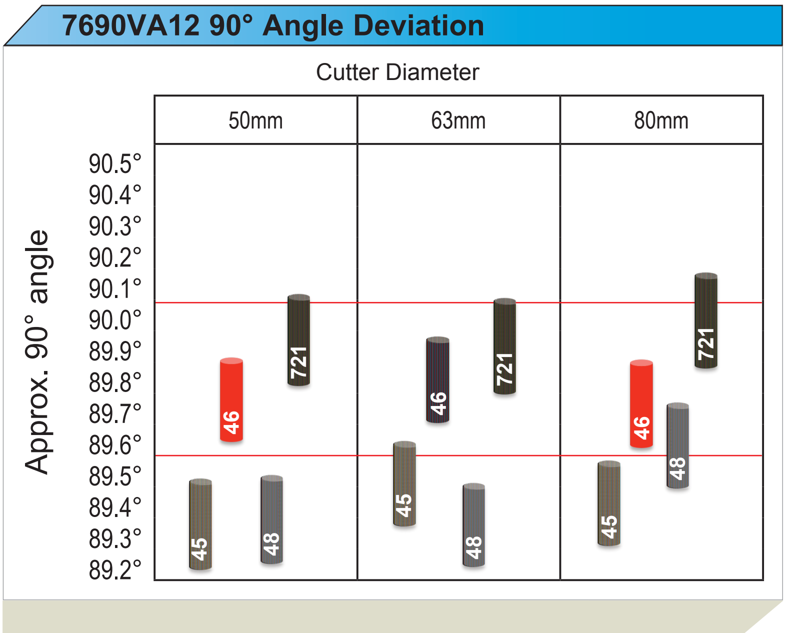


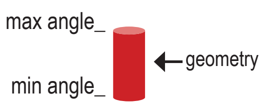
7690VA09 90° Angle Deviation



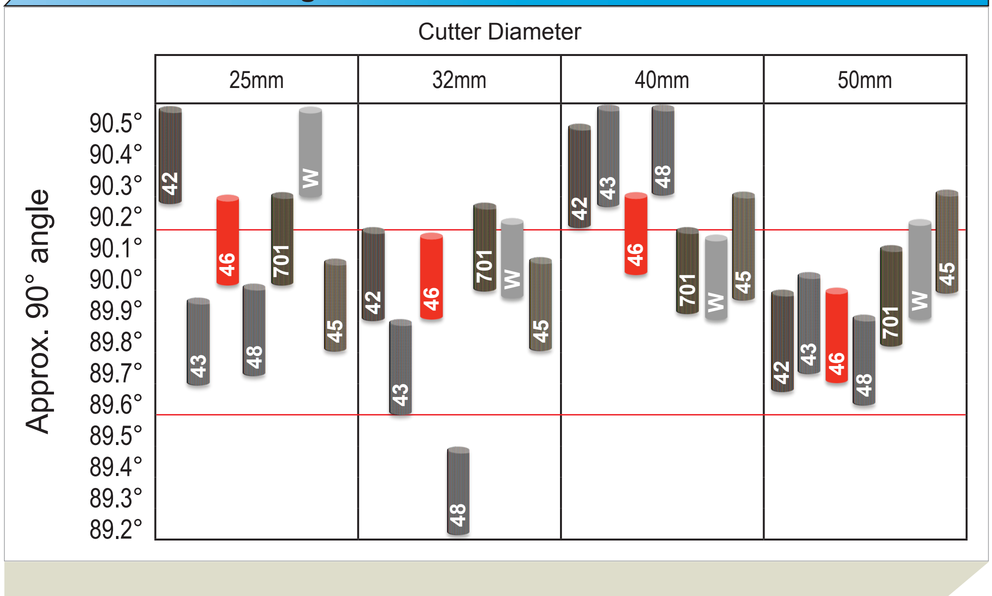



7690VA12 90° Angle Deviation
Cutter Diameter
20mm
25mm
32mm
40mm
Approx. 90° angle
90.5°
90.4°
90.3°
90.2°
90.1°
90.0°
89.9°
89.8°
89.7°
89.6°
89.5°
89.4°
89.3°
89.2°
45
46
48
721

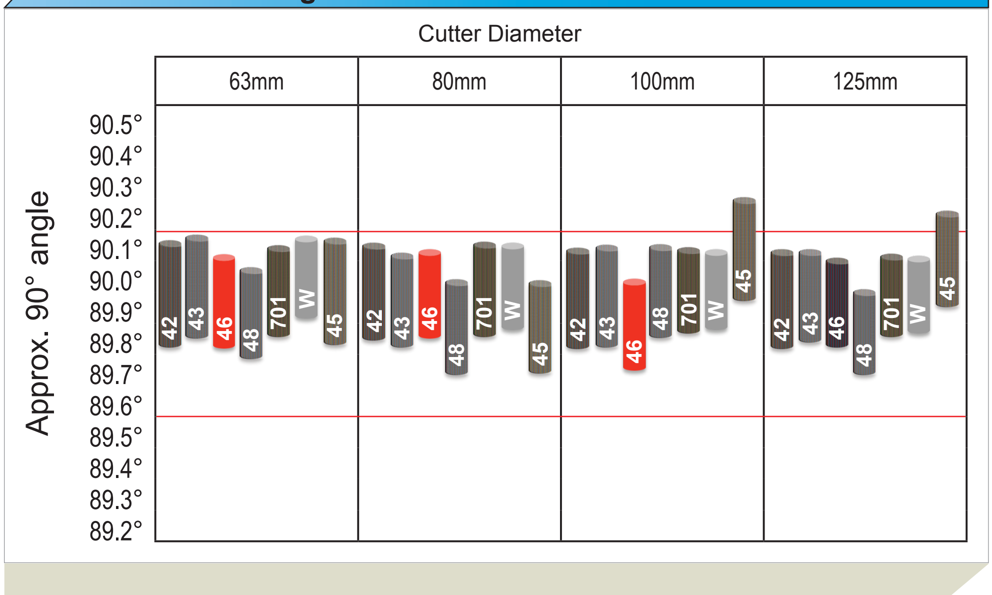

7690VA12 90° Angle Deviation
Cutter Diameter
50mm
63mm
80mm
Approx. 90° angle
90.5°
90.4°
90.3°
90.2°
90.1°
90.0°
89.9°
89.8°
89.7°
89.6°
89.5°
89.4°
89.3°
89.2°
45
46
48
721

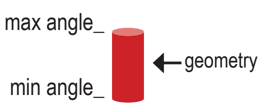

max angle_
min angle_
geometry

7690VA16 90° Angle Deviation

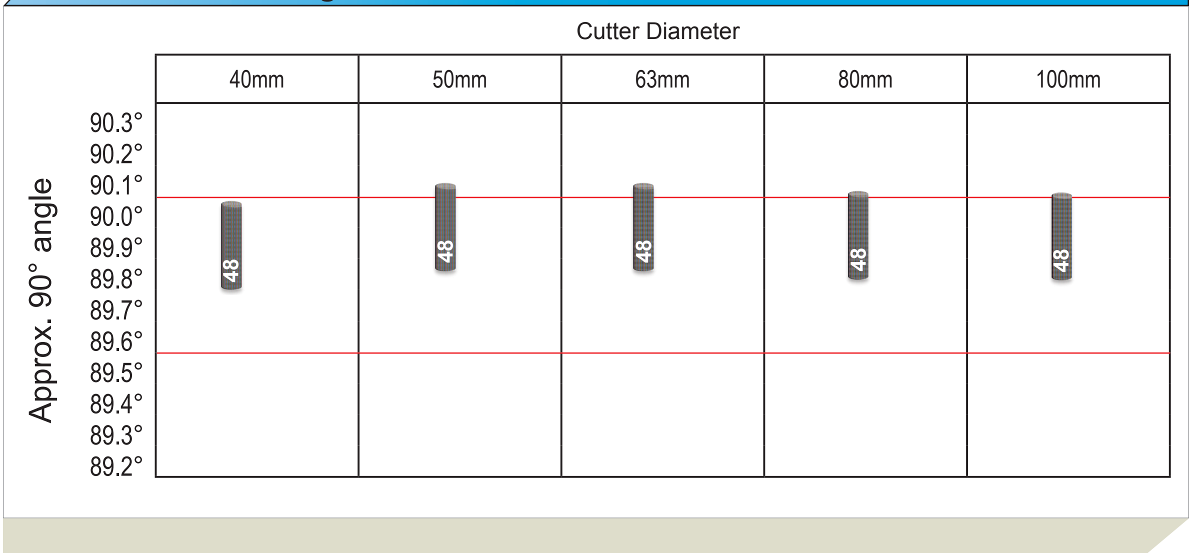


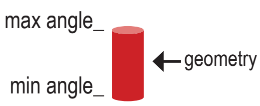
7690VA16 90° Angle Deviation

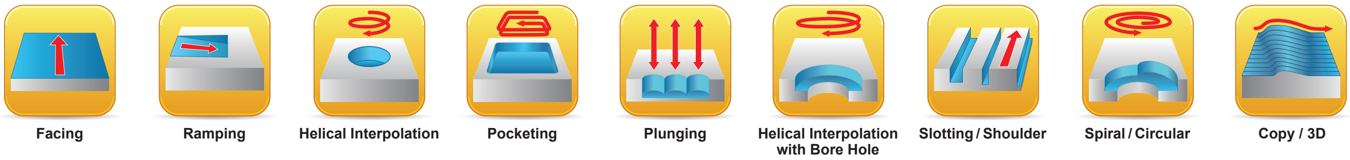




7690VAP16 90° Angle Deviation







HIGH FEED CUTTERS

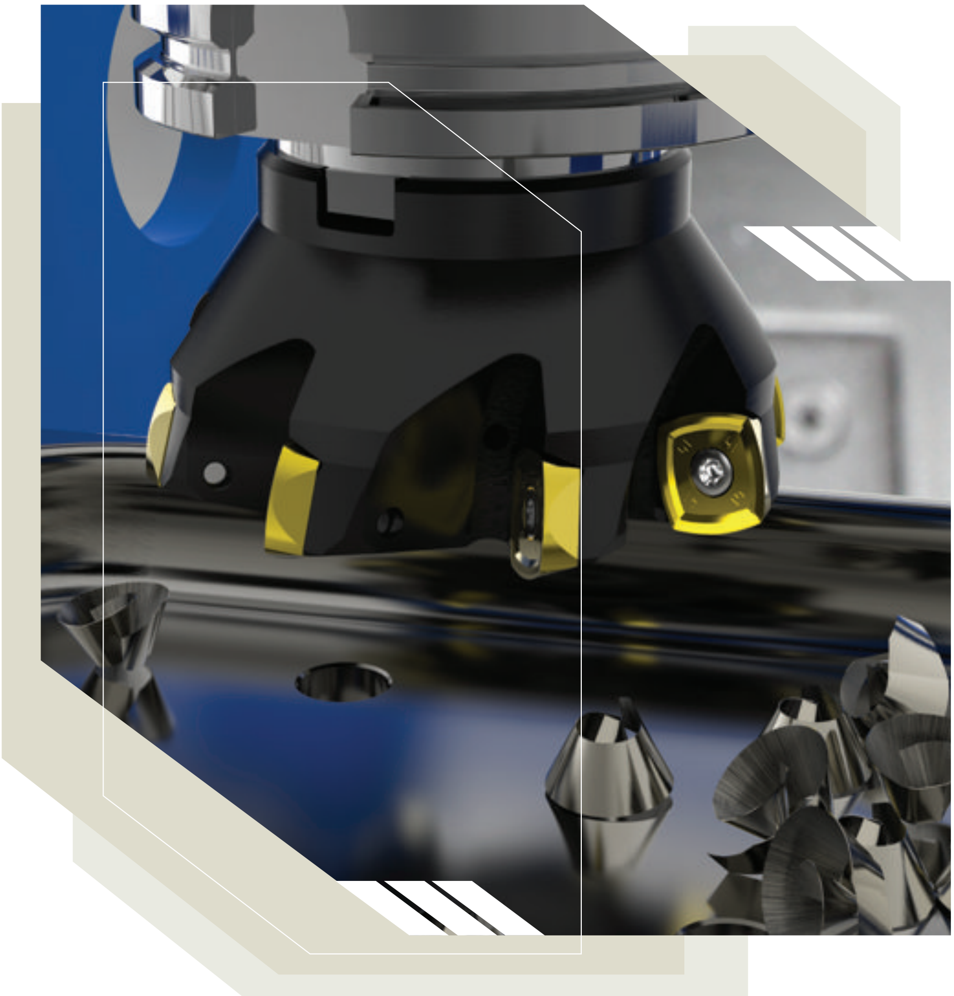
7792VX high feed milling cutters are capable of high metal removal in facing, plunging and slotting applications. The patented insert design offers better performance than round insert cutters.

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.

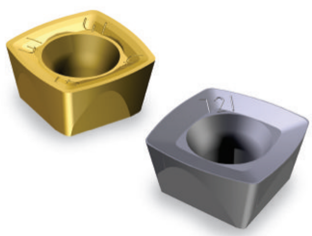
Our high feed cutter has the capacity to achieve 5 times higher feed rate than other existing cutters in the market. This is due to its unique design and insert positioning. 7792VX cutters also has a tremendous advantage, when used in a long (extended) toolholder. These cutters absorb vibration and greatly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



EU Patent #EP 1689 548 BI / # EP 1897 643 BI
US Patent #7,220,083 / #7,600,952 / #7,806,634 / # 7,988,387 / #8,162,152



7792VXP06:
Maximum a_p = 0,90mm
Diameter Range = 16mm to 32mm

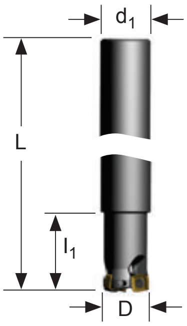
7792VXD09:
Maximum a_p = 1,50mm
Diameter Range = 25mm to 50mm

7792VXD12:
Maximum a_p = 2,50mm
Diameter Range = 32mm to 160mm
Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 126.

7792VXE16:
Maximum a_p = 3,50mm
Diameter Range = 63mm to 160mm
Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 128.

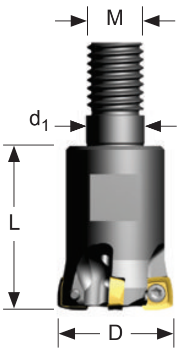
7792VXP06

High Feed Milling Cutter



Cylindrical Shank

Product		Dimensions (mm)						Spares				
EDP	**Item Description**	D	L/H	l_1	d_1	a_p max	No. of Teeth	*EDP*	Screw	*EDP*	Key	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



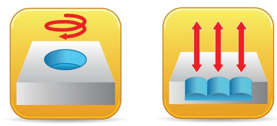
Modular Head

Product		Dimensions (mm)						Spares				
EDP	**Item Description**	D	L/H	M	d_1	a_p max	No. of Teeth	*EDP*	Screw	*EDP*	Key	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

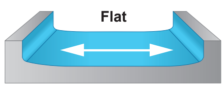
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page 84.

7792VXP06 Technical Information (mm)

Product		Dimensions							
EDP	**Item Description**	Facing Pitch	Ramping Angle A °	Ramping Angle B °	Helical Hole min.	Helical Hole max.	a_p max Helical / Linear	a_e max Plunging	Max RPM
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

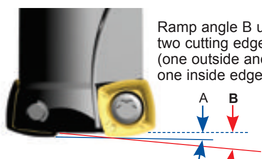


Helical Interpolation **Plunging**



Facing Pitch

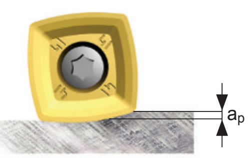
Ramp angle A uses one outside cutting edge only.



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

A = max ramp angle utilising full face contact

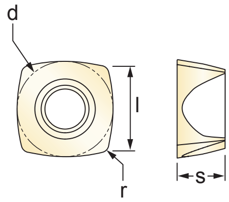
B = max ramp angle utilising full contact + internal corner radius



Depth of Cut (ap)

Stellram® Cutting Tool Systems

XPLT06-D41



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 9.

7792VXP06 Feeds f_z (mm/tooth)

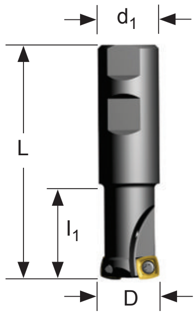
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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

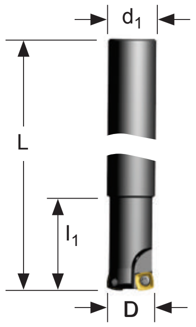
Note: Speed recommendations can be found on page 80.

7792VXD09

High Feed Milling Cutter

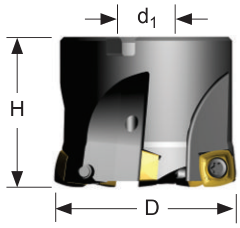


Weldon Shank



Cylindrical Shank

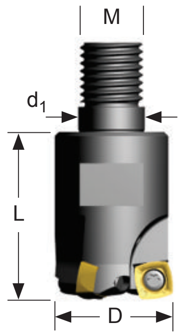
Product		Dimensions (mm)						Spares				
EDP	**Item Description**	D	L/H	l_1	d_1	a_p max	No. of Teeth	*EDP*	Screw	*EDP*	Key	Screw Tightening Nm
7792VXD09 Weldon Shank												
029461	**7792VXD09WA025Z2R**	25	96	40	25	1,50	2	*015269*	F3508T	*015240*	T15	2,10
029462	**7792VXD09WA032Z3R**	32	100	40	32	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



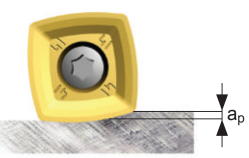
Shell Mill Fixation

Product		Dimensions (mm)						Spares				
EDP	**Item Description**	D	L/H	M	d_1	a_p max	No. of Teeth	*EDP*	Screw	*EDP*	Key	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 84.



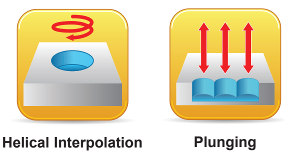
Modular Head

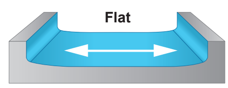


Depth of Cut (ap)

7792VXD09 Technical Information (mm)

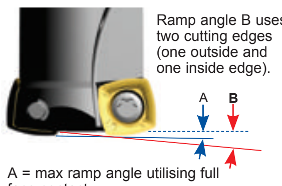
Product		Dimensions							
EDP	**Item Description**	Facing Pitch	Ramping Angle A °	Ramping Angle B °	Helical Hole min.	Helical Hole max.	a_p max Helical / Linear	a_e max Plunging	Max RPM
029461	**7792VXD09WA025Z2R**	11,75	2.80	6.30	34	48	1,00	6,00	48500
029462	**7792VXD09WA032Z3R**	18,75	1.50	5.00	48	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





Facing Pitch

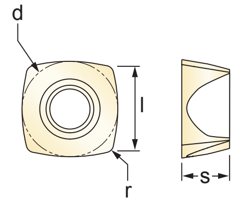
Ramp angle A uses one outside cutting edge only.



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

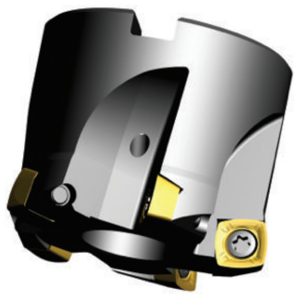
A = max ramp angle utilising full face contact

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



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 9.



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)

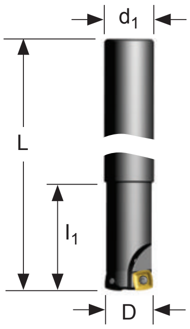
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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

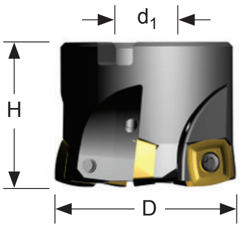
Note: Speed recommendations can be found on page 80.

7792VXD12

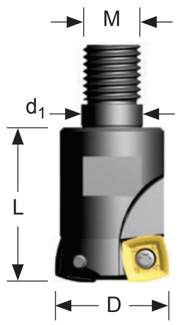
High Feed Milling Cutter



Cylindrical Shank



Shell Mill Fixation



Modular Head

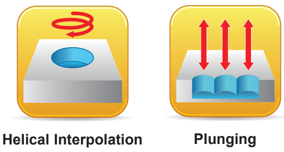
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l1	d1	ap max	No. of Teeth	EDP	Screw	EDP	Key	Screw Tightening Nm
7792VXD12 Cylindrical Shank												
031195	7792VXD12CA032Z2R70	32	250	70	32	2,50	2	015262	D4010T	015240	T15	3,10
7792VXD12 Shell Mill Fixation - Coarse, Medium and Fine 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

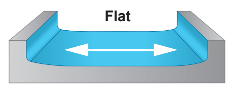
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d1	ap max	No. of Teeth	EDP	Screw	EDP	Key	Screw Tightening Nm
7792VXD12 Modular Head												
030994	7792VXD12SA032Z2R43	32	43	M16	17,00	2,50	2	015262	D4010T	015240	T15	3,10

Note: For cylindrical shank extensions in high density alloy with through coolant refer to page 84.

7792VXD12 Technical Information (mm)

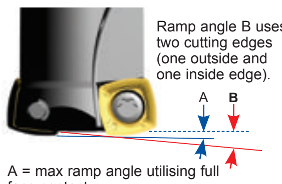
Product		Dimensions							
EDP	Item Description	Facing Pitch	Ramping Angle A °	Ramping Angle B °	Helical Hole min. - max.		ap max Helical / Linear	ae max Plunging	Max RPM
031195	7792VXD12CA032Z2R70	10,60	1.80	2.60	42	62	1,80	9,00	31500
029467	7792VXD12-A052Z3R	33,60	0.80	2.70	82	102	1,80	9,00	22000
029468	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





Facing Pitch

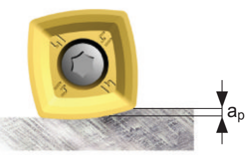
Ramp angle A uses one outside cutting edge only.



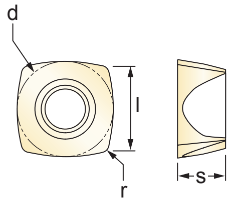
Ramp angle B uses two cutting edges (one outside and one inside edge).

A = max ramp angle utilising full face contact

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

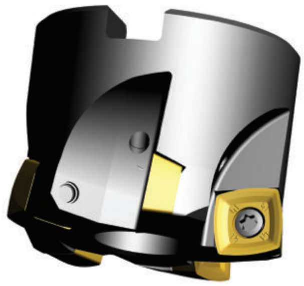


Depth of Cut (ap)



Product			Application & Material			Dimensions (mm)				
			Facing	Slotting	Plunging					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. 2,50	a_p max. 2,00	a_e max. 9,00	d (IC)	l	s	r	h_m min
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 9.



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.

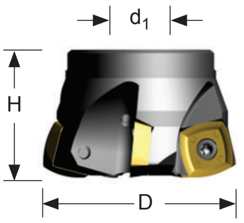
XDLT120512ER-D411 uses less power than the -D41 geometry.

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	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.
SR-D	X400	Facing	0,30 - 3,00	0,30 - 2,80	-	-	-	-	-	-	-	-	-	-	-	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 - 2,80	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 80.

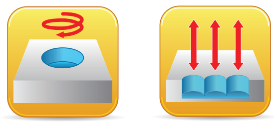


Shell Mill Fixation

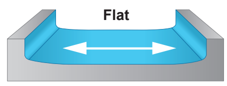
Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	Screw Tightening Nm
7792VXE16 Shell Mill Fixation												
031277	7792VXE16-A063Z5R	63	40	-	22	3,50	5	031225	DP5013T	030819	TP20	7,60
031278	7792VXE16-A080Z6R	80	50	-	27	3,50	6	031225	DP5013T	030819	TP20	7,60
031279	7792VXE16-A100Z8R	100	50	-	32	3,50	8	031225	DP5013T	030819	TP20	7,60
031280	7792VXE16-A125Z10R	125	63	-	40	3,50	10	031225	DP5013T	030819	TP20	7,60
031281	7792VXE16-160Z12	160	63	-	40	3,50	12	031225	DP5013T	030819	TP20	7,60

7792VXE16 Technical Information (mm)

Product		Dimensions							
EDP	Item Description	Facing Pitch	Ramping Angle A °	Ramping Angle B °	Helical Hole min.	Helical Hole max.	a_p max Helical / Linear	a_e max Plunging	Max RPM
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

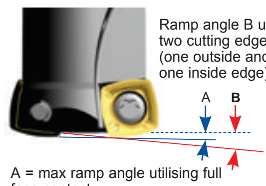


Helical Interpolation **Plunging**



Facing Pitch

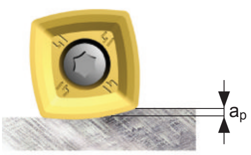
Ramp angle A uses one outside cutting edge only.



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



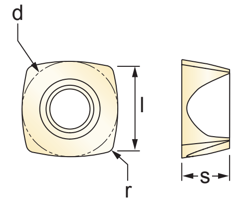
Depth of Cut (ap)

7792VXE16

Milling Inserts & Recommended Feeds

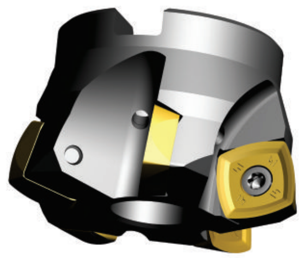
XELW16-D

XELT16-D41



Product			Application & Material			Dimensions (mm)				
			Facing	Slotting	Plunging					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. 3,50	a_p max. 3,00	a_e max.13,00	d (IC)	l	s	r	h_m min
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	**XDLT120508ER-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 9.



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/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.
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 80.

Speed v_c (m/min)

7792VX Series

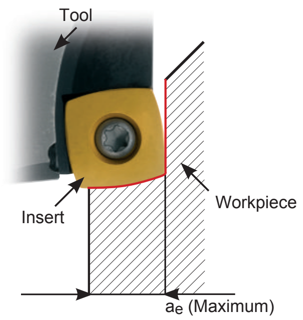
Wear Resistance: – ⟷ +

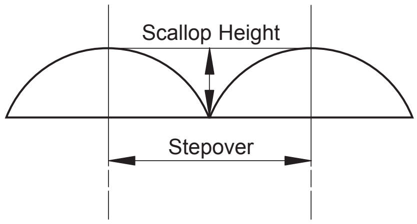
Speed min. - max.

Coolant Recommendation
Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	PVD X Grade X400	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD Standard SP6519	Wet	Dry	Uncoated Micrograin GH2	Wet	Dry	CVD Standard SC6525	Wet	Dry	CVD Standard SC3025
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	120 - 260				⦿	●	130 - 295				⦿	●	140 - 370			
P	Unalloyed Steel	<950 N/mm² <280 HBN			105 - 230						115 - 260						120 - 325			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230				⦿	●	105 - 290			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 210			
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 140			
M	Stainless Steel	Austenitic + Ferritic 300 series				⦿	●	115 - 250	⦿	●	115 - 270									
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235									
M	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120									
K	Cast Iron	Grey GG-Ft							⦿	●	140 - 295					●	145 - 390		●	150 - 395
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240						115 - 305			120 - 335
K	Cast Iron	Malleable GTS - MN/MP									100 - 220									105 - 275
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN							●		305 - 2130	●		400 - 2745						
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN									245 - 1760			295 - 2135						
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55									
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48									
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55									
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79									
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		●	45 - 95															
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80															

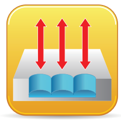
Plunging





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.**

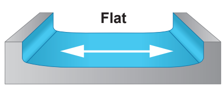
Plunging Information (mm) tool definition-scallop height and step over

	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
	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)

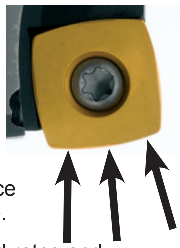
Insert Size	Cutter dia.	Hole min.	Hole max.
06	16	22	30
	20	30	38
	25	40	48
	32	54	62
09	25	34	48
	32	48	62
	40	64	78
	50	84	98
12	32	42	62
	52	82	102
	63	104	124
	66	110	130
	80	138	158
	100	178	198
	125	228	248
	160	298	318
16	63	96	124
	80	130	158
	100	170	198
	125	220	248
	160	290	318

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.

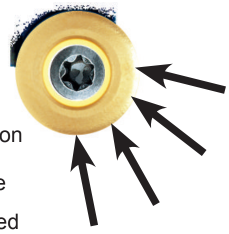
7792VX

- 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

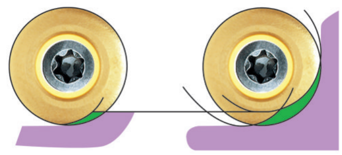


The 7792VX machines with a constant volume of chip throughout all aspects of producing cavities and produces a side wall that is close to profile.

Round insert tools have increasing chip volume through the process.

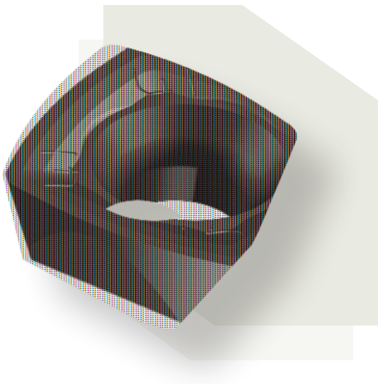
7792VX

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

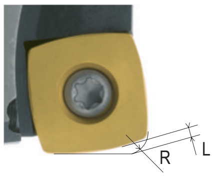


Round insert

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



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.



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

For finish pass applications:

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

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

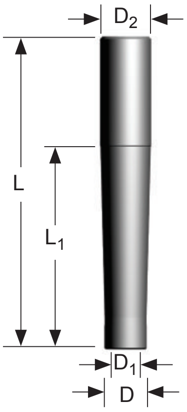
h_m = Average chip thickness
a_e = Radial engagement
f_z = Feed per tooth
d = Cutter diameter

Formula: Average Chip Thickness (h_m)

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

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

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

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.

Facing | Ramping | Pocketing | Helical Interpolation | Helical Interpolation with Bore Hole | Spiral / Circular | Copy / 3D | Chamfering | Shoulder / Profiling / Slotting

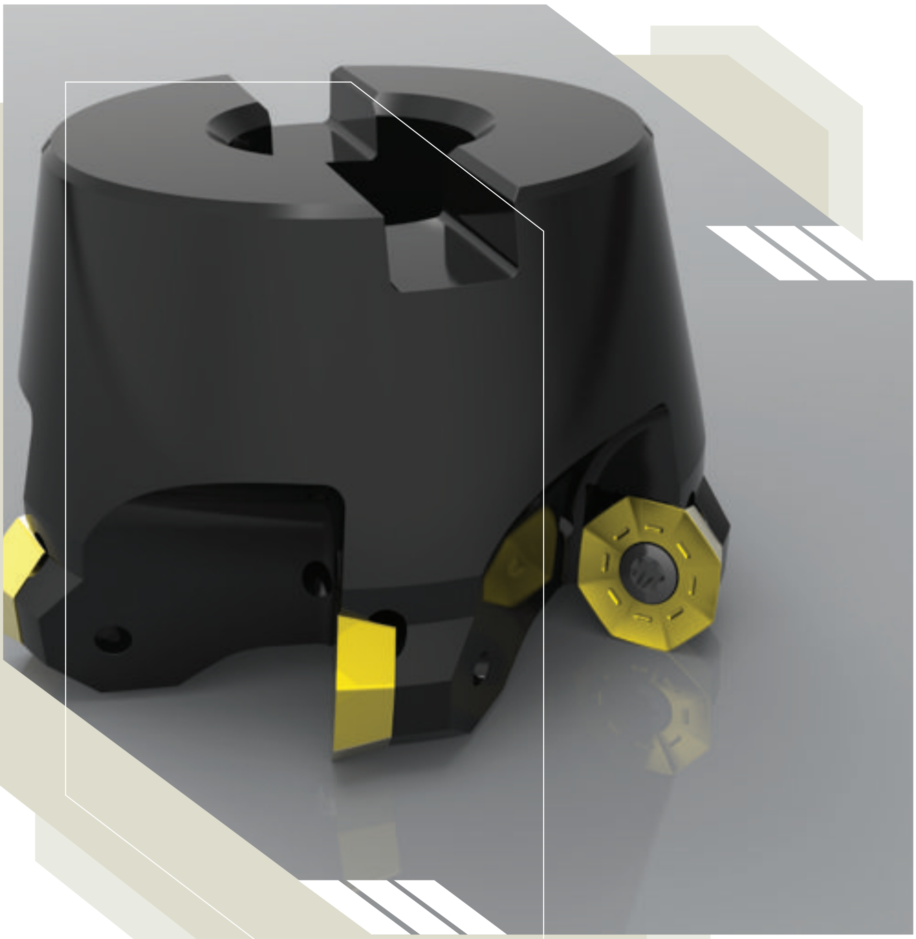
42° LEAD ANGLE - FACE MILLS
7745VOD cutters are designed for machining most materials. Octagonal inserts offer up to eight economical cutting edges.

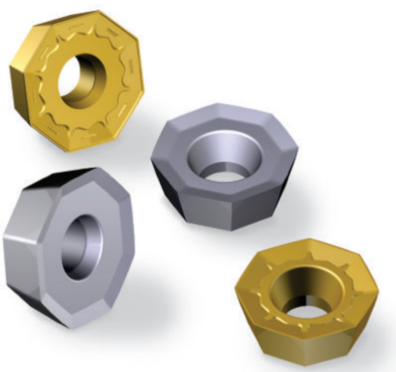
These cutters are ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Stainless Steel, High Temperature Alloys, Cast Iron and Aluminium Alloys.

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.



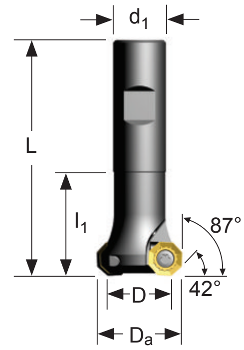


7745VOD04:
Maximum a_p = 3,50mm
(a_p1 max = 8mm)
Diameter Range = 25mm to 160mm
Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 134.

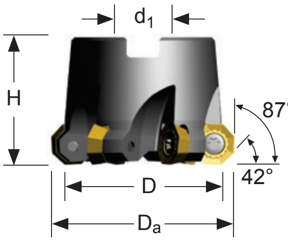
7745VOD06:
Maximum a_p = 4,50mm
(a_p1 = 10mm)
Diameter Range = 50mm to 160mm
Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 138.

7745VOD04

Face Milling Cutter



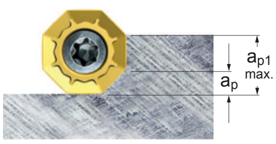
Weldon Shank



Shell Mill Fixation

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	D_a*	L/H	l_1	d_1	a_p	a_p 1 max	No. of Teeth	EDP	Screw	EDP	Key	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

D_a* = Outside Diameter



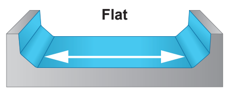
Depth of Cut (ap)

7745VOD04 Technical Information (mm)

Product		Dimensions					
EDP	**Item Description**	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p 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

Ramping

Helical Interpolation

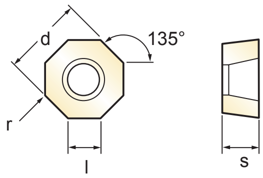


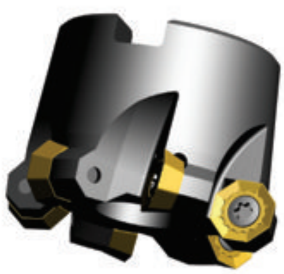
Facing Pitch

7745VOD04

Milling Inserts

ODET04-441 ODET04-44 ODMT04-41 ODMT04-412 ODEW04-RA ODMW04-SN





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	hm 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 9.

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 89. Speed recommendations can be found on page 93.

7745VOD04 Feeds f_z (mm/tooth)

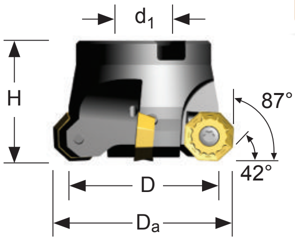
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 93.

7745VOD06

Face Milling Cutter



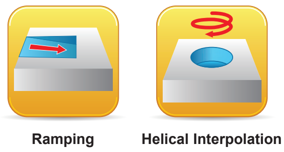
Shell Mill Fixation

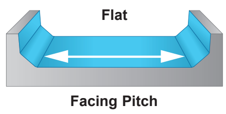
Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	L/H	l1	d1	ap	ap 1 max	No. of Teeth	EDP	Screw	EDP	Key	Screw Tightening nm
7745VOD06 Shell Mill Fixation - Medium and Fine Pitch														
026581	**7745VOD06-A050R**	50	60	40	-	22	4,50	10	4	*015270*	F4011T	*015241*	T20	3,10
026582	**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.	Helical Hole 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

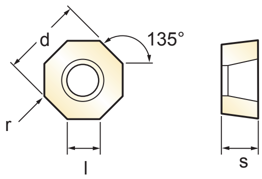




Depth of Cut (ap)

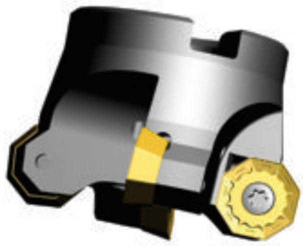
7745VOD06

ODET06-441 ODET06-44 ODMT06-41 ODEW06-RA ODMW06-TN ODMW06-SN



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	Item Description	Grade	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			a_p max. 4,50	a_p min. - max. 1,00 - 2,00	a_p 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 9.



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 92. Speed recommendations can be found on page 93.

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/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.
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 93.

Speed v_c (m/min)

7745VOD Series

Wear Resistance: – ⟷ +

Speed min. - max.

Coolant Recommendation: Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD X Grade X700	Wet	Dry	PVD Standard SP6519	Wet	Dry	PVD Standard SP4019	Wet	Dry	CVD Standard MP91M	Wet	Dry	CVD Standard SC3025	Wet	Dry	Uncoated Micrograin GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	130 - 270				⦿	●	130 - 295				⦿	●	460 - 1130						
P	Unalloyed Steel	<950 N/mm² <280 HBN			115 - 240						115 - 260						395 - 1000						
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	100 - 210				⦿	●	100 - 230				⦿	●	345 - 885						
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			75 - 160						75 - 175						260 - 675						
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN		●	50 - 100					●	50 - 110					●	165 - 425						
M	Stainless Steel	Austenitic + Ferritic 300 series	⦿	●	115 - 250	⦿	●	115 - 260	⦿	●	115 - 270	⦿	●	120 - 280									
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 230			105 - 235			110 - 250									
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120	●		50 - 130									
K	Cast Iron	Grey GG-Ft							⦿	●	140 - 295					●	475 - 1200		●	150 - 395			
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240						375 - 935			120 - 335			
K	Cast Iron	Malleable GTS - MN/MP									100 - 220						345 - 855			105 - 275			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																			●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																					295 - 2440
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 52	●		23 - 55	●		24 - 63									
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 46			22 - 48			23 - 52									
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 53			25 - 55			26 - 59									
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 75			36 - 79			37 - 84									
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN											●	50 - 100									
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN												40 - 90									

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 programmemed 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)

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


Facing


Chamfering

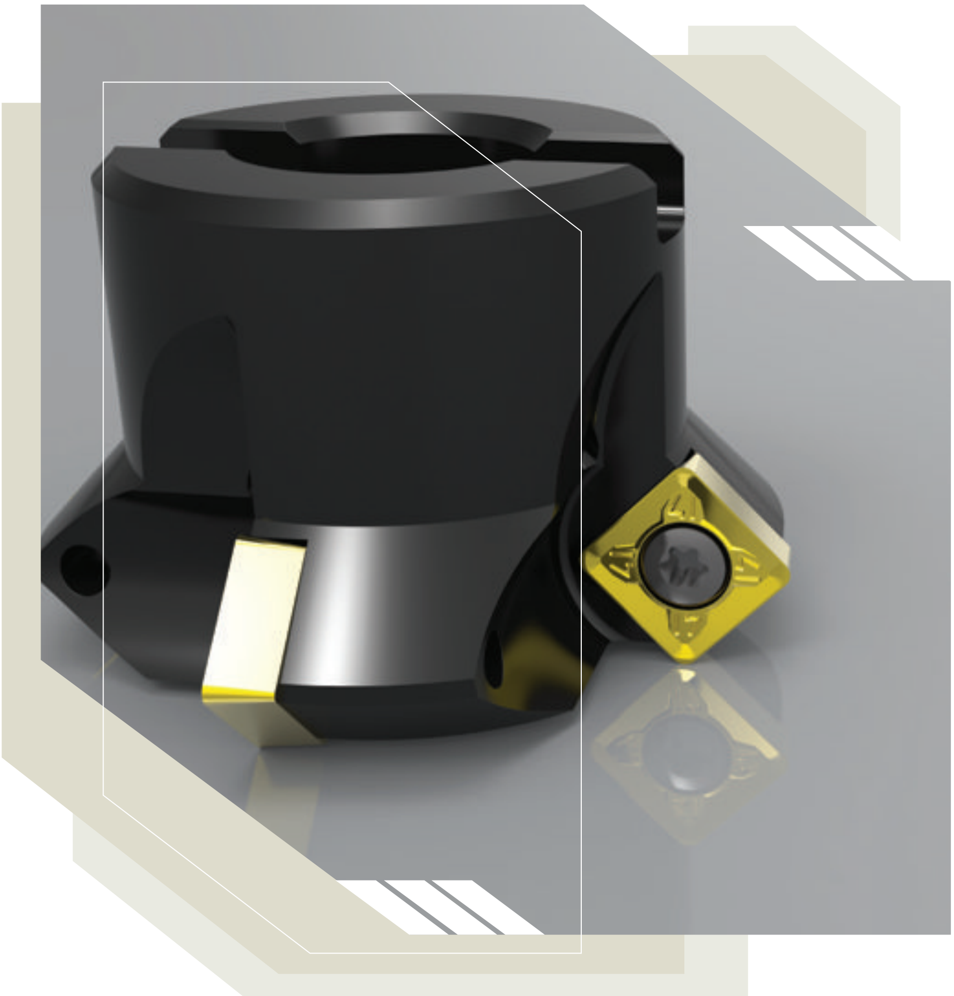
45° LEAD ANGLE – FACE MILLS
7745VS cutters are designed for machining Tool Steel and Cast Iron. They feature exceptionally thick square inserts and are ideal for tough cutting conditions. The upper edge of the insert does not rest against a pocket allowing for recessing operations.

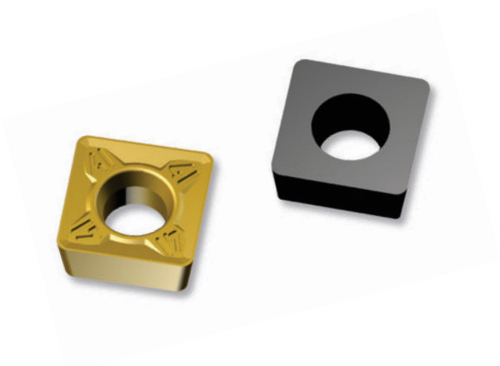
Ideal for roughing, semi-finishing and finishing. These cutters are a very good choice for machining surfaces with heavy scale and are also ideal for machining surfaces with irregular stock.

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.

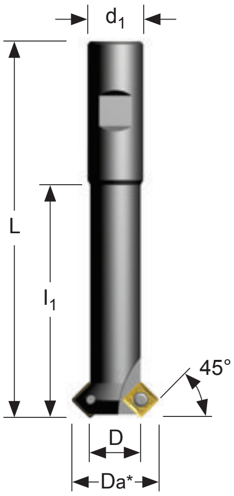




7745VS09:
Maximum a_p = 5mm
Diameter Range = 16mm to 25mm

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 144.



Weldon Shank

Facing

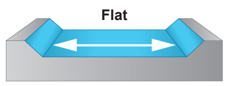
Chamfering

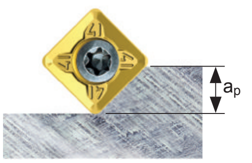
Product		Dimensions (mm)							Spares				
EDP	Item Description	D	Da*	L/H	l_1	d_1	ap max	No. of Teeth	*EDP*		*EDP*		Screw Tightening Nm.
7745VS09 Weldon Shank													
021762	**7745VS09WA016R085**	16	27	135	85	16	5,00	2	*015262*	D4010T	*015240*	T15	3,10
021763	**7745VS09WA020R085**	20	31	135	85	20	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

D_a* = Outside Diameter

7745VS09 Technical Information (mm)

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





Depth of Cut (ap)

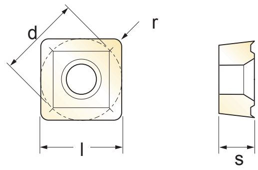
7745VS09

Milling Inserts & Recommended Feeds

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

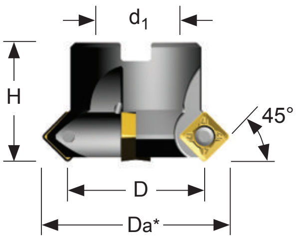
Machining Choice: ◆ 1st Choice ■ 2nd Choice ● 3rd Choice | Material Guide Key descriptions found on page 9.

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	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.
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 101.



Shell Mill Fixation

Facing

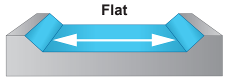
Chamfering

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

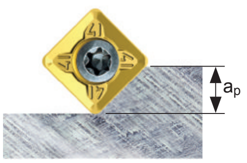
Da* = Outside Diameter

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



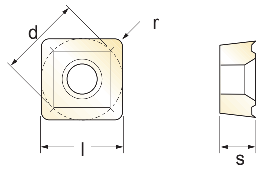
Facing Pitch



Depth of Cut (a_p)

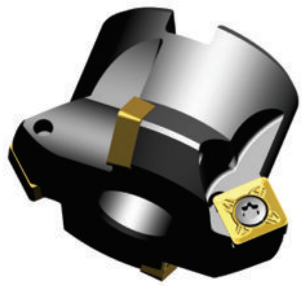
7745VS12

SCCT12 SCHT12 SCKT12-41 SCMT12-41 SCMT12-T



Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	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	d (IC)	l	s	r	h_m min
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 9.



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 100. Speed recommendations can be found on page 101.

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 >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	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	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Speed recommendations can be found on page 101.

Speed v_c (m/min)

7745VS Series

Wear Resistance: – → +

Speed min. - max.

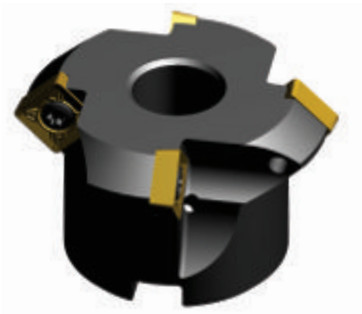
Coolant Recommendation
Recommended ● Possible ◉

ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin
					X400			X500			SP6519			SP4019			MP91M			GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN	◉	●	120 - 260	◉	●	130 - 270	◉	●	130 - 295					●	140 - 345			
P	Unalloyed Steel	<950 N/mm² <280 HBN			105 - 230			115 - 240			115 - 260						120 - 305			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	◉	●	95 - 200	◉	●	100 - 210	◉	●	100 - 230					●	105 - 270			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 205			
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 130			
M	Stainless Steel	Austenitic + Ferritic 300 series				◉	●	115 - 250	◉	●	115 - 270	◉	●	120 - 280						
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250						
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 255			115 - 285			120 - 245
K	Cast Iron	Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260			115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																		
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																		
S	High Temperature Alloys	Iron Based																		
S	High Temperature Alloys	Cobalt Based																		
S	High Temperature Alloys	Nickel Based																		
S	High Temperature Alloys	Titanium Based																		
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105			
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80									40 - 90			40 - 95			

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 $\frac{0,08}{0,707}$ = 0,11mm 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

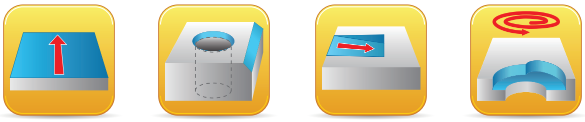
d = Cutter diameter

Formula: Average Chip Thickness (h_m)

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

7745VSE Series

Face Milling Cutter



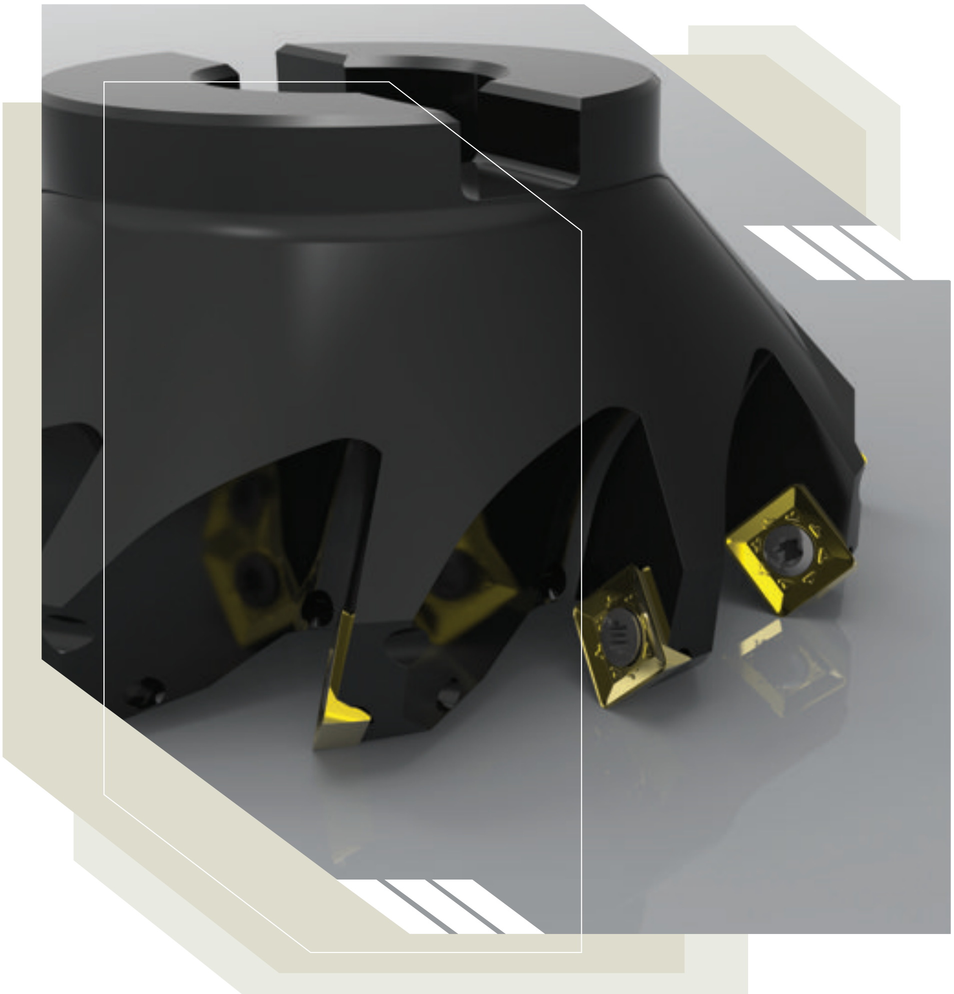
Facing | Chamfering | Ramping | Spiral / Circular

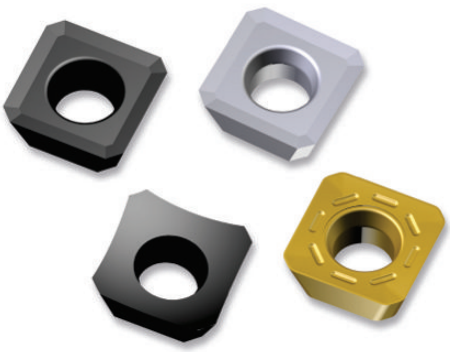
45° LEAD ANGLE - FACE MILLS
7745VSE cutters are designed for Stainless Steels and High Temperature Alloys. Square inserts with a 15 degree clearance are used for reducing edge build-up.

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.





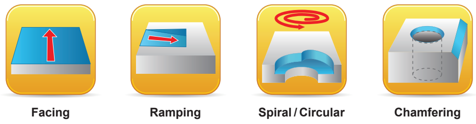
7745VSE09:
Maximum a_p = 5,00mm
Diameter Range = 16mm to 125mm
Available in medium and fine pitch.

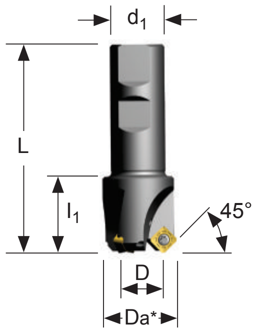
7745VSE12:
Maximum a_p = 7,00mm
Diameter Range = 50mm to 125mm
Available in medium pitch only.

Note: Larger diameter Shell Mill Fixation cutters with interchangeable cartridges are available. Please see page 150.

7745VSE09

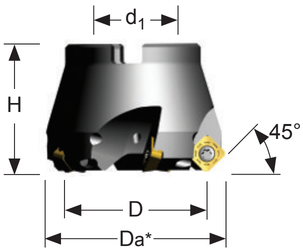
Face Milling Cutter





Weldon Shank

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	Da*	L/H	l_1	d_1	a_p 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



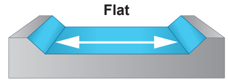
Shell Mill Fixation

Da* = Outside Diameter

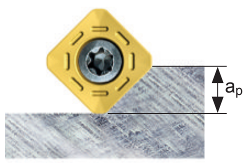
7745VSE09 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole max.	a_p 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



Facing Pitch



Depth of Cut (ap)

7745VSE09


SDEX09-701

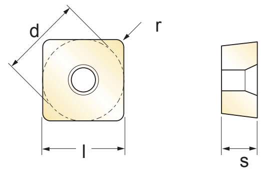
SDCT09

SDHT09-421

SDHT09-422

SDKT09-45

SDHW09



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. 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 9.

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 107. Speed recommendations can be found on page 112.

7745VSE09

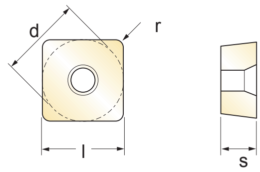

SDET09


SDHT09-422


SDHT09-423


SDMT09-41


SDMW09



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. 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 9.

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 107. Speed recommendations can be found on page 112.

7745VSE09 Feeds f_z (mm/tooth)

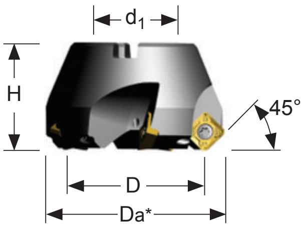
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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	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 112.

7745VSE12

Face Milling Cutter



Shell Mill Fixation


Facing


Ramping


Spiral / Circular


Chamfering

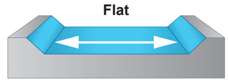
Product		Dimensions (mm)								Spares				
EDP	**Item Description**	D	Da*	H	l1	d1	ap max	Max. plunging depth	No. of Teeth	*EDP*		*EDP*		Screw Tightening Nm.
7745VSE12 Shell Mill Fixation														
021788	**7745VSE12-A050Z4R**	50	65	45	-	22	7,00	6,00	4	*015270*	F4011T	*015241*	T20	3,10
021789	**7745VSE12-A063Z5R**	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

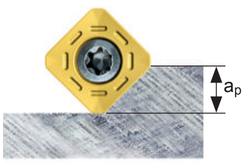
7745VSE12 Technical Information (mm)

Product		Dimensions					
EDP	**Item Description**	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap 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

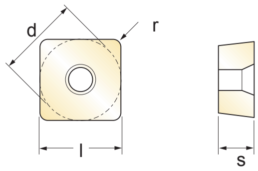


Depth of Cut (a_p)

7745VSE12

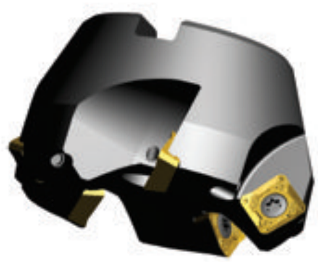
Milling Inserts

SDEX12-701 SDCT12 SDHT12-421 SDKT12-45 SDHT12-42 SDCW12 SDHW12



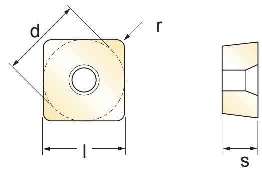
Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h_m min
			Depth of Cut (mm)							
			a_p max. 7,00	a_p min. - max. 1,00 - 3,00	a_p min. - max. 0,20 - 1,00					
Insert selection with facet										
034522	**SDEX1204AEFN-701**	**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.



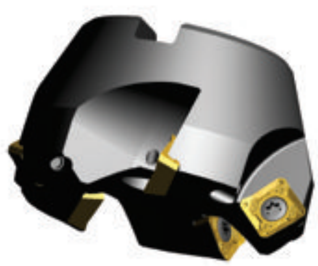
SDHW1204AETN X500 should be used in Stainless Steel and High Temperature Alloys with heavy scale and generally when the conditions are unstable.

Note: Feed recommendations can be found on page 111. Speed recommendations can be found on page 112.



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 9.



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 111. Speed recommendations can be found on page 112.

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 112.

Speed v_c (m/min)

7745VSE Series

Wear Resistance: – → +

Speed min. - max.

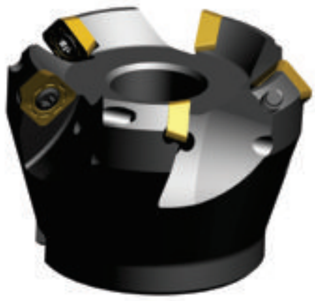
Coolant Recommendation

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/mm² <180 HBN	◉	●	120 - 260	◉	●	130 - 270	◉	●	130 - 295					●	140 - 345					●	240 - 345
		<950 N/mm² <280 HBN			105 - 230			115 - 240			115 - 260						120 - 305						190 - 270
	Alloyed Steel	700-950 N/mm² 200-280 HBN	◉	●	95 - 200	◉	●	100 - 210	◉	●	100 - 230					●	105 - 270					●	140 - 205
		950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 205						90 - 130
		1200-1400 N/mm² 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/mm² >415 HBN		●	45 - 95								●	50 - 110		●	50 - 105						
		Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80									45 - 100			40 - 95						

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)

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

Stellram®
Cutting Tool Systems

Milling

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

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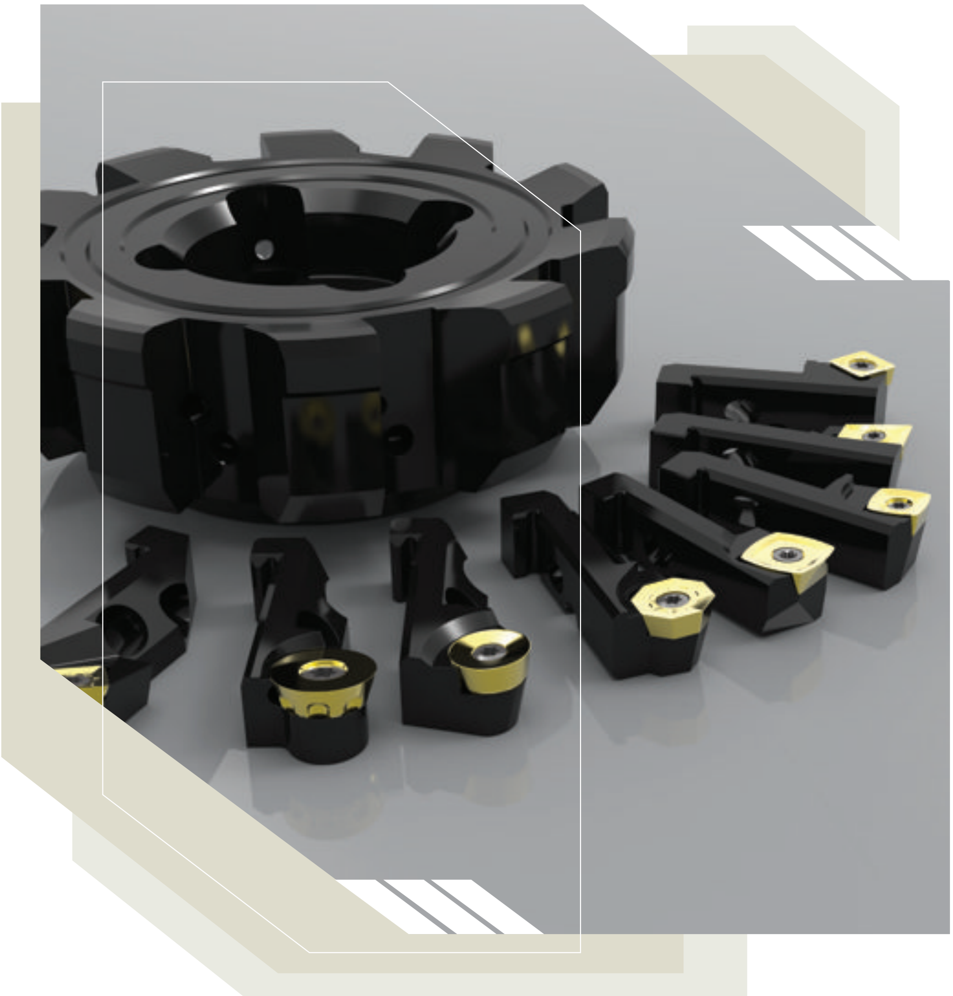
8000V-8010V Face Milling Cutter Series

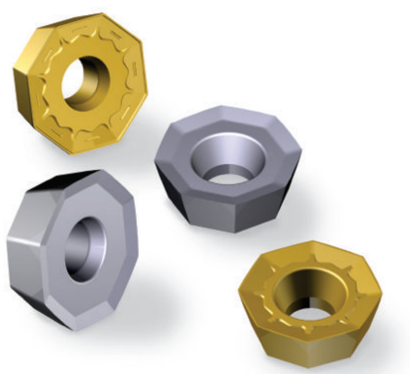
VERSATILE CARTRIDGE MILLING CUTTERS

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 0,04mm.

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





8000V-8010V Face Milling Cutter

Facing | Shoulder / Profiling / Slotting | Ramping | Pocketing | Helical Interpolation | Helical Interpolation with Bore Hole | Spiral / Circular

8000V Cutter

8000V CUTTERS WITH UNEQUAL PITCH

The cutters in the 8000V series (Ø 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. 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

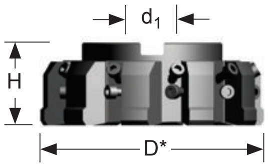
For machining High Temperature Alloys, we have modified our milling cutters with cartridges. Available in Ø 100 – 200mm, the bodies of the 8010V milling cutters have the same characteristics as the 8000V body but the distribution of the teeth is regular. The number of teeth is equal to that of the 8000V 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 169 - 172.
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.

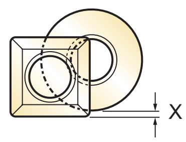
81 FS 00 Cartridge

Product		Spares							
EDP	Item Description	X" Adjustment Range (mm)	*EDP*	Insert	*EDP*		*EDP*	Adjusting	Insert Style
Finishing Cartridge & Spares									
014953	**81FS00R-12**	0,03-0,05	*015266*	D5013T	*105241*	T20	*016858*	72.602	SPHX12....

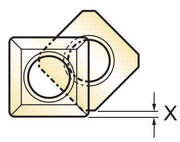
These cartridges, have a fine adjusting set screw and are set according to the dimension (axial shift) "X".
X = 0,03 - 0,05 mm
(X = 0,02 mm with a pressed insert with a nose radius).

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



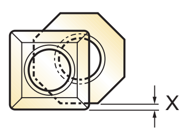
8000VR 00



8000VS / VSE 45

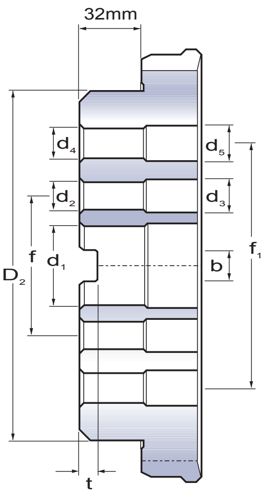
The following series assemblies with a wiper inserts are not possible:

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



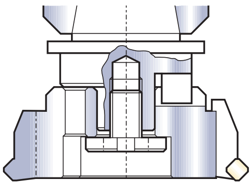
8000VOD 45

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



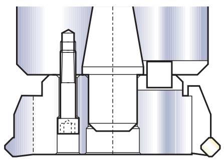
80.0V Cutters Mounting & Attachment Dimensions (mm)

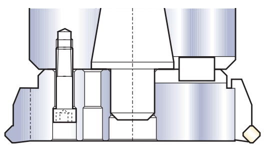
Ø Cutter D	Fixation Bore / Pilot	d_1 H7	D_2	f	f_1	d_2	d_3	d_4	d_5	b1	t
Ø 100	Ø 32 mm	32	53	-	-	-	-	-	-	14,40	8
Ø 125	Ø 40 mm	40	77	-	-	-	-	-	-	16,40	9
Ø 160	Ø 40 mm	40	100	66,70	-	14	20	-	-	16,40	9
Ø 200	Ø 60 mm	60	136	101,60	-	18	26	-	-	25,70	14
Ø 250	Ø 60 mm	60	180	101,60	-	18	26	-	-	25,70	14
Ø 315	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.

80.0VA90-_R-16 Series

Cartridge Shoulder Milling Cutter

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.

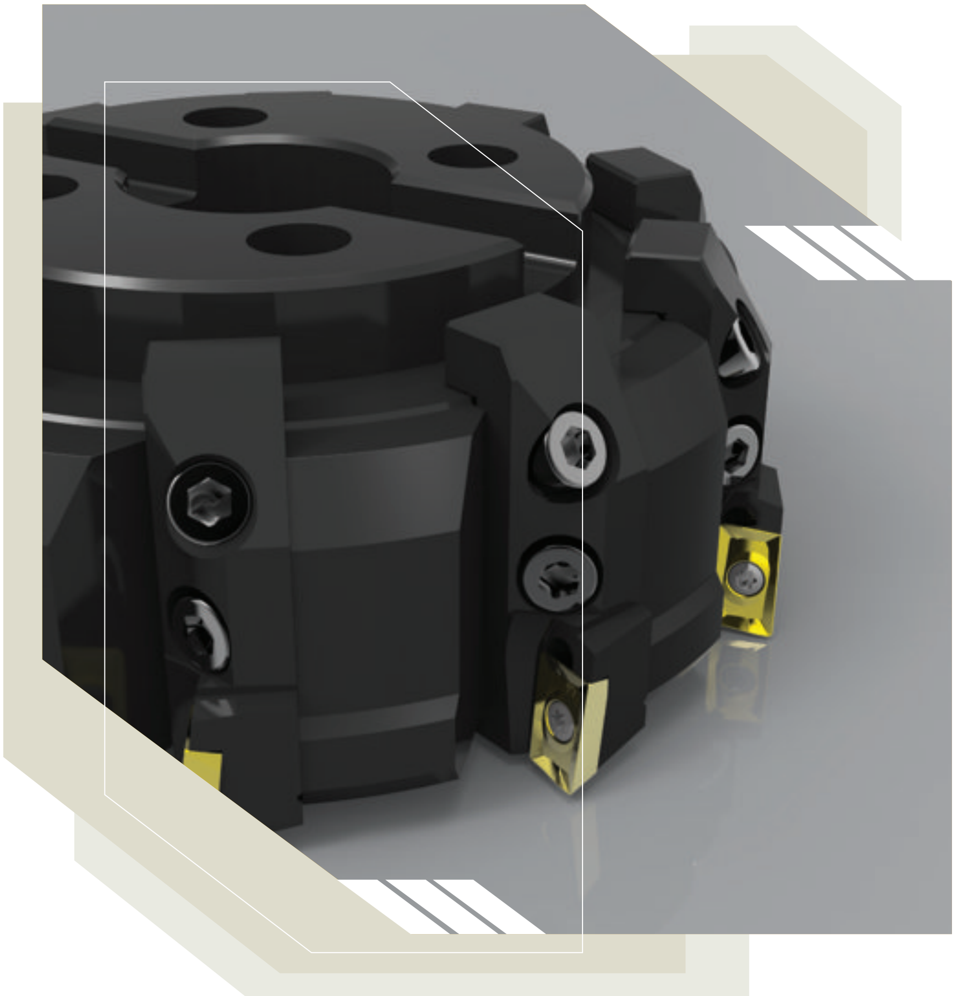
This cutter series is available in two different versions, both with medium pitch.

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.

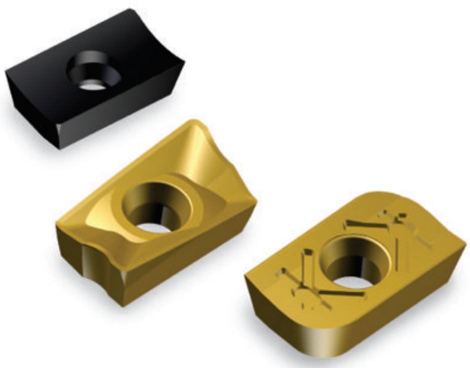


8000VA90-_R-16:
Maximum a_p = 16mm
Effective Cutting Diameter
Range = 106mm to 406mm

* Denotes non stock items diameter 321mm - 406mm

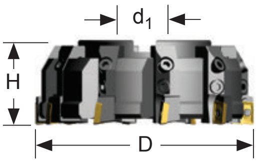
8010VA90-_R-16:
Maximum a_p =16mm
Effective Cutting Diameter
Range = 106*mm to 206*mm

* Denotes non stock items.



80.0VA90-_R-16

Shoulder Milling Cutter Assemblies



Cutter Body & Cartridges

Shoulder / Profiling / Slotting

Facing

Product		Dimensions (mm)					Spares				
EDP	Item Description	D Effective Cutting Diameter	H	d_1	ap 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.

80VA90R-16

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.

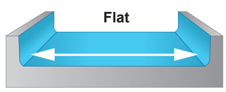
Note: When using inserts with a radius larger than 2,0mm the cartridges need to be modified for additional clearance by the end user.

Note: Mounting instructions refer to pages 169 - 172.

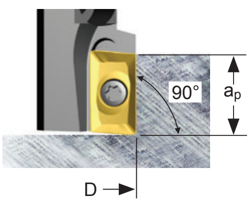
80.VA90-_R-16 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap 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.

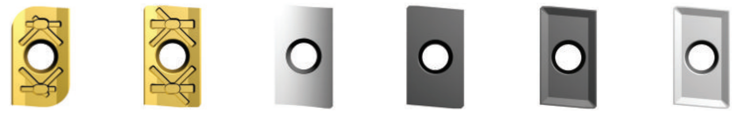


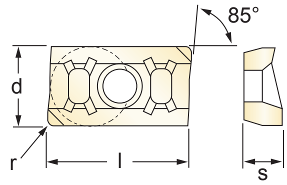
Facing Pitch



Depth of Cut (ap)

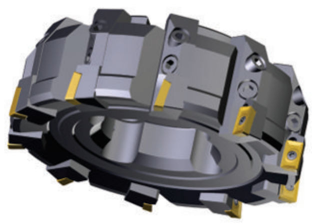
80.0VA90-_R-16





Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼ Depth of Cut (mm) a_p max. 16,00	Semi-Finishing ▼▼ Depth of Cut (mm) a_p min. - max. 1,50 - 5,00	Finishing ▼▼▼ Depth of Cut (mm) a_p min. - max. 0,10 - 1,50	d (IC)	l	s	r	h_m min
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 9.



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 123. Speed recommendations can be found on page 124.

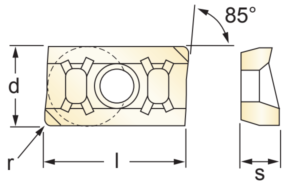
80.0VA90-_R-16


APHT16-46


APET16-48


APKT16-43


APKT16-45



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	Item Description	Grade	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			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 9.

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

Note: Feed recommendations can be found on page 123. Speed recommendations can be found on page 124.

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	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.
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 124.

80.0VA90-_R-16 Recommended Speeds

Speed v_c (m/min)

80.0VA90-_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			PVD Standard			CVD Standard			CVD Standard			Uncoated Micrograin
					X400			X500			SP6519			SP4019			MP91M			SC3025			GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN				◉	●	130 - 270	◉	●	130 - 295					●	140 - 345						
P	Unalloyed Steel	<950 N/mm² <280 HBN						115 - 240			115 - 260						120 - 305						
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	◉	●	95 - 200	◉	●	100 - 210	◉	●	100 - 230					●	105 - 270						
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 205						
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 130						
M	Stainless Steel	Austenitic + Ferritic 300 series				◉	●	115 - 250	◉	●	115 - 270	◉	●	120 - 280									
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250									
M	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120												
K	Cast Iron	Grey GG-Ft														●	145 - 365		●	150 - 395	◉	●	135 - 290
K	Cast Iron	Spheroidal-Ductile GGG-FGS															115 - 285			120 - 335			120 - 245
K	Cast Iron	Malleable GTS - MN/MP															105 - 260			105 - 275			115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2895							●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2320									295 - 2440
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55	●		24 - 63									
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48			23 - 52									
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55			26 - 59									
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79			37 - 84									
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105						
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80									40 - 90			40 - 95						

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

EU Patent #EP 1689 548 BI / # EP 1897 643 BI
US Patent #7,220,083 / #7,600,952 / #7,806,634 / # 7,988,387 / #8,162,152

8000VXD92-_R-12:
Maximum a_p = 2,50mm
Diameter Range =
106mm to 256mm

8010VXD92-_R-12:
Maximum a_p = 2,50mm
**Diameter Range =
106mm to 256mm

**Denotes non stock
8010VXD92-_R-12 items
diameter 106mm to 256mm

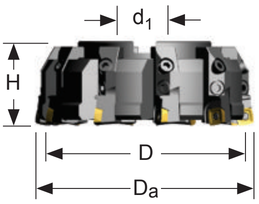
8000VXE92-_R-16:
Maximum a_p = 3,50mm
Diameter Range =
106mm to 256mm

8010VXE92-_R-16:
Maximum a_p = 3,50mm
**Diameter Range =
106mm to 256mm

**Denotes non stock
8010VXE92-_R-12 items
diameter 106mm to 256mm

80.0VXD92-_R-12

Cartridge High Feed Milling Cutter Assemblies



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*	D4012T	*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*	D4012T	*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	-	-

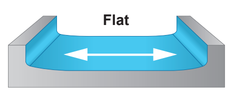
Note: Mounting instructions refer to pages 169 - 172.

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

80.0VXD92-_R-12 Technical Information (mm)

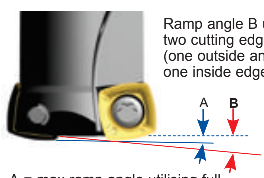
Product		Dimensions						
EDP	**Item Description**	Facing Pitch	Ramping Angle A°	Ramping Angle B°	Helical Hole min.	Helical Hole max.	ap max Helical / Linear	Max RPM
033161	**8000VXD92-100R-12**	87,95	0,31	0,47	192	210	1,80	10800
033162	**8000VXD92-125R-12**	112,95	0,24	0,36	242	260	1,80	9200
033163	**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.



Facing Pitch

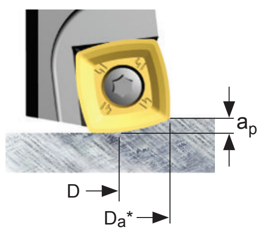
Ramp angle A uses one outside cutting edge only.



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 (ap)

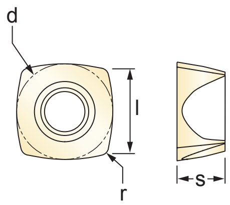
Stellram®
Cutting Tool Systems

XDLW12-D

XDLT12-D41

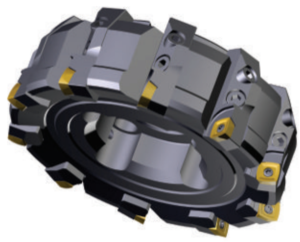
XDLT12-D721

XDLT12-D411



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 9.



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)

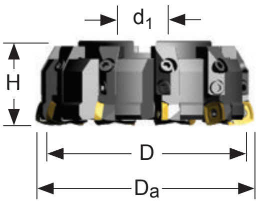
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium Based Alloys	Hard Steel >1400 N/mm² >415 HBN	Chilled Cast Iron >1400 N/mm²
			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 - 3,00	0,30 - 3,00	-	-	-	-	-	-	-	-	-	-	-	0,30 - 1,20	0,30 - 1,50
SR-D	X400	Slotting	0,30 - 2,50	0,30 - 2,50	-	-	-	-	-	-	-	-	-	-	-	0,30 - 0,80	0,30 - 1,00
SR-D	X500	Facing	-	0,30 - 2,80	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	2,00 - 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 130.

80.0VXE92-_R-16

Face Milling Cutter Assemblies



Cutter Body & Cartridges

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	7,60
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	7,60
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

80VX92R-16

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	7,60	022646	7065	-	-

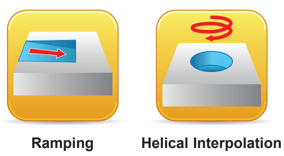
Note: Mounting instructions refer to pages 169 - 172.

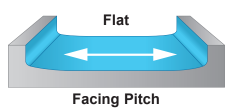
Note: XE..1605.., X-Style cutter assemblies cannot utilise the finishing wiper cartridges.

80.0VXE92-_R-16 Technical Information (mm)

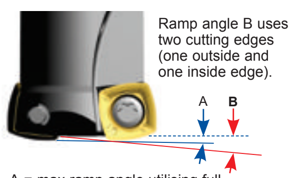
Product		Dimensions						
EDP	Item Description	Facing Pitch	Ramping Angle A °	Ramping Angle B °	Helical Hole min.	Helical Hole max.	ap max Helical / Linear	Max RPM
033207	8000VXE92-100R-16	82,15	0.39	0.47	186	210	2,50	10800
033208	8000VXE92-125R-16	107,15	0.29	0.36	236	260	2,50	9200
033209	8000VXE92-160R-16	142,15	0.22	0.27	306	330	2,50	7800
033210	8000VXE92-200R-16	182,15	0.17	0.20	386	410	2,50	6800
033211	8000VXE92-250R-16	232,15	0.13	0.16	486	510	2,50	5900
033212	8010VXE92-100R-16**	82,15	0.39	0.47	186	210	2,50	10800
033213	8010VXE92-125R-16**	107,15	0.29	0.36	236	260	2,50	9200
033214	8010VXE92-160R-16**	142,15	0.22	0.27	306	330	2,50	7800
033215	8010VXE92-200R-16**	182,15	0.17	0.20	386	410	2,50	6800

** Denotes non stock items.



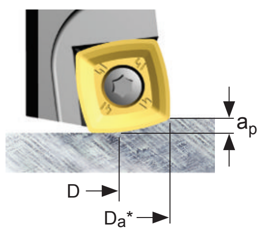


Ramp angle A uses one outside cutting edge only.



A = max ramp angle utilising full face contact

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

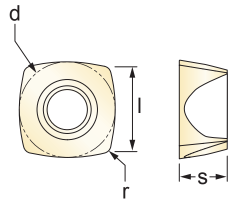


Depth of Cut (ap)

Stellram® Cutting Tool Systems

XELW16-D

XELT16-D41



Product			Application & Material			Dimensions (mm)				
			Facing	Slotting	Plunging					
			Depth of Cut (mm)							
EDP	**Item Description**	**Grade**	a_p max. 3,50	a_p max. 3,00	a_e max. -	d (IC)	l	s	r	h_m min
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 9.

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	Aluminium & Alloys <16% Si	Aluminium & 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.
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	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 130.

Speed v_c (m/min)

80.0VX.92 Series

Wear Resistance: – ⟷ +

Speed min. - max.

Coolant Recommendation: Recommended ● Possible ⦿

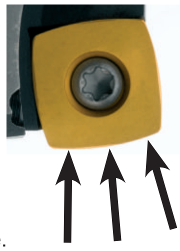
ISO	Materials	Rm and Hardness	X400 wet	X400 dry	PVD X Grade X400	X500 wet	X500 dry	CVD X Grade X500	SP6519 wet	SP6519 dry	PVD Standard SP6519	GH2 wet	GH2 dry	Uncoated Micrograin GH2	SC6525 wet	SC6525 dry	CVD Standard SC6525	SC3025 wet	SC3025 dry	CVD Standard SC3025
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	120 - 260				⦿	●	130 - 295				⦿	●	140 - 370			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			105 - 230						115 - 260						120 - 325			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230				⦿	●	105 - 290			
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 210			
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 140			
M	Stainless Steel	Austenitic + Ferritic 300 series				⦿	●	115 - 250	⦿	●	115 - 270									
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235									
M	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120									
K	Cast Iron	Grey GG-Ft							⦿	●	140 - 295						145 - 390			150 - 395
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240					●	115 - 305		●	120 - 335
K	Cast Iron	Malleable GTS - MN/MP									100 - 220									105 - 275
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2745						
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2135						
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55									
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48									
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55									
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79									
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		●	45 - 95															
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			35 - 80															

Stellram® Cutting Tool Systems

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

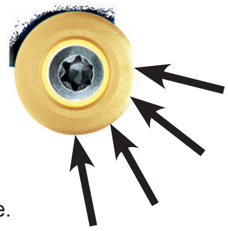
The unique design of the insert, approach angle and the cutter body ensure the cutting forces are predominantly directed in the axial direction. The example shown with a round insert tool shows complex forces which result in high levels of vibration and damage to the cutting edge.

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



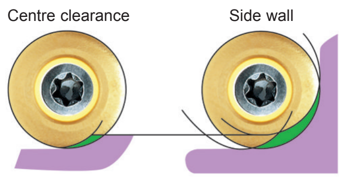
- Tangential forces act around the radius.
- Leads to vibration and damage of the cutting edge.
- Leads to reduced feed and lower productivity.

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.

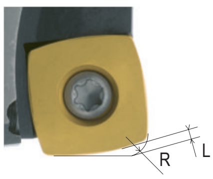


Round insert

- 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)

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

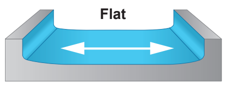
Facing Pitch, Ramp Angle, Helical Interpolation and Max RPM Capacity for 80.0VX.92 Series (mm)

Product		Dimensions								
Insert Size	Item Description	D Effective Cutting Diameter	D_a*	Facing Pitch	Ramping Angle A°	Ramping Angle B°	Helical Hole min.	Helical Hole max.	a_p max Helical / Linear	Max RPM
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

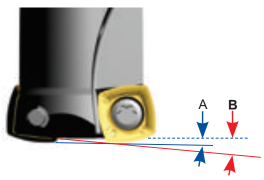
* Denotes non stock items.


Ramping


Helical Interpolation



Facing Pitch



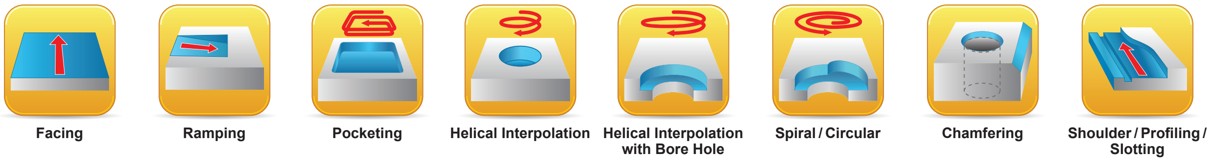
Ramp angle A uses one outside cutting edge only.

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

80.0VOD45-_R-04 & -06 Series Cartridge Face Milling Cutter



42° CARTRIDGE FACE MILLING ASSEMBLIES
The **80.0VOD45** cutters are designed to machine all materials. Octagonal inserts offer up to eight economical cutting edges.

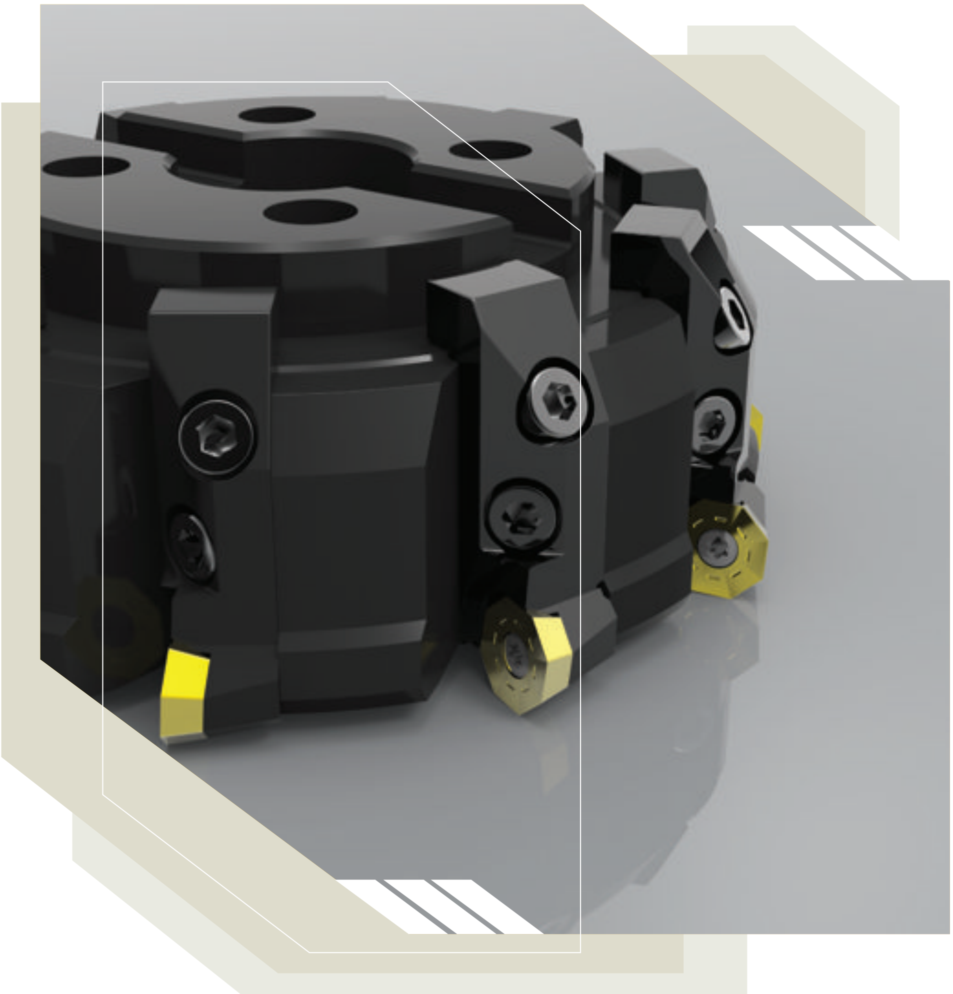
80.0VOD45 cutters are assembled with cartridges for OD..0404.. or OD..0605.. milling inserts for face milling applications.

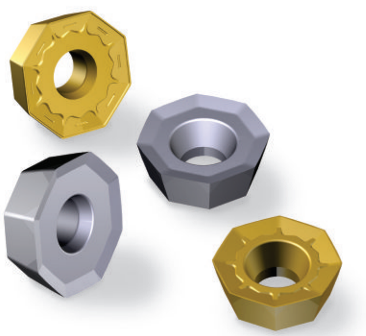
The cutters series **8000VOD45** has an unequal medium pitch for reducing vibration and is for roughing, semi-finishing and finishing of Steel, Steel Alloys, Stainless Steel, Cast Iron and Aluminium Alloys.

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:
Maximum a_p = 3,50mm
(a_p1 max = 8mm)
Effective Cutting Diameter
Range = 100mm to 400mm

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

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

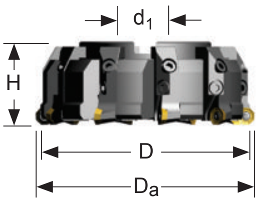
80.0VOD45-_R-06:
Maximum a_p = 4,50mm
(a_p1 = 10mm)
Effective Cutting Diameter
Range = 100mm to 400mm

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

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

80.0VOD45-_R-04

Face Milling Cutter Assemblies



Cutter Body & Cartridges

Product		Dimensions (mm)							Spares				
EDP	Item Description	D Effective Cutting Diameter	D_a*	H	d_1	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					
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	*015270*	F4011T	*015241*	T20	3,10
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					
021937	**8010VOD45-125R-04****	125	133	63	40	3,50	8,00	8	*015270*	F4011T	*015241*	T20	3,10
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.

D_a* = Outside Diameter

80VOD45R-04

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

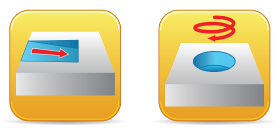
Note: Mounting instructions refer to pages 169 - 172.

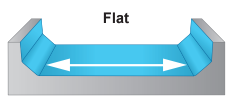
81FS00R-12

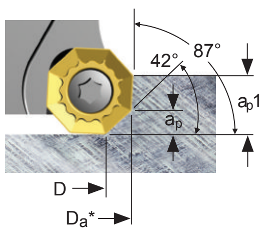
80.0VOD45-_R-04 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap max Helical / Linear	Max RPM
021837	**8000VOD45-100R-04**	100	0.17	196	214	2,00	10800
021838	**8000VOD45-125R-04**	125	0.14	246	264	2,00	10000
021839	**8000VOD45-160R-04**	160	0.11	316	334	2,00	8000
021840	**8000VOD45-200R-04**	200	0.09	396	414	2,00	6800
021841	**8000VOD45-250R-04**	250	0.07	496	514	2,00	5900
021842	**8000VOD45-315R-04****	315	-	-	-	-	5200
021843	**8000VOD45-400R-04****	400	-	-	-	-	4500
021936	**8010VOD45-100R-04****	100	0.17	196	214	2,00	10800
021937	**8010VOD45-125R-04****	125	0.14	246	264	2,00	10000
021938	**8010VOD45-160R-04****	160	0.11	316	334	2,00	8000
021939	**8010VOD45-200R-04****	200	0.09	396	414	2,00	6800

** Denotes non stock items.



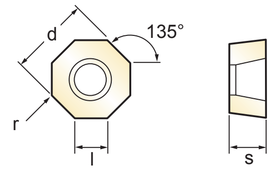




Depth of Cut (ap)

80.0VOD45-_R-04

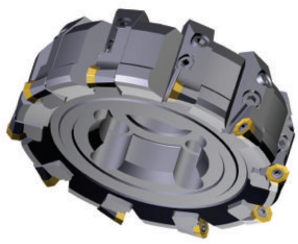
ODET04-441 | ODET04-44 | ODMT04-41 | ODMT04-412 | ODEW04-RA | ODMW04-SN | SPHX12-EN (wiper)



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. 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 9.

Note: Feed recommendations can be found on page 136. Speed recommendations can be found on page 137.



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)							
			a_p max. -	a_p min. - max. -	a_p 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 9.

Note: Mounting instruction for wiper inserts refer to pages 169 - 172.

80.0VOD45-_R-04

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	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.
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 (fn 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 137.

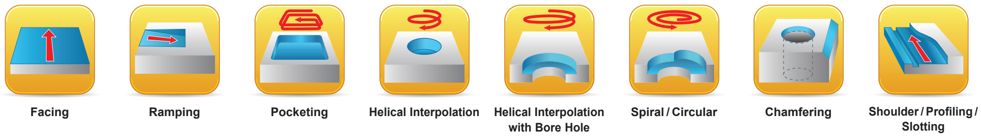
Speed v_c (m/min)

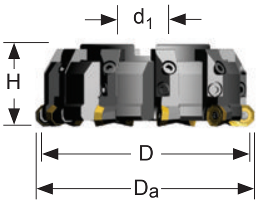
80.0VOD45-_R-04 Series			Wear Resistance – → + (Speed min. - max..)																				
Coolant Recommendation: Recommended ● Possible ⊙					CVD X Grade			PVD X Grade			PVD Standard			CVD Standard			CVD Standard			Uncoated Micrograin			Uncoated Cermet
ISO	Materials	Rm and Hardness			X500			X700			SP6519			MP91M			SC3025			GH1*			SA9608
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⊙	●	130 - 270				⊙	●	130 - 295		●	140 - 345					●	240 - 345		●	265 - 380
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			115 - 240						115 - 260			120 - 305						215 - 305			235 - 335
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⊙	●	100 - 210				⊙	●	100 - 230		●	105 - 270					●	190 - 270		●	205 - 295
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			75 - 160						75 - 175			80 - 205						140 - 205			155 - 225
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	50 - 100					●	50 - 110		●	50 - 130					●	90 - 130		●	100 - 145
M	Stainless Steel	Austenitic + Ferritic 300 series	⊙	●	115 - 250	⊙	●	115 - 260	⊙	●	115 - 270							⊙	●	215 -305	⊙	●	235 -335
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 230			105 - 235									195 - 275			215 - 305
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120							●		90 - 180	●		100 - 200
K	Cast Iron	Grey GG-Ft							⊙	●	140 - 295		●	145 - 365		●	150 - 395	⊙	●	135 - 290		●	280 -400
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240			115 - 285			120 - 335			120 - 245			220 -315
K	Cast Iron	Malleable GTS - MN/MP									100 - 220			105 - 260			105 - 275			115 - 200			200 -285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																●		400 - 3050			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																		295 - 2440			
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 52	●		23 - 55										●		50 - 75
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 46			22 - 48												48 - 70
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 53			25 - 55												52 - 75
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 75			36 - 79												60 - 95
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN																					
H	Hard Materials	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





Cutter Body & Cartridges

Product		Dimensions (mm)							Spares				
EDP	**Item Description**	D Effective Cutting Diameter	Da*	H	d_1	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

80VOD45R-06

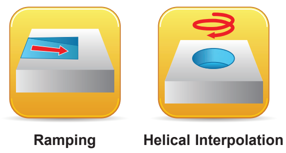
Product		Spares								
EDP	**Item Description**	*EDP*		*EDP*		Screw Tightening Nm	*Cartridge Screw EDP*		*Adjustment Screw EDP*	
Cartridge & Spares										
026587	**80VOD45R-06**	015270	F4011T	*015241*	T20	3,10	*022646*	7065	-	-
Finishing Cartridge & Spares										
014953	**81FS00R-12**	015266	D5013T	*015241*	T20	6,00	*022646*	7065	*0168*	602

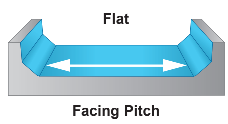
Note: Mounting instructions refer to pages 169 - 172.

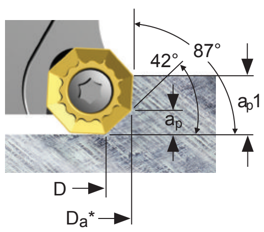
81FS00R-12

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.



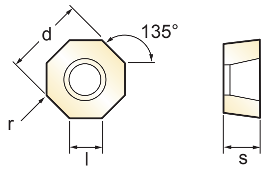




Depth of Cut (ap)

80.0VOD45-_R-06

ODET06-441 | ODET06-44 | ODMT06-41 | ODEW06-RA | ODMW06-TN | ODMW06-SN | SPHX12-EN (wiper)



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. 4,50	a_p min. - max. 1,00 - 2,00	a_p min. - max. 0,20 - 1,00	d (IC)	l	s	r	h_m min
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 9.

Note: Feed recommendations can be found on page 140. Speed recommendations can be found on page 141.

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.

Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max. -	a_p min. - max. -	a_p min. - max. 0,20 - 1,00	d (IC)	l	s	r	h_m min
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 9.

Note: Mounting instruction for wiper inserts refer to page 169.

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	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.
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 (fn in mm)

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
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 141.

80.0VOD45-_R-06 Recommended Speeds

Speed v_c (m/min)

80.0VOD45-_R-06 Series			Wear Resistance – → +																				
			Speed min. - max..																				
Coolant Recommendation: Recommended ● Possible ⦿					CVD X Grade			PVD Standard			PVD Standard			CVD Standard			CVD Standard			Uncoated Micrograin			Uncoated Cermet
ISO	Materials	Rm and Hardness	Wet	Dry	X500	Wet	Dry	SP6519	Wet	Dry	SP4019	Wet	Dry	MP91M	Wet	Dry	SC3025	Wet	Dry	GH1*	Wet	Dry	SA9608
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	130 - 270	⦿	●	130 - 295					●	140 - 345					●	240 - 345		●	265 - 380
		<950 N/mm^2 <280 HBN			115 - 240			115 - 260						120 - 305						215 - 305			235 - 335
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	100 - 210	⦿	●	100 - 230					●	105 - 270					●	190 - 270		●	205 - 295
		950-1200 N/mm^2 280-355 HBN			75 - 160			75 - 175						80 - 205						140 - 205			155 - 225
		1200-1400 N/mm^2 355-415 HBN		●	50 - 100		●	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				⦿	●	140 - 295					●	145 - 365		●	150 - 395	⦿	●	135 - 290		●	280 -400
		Spheroidal-Ductile GGG-FGS						110 - 240						115 - 285			120 - 335			120 - 245			220 -315
		Malleable GTS - MN/MP						100 - 220						105 - 260			105 - 275			115 - 200			200 -285
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 - 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								●	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.

Stellram® Cutting Tool Systems

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 $\frac{0,08}{0,669}$ = 0,12mm 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)

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

Facing

45° CARTRIDGE FACE MILLING ASSEMBLIES
The robust cutter series 8000VS45-_R-12 is combined with SC..12M5.. square insert.

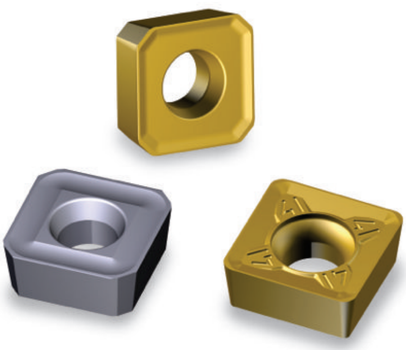
8000VS45-_R-12 cutters are assembled with 45° cartridges for face milling applications.

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° degrees 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.

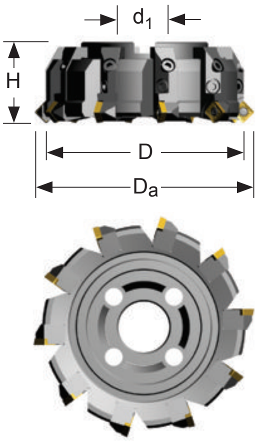
8000VS45.. series can be assembled with a particular wiper cartridge for finishing when a fine finished surface is required. The corresponding pocket on the body for the finishing cartridge is marked with a “F” .



8000VS45-_R-12:
Maximum a_p = 7mm
Effective Cutting Diameter Range = 100mm to 400mm

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

Facing



Cutter Body & Cartridges

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
8000VS45-_R-12 Bodies with Unequal Medium Pitch & Cartridge												
021851	**8000VS45-100R-12**	100	115	68	32	7	6					
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	*015266*	D5013T	*015241*	T20	6,00
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.

80VS45R-12

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

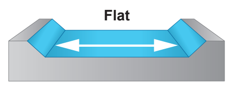
Note: Mounting instructions refer to pages 169 - 172.

81FS00R-12

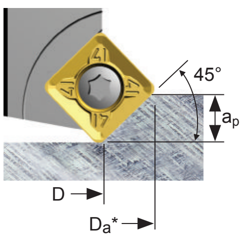
8000VS45-_R-12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p 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.

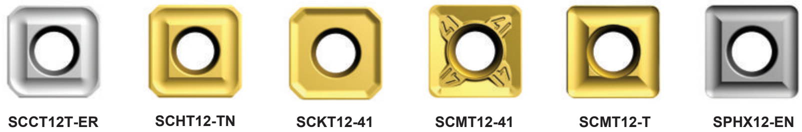


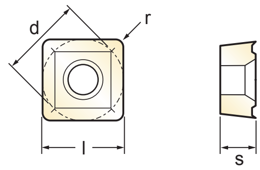
Facing Pitch



Depth of Cut (a_p)

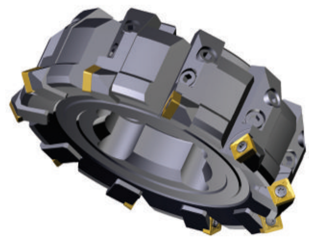
8000VS45-_R-12





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 - 3,50	a_p 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 9.



INSERT APPLICATION NOTES:
All inserts with a radius should only be used for semi roughing applications, where a finished surface is not required.

Note: Feed recommendations can be found on page 146. Speed recommendations can be found on page 147.

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 9.

Note: Mounting instruction for wiper inserts refer to page 169.

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 147.

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 X400			CVD X Grade X500			PVD Standard SP6519			PVD Standard SP4019			CVD Standard MP91M			Uncoated Micrograin GH1*			Uncoated Cermet SA9608
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	120 - 260				⦿	●	130 - 295					●	140 - 345		●	230 - 345		●	265 - 380
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			105 - 230						115 - 260						120 - 305			215 - 305			235 - 335
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	95 - 200				⦿	●	100 - 230					●	105 - 270		●	190 - 270		●	205 - 295
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 150						75 - 175						80 - 205			140 - 205			155 - 225
P	Alloyed Steel	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
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250						195 - 275			215 - 305
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 255			115 - 285			120 - 245			220 -315
K	Cast Iron	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																					
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																					
S	High Temperature Alloys	Iron Based																					
S	High Temperature Alloys	Cobalt Based																					
S	High Temperature Alloys	Nickel Based																					
S	High Temperature Alloys	Titanium Based																					
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105						
H	Hard Materials	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 $\frac{0,08}{0,707}$ = 0,113mm 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)

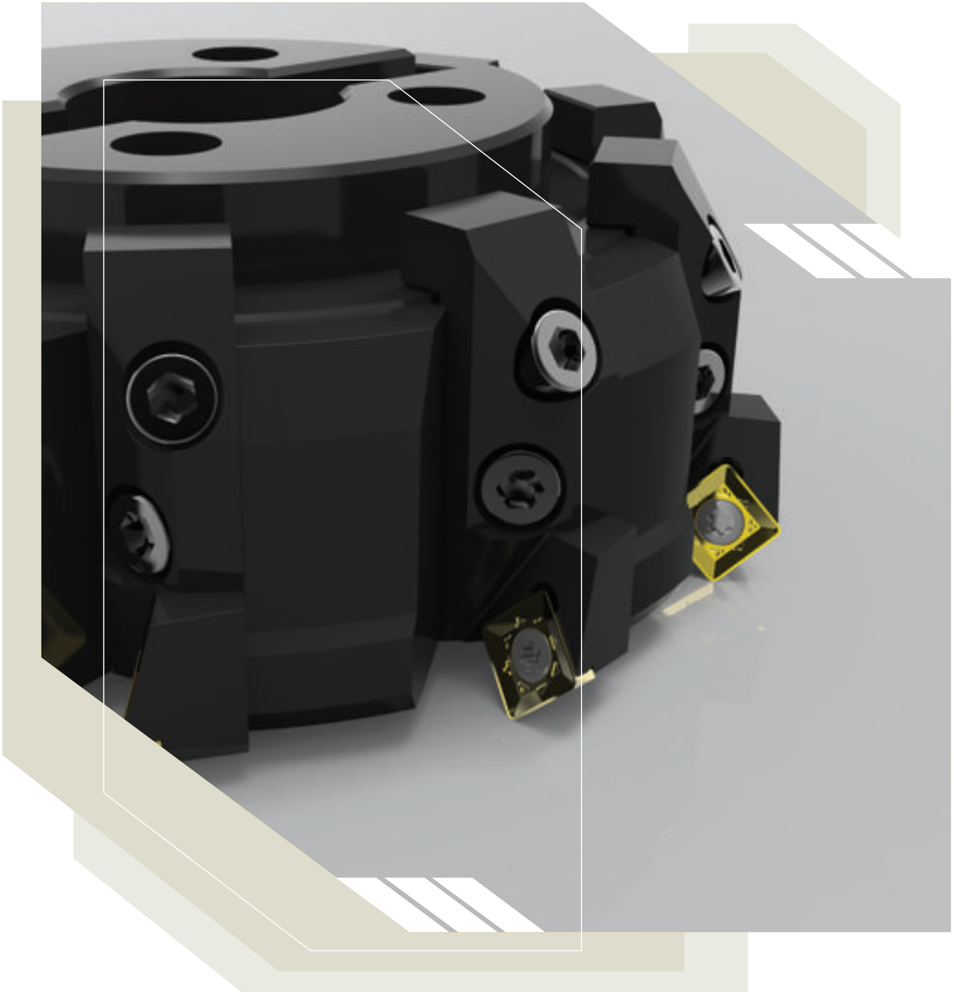
$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

80.0VSE45-_R-12 Series

Cartridge Face Milling Cutter

Facing

Spiral / Circular



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”.

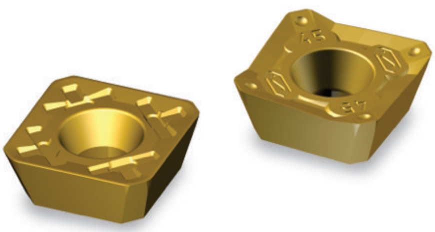
Note: The 8010 series are not possible to assemble with a wiper cartridge.

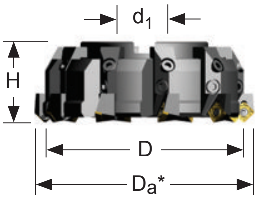
8000VSE45-_R12:
Maximum a_p = 7,00mm
Effective Cutting Diameter
Range = 100mm to 400mm

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

8010VSE45-_R-12:
Maximum a_p = 7,00mm
Effective Cutting Diameter
Range = = 100mm to 200mm

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





Cutter Body & Cartridges

Facing

Spiral / Circular

Product		Dimensions (mm)						Spares				
EDP	Item Description	D Effective Cutting Diameter	D_a*	H	d_1	ap 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					
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	015270	F4011T	015241	T20	3,10
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					
021948	8010VSE45-125R-12**	125	140	63	40	7	8	015270	F4011T	015241	T20	3,10
021951	8010VSE45-160R-12**	160	175	63	40	7	10					
021954	8010VSE45-200R-12**	200	215	63	60	7	12					

* Denotes non stock items.

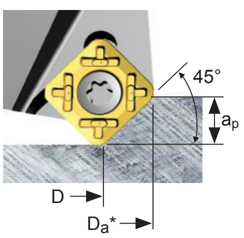
D_a* = Outside Diameter

80_VSE45_ R12

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	72.602

Note: Mounting instructions refer to pages 169 - 172.

81FS00R-12



Depth of Cut (ap)

Stellram®
Cutting Tool Systems

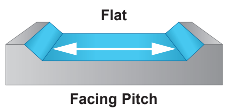
80.0VSE45-_R-12

Face Milling Cutter Assemblies

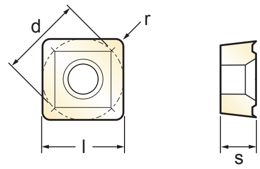
80.0VSE45-_R-12 Technical Information (mm)

Product		Dimensions					
EDP	**Item Description**	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
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.

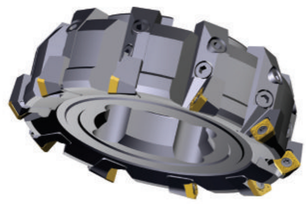


SDEX12-701 | SDCT12-FN | SDHT12-421 | SDKT12-45 | SDHT12-42 | SDCW12-TN | SDHW12-TN



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	ap max. 7,00	ap min. - max. 1,00 - 3,00	ap min. - max. 0,20 -1,00	d (IC)	l	s	r	hm min
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 154. Speed recommendations can be found on page 155.

Stellram® Cutting Tool Systems

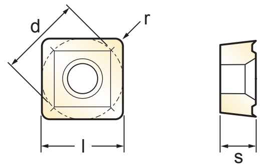
SDHT12-422

SDHT12-423

SDMT12-41

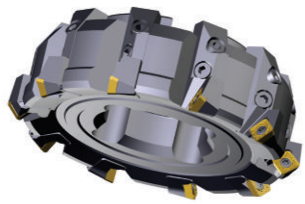
SDMW12

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 9.



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	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 9.

Note: Mounting instruction for wiper inserts refer to page 169.

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 154. Speed recommendations can be found on page 155.

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 155.

80.0VSE45-_R-12 Recommended Speeds

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 X400	💧	🚫	CVD X Grade X500	💧	🚫	PVD Standard SP6519	💧	🚫	PVD Standard SP4019	💧	🚫	CVD Standard MP91M	💧	🚫	Uncoated Micrograin GH1*	💧	🚫	Uncoated Cermet SA9808	💧	🚫	Uncoated Cermet SA9608
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	120 - 260	⦿	●	130 - 270	⦿	●	130 - 295					●	140 - 345		●	240 - 345		●	240 - 345		●	265 - 380
		<950 N/mm² <280 HBN			105 - 230			115 - 240			115 - 260						120 - 305			215 - 305			215 - 305			235 - 335
	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230					●	105 - 270		●	190 - 270		●	190 - 270		●	205 - 295
		950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 205			140 - 205			140 - 205			155 - 225
		1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 130		●	90 - 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										●		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/mm² >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105									
		Chilled Cast Iron >1400 N/mm² > 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 $\frac{0,08}{0,707}$ = 0,113mm 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)

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

Stellram® Cutting Tool Systems

Facing | Ramping | Pocketing | Helical Interpolation | Helical Interpolation with Bore Hole

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:

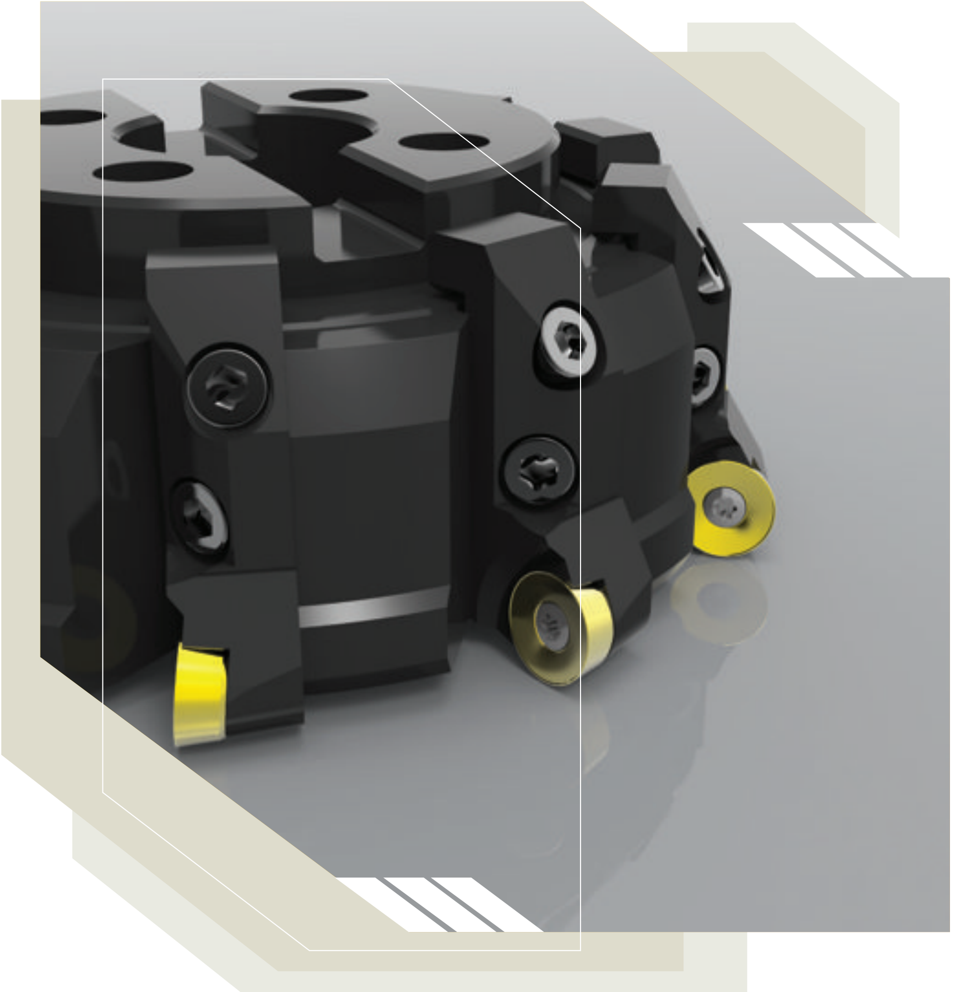
80.0VR00-_R-16 cutters are assembled with cartridges for RP..1606.. milling inserts for face milling applications. Available with medium pitch.

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.

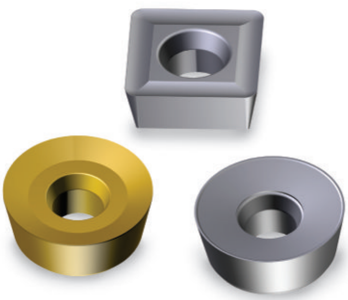


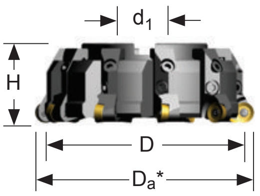
8000VR00-_R-16:
Maximum a_p = 8,00mm
Diameter Range Da* =
116mm to 416mm

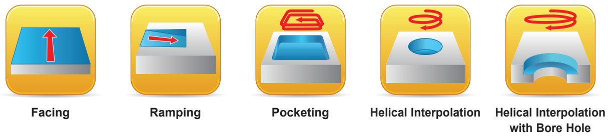
**Denotes non stock items
Diameter 331mm - 416mm

8010VR00-_R-16:
Maximum a_p = 8,00mm
Diameter Range Da* =
116mm to 216mm

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







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

Cutter Body & Cartridges

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 169 - 172.

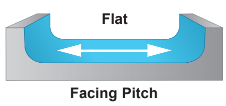
80VRP00R-16

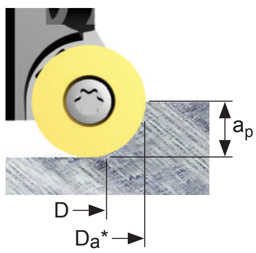
81FS00R-12

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

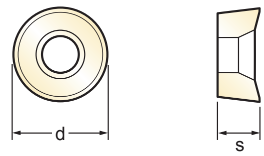
** Denotes non stock items.





Depth of Cut (ap)

RPMT16-41 RPHT16-S RPHT16-T SPHX12-EN



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. 8,00	a_p min. - max. 1,00 - 3,00	a_p 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 9.

RPHT1606MOS and RPHT1606MOT 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)							
			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	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 9.

Note: Mounting instruction for wiper inserts refer to page 169.

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	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.
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 160.

Speed v_c (m/min)

80.0VR00-_R-16 Series

Wear Resistance: – → +

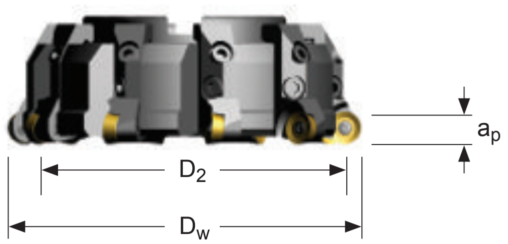
Speed min. - max.

Coolant Recommendation: Recommended ● Possible ◉

ISO	Materials	Rm and Hardness			PVD X Grade X400			CVD X Grade X500			PVD Standard SP6519			CVD Standard MP91M			Uncoated Micrograin GH1*			Uncoated Cermet SA9608
P	Unalloyed Steel	<600 N/mm² <180 HBN	◉	●	120 - 260	◉	●	130 - 270	◉	●	130 - 295					●	240 - 345		●	265 - 380
P	Unalloyed Steel	<950 N/mm² <280 HBN			105 - 230			115 - 240			115 - 260						215 - 305			235 - 335
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	◉	●	95 - 200	◉	●	100 - 210	◉	●	100 - 230					●	190 - 270		●	205 - 295
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175						140 - 205			155 - 225
P	Alloyed Steel	1200-1400 N/mm² 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
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235						195 - 275			215 - 305
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 285			120 - 245			220 -315
K	Cast Iron	Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 260			115 - 200			200 -285
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																		
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																		
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55							●		50 - 75
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48									48 - 70
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55									52 - 75
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79									60 - 95
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		●	45 - 95															
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 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	a_e = Radial Depth of Cut
h_m = Average chip thickness	a_p = Axial Depth of Cut
r = Insert radius	

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

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

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

80.0VR00-_R-20 Series

Cartridge Face Milling Cutter

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.

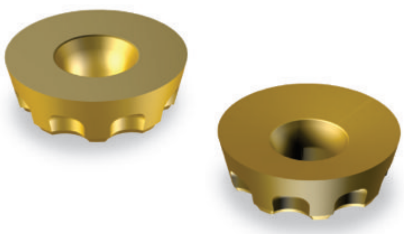
NOTE: The 80.0VR00-_R-20 series when mounted with cartridge 80VR00-_R-20 using RD..2006.. round button inserts cannot utilise the wiper cartridge for finishing, when a fine finished surface is required.

8000VR00-_R-20:
Maximum a_p = 10,00mm
Diameter Range Da* =
116mm to 416mm

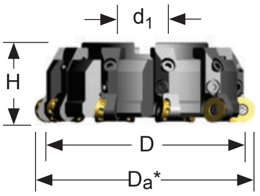
**Denotes non stock items diameter 331mm - 416mm

8010VR00-_R-20:
Maximum a_p = 10,00mm
Diameter Range Da* =
116mm to 216mm

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



Facing | Ramping | Pocketing | Helical Interpolation | Helical Interpolation with Bore Hole



Cutter Body & Cartridges

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
8000VR00-_ R-20 Bodies with Unequal Medium Pitch & Cartridges												
033139	8000VR00-100R-20	96	116	68	32	10,00	6					
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	029640	D6014T	015241	T20	10,50
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					
033147	8010VR00-125R-20**	121	141	63	40	10,00	8	029640	D6014T	015241	T20	10,50
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

80VRD00R-20

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 169 - 172.

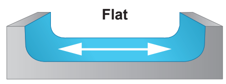
Note: RD..2006.. Round button cutter assemblies cannot utilise the finishing wiper cartridges.

80.0VR00-_R-20 Technical Information (mm)

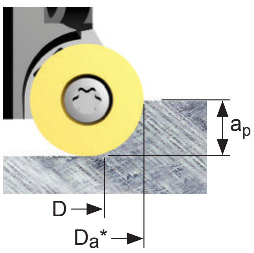
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole max.	a_p max Helical / Linear	Max RPM
033139	8000VR00-100R-20	96	3.30	194	230	5,00	10800
033140	8000VR00-125R-20	121	2.35	244	280	5,00	9200
033141	8000VR00-160R-20	156	1.80	314	350	5,00	7800
033142	8000VR00-200R-20	196	1.40	396	430	5,00	6800
033143	8000VR00-250R-20	246	1.10	494	530	5,00	5900
033144	8000VR00-315R-20**	311	1.00	624	660	5,00	5200
033145	8000VR00-400R-20**	396	0.75	794	830	5,00	4500
033146	8010VR00-100R-20**	96	3.30	194	230	5,00	10800
033147	8010VR00-125R-20**	121	2.35	244	280	5,00	9200
033148	8010VR00-160R-20**	156	1.80	314	350	5,00	7800
033149	8010VR00-200R-20**	196	1.40	396	430	5,00	6800

** Denotes non stock items.

Ramping | Helical Interpolation

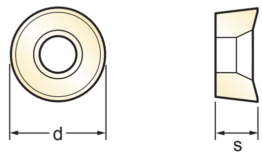


Facing Pitch



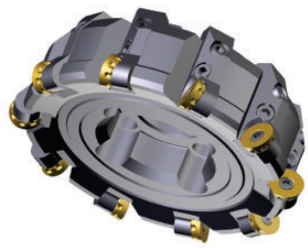
Depth of Cut (a_p)

Stellram®
Cutting Tool Systems



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 9.



INSERT APPLICATION NOTES:

RDHW2006MOE-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)

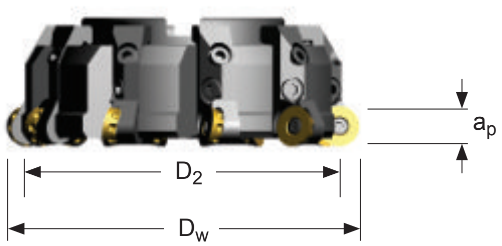
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 166.

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
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			115 - 240			115 - 260
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	100 - 210	⦿	●	100 - 230
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			75 - 160			75 - 175
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	50 - 100		●	50 - 110
M	Stainless Steel	Austenitic + Ferritic 300 series	⦿	●	115 - 250	⦿	●	115 - 270
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 235
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 120
K	Cast Iron	Grey GG-Ft	⦿	●	120 - 280	⦿	●	140 - 295
K	Cast Iron	Spheroidal-Ductile GGG-FGS			105 - 205			110 - 240
K	Cast Iron	Malleable GTS - MN/MP			95 - 170			100 - 220
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN						
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN						
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 55
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 48
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 55
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 79
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN						
H	Hard Materials	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

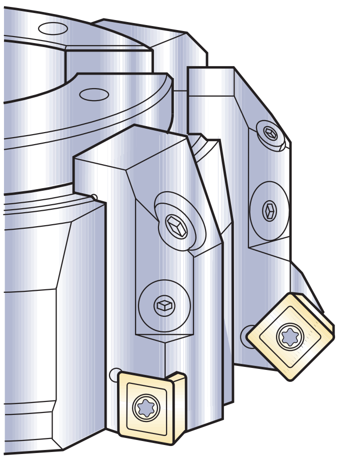
Formula: Average Chip Thickness (h_m)

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

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/2)	
			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.

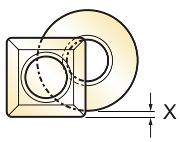
On the cutter series 8000V one, two or even three (according to diameter) of the roughing cartridges may be replaced by an 81 FS 00 R-12 finishing cartridge. One corresponding pocket is marked with an “F”.

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

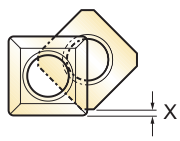
X = 0,03 - 0,05 mm

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

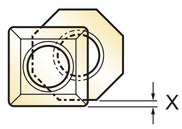
Maximum feed up to 3 mm/rev.



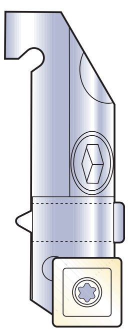
8000VR00 (R-16 only)



8000VS / VSE45



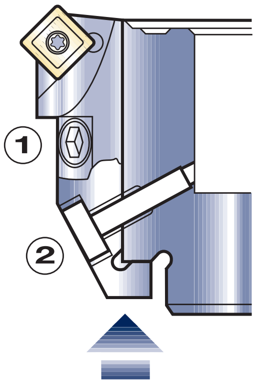
8000VOD45



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

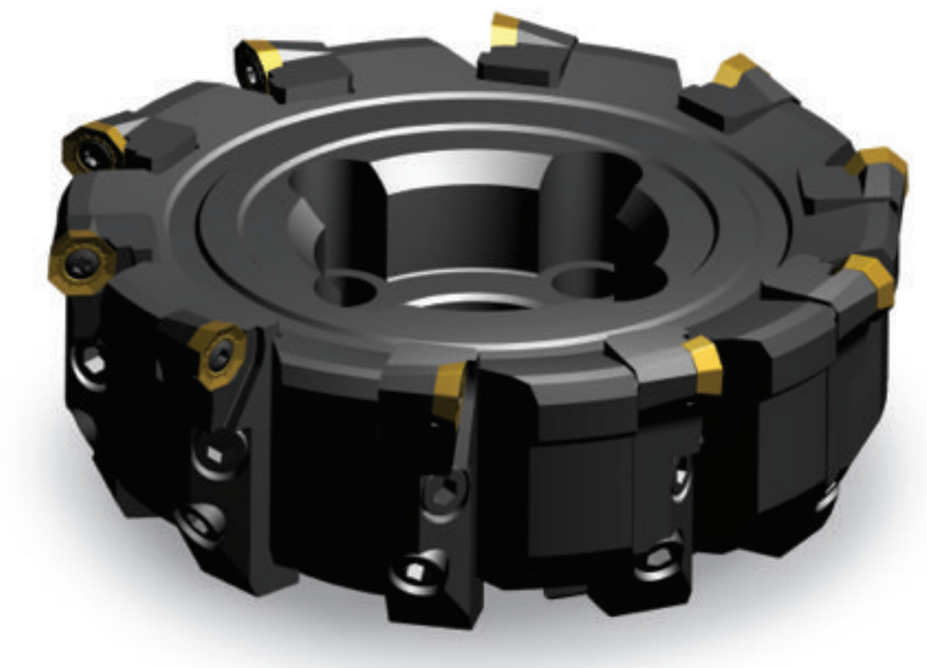


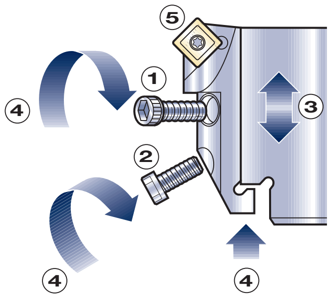
General Cartridge Mounting Instructions

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-µm.

A Mounting of Cartridges without Adjustment

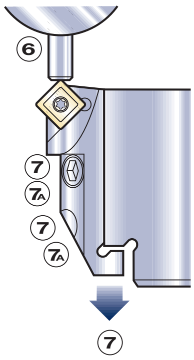
1. Lubricate the screw under the head and on the thread (preferably with copper paste).
2. Clean cartridges and their pockets located in the milling cutter.
3. Introduce the first cartridge into its pocket and check if it moves freely.
4. Introduce screw No. 1 and tighten it moderately whilst pushing 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

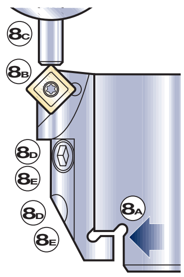
After height zero has been reached:

A Lock screw No. 1 securely with the extended allen key (tightening torque14 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.

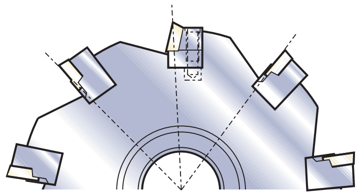
8. To adjust the other cartridges, proceed as follows:

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 a. cartridge with the mounted insert on the pre-setter in position 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 in **B 7. A** and **B**. Then tighten all screws Nr.2 moderately.

9. Once the mounting of the cartridges is complete, mount the indexable inserts.



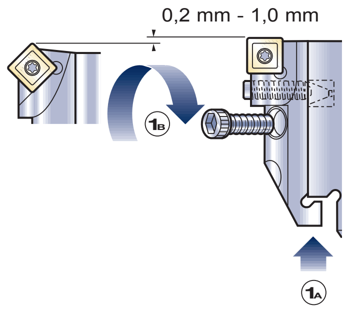
NOTE: By proceeding in this way with the mounting of cartridges, the insert seats should all be at a precise height (± 0,002); only variations in the insert dimensions will then influence the axial runout of the milling cutter.



C Mounting & Setting of the Finishing Cartridges

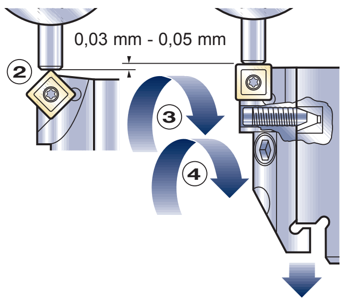
The 8000V series of milling cutters have no additional and independent pockets, but according to their diameter one, two or even three roughing cartridges can be replaced by one finishing cartridge - 81 FS 00 R-12. One corresponding pocket is marked with an “F”.

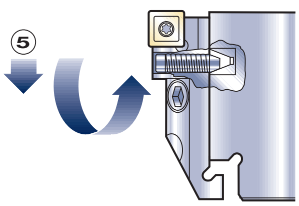
NOTE: When using two or even three finishing cartridges, their equal spacing on the milling cutter circumference must be ensured and the axial runout between the edges of the wiper inserts must be as small as possible.



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.

5210VS Series

Shoulder Milling Cutter

Shoulder / Profiling

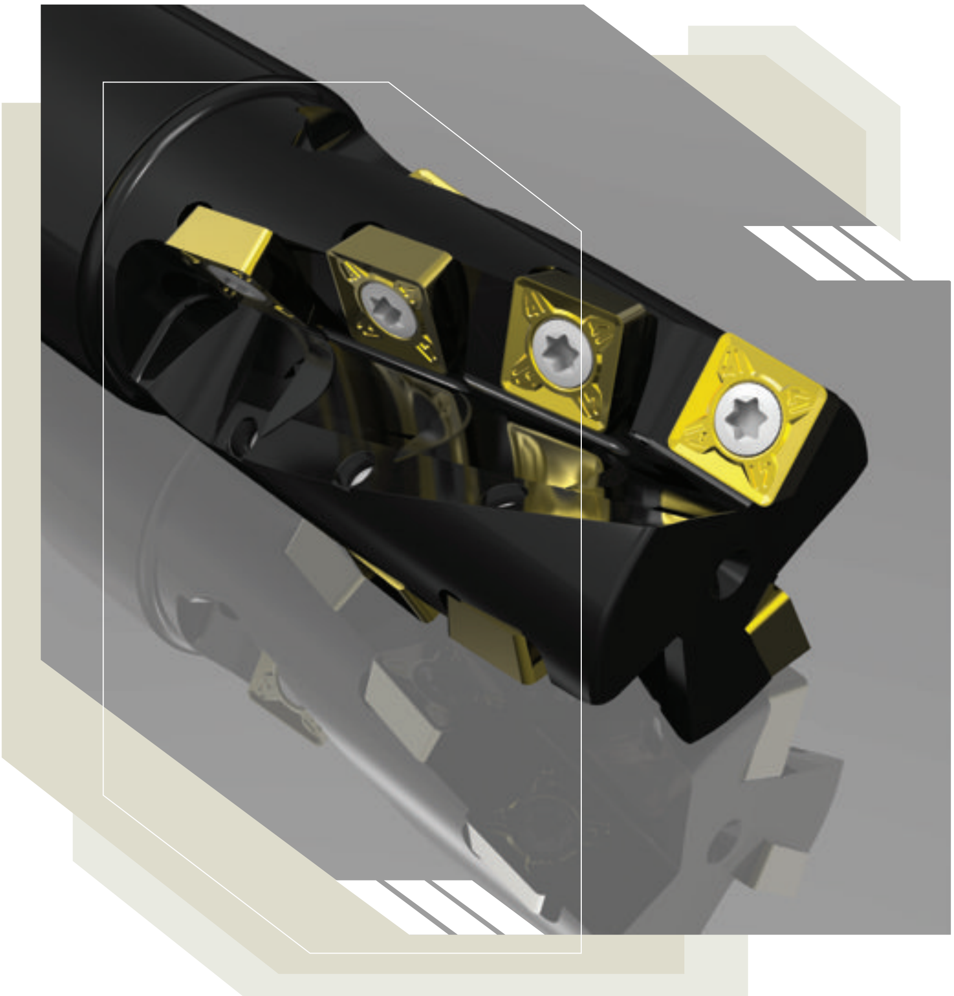
LONG EDGE MILLING CUTTER

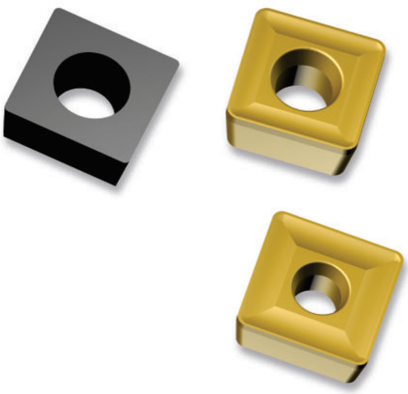
The teeth on **5210 VS** cutters are set with a pronounced left hand helix angle. The chosen angle allows, in most cases, at least two teeth to be engaged in the material continuously allowing a progressive attack on the material by each cutting stroke, thereby reducing insert fracture.

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.



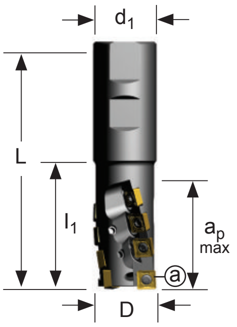


5210VS09:
Maximum a_p = 50mm
Diameter Range = 32mm only

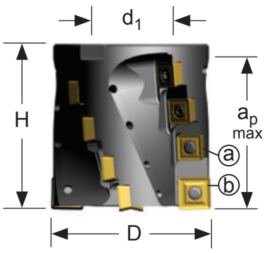
5210VS12:
Maximum a_p = 68mm for Diameter 80mm
77mm for Diameter 100mm
Diameter Range = 80mm to 100mm

5210VS

Shoulder Milling Cutter



Weldon Shank



Shell Mill Fixation

Shoulder / Profiling

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l_1	d_1	ap 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

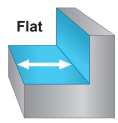
5210VS Assembly Information

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.		ap max Helical / Linear	Max RPM
015235	**5210VS09WA032R50**	32,00	-	-	-	-	35500
021656	**5210VS12-080R68**	80,00	-	-	-	-	20500
021657	**5210VS12-100R77**	100,00	-	-	-	-	18000



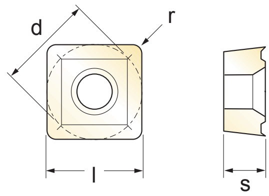
Facing Pitch


SCMT09-41


SCMT09-T


SOMT12-B


SOMT15-B



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_m min
				Depth of Cut (mm)							
				a_p max.*	a_p min. - max.	a_p 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
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 9.

* 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 176. Speed recommendations can be found on page 177.

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	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.
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 177.

Speed v_c (m/min)

5210VS Series

Wear Resistance: – ⟷ +

Speed min. - max.

Coolant Recommendation: Recommended ● Possible ⦿

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

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.

5230VS Series — Chevron Long Edge Milling Cutter (Porcupine)

Shoulder / Profiling / Slotting

HIGH PERFORMANCE LONG EDGE MILLING CUTTERS
The Stellram **5230VS09** and **VS12** Cutter Series is perfectly qualified for profiling and full slotting.

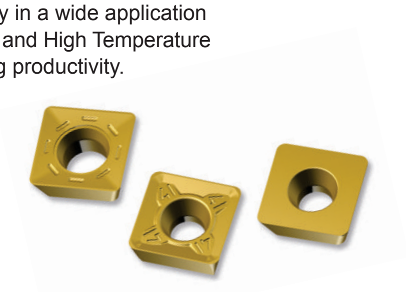
Designed for high material removal rates in Titanium and High Temperature Alloys. Several applications have shown metal removal rates of up to two times greater than the previous operating cutting parameters.

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

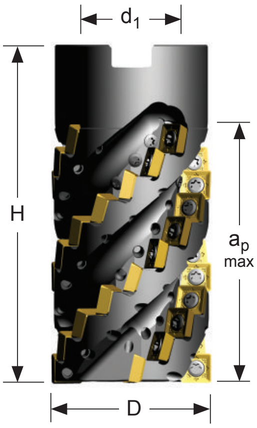
- Insert positioning provides smooth progressive penetration and cutting action for extended tool life.
- Individual coolant jets to each insert provides constant chip evacuation and temperature stability in the cutting zone.
- The advanced Chevron design improves stability and lowers power consumption, 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.



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)



Shell Mill Fixation


Shoulder / Profiling / Slotting

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
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. a_p 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	015062	F3006T	12	013214	T9	031582	SB-3621	34

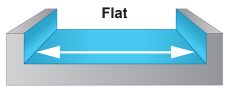
5230VS09 Torque Values and Spare Parts

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	031258	NLW-0.375	031268	M12-1.75 ISO x 30mm SHCS	80	100

** 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					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
031419	5230VS09-A050Z4R51	50	-	-	-	-	32500
031603	5230VS09-A050Z4R80	50	-	-	-	-	32500



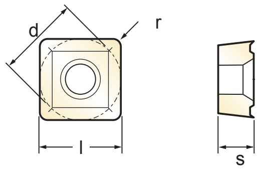
Facing Pitch

SDHT09-422

SDHT09-423

SDMT09-41

SDMW09-TN



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max* or a_e max.*	a_p max. and a_e max. 15% D**	a_p min. - max.	d (IC)	l	s	r	h_m min
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 9.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page 180.

* 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 182. Speed recommendations can be found on page 183.

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	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.
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.

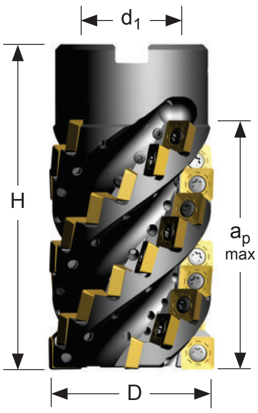
Speed recommendations can be found on page 183.

Speed v_c (m/min)

5230VS Series			Wear Resistance – → +								
			Speed min. - max.								
Coolant Recommendation Recommended ● Possible ◉					CVD X Grade			PVD Standard			CVD Standard
ISO	Materials	Rm and Hardness			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
		1200-1400 N/mm^2 355-415 HBN		●	50 - 100		●	50 - 110		●	50 - 130
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									

Stellram® Cutting Tool Systems

5230VS12 Chevron Long Edge Milling Cutter (Porcupine)



Shell Mill Fixation

Shoulder / Profiling / Slotting

Product		Dimensions (mm)								Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	a_p 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. a_p 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

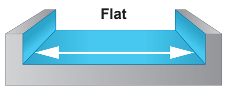
Cutter	Nord Lock Washer		Mounting Bolt		**Torque Values in Nm	
	EDP	Description	EDP	Description	Normal Condition	Excessive Condition
5230VS12-A063Z4R57	031258	NLW-0.375	031268	M12-1.75 ISO x 30mm SHCS	80	100
5230VS12-A063Z4R94						
5230VS12-A080Z5R65	031226	NLW-12SP	031269	M16-2 ISO x 40mm SHCS	110	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.		a_p 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

Flat



Facing Pitch

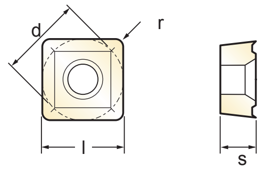
Stellram® Cutting Tool Systems


SDHT12-422


SDHT12-423


SDMT12-41


SDMW12



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max* or a_e max.*	a_p max. and a_e max. 15% D**	a_p min. - max.	d (IC)	l	s	r	h_m min
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 9.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page 184.

* 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 186. Speed recommendations can be found on page 187.

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	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.
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 187.

Speed v_c (m/min)

5230VS Series

Wear Resistance: – ⟷ +

Speed min. - max.

Coolant Recommendation
Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD Standard SP6519	Wet	Dry	CVD Standard MP91M
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	130 - 270	⦿	●	130 - 295		●	140 - 345
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			115 - 240			115 - 260			120 - 305
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	100 - 210	⦿	●	100 - 230		●	105 - 270
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			75 - 160			75 - 175			80 - 205
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	50 - 100		●	50 - 110		●	50 - 130
M	Stainless Steel	Austenitic + Ferritic 300 series	⦿	●	115 - 250	⦿	●	115 - 270			
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 235			
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 120			
K	Cast Iron	Grey GG-Ft	⦿	●	120 - 280	⦿	●	140 - 295		●	145 - 365
K	Cast Iron	Spheroidal-Ductile GGG-FGS			105 - 205			110 - 240			115 - 285
K	Cast Iron	Malleable GTS - MN/MP			95 - 170			100 - 220			105 - 260
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN									
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN									
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 55			
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 48			
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 55			
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 79			
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN									
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN									

Stellram® Cutting Tool Systems

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)

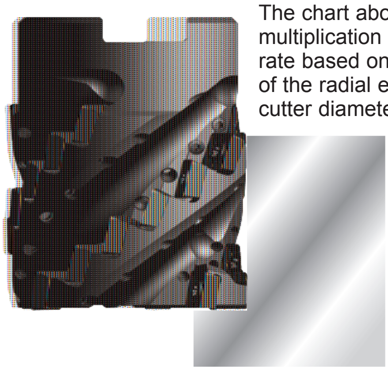
$$h_m = f_z \times \sqrt{\frac{a_e}{d}}$$

h_m Correction Coefficient Chart

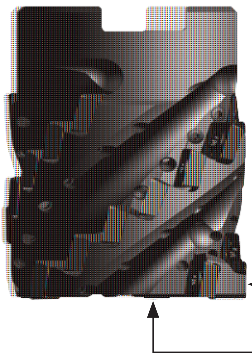
Cutter Ø 50mm			Cutter Ø 63mm			Cutter Ø 80mm			Cutter Ø 100mm		
a_e%	a_e (mm)	Coefficient Factor	a_e%	a_e (mm)	Coefficient Factor	a_e%	a_e (mm)	Coefficient Factor	a_e%	a_e (mm)	Coefficient Factor
5	2,50	2,30	**5**	3,15	2,30	5	4,00	2,30	**5**	5,00	2,30
10	5,00	1,66	**10**	6,30	1,66	**10**	8,00	1,66	**10**	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.

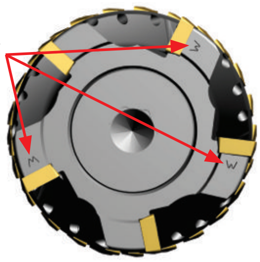
At 10%, your coefficient is 1,66 (see above table); therefore you must multiply your feed rate by 1,66 for correcting the feed for profiling.



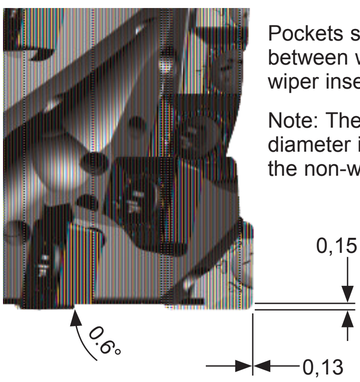
The chart above shows the multiplication factor for the feed rate based on the percentage of the radial engagement of the cutter diameter.



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.

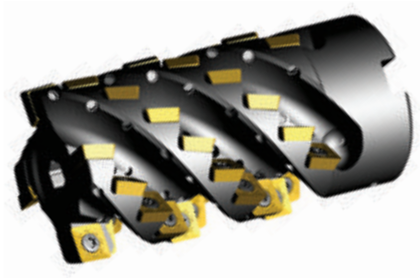
Cutter Diameter (mm)	No. of Wiper Inserts
50	2
63	2
80	3
100	3

Stellram® Cutting Tool Systems

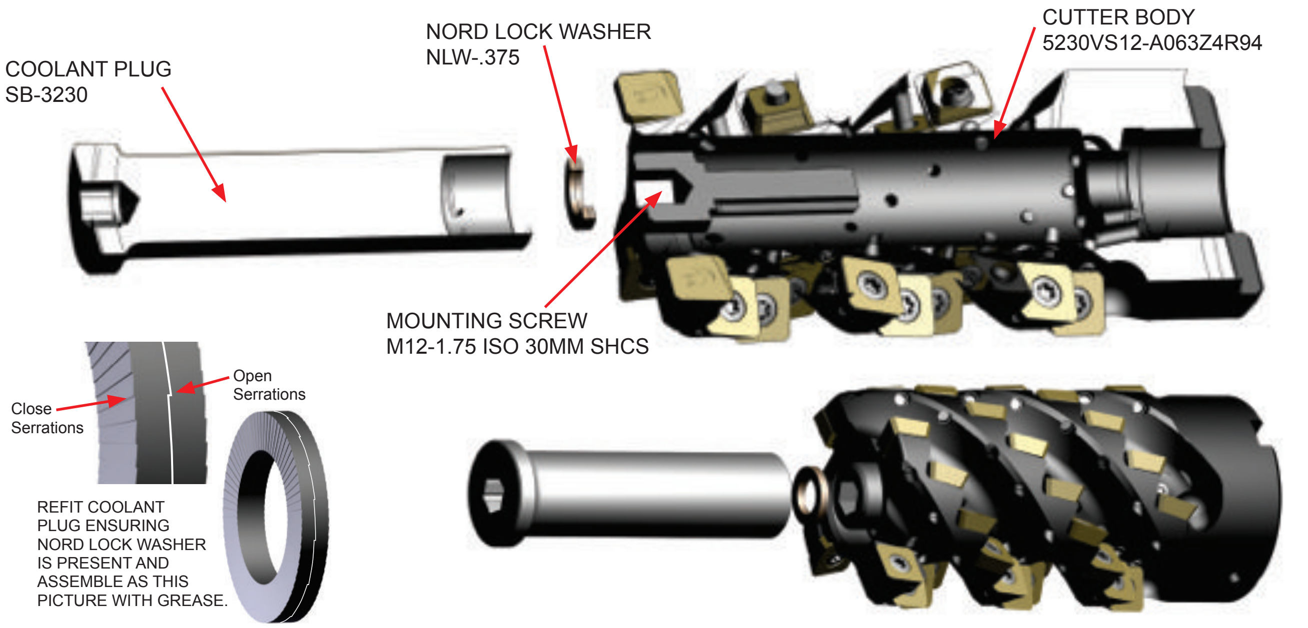
5230VS09 and VS12 Fitting Instructions for Shell Mill Cutters

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.



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 190) 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 190) Detail 2.

5. Note: If axial depth of cut (a_p) is less then 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	

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.

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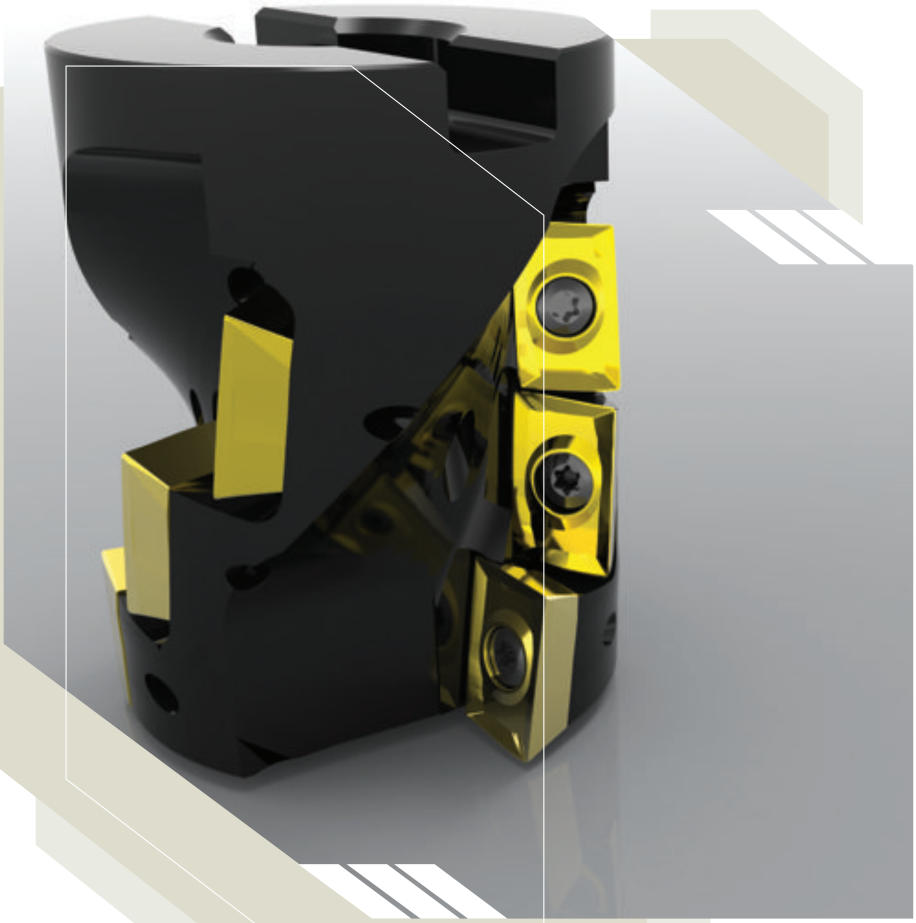
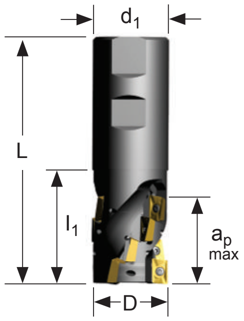
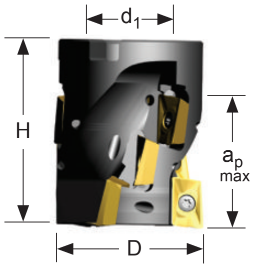


5315VA12:
Maximum a_p = 23mm to 45mm
Diameter Range = 25mm to 40mm

5315VA16:
Maximum a_p = 31mm to 61mm
Diameter Range = 50mm to 80mm



Weldon Shank



Shell Mill Fixation

Shoulder / Profiling / Slotting

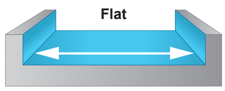
Product		Dimensions (mm)								Spares				
EDP	Item Description	D	L/H	l_1	d_1	a_p max	a_{p1} max Slotting*	No. of flutes	No. of inserts	EDP		EDP		Screw Tightening Nm
5315VA12 Weldon Shank														
029106	5315VA12WA025R23	25	96	40	25	23	15	2	4	027860	F3007T	022157	T8	1,40
029107	5315VA12WA025R35	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.

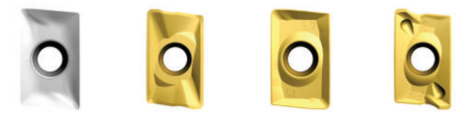
Note: Please note that a maximum of 0,8mm insert radius is allowed on the 5315VA12 range of cutters.
Larger radii inserts can be used on the leading pocket only if the body is modified by the end user.

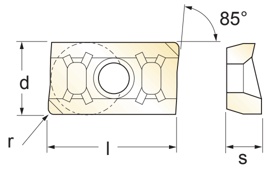
5315VA12 Technical Information (mm)

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



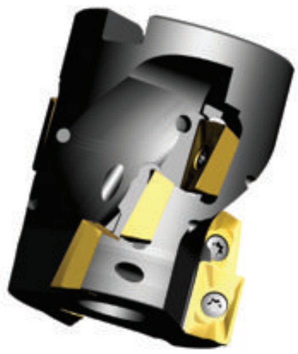
Facing Pitch





Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max* or a_e max.*	a_p max. and a_e max. 15% D**	a_p min. - max.	d (IC)	l	s	r	h_m min
029098	ADGT12T3PDFR-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 9.



* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page 192.

* 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 194. Speed recommendations can be found on page 195.

5315VA12 Feeds f_z (mm/flute)

Geometry	Grade	Operation	Unalloyed Steel Min. - Max.	Alloyed Steel Min. - Max.	Stainless Steel Min. - Max.	Stainless Steel Refractory PH Min. - Max.	Gray Iron Min. - Max.	Spheroidal-Ductile Iron Min. - Max.	Malleable Iron Min. - Max.	Aluminium & Alloys <16% Si 116 HBN Min. - Max.	Aluminium & Silicon >16% Si 92 HBN Min. - Max.	HTA Iron Based Alloys Min. - Max.	HTA Cobalt Based Alloys Min. - Max.	HTA Nickel Based Alloys Min. - Max.	HTA Titanium Based Alloys Min. - Max.	Hard Steel >1400 N/mm^2 >415 HBN Min. - Max.	Chilled Cast Iron >1400 N/mm^2 >400 HBN 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 195.

Speed v_c (m/min)

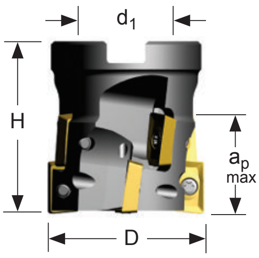
5315VA12 Series

Wear Resistance: – ⟵⟶ +

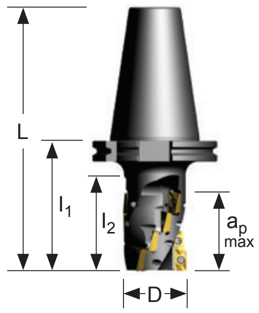
Speed min. - max.

Coolant Recommendation — Recommended ● Possible ◉

ISO	Materials	Rm and Hardness	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD X Grade X700	Wet	Dry	PVD Standard SP6519	Wet	Dry	CVD Standard MP91M	Wet	Dry	CVD Standard SC3025	Wet	Dry	Uncoated Micrograin GH1
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	◉	●	130 - 270				◉	●	130 - 295		●	140 - 345						
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			115 - 240						115 - 260			120 - 305						
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	◉	●	100 - 210				◉	●	100 - 230		●	105 - 270						
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			75 - 160						75 - 175			80 - 205						
P	Alloyed Steel	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									
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 230			105 - 235									
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120									
K	Cast Iron	Grey GG-Ft							◉	●	140 - 235		●	145 - 365		●	150 - 395			
K	Cast Iron	Spheroidal-Ductile GGG-FGS									110 - 240			115 - 285			120 - 335			
K	Cast Iron	Malleable GTS - MN/MP									100 - 220			105 - 260			105 - 275			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN																●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN																		295 - 2440
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 52	●		23 - 55									
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 46			22 - 48									
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 53			25 - 55									
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 75			36 - 79									
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN																		
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN																		



Shell Mill Fixation



DIN 69871 Fixation

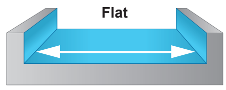
Shoulder / Profiling / Slotting

Product		Dimensions (mm)									Spares				
EDP	Item Description	D	L/H	l_1	l_2	d_1	a_p max	a_{p1} 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.		a_p 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



Facing Pitch

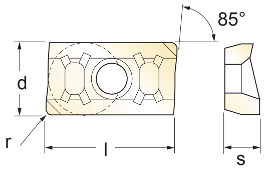
APET16-42

APHT16-42

APEX16-701

APHT16-F

APFW16-T



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max* or a_e max.*	a_p max. and a_e max. 15% D**	a_p min. - max.	d (IC)	l	s	r	h_m min
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	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
015154	APHT1604PDFR	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 9.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page 196.

* 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.

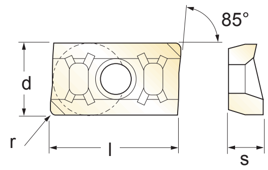
APHT1604PDTR-42 X500 to be used for Stainless Steel with heavy scale or for unstable conditions.
APFW1604PDTR X400 should be used for Alloyed Steel with heavy scale or hardened steel.
APFW1604PDTR SP4019 should be used for High Temperature Alloys with heavy scale or hardened steel.

Note: Feed recommendations can be found on page 199. Speed recommendations can be found on page 201.

5315VA16

Long Edge Milling Cutter (Porcupine)

APHT16-46 APET16-48 APKT16-43 APKT16-45



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max* or a_e max.*	a_p max. and a_e max. 15% D**	a_p min. - max.	d (IC)	l	s	r	h_m min
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 9.

* Note: Please do not surpass the recommended max. a_p for slotting as shown on the steel body page 196.

* 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.

APKT1604PDER-43 X500 to be used for steel when unstable conditions

Note: Feed recommendations can be found on page 200. Speed recommendations can be found on page 201.

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	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.
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 201.

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	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.
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 ◉

ISO	Materials	Rm and Hardness	Wet	Dry	PVD X Grade X400	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD Standard SP6519	Wet	Dry	PVD Standard SP4019	Wet	Dry	PVD Standard MP91M	Wet	Dry	CVD Standard SC3025	Wet	Dry	Uncoated Micrograin GH1
P	Unalloyed Steel	<600 N/mm^2 <180 HBN				◉	●	130 - 270	◉	●	130 - 295					●	140 - 345						
P	Unalloyed Steel	<950 N/mm^2 <280 HBN						115 - 240			115 - 260						120 - 305						
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	◉	●	95 - 200	◉	●	100 - 210	◉	●	100 - 230					●	105 - 270						
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 150			75 - 160			75 - 175						80 - 205						
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	45 - 95		●	50 - 100		●	50 - 110					●	50 - 130						
M	Stainless Steel	Austenitic + Ferritic 300 series				◉	●	115 - 250	◉	●	115 - 270												
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235												
M	PH Stainless	Refractory P.H.				●		50 - 110	●		50 - 120												
K	Cast Iron	Grey GG-Ft															145 - 365			150 - 395			135 - 290
K	Cast Iron	Spheroidal-Ductile GGG-FGS														●	115 - 285		●	120 - 335	◉	●	120 - 245
K	Cast Iron	Malleable GTS - MN/MP															105 - 260			105 - 275			115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2895							●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2320									295 - 2440
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55	●		24 - 63									
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48			23 - 52									
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55			26 - 59									
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79			37 - 84									
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		●	45 - 95								●	50 - 100		●	50 - 105						
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			35 - 80									40 - 90			40 - 95						

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)

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

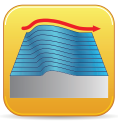
Multiplication factor for the feed rate based on the percentage of radial engagement of the cutter diameter

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.



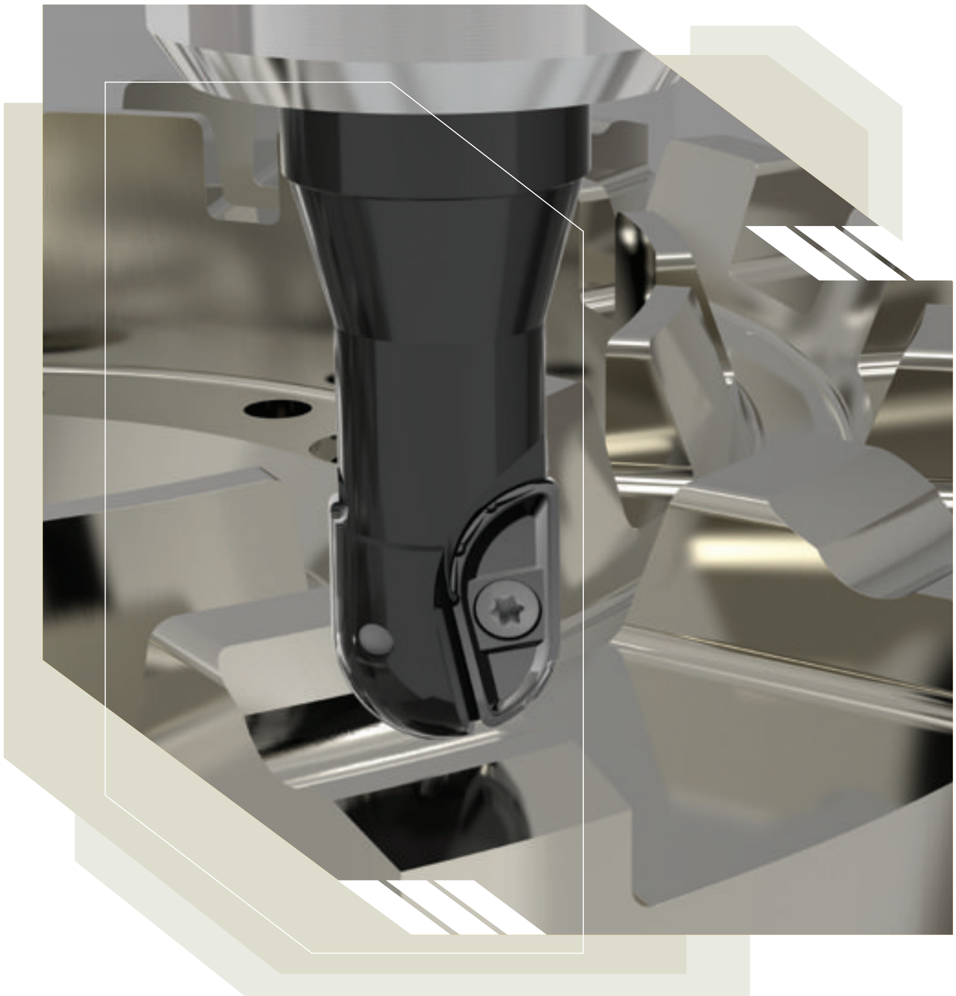
BALL NOSE CONTOUR MILLING CUTTER

The 5505VX.. Ball Nose Cutters have a reinforced design feature, which delivers a high volume of chip removal.

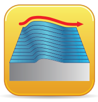
The chip breaker geometry provides excellent chip control and evacuation during machining and prevents edge build-up.

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:
Diameter Range = 16mm to 50mm



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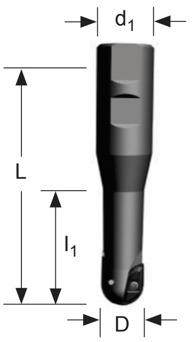
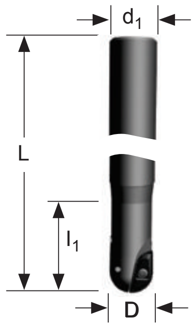
Contour Milling



Weldon Shank

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	l1	d1	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



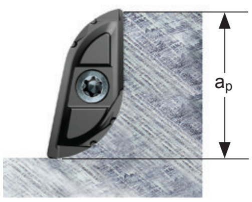
Cylindrical Shank

Modular Head

Product		Dimensions (mm)						Spares				
EDP	Item Description	D	L/H	M	d1	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 84.

Note: Do not remove the radial screw; this is a fixed location for the insert see page 208.



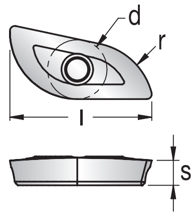
Depth of Cut (ap)

5505VX Technical Information (mm)

Product		Dimensions					
EDP	**Item Description**	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
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

Ramping

XPNT-F



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	**Item Description**	**Grade**	a_p max.*	a_e / a_p max. 10% of the cutter diameter	a_e / a_p max. -	d (IC)	l	s	r	h_m min
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 9.

* 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	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.
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 207.

Speed v_c (m/min)

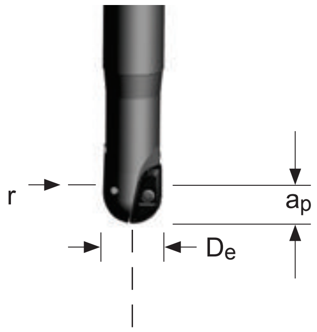
5505VX Series

Coolant Recommendation
Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	Speed min. - max. PVD Standard 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			

Stellram® Cutting Tool Systems

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

Average chip thickness: h_m

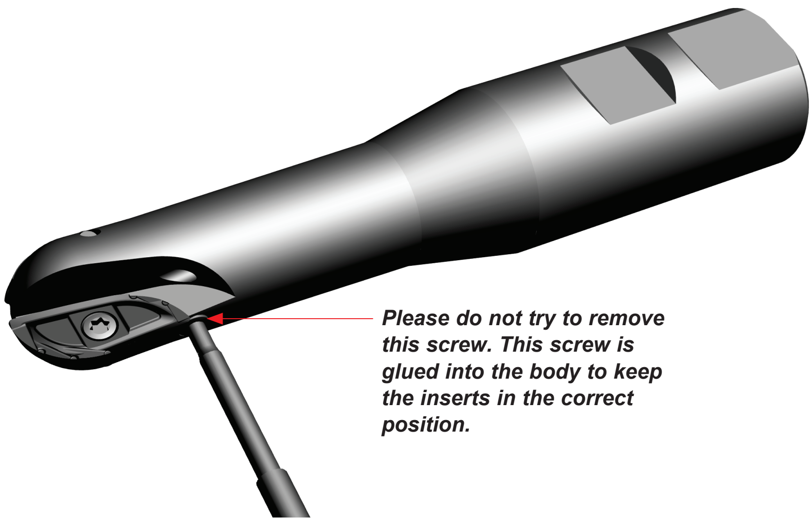
$$h_m = f_z \times \frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}$$

To find programmed feedrate: f_z

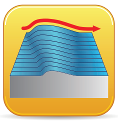
$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

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



Please do not try to remove this screw. This screw is glued into the body to keep the inserts in the correct position.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Contour Milling

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.

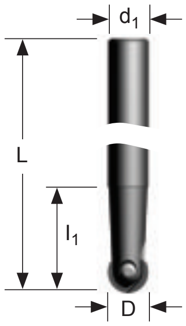
This specific insert geometry design allows finishing applications up to 90°

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:
Diameter Range = 8mm to 25mm

5500V Contour Milling Cutter



Cylindrical Shank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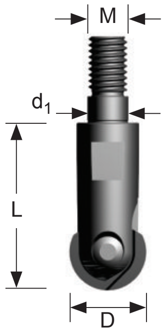
Contour Milling

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.

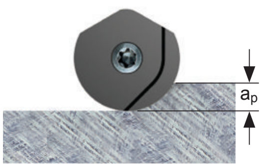


Modular Head

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 84.
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.

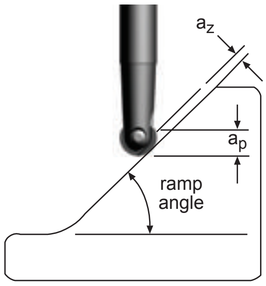


Depth of Cut (a_p)

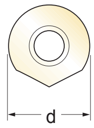
5500V Technical Information

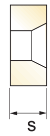
Product		Angles ° / Dimensions (mm)												
		Ramping Data												
EDP	Item Description	15°		30°		45°		60°		75°		85°		Max RPM
		a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	a_z max	a_p max	
021666	**5500V08CR**	3,0	3,9	2,0	3,5	1,2	2,0	0,5	2,0	0,1	1,1	0,1	0,4	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




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 9.

Speed recommendations can be found on page 213.

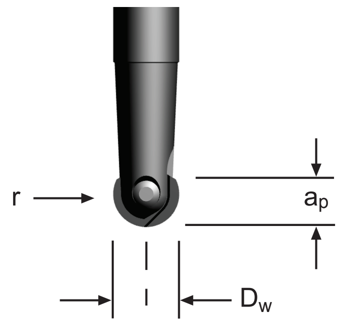
5500V Feeds f_z (mm/tooth)

Insert Diameter	Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	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.
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 ⦿					PVD Micrograin
ISO	Materials	Rm and Hardness			SP1019
P	Unalloyed Steel	<600 N/mm^2 <180 HBN		●	225 - 380
		<950 N/mm^2 <280 HBN			200 - 335
	Alloyed Steel	700-950 N/mm^2 200-280 HBN		●	175 - 295
		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-Ft	⦿	●	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

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

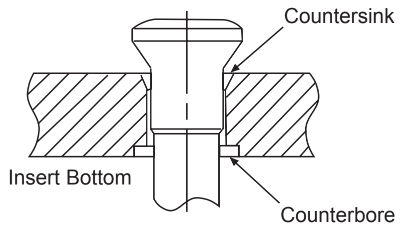
$$f_z = \frac{h_m}{\frac{\sqrt{r^2 - (r - a_e)^2}}{r} \times \frac{\sqrt{r^2 - (r - a_p)^2}}{r}}$$

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

Insert Assembly Information

RG Insert Orientation



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.

7700VR Series

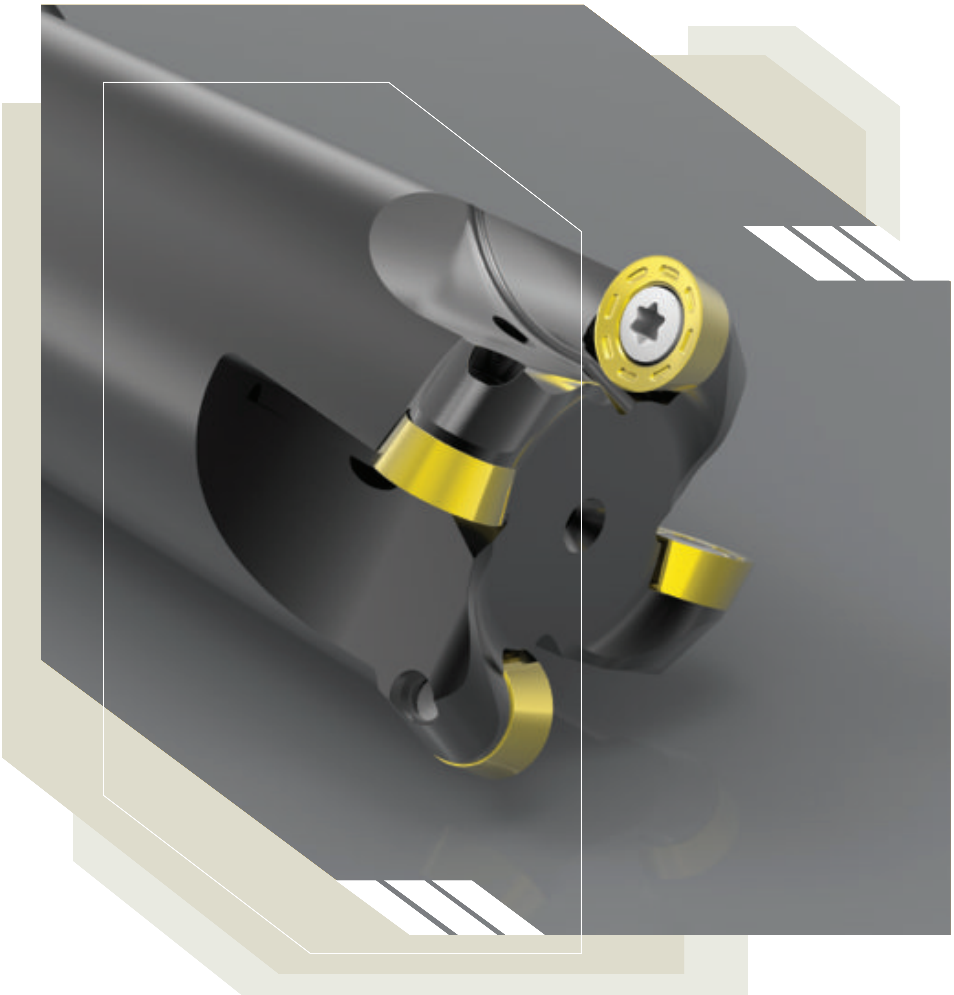
Copy Milling Cutter

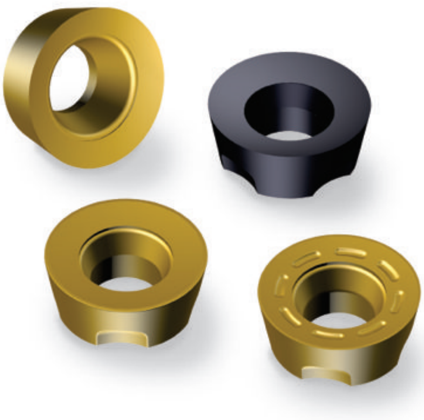
Facing | Copy / 3D | Ramping | Spiral / Circular | Helical Interpolation | Helical Interpolation with Bore Hole | Pocketing

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.



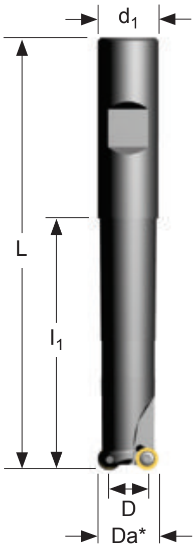


7700VR06:
Maximum a_p = 3mm
Diameter Range = 14mm to 20mm

7700VR08:
Maximum a_p = 4mm
Diameter Range = 16mm to 32mm

7700VR10:
Maximum a_p = 5mm
Diameter Range = 20mm to 32mm

7700VR06 Copy Milling Cutter



Weldon Shank

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L	l_1	d_1	ap max	No. of teeth	EDP	Screw	EDP	Key	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

Modular Head

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L	M	d_1	ap max	No. of teeth	EDP	Screw	EDP	Key	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

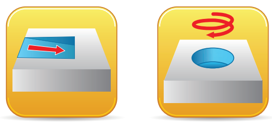
D = Effective Diameter (Axis) from insert centreline to centreline.

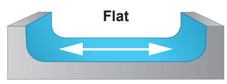
Da* = Outside Diameter

Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page 84.

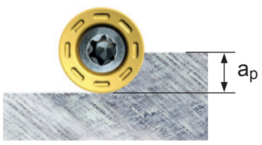
7700VR06 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole max.	a_p 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



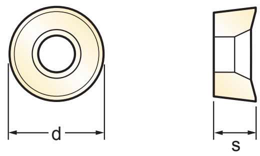


Facing Pitch



Depth of Cut (a_p)

RPEX06-701 RPMT06-41 RPEW06-T



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max	a_p min - max	a_p min - max	d (IC)	l	s	r	h_m min
			-	0,50- 1,50	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 9.

7700VR06 Feeds f_z (mm/tooth)

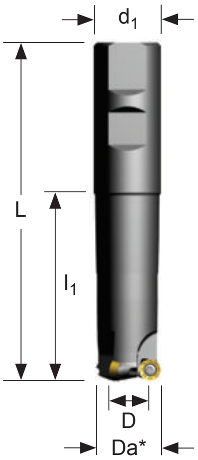
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 222.

7700VR08

Copy Milling Cutter

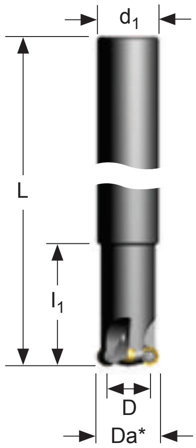


Weldon Shank

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	l_1	d_1	ap max	No. of teeth	EDP	Screw	EDP	Key	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



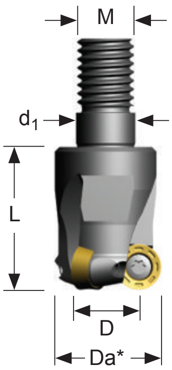
Cylindrical Shank

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D	L/H	M	d_1	ap max	No. of teeth	EDP	Screw	EDP	Key	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.

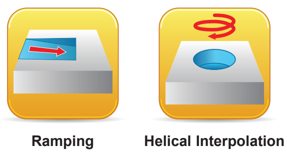
Da* = Outside Diameter

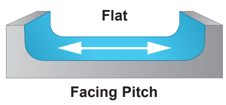
Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page 84.

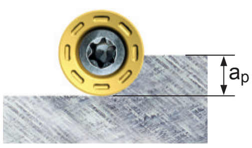


Modular Head

7700VR08 Technical Information (mm)							
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		ap 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







Depth of Cut (ap)

Stellram® Cutting Tool Systems

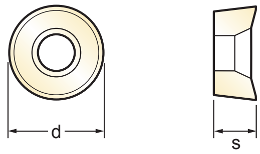
7700VR08

Milling Inserts & Recommended Feeds

RPEX08-701

RPMT08-41

RPHT08-422



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 9.

7700VR08 Feeds f_z (mm/tooth)

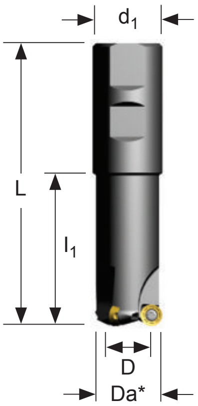
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 222.

7700VR10

Copy Milling Cutter

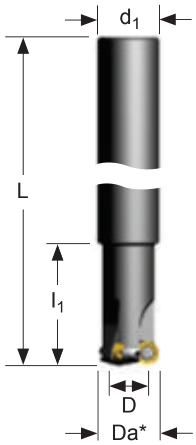


Weldon Shank

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



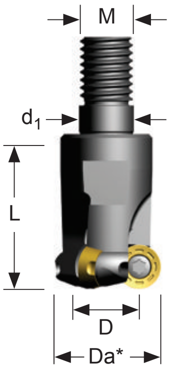
Cylindrical Shank

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

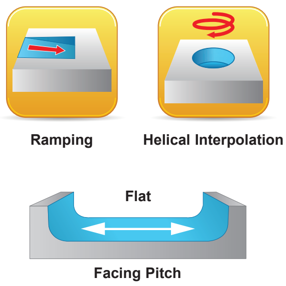
Note: For Cylindrical Shank extensions in high density alloy with through coolant refer to page 84.

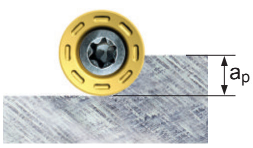


Modular Head

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

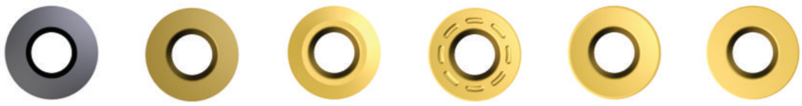




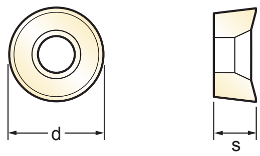
Depth of Cut (ap)

7700VR10

Milling Inserts & Recommended Feeds



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 9.

RPMW10T3MOT-X4 X500 is recommended for materials with heavy scale.

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	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.
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	-	-

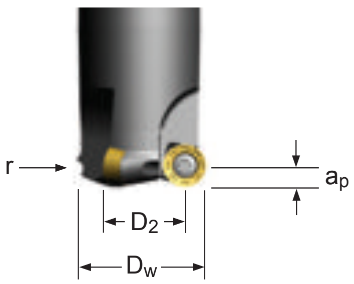
Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page 222.

Speed v_c (m/min)

7700VR Series			Wear Resistance – → +																				
			Speed min. - max.																				
Coolant Recommendation Recommended ● Possible ◉					CVD X Grade			PVD X Grade			PVD Standard			Uncoated Micrograin			PVD Standard			CVD Standard			Uncoated Micrograin
ISO	Materials	Rm and Hardness			X500			X700			SP6519			GH2			SP4019			MP91M			GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN	◉	●	130 - 270				◉	●	130 - 295					●	140 - 315		●	140 - 345			
P	Unalloyed Steel	<950 N/mm² <280 HBN			115 - 240						115 - 260						120 - 275			120 - 305			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	◉	●	100 - 210				◉	●	100 - 230					●	105 - 245		●	105 - 270			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			75 - 160						75 - 175						80 - 190			80 - 205			
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN		●	50 - 100					●	50 - 110					●	50 - 120		●	50 - 130			
M	Stainless Steel	Austenitic + Ferritic 300 series	◉	●	115 - 250	◉	●	115 - 260	◉	●	115 - 270				◉	●	120 - 280						
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 230			105 - 235						110 - 250						
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 115	●		50 - 120				●		50 - 130						
K	Cast Iron	Grey GG-Ft	◉	●	120 - 280				◉	●	140 - 295					●	145 - 330		●	145 - 365			
K	Cast Iron	Spheroidal-Ductile GGG-FGS			105 - 205						110 - 240						115 - 255			115 - 285			
K	Cast Iron	Malleable GTS - MN/MP			95 - 170						100 - 220						105 - 235			105 - 260			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2745	●		400 - 2895				●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2135			295 - 2320						295 - 2440
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 52	●		23 - 55				●		24 - 63						
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 46			22 - 48						23 - 52						
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 53			25 - 55						26 - 59						
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 75			36 - 79						37 - 84						
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN																					
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 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.

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

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

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

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

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..

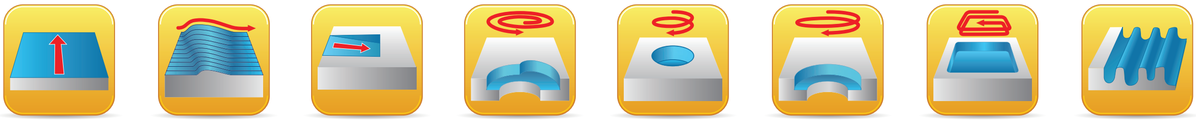
Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
F-701	8,00	0,25	0,02	0,05	0,11	0,28
	8,00	0,50	0,02	0,05	0,08	0,20
	8,00	0,75	0,02	0,05	0,07	0,16
	8,00	1,00	0,02	0,05	0,06	0,14
	8,00	1,25	0,02	0,05	0,05	0,13
	8,00	1,50	0,02	0,05	0,05	0,12
E-701	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
E-701-X4	10,00	0,25	0,03	0,07	0,19	0,44
	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
E-421-X4	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
	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
E-41-X4	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
	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
E-422-X4	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
	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
RPHT_T-X4	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
	10,00	1,50	0,07	0,14	0,18	0,36
	10,00	2,00	0,07	0,14	0,16	0,31
RPMW_T-X4	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
	10,00	2,00	0,10	0,16	0,22	0,36

7702VRD & 7712VRD Series

Copy/Contour Milling Cutter



Facing | Copy / 3D | Ramping | Spiral / Circular | Helical Interpolation | Helical Interpolation with Bore Hole | Pocketing | Contour Milling

ROUND INSERT MILLING CUTTER WITH AND WITHOUT INDEXATION

The **7702VRD** 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) .

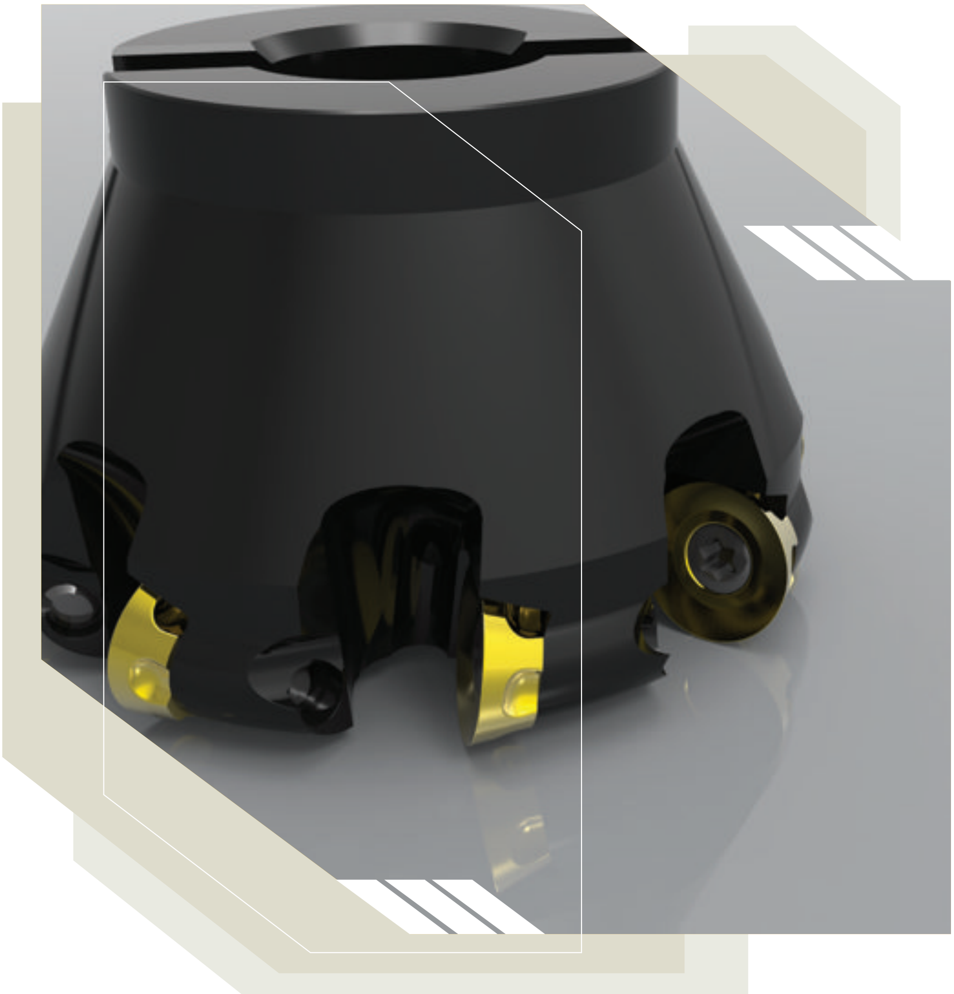
The series **7712VRD** is ideal for roughing, semi-finishing and finishing of Steel, Alloyed Steel, Tool Steel and Aluminium as well as for Hardened Steel. This cutter series has an anti-rotation design which ensures a precise number of indexes per insert.

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.



US Patent # 7,722,297
Foreign Patents Pending

7702VRD07:
Maximum a_p = 3,5mm
Diameter Range = 15mm to 20mm

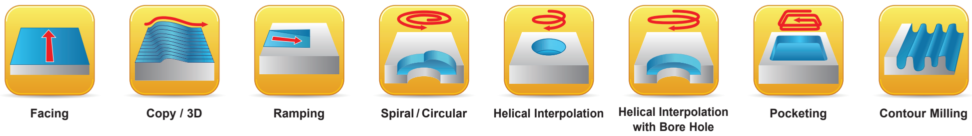
7702VRD10:
Maximum a_p = 5mm
Diameter Range = 20mm to 35mm

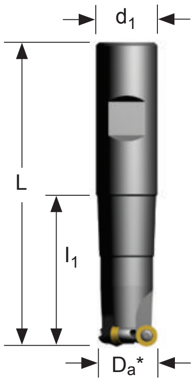
7702VRD12 and 7712VRD12:
Maximum a_p = 6mm
Diameter Range = 25mm to 80mm

7702VRD16 and 7712VRD16:
Maximum a_p = 8mm
Diameter Range = 32mm to 100mm

7702VRD07

Copy/Contour Milling Cutter

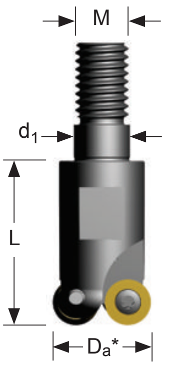




Weldon Shank

Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	l_1	d_1	a_p 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

D_a* = Outside Diameter



Modular Head

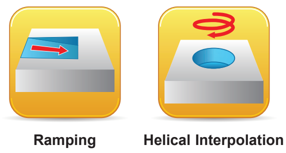
Product		Dimensions (mm)						Spares				
EDP	Item Description	Da*	L	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD07 Modular Head												
030863	7702VRD07SA015R25	15	25	M8	8,5	3,5	2	015060	F2505T	018488	T7	0,80

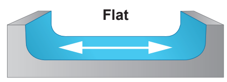
Note: For Cylindrical shanks extensions in high density alloy with through coolant refer to page 84.

D_a* = Outside Diameter

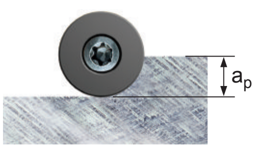
7702VR07 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p 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





Facing Pitch



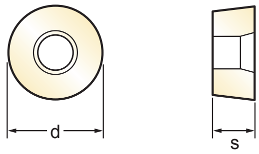
Depth of Cut (a_p)

7702VRD07

Milling Inserts & Recommended Feeds

RDET07-701

RDHW07



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 9.

7702VRD07 Feeds f_z (mm/tooth)

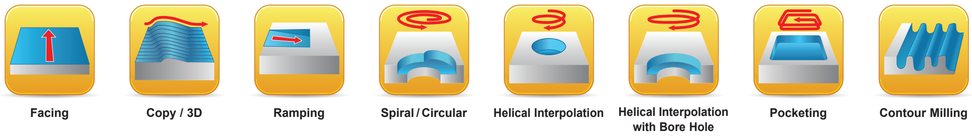
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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

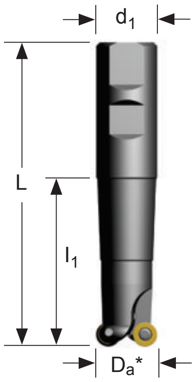
Note: HTA = High Temperature Alloys

Speed recommendations can be found on page 234.

7702VRD10

Shoulder Milling Cutter

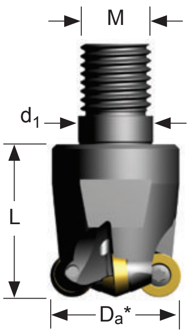




Weldon Shank

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
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

D_a* = Outside Diameter



Modular Head

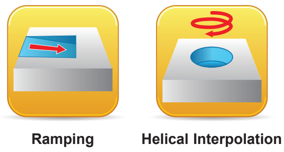
Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a*	L	M	d_1	a_p max	No. of Teeth	EDP		EDP		Screw Tightening Nm
7702VRD10 Modular Head												
031238	**7702VRD10SA020R30**	20	30	M10	10,5	5	2	*022056*	F3507T	*015240*	T15	2,10
031290	**7702VRD10SA025R35**	25	35	M12	12,5	5	3	*015269*	F3508T	*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

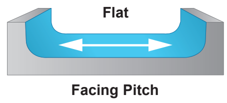
Note: For Cylindrical shanks extensions in high density alloy with through coolant refer to page 84.

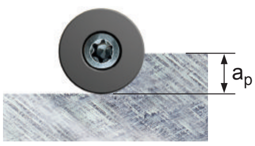
D_a* = Outside Diameter

7702VRD10 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
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



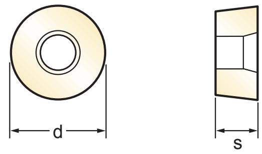




Depth of Cut (a_p)

RDET10-701

RDHW10



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 9.

* Max. recommended a_p = 2,5mm (depending on the application)

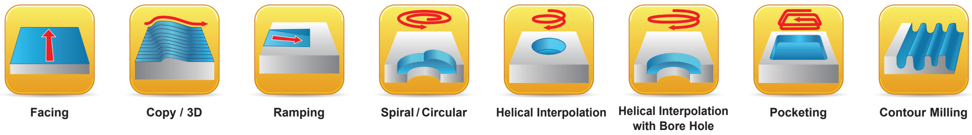
7702VRD10 Feeds f_z (mm/tooth)

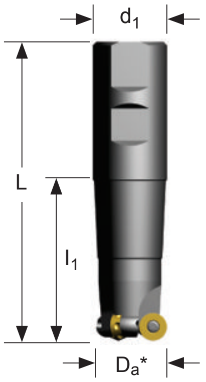
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 234.

7702VRD12 & 7712VRD12 Copy/Contour Milling Cutter





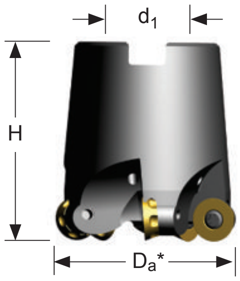
Weldon Shank

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a*	L	l_1	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	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).



Shell Mill Fixation

Product		Dimensions (mm)						Spares				
EDP	Item Description	D_a*	L	M	d_1	a_p max	No. of Teeth	EDP	Screw	EDP	Key	Screw Tightening Nm
7712VRD12 Modular Head												
031383	7712VRD12SA035R35	35	35	M16	17,0	6	3	022056	F3507T	015240	T15	2,10

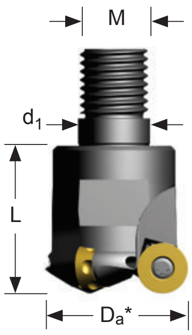
Note: For Cylindrical shank extensions in high density alloy with through coolant refer to page 84.

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.

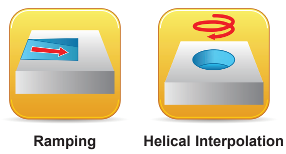
The insert for the 7712VRD12 cutter is 6 times indexable.

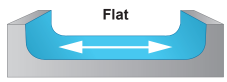


Modular Head

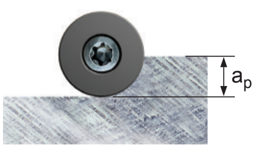
7702VRD12 & 7712VRD12 Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole 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



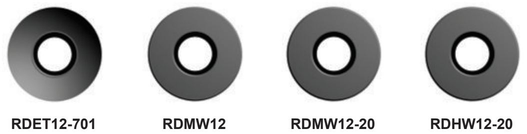


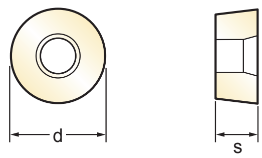
Facing Pitch



Depth of Cut (a_p)

7702VRD12 & 7712VRD12





Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
			Depth of Cut (mm)							
EDP	Item Description	Grade	a_p max 3,50*	a_p min - max 0,50 - 2,50	a_p min - max 0,10 - 0,80	d (IC)	l	s	r	h_m min
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 9.

* Max. recommended a_p = 3,5mm (depending on the application)

RDMW12T3MOT-20-X6 and RDHW12T3MOT-20-X6 are for heavy roughing applications.

7702VRD12 & 7712VRD12 Feeds f_z (mm/tooth)

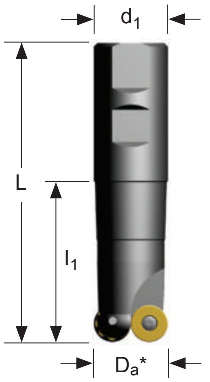
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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 234.

7702VRD16 & 7712VRD16

Copy/Contour Milling Cutter



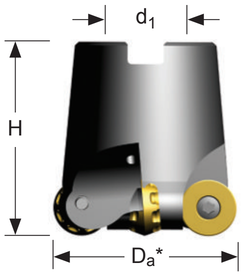
Weldon Shank

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).



Shell Mill Fixation

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

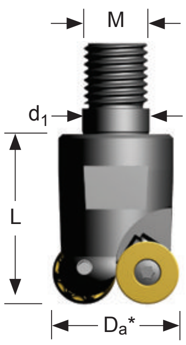
Note: For Cylindrical shank extensions in high density alloy with through coolant refer to page 84.

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.

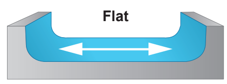
The insert for the 7712VRD16 cutter is 8 times indexable.

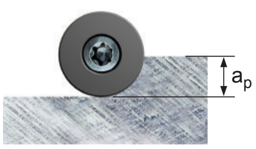


Modular Head

7702VRD16 & 7712VRD16 Technical Information (mm)

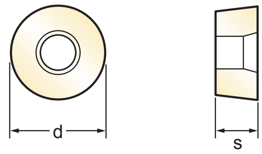
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min. - max.		a_p max Helical / Linear	Max RPM
025709	7702VRD16WA032R70	16	17.50	34	62	5,33	34000
029057	7712VRD16-A052R	36	5.20	74	102	5,33	22500
029058	7712VRD16-A066R	50	4.10	102	130	5,33	19000
029059	7712VRD16-A080R	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





Depth of Cut (a_p)

7702VRD16 & 7712VRD16



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 9.

* Max. recommended a_p = 5mm (depending on the application)

RDMW1604MOT-30-X8 and RDHW1604MOT-30-X8 are for heavy roughing applications.

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	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.
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 234.

7702VRD & 7712VRD Series

Recommended Speeds

Speed v_c (m/min)

7702VRD & 7712VRD Series

Wear Resistance: – ⟵⟶ +

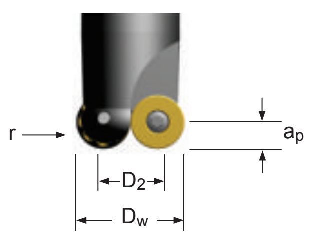
Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	PVD Standard SP5419	Wet	Dry	PVD Standard SP4019
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	115 - 205		●	140 - 315
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			105 - 185			120 - 275
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	90 - 160		●	105 - 245
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 120			80 - 190
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	45 - 80		●	50 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series						
M	Stainless Steel	Martensitic 400 series						
M	PH Stainless	Refractory P.H.						
K	Cast Iron	Grey GG-Ft					●	145 - 330
K	Cast Iron	Spheroidal-Ductile GGG-FGS						115 - 255
K	Cast Iron	Malleable GTS - MN/MP						105 - 235
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN				●		400 - 2895
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN						295 - 2320
S	High Temperature Alloys	Iron Based						
S	High Temperature Alloys	Cobalt Based						
S	High Temperature Alloys	Nickel Based						
S	High Temperature Alloys	Titanium Based						
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN					●	50 - 100
H	Hard Materials	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

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.

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

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 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	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z 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	042
	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	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z 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 improtant 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
	12,00	3,50	0,04	0,09	0,07	0,17
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
	12,00	3,50	0,13	0,18	024	0,33
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..

Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z max.
	Dimensions (mm)					
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
T-X8	16,00	0,25	0,14	0,20	1,12	1,60
	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
T-30-X8	16,00	0,25	0,25	0,30	2,00	2,40
	16,00	0,50	0,25	0,30	1,41	1,70
	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

7710VRD20 Series

Copy / Contour Milling Cutter

Facing | Copy / 3D | Ramping | Spiral / Circular | Helical Interpolation | Helical Interpolation with Bore Hole | Pocketing

ROUND INSERT MILLING CUTTERS WITH INDEXATION

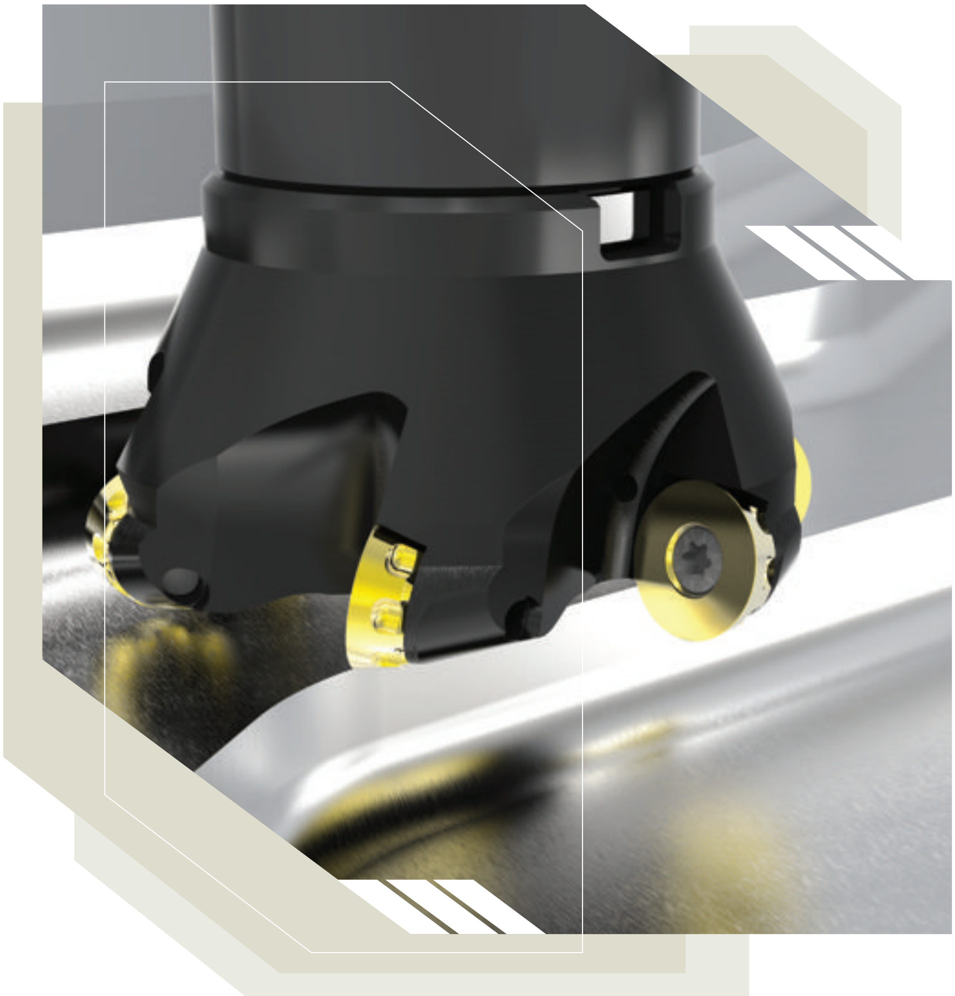
The **7710VRD** cutter series is excellent for heavy roughing and semi-finishing of all materials. Specifically for Stainless Steel and High Temperature Alloys as well as for Steel, Steel Alloys and Cast Iron.

This cutter design is perfectly suited for face milling forgings where material allowance is unpredictable.

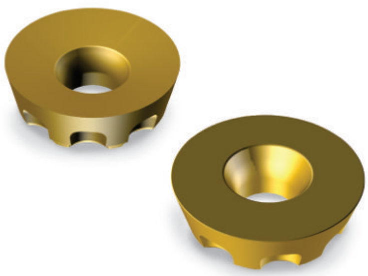
The 7710VRD cutter series with anti-rotation ensures a precise number of indexes per insert.

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

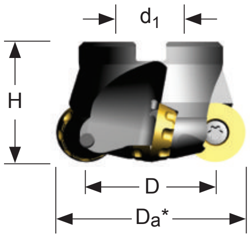
This 20mm insert size is 8 times indexable that gives a maximum possible usage of the available edges.



Foreign Patents Pending
US Patent #7,722,297



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 164.



Shell Mill Fixation

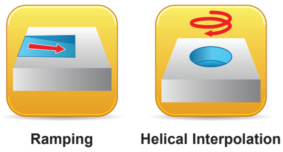
Product		Dimensions (mm)							Spares				
EDP	**Item Description**	Da*	D Effective Cutting Diameter	H	l1	d1	ap max	No. of Teeth	*EDP*	(screw)	*EDP*	(key)	Screw Tightening Nm
7710VRD20 Shell Mill Fixation													
031443	**7710VRD20-A063Z4R**	63	43	40	40	22	10	4	*029640*	D6014T	*015241*	T20	10,50
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					

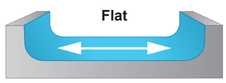
D = Effective Diameter (Axis) from Insert centreline to centreline

Da* = Outside Diameter

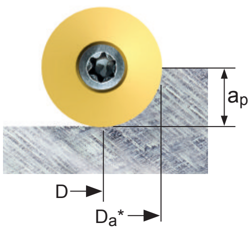
7710VRD20 Technical Information (mm)

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



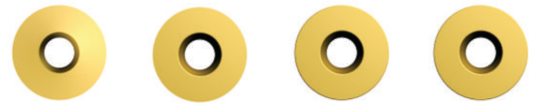


Facing Pitch

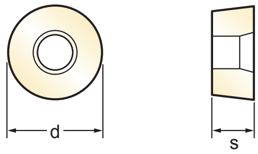


Depth of Cut (ap)

7710VRD20 Milling Inserts & Recommended Feeds

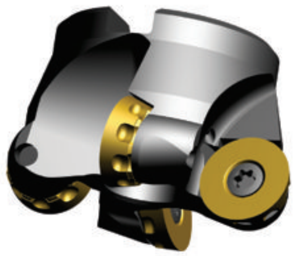


RDHT20-42-X8 RDHW20-E-X8 RDHW20-S-X8 RDHW20-25-X8



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 10,0*	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 9.



* Max. recommended a_p = 7,5mm (depending on the application)

INSERT APPLICATION NOTES:

RDHW2006MOE-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.

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	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.
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	-	-	-	-	-	-	-	-

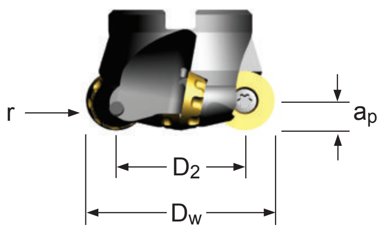
Note: HTA = High Temperature Alloys

Note: Speed recommendations can be found on page 242.

Speed v_c (m/min)

7710VRD20 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
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			115 - 240			115 - 260
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	100 - 210	⦿	●	100 - 230
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			75 - 160			75 - 175
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN		●	50 - 100		●	50 - 110
M	Stainless Steel	Austenitic + Ferritic 300 series	⦿	●	115 - 250	⦿	●	115 - 270
M	Stainless Steel	Martensitic 400 series			100 - 220			105 - 235
M	PH Stainless	Refractory P.H.	●		50 - 110	●		50 - 120
K	Cast Iron	Grey GG-Ft	⦿	●	120 - 280	⦿	●	140 - 295
K	Cast Iron	Spheroidal-Ductile GGG-FGS			105 - 205			110 - 240
K	Cast Iron	Malleable GTS - MN/MP			95 - 170			100 - 220
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN						
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN						
S	High Temperature Alloys	Iron Based	●		23 - 48	●		23 - 55
S	High Temperature Alloys	Cobalt Based			21 - 44			22 - 48
S	High Temperature Alloys	Nickel Based			24 - 51			25 - 55
S	High Temperature Alloys	Titanium Based			35 - 73			36 - 79
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN						
H	Hard Materials	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.

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

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

7713VR Series

Copy / Contour Milling Cutter

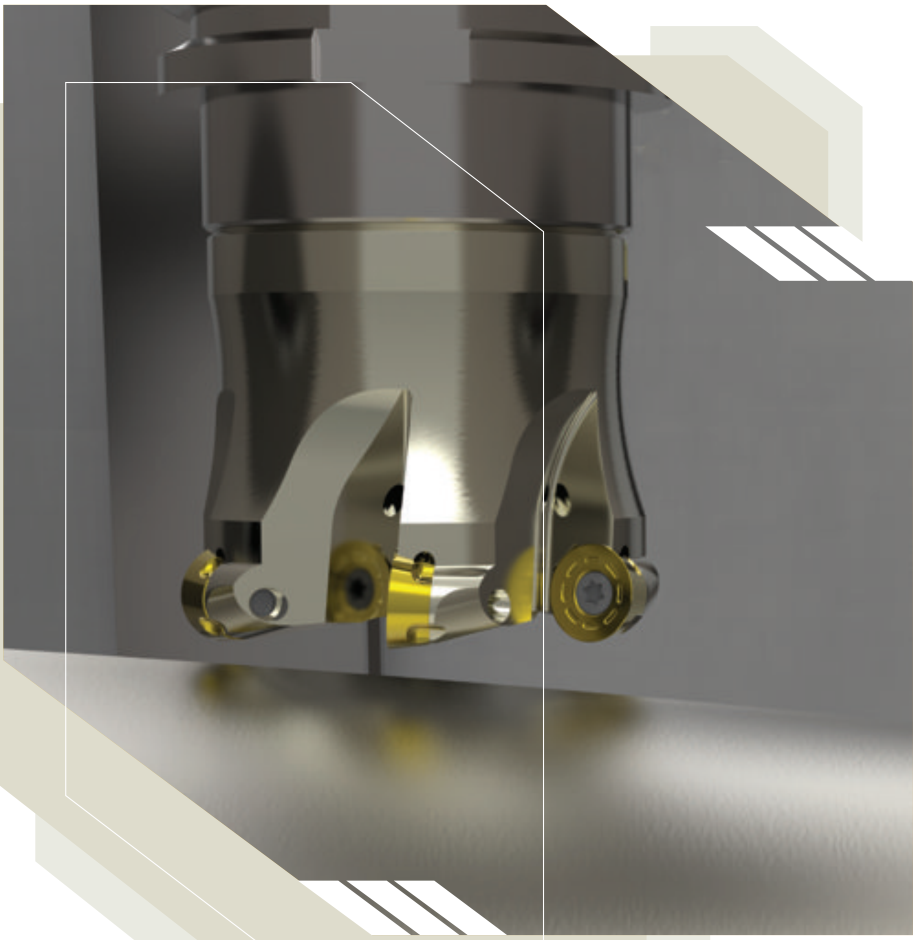
ROUND INSERT MILLING CUTTER WITH INDEXATION

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.

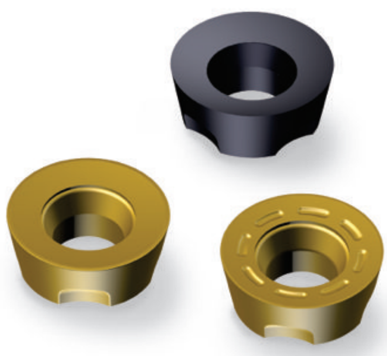
This cutter series has an anti-rotation design which ensures a precise number of indexes per insert. This gives a maximum possible usage of the available edges for roughing applications.

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.



US Patent # 7,722,297
Foreign Patents Pending

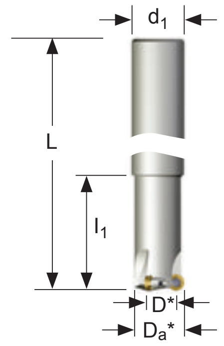


7713VR10:
Maximum a_p = 5mm
Diameter Range = 20 to 63mm

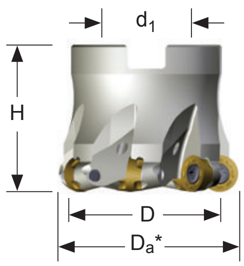
7713VR12:
Maximum a_p = 6mm
Diameter Range = 25 to 80mm

7713VR10

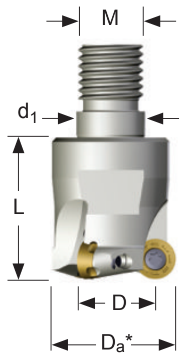
Copy / Contour Milling Cutter



Cylindrical Shank



Shell Mill Fixation



Modular Head

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L/H	l_1	d_1	ap max	No. of Teeth	EDP	Screw	EDP	Key	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													
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

D_a* = Outside Diameter

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L	M	d_1	ap max	No. of Teeth	EDP	Screw	EDP	Key	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

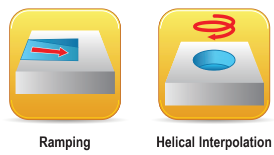
D_a* = Outside Diameter

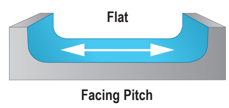
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page 84.
The 7713VR10 series with anti-rotation pocket ensures a precise number of indexes per insert.

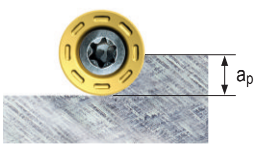
This unique patented pocket design prevents the inserts from rotating in the pocket during heavy feed machining and unstable conditions.

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

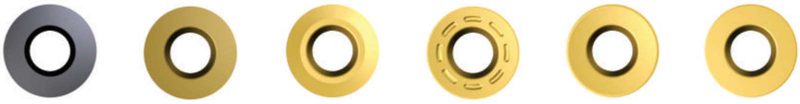




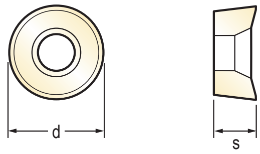


Depth of Cut (ap)

7713VR10 Milling Inserts & Recommended Feeds

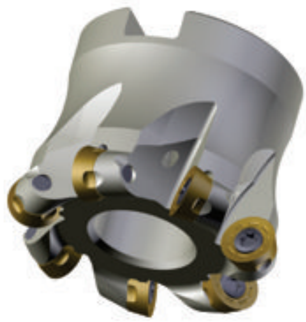


RPEX10-701 RPHT10-421 RPMT10-41 RPHT10-422 RPHT10-T RPMW10-T



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 5,00*	a_p min. - max. 1,00 - 2,0	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 9.



RPMW10T3MOT-X4 X500 is recommended for materials with heavy scale.
*Max. recommended ap = 2,5mm (depending on the application)

7713VR10 Feeds f_z (mm/tooth)

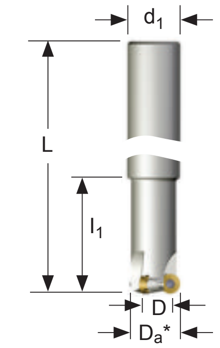
Geometry	Grade	Operation	Unalloyed Steel	Alloyed Steel	Stainless Steel	Stainless Steel Refractory PH	Gray Iron	Spheroidal-Ductile Iron	Malleable Iron	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN	HTA Iron Based Alloys	HTA Cobalt Based Alloys	HTA Nickel Based Alloys	HTA Titanium 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.
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

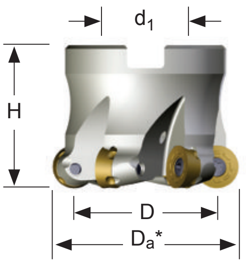
Speed recommendations can be found on page 251.

7713VR12

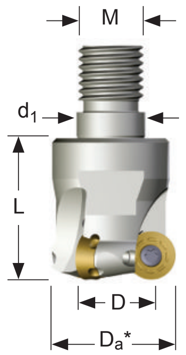
Contour Milling Cutter



Cylindrical Shank



Shell Mill Fixation



Modular Head

Depth of Cut (ap)

Product		Dimensions (mm)							Spares				
EDP	Item Description	Da*	D Effective Diameter	L/H	l_1	d_1	ap max	No. of Teeth	EDP	(screw)	EDP	(key)	Screw Tightening Nm
7713VR12 Cylindrcal 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	d_1	ap max	No. of Teeth	EDP	(screw)	EDP	(key)	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

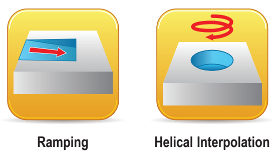
Note: For cylindrical shank extensions in high density alloy with through coolant refer to page 84.

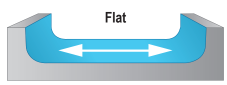
The 7713VR12 series with anti-rotation pocket ensures a precise number of indexes per insert.

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

7713VR12 Technical Information (mm)

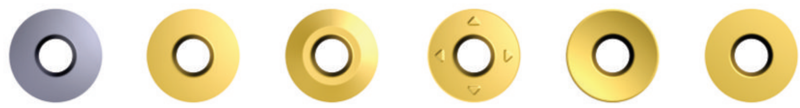
Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole max.	ap max Helical / Linear	Max RPM
033126	7713VR12CA025Z2R50	13	11.20	28	48	4,00	50000
033127	7713VR12CA032Z3R70	20	10.80	42	62	4,00	40000
033115	7713VR12-A040Z04R	28	7.90	58	78	4,00	34000
033116	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



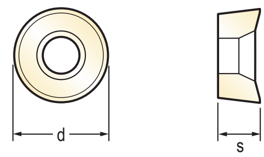


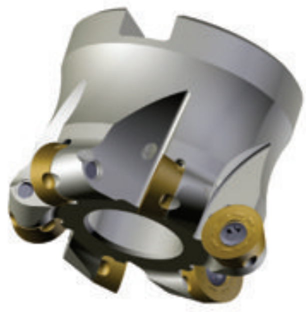
Facing Pitch

Stellram®
Cutting Tool Systems



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)							
			a_p max 6,00*	a_p min. - max. 1,00 - 2,50	a_p 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 9.

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 251.

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	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.
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 251.

Speed v_c (m/min)

7713VR Series

Wear Resistance

– +

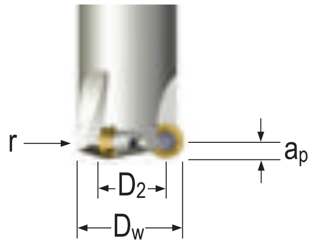
Speed min. - max.

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/mm² <180 HBN	⦿	●	130 - 270				⦿	●	130 - 295					●	140 - 345			
		<950 N/mm² <280 HBN			115 - 240						115 - 260						120 - 305			
	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	100 - 210				⦿	●	100 - 230					●	105 - 270			
		950-1200 N/mm² 280-355 HBN			75 - 160						75 - 175						80 - 205			
		1200-1400 N/mm² 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/mm² >415 HBN														●	50 - 105			
		Chilled Cast Iron >1400 N/mm² > 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

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.

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

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 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	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	0,08	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

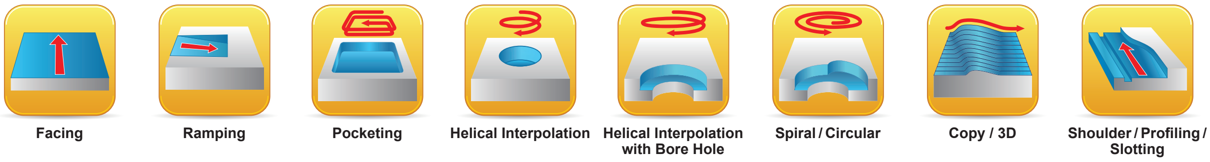
With round inserts, the thickness of the chip varies depending on the axial depth of cut and is related to the size of the cutting edge preparation.
For best tool-life it is important to maintain the proper chip thickness as shown below.

Inserts RP..1204..

Dimensions (mm)						
Inserts Geometry	Insert Size	a_p Axial d.o.c.	h_m min.	h_m max.	f_z min.	f_z 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
	12,00	3,50	0,02	0,11	0,04	0,20
E-701-X4	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
	12,00	3,00	0,03	0,12	0,06	0,24
	12,00	3,50	0,03	0,12	0,06	0,22
E-421-X4	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
	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
E-41-X4	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
	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
E-442-X4	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
	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
RPHT-T-X4	12,00	0,25	0,10	0,21	0,69	1,45
	12,00	0,50	0,10	0,21	0,49	1,03
	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
RPMW-T-X4	12,00	0,25	0,13	0,22	0,90	1,52
	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

57_VZ.. Series

Profiling / Pocketing Milling Cutter



ALUMINIUM 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.

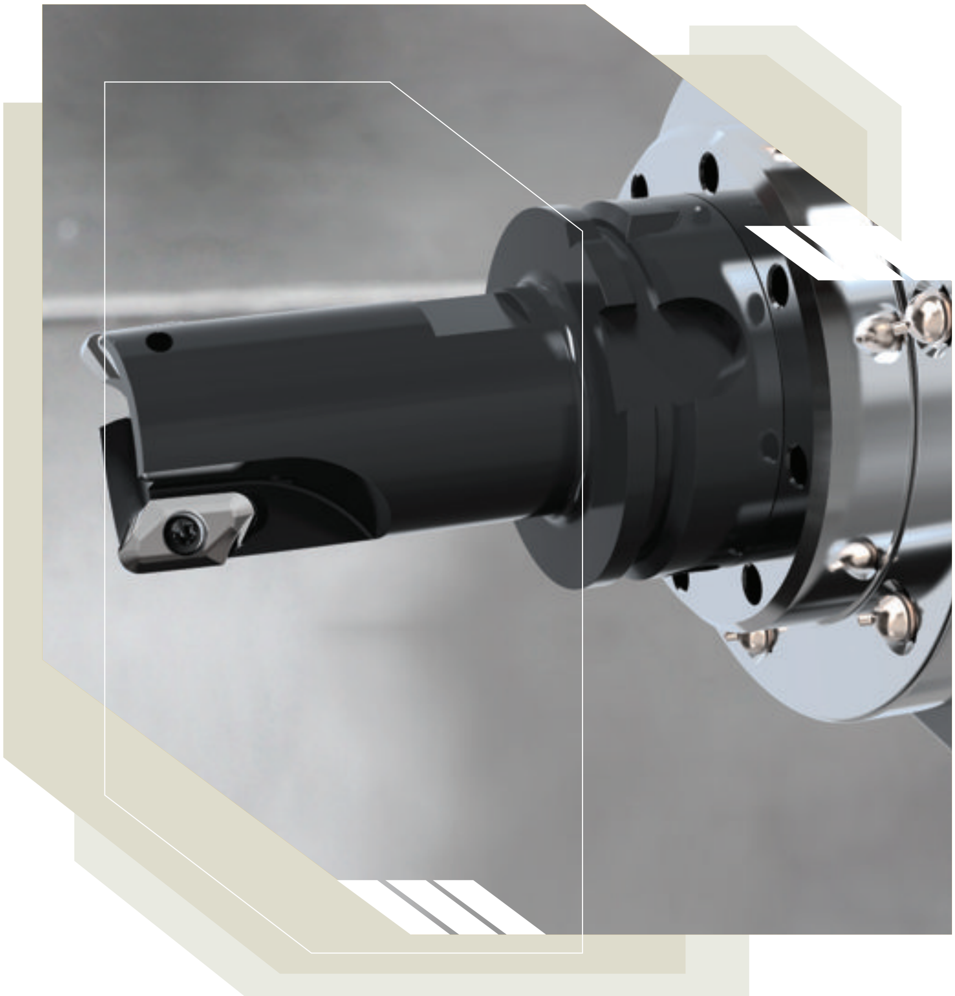
Features and Benefits of the 5702VZD and 5720VZ:

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 then 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.



US Patent #7,905,689
Foreign Patents Pending

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.

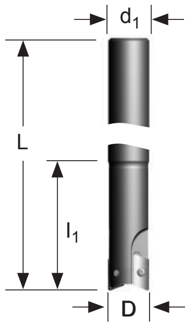
5702VZD14:
Maximum a_p =12mm
Diameter Range = 20mm only

5720VZ16:
Maximum a_p = 16mm
Diameter Range = 25mm - 80mm

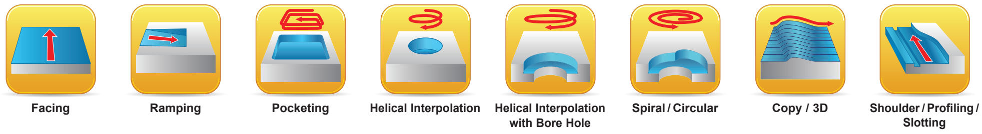
Note: Shell mill and modular head cutters are not balanced. It is recommended to balance the cutter and adapter as an assembly for high speed machining at 8,000 rpm or above. See detailed notes on the following product pages.

5702VZD14

Profiling / Pocketing Milling Cutters



Cylindrical Shank



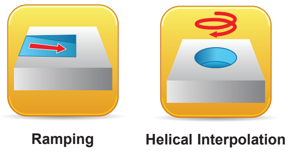
Product		Dimensions (mm)							Spares				
EDP	Item Description	D	L/H	l_1	d_1	ap max	No. of Teeth	Insert radius range	EDP	Screw	EDP	Key	Screw Tightening Nm*
5702VZD14 Cylindrical Shank													
028998	5702VZD14CA020R58-2	20	108	58	20	12	2	< 2,00	015060	F2505T	018488	T7	0,80
028999	5702VZD14CA020R58-4	20	108	58	20	12	2	2,50 to 4,00	015060	F2505T	018488	T7	0,80

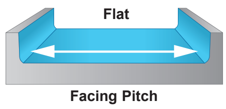
*** It is important to change the screw each time the insert is changed to ensure the highest security.**
A dynamometric key and the right torque value are important. See above for the correct torque information.

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 261.

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.

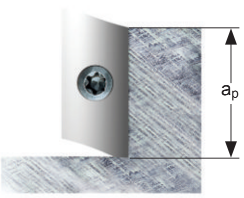
These tools are stocked without an electronic chip.

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.

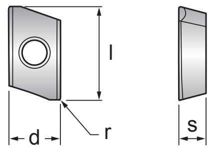
Cylindrical Shank tools mounted in a shrink fit holder or any other mill chuck holder + inserts + screws must be re-inspected for balance as an assembly by the end user when at or exceeding 8,000 rpm. End user must balance the assembly to a G6.3 value minimum.

Additional Balancing and Torque values can be found in the technical section pages 264.



Depth of Cut (a_p)

ZDCX14-701



Product			Application & Material			Dimensions (mm)				
			Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼					
EDP	**Item Description**	**Grade**	Depth of Cut (mm)			d (IC)	l	s	r	h_m min
			a_p max. 12*	a_p min. - max. 1,00 - 4,00	a_p 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 9.

* 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.

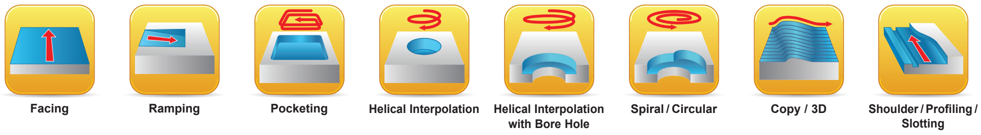
5702VZD Feeds f_z (mm/tooth)

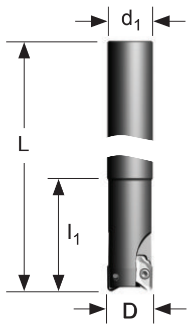
Size	Geometry	Grade	Operation	Aluminium & Alloys <16% Si 116 HBN	Aluminium & Silicon >16% Si 92 HBN
				Min. - Max.	Min. - Max.
14mm	FR-701	GH1	Profile/ Pocketing	0,02 - 0,25	0,02 - 0,20

Speed v_c (m/min)

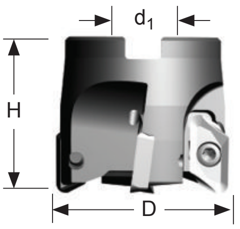
5702VZD Series					K10-K20/C3 - C2 ISO / ANSI
					Speed min. - max.
Coolant Recommendation Recommended ● Possible ⦿					Uncoated Micrograin
ISO	Materials	Rm and Hardness			GH1
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●		400 - 3050
		Aluminium + Silicon > 16% Si 92 HBN			295 - 2440

Stellram®
Cutting Tool Systems





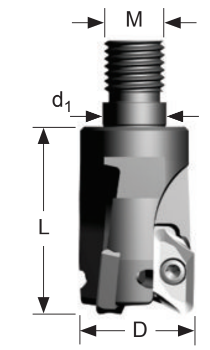
Cylindrical Shank



Shell Mill Fixation

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.**

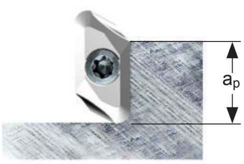


Modular Head

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 84.



Depth of Cut (ap)

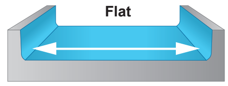
5720VZ Technical Information (mm)

Product		Dimensions					
EDP	Item Description	Facing Pitch	Ramping Angle °	Helical Hole min.	Helical Hole max.	a_p 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


Ramping


Helical Interpolation



Facing Pitch

Find the different ramping angles for all available insert radii on technical information page 262.

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.

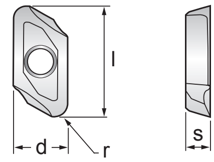
Cylindrical Shanks or Special HSK Integral Shanks are designed and balanced to G6.3 at 30,000 RPM for diameters 50mm and below. Diameters larger then 50mm are balanced to G6.3 at 24,000 rpm.

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 264.


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	ZDET16M5PDFR-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 9.

* Max. possible a_p of 16mm and a_e the full diameter (depending on the application).
* For Slotting applications with 5720VZ16 series please see recommendations for maximum a_p on page 262.

5720VZ 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-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 Recommended ● Possible ◉					Uncoated Micrograin
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

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)

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

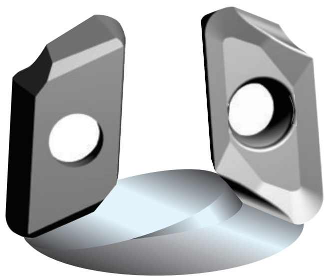
5720VZ16 Ramp Angle °

	Insert ZDET16M5…FR-721 (Radius mm)								
Cutter Dia. (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 maxium 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	Qcm³/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%) Cu	Si	Fe	Mn	Mg	Zn	Cr	Ti	Pb	Bi	Al	Others	Typical tremper	Rm (Mpa)	Machinability Chip formation	Machinability	Typical Applications	v_c m/min min. - max.	f_z mm/Z max.
Al	1050	0.05	0.25	0.4	0.5	0.05	0.05	-	-	-	-	99.50min	-	H14	105	D	A	Chemical equipment Sheet metal work Coiled tube	600 - 3000	0,2
	1100	0.05~0.20	Si+Fe1.0max		0.05	-	0.1	-	-	-	-	99.00min	-	H14	90	D	A			
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. Transportation equipment.	400 - 3000	0,25
													H34							
	5056	0.1	0.3	0.4	0.05~0.20	4.5~5.6	0.1	0.05~0.20	-	-	-	remaining	-	H12	300	C	A			
													H32							
	5083	0.1	0.4	0.4	0.4~1.0	4.0~4.9	0.25	0.05~0.25	0.15	-	-	remaining	-	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			

Machinability

A EXCELLENT

B GOOD-TO-EXCELLENT

C GOOD

D NOT GOOD

$V_C = \varpi \times D \times n / 1000$ m/min = mm x RPM

D: Tool diameter, N: RPM, V_C: Cutting speed, $\varpi = 3.1416$

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 256 & 258.
  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°)
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 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 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.

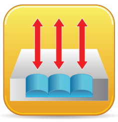
For each new modular head added to the same extension, re-balance the assembly. For each new Shell Mill installed on the same toolholder, re-balance the assembly.

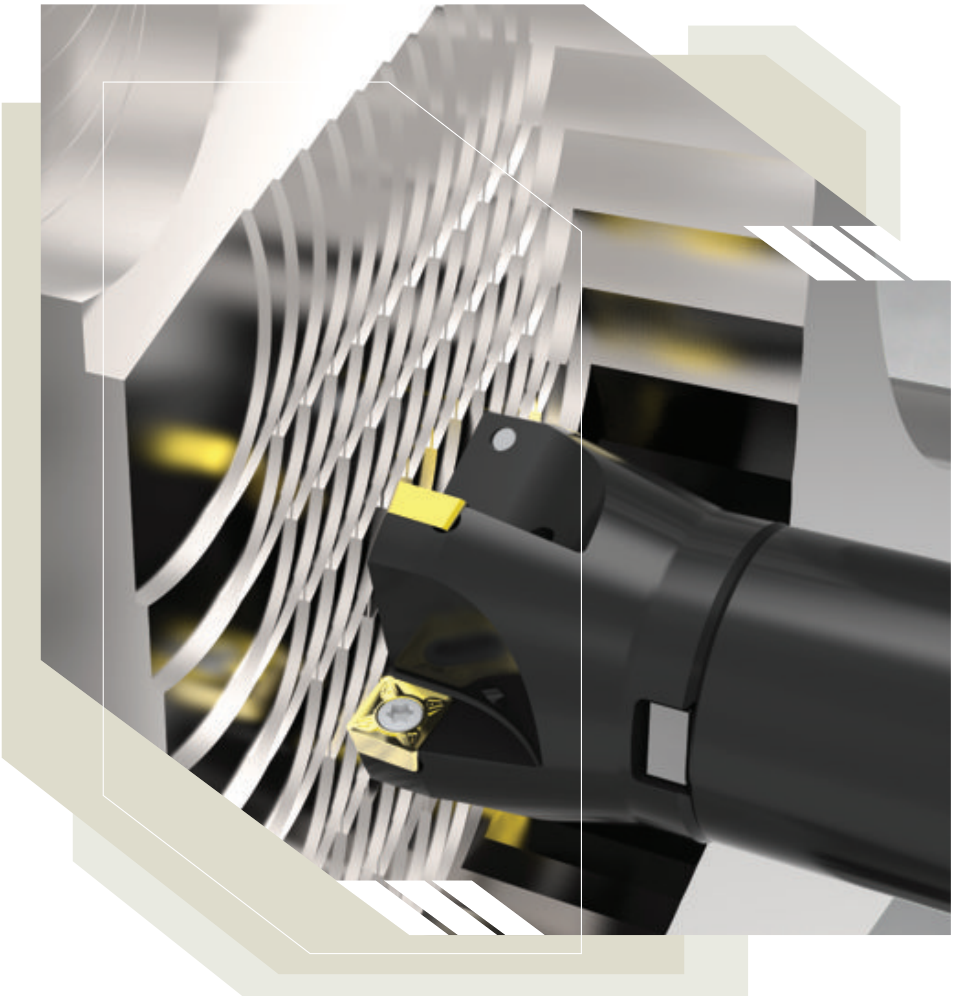
Tighten the Modular Head to the Extension, with lubricant, apply the torque value of:

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





PLUNGE 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.

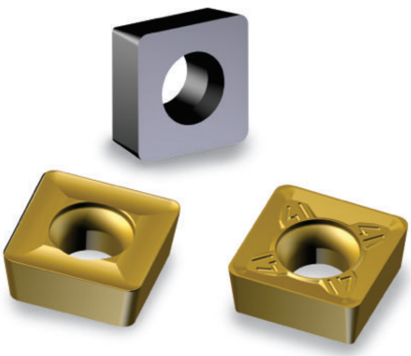
Utilising plunge milling techniques may increase productivity 2 to 5 times over traditional profiling operations.

Strellram'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.

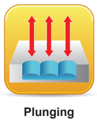
7791VS09:
Maximum a_e = 8mm
Diameter Range = 25mm - 50mm

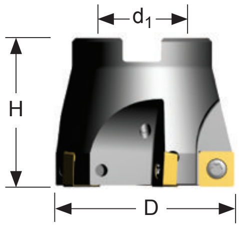
7791VS12:
Maximum a_e = 11mm
Diameter Range = 63mm - 80mm



7791VS09 & 7791VS12

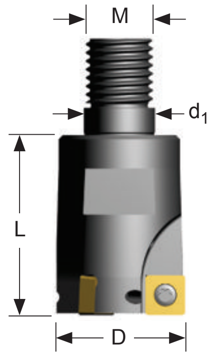
Plunge Milling Cutter





Shell Mill Fixation

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



Modular Head

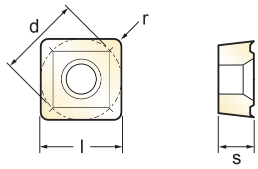
Product		Dimensions (mm)						Spares					
EDP	Item Description	D	L/H	l_1	d_1	a_e max plunging	No. of Teeth	*EDP*		*EDP*		Screw Tightening Nm	Max RPM
7791VS09 Modular Head													
031350	**7791VS09SA025Z2R35**	25	35	M12	12,5	8	2	*015262*	D4008T	*015240*	T15	3,10	57700
031405	**7791VS09SA032Z3R43**	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 84.


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_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 9.

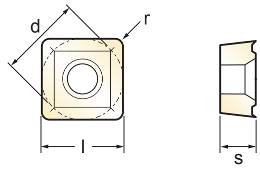
SCMT09T308E GH1 has limited usage for Aluminium Alloys.
SCMT09T308T SP4019 is for Stainless Steel with heavy scale.

Note: Feed recommendations can be found on page 269. Speed recommendations can be found on page 270.

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 9.

SCMT12M512T SP4019 is for Stainless Steel with heavy scale.

Note: Feed recommendations can be found on page 269. Speed recommendations can be found on page 270.

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	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.
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 270.

7791VS09 & 7791VS12 Recommended Speeds

Speed v_c (m/min)

7791VS Series

Wear Resistance: – → +

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⦿

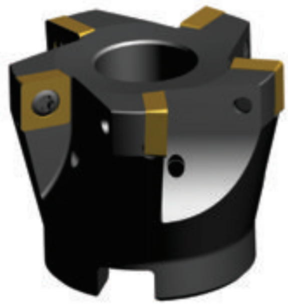
ISO	Materials	Rm and Hardness			PVD X Grade			PVD X Grade			PVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin
					X400			X500			X700			SP6519			SP4019			MP91M			GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	120 - 260	⦿	●	130 - 270				⦿	●	130 - 295					●	140 - 345			
		<950 N/mm² <280 HBN			105 - 230			115 - 240						115 - 260						120 - 305			
	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210				⦿	●	100 - 230					●	105 - 270			
		950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160						75 - 175						80 - 205			
		1200-1400 N/mm² 355-415 HBN		●	45 - 95		●	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 - 330		●	145 - 365	⦿	●	135 - 290
		Spheroidal-Ductile GGG-FGS												110 - 240			115 - 255			115 - 285			120 - 245
		Malleable GTS - MN/MP												100 - 220			105 - 235			105 - 260			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				●		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/mm² >415 HBN		●	45 - 95											●	50 - 100		●	50 - 105			
		Chilled Cast Iron >1400 N/mm² > 400 HBN			35 - 80												40 - 90			40 - 95			

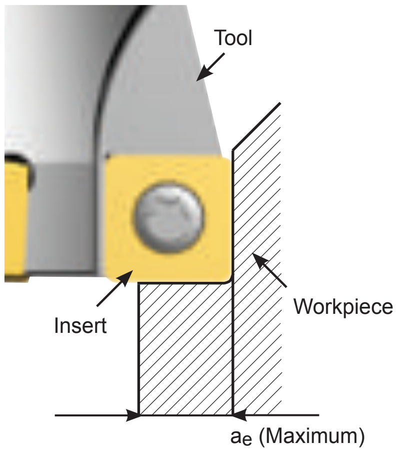
Stellram®
Cutting Tool Systems

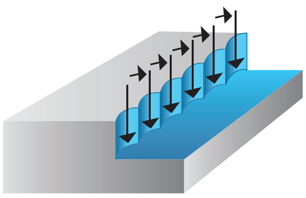
Tool Definition

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.

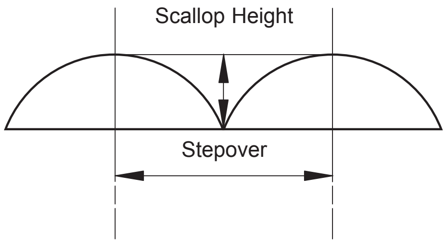






The maximum radial engagement is directly in relation with insert cutting edge length.

For insert type: **SC...09 the a_e, max is 8mm.**

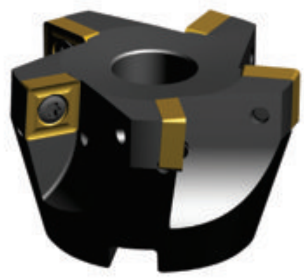


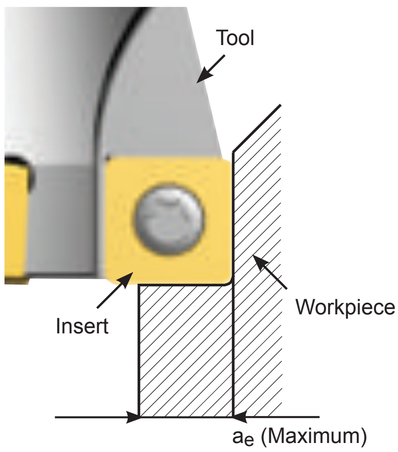
The cutting edge should not be in contact with the material face after machining to maintain the cutting edge quality.

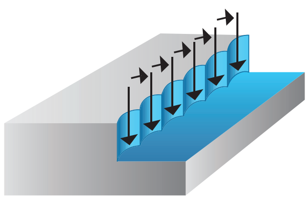
Tool Definition

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.

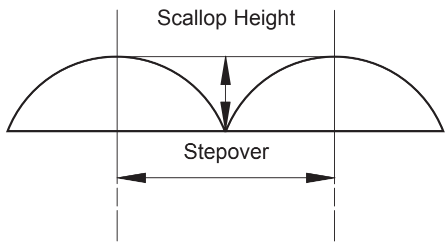






The maximum radial engagement is directly in relation with insert cutting edge length.

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.

Stellram® Cutting Tool Systems

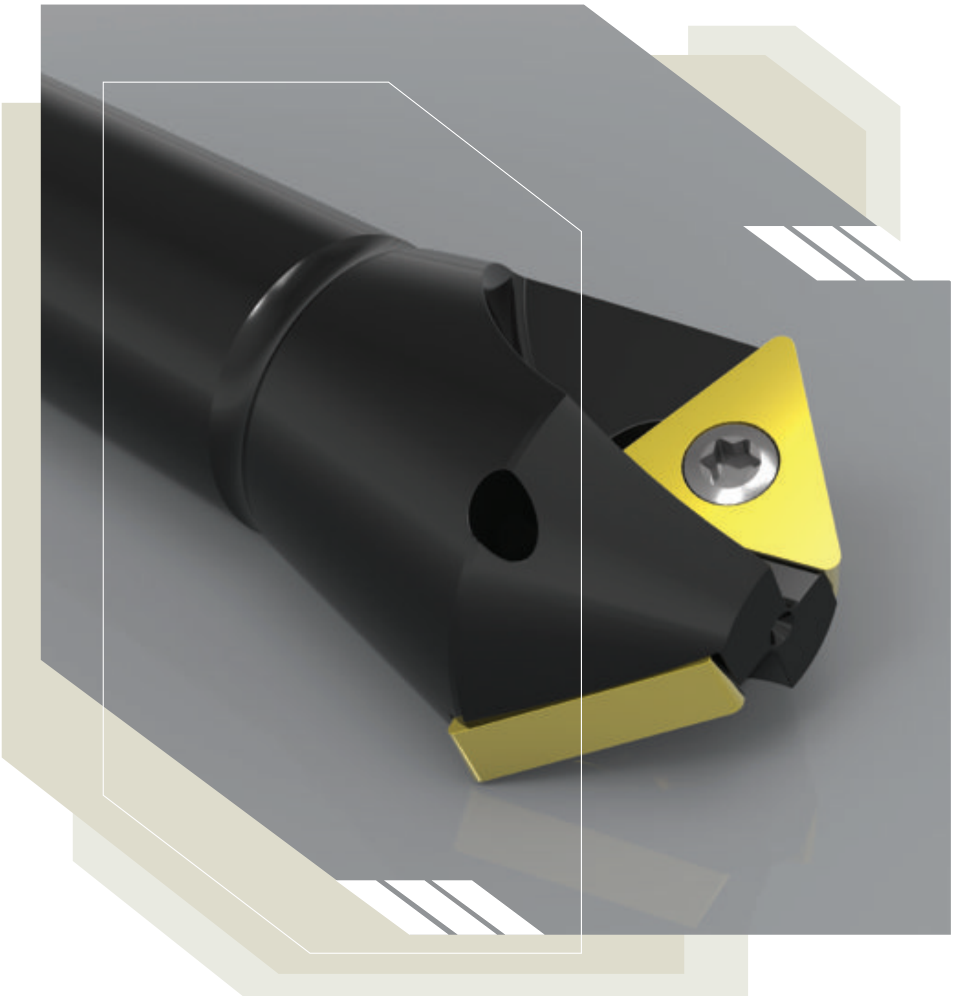
Chamfering

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.

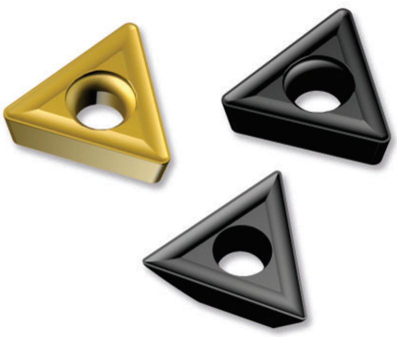
Due to a wide range of available geometries and grades all these cutters are suitable for machining all materials.



7745VT11:
Diameter Range = 16mm

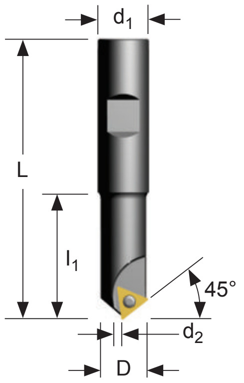
7745VT16:
Diameter Range = 20mm to 30mm

7760VT:
Diameter Range = 16mm to 25mm

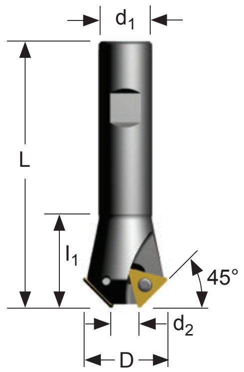


7745VT & 7760VT

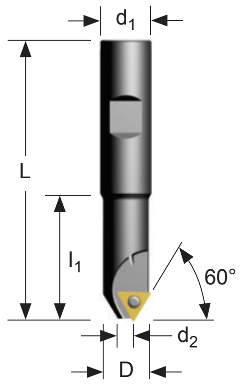
Chamfer Milling Cutter



45° VT11 Weldon Shank



45° VT16 Weldon Shank



60° VT11 Weldon Shank

Chamfering

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

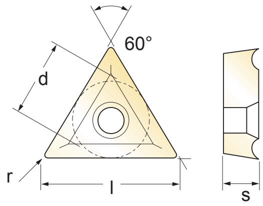
* Denotes the cutter for spot drilling. For Spot Drilling the a_p max. is 6,00mm and for linear movement the a_p max. is 11,00mm.

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

Depth of Cut (a_p)

TPMT11-M TCMX16-ZR TCMT16



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. 9,00	a_p min. - max. 1,00 - 7,00	a_p 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 9.

* 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 276. Speed recommendations can be found on page 277.

Stellram®
Cutting Tool Systems

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/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 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 277.

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 X400			CVD X Grade X500			PVD Standard SP6519			PVD Standard SP4019			CVD Standard MP91M			Uncoated Micrograin GH1
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	120 - 260	⦿	●	130 - 270	⦿	●	130 - 295		●	140 - 315		●	140 - 345			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			105 - 230			115 - 240			115 - 260			120 - 275			120 - 305			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230		●	105 - 245		●	105 - 270			
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 150			75 - 160			75 - 175			80 - 190			80 - 205			
P	Alloyed Steel	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						
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250						
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 255			115 - 285			120 - 245
K	Cast Iron	Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260			115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2895				●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2320						295 - 2440
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55	●		24 - 63						
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48			23 - 52						
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55			26 - 59						
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79			37 - 84						
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		●	45 - 95								●	50 - 100						
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			35 - 80									40 - 90						

Stellram® Cutting Tool Systems

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)

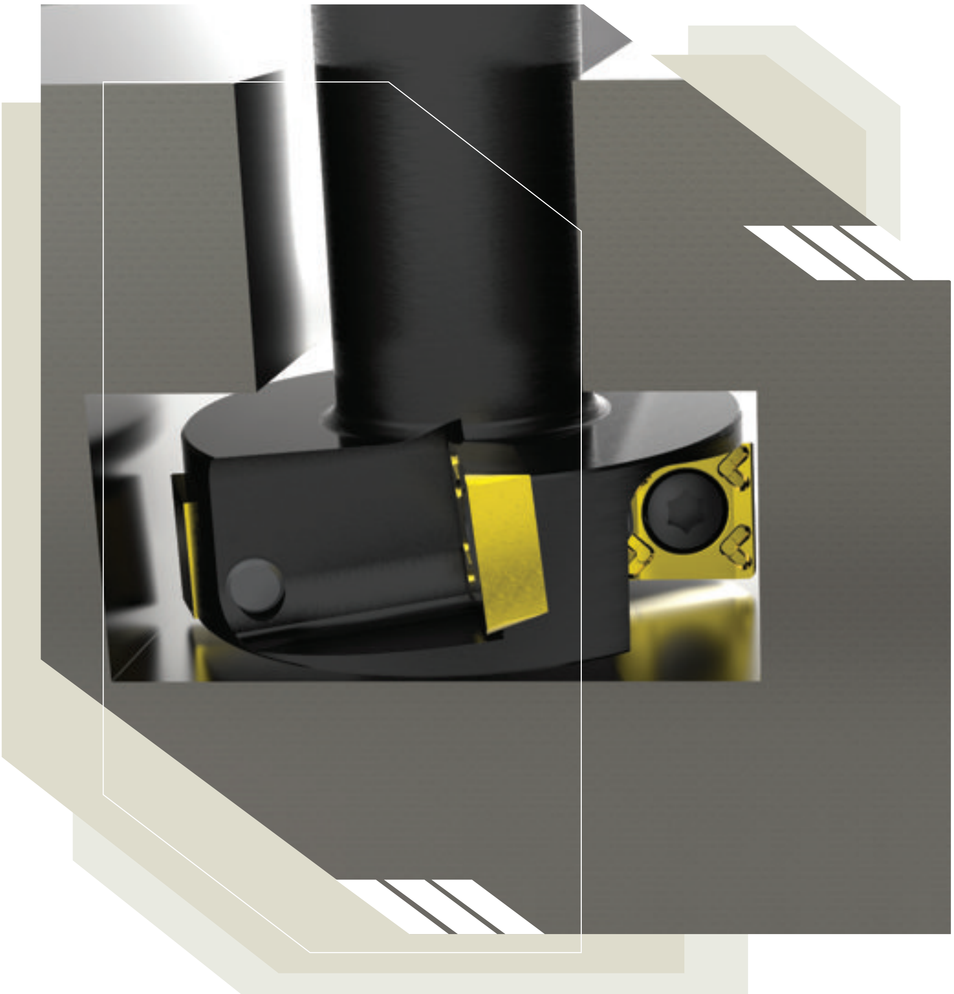
i.e.: $\frac{h_m}{0,866}$ or $\frac{0,08mm}{0,866}$ = 0,092mm programmed feed rate

T-Slotting

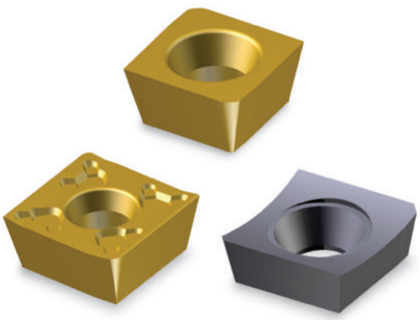
T-SLOT MILLING CUTTERS
The **5400VM** cutter is specifically designed for producing T-slots after machining the tenon slot. This particular design places two inserts slightly higher on the body to machine the top of the slot while the other two machine the bottom of the slot.

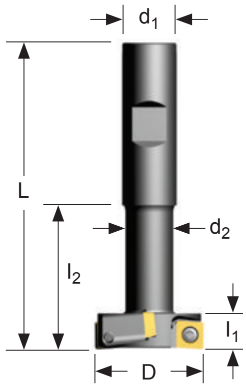
The unique design with reinforced insert support and shallow machined chip flutes, allows this cutter design to run at higher feed rates.

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:
Diameter Range = 18mm to 40mm

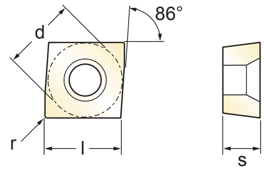




Weldon Shank

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

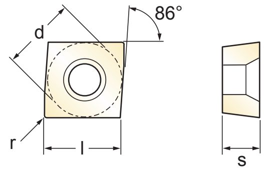


Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h_m min
			Depth of Cut (mm)							
			a_e / a_p max. *	a_e min. - max. -	a_e min. - max. -					
Insert Size 04										
017667	MPHW0402PPTL	X500		-	-	4,76	4,76	2,38	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 9.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page 283. Speed recommendations can be found on page 284.



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
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
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
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
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 9.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page 283. Speed recommendations can be found on page 284.

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 284.

Speed v_c (m/min)

5400VM Series

Wear Resistance: – → +

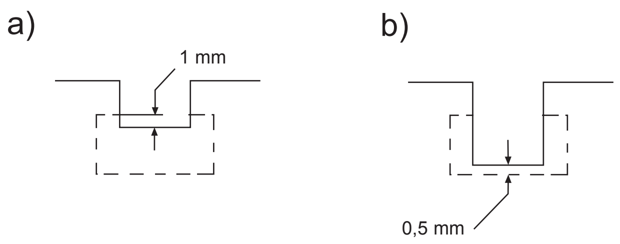
Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			PVD X Grade			CVD X Grade			PVD Standard			PVD Standard			CVD Standard			Uncoated Micrograin
					X400			X500			SP6519			SP4019			MP91M			GH1
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	⦿	●	120 - 260	⦿	●	130 - 270	⦿	●	130 - 295		●	140 - 315		●	140 - 345			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			105 - 230			115 - 240			115 - 260			120 - 275			120 - 305			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230		●	105 - 245		●	105 - 270			
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			70 - 150			75 - 160			75 - 175			80 - 190			80 - 205			
P	Alloyed Steel	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						
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250						
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 255			115 - 285			120 - 245
K	Cast Iron	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
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2320						295 - 2440
S	High Temperature Alloys	Iron Based																		
S	High Temperature Alloys	Cobalt Based																		
S	High Temperature Alloys	Nickel Based																		
S	High Temperature Alloys	Titanium Based																		
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN																		
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN																		

5400VM Technical Information



ATI 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.

Milling

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

stellram.com

Slotting / Shoulder

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.

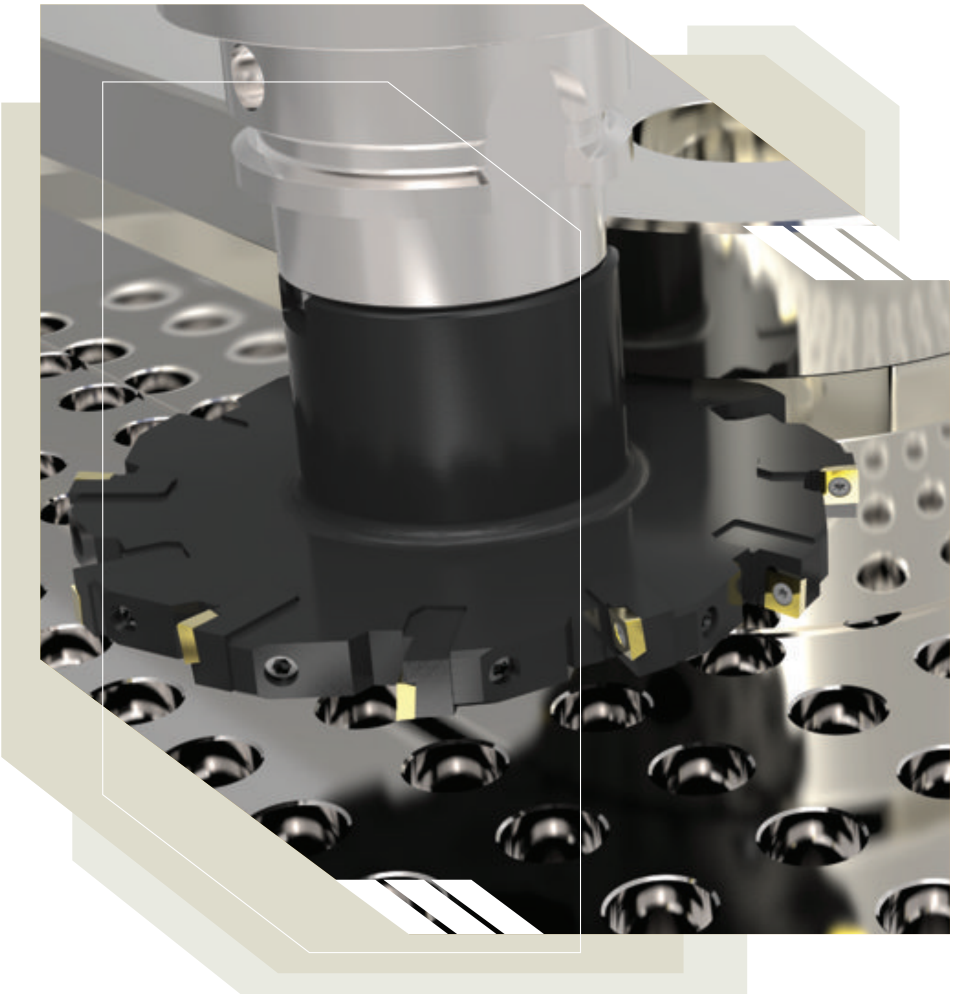
The cartridges are fixed to the cutter body by an efficient clamping system which works in the same direction as the cutting force.

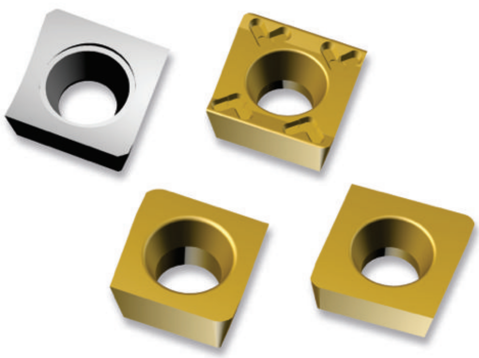
Due to the adjustable cartridges, these cutters are perfectly qualified to machine precision slots.

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 ATI 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.





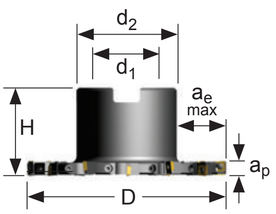
The 7220VM range with width adjustment is as follows:

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

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.



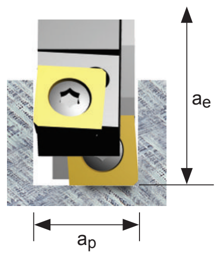
Disc Cutter & Cartridge

Slotting / Shoulder

Product		Dimensions (mm)										
EDP	Assembled Description	D	L/H	d_1	d_2	No. of Teeth (right / left)	a_e max	a_p adjustment range: a_p min	a_p max	Screw Tightening Nm	Insert type	Insert size metric
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 + 5L	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).

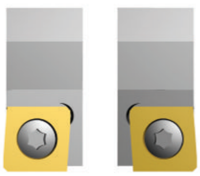
Product		Mounting Bolt	
EDP	Assembled Description	EDP	Bolt
7220VM04 Disk Mill Cutters			
016700	7220VM04-063R06/07N	031299	M10 1.5 X 25 SHCS
016701	7220VM04-063R07/08N	031299	M10 1.5 X 25 SHCS
016702	7220VM04-080R06/07N	031268	M12 X 1.75 X 30 SHCS
016703	7220VM04-080R07/08N	031268	M12 X 1.75 X 30 SHCS
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	T20B
016764	**72VMR12/14**	016756	**72VML12/14**	-	-	015256	72.693T	015273	T20B
7220VM11 Disk Mill Cutters									
016765	**72VMR14/16**	016757	**72VML14/16**	016858	72.602	015257	72.694T	015273	T20B
016766	**72VMR16/18**	016758	**72VML16/18**	016858	72.602	015257	72.694T	015273	T20B
015445	**72VMR18/20**	015444	**72VML18/20**	016858	72.602	015257	72.694T	015273	T20B

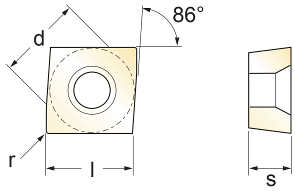
Note: Adjusting screw is only supplied for the 7220VM11 size Disk Mills. All other Disk Mills do not have an adjusting screw, the smaller sizes are adjusted manually.

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.

MP_W..L MP_W..R MPEX..L-701 MPEX..R-701



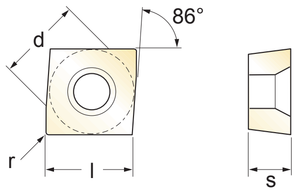
Product			Application & Material			Dimensions (mm)				
EDP	Item Description	Grade	Roughing ▼	Semi-Finishing ▼▼	Finishing ▼▼▼	d (IC)	l	s	r	h_m min
			Depth of Cut (mm)							
			a_p / a_e max*	a_p / a_e min - max 1,00 - 3,00	a_p / a_e min - max 0,20 - 1,00					
Insert size 04										
017667	MPHW0402PPTL	X500	■◆●◆●	●●●●●	-	4,76	4,76	2,38	Facet	0,07
017666	MPHW0402PPTR	X500	■◆●◆●	●●●●●	-	4,76	4,76	2,38	Facet	0,07
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 9.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page 292. Speed recommendations can be found on page 293.

MPEX..R-701 MPEX..R-701 MPHT..L-42 MPHT..R-42 MPFW..L MPFW..R



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
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
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
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
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 9.

* Max a_p and a_e is determined by selection of the cutter.

Note: Feed recommendations can be found on page 292. Speed recommendations can be found on page 293.

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	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 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 293.

7220VM Recommended Speeds

Speed v_c (m/min)

7220VM Series

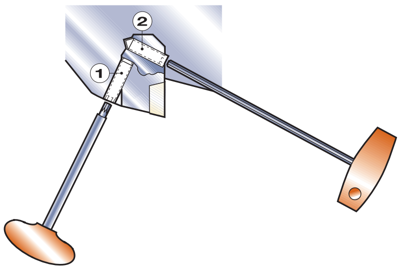
Wear Resistance: – ⟷ +

Speed min. - max.

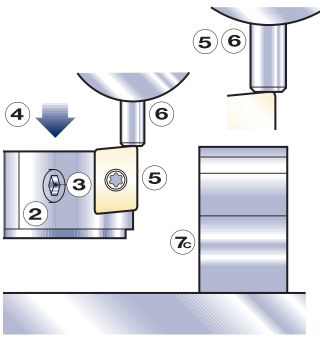
Coolant Recommendation: Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	PVD X Grade X400	Wet	Dry	CVD X Grade X500	Wet	Dry	PVD Standard SP6519	Wet	Dry	PVD Standard SP4019	Wet	Dry	CVD Standard MP91M	Wet	Dry	Uncoated Micrograin GH1
P	Unalloyed Steel	<600 N/mm² <180 HBN	⦿	●	120 - 260	⦿	●	130 - 270	⦿	●	130 - 295		●	140 - 315		●	140 - 345			
P	Unalloyed Steel	<950 N/mm² <280 HBN			105 - 230			115 - 240			115 - 260			120 - 275			120 - 305			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	⦿	●	95 - 200	⦿	●	100 - 210	⦿	●	100 - 230		●	105 - 245		●	105 - 270			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			70 - 150			75 - 160			75 - 175			80 - 190			80 - 205			
P	Alloyed Steel	1200-1400 N/mm² 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						
M	Stainless Steel	Martensitic 400 series						100 - 220			105 - 235			110 - 250						
M	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
K	Cast Iron	Spheroidal-Ductile GGG-FGS						105 - 205			110 - 240			115 - 255			115 - 285			120 - 245
K	Cast Iron	Malleable GTS - MN/MP						95 - 170			100 - 220			105 - 235			105 - 260			115 - 200
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN										●		400 - 2895				●		400 - 3050
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN												295 - 2320						295 - 2440
S	High Temperature Alloys	Iron Based				●		23 - 48	●		23 - 55	●		24 - 63						
S	High Temperature Alloys	Cobalt Based						21 - 44			22 - 48			23 - 52						
S	High Temperature Alloys	Nickel Based						24 - 51			25 - 55			26 - 59						
S	High Temperature Alloys	Titanium Based						35 - 73			36 - 79			37 - 84						
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN																		
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN																		

"A" Adjusting 7220VM11 with Adjusting Screw



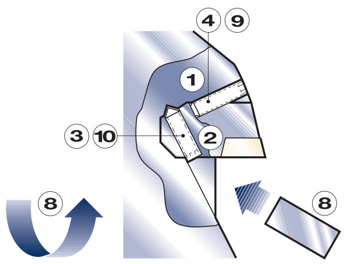
1. Mount the cutter body on the pre-setter.
2. Before mounting the cartridge into the cutter body seat, turn back adjustment screw No. 2 of the first cartridge.
3. Gently loosen fixing screw No. 1. Then fit this cartridge into the seat and push the cartridge downwards.
4. Mount the insert on the cartridge to be adjusted



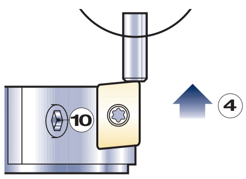
IMPORTANT!

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.

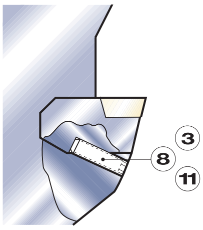


***NOTE:** "Half-side" cutters, with non-staggered teeth, need only be adjusted on one side.

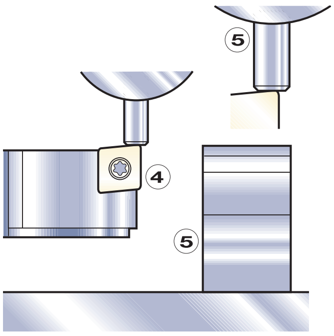


Stellram®
Cutting Tool Systems

"B" Adjusting 7220VM 04, 06 & 08 Cutters without Adjusting Screw



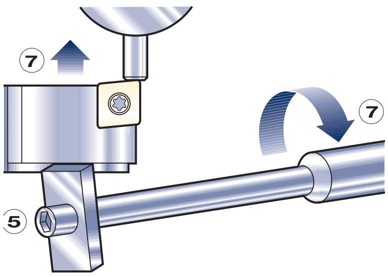
1. Mount the cutter body on the pre-setter.
2. Gently loosen fixing screw No. 1. Then fit this cartridge into the seat and push the cartridge downwards.
3. Mount the insert on the cartridge to be adjusted.



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

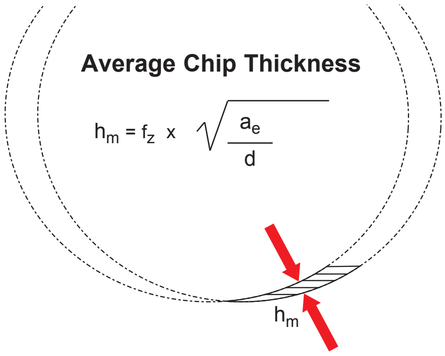
Formula: Average Chip Thickness (h_m)

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

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	GH1	GH2	SA9608	SA9808	SC3025	SC6525	MP91M	X500	SP1019	SP4019	SP6519	X700	X400	SP5419
		Uncoated		Cermet		CVD				PVD					
		Uncoated	Uncoated	Uncoated	Uncoated	TiN-TiCN-Al_2O_3	TiN-TiCN-Al_2O_3	TiN-MT-TiCN-Al_2O_3	TiN-TiC TiN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
P	Unalloyed and Alloyed Steel			P01–P05	P05–P10		P05–P20	P10–P30	P25–P40	P01–P10	P10–P25	P20–P35		P25–P40	P35–P50
M	Stainless Steels			M01–M05	M05–M10				M20–M40	M05–M15	M10–M20	M15–M30	M15–M30		
K	Cast Irons	K05–K20	K15–K30	K01–K10	K05–K15	K10–K20	K10–K25	K15–K30	K25–K35	K05–K15	K15–K25	K20–K30			
N	Aluminum & Alloys	N01–N10	N10–N20							N05–N10	N10–N20				
S	High Temperature Alloys			S01–S05					S20–S30	S01–S05	S05–S10	S10–S15	S15–S20		
H	Hard Materials							H15–H25		H05–H10	H15–H25			H20–H30	

Codes: P01, P05, P10, P15, P20, P25, P30, P35, P40, P45, P50; M01, M05, M10, M15, M20, M25, M30, M35, M40; K01, K05, K10, K15, K20, K25, K30, K35, K40; N01, N05, N10, N15, N20, N25, N30; S01, S05, S10, S15, S20, S25, S30; H01, H05, H10, H15, H20, H25, H30

↑ Increasing - wear resistance - Increasing cutting speed

↓ Increasing - shock resistance - Increasing - feed

Cutting Conditions

Speed v_c (m/min)

Speed v_c (m/min)

For all Families

Wear Resistance

– ⟶ +

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⊙

ISO	Materials	Rm and Hardness			PVD Standard SP5419			PVD X Grade X400			CVD X Grade X500			PVD X Grade X700			PVD Standard SP6519			Uncoated Micrograin GH2			PVD Standard 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

Speed v_c (m/min)

For all Families

Wear Resistance

– → +

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ◉

ISO	Materials	Rm and Hardness			CVD Standard MP91M			CVD Standard SC6525			CVD Standard SC3025			Uncoated Micrograin GH1*			PVD Micrograin SP1019			Uncoated Cermet SA9808			Uncoated Cermet 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-Ft		●	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						

* 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.

Stellram®
Cutting Tool Systems

Calculation Formulas - Indexable Milling

Speed-Spindle Rotation (rpm)

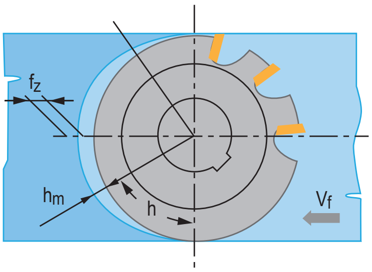
$$n = \frac{V_c \times 1000}{D_c \times \varpi}$$

Cutting Speed (m/min.)

$$V_c = \frac{D_c \times \varpi \times n}{1000}$$

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

$$h_m = f_z \times \sqrt{\frac{a_e}{D_c}} \quad \text{or} \quad f_z = h_m \times \sqrt{\frac{D_c}{a_e}}$$

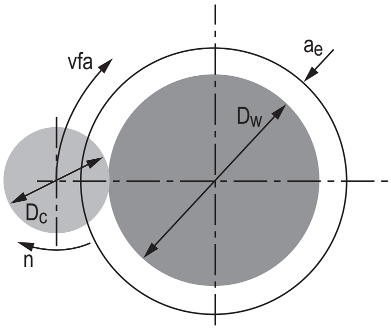
Terminology

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	cm³/min
h_m	Medium chip thickness	mm
π	Pie Symbol (3.1416)	pie

Feed Rate Compensation

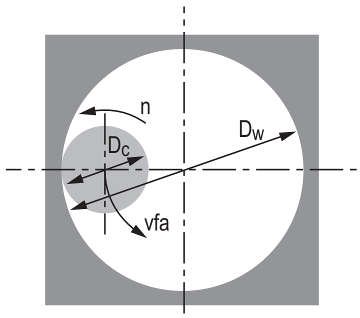
V_f	feed rate of tool	[mm/min]
Vfa	feed rate of tool axis	[mm/min]
D_c	cutter diameter	[mm]
D_w	workpiece diameter	[mm]
n	rotation	[rpm]
f_z	feed per tooth	[mm/z]
Z	number of teeth	

$$V_f = n \times f_z \times Z$$



<u>External</u>

$$Vfa = V_f \times \left(\frac{D_w + D_c}{D_w}\right)$$



<u>Internal</u>

$$Vfa = V_f \times \left(\frac{D_w - D_c}{D_w}\right)$$

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

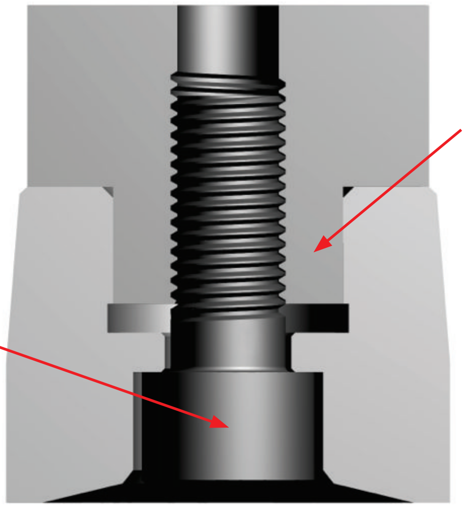
Brinell	Rockwell		Vickers	Tensile Strength	
HBN Hardness	HRC Hardness	HRB Hardness	HV Hardness	Rm Tensile Strength	Rm Tensile Strength
Brinell 3000 Kgf	Diamond penetrator	Ball 1/16"	Vickers 30	N / mm^2 MPa	KSI
226	20	-	238	760	110
231	21	-	243	770	112
237	22	-	248	790	115
243	23	-	254	810	117
247	24	-	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

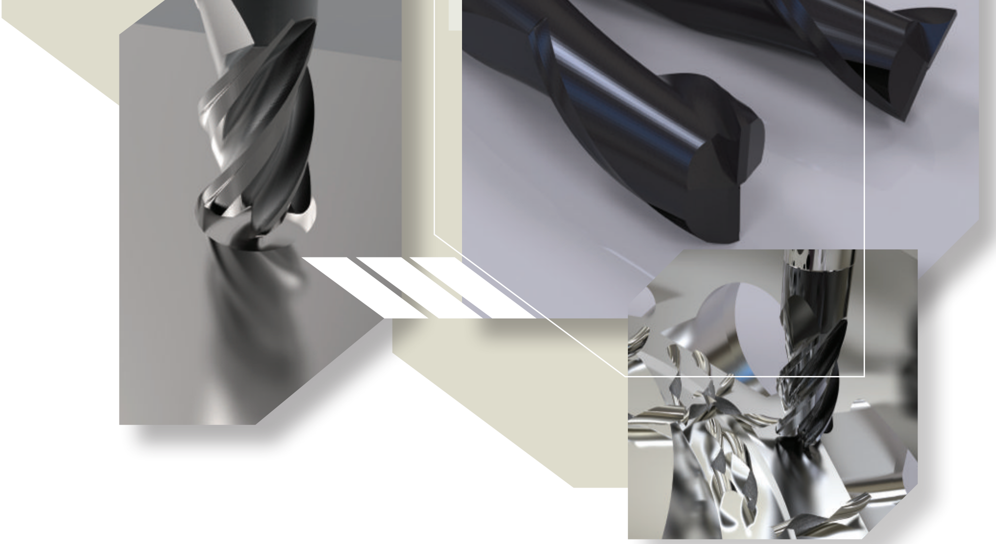
Replacement bolts for Metric Shell Mills, please use the chart below.

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.



All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

stellram.com

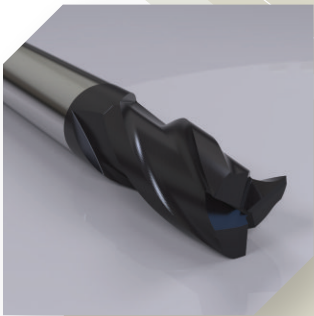
Stellram is committed to being the leading manufacturer and supplier of solid carbide rotary cutting tools in the world. Through a combination of state-of-the-art technology, rigorous quality procedures and highly skilled people, we strive to provide cost effective solutions and support to increase your competitive advantage.

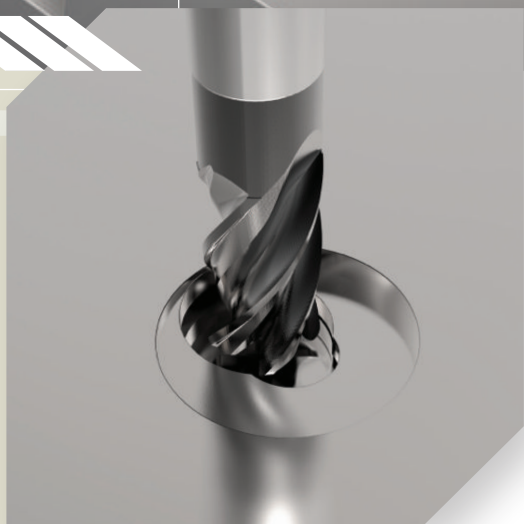
Technology

Major investment in the latest CNC grinding and inspection equipment has enabled Stellram to become a major supplier of standard and special solid carbide tooling worldwide.

Technical

An experienced team of application sales engineers together with a dedicated in-house department is focussed to offer technical support and deliver production engineering improvements.





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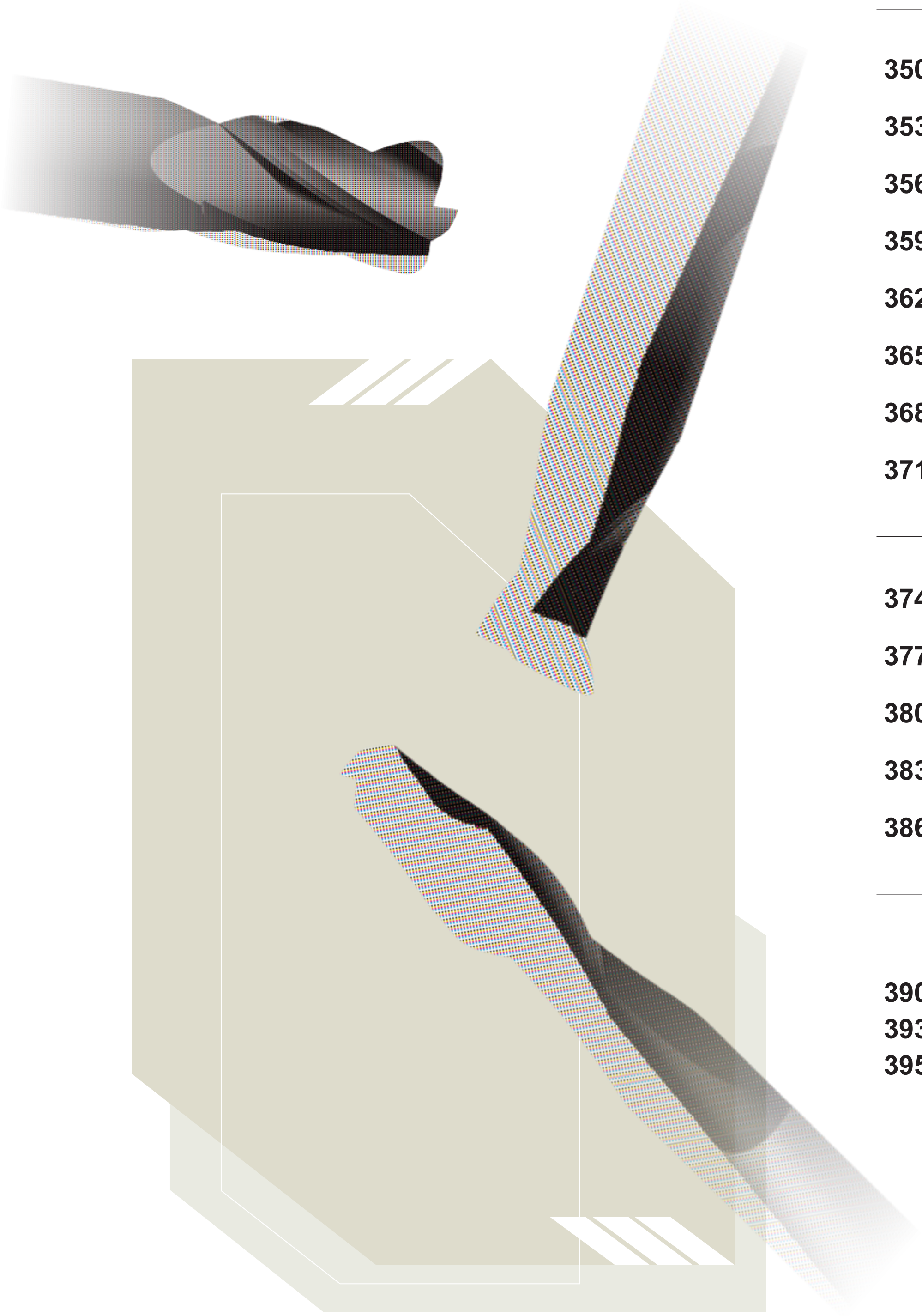


XER	100	N	N	4	-	E
1	2	3	4	5		6

1 End mill Family

B - Ball Nosed End Mill
E- Standard End Mill (Square Ended)
EA - End Mill - Aluminium
ER - Standard End Mill with Radius
ERC - Roughing End Mill with Chamfer
HB - High Performance End Mill - Ball Nosed
HE - High Performance End Mill
HER - High Performance End Mill with Radius
HMN - High Performance Multiflute End Mill (Negative)
HMR - High Performance Multiflute End Mill with Radius
HPA - High Performance End Mill - Aluminium
RSM - Reduced Shank - Multiflute End Mill
XE - Unequal Form Aerospace End Mill
XER - Unequal Form Aerospace End Mill with Radius

2 Cutting Diameter

3 Overall Length

N = Normal
S = Short
M = Medium
K = Intermediate
L = Long
XL = Extra Long
T* = Taper
X = Special

4 Flute length

N = Normal
S = Short
M = Medium
K = Intermediate
L = Long
XL = Extra Long
X = Special

5 Number of Flutes

Z** = 2 - 10

6 Radius

C = 0,25
D = 0,30
E = 0,50
F = 0,75
G = 1,00
H = 1,25
J = 1,50
K = 2,00
L = 2,50
M = 3,00
P = 4,00
Q = 5,00

* When cutting diameter (D) is smaller than the shank diameter (d1), the overall length designation is followed by a “T”.

eg. XER030NTN4-C

** An “X” following the number of flutes designation signifies the use of special geometry.

eg. RSM250LM10X-M

Number of Flutes / Cutting Edges

- 2 Flute
- 3 Flute
- 4 Flute
- 4 Flute with Radius
- 2 Flute Ball Nosed
- 4 Flute Ball Nosed
- 4 Flute - Independent Edges
- 6 Flute
- 6 Flute - Non Centre Cutting
- 8 Flute - Non Centre Cutting
- 10 Flute - Non Centre Cutting

Helix

- 30° Helix
- 45° Helix
- 50° Helix
- 55° Helix
- 35°/38° Helix

Corner Style

- Sharp Corner
- Ball Nosed
- Corner Radius
- Corner Chamfer

Shank Style

- Cylindrical Shank
- Weldon Shank*

* Available on request

Shank Tolerance

- Shank Tolerance

Manufacturing Standards

- Manufactured to DIN 6535
- Manufactured to DIN 6527L
- Works Standard

Coating

- Uncoated Carbide Grade
- PVD Coated Carbide Grade

General Applications

Slotting - Square Ended

Slotting - Ball Nosed

Slotting Application
Technical information provided with each family.

Shoulder Milling - Square Ended

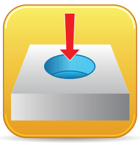
Shoulder Milling - Ball Nosed

Profiling / Shoulder Milling Application
Technical information provided with each family.

Tool Path Strategies

Pocketing

Tool Suitable for Pocketing
Technical information provided with each family. (As Slotting Parameters)



Drilling

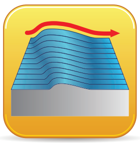
Tool Suitable for Drilling
See Page 391 - for Technical Details

Helical Interpolation

Tool Suitable for Helical Interpolation
See Page 391 - for Technical Details

Ramping

Tool Suitable for Ramping
See Page 390 - for Technical Details



Copy / 3D

Tool Suitable for Copy Milling
See Page 392 - for Technical Details

Facing

Tool Suitable for Facing

Trochoidal

Tool Suitable for Trochoidal Milling
See Page 391 - for Technical Details

Solid Carbide

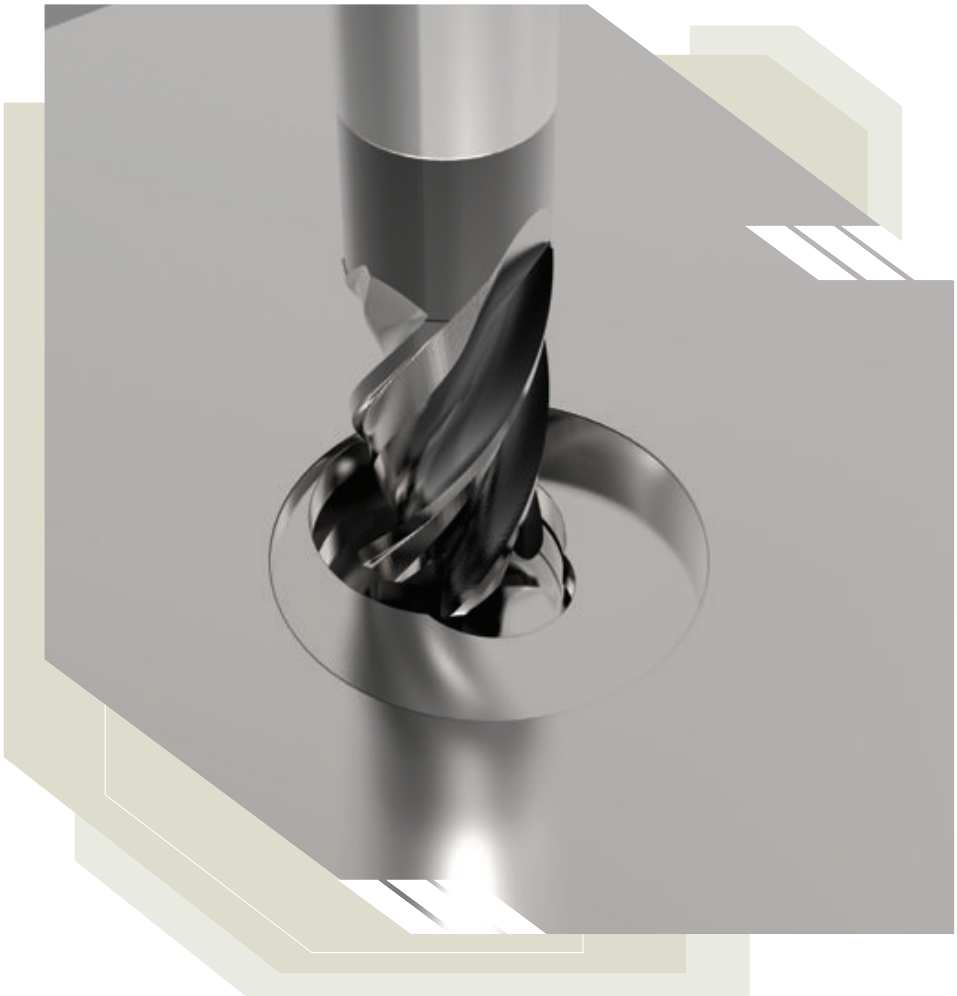
Aerospace End Mills
XE / XER

Facing | Slotting - Square End | Shoulder Milling - Square Ended | Pocketing | Helical Interpolation | Trochoidal

AEROSPACE RADIUS END MILL
XE & XER End Mills have been specifically designed and manufactured for the machining of Titanium and High Temperature Alloys that are typically found in Aerospace, Defence, Medical and Oils & Gas Segments.

Key Features
- Advanced Geometric design
- Tough and Wear resistant Submicron Substrate
- Advanced Nano - Composite PVD Coating
- High Precision Radii

Benefits
- Improved stability with the suppression of vibration & harmonics
- Excellent chip control
- Increased application capacity for Slotting and Profiling
- Increased metal removal rates by up to 2X against comparable tools



Range:
XE:
Ø: 2,00mm - 20,00mm
Radii : 0,25mm

XER:
Ø : 2,00mm - 20,00mm
Radii : 0,25mm - 4,00mm

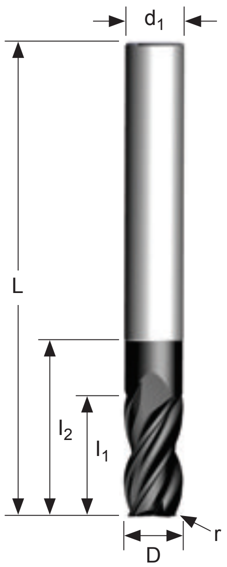
XE
4 - Flute End Mill

Aerospace

Materials Application

SP4060					
P	M	K	N	S	H

PVD



4 - Flute End Mill

Metric Product		Dimensions (mm)										
EDP	**Item Description**	D	L	l_1	l_2	d_1	r	a_p max	No. of Teeth	Helical Hole min - max		Trochoidal min
031360	**XE 020MTN4-C**	2,00	65,00	4,00	-	6,00		4,00	4	2,86	3,41	2,86
031361	**XE 025MTN4-C**	2,50	65,00	5,00	-	6,00		5,00	4	3,58	4,39	3,58
031362	**XE 030MTN4-C**	3,00	65,00	6,00	-	6,00		6,00	4	4,29	5,36	4,29
031363	**XE 035MTN4-C**	3,50	65,00	7,00	-	6,00		7,00	4	5,01	6,34	5,01
031364	**XE 040MTN4-C**	4,00	65,00	8,00	-	6,00		4,00	4	5,72	7,31	5,72
031365	**XE 045MTN4-C**	4,50	65,00	9,00	-	6,00		9,00	4	6,44	8,29	6,44
031366	**XE 050MTN4-C**	5,00	75,00	10,00	-	6,00	0,25	10,00	4	7,15	9,26	7,15
031367	**XE 060MN4-C**	6,00	75,00	12,00	18,00	6,00		12,00	4	8,58	11,21	8,58
031368	**XE 080MN4-C**	8,00	75,00	16,00	24,00	8,00		16,00	4	11,44	15,11	11,44
031369	**XE 100MN4-C**	10,00	100,00	20,00	30,00	10,00		20,00	4	14,30	19,01	14,30
031370	**XE 120MN4-C**	12,00	100,00	24,00	36,00	12,00		24,00	4	17,16	22,91	17,16
031371	**XE 160MN4-C**	16,00	115,00	32,00	48,00	16,00		32,00	4	22,88	30,71	22,88
031372	**XE 200MN4-C**	20,00	120,00	40,00	60,00	20,00		40,00	4	28,60	38,51	28,60

XE - Radial a_e and Axial a_p depth of cut range

Product	Dimensions						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SP4060	0,2 - 0,5 D	0,5 - 2,0 D	Mid - High	0,05 - 0,2 D	0,1 - 2,0 D	Low - Mid	0,5 - 1,25 D

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

XER
4 - Flute End Mill

35° 38° | r | DIN 6535 | DIN 6527L | HA | h6

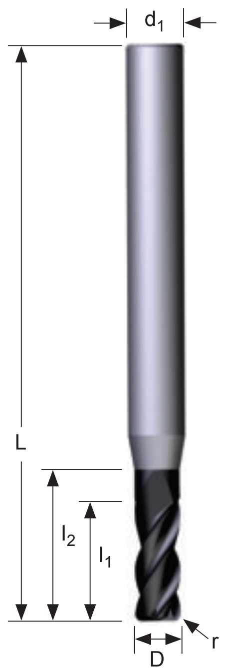
Aerospace

Materials Application

SP4060					
P	M	K	N	S	H

PVD

Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Helical Interpolation | Trochoidal



4 - Flute End Mill

Metric Product		Dimensions (mm)										
EDP	Item Description	D	L	l_1	l_2	d_1	r	a_p max	No. of Teeth	Helical Hole min - max		Trochoidal min
031936	XER 020NTN4-C	2,00	57,00	7,00	-	6,00	0,25	7,00	4	2,86	3,41	2,86
031937	XER 025NTN4-C	2,50	57,00	8,00	-	6,00	0,25	8,00	4	3,58	4,39	3,58
031938	XER 030NTN4-C	3,00	57,00	8,00	-	6,00	0,25	8,00	4	4,29	5,36	4,29
031939	XER 035NTN4-C	3,50	57,00	10,00	-	6,00	0,25	10,00	4	5,01	6,33	5,01
031940	XER 040NTN4-C	4,00	57,00	11,00	-	6,00	0,25	11,00	4	5,72	7,31	5,72
031941	XER 040NTN4-E	4,00	57,00	11,00	-	6,00	0,50	11,00	4	5,72	6,83	5,72
031942	XER 050NTN4-C	5,00	57,00	13,00	-	6,00	0,25	13,00	4	7,15	9,26	7,15
031943	XER 050NTN4-E	5,00	57,00	13,00	-	6,00	0,50	13,00	4	7,15	8,78	7,15
031944	XER 050NTN4-F	5,00	57,00	13,00	-	6,00	0,75	13,00	4	7,15	8,29	7,15
031945	XER 060NN4-C	6,00	57,00	13,00	21,00	6,00	0,25	13,00	4	8,58	11,21	8,58
031946	XER 060NN4-E	6,00	57,00	13,00	21,00	6,00	0,50	13,00	4	8,58	10,73	8,58
031947	XER 060NN4-G	6,00	57,00	13,00	21,00	6,00	1,00	13,00	4	8,58	9,75	8,58
031948	XER 080NN4-C	8,00	63,00	19,00	27,00	8,00	0,25	19,00	4	11,44	15,11	11,44
031949	XER 080NN4-E	8,00	63,00	19,00	27,00	8,00	0,50	19,00	4	11,44	14,63	11,44
031950	XER 080NN4-G	8,00	63,00	19,00	27,00	8,00	1,00	19,00	4	11,44	13,65	11,44
031951	XER 100NN4-C	10,00	72,00	22,00	32,00	10,00	0,25	22,00	4	14,30	19,01	14,30
031952	XER 100NN4-E	10,00	72,00	22,00	32,00	10,00	0,50	22,00	4	14,30	18,53	14,30
031953	XER 100NN4-G	10,00	72,00	22,00	32,00	10,00	1,00	22,00	4	14,30	17,55	14,30
031954	XER 100NN4-J	10,00	72,00	22,00	32,00	10,00	1,50	22,00	4	14,30	16,58	14,30
031955	XER 120NN4-C	12,00	83,00	26,00	38,00	12,00	0,25	26,00	4	17,16	22,91	17,16
031956	XER 120NN4-E	12,00	83,00	26,00	38,00	12,00	0,50	26,00	4	17,16	22,43	17,16
031957	XER 120NN4-G	12,00	83,00	26,00	38,00	12,00	1,00	26,00	4	17,16	21,45	17,16
031958	XER 120NN4-J	12,00	83,00	26,00	38,00	12,00	1,50	26,00	4	17,16	20,48	17,16
032269	XER 120NN4-L	12,00	83,00	26,00	38,00	12,00	2,50	26,00	4	17,16	18,53	17,16
031959	XER 160NN4-C	16,00	92,00	32,00	44,00	16,00	0,25	32,00	4	22,88	30,71	22,88
031960	XER 160NN4-G	16,00	92,00	32,00	44,00	16,00	1,00	32,00	4	22,88	29,25	22,88
031961	XER 160NN4-J	16,00	92,00	32,00	44,00	16,00	1,50	32,00	4	22,88	28,28	22,88
031962	XER 160NN4-K	16,00	92,00	32,00	44,00	16,00	2,00	32,00	4	22,88	27,30	22,88
032270	XER 160NN4-L	16,00	92,00	32,00	44,00	16,00	2,50	32,00	4	22,88	26,33	22,88
031963	XER 160NN4-M	16,00	92,00	32,00	44,00	16,00	3,00	32,00	4	22,88	25,35	22,88
032271	XER 160NN4-P	16,00	92,00	32,00	44,00	16,00	4,00	32,00	4	22,88	23,40	22,88
031964	XER 200NN4-C	20,00	104,00	38,00	54,00	20,00	0,25	38,00	4	28,60	38,51	28,60
031965	XER 200NN4-G	20,00	104,00	38,00	54,00	20,00	1,00	38,00	4	28,60	37,05	28,60
031966	XER 200NN4-J	20,00	104,00	38,00	54,00	20,00	1,50	38,00	4	28,60	36,08	28,60
031967	XER 200NN4-K	20,00	104,00	38,00	54,00	20,00	2,00	38,00	4	28,60	35,10	28,60
032272	XER 200NN4-L	20,00	104,00	38,00	54,00	20,00	2,50	38,00	4	28,60	34,13	28,60
031968	XER 200NN4-M	20,00	104,00	38,00	54,00	20,00	3,00	38,00	4	28,60	33,15	28,60
032273	XER 200NN4-P	20,00	104,00	38,00	54,00	20,00	4,00	38,00	4	28,60	31,20	28,60

XER - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	ae%	ap%	fz	ae%	ap%	fz	ap%
SP4060	0,2 - 0,5 D	0,5 - ap max*	Mid - High	0,05 - 0,2 D	0,5 - ap max*	Low - Mid	0,5 - 1,16 D

* Do not exceed 2 D for a_p max - where 2 D is available

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

a_p a_e

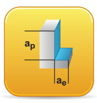
a_p

Slotting - Square Ended

XE / XER Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS-MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
2,0	-	-	-	0,005 0,007	0,005 0,007	0,005 0,007	0,005 0,007	0,004 0,006	-	-	-	-	-	0,005 0,007	0,003 0,005	0,003 0,005	0,005 0,007	-	-
2,5	-	-	-	0,006 0,010	0,006 0,009	0,006 0,010	0,005 0,009	0,005 0,008	-	-	-	-	-	0,006 0,010	0,004 0,008	0,004 0,008	0,006 0,010	-	-
3,0	-	-	-	0,007 0,012	0,007 0,011	0,007 0,012	0,005 0,011	0,006 0,009	-	-	-	-	-	0,007 0,013	0,005 0,011	0,005 0,011	0,007 0,013	-	-
3,5	-	-	-	0,009 0,015	0,008 0,013	0,009 0,014	0,006 0,013	0,007 0,011	-	-	-	-	-	0,009 0,016	0,006 0,014	0,006 0,013	0,009 0,016	-	-
4,0	-	-	-	0,010 0,018	0,009 0,015	0,010 0,016	0,006 0,014	0,008 0,013	-	-	-	-	-	0,010 0,019	0,006 0,016	0,006 0,014	0,010 0,018	-	-
5,0	-	-	-	0,013 0,023	0,011 0,018	0,013 0,021	0,008 0,018	0,008 0,016	-	-	-	-	-	0,013 0,025	0,008 0,021	0,008 0,018	0,013 0,024	-	-
6,0	-	-	-	0,015 0,029	0,013 0,022	0,015 0,026	0,010 0,022	0,012 0,020	-	-	-	-	-	0,015 0,031	0,010 0,026	0,010 0,022	0,015 0,030	-	-
8,0	-	-	-	0,020 0,039	0,017 0,029	0,020 0,037	0,014 0,031	0,016 0,028	-	-	-	-	-	0,020 0,044	0,014 0,036	0,014 0,031	0,020 0,042	-	-
10,0	-	-	-	0,025 0,050	0,021 0,037	0,025 0,048	0,018 0,040	0,020 0,036	-	-	-	-	-	0,025 0,057	0,018 0,048	0,018 0,040	0,025 0,055	-	-
12,0	-	-	-	0,030 0,062	0,025 0,044	0,030 0,060	0,022 0,049	0,024 0,044	-	-	-	-	-	0,030 0,071	0,022 0,059	0,022 0,049	0,030 0,069	-	-
16,0	-	-	-	0,040 0,084	0,032 0,059	0,040 0,085	0,030 0,069	0,032 0,060	-	-	-	-	-	0,040 0,100	0,030 0,084	0,030 0,069	0,040 0,098	-	-
20,0	-	-	-	0,050 0,108	0,040 0,073	0,050 0,111	0,038 0,089	0,040 0,076	-	-	-	-	-	0,050 0,131	0,038 0,109	0,038 0,089	0,050 0,127	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,05 D	2,30 x f_z
	0,10 D	1,65 x f_z
	0,15 D	1,40 x f_z
	0,20 D	1,25 x f_z
	0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

XE / XER Series					
					Speed min. - max.
Coolant Recommendation: Recommended ● Possible ⦿					PVD Standard
ISO	Materials	Rm and Hardness	Wet	Dry	SP4060
P	Unalloyed Steel	<600 N/mm² <180 HBN			
P	Unalloyed Steel	<950 N/mm² <280 HBN			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN	●	⦿	
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN	●	⦿	50 - 280
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN	●	⦿	45 - 160
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	95 - 200
M	Stainless Steel	Martensitic 400 series	●	⦿	70 - 145
M	PH Stainless	Refractory P.H.	●		60 - 110
K	Cast Iron	Grey GG-Ft			
K	Cast Iron	Spheroidal-Ductile GGG-FGS			
K	Cast Iron	Malleable GTS - MN/MP			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	60 - 140
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 75
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 80
S	High Temperature Alloys	Titanium Based	●	⦿	40 - 120
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			

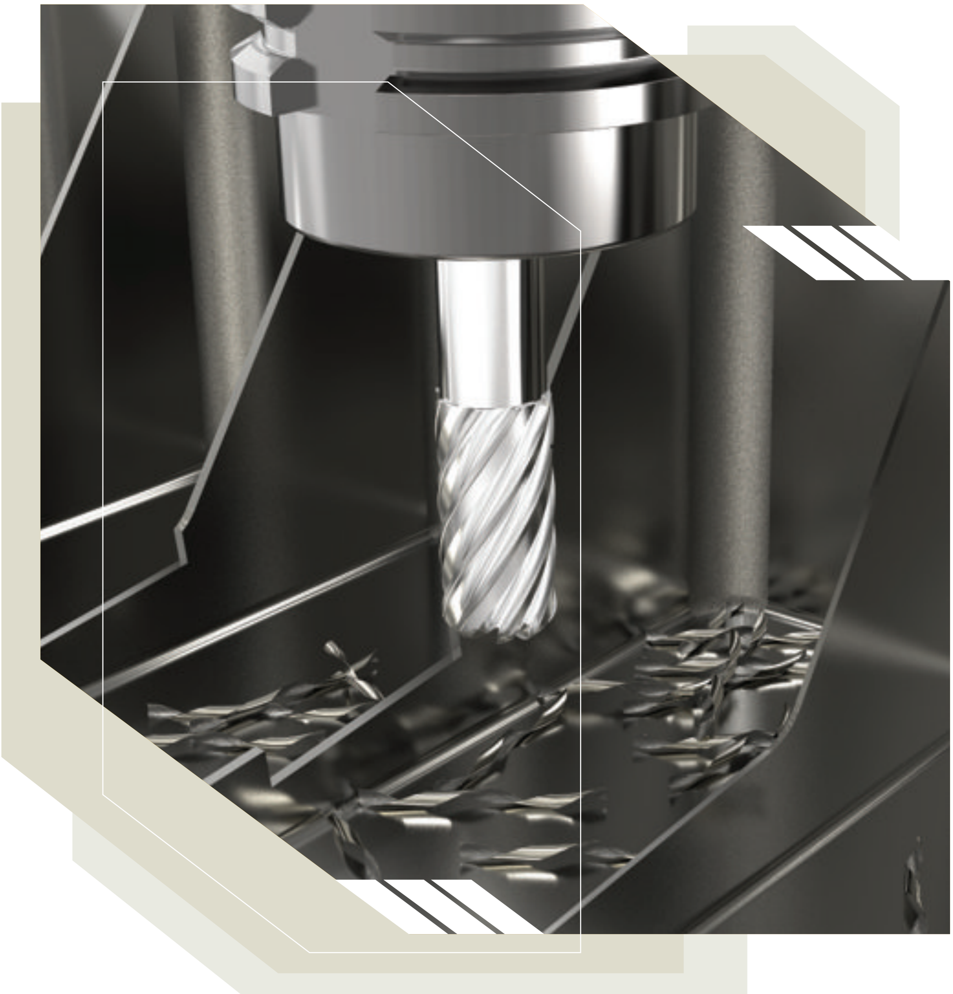
All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

stellram.com

RSM AEROSPACE PROGRAM
The RSM program is specially designed to overcome a number of problems usually associated with machining Titanium components, in particular the profiling of walls, pockets and surfaces in 2D and 3D applications.

Issues such as vibration and material tarnishing are significantly reduced by the tool's unique geometry. The tool also features a reduced shank which offers optimum flexibility. This allows the user to obtain maximum reach and workholding length* to suit individual requirements, thereby reducing required inventory.

* Recommended minimum secure clamping length is 2,5 x shank diameter.



RSM Range:
Ø: 10,00mm - 25,00mm
Radii*: 0,50mm - 5,00mm

Z*: 6, 8 & 10

* Radii and Cutting edges dependent on diameter

RSM
Multi Flute End Mill

Aerospace

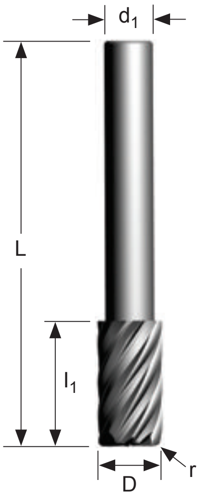
Materials Application

SU4000					
P	M	K	N	S	H
				◆	

Uncoated

Facing

Shoulder Milling - Square Ended



Multi-Flute End Mill

Metric Product		Dimensions (mm)									
EDP	**Item Description**	D	L	l_1	d_1	ap max	Radius r	No. of Teeth	Helical Hole min - max		Trochoidal min
031027	**RSM100LM6X-E**	10,00	125,00	20,00	9,00	20,00	0,50	6	-	-	-
031028	**RSM100LM6X-G**	10,00	125,00	20,00	9,00	20,00	1,00	6	-	-	-
031029	**RSM100LM6X-K**	10,00	125,00	20,00	9,00	20,00	2,00	6	-	-	-
031030	**RSM100LM6X-M**	10,00	125,00	20,00	9,00	20,00	3,00	6	-	-	-
031023	**RSM120LM6X-E**	12,00	125,00	24,00	10,00	24,00	0,50	6	-	-	-
031024	**RSM120LM6X-G**	12,00	125,00	24,00	10,00	24,00	1,00	6	-	-	-
031025	**RSM120LM6X-K**	12,00	125,00	24,00	10,00	24,00	2,00	6	-	-	-
031026	**RSM120LM6X-M**	12,00	125,00	24,00	10,00	24,00	3,00	6	-	-	-
031015	**RSM160LM6X-G**	16,00	150,00	32,00	14,00	32,00	1,00	6	-	-	-
031016	**RSM160LM6X-K**	16,00	150,00	32,00	14,00	32,00	2,00	6	-	-	-
031017	**RSM160LM6X-M**	16,00	150,00	32,00	14,00	32,00	3,00	6	-	-	-
031018	**RSM160LM6X-P**	16,00	150,00	32,00	14,00	32,00	4,00	6	-	-	-
031019	**RSM160LM8X-G**	16,00	150,00	32,00	14,00	32,00	1,00	8	-	-	-
031020	**RSM160LM8X-K**	16,00	150,00	32,00	14,00	32,00	2,00	8	-	-	-
031021	**RSM160LM8X-M**	16,00	150,00	32,00	14,00	32,00	3,00	8	-	-	-
031022	**RSM160LM8X-P**	16,00	150,00	32,00	14,00	32,00	4,00	8	-	-	-
031005	**RSM200LM6X-G**	20,00	160,00	39,00	18,00	39,00	1,00	6	-	-	-
031006	**RSM200LM6X-K**	20,00	160,00	39,00	18,00	39,00	2,00	6	-	-	-
031007	**RSM200LM6X-M**	20,00	160,00	39,00	18,00	39,00	3,00	6	-	-	-
031008	**RSM200LM6X-P**	20,00	160,00	39,00	18,00	39,00	4,00	6	-	-	-
031009	**RSM200LM6X-Q**	20,00	160,00	39,00	18,00	39,00	5,00	6	-	-	-
031010	**RSM200LM8X-G**	20,00	160,00	39,00	18,00	39,00	1,00	8	-	-	-
031011	**RSM200LM8X-K**	20,00	160,00	39,00	18,00	39,00	2,00	8	-	-	-
031012	**RSM200LM8X-M**	20,00	160,00	39,00	18,00	39,00	3,00	8	-	-	-
031013	**RSM200LM8X-P**	20,00	160,00	39,00	18,00	39,00	4,00	8	-	-	-
031014	**RSM200LM8X-Q**	20,00	160,00	39,00	18,00	39,00	5,00	8	-	-	-
033036	**RSM250LM8X-K**	25,00	160,00	47,00	22,00	47,00	2,00	8	-	-	-
033037	**RSM250LM8X-M**	25,00	160,00	47,00	22,00	47,00	3,00	8	-	-	-
033038	**RSM250LM8X-P**	25,00	160,00	47,00	22,00	47,00	4,00	8	-	-	-
033039	**RSM250LM8X-Q**	25,00	160,00	47,00	22,00	47,00	5,00	8	-	-	-
033040	**RSM250LM10X-K**	25,00	160,00	47,00	22,00	47,00	2,00	10	-	-	-
033041	**RSM250LM10X-M**	25,00	160,00	47,00	22,00	47,00	3,00	10	-	-	-
033042	**RSM250LM10X-P**	25,00	160,00	47,00	22,00	47,00	4,00	10	-	-	-
033043	**RSM250LM10X-Q**	25,00	160,00	47,00	22,00	47,00	5,00	10	-	-	-

For technical information, refer to page 389.

RSM Technical Information

Product			Dimensions (mm)																	
Family Description	Diameter	Z	Profiling					Facing					Chip Thickness		Profiling (mm/z)				Facing (mm/z)	
															for a_e min		for a_e max			
			a_e min	a_e max	a_p min	a_p max	a_d max mm²	a_e min	a_e max	a_p min	a_p max	a_d max mm²	h_m min	h_m max	f_z min	f_z max	f_z min	f_z max	f_z min	f_z max
RSM100	10,00	6	0,17	0,67	10,30	13,00	6,87	Radius +0,50	7,50	0,20	Radius +0,50	1,25	0,02	0,05	0,078	0,195	0,040	0,100	0,020	0,057
RSM120	12,00	6	0,20	0,80	12,80	15,60	10,24		9,00			1,80			0,078	0,195	0,040	0,100		
RSM160	16,00	6	0,27	1,07	17,80	20,80	18,99		12,00			3,20			0,078	0,195	0,040	0,100		
RSM160	16,00	8	0,20	0,80	12,00	20,80	9,60		12,00			3,20			0,090	0,225	0,046	0,115		
RSM200	20,00	6	0,33	1,33	23,00	26,00	30,67		15,00			5,00			0,078	0,195	0,040	0,100		
RSM200	20,00	8	0,25	1,00	16,00	26,00	16,00		15,00			5,00			0,090	0,225	0,046	0,115		
RSM250	25,00	8	0,31	1,25	20,50	32,50	25,63		18,75			7,81			0,090	0,225	0,046	0,115		
RSM250	25,00	10	0,25	1,00	15,50	32,50	15,50		18,75			7,81			0,101	0,251	0,051	0,128		

In the application of RSM end mills, it is vital that a_d max mm² is not exceeded. For this, adjust a_e & a_p accordingly.

Example:

When using a_p max, then a_e = a_d max mm²/ a_p max
= 15,50 / 32,50
= 0,47mm

When using a_e max, Then a_p = a_d max mm²/ a_e max
= 15,5 / 1
= 15,50mm

Example based on values for RSM250 (Z=10)

Material Reference Chart and Recommended Surface Speeds

							Metric	
Type	Commercial Name	Designation	Hardness HRB HRC HB	Rm N/mm2	WC (0.15) W/cm³/min	WC (0.006) Hp/in³/min	V_c min (m/min)	V_c max (m/min)
Titanium a	Ti-5Al-2.5Sn	ATI 5-2.5	HRC36	1130	49	1,08	60	120
Titanium a	Ti-6Al-4Zr-2Mo-2Sn	ATI 6-2-4-2®	HRC28	900	31	0,67	60	130
Titanium a	Ti-6Al-4Zr-2Mo-2Sn-0.2Si	ATI 6-2-4-2Si	HRC28	900	31	0,67	60	130
Titanium a	Ti-8Al-1Mo-1V	ATI 8-1-1®	HRC35	1100	49	1,08	60	120
Titanium b	Ti-11.5Mo-6Zr-4.5Sn	-	-	-	45	0,99	35	70
Titanium b	Ti-13V-11Cr-3Al	-	-	-	45	0,99	35	70
Titanium b	Ti-3Al-8V-6Cr-4Mo-4Zr	ATI 38-644®	HRC32	1000	45	0,99	35	70
Titanium b	Ti-8Mo-8V-2Fe-3Al	-	-	-	45	0,99	35	70
Titanium b	Ti-13V-11Cr-3Al	ATI 13-11-3	HRC40	1270	70	1,53	30	60
Titanium b	Ti 10.2.3	ATI 10-2-3®	HRC35	1100	62	1,35	25	60
Titanium b	Ti-15Mo	ATI 15Mo®	HRC24	820	33	0,72	50	105
Titanium b	Ti-15-333	ATI 15-3-3-3®	HRC32	1000	45	0,99	35	70
Titanium b	Ti 45Nb	ATI 45Nb®	-	-	30	0,65	45	95
Titanium b - ab	5Al-5V-5Mo-3Cr	ATI Ti5-5-5-3 Alloy	HRC40	1270	70	1,53	30	60
Titanium ab	Ti-425	ATI 425® MIL	HRC36	1130	49	1,08	30	60
Titanium ab	Ti-6AL-4V	ATI 6-4®	HRC30-34	1130	49	1,08	60	120
Titanium ab	Ti-6Al-4V	ATI 6-4®	HRC35-39	1200	62	1,35	55	110
Titanium ab	Ti-6Al-5Zr-0.5Mo-0.25Si	-	-	-	49	1,08	50	105
Titanium ab	Ti-6Al-5Zr-4Mo-Cu-0.2Si	-	-	-	49	1,08	50	105
Titanium ab	Ti-6Al-6V-2Sn	ATI 6-6-2®	HRC35	1100	49	1,08	50	110
Titanium ab	Ti-7Al-4Mo	-	-	-	45	0,99	50	105
Titanium ab	3-2.5	ATI 3-2.5®	HRC24	820	33	0,72	60	130
Titanium ab	6-4ELI	ATI 6-4 ELI®	HRC32	1000	45	0,99	60	125
Titanium ab	6-2-4-6	ATI 6-2-4-6®	HRC36	1130	47	1,03	55	110
Titanium ab	Ti-17	ATI 17®	HRC38	1200	51	1,12	55	110
Titanium ab	Ti-4Al-4Mo-2Sn-0.5Si	ATI 4-4-2®	HRC35	1100	49	1,08	50	105
Titanium ab	Ti-4Al-4Mo-4Sn-0.5Si	-	-	-	49	1,08	50	105
Pure Titanium	Ti 99.5	ATI CP4®	HRB100	780	30	0,65	90	185
Pure Titanium	Ti 99.6	ATI CP3®	HRB90	600	30	0,65	95	205
Pure Titanium	Ti 99.7	ATI CP2®	HRB80	510	30	0,65	105	220
Pure Titanium	Ti 99.8	ATI CP1®	HRB70	430	30	0,65	115	240

Facing | Shoulder Milling-Square Ended | Ramping | Slotting-Square Ended | Pocketing | Helical Interpolation | Drilling | Trochoidal

RAPIDE END MILLS
The Rapide family offers a comprehensive range of end mills suitable for High Speed and High Performance Machining, in an array of materials including Steels, Stainless Steels, High Temperature Alloys, Cast Irons, Hard Materials and Aluminium Alloys.

Key Features
- Material Specific Geometries
- Advanced PVD coating
- Premium Micrograin Carbide

Benefits
- Higher speeds and feeds achievable
- Rapid material removal
- Suitable for machining materials up to 65 HRC
- Dry machining possible

Range:
Ø: 2,00mm - 20,00mm
Z: 2,3,4 & 6
End Styles: Square Ended, Square Ended with Radius, Ball Nosed

ERC

3 - Flute End Mill

45° | C x 45° | h6 | HA | DIN 6535 | DIN 6527L | Stellram

Rapide

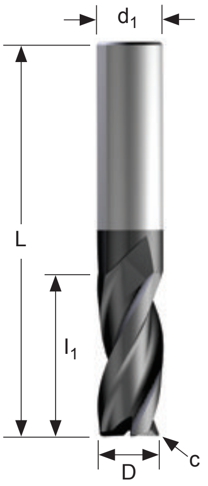
Facing | Shoulder Milling - Square Ended | Ramping | Slotting - Square Ended | Pocketing | Helical Interpolation | Drilling | Trochoidal | High Performance Machining (HPM)

Materials Application

SP4035

P	M	K	N	S	H
◆◆	◆◆	◆		◆	◆

PVD

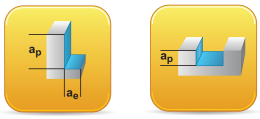


3 - Flute End Mill

Metric Product		Dimensions (mm)									
EDP	**Item Description**	D	L	l_1	d_1	c	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034343	**ERC 030NTN3**	3,00	57,00	8,00	6,00	0,10	8,00	3	4,29	5,85	4,29
034344	**ERC 040NTN3**	4,00	57,00	11,00	6,00	0,10	11,00	3	5,72	7,80	5,72
034345	**ERC 050NTN3**	5,00	57,00	13,00	6,00	0,20	13,00	3	7,15	9,75	7,15
034346	**ERC 060NN3**	6,00	57,00	13,00	6,00	0,20	13,00	3	8,58	11,70	8,58
034347	**ERC 080NN3**	8,00	63,00	20,00	8,00	0,20	20,00	3	11,44	15,60	11,44
034348	**ERC 100NN3**	10,00	72,00	22,00	10,00	0,20	22,00	3	14,30	19,50	14,30
034349	**ERC 120NN3**	12,00	75,00	25,00	12,00	0,25	25,00	3	17,16	23,40	17,16
034839	**ERC 160NN3**	16,00	93,00	35,00	16,00	0,25	35,00	3	22,88	31,20	22,88
034351	**ERC 200NN3**	20,00	100,00	44,00	20,00	0,25	44,00	3	28,60	39,00	28,60

ERC - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	fz	a_e%	a_p%	fz	a_p%
SP4035	0,1 - 0,5 D	0,05 - 2 D	Mid - High	0,05 - 0,1 D	0,05 - 2 D	Low - Mid	0,1 - 1,5 D



Slotting - Square Ended

* For a_p max do not exceed 0,05 D (a_e)

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

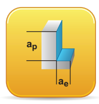
See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

ERC Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,014	0,008 0,013	0,009 0,014	0,009 0,013	0,008 0,011	0,009 0,014	0,009 0,013	0,009 0,013	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	0,006 0,010	0,006 0,010
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	0,008 0,014	0,008 0,014
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,014 0,022	0,015 0,025	0,015 0,022	0,013 0,020	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	0,010 0,019	0,010 0,018
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	0,012 0,023	0,012 0,022
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	0,016 0,033	0,016 0,030
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	0,020 0,043	0,020 0,039
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	0,024 0,053	0,024 0,049
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	0,032 0,076	0,032 0,068
20,0	0,060 0,160	0,060 0,160	0,060 0,160	0,060 0,130	0,048 0,101	0,060 0,130	0,060 0,101	0,050 0,090	0,060 0,171	0,060 0,130	0,060 0,101	-	-	0,060 0,171	0,050 0,120	0,050 0,112	0,060 0,152	0,040 0,100	0,040 0,089

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling



Feed Correction Parameters	
a_e	Correction Factor
0,05 D	2,30 x f_z
0,10 D	1,65 x f_z
0,15 D	1,40 x f_z
0,20 D	1,25 x f_z
0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

ISO	Materials	Rm and Hardness	Coolant: Wet	Coolant: Dry	Speed min. - max. PVD Standard SP4035
ERC Series					
Coolant Recommendation — Recommended ● Possible ⦿					
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	80 - 360
		<950 N/mm^2 <280 HBN			70 - 320
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	70 - 320
		950-1200 N/mm^2 280-355 HBN			50 - 280
		1200-1400 N/mm^2 355-415 HBN			45 - 160
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	80 - 160
		Martensitic 400 series			55 - 120
	PH Stainless	Refractory P.H.	●		50 - 90
K	Cast Iron	Grey GG-Ft	●	⦿	100 - 225
		Spheroidal-Ductile GGG-FGS			70 - 155
		Malleable GTS - MN/MP			65 - 130
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	50 - 110
		Cobalt Based			15 - 60
		Nickel Based			20 - 65
		Titanium Based			30 - 100
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		⦿	60 - 140
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			50 - 130

HE

4 - Flute End Mill

30° 90° h6 HA

Rapide

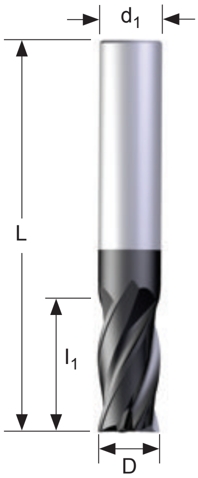
Materials Application

SP4035

P	M	K	N	S	H
◆		◆			◆

PVD

Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Trochoidal | HSM High Speed Machining

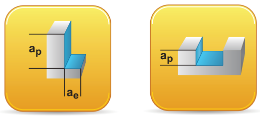


4 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034352	**HE 020NTN4**	2,00	50,00	6,00	6,00	6,00	4	-	-	2,86
034353	**HE 030NTN4**	3,00	50,00	8,00	6,00	8,00	4	-	-	4,29
034354	**HE 040NTN4**	4,00	50,00	11,00	6,00	11,00	4	-	-	5,72
034355	**HE 050NTN4**	5,00	50,00	13,00	6,00	13,00	4	-	-	7,15
034356	**HE 060NN4**	6,00	50,00	13,00	6,00	13,00	4	-	-	8,58
034357	**HE 080NN4**	8,00	63,00	20,00	8,00	20,00	4	-	-	11,44
034358	**HE 100NN4**	10,00	72,00	22,00	10,00	22,00	4	-	-	14,30
034359	**HE 120NN4**	12,00	75,00	25,00	12,00	25,00	4	-	-	17,16
034360	**HE 160NN4**	16,00	88,00	32,00	16,00	32,00	4	-	-	22,88

HE - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Material	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
Alloyed Steel / Cast Iron	-	-	-	0,01 - 0,05 D	0,1 - 1,25 D	-	0,05 - 0,2 D
Hard Materials	-	-	-	0,01 - 0,03 D	0,1 - 1 D	-	0,05 - 0,1 D



Slotting - Square Ended

* For a_p max do not exceed 0.05 D (a_e)

Note: For trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HE Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm^2 <180 HBN	Unalloyed Steel 700-950N/mm^2 200-280 HBN	Alloyed Steel <600 N/mm^2 <180 HBN	Alloyed Steel 950-1200N/mm^2 280-355 HBN	Alloyed Steel 1200-1400N/mm^2 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
2,0	-	-	0,005 0,007	0,005 0,007	0,005 0,007	-	-	-	0,005 0,007	0,005 0,007	0,005 0,007	-	-	-	-	-	-	0,003 0,005	0,003 0,005
3,0	-	-	0,008 0,012	0,008 0,012	0,007 0,011	-	-	-	0,008 0,012	0,008 0,012	0,008 0,011	-	-	-	-	-	-	0,005 0,008	0,005 0,008
4,0	-	-	0,010 0,017	0,010 0,016	0,009 0,015	-	-	-	0,010 0,017	0,010 0,016	0,010 0,015	-	-	-	-	-	-	0,006 0,011	0,006 0,011
5,0	-	-	0,013 0,023	0,013 0,021	0,011 0,020	-	-	-	0,013 0,023	0,013 0,021	0,013 0,020	-	-	-	-	-	-	0,008 0,015	0,008 0,015
6,0	-	-	0,015 0,029	0,015 0,026	0,013 0,024	-	-	-	0,015 0,029	0,015 0,026	0,015 0,024	-	-	-	-	-	-	0,009 0,019	0,009 0,018
8,0	-	-	0,020 0,042	0,020 0,037	0,017 0,033	-	-	-	0,020 0,042	0,020 0,037	0,020 0,033	-	-	-	-	-	-	0,012 0,026	0,012 0,025
10,0	-	-	0,025 0,057	0,025 0,048	0,021 0,042	-	-	-	0,025 0,057	0,025 0,048	0,025 0,042	-	-	-	-	-	-	0,015 0,034	0,015 0,032
12,0	-	-	0,030 0,072	0,030 0,060	0,025 0,051	-	-	-	0,030 0,072	0,030 0,060	0,030 0,051	-	-	-	-	-	-	0,018 0,043	0,018 0,039
16,0	-	-	0,040 0,104	0,040 0,085	0,032 0,070	-	-	-	0,040 0,104	0,040 0,085	0,040 0,070	-	-	-	-	-	-	0,024 0,061	0,024 0,055

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,01	5,00 x f_z
	0,03	2,90 x f_z
	0,05	2,25 x f_z
	0,08	1,85 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Stellram®
Cutting Tool Systems

Speed v_c (m/min)

HE Series

Coolant Recommendation: Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			PVD Standard SP4035 (Speed min. - max.)
P	Unalloyed Steel	<600 N/mm² <180 HBN			
P	Unalloyed Steel	<950 N/mm² <280 HBN			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN			70 - 320
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN	●	⦿	50 - 280
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN			45 - 160
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft			100 - 225
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	70 - 155
K	Cast Iron	Malleable GTS - MN/MP			65 - 130
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based			
S	High Temperature Alloys	Cobalt Based			
S	High Temperature Alloys	Nickel Based			
S	High Temperature Alloys	Titanium Based			
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN		⦿	60 - 140
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			50 - 130

HER
4 - Flute End Mill

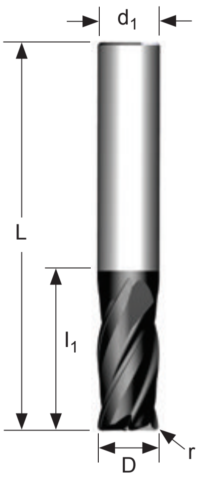
Rapide

Materials Application

SP4035					
P	M	K	N	S	H
◆		◆			◆

PVD

Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Trochoidal | HSM High Speed Machining



4 - Flute End Mill

Metric Product		Dimensions (mm)									
EDP	**Item Description**	D	L	l_1	d_1	r	a_p max*	No. of Teeth	Helical Hole min	Helical Hole max	Trochoidal min
034361	**HER 060NN4-E**	6,00	50,00	13,00	6,00	0,50	13,00	4	-	-	8,58
034362	**HER 060NN4-G**	6,00	50,00	13,00	6,00	1,00	13,00	4	-	-	8,58
034363	**HER 080NN4-E**	8,00	63,00	20,00	8,00	0,50	20,00	4	-	-	11,44
034364	**HER 080NN4-G**	8,00	63,00	20,00	8,00	1,00	20,00	4	-	-	11,44
034365	**HER 100NN4-E**	10,00	72,00	22,00	10,00	0,50	22,00	4	-	-	14,30
034366	**HER 100NN4-G**	10,00	72,00	22,00	10,00	1,00	22,00	4	-	-	14,30
034367	**HER 120NN4-E**	12,00	75,00	25,00	12,00	0,50	25,00	4	-	-	17,16
034368	**HER 120NN4-G**	12,00	75,00	25,00	12,00	1,00	25,00	4	-	-	17,16

HER - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
	Shoulder Milling						
Material	Roughing			Finishing			Slotting
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
Alloyed Steel / Cast Iron	-	-	-	0,01 - 0,05 D	0,1 - 1,25 D	Low - Mid	0,05 - 0,2 D
Hard Materials	-	-	-	0,01 - 0,03 D	0,1 - 1 D	Low - Mid	0,05 - 0,1 D

Slotting - Square Ended

* For a_p max do not exceed 0,05 D (a_e)

Note: For trochoidal application details, refer to pages 390 - 391.

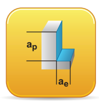
See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HER Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
2,0	-	-	0,005 0,007	0,005 0,007	0,005 0,007	-	-	-	0,005 0,007	0,005 0,007	0,005 0,007	-	-	-	-	-	-	0,003 0,005	0,003 0,005
3,0	-	-	0,008 0,012	0,008 0,012	0,007 0,011	-	-	-	0,008 0,012	0,008 0,012	0,008 0,011	-	-	-	-	-	-	0,005 0,008	0,005 0,008
4,0	-	-	0,010 0,017	0,010 0,016	0,009 0,015	-	-	-	0,010 0,017	0,010 0,016	0,010 0,015	-	-	-	-	-	-	0,006 0,011	0,006 0,011
5,0	-	-	0,013 0,023	0,013 0,021	0,011 0,020	-	-	-	0,013 0,023	0,013 0,021	0,013 0,020	-	-	-	-	-	-	0,008 0,015	0,008 0,015
6,0	-	-	0,015 0,029	0,015 0,026	0,013 0,024	-	-	-	0,015 0,029	0,015 0,026	0,015 0,024	-	-	-	-	-	-	0,009 0,019	0,009 0,018
8,0	-	-	0,020 0,042	0,020 0,037	0,017 0,033	-	-	-	0,020 0,042	0,020 0,037	0,020 0,033	-	-	-	-	-	-	0,012 0,026	0,012 0,025
10,0	-	-	0,025 0,057	0,025 0,048	0,021 0,042	-	-	-	0,025 0,057	0,025 0,048	0,025 0,042	-	-	-	-	-	-	0,015 0,034	0,015 0,032
12,0	-	-	0,030 0,072	0,030 0,060	0,025 0,051	-	-	-	0,030 0,072	0,030 0,060	0,030 0,051	-	-	-	-	-	-	0,018 0,043	0,018 0,039
16,0	-	-	0,040 0,104	0,040 0,085	0,032 0,070	-	-	-	0,040 0,104	0,040 0,085	0,040 0,070	-	-	-	-	-	-	0,024 0,061	0,024 0,055

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling



Feed Correction Parameters

a_e	Correction Factor
0,01	5,00 x f_z
0,03	2,90 x f_z
0,05	2,25 x f_z
0,08	1,85 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

HER Series					
			Speed min. - max.		
Coolant Recommendation Recommended ● Possible ⦿					PVD Standard
ISO	Materials	Rm and Hardness	💧	🚫	SP4035
P	Unalloyed Steel	<600 N/mm^2 <180 HBN			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN			70 - 320
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	50 - 280
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN			45 - 160
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft			100 - 225
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	70 - 155
K	Cast Iron	Malleable GTS - MN/MP			65 - 130
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based			
S	High Temperature Alloys	Cobalt Based			
S	High Temperature Alloys	Nickel Based			
S	High Temperature Alloys	Titanium Based			
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		⦿	60 - 140
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			50 - 130

HB

2 - Flute Ball Nose End Mill

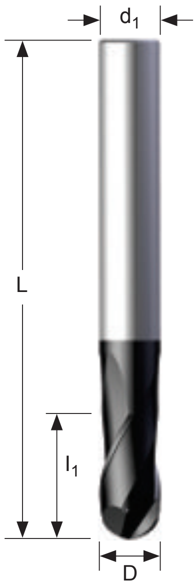
Rapide

Materials Application

SP4035					
P	M	K	N	S	H

PVD

Copy / 3D · Slotting - Ball Nosed · Shoulder Milling - Ball Nosed · Pocketing · High Speed Machining



2-Flute Ball Nose End Mill

Metric Product		Dimensions (mm)									
EDP	Item Description	D	L	l_1	d_1	a_p max	No. of Teeth	Helical Hole min	Helical Hole max	Trochoidal min
034375	HB 030LTL2	3,00	63,00	8,00	6,00	8,00	2	-	-	-
034376	HB 040LTL2	4,00	63,00	8,00	6,00	8,00	2	-	-	-
034377	HB 060LL2	6,00	75,00	12,00	6,00	12,00	2	-	-	-
034378	HB 080LL2	8,00	75,00	14,00	8,00	14,00	2	-	-	-
034379	HB 100LL2	10,00	100,00	18,00	10,00	18,00	2	-	-	-
034380	HB 120LL2	12,00	100,00	22,00	12,00	22,00	2	-	-	-

HB - Radial a_e and Axial a_p depth of cut range

Product	Dimensions						
Material	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	fz	a_e%	a_p%	fz	a_p%
Alloyed Steel / Cast Iron	-	-	-	0,03 - 0,05 D	0,1 - 0,8 D	-	0,05 - 0,2 D
Hard Materials	-	-	-	0,01 - 0,03 D	0,1 - 0,5 D	-	0,05 - 0,1 D

Slotting - Ball Nosed

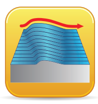
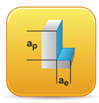
For copy milling & shoulder milling applications, refer to page 392.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HB Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	-	-	0,008 0,012	0,008 0,012	0,007 0,011	-	-	-	0,008 0,012	0,008 0,012	0,008 0,011	-	-	-	-	-	-	0,005 0,008	0,005 0,008
4,0	-	-	0,010 0,017	0,010 0,016	0,009 0,015	-	-	-	0,010 0,017	0,010 0,016	0,010 0,015	-	-	-	-	-	-	0,006 0,011	0,006 0,011
6,0	-	-	0,015 0,029	0,015 0,026	0,013 0,024	-	-	-	0,015 0,029	0,015 0,026	0,015 0,024	-	-	-	-	-	-	0,009 0,019	0,009 0,018
8,0	-	-	0,020 0,042	0,020 0,037	0,017 0,033	-	-	-	0,020 0,042	0,020 0,037	0,020 0,033	-	-	-	-	-	-	0,012 0,026	0,012 0,025
10,0	-	-	0,025 0,057	0,025 0,048	0,021 0,042	-	-	-	0,025 0,057	0,025 0,048	0,025 0,042	-	-	-	-	-	-	0,015 0,034	0,015 0,032
12,0	-	-	0,030 0,072	0,030 0,060	0,025 0,051	-	-	-	0,030 0,072	0,030 0,060	0,030 0,051	-	-	-	-	-	-	0,018 0,043	0,018 0,039

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
 	For copy milling & shoulder milling applications, refer to page 392.	

Speed v_c (m/min)

HB Series

Coolant Recommendation

Recommended ● Possible ⦿

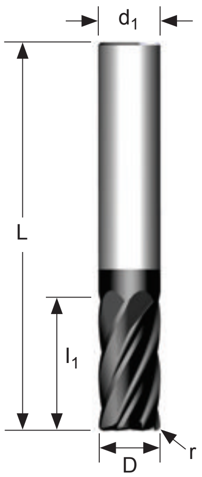
ISO	Materials	Rm and Hardness	Wet	Dry	PVD Standard SP4035 (Speed min. - max.)
P	Unalloyed Steel	<600 N/mm^2 <180 HBN			
		<950 N/mm^2 <280 HBN			
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	90 - 400
		950-1200 N/mm^2 280-355 HBN			60 - 350
		1200-1400 N/mm^2 355-415 HBN			55 - 200
M	Stainless Steel	Austenitic + Ferritic 300 series			
		Martensitic 400 series			
	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft	●	⦿	120 - 280
		Spheroidal-Ductile GGG-FGS			90 - 190
		Malleable GTS - MN/MP			80 - 160
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		⦿	80 - 175
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			70 - 160

Materials Application

SP4035					
P	M	K	N	S	H

PVD

Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Trochoidal | HSM High Speed Machining | HPM High Performance Machining



6 - Flute End Mill

Metric Product		Dimensions (mm)									
EDP	Item Description	D	L	l_1	d_1	r	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034333	HMR 030NTN6-C	3,00	50,00	10,00	6,00	0,25	10,00	6	-	-	4,29
034334	HMR 040NTN6-C	4,00	50,00	10,00	6,00	0,25	10,00	6	-	-	5,72
034335	HMR 050NTN6-C	5,00	50,00	15,00	6,00	0,25	15,00	6	-	-	7,15
034336	HMR 060NN6-C	6,00	50,00	20,00	6,00	0,25	20,00	6	-	-	8,58
034645	HMR 060NN6-E	6,00	50,00	20,00	6,00	0,50	20,00	6	-	-	8,58
034337	HMR 080NN6-C	8,00	63,00	20,00	8,00	0,25	20,00	6	-	-	11,44
034646	HMR 080NN6-E	8,00	63,00	20,00	8,00	0,50	20,00	6	-	-	11,44
034338	HMR 100NN6-C	10,00	72,00	25,00	10,00	0,25	25,00	6	-	-	14,30
034339	HMR 100NN6-E	10,00	72,00	25,00	10,00	0,50	25,00	6	-	-	14,30
034340	HMR 120NN6-C	12,00	75,00	25,00	12,00	0,25	25,00	6	-	-	17,16
034647	HMR 120NN6-E	12,00	75,00	25,00	12,00	0,50	25,00	6	-	-	17,16
034341	HMR 160NN6-C	16,00	93,00	30,00	16,00	0,25	30,00	6	-	-	22,88
034648	HMR 160NN6-E	16,00	93,00	30,00	16,00	0,50	30,00	6	-	-	22,88
034342	HMR 200NN6-C	20,00	100,00	44,00	20,00	0,25	44,00	6	-	-	28,60

HMR - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
	Shoulder Milling						
Grade	Roughing			Finishing			Slotting
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SP4035	-	-	-	0,01 - 0,1 D	0,05 - 2 D	-	0,05 D

Slotting - Square Ended

* For a_p max do not exceed 0,05 D (a_e)

Note: For trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HSM

High Speed Machining

HMR Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,008 0,012	0,008 0,012	0,008 0,012	0,008 0,012	0,007 0,011	-	-	-	0,008 0,012	0,008 0,012	0,008 0,011	-	-	0,008 0,012	0,005 0,009	0,005 0,009	0,008 0,013	0,005 0,008	0,005 0,008
4,0	0,010 0,017	0,010 0,017	0,010 0,017	0,010 0,016	0,009 0,015	-	-	-	0,010 0,017	0,010 0,016	0,010 0,015	-	-	0,010 0,017	0,006 0,012	0,006 0,012	0,010 0,017	0,006 0,011	0,006 0,011
5,0	0,013 0,023	0,013 0,023	0,013 0,023	0,013 0,021	0,011 0,020	-	-	-	0,013 0,023	0,013 0,021	0,013 0,020	-	-	0,013 0,023	0,008 0,017	0,008 0,016	0,013 0,023	0,008 0,015	0,008 0,015
6,0	0,015 0,029	0,015 0,029	0,015 0,029	0,015 0,026	0,013 0,024	-	-	-	0,015 0,029	0,015 0,026	0,015 0,024	-	-	0,015 0,029	0,010 0,021	0,010 0,020	0,015 0,028	0,009 0,019	0,009 0,018
8,0	0,020 0,042	0,020 0,042	0,020 0,042	0,020 0,037	0,017 0,033	-	-	-	0,020 0,042	0,020 0,037	0,020 0,033	-	-	0,020 0,042	0,014 0,030	0,014 0,028	0,020 0,041	0,012 0,026	0,012 0,025
10,0	0,025 0,057	0,025 0,057	0,025 0,057	0,025 0,048	0,021 0,042	-	-	-	0,025 0,057	0,025 0,048	0,025 0,042	-	-	0,025 0,057	0,018 0,041	0,018 0,037	0,025 0,054	0,015 0,034	0,015 0,032
12,0	0,030 0,072	0,030 0,072	0,030 0,072	0,030 0,060	0,025 0,051	-	-	-	0,030 0,072	0,030 0,060	0,030 0,051	-	-	0,030 0,072	0,022 0,051	0,022 0,047	0,030 0,068	0,018 0,043	0,018 0,039
16,0	0,040 0,104	0,040 0,104	0,040 0,104	0,040 0,085	0,032 0,070	-	-	-	0,040 0,104	0,040 0,085	0,040 0,070	-	-	0,040 0,104	0,030 0,075	0,030 0,067	0,040 0,098	0,024 0,061	0,024 0,055
20,0	0,050 0,140	0,050 0,140	0,050 0,140	0,050 0,111	0,040 0,090	-	-	-	0,050 0,140	0,050 0,111	0,050 0,090	-	-	0,050 0,140	0,038 0,100	0,038 0,089	0,050 0,130	0,030 0,079	0,030 0,071

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters

a_e	Correction Factor
0,01	5,00 x f_z
0,03	2,90 x f_z
0,05	2,25 x f_z
0,08	1,85 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

HSM
High Speed Machining

Speed v_c (m/min)

HMR Series					
			Speed min. - max.		
Coolant Recommendation: Recommended ● Possible ⦿					PVD Standard
ISO	**Materials**	**Rm and Hardness**	Coolant	Dry	SP4035
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	100 - 450
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿	90 - 400
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	90 - 400
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	60 - 350
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿	55 - 200
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft	●	⦿	120 - 280
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	90 - 190
K	Cast Iron	Malleable GTS - MN/MP	●	⦿	80 - 160
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	60 - 140
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 75
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 80
S	High Temperature Alloys	Titanium Based	●	⦿	40 - 120
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		⦿	80 - 175
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN		⦿	70 - 160

HPM
High Performance Machining

HMR Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,014	0,008 0,013	0,009 0,013	0,009 0,012	0,008 0,011	0,009 0,014	0,009 0,013	0,009 0,013	-	-	0,009 0,014	0,006 0,010	0,006 0,010	0,009 0,013	0,006 0,010	0,006 0,010
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,015	0,012 0,019	0,008 0,014	0,008 0,014
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,014 0,022	0,015 0,024	0,015 0,022	0,013 0,020	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,016 0,027	0,011 0,020	0,011 0,019	0,015 0,026	0,010 0,019	0,010 0,018
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	0,012 0,023	0,012 0,022
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	0,016 0,033	0,016 0,030
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	0,020 0,043	0,020 0,039
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	0,024 0,053	0,024 0,049
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,042 0,084	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	0,032 0,076	0,032 0,068
20,0	0,060 0,160	0,060 0,160	0,060 0,160	0,060 0,130	0,048 0,101	0,060 0,130	0,060 0,101	0,050 0,090	0,060 0,171	0,060 0,130	0,060 0,101	-	-	0,060 0,171	0,050 0,120	0,050 0,112	0,060 0,152	0,040 0,100	0,040 0,089

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters

a_e	Correction Factor
0,01	5,00 x f_z
0,03	2,90 x f_z
0,05	2,25 x f_z
0,08	1,85 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

HPM
High Performance Machining

Speed v_c (m/min)

HMR Series						Speed min. - max.
Coolant Recommendation: Recommended ● Possible ⦿						PVD Standard
ISO	Materials	Rm and Hardness	Wet	Dry		SP4035
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿		80 - 360
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿		70 - 320
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿		70 - 320
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿		50 - 280
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿		45 - 160
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿		80 - 160
M	Stainless Steel	Martensitic 400 series	●	⦿		55 - 120
M	PH Stainless	Refractory P.H.		⦿		55 - 90
K	Cast Iron	Grey GG-Ft	●	⦿		100 - 225
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿		70 - 155
K	Cast Iron	Malleable GTS - MN/MP	●	⦿		65 - 130
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN				
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN				
S	High Temperature Alloys	Iron Based	●	⦿		50 - 110
S	High Temperature Alloys	Cobalt Based	●	⦿		15 - 60
S	High Temperature Alloys	Nickel Based	●	⦿		20 - 65
S	High Temperature Alloys	Titanium Based	●	⦿		30 - 100
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		⦿		60 - 140
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN		⦿		50 - 130

HMN

6 - Flute End Mill

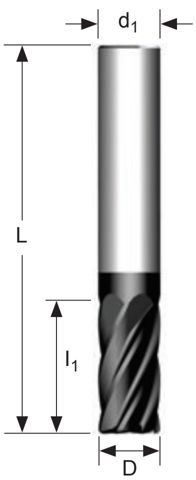
Rapide

Materials Application

SP4035					
P	M	K	N	S	H

PVD

Slotting - Square Ended | Slotting - Square Ended | Trochoidal | High Speed Machining



6 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034369	**HMN 060NN6**	6,00	50,00	13,00	6,00	13,00	6	-	-	8,58
034370	**HMN 080NN6**	8,00	63,00	20,00	8,00	20,00	6	-	-	11,44
034371	**HMN 100NN6**	10,00	72,00	22,00	10,00	22,00	6	-	-	14,30
034372	**HMN 120NN6**	12,00	75,00	25,00	12,00	25,00	6	-	-	17,16
034373	**HMN 160NN6**	16,00	92,00	32,00	16,00	32,00	6	-	-	22,88
034374	**HMN 200NN6**	20,00	100,00	38,00	20,00	38,00	6	-	-	28,60

HMN - Radial a_e and Axial a_p depth of cut range

Product	Dimensions	
Grade	Shoulder Milling	
	ae%	ap%
SP4035	0,01 - 0,05 D	0,05 - 2 D

* For a_p max do not exceed 0,05 D (a_e)
For trochoidal application details refer to pages 390 - 391

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HMN Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	-	-	-	-	0,008 0,013	-	-	-	0,009 0,014	0,009 0,013	0,009 0,013	-	-	-	-	-	-	0,006 0,010	0,006 0,010
4,0	-	-	-	-	0,011 0,017	-	-	-	0,012 0,020	0,012 0,019	0,012 0,017	-	-	-	-	-	-	0,008 0,014	0,008 0,014
5,0	-	-	-	-	0,014 0,022	-	-	-	0,015 0,027	0,015 0,025	0,015 0,022	-	-	-	-	-	-	0,010 0,019	0,010 0,018
6,0	-	-	-	-	0,016 0,027	-	-	-	0,018 0,034	0,018 0,030	0,018 0,027	-	-	-	-	-	-	0,012 0,023	0,012 0,022
8,0	-	-	-	-	0,021 0,037	-	-	-	0,024 0,051	0,024 0,043	0,024 0,037	-	-	-	-	-	-	0,016 0,033	0,016 0,030
10,0	-	-	-	-	0,026 0,047	-	-	-	0,030 0,068	0,030 0,056	0,030 0,047	-	-	-	-	-	-	0,020 0,043	0,020 0,039
12,0	-	-	-	-	0,030 0,057	-	-	-	0,036 0,087	0,036 0,070	0,036 0,057	-	-	-	-	-	-	0,024 0,053	0,024 0,049
16,0	-	-	-	-	0,039 0,079	-	-	-	0,048 0,127	0,048 0,099	0,048 0,079	-	-	-	-	-	-	0,032 0,076	0,032 0,068
20,0	-	-	-	-	0,048 0,101	-	-	-	0,060 0,171	0,060 0,130	0,060 0,101	-	-	-	-	-	-	0,040 0,100	0,040 0,089

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,01 D	5,00 x f_z
	0,02 D	3,55 x f_z
	0,03 D	2,90 x f_z
	0,04 D	2,50 x f_z
	0,05 D	2,25 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

HMN Series

Coolant Recommendation
Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Coolant	Dry	Speed min. - max. PVD Standard SP4035
P	Unalloyed Steel	<600 N/mm^2 <180 HBN			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN			
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN			55 - 200
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft			120 - 280
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	90 - 190
K	Cast Iron	Malleable GTS - MN/MP			80 - 160
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based			
S	High Temperature Alloys	Cobalt Based			
S	High Temperature Alloys	Nickel Based			
S	High Temperature Alloys	Titanium Based			
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN		⦿	80 - 175
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			70 - 160

EA
2 - Flute End Mill

30° 90° HA h6

Rapide

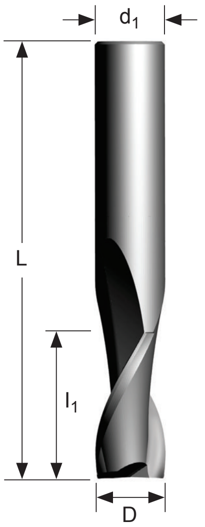
Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Drilling | Ramping | Helical Interpolation | Trochoidal | High Performance Machining

HPM

Materials Application

SU0800					
P	M	K	N	S	H
			◆		

Uncoated



2 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034322	**EA 020NTN2**	2,00	38,00	6,00	3,00	6,00	2	2,86	3,90	2,86
034323	**EA 025NTN2**	2,50	38,00	8,00	3,00	8,00	2	3,58	4,88	3,58
034324	**EA 030NN2**	3,00	38,00	12,00	3,00	12,00	2	4,29	5,85	4,29
034325	**EA 040NN2**	4,00	50,00	14,00	4,00	14,00	2	5,72	7,80	5,72
034326	**EA 050NN2**	5,00	50,00	20,00	5,00	20,00	2	7,15	9,75	7,15
034327	**EA 060NN2**	6,00	63,00	20,00	6,00	20,00	2	8,58	11,70	8,58
034328	**EA 080NN2**	8,00	63,00	20,00	8,00	20,00	2	11,44	15,60	11,44
034329	**EA 100NN2**	10,00	70,00	25,00	10,00	25,00	2	14,30	19,50	14,30
034330	**EA 120NN2**	12,00	75,00	25,00	12,00	25,00	2	17,16	23,40	17,16
034331	**EA 160NN2**	16,00	88,00	30,00	16,00	30,00	2	22,88	31,20	22,88
034332	**EA 200NN2**	20,00	100,0	38,00	20,00	38,00	2	28,60	39,00	28,60

EA - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SU0800	0,1 - 0,2 D	0,1 - 1,5 D	Mid - High	0,05 - 0,1 D	0,1 - 1,5 D	Low - Mid	0,05 - 0,5 D

a_p a_e

Slotting - Square Ended

* For a_p max do not exceed 0,05 D (a_e)

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

EA Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	-	-	-	-	-	-	-	-	-	-	-	0,017 0,031	0,017 0,027	-	-	-	-	-	-
4,0	-	-	-	-	-	-	-	-	-	-	-	0,022 0,043	0,022 0,037	-	-	-	-	-	-
5,0	-	-	-	-	-	-	-	-	-	-	-	0,027 0,057	0,027 0,049	-	-	-	-	-	-
6,0	-	-	-	-	-	-	-	-	-	-	-	0,032 0,071	0,032 0,061	-	-	-	-	-	-
8,0	-	-	-	-	-	-	-	-	-	-	-	0,042 0,102	0,042 0,087	-	-	-	-	-	-
10,0	-	-	-	-	-	-	-	-	-	-	-	0,051 0,135	0,051 0,114	-	-	-	-	-	-
12,0	-	-	-	-	-	-	-	-	-	-	-	0,060 0,169	0,060 0,142	-	-	-	-	-	-
16,0	-	-	-	-	-	-	-	-	-	-	-	0,078 0,242	0,078 0,202	-	-	-	-	-	-
20,0	-	-	-	-	-	-	-	-	-	-	-	0,095 0,320	0,095 0,266	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,05 D	2,30 x f_z
	0,10 D	1,65 x f_z
	0,15 D	1,40 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

EA Series

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Wet	Dry	Uncoated Micrograin SU0800
P	Unalloyed Steel	<600 N/mm² <180 HBN			
P	Unalloyed Steel	<950 N/mm² <280 HBN			
P	Alloyed Steel	700-950 N/mm² 200-280 HBN			
P	Alloyed Steel	950-1200 N/mm² 280-355 HBN			
P	Alloyed Steel	1200-1400 N/mm² 355-415 HBN			
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft			
K	Cast Iron	Spheroidal-Ductile GGG-FGS			
K	Cast Iron	Malleable GTS - MN/MP			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●	⦿	300 - 1400
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN	●	⦿	90 - 250
S	High Temperature Alloys	Iron Based			
S	High Temperature Alloys	Cobalt Based			
S	High Temperature Alloys	Nickel Based			
S	High Temperature Alloys	Titanium Based			
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm² > 400 HBN			

HPA
2 - Flute End Mill

Rapide

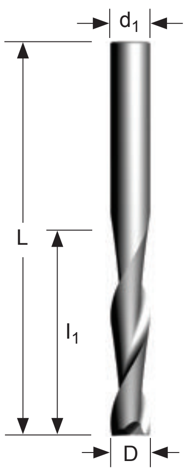
Materials Application

SU0800

P	M	K	N	S	H
			◆		

Uncoated

Facing | Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Drilling | Ramping | Helical Interpolation | Trochoidal | High Performance Machining

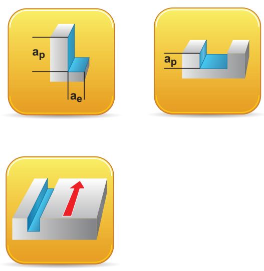


2 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034381	**HPA 030NN2**	3,00	50,00	12,00	3,00	12,00	2	4,29	5,85	4,29
034382	**HPA 040NN2**	4,00	50,00	14,00	4,00	14,00	2	5,72	7,80	5,72
034383	**HPA 050NN2**	5,00	50,00	20,00	5,00	20,00	2	7,15	9,75	7,15
034384	**HPA 060NN2**	6,00	63,00	20,00	6,00	20,00	2	8,58	11,70	8,58
034385	**HPA 080NN2**	8,00	63,00	20,00	8,00	20,00	2	11,44	15,60	11,44
034386	**HPA 100NN2**	10,00	70,00	25,00	10,00	25,00	2	14,30	19,50	14,30
034387	**HPA 120NN2**	12,00	75,00	25,00	12,00	25,00	2	17,16	23,40	17,16
034388	**HPA 160NN2**	16,00	88,00	32,00	16,00	32,00	2	22,88	31,20	22,88
034389	**HPA 200NN2**	20,00	100,00	38,00	20,00	38,00	2	28,60	39,00	28,60

HPA - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
	Shoulder Milling						
Grade	Roughing			Finishing			Slotting
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SU0800	0,2 - 0,5 D	0,1 - 2 D	Mid - High	0,05 - 0,2 D	0,1 - 2 D	Low - Mid	0,1 - 1 D



Slotting - Square Ended

* For a_p max do not exceed 0,05 D (a_e)

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

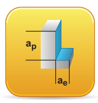
See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

HPA Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	-	-	-	-	-	-	-	-	-	-	-	0,017 0,031	0,017 0,027	-	-	-	-	-	-
4,0	-	-	-	-	-	-	-	-	-	-	-	0,022 0,043	0,022 0,037	-	-	-	-	-	-
5,0	-	-	-	-	-	-	-	-	-	-	-	0,027 0,057	0,027 0,049	-	-	-	-	-	-
6,0	-	-	-	-	-	-	-	-	-	-	-	0,032 0,071	0,032 0,061	-	-	-	-	-	-
8,0	-	-	-	-	-	-	-	-	-	-	-	0,042 0,102	0,042 0,087	-	-	-	-	-	-
10,0	-	-	-	-	-	-	-	-	-	-	-	0,051 0,135	0,051 0,114	-	-	-	-	-	-
12,0	-	-	-	-	-	-	-	-	-	-	-	0,060 0,169	0,060 0,142	-	-	-	-	-	-
16,0	-	-	-	-	-	-	-	-	-	-	-	0,078 0,242	0,078 0,202	-	-	-	-	-	-
20,0	-	-	-	-	-	-	-	-	-	-	-	0,095 0,320	0,095 0,266	-	-	-	-	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters

a_e	Correction Factor
0,05 D	2,30 x f_z
0,10 D	1,65 x f_z
0,15 D	1,40 x f_z
0,20 D	1,25 x f_z
0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Stellram®
Cutting Tool Systems

Speed v_c (m/min)

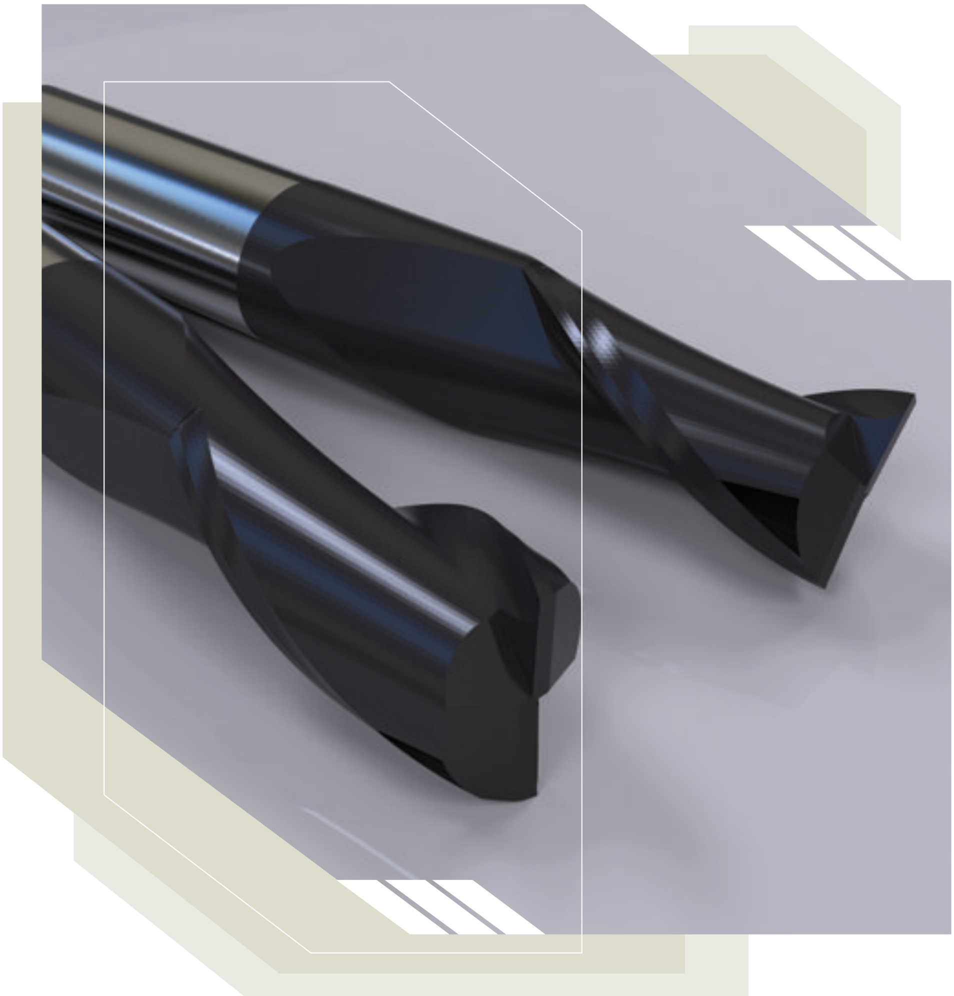
HPA Series					
Coolant Recommendation: Recommended ● Possible ⦿					Speed min. - max. Uncoated Micrograin
ISO	Materials	Rm and Hardness	Coolant	Dry	SU0800
P	Unalloyed Steel	<600 N/mm^2 <180 HBN			
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN			
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN			
M	Stainless Steel	Austenitic + Ferritic 300 series			
M	Stainless Steel	Martensitic 400 series			
M	PH Stainless	Refractory P.H.			
K	Cast Iron	Grey GG-Ft			
K	Cast Iron	Spheroidal-Ductile GGG-FGS			
K	Cast Iron	Malleable GTS - MN/MP			
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN	●	⦿	300 - 1400
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN	●	⦿	90 - 400
S	High Temperature Alloys	Iron Based			
S	High Temperature Alloys	Cobalt Based			
S	High Temperature Alloys	Nickel Based			
S	High Temperature Alloys	Titanium Based			
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

stellram.com

GENERAL PURPOSE MILLING
Designed to complement the Stellram Premium End mills, the general purpose End Mills offer solutions for a wide range of applications and materials.

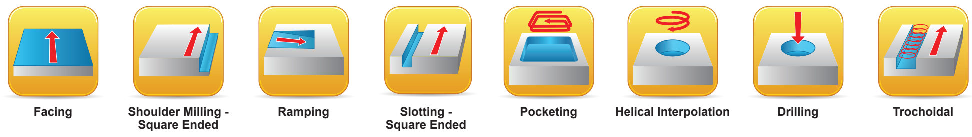
Available in:
- a comprehensive range of diameters (including miniatures)
- 2, 3 and 4 flute geometries
- Square End, Square End with Radius, and Ball Nosed styles
- Standard and Extended length
- Uncoated and Coated Premium Carbide grades



E_NN2

2 - Flute End Mill

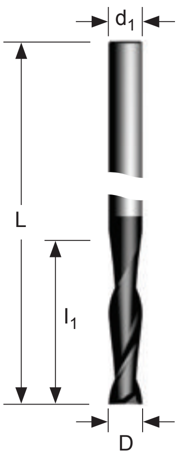
General Milling



Materials Application

SP4556					
P	M	K	N	S	H
◆◆	◆◆	◆		◆	

PVD



2 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min	Helical Hole max	Trochoidal min
034169	**E 030NN2**	3,00	38,00	12,00	3,00	12,00	2	4,29	5,85	4,29
034170	**E 040NN2**	4,00	50,00	14,00	4,00	14,00	2	5,72	7,80	5,72
034171	**E 050NN2**	5,00	50,00	16,00	5,00	16,00	2	7,15	9,75	7,15
034172	**E 060NN2**	6,00	63,00	19,00	6,00	19,00	2	8,58	11,70	8,58
034173	**E 080NN2**	8,00	63,00	19,00	8,00	19,00	2	11,44	15,60	11,44
034174	**E 100NN2**	10,00	70,00	22,00	10,00	22,00	2	14,30	19,50	14,30
034175	**E 120NN2**	12,00	75,00	25,00	12,00	25,00	2	17,16	23,40	17,16
034176	**E 160NN2**	16,00	88,00	32,00	16,00	32,00	2	22,88	31,20	22,88
034177	**E 200NN2**	20,00	100,00	38,00	20,00	38,00	2	28,60	39,00	28,60

E_NN2 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SP4556	0,1 - 0,2 D	0,5 - 1,5 D	Mid - High	0,05 - 0,1D	0,5 - 1,5 D	Low - Mid	0,1 - 0,5 D

Slotting - Square Ended

*** When using a_p max, a_e should not exceed 0,1 D**

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_NN2
2 - Flute End Mill

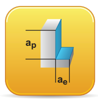
Recommended Feeds
General Milling

E_NN2 Feeds f_Z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,013	0,009 0,012	0,009 0,013	0,009 0,013	0,007 0,011	0,009 0,014	0,009 0,013	0,009 0,012	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	-	-
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,013 0,022	0,015 0,024	0,015 0,022	0,013 0,019	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	-	-
20,0	0,060 0,160	0,060 0,160	0,060 0,160	0,060 0,130	0,048 0,101	0,060 0,130	0,060 0,101	0,050 0,090	0,060 0,171	0,060 0,130	0,060 0,101	-	-	0,060 0,171	0,050 0,120	0,050 0,112	0,060 0,152	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters	
a_e	Correction Factor
0,05 D	2,30 x f_Z
0,10 D	1,65 x f_Z
0,15 D	1,40 x f_Z
0,20 D	1,25 x f_Z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

E_NN2 Series					Speed min. - max.
Coolant Recommendation Recommended ● Possible ⦿					PVD Micrograin
ISO	**Materials**	**Rm and Hardness**			SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
		<950 N/mm^2 <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm^2 280-355 HBN			90 - 140
		1200-1400 N/mm^2 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

E_NN3

3 - Flute End Mill

30° 90° h6 HA

General Milling

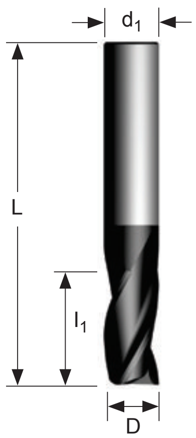
Materials Application

SP4556

P	M	K	N	S	H
◆◆	◆◆	◆		◆	

PVD

Facing · Shoulder Milling - Square Ended · Ramping · Slotting - Square Ended · Pocketing · Helical Interpolation · Drilling · Trochoidal

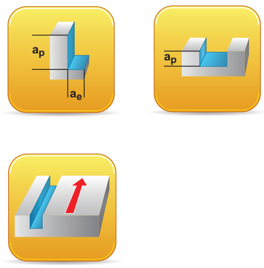


3 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034195	**E 030NN3**	3,00	38,00	12,00	3,00	12,00	3	4,29	5,85	4,29
034196	**E 040NN3**	4,00	50,00	14,00	4,00	14,00	3	5,72	7,80	5,72
034197	**E 050NN3**	5,00	50,00	16,00	5,00	16,00	3	7,15	9,75	7,15
034198	**E 060NN3**	6,00	63,00	19,00	6,00	19,00	3	8,58	11,70	8,58
034199	**E 080NN3**	8,00	63,00	19,00	8,00	19,00	3	11,44	15,60	11,44
034200	**E 100NN3**	10,00	70,00	22,00	10,00	22,00	3	14,30	19,50	14,30
034201	**E 120NN3**	12,00	75,00	25,00	12,00	25,00	3	17,16	23,40	17,16
034202	**E 160NN3**	16,00	88,00	32,00	16,00	32,00	3	22,88	31,20	22,88
034203	**E 200NN3**	20,00	100,00	38,00	20,00	38,00	3	28,60	39,00	28,60

E_NN3 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SP4556	0,1 - 0,5 D	0,5 - 2 D	Mid - High	0,05 - 0,1 D	0,5 - 2 D	Low - Mid	0,1 - 0,5 D



Slotting - Square Ended

*** When using a_p max, a_e should not exceed 0.1D**

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_NN3
3- Flute End Mill

Recommended Feeds
General Milling

E_NN3 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,007	0,009	0,009	0,009	-	-	0,009	0,007	0,007	0,009	-	-
	0,014	0,014	0,014	0,013	0,012	0,013	0,013	0,011	0,014	0,013	0,012			0,014	0,011	0,010	0,014		
4,0	0,012	0,012	0,012	0,012	0,011	0,012	0,012	0,010	0,012	0,012	0,012	-	-	0,012	0,009	0,009	0,012	-	-
	0,020	0,020	0,020	0,019	0,017	0,019	0,017	0,015	0,020	0,019	0,017			0,020	0,015	0,014	0,019		
5,0	0,015	0,015	0,015	0,015	0,013	0,015	0,015	0,013	0,015	0,015	0,015	-	-	0,015	0,011	0,011	0,015	-	-
	0,027	0,027	0,027	0,025	0,022	0,024	0,022	0,019	0,027	0,025	0,022			0,027	0,020	0,019	0,026		
6,0	0,018	0,018	0,018	0,018	0,016	0,018	0,018	0,015	0,018	0,018	0,018	-	-	0,018	0,013	0,013	0,018	-	-
	0,033	0,033	0,033	0,030	0,027	0,030	0,027	0,024	0,034	0,030	0,027			0,034	0,025	0,024	0,033		
8,0	0,024	0,024	0,024	0,024	0,021	0,024	0,024	0,020	0,024	0,024	0,024	-	-	0,024	0,018	0,018	0,024	-	-
	0,049	0,049	0,049	0,043	0,037	0,043	0,037	0,033	0,051	0,043	0,037			0,051	0,036	0,035	0,047		
10,0	0,030	0,030	0,030	0,030	0,026	0,030	0,030	0,025	0,030	0,030	0,030	-	-	0,030	0,023	0,023	0,030	-	-
	0,065	0,065	0,065	0,056	0,047	0,056	0,047	0,042	0,068	0,056	0,047			0,068	0,049	0,046	0,063		
12,0	0,036	0,036	0,036	0,036	0,030	0,036	0,036	0,030	0,036	0,036	0,036	-	-	0,036	0,029	0,029	0,036	-	-
	0,082	0,082	0,082	0,070	0,057	0,070	0,057	0,051	0,087	0,070	0,057			0,087	0,062	0,058	0,079		
16,0	0,048	0,048	0,048	0,048	0,039	0,048	0,048	0,040	0,048	0,048	0,048	-	-	0,048	0,039	0,039	0,048	-	-
	0,119	0,119	0,119	0,099	0,079	0,099	0,079	0,070	0,127	0,099	0,079			0,127	0,090	0,084	0,115		
20,0	0,060	0,060	0,060	0,060	0,048	0,060	0,060	0,050	0,060	0,060	0,060	-	-	0,060	0,050	0,050	0,060	-	-
	0,160	0,160	0,160	0,130	0,101	0,130	0,101	0,090	0,171	0,130	0,101			0,171	0,120	0,112	0,152		

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters

a_e	Correction Factor
0,05 D	2,30 x f_z
0,10 D	1,65 x f_z
0,15 D	1,40 x f_z
0,20 D	1,25 x f_z
0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

E_NN3 Series					Speed min. - max.
Coolant Recommendation Recommended ● Possible ⦿					PVD Micrograin
ISO	Materials	Rm and Hardness	Coolant	Dry	SP4556
P	Unalloyed Steel	<600 N/mm² <180 HBN	●	⦿	125 - 180
		<950 N/mm² <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm² 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm² 280-355 HBN			90 - 140
		1200-1400 N/mm² 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN			
		Chilled Cast Iron >1400 N/mm² > 400 HBN			

E_NN4

4 - Flute End Mill

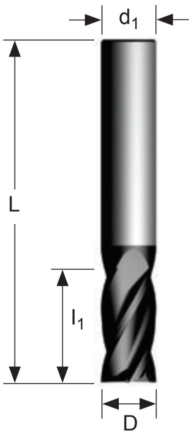
General Milling

Materials Application

SP4556					
P	M	K	N	S	H

PVD

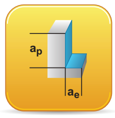

Facing
Shoulder Milling - Square Ended
Pocketing
Trochoidal



Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034219	**E 030NN4**	3,00	38,00	12,00	3,00	12,00	4	-	-	4,29
034220	**E 040NN4**	4,00	50,00	14,00	4,00	14,00	4	-	-	5,72
034221	**E 050NN4**	5,00	50,00	16,00	5,00	16,00	4	-	-	7,15
034222	**E 060NN4**	6,00	63,00	19,00	6,00	19,00	4	-	-	8,58
034223	**E 080NN4**	8,00	63,00	19,00	8,00	19,00	4	-	-	11,44
034224	**E 100NN4**	10,00	70,00	22,00	10,00	22,00	4	-	-	14,30
034225	**E 120NN4**	12,00	75,00	25,00	12,00	25,00	4	-	-	17,16
034226	**E 160NN4**	16,00	88,00	32,00	16,00	32,00	4	-	-	22,88
034227	**E 200NN4**	20,00	100,00	38,00	20,00	38,00	4	-	-	28,60

E_NN4 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)					
Grade	Shoulder Milling					
	Roughing			Finishing		
	ae%	ap%	fz	ae%	ap%	fz
SP4556	0,1 - 0,5 D	0,5 - 2 D	Mid - High	0,05 - 0,1 D	0,5 - 2 D	Low - Mid



*** When using a_p max, a_e should not exceed 0,1 D**

Note: For trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_NN4 Feeds f_z (mm/tooth) - Shoulder Milling (a_e max)

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,013	0,009 0,012	0,009 0,013	0,009 0,013	0,007 0,011	0,009 0,014	0,009 0,013	0,009 0,012	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	-	-
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,013 0,022	0,015 0,024	0,015 0,022	0,013 0,019	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	-	-
20,0	0,060 0,160	0,060 0,160	0,060 0,160	0,060 0,130	0,048 0,101	0,060 0,130	0,060 0,101	0,050 0,090	0,060 0,171	0,060 0,130	0,060 0,101	-	-	0,060 0,171	0,050 0,120	0,050 0,112	0,060 0,152	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,05 D	2,30 x f_z
	0,10 D	1,65 x f_z
	0,15 D	1,40 x f_z
	0,20 D	1,25 x f_z
	0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

E_NN4 Series

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			Speed min. - max. PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿	100 - 170
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	90 - 140
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿	80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
M	Stainless Steel	Martensitic 400 series	●	⦿	65 - 90
M	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	60 - 120
K	Cast Iron	Malleable GTS - MN/MP	●	⦿	50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 40
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 45
S	High Temperature Alloys	Titanium Based	●	⦿	30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

ER_NN4-with Radius (r)

4 - Flute End Mill

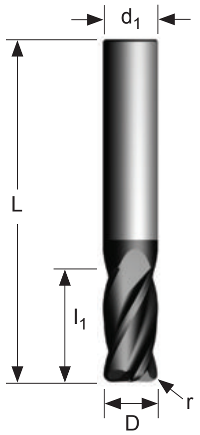
General Milling

Materials Application

SP4556					
P	M	K	N	S	H

PVD

Facing | Shoulder Milling - Square Ended | Pocketing | Trochoidal



4 - Flute End Mill

Metric Product		Dimensions (mm)									
EDP	Item Description	D	L	l_1	d_1	r	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034228	ER 030NN4-E	3,00	38,00	12,00	3,00	0,50	12,00	4	-	-	4,29
034229	ER 040NN4-E	4,00	50,00	14,00	4,00	0,50	14,00	4	-	-	5,72
034230	ER 050NN4-E	5,00	50,00	16,00	5,00	0,50	16,00	4	-	-	7,15
034231	ER 060NN4-E	6,00	63,00	19,00	6,00	0,50	19,00	4	-	-	8,58
034232	ER 060NN4-G	6,00	63,00	19,00	6,00	1,00	19,00	4	-	-	8,58
034233	ER 080NN4-E	8,00	63,00	19,00	8,00	0,50	19,00	4	-	-	11,44
034234	ER 080NN4-G	8,00	63,00	19,00	8,00	1,00	19,00	4	-	-	11,44
034235	ER 100NN4-E	10,00	70,00	22,00	10,00	0,50	22,00	4	-	-	14,30
034236	ER 100NN4-G	10,00	70,00	22,00	10,00	1,00	22,00	4	-	-	14,30
034237	ER 100NN4-J	10,00	70,00	22,00	10,00	1,50	22,00	4	-	-	14,30
034238	ER 120NN4-E	12,00	75,00	25,00	12,00	0,50	25,00	4	-	-	17,16
034239	ER 120NN4-G	12,00	75,00	25,00	12,00	1,00	25,00	4	-	-	17,16
034240	ER 120NN4-J	12,00	75,00	25,00	12,00	1,50	25,00	4	-	-	17,16
034241	ER 120NN4-K	12,00	75,00	25,00	12,00	2,00	25,00	4	-	-	17,16
034242	ER 160NN4-G	16,00	92,00	32,00	16,00	1,00	32,00	4	-	-	22,88
034243	ER 160NN4-J	16,00	92,00	32,00	16,00	1,50	32,00	4	-	-	22,88
034244	ER 160NN4-K	16,00	92,00	32,00	16,00	2,00	32,00	4	-	-	22,88

E_NN4-(r) Radial a_e and Axial a_p depth of cut range

Product	Dimensions					
	Shoulder Milling					
Grade	Roughing			Finishing		
	ae%	ap%	fz	ae%	ap%	fz
SP4556	0,1 - 0,5 D	0,5 - 2 D	Mid - High	0,5 -0,1 D	0,5 - 2 D	Low - Mid

*** When using a_p max, a_e should not exceed 0,1D**

Note: For trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

ER_NN4-with Radius (r)

4 - Flute End Mill

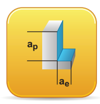
Recommended Feeds
General Milling

ER_NN4-(r) Feeds f_z (mm/tooth) - Shoulder Milling (a_e max)

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,013	0,009 0,012	0,009 0,013	0,009 0,013	0,007 0,011	0,009 0,014	0,009 0,013	0,009 0,012	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	-	-
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,013 0,022	0,015 0,024	0,015 0,022	0,013 0,019	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters

a_e	Correction Factor
0,05 D	2,30 x f_z
0,10 D	1,65 x f_z
0,15 D	1,40 x f_z
0,20 D	1,25 x f_z
0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

ER_NN4-with Radius Series

Speed min. - max.

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm² <180 HBN	●	⦿	125 - 180
		<950 N/mm² <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm² 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm² 280-355 HBN			90 - 140
		1200-1400 N/mm² 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm² >415 HBN			
		Chilled Cast Iron >1400 N/mm² > 400 HBN			

B_NN2

2 - Flute Ball Nose End Mill

General Milling

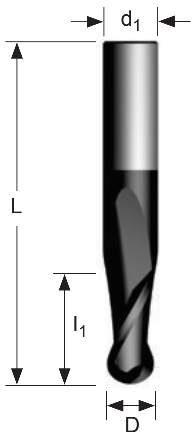
Materials Application

SP4556

P	M	K	N	S	H
◆◆	◆◆	◆		◆	

PVD

Copy / 3D | Slotting - Ball Nosed | Shoulder Milling - Ball Nosed | Pocketing



2 - Flute Ball Nose End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034276	**B 030NN2**	3,00	38,00	12,00	3,00	12,00	2	-	-	-
034277	**B 040NN2**	4,00	50,00	14,00	4,00	14,00	2	-	-	-
034278	**B 050NN2**	5,00	50,00	16,00	5,00	16,00	2	-	-	-
034279	**B 060NN2**	6,00	63,00	19,00	6,00	19,00	2	-	-	-
034280	**B 080NN2**	8,00	63,00	19,00	8,00	19,00	2	-	-	-
034281	**B 100NN2**	10,00	70,00	22,00	10,00	22,00	2	-	-	-
034282	**B 120NN2**	12,00	75,00	25,00	12,00	25,00	2	-	-	-
034283	**B 160NN2**	16,00	88,00	32,00	16,00	32,00	2	-	-	-
034284	**B 200NN2**	20,00	100,00	38,00	20,00	38,00	2	-	-	-

B_NN2 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)						
Grade	Shoulder Milling						Slotting
	Roughing			Finishing			
	a_e%	a_p%	f_z	a_e%	a_p%	f_z	a_p%
SP4556	0,1 - 0,2 D	0,5 - 1,4 D	Mid - High	0,05 - 0,1 D	0,5 - 1,4 D	Low - Mid	0,1 - 0,4 D

Slotting - Ball Nosed

*** When using a_p max, a_e should not exceed 0,1 D**

Note: For copy milling & shoulder milling applications, refer to page 392.

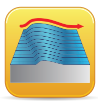
See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

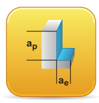
B_NN2 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,013	0,009 0,012	0,009 0,013	0,009 0,013	0,007 0,011	0,009 0,014	0,009 0,013	0,009 0,012	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	-	-
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,013 0,022	0,015 0,024	0,015 0,022	0,013 0,019	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	-	-
20,0	0,060 0,160	0,060 0,160	0,060 0,160	0,060 0,130	0,048 0,101	0,060 0,130	0,060 0,101	0,050 0,090	0,060 0,171	0,060 0,130	0,060 0,101	-	-	0,060 0,171	0,050 0,120	0,050 0,112	0,060 0,152	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling





Feed Correction Parameters

a_e	Correction Factor

Note: For copy milling & shoulder milling applications, refer to page 392.

Speed v_c (m/min)

B_NN2 Series

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			Speed min. - max. PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
		<950 N/mm^2 <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm^2 280-355 HBN			90 - 140
		1200-1400 N/mm^2 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

B_NN4

4 - Flute End Mill

General Milling

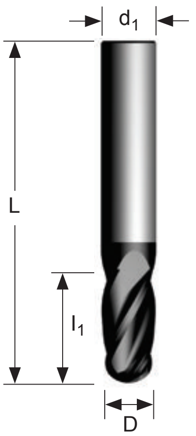
Materials Application

SP4556					
P	M	K	N	S	H

PVD

Copy / 3D

Shoulder Milling - Ball Nosed



4 - Flute Ball Nose End Mill

Metric Product		Dimensions (mm)								
EDP	Item Description	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034724	B 030NN4	3,00	38,00	12,00	3,00	12,00	4	-	-	-
034725	B 040NN4	4,00	50,00	14,00	4,00	14,00	4	-	-	-
034726	B 050NN4	5,00	50,00	16,00	5,00	16,00	4	-	-	-
034727	B 060NN4	6,00	63,00	19,00	6,00	19,00	4	-	-	-
034728	B 080NN4	8,00	63,00	19,00	8,00	19,00	4	-	-	-
034729	B 100NN4	10,00	70,00	22,00	10,00	22,00	4	-	-	-
034730	B 120NN4	12,00	75,00	25,00	12,00	25,00	4	-	-	-

B_NN4 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)					
	Shoulder Milling					
Grade	Roughing			Finishing		
	ae%	ap%	fz	ae%	ap%	fz
SP4556	0,1 - 0,5 D	0,5 -1,9 D	Mid - High	0,05 - 0,1 D	0,5 - 1,9 D	Low - Mid

*** When using a_p max, a_e should not exceed 0,1 D**

Note: For copy milling & shoulder milling applications, refer to page 392.

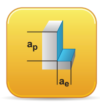
See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

Stellram® Cutting Tool Systems

B_NN4 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS-MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
3,0	0,009 0,014	0,009 0,014	0,009 0,014	0,009 0,013	0,009 0,012	0,009 0,013	0,009 0,013	0,007 0,011	0,009 0,014	0,009 0,013	0,009 0,012	-	-	0,009 0,014	0,007 0,011	0,007 0,010	0,009 0,014	-	-
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
5,0	0,015 0,027	0,015 0,027	0,015 0,027	0,015 0,025	0,013 0,022	0,015 0,024	0,015 0,022	0,013 0,019	0,015 0,027	0,015 0,025	0,015 0,022	-	-	0,015 0,027	0,011 0,020	0,011 0,019	0,015 0,026	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters
	a_e | Correction Factor
 	Note: For copy milling & shoulder milling applications, refer to page 392.

Speed v_c (m/min)

ISO	Materials	Rm and Hardness	Coolant: Recommended ● (wet)	Coolant: Possible ⦿ (dry)	Speed min. - max. PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			100 - 170
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			90 - 140
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
M	Stainless Steel	Martensitic 400 series			65 - 90
M	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
K	Cast Iron	Spheroidal-Ductile GGG-FGS			60 - 120
K	Cast Iron	Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
S	High Temperature Alloys	Cobalt Based			20 - 40
S	High Temperature Alloys	Nickel Based			25 - 45
S	High Temperature Alloys	Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

E_LL4

4 - Flute End Mill

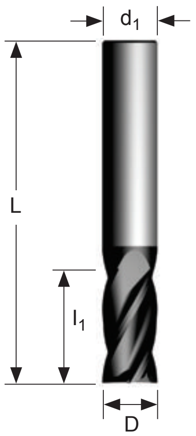
General Milling

Materials Application

SP4556					
P	M	K	N	S	H
◆◆	◆◆	◆		◆	

PVD

Metric Product		Dimensions (mm)								
EDP	Item Description	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034317	E 060LL4	6,00	75,00	25,00	6,00	25,00	4	-	-	8,58
034318	E 080LL4	8,00	75,00	25,00	8,00	25,00	4	-	-	11,44
034319	E 100LL4	10,00	100,00	38,00	10,00	38,00	4	-	-	14,30
034320	E 120LL4	12,00	100,00	50,00	12,00	50,00	4	-	-	17,16
034321	E 160LL4	16,00	150,00	75,00	16,00	75,00	4	-	-	22,88



4 - Flute End Mill

E_LL4 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)					
Grade	Shoulder Milling					
	Roughing			Finishing		
	a_e%	a_p%	f_z	a_e%	a_p%	f_z
SP4556	0,1 - 0,3 D	0,5 - 3 D	Mid - High	0,05 - 0,1 D	0,5 - 3 D	Low - Mid

*** When using a_p max, a_e should not exceed 0,1 D**

Note: For trochoidal application details, refer to pages 390 -391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_LL4 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-
16,0	0,048 0,119	0,048 0,119	0,048 0,119	0,048 0,099	0,039 0,079	0,048 0,099	0,048 0,079	0,040 0,070	0,048 0,127	0,048 0,099	0,048 0,079	-	-	0,048 0,127	0,039 0,090	0,039 0,084	0,048 0,115	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling

Feed Correction Parameters	
a_e	Correction Factor
0,05 D	2,30 x f_z
0,10 D	1,65 x f_z
0,15 D	1,40 x f_z
0,20 D	1,25 x f_z
0,30 D	1,09 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

ISO	Materials	Rm and Hardness	Coolant: wet (💧)	Coolant: dry	SP4556
E_LL4 Series					Speed min. - max.
Coolant Recommendation: Recommended ● Possible ⦿					PVD Micrograin
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	75 - 110
P	Unalloyed Steel	<950 N/mm^2 <280 HBN			60 - 100
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	60 - 100
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN			55 - 85
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN			50 - 70
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	50 - 70
M	Stainless Steel	Martensitic 400 series			40 - 55
M	PH Stainless	Refractory P.H.	●		30 - 45
K	Cast Iron	Grey GG-Ft	●	⦿	55 - 90
K	Cast Iron	Spheroidal-Ductile GGG-FGS			35 - 70
K	Cast Iron	Malleable GTS - MN/MP			30 - 60
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	30 - 70
S	High Temperature Alloys	Cobalt Based			15 - 35
S	High Temperature Alloys	Nickel Based			20 - 35
S	High Temperature Alloys	Titanium Based			25 - 50
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

B_LL2 / B_XLXL2

2 - Flute Ball Nose End Mill

General Milling

Materials Application

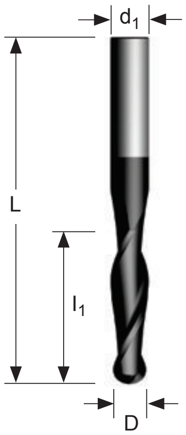
SP4556					
P	M	K	N	S	H

PVD

Copy / 3D

Shoulder Milling - Ball Nosed

Pocketing



2 - Flute Ball Nose End Mill

Metric Product		Dimensions (mm)								
EDP	Item Description	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034738	B 040LL2	4,00	65,00	25,00	4,00	25,00	2	-	-	-
034739	B 060LL2	6,00	75,00	25,00	6,00	25,00	2	-	-	-
034740	B 060XLXL2	6,00	100,00	38,00	6,00	38,00	2	-	-	-
034741	B 080LL2	8,00	75,00	25,00	8,00	25,00	2	-	-	-
034742	B 080XLXL2	8,00	100,00	38,00	8,00	38,00	2	-	-	-
034743	B 100LL2	10,00	100,00	38,00	10,00	38,00	2	-	-	-
034744	B 100XLXL2	10,00	125,0	63,00	10,00	63,00	2	-	-	-
034745	B 120LL2	12,00	100,0	50,00	12,00	50,00	2	-	-	-
034746	B 120XLXL2	12,00	150,00	75,00	12,00	75,00	2	-	-	-

Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)					
Grade	Shoulder Milling					
	Roughing			Finishing		
	ae%	ap%	fz	ae%	ap%	fz
B_LL2						
SP4556	0,05 - 0,1 D	0,5 - 2,8 D	Mid - High	0,01 - 0,05 D	0,5 - 2,8 D	Low - Mid
B_XLXL2						
SP4556	0,05 - 0,1 D	1,0 - 3,5 D	Mid - High	0,01 - 0,05 D	1,0 - 3,5 D	Low - Mid

*** When using a_p max, a_e should not exceed 0.1 D**

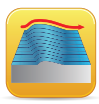
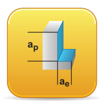
Note: For copy milling & shoulder milling applications, refer to page 392.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

B_LL2 / B_XLXL2 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
4,0	0,012 0,020	0,012 0,020	0,012 0,020	0,012 0,019	0,011 0,017	0,012 0,019	0,012 0,017	0,010 0,015	0,012 0,020	0,012 0,019	0,012 0,017	-	-	0,012 0,020	0,009 0,015	0,009 0,014	0,012 0,019	-	-
6,0	0,018 0,033	0,018 0,033	0,018 0,033	0,018 0,030	0,016 0,027	0,018 0,030	0,018 0,027	0,015 0,024	0,018 0,034	0,018 0,030	0,018 0,027	-	-	0,018 0,034	0,013 0,025	0,013 0,024	0,018 0,033	-	-
8,0	0,024 0,049	0,024 0,049	0,024 0,049	0,024 0,043	0,021 0,037	0,024 0,043	0,024 0,037	0,020 0,033	0,024 0,051	0,024 0,043	0,024 0,037	-	-	0,024 0,051	0,018 0,036	0,018 0,035	0,024 0,047	-	-
10,0	0,030 0,065	0,030 0,065	0,030 0,065	0,030 0,056	0,026 0,047	0,030 0,056	0,030 0,047	0,025 0,042	0,030 0,068	0,030 0,056	0,030 0,047	-	-	0,030 0,068	0,023 0,049	0,023 0,046	0,030 0,063	-	-
12,0	0,036 0,082	0,036 0,082	0,036 0,082	0,036 0,070	0,030 0,057	0,036 0,070	0,036 0,057	0,030 0,051	0,036 0,087	0,036 0,070	0,036 0,057	-	-	0,036 0,087	0,029 0,062	0,029 0,058	0,036 0,079	-	-

Note: HTA = High Temperature Alloys

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
 	Note: For copy milling & shoulder milling applications, refer to page 392.	

Speed v_c (m/min)

B_LL2 / B_XLXL2 Series

Coolant Recommendation: Recommended ● Possible ⦿

Speed min. - max.

ISO	Materials	Rm and Hardness	Coolant	Dry	PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	75 - 110
		<950 N/mm^2 <280 HBN			60 - 100
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	60 - 100
		950-1200 N/mm^2 280-355 HBN			55 - 85
		1200-1400 N/mm^2 355-415 HBN			50 - 70
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	50 - 70
		Martensitic 400 series			40 - 55
	PH Stainless	Refractory P.H.	●		30 - 45
K	Cast Iron	Grey GG-Ft	●	⦿	55 - 90
		Spheroidal-Ductile GGG-FGS			35 - 70
		Malleable GTS - MN/MP			30 - 60
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	30 - 70
		Cobalt Based			15 - 35
		Nickel Based			20 - 35
		Titanium Based			25 - 50
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

E_NTN2

2 - Flute End Mill

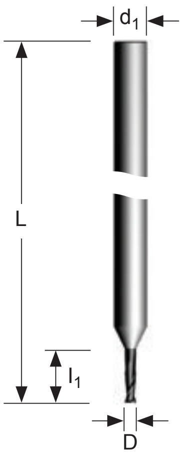
General Purpose - Miniature

Materials Application

SP4556					
P	M	K	N	S	H

PVD

Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Helical Interpolation | Trochoidal



2 - Flute End Mill

Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034158	**E 004NTN2**	0,40	38,00	1,20	3,00	1,20	2	0,57	0,78	0,57
034159	**E 005NTN2**	0,50	38,00	1,50	3,00	1,50	2	0,72	0,98	0,72
034160	**E 006NTN2**	0,60	38,00	1,80	3,00	1,80	2	0,86	1,17	0,86
034161	**E 007NTN2**	0,70	38,00	2,10	3,00	2,10	2	1,00	1,37	1,00
034162	**E 008NTN2**	0,80	38,00	2,40	3,00	2,40	2	1,14	1,56	1,14
034163	**E 009NTN2**	0,90	38,00	2,70	3,00	2,70	2	1,29	1,76	1,29
034164	**E 010NTN2**	1,00	38,00	3,00	3,00	3,00	2	1,43	1,95	1,43
034165	**E 012NTN2**	1,20	38,00	3,60	3,00	3,60	2	1,72	2,34	1,72
034166	**E 015NTN2**	1,50	38,00	5,00	3,00	5,00	2	2,15	2,93	2,15
034167	**E 020NTN2**	2,00	38,00	6,00	3,00	6,00	2	2,86	3,90	2,86
034168	**E 025NTN2**	2,50	38,00	7,00	3,00	7,00	2	3,58	4,88	3,58

E_NTN2 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)		
	Shoulder Milling		Slotting
	a_e%	a_p%	a_p%
SP4556	0,05 - 0,2 D	0,05 - 0,2 D	0,1 - 0,3 D

Slotting - Square Ended

*** When using a_p max, a_e should not exceed 0,05 D**

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_NTN2 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
0,4	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	-	-	0,004	0,004	0,004	0,004	-	-
0,5	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	-	-	0,005	0,005	0,005	0,005	-	-
0,6	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	-	-	0,005	0,005	0,005	0,005	-	-
0,7	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	-	-	0,006	0,006	0,006	0,006	-	-
0,8	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	-	-	0,007	0,007	0,007	0,007	-	-
0,9	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	-	-	0,008	0,008	0,008	0,008	-	-
1.0	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	-	-	0,009	0,009	0,009	0,009	-	-
1,2	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	-	-	0,011	0,011	0,011	0,011	-	-
1,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,0	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-

Note: HTA = High Temperature Alloys

Note: Due to the small diameter of the miniature end mill line, the feed rate has been reduced to a starting value only.

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,10 D	1,65 x f_z
	0,20 D	1,25 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

ISO	Materials	Rm and Hardness	Coolant: Wet	Coolant: Dry	SP4556 (PVD Micrograin) Speed min. - max.
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿	100 - 170
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	90 - 140
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿	80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
M	Stainless Steel	Martensitic 400 series	●	⦿	65 - 90
M	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	60 - 120
K	Cast Iron	Malleable GTS - MN/MP	●	⦿	50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 40
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 45
S	High Temperature Alloys	Titanium Based	●	⦿	30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

E_NTN2 Series

Coolant Recommendation: Recommended ● Possible ⦿

When calculating rotation speed (RPM), use V_c recommendations above.
If the RPM exceeds spindle capacity, use maximum spindle speed available.

When using rotation speeds above 25,000 RPM, ensure a balanced work holding assembly is utilised.

E_NTN3

3 - Flute End Mill

General Purpose - Miniature

Materials Application

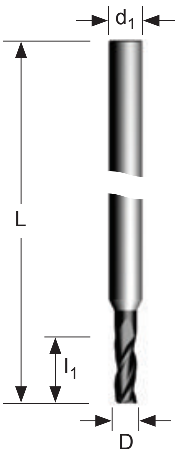
SP4556

P	M	K	N	S	H
◆◆	◆◆	◆		◆	

PVD

Slotting - Square Ended | Shoulder Milling - Square Ended | Pocketing | Helical Interpolation | Trochoidal

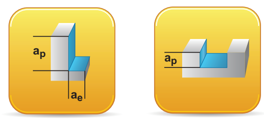
Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034191	**E 010NTN3**	1,00	38,00	3,0	3,00	3,00	3	1,43	1,95	1,43
034192	**E 015NTN3**	1,50	38,00	5,00	3,00	5,00	3	2,15	2,93	2,15
034193	**E 020NTN3**	2,00	38,00	6,00	3,00	6,00	3	2,86	3,90	2,86
034194	**E 025NTN3**	2,50	38,00	7,00	3,00	7,00	3	3,58	4,88	3,58



3 - Flute End Mill

E_NTN3 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)		
	Shoulder Milling		Slotting
	ae%	ap%	ap%
SP4556	0,05 - 0,2 D	0,05 - 0,2 D	0,1 - 0,3 D



Slotting - Square Ended

*** When using a_p max, a_e should not exceed 0,05 D**

Note: For ramping angle, helical a_p max. and trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

E_NTN3 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
1.0	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	-	-	0,009	0,009	0,009	0,009	-	-
1,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,0	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-

Note: HTA = High Temperature Alloys

Note: Due to the small diameter of the miniature end mill line, the feed rate has been reduced to a starting value only.

Shoulder Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	0,10 D	1,65 x f_z
	0,20 D	1,25 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

E_NTN3 Series					PVD Micrograin
Coolant Recommendation: Recommended ● Possible ⦿					Speed min. - max.
ISO	Materials	Rm and Hardness	Coolant	Dry	SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
		<950 N/mm^2 <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm^2 280-355 HBN			90 - 140
		1200-1400 N/mm^2 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

When calculating rotation speed (RPM), use V_c recommendations above.
If the RPM exceeds spindle capacity, use maximum spindle speed available.

When using rotation speeds above 25,000 RPM, ensure a balanced work holding assembly is utilised.

E_NTN4

4 - Flute End Mill

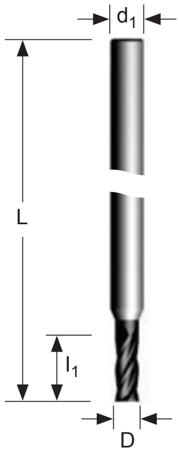
General Purpose - Miniature

Materials Application

SP4556					
P	M	K	N	S	H

PVD

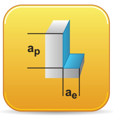
Metric Product		Dimensions (mm)								
EDP	**Item Description**	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034216	**E 010NTN4**	1,00	38,00	3,00	3,00	3,00	4	-	-	1,43
034217	**E 015NTN4**	1,50	38,00	5,00	3,00	5,00	4	-	-	2,15
034218	**E 020NTN4**	2,00	38,00	6,00	3,00	6,00	4	-	-	2,86



4 - Flute End Mill

E_NTN4 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)	
	Shoulder Milling	
	ae%	ap%
SP4556	0,05 - 0,2 D	0,05 - 0,2 D



*** When using a_p max, a_e should not exceed 0,05 D**

Note: For trochoidal application details, refer to pages 390 - 391.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

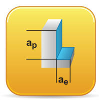
E_NTN4 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm^2 <180 HBN	Unalloyed Steel 700-950N/mm^2 200-280 HBN	Alloyed Steel <600 N/mm^2 <180 HBN	Alloyed Steel 950-1200N/mm^2 280-355 HBN	Alloyed Steel 1200-1400N/mm^2 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
1.0	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	-	-	0,010	0,010	0,010	0,010	-	-
1,5	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-
2,0	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-
2,5	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-

Note: HTA = High Temperature Alloys

Note: Due to the small diameter of the miniature end mill line, the feed rate has been reduced to a starting value only.

Shoulder Milling / Profiling



Feed Correction Parameters	
a_e	Correction Factor
0,10 D	1,65 x f_z
0,20 D	1,25 x f_z

For a_e less than a_e max, use correction factors stated above.
For a_e max, use feeds stated above.

Speed v_c (m/min)

E_NTN4 Series

Coolant Recommendation

Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness			PVD Micrograin SP4556 (Speed min. - max.)
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿	100 - 170
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	90 - 140
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿	80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
M	Stainless Steel	Martensitic 400 series	●	⦿	65 - 90
M	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	60 - 120
K	Cast Iron	Malleable GTS - MN/MP	●	⦿	50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 40
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 45
S	High Temperature Alloys	Titanium Based	●	⦿	30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

When calculating rotation speed (RPM), use V_c recommendations above.
If the RPM exceeds spindle capacity, use maximum spindle speed available.

When using rotation speeds above 25,000 RPM, ensure a balanced work holding assembly is utilised.

B_NTN2

2 - Flute Ball Nose End Mill

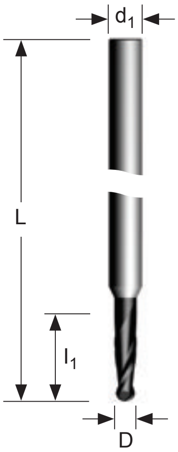
General Purpose - Miniature

Materials Application

SP4556					
P	M	K	N	S	H

PVD

Copy / 3D — Slotting - Ball Nosed — Shoulder Milling - Ball Nosed — Pocketing



2 - Flute Ball Nose End Mill

Metric Product		Dimensions (mm)								
EDP	Item Description	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min - max		Trochoidal min
034265	B 004NTN2	0,40	38,00	1,20	3,00	1,20	2	-	-	-
034266	B 005NTN2	0,50	38,00	1,50	3,00	1,50	2	-	-	-
034267	B 006NTN2	0,60	38,00	1,80	3,00	1,80	2	-	-	-
034268	B 007NTN2	0,70	38,00	2,10	3,00	2,10	2	-	-	-
034269	B 008NTN2	0,80	38,00	2,40	3,00	2,40	2	-	-	-
034270	B 009NTN2	0,90	38,00	2,70	3,00	2,70	2	-	-	-
034271	B 010NTN2	1,00	38,00	3,00	3,00	3,00	2	-	-	-
034272	B 012NTN2	1,20	38,00	3,60	3,00	3,60	2	-	-	-
034273	B 015NTN2	1,50	38,00	5,00	3,00	5,00	2	-	-	-
034274	B 020NTN2	2,00	38,00	6,00	3,00	6,00	2	-	-	-
034275	B 025NTN2	2,50	38,00	7,00	3,00	7,00	2	-	-	-

B_NTN2 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions		
	Shoulder Milling		Slotting
	ae%	ap%	ap%
SP4556	0,05 - 0,2D	0,05 - 0,2D	0,1 - 0,3 D

Slotting - Ball Nosed

*** When using a_p max, a_e should not exceed 0,05 D**

Note: For copy milling & shoulder milling applications, refer to page 392.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

B_NTN2 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
0,4	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	-	-	0,004	0,004	0,004	0,004	-	-
0,5	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	-	-	0,005	0,005	0,005	0,005	-	-
0,6	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	0,005	-	-	0,005	0,005	0,005	0,005	-	-
0,7	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	0,006	-	-	0,006	0,006	0,006	0,006	-	-
0,8	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	0,007	-	-	0,007	0,007	0,007	0,007	-	-
0,9	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	0,008	-	-	0,008	0,008	0,008	0,008	-	-
1.0	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	0,009	-	-	0,009	0,009	0,009	0,009	-	-
1,2	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	0,011	-	-	0,011	0,011	0,011	0,011	-	-
1,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,0	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-
2,5	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	-	-	0,014	0,014	0,014	0,014	-	-

Note: HTA = High Temperature Alloys

Note: Due to the small diameter of the miniature end mill line, the feed rate has been reduced to a starting value only.

Copy Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
	Note: For copy milling & shoulder milling applications, refer to page 392.	

Speed v_c (m/min)

B_NTN2 Series					Speed min. - max.
Coolant Recommendation — Recommended ● Possible ⦿					PVD Micrograin
ISO	Materials	Rm and Hardness	Coolant	Dry	SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HB N	●	⦿	125 - 180
		<950 N/mm^2 <280 HBN			100 - 170
	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
		950-1200 N/mm^2 280-355 HBN			90 - 140
		1200-1400 N/mm^2 355-415 HBN			80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
		Martensitic 400 series			65 - 90
	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
		Spheroidal-Ductile GGG-FGS			60 - 120
		Malleable GTS - MN/MP			50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
		Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
		Cobalt Based			20 - 40
		Nickel Based			25 - 45
		Titanium Based			30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
		Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

When calculating rotation speed (RPM), use V_c recommendations above.
If the RPM exceeds spindle capacity, use maximum spindle speed available.

When using rotation speeds above 25,000 RPM, ensure a balanced work holding assembly is utilised.

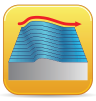
B_NTN4

4 - Flute Ball Nose End Mill

General Purpose - Miniature

Materials Application

SP4556					
P	M	K	N	S	H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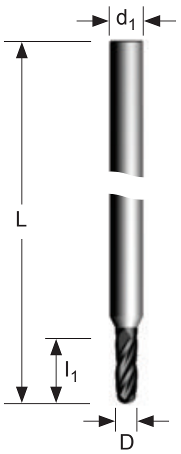
Shoulder Milling - Ball Nosed

PVD

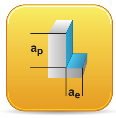


4 - Flute Ball Nose End Mill

Metric Product		Dimensions (mm)								
EDP	Item Description	D	L	l_1	d_1	a_p max*	No. of Teeth	Helical Hole min	Helical Hole max	Trochoidal min
034720	B 010NTN4	1,00	38,00	3,00	3,00	3,00	4	-	-	-
034721	B 015NTN4	1,50	38,00	5,00	3,00	5,00	4	-	-	-
034722	B 020NTN4	2,00	38,00	6,00	3,00	6,00	4	-	-	-
034723	B 025NTN4	2,50	38,00	7,00	3,00	7,00	4	-	-	-

B_NTN4 - Radial a_e and Axial a_p depth of cut range

Product	Dimensions (mm)	
	Shoulder Milling	
	a_e%	a_p%
SP4556	0,05 - 0,2 D	0,05 - 0,2 D



*** When using a_p max, a_e should not exceed 0,05 D**

Note: For copy milling & shoulder milling applications, refer to page 392.

See pages 395 - 404 for EDP - Description - Previous Part number Cross reference charts.

B_NTN4 Feeds f_z (mm/tooth) - Slotting / Pocketing

D	Unalloyed Steel <600 N/mm² <180 HBN	Unalloyed Steel 700-950N/mm² 200-280 HBN	Alloyed Steel <600 N/mm² <180 HBN	Alloyed Steel 950-1200N/mm² 280-355 HBN	Alloyed Steel 1200-1400N/mm² 355-415 HBN	Stainless Steel Austenitic + Ferretic 300 Series	Stainless Steel Martensitic 400 Series	Stainless Steel Refractory PH	Cast Irons Grey GG-FT	Cast Irons Spheroidal- Ductile GGG-FGS	Cast Irons Malleable GTS -MN/MP	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
Range	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.	Min. - Max.	Min. - Max.	Min. - Max.	Min. - Max.
1.0	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	0,010	-	-	0,010	0,010	0,010	0,010	-	-
1,5	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-
2,0	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-
2,5	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	0,015	-	-	0,015	0,015	0,015	0,015	-	-

Note: HTA = High Temperature Alloys

Note: Due to the small diameter of the miniature end mill line, the feed rate has been reduced to a starting value only.

Copy Milling / Profiling	Feed Correction Parameters	
	a_e	Correction Factor
 	Note: For copy milling & shoulder milling applications, refer to page 392.	

Speed v_c (m/min)

B_NTN4 Series

Coolant Recommendation: Recommended ● Possible ⦿

ISO	Materials	Rm and Hardness	Coolant (wet)	Coolant (dry)	Speed min. - max. PVD Micrograin SP4556
P	Unalloyed Steel	<600 N/mm^2 <180 HBN	●	⦿	125 - 180
P	Unalloyed Steel	<950 N/mm^2 <280 HBN	●	⦿	100 - 170
P	Alloyed Steel	700-950 N/mm^2 200-280 HBN	●	⦿	100 - 170
P	Alloyed Steel	950-1200 N/mm^2 280-355 HBN	●	⦿	90 - 140
P	Alloyed Steel	1200-1400 N/mm^2 355-415 HBN	●	⦿	80 - 120
M	Stainless Steel	Austenitic + Ferritic 300 series	●	⦿	85 - 120
M	Stainless Steel	Martensitic 400 series	●	⦿	65 - 90
M	PH Stainless	Refractory P.H.	●		50 - 80
K	Cast Iron	Grey GG-Ft	●	⦿	90 - 150
K	Cast Iron	Spheroidal-Ductile GGG-FGS	●	⦿	60 - 120
K	Cast Iron	Malleable GTS - MN/MP	●	⦿	50 - 100
N	Aluminium & Alloys	Aluminium & Alloys < 16% Si 116 HBN			
N	Aluminium & Alloys	Aluminium + Silicon > 16% Si 92 HBN			
S	High Temperature Alloys	Iron Based	●	⦿	40 - 90
S	High Temperature Alloys	Cobalt Based	●	⦿	20 - 40
S	High Temperature Alloys	Nickel Based	●	⦿	25 - 45
S	High Temperature Alloys	Titanium Based	●	⦿	30 - 60
H	Hard Materials	Hard Steel >1400 N/mm^2 >415 HBN			
H	Hard Materials	Chilled Cast Iron >1400 N/mm^2 > 400 HBN			

When calculating rotation speed (RPM), use v_c recommendations above.
If the RPM exceeds spindle capacity, use maximum spindle speed available.

When using rotation speeds above 25,000 RPM, ensure a balanced work holding assembly is utilised.

RSM Technical Information

Product			Dimensions (mm)																	
			Profiling					Facing					Chip Thickness		Profiling (mm/z)				Facing (mm/z)	
															for a_e min		for a_e max			
Family Description	Diameter	Z	a_e min	a_e max	a_p min	a_p max	a_d max mm^2	a_e min	a_e max	a_p min	a_p max	a_d max mm^2	h_m min	h_m max	f_z min	f_z max	f_z min	f_z max	f_z min	f_z max
RSM100	10,00	6	0,17	0,67	10,30	13,00	6,87	Radius +0,50	7,50	0,20	Radius +0,50	1,25	0,02	0,05	0,078	0,195	0,040	0,100	0,020	0,057
RSM120	12,00	6	0,20	0,80	12,80	15,60	10,24		9,00			1,80			0,078	0,195	0,040	0,100		
RSM160	16,00	6	0,27	1,07	17,80	20,80	18,99		12,00			3,20			0,078	0,195	0,040	0,100		
RSM160	16,00	8	0,20	0,80	12,00	20,80	9,60		12,00			3,20			0,090	0,225	0,046	0,115		
RSM200	20,00	6	0,33	1,33	23,00	26,00	30,67		15,00			5,00			0,078	0,195	0,040	0,100		
RSM200	20,00	8	0,25	1,00	16,00	26,00	16,00		15,00			5,00			0,090	0,225	0,046	0,115		
RSM250	25,00	8	0,31	1,25	20,50	32,50	25,63		18,75			7,81			0,090	0,225	0,046	0,115		
RSM250	25,00	10	0,25	1,00	15,50	32,50	15,50		18,75			7,81			0,101	0,251	0,051	0,128		

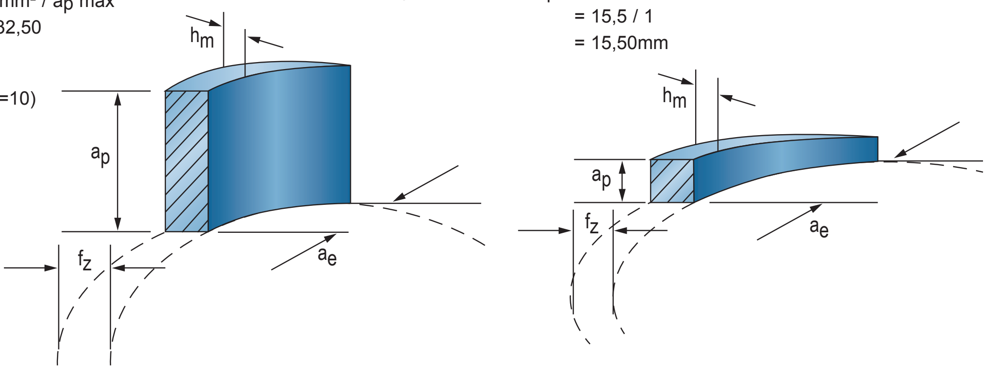
In the application of RSM end mills, it is vital that ad max mm² is not exceeded, for this, adjust a_e & a_p accordingly.

Example:

When using a_p max, then a_e = ad max mm² / a_p max
= 15,50 / 32,50
= 0,47mm

When using a_e max, Then a_p = ad max mm² / a_e max
= 15,5 / 1
= 15,50mm

Example based on values for RSM250 (Z=10)

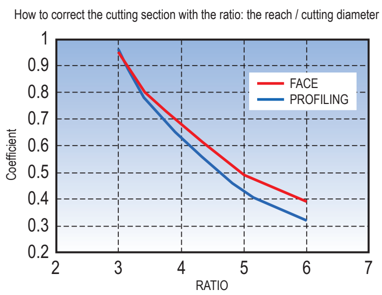


Key:

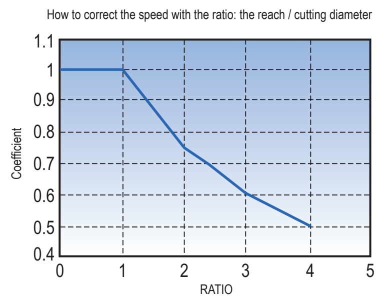
- a_e Radial depth of cut (mm)
- a_p Axial depth of cut (mm)
- a_d Cutting section (mm²)
- f_z Feed per tooth (mm/z)
- h_m Effective chip thickness (mm)

Cutting Section (ad) and Speed (Vc) Correction Coefficients

When the length to diameter (Lu:D) exceeds 3:1 the cutting section (a_d) should be reduced as per the following graph.



When the length to diameter (Lu:D) exceeds 3:1 the speed (V_c) should be reduced as per the following graph.



Example 1

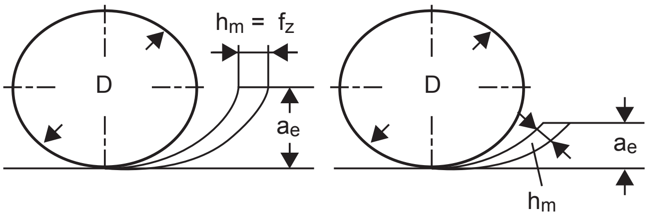
Operation	*Profile milling*	a_d:	*15,50mm²*
Cutter	*RSM250LM10*	Correction coefficient	*0,64*
L:D	*4:1*	Compensated a_d:	*9,92mm²*

Example 2

Material	*ATI 6-4™*	Correction coefficient	*0,50*
L:D	*4:1*	Compensated V_c:	*35 m/min*
Standard V_c	*70 m/min*		

Feed Correction

When using a_e, less than a_e (max), use calculation, in combination with the given feed rate to correct feed.



$$h_m = 2 \times f_z \times \sqrt{(a_e / D) \times (1 - (a_e / D))} \text{ mm}$$

$$f_z = \frac{h_m}{2 \times \sqrt{(a_e / D) \times (1 - (a_e / D))}} \text{ (mm/Z)}$$

a_e max values can be found on all family pages in the tables "Radial a_e and Axial a_p depth of cut range"

Linear Ramping

For linear ramping, use the feed correction factors in the table below, in conjunction with the specified feeds for each family.

Ramping Angle Capacity

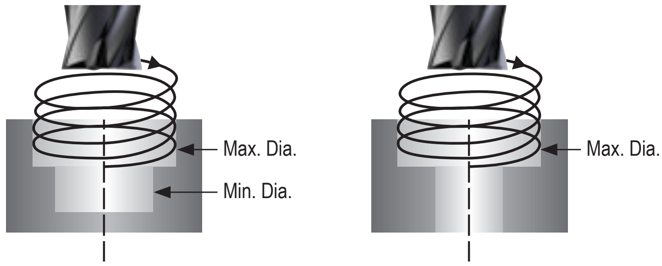
Cutter family	Number of flutes	Effective center cut: Zu for ramping	Max Ramping angle (°)	Feed Correction Calculation			
				45°	30°	10°	5°
E_NN2 EA HPA	2	2	45	0,6 x f_z	0,7 x f_z	0,85 x f_z	0,9 x f_z
E_NN3 ERC	3	1	45	0,3 x f_z	0,5 x f_z	0,75 x f_z	0,85 x f_z
XE XER	4	2	10	-	-	0,5 x f_z	0,75 x f_z

Helical Interpolation

Min. Hole Diameter from solid =
1,43 x Dia. cutter

Max. Hole Diameter from solid =
1,95 x (Dia. cutter - radius)

Max. Enlargement Diameter =
Hole size + ((Dia. cutter - radius) x 2)



Helical Ramping Angle Calculation:
The ramping angle is dependent on size of hole, and the material being machined.

Example: XER 100NN4-C, machining a hole 18,53mm on Titanium Alloy.

Max depth of cut = 0,07 X 10,00
= 0,7mm

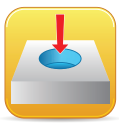
$$\text{Ramping angle} = \tan^{-1}\left(\frac{0{,}70}{18{,}53 \times \varpi}\right)$$

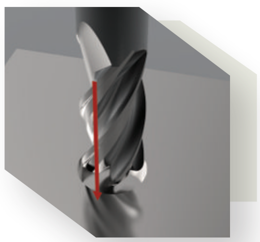
$$= \tan^{-1}(0{,}012)$$
$$= 0{,}70°$$

Maximum Depth of Cut Calculation

Material		ap (doc), max		
P	Unalloyed Steel / Alloyed Steel	0,05	0,1	x Dia.
M	Stainless Steel	0,05	0,08	x Dia.
K	Cast Iron	0,08	0,10	x Dia.
N	Aluminum	0,20		x Dia.
S	Inconel	0,03		x Dia.
S	Titanium	0,07		x Dia.

Drilling

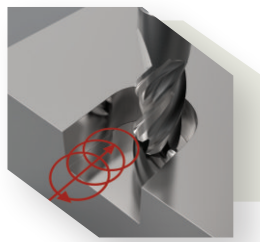




Feed Correction

Number of Flutes	Drilling
2	0,5 x fz
3	0,1 x fz
4	N/A

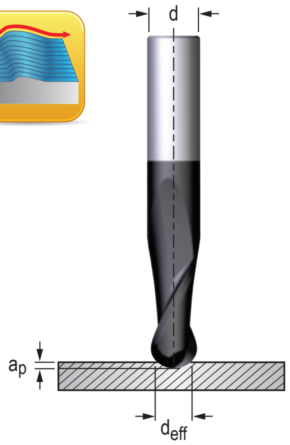
Trochoidal Milling

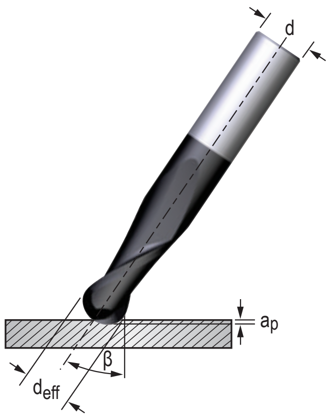


Capacity

End Mill Diameter (D)	Slot Width Min
1,00 - 6,00	1,43 D
8,00 - 12,00	1,43 D
16,00 - 20,00	1,43 D

Copy / 3D Milling





$\beta = 0 \quad d_{eff} = 2 \times \sqrt{R^2 - (R - a_p)^2}$

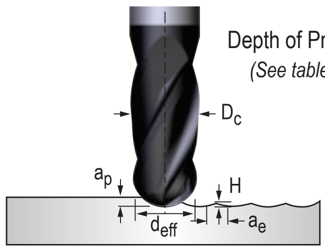
$R = D / 2$ (mm)

$$hm = f_z \times \sqrt{(R^2 - (R - a_e)^2)} / R \times \sqrt{(R^2 - (R - a_p)^2)} / R$$

$$f_z = \frac{h_m}{\sqrt{(R^2 - (R - a_e)^2)} / R \times \sqrt{(R^2 - (R - ap)^2)} / R} \quad \text{(mm/Z)}$$

$$\beta <> 0 \quad d_{eff}\ \text{(mm)} = D \times \sin\left[\beta \pm \arccos\left(\frac{d - 2 \times a_p}{d}\right)\right]$$

Depth of profile / Diameter pitch correlation



$$\text{Depth of Profile (H)} = \frac{D_c}{2} - \sqrt{\left(\frac{D_c}{2}\right)^2 - a_e^2}$$

(See table below)

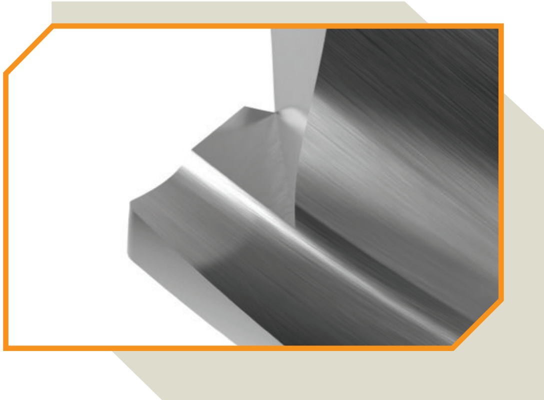
Application Parameters / Depth of Profile (H) (mm)

a_e \ diameter	20,00	16,00	12,00	10,00	8,00	6,00	5,00	4,00	3,00
10,00	10,00								
8,00	4,00	8,00							
6,00	2,00	2,71	6,00						
5,00	1,34	1,76	2,68	5,00					
4,00	0,83	1,07	1,53	2,00	4,00				
3,00	0,46	0,58	0,80	1,00	1,35	3,00			
2,50	0,32	0,40	0,55	0,67	0,88	1,34	2,50		
2,00	0,20	0,25	0,34	0,42	0,54	0,76	1,00	2,00	
1,50	0,11	0,14	0,19	0,23	0,29	0,40	0,50	0,68	1,50
0,75	0,03	0,04	0,05	0,06	0,07	0,10	0,12	0,15	0,20

Read across top row and down first column for chosen parameters to find resultant Depth of profile (H)

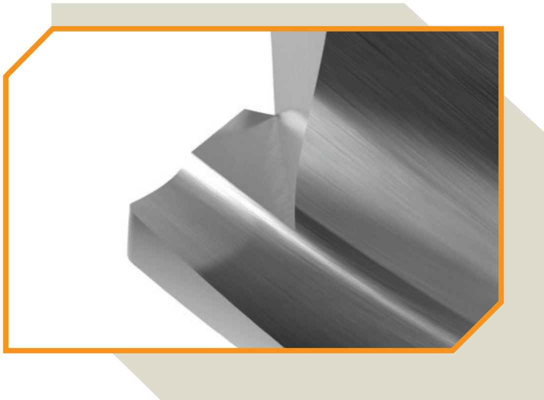
SU4000

Coating Type: Uncoated Submicron
Our toughest and most wear resistant submicron substrate. Developed for machining Titanium and Titanium Alloys, whilst overcoming the problems associated with such materials.



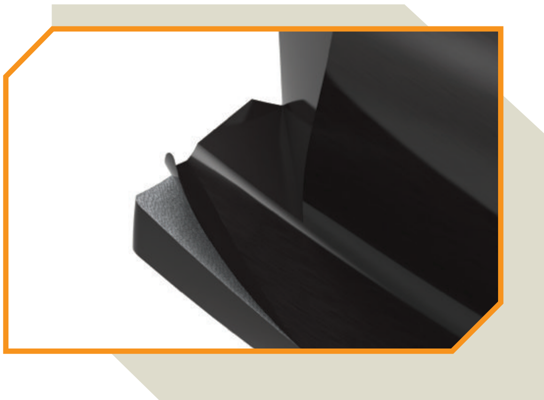
SU0800

Coating Type: Uncoated Submicron
A tough and wear resistant Submicron Grade, developed for Aluminium and Aluminium Alloys.



SP4556

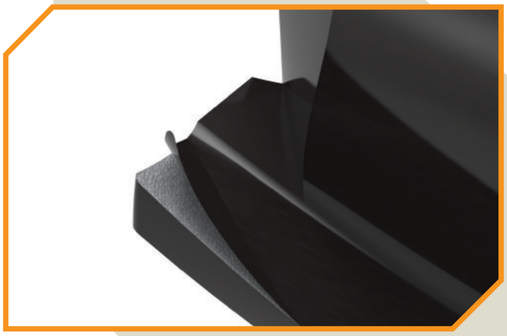
Coating Type: PVD, TiAlN
A versatile PVD TiAlN coated micrograin substrate suitable for a variety of applications. Primary use in Unalloyed Steels, Alloyed Steels, Stainless Steel and Cast Irons.



SP4035

Coating Type: PVD, TiAlN

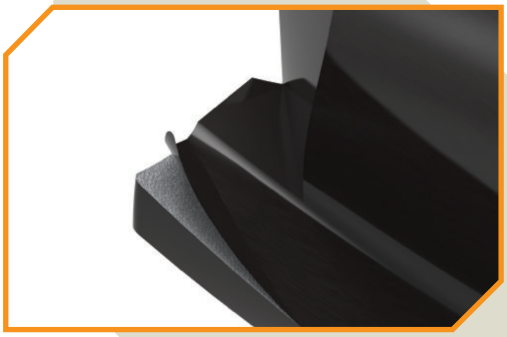
A TiAlN PVD coated grade with a micrograin substrate offering high temperature stability and a low coefficient of friction, allowing the possibility of higher speeds and feeds, as well as dry machining. Primarily used in Steels, Stainless Steels, High Temperature Alloys, Cast Irons and Hard Materials.



SP4060

Coating Type: Advanced Nano PVD, TiAlN

Our toughest and most wear resistant submicron substrate, combined with an advanced nano composite TiAlN PVD coating, allowing tools to be used at elevated surface speeds. Primarily used in High Temperature Alloys and Stainless Steels. Also suitable for Alloyed Steels.



Part numbers for General Purpose milling & Rapide® milling ranges have now been allocated new EDP Numbers and descriptions, to fit in line with existing Stellram products and nomenclature.

Please use the following tables to cross reference the new EDP Numbers / Desciptions with the previous part numbers.

PVD E

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034158	**E 004NTN2**		G11201570E	
	034159	**E 005NTN2**		G11201960E	
	034160	**E 006NTN2**		G11202360E	
	034161	**E 007NTN2**		G11202750E	
	034162	**E 008NTN2**		G11203150E	
	034163	**E 009NTN2**		G11203540E	374
	034164	**E 010NTN2**		G11203940TE	
	034165	**E 012NTN2**		G11204720E	
	034166	**E 015NTN2**		G11205910TE	
	034167	**E 020NTN2**		G11207870TE	
	034168	**E 025NTN2**	SP4556	G11209840TE	
	034169	**E 030NN2**		G11211810TE	
	034170	**E 040NN2**		G11215750TE	
	034171	**E 050NN2**		G11219680TE	
	034172	**E 060NN2**		G11223620TE	
	034173	**E 080NN2**		G11231500TE	350
	034174	**E 100NN2**		G11239370TE	
	034175	**E 120NN2**		G11247240TE	
	034176	**E 160NN2**		G11262990TE	
	034177	**E 200NN2**		G11278740TE	

PVD E

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034191	**E 010NTN3**		G11303940TE	
	034192	**E 015NTN3**		G11305910TE	377
	034193	**E 020NTN3**		G11307870TE	
	034194	**E 025NTN3**		G11309840TE	
	034195	**E 030NN3**		G11311810TE	
	034196	**E 040NN3**		G11315750TE	
	034197	**E 050NN3**	SP4556	G11319680TE	
	034198	**E 060NN3**		G11323620TE	
	034199	**E 080NN3**		G11331500TE	353
	034200	**E 100NN3**		G11339370TE	
	034201	**E 120NN3**		G11347240TE	
	034202	**E 160NN3**		G11362990TE	
	034203	**E 200NN3**		G11378740TE	

PVD E

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034216	**E 010NTN4**		G11403940TE	
	034217	**E 015NTN4**		G11405910TE	380
	034218	**E 020NTN4**		G11407870TE	
	034219	**E 030NN4**		G11411810TE	
	034220	**E 040NN4**		G11415750TE	
	034221	**E 050NN4**		G11419680TE	
	034222	**E 060NN4**	SP4556	G11423620TE	
	034223	**E 080NN4**		G11431500TE	356
	034224	**E 100NN4**		G11439370TE	
	034225	**E 120NN4**		G11447240TE	
	034226	**E 160NN4**		G11462990TE	
	034227	**E 200NN4**		G11478740TE	

PVD ER

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034228	**ER 030NN4-E**		G11411810E050	
	034229	**ER 040NN4-E**		G11415750E050	
	034230	**ER 050NN4-E**		G11419680E050	
	034231	**ER 060NN4-E**		G11423620E050	
	034232	**ER 060NN4-G**		G11423620E100	
	034233	**ER 080NN4-E**		G11431500E050	
	034234	**ER 080NN4-G**		G11431500E100	
	034235	**ER 100NN4-E**		G11439370E050	
	034236	**ER 100NN4-G**	SP4556	G11439370E100	359
	034237	**ER 100NN4-J**		G11439370E150	
	034238	**ER 120NN4-E**		G11447240E050	
	034239	**ER 120NN4-G**		G11447240E100	
	034240	**ER 120NN4-J**		G11447240E150	
	034241	**ER 120NN4-K**		G11447240E200	
	034242	**ER 160NN4-G**		G11462990E100	
	034243	**ER 160NN4-J**		G11462990E150	
	034244	**ER 160NN4-K**		G11462990E200	

PVD

E

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034317	**E 060LL4**		G14823620E	
	034318	**E 080LL4**		G14831500E	
	034319	**E 100LL4**	SP4556	G14839370E	368
	034320	**E 120LL4**		G14847240E	
	034321	**E 160LL4**		G14862990E	

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PVD B

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034265	B 004NTN2		G12201570E	
	034266	B 005NTN2		G12201960E	
	034267	B 006NTN2		G12202360E	
	034268	B 007NTN2		G12202750E	
	034269	B 008NTN2		G12203150E	
	034270	B 009NTN2		G12203540E	383
	034271	B 010NTN2		G12203940E	
	034272	B 012NTN2		G12204720E	
	034273	B 015NTN2		G12205910E	
	034274	B 020NTN2		G12207870E	
	034275	B 025NTN2	SP4556	G12209840E	
	034276	B 030NN2		G12211810E	
	034277	B 040NN2		G12215750E	
	034278	B 050NN2		G12219680E	
	034279	B 060NN2		G12223620E	
	034280	B 080NN2		G12231500E	362
	034281	B 100NN2		G12239370E	
	034282	B 120NN2		G12247240E	
	034283	B 160NN2		G12262990E	
	034284	B 200NN2		G12278740E	

PVD B

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034720	B 010NTN4		G12403940E	
	034721	B 015NTN4		G12405910E	386
	034722	B 020NTN4		G12407870E	
	034723	B 025NTN4		G12409840E	
	034724	B 030NN4		G12411810E	
	034725	B 040NN4	SP4556	G12415750E	
	034726	B 050NN4		G12419680E	
	034727	B 060NN4		G12423620E	365
	034728	B 080NN4		G12431500E	
	034729	B 100NN4		G12439370E	
	034730	B 120NN4		G12447240E	

PVD

B

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034738	**B 040LL2**		G12615750E	
	034739	**B 060LL2**		G12623620E	
	034740	**B 006XLXL2**		G12623620E-XL	
	034741	**B 080LL2**		G12631500E	
	034742	**B 080XLXL2**	SP4556	G12631500E-XL	371
	034743	**B 100LL2**		G12639370E	
	034744	**B 100XLXL2**		G12639370E-XL	
	034745	**B 120LL2**		G12647240E	
	034746	**B 120XLXL2**		G12647240E-XL	

30°

Full Radius

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Stellram

PVD ERC

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034343	ERC 030NTN3		G16311810M6	
	034344	ERC 040NTN3		G16315750M6	
	034345	ERC 050NTN3		G16319680M6	
	034346	ERC 060NN3		G16323620M6	
	034347	ERC 080NN3	SP4035	G16331500	322
	034348	ERC 100NN3		G16339370	
	034349	ERC 120NN3		G16347240	
	034839	ERC 160NN3		G16362990	
	034351	ERC 200NN3		G16378740	

PVD HE

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034352	HE 020NTN4		G16407870	
	034353	HE 030NTN4		G16411810	
	034354	HE 040NTN4		G16415750	
	034355	HE 050NTN4		G16419680	
	034356	HE 060NN4	SP4035	G16423620	325
	034357	HE 080NN4		G16431500	
	034358	HE 100NN4		G16439370	
	034359	HE 120NN4		G16447240	
	034360	HE 160NN4		G16462990	

PVD

HER

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034361	**HER 060NN4-E**	SP4035	G16823620-05	328
	034362	**HER 060NN4-G**		G16823620-10	
	034363	**HER 080NN4-E**		G16831500-05	
	034364	**HER 080NN4-G**		G16831500-10	
	034365	**HER 100NN4-E**		G16839370-05	
	034366	**HER 100NN4-G**		G16839370-10	
	034367	**HER 120NN4-E**		G16847240-05	
	034368	**HER 120NN4-G**		G16847240-10	

HB

PVD

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034375	**HB 030LTL2**	SP4035	G17211810LF	331
	034376	**HB 040LTL2**		G17215750LF	
	034377	**HB 060LL2**		G17223620LF	
	034378	**HB 080LL2**		G17231500LF	
	034379	**HB 100LL2**		G17239370LF	
	034380	**HB 120LL2**		G17247240LF	

30°
Full Radius
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HA
Stellram

HMR

PVD

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034333	**HMR 030NTN6-C**	SP4035	G16011810-025	334
	034334	**HMR 040NTN6-C**		G16015750-025	
	034335	**HMR 050NTN6-C**		G16019680-025	
	034336	**HMR 060NN6-C**		G16023620-025	
	034645	**HMR 060NN6-E**		G16023620-050	
	034337	**HMR 080NN6-C**		G16031500-025	
	034646	**HMR 080NN6-E**		G16031500-050	
	034338	**HMR 100NN6-C**		G16039370-025	
	034339	**HMR 100NN6-E**		G16039370-050	
	034340	**HMR 120NN6-C**		G16047240-025	
	034647	**HMR 120NN6-E**		G16047240-050	
	034341	**HMR 160NN6-C**		G16062990-025	
	034648	**HMR 160NN6-E**		G16062990-050	
	034342	**HMR 200NN6-C**		G16078740-025	

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Stellram

PVD

HMN

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034369	**HMN 060NN6**	SP4035	G16923620	339
	034370	**HMN 080NN6**		G16931500	
	034371	**HMN 100NN6**		G16939370	
	034372	**HMN 120NN6**		G16947240	
	034373	**HMN 160NN6**		G16962990	
	034374	**HMN 200NN6**		G16978740	

50°

90°

h6

HA

Stellram

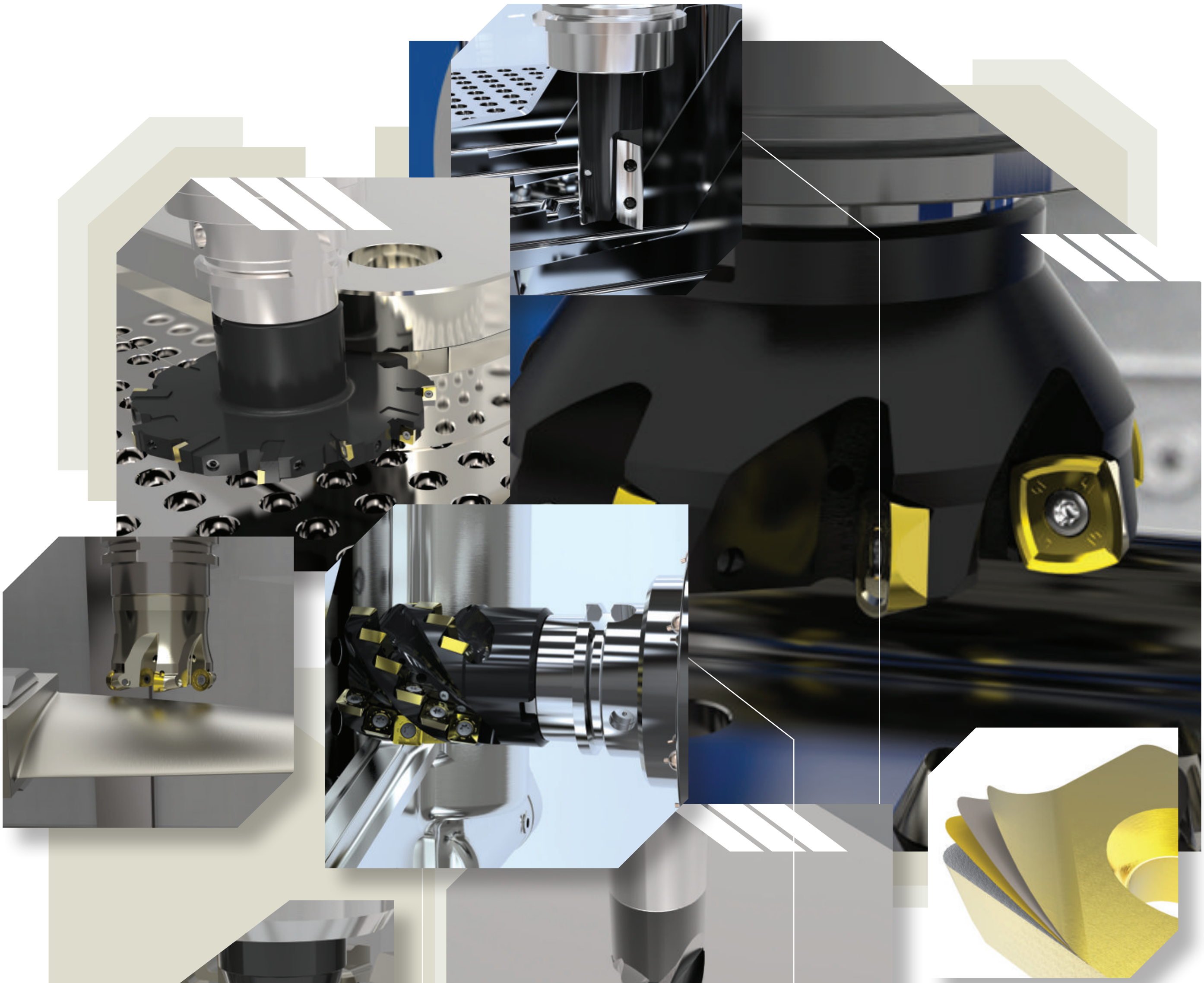
Uncoated EA

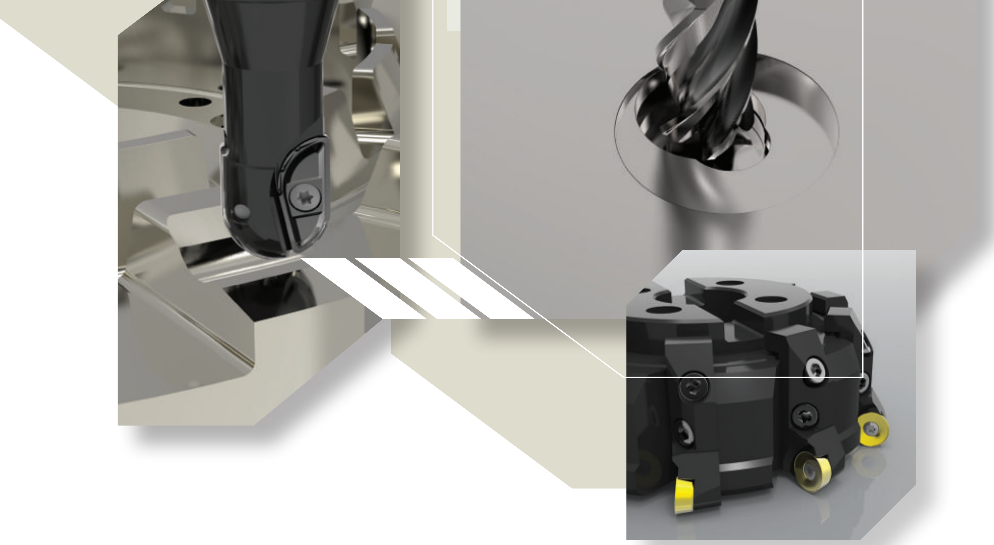
Definition	EDP	Description	Grade	Previous Part No	Page No.
	034322	EA 020NTN2		G15207870	
	034323	EA 025NTN2		G15209840	
	034324	EA 030NN2		G15211810	
	034325	EA 040NN2		G15215750	
	034326	EA 050NN2		G15219680	
	034327	EA 060NN2	SU0800	G15223620	342
	034328	EA 080NN2		G15231500	
	034329	EA 100NN2		G15239370	
	034330	EA 120NN2		G15247240	
	034331	EA 160NN2		G15262990	
	034332	EA 200NN2		G15278740	

Uncoated HPA

Definition	EDP	Description	Grade	Previous Part No	Page No.
	034381	HPA 030NN2		G19211810	
	034382	HPA 040NN2		G19215750	
	034383	HPA 050NN2		G19219680	
	034384	HPA 060NN2		G19223620	
	034385	HPA 080NN2	SU0800	G19231500	345
	034386	HPA 100NN2		G19239370	
	034387	HPA 120NN2		G19247240	
	034388	HPA 160NN2		G19262990	
	034389	HPA 200NN2		G19278740	

Milling





All Stellram's products are supported by a confident and technical sales team backed by an extensive customer care policy.

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Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Unalloyed Steels											
1006 / Fd5	1006			1160	1006	1.0201	St36	Fd5			
1010 / XC10	1010		045M10	1265	1010	1.1121	Ck10	XC10	C10	F.1510	
1015 / CC12	1015		080M15	1350	1015	1.0401	C15	CC12	C15C16	F.111	
1020 / CC20			050A20	1450	1020	1.0402	C22	CC20	C20C21	F.112	
1022 / 20M5	1022		120M19	1410	1022	1.1133	GS.20Mn5	20M5	G22Mn3	F.1515	
1025 /	1025				1025	1.1158	Ck25				S25C
1035 / CC35	1035		060A35	1550	1035	1.0501	C35	CC35	C35	F.113	
1035 / XC38TS	1035		060A35	1572	1035	1.1183	Ck35	XC38TS	C36		S35C
1039 / 35M5	1039		150M36		1039	1.1157	40Mn4	35M5			
1040 / 1C40			080M40		1040	1.0511	C40	1C40/AF60C40	C40/1C40	F.114.A	
1043 / CC45	1043							CC45			
1045 / CC45	1045		080M46	1650	1045	1.0503	C45	CC45	C45	F.114	
1045 / XC42	1045		080M46	1672	1045	1.1191	Ck45	XC42	C45	C45K	S45C
1049 / XC42H1			080M46	1660	1049	1.1201	Cm45	3C45/XC42H1/XC48H1		F.1145.C45k-1/F.1147-C48k-1	S50C
1049 / XC48H1			080M50		1049/1050	1.1206	Ck50	2C50/XC48H1			
1050 / XC48TS	1050		060A52	1674	1050	1.1213	Cf53	XC48TS	C53		S50C
1055 / XC55	1055		070M55		1055	1.1203	Ck55	XC55	C50	C55K	S55C
105WC13			BO1	2140	O1	1.2510	105WCr6	105WC13	10WCr6-107WCr5KU	105WCr5	SKS31-SKS2-SKS3
1060 / CC55	1060		080A62		1060	1.0601	C60	CC55	C60		
1070 / XC68	1070		070A72	1770	1070	1.1231	Ck67	XC68	C70	F.5103	
1080 / XC75	1080		060A78	1774	1080	1.1248	Ck75	XC75		F.5107	
1086 / XC90					1086	1.1269	Ck85	XC90	C90		
1095 / XC100	1095		060A96	1870	1095	1.1274	Ck101	XC100		F.5117	SUP4
10PbF2						1.0722	10SPb20	10PbF2	CF10SPb20	10SPb20	
1108 / 10F1			(210M15)		1108/1109	1.0721	10S20	10F1	CF10S20	F.2121-10S20	
1140 / 35MF4			212M36	1957	1140	1.0726	35S20	35MF4		F210G	
1151 / 45MF4	1151		212M44	1973	1151	1.0727	45S20	45MF4			
120WV10			BF1			1.2516	120WV4	120WV10	110W4KU		
1213 / S250			230M07	1912	1213	1.0715	9SMn28	S250	CF9SMn28	11SMn28	SUM22
1215 / S300			240M07		1215	1.0736	9SMn36	S300	CF9SMn36	12SMn35	
12L13 / S250Pb				1914	12L13	1.0718	9SMnPb28	S250Pb	CF9SMnPb28	11SMnPb28	SUM22L
12L14 / S300Pb				1926	12L14	1.0737	9SMnPb36	S300Pb	CF9SMnPb36	12SMnP35	
18NCD6			820A16			1.6587	17CrNiMo6	18NCD6		14NiCrMo13	
20MC5						1.7139	16MnSCr5	20MC5	20MnCr5	F.150.D	SMnC420H
2515 / Z18N5					2515	1.5680	12Ni19	Z18N5			
30CD12			722M24	2240		1.8515	32CrMo12	30CD12	32CrMo12	F.124.A	
3115 / 16NC6					3115	1.5919	15CrNi6	16NC6			
3415 / 12NC15			655M13-655A12		3415-3310	1.5752	14NiCr14	12NC15			SNC815(H)
38C2						1.7003	38Cr2	38C2/38Cr2	38Cr2/41Cr2KB	F.1200-38Cr3	
40CrMnNiMo8						1.2738	40CrMnNiMo8				
4130 / 25CD4			1717CDS110	2225	4130	1.7218	25CrMo4	25CD4	25CrMo4(KB)	55Cr3AM-26CrMo4	SCM420-SCM430

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

Hardness HRB HRC HB	Rm N/mm^2	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Unalloyed Steels																			
	390																		
	390																		
	590-780																		
	500-650																		
	500-650																		
	500-650																		
	550-750																		
	540-730																		
	690-930																		
	580-800																		
	630-800																		
	630-800																		
	630-800																		
	620-850																		
	650-900																		
	640-830																		
	640-830																		
	750-850																		
	750-900																		
	810																		
	630																		
	670																		
	1000-1100																		
	390-710																		
	350-780																		
	510-740																		
	650																		
	775																		
	410-710																		
	430-740																		
	410-710																		
	430-740																		
	980-1320																		
	480-640																		
	510-710																		
	980-1420																		
	500-850																		
	880-1230																		
	800-950																		
	785																		
	650-950																		

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Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Unalloyed Steels											
4137-4135 / 35CD4			708A37	2234	4137-4135	1.7220	34CrMo4	35CD4	35CrMo4	34CrMo4	SCM432;SCCRM3
4140 / 42CD4			708M40	2244	4140	1.7225	42CrMo4	42CD4	42CrMo4	42CrMo4	SCM440(H)
4140 / 42CD4(HT)			708M40	2244	4140	1.7225	42CrMo4	42CD4	42CrMo4	42CrMo4	SCM440(H)
4140-4142 / 42CD4TS			708M40	2244	4140-4142	1.7223	41CrMo4	42CD4TS	41CrMo4	42CrMo4	SCM440
4150 / 50CrMo4			708A47		4150	1.7228	50CrMo4	50CrMo4			SCM445(H)
4340 / 35NCD6			817M40	2541	4340	1.6582	35CrNiMo6	35NCD6	35NiCrMo6(KB)	F.1280	
4419 /			1503-243-430	2512	4419	1.5419	22Mo4		G20Mo5/G22Mo5		SCPH11
5015 / 12C3			523M15		5015	1.7015	15Cr3	12C3			SCr415(H)
5045 / 45Cr2					5045-5046	1.7006	46Cr2	42C2/46Cr2	45Cr2		
5130 /			530A30		5130	1.7030	28Cr4				
5132 / 32C4			530A32		5132	1.7033	34Cr4	32C4	34Cr4(KB)	35Cr4	SCr430(H)
5135 / 37Cr4			530A36/530H36		5135	1.7034	37Cr4	37Cr4/38C4	36CrMn4/36Cr-Mn5/38Cr4KB/38Cr-Mn4KB	F.1210-38Cr4DF/ F.1201-38Cr4	SCr435H
5140 / 42C4			530M40		5140	1.7035	41Cr4	42C4	41Cr4	42Cr4	SCr440(H)
5155 / 55C3			524A60	2253	5155	1.7176	55Cr3	55C3			SUP9(A)
55NCDV6						1.2711	54NiCrMoV6	55NCDV6			
57NiCrMoV77						1.2744	57NiCrMoV77				
6150 / 50CV4			735A50	2230	6150	1.8159	50CrV4	50CV4	50CrV4	51CrV4	SUP10
6F3 / 55NCDV7					6F3	1.2714	56NiCrMoV7	55NCDV7			
6F5 / 55NC10					6F5	1.2718	55NiCr10	55NC10			
75CrMoNiW67						1.2762	75CrMoNiW67				
8620 / 20NCD2			805M20	2506	8620	1.6523	21NiCrMo2	20NCD2	20NiCrMo2	20NiCrMo2	SNCM220(H)
90MCV8			BO2		2	1.2842	90MnCrV8	90MCV8	90MnCr8KU		
9310 / 16NCD13			832H13/832M13/S157		9310	1.6657	14NiCrMo134	16NCD13	15NiCrMo13	F.1560-14NiCrMo13/F. 1569-14NiCrMo131	
A105 / A48CP		K03501			A105		C22-8	A48CP			
A106GB / TUE250B							P235GH	TUE250B			
A182 / 12CD9			1501-622	2218	ASTMA182F22	1.7380	10CrMo910	12CD9.10	12CrMo910	TU.H	
A182 / 15CD3.5			1501-620Gr27		ASTMA182F11-F12	1.7335	13CrMo44	15CD3.5-15CD4.5	14CrMo45	14CrMo45	
A204Gr.A / 15D3			1501-240	2912	ASTMA204Gr.A	1.5415	15Mo3	15D3	16Mo3KW	16Mo3	
A234WPB / AE250B								AE250B			
A234WPL6 / 42BT		K03006						42BT			
A27 65.35 / E23.45M			A1	1305	A27 65.35	1.0443	GS.45	E23.45M		F.221	
A33			Fe310-0/144915HR,HS	1300		1.0035	Fe310.0 (St33)	A33	Fe320	A310-0/FE310-0	
A333G6 / TU42BT							P265GH	TU42BT			
A34-2						1.0028	Ust34-2	A34-2	Fe330Fe/330BFU		SS330
A34-2NE			144934/20HR,HS,CR,CS			1.0034	RSt34-2	A34-2NE	Fe330BFN		
A350LF2 / A48FP		K03504						A48FP			
A36 / E28					A36			E28			
A515.65 / A37CP			1501 161	1330	A515 65	1.0345	H I	A37CP		F.1110	
A516 / A48CP					A516Gr.70	1.0481	17Mn4/ A515Gr.70/ A414Gr.F	A48CP	Fe510-1KG;KT;KW/ Fe510-2KG;KT;KW	A47RCI/RAII	SG365/SGV410/ SGV450/SGV480
A516G60 / E24-2							P265GH	E24-2			
A516G70 / E36-4							P295GH	E36-4			

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Materials Cross Reference Chart

Hardness HRB HRC HB	Rm N/mm^2	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Unalloyed Steels																			
	750-1100																		
	740-1080																		
	800-1200																		
	750-1100																		
	1100-1300																		
241-277HB	890																		
	440-590																		
	690-880																		
	900-1100																		
	530-860																		
	700-950																		
	950-1150																		
	700-750																		
	1050-1100																		
	800																		
	850																		
	780-1180																		
	850																		
	800																		
	705																		
	510-710																		
	740																		
	560-1200																		
187HB	600		0.4	0.3		0.12		0.15-0.35	0.6-1.05	0.35				0.035	0.04			0.4	Nb 0.4
			0.4	0.4		0.15		0.10 min	0.29-1.06	0.3				0.048	0.058			0.4	Nb 0.4
	440-590																		
	440-590																		
	440-570																		
197HB	660		0.4	0.4		0.15		0.10 min	0.29-1.06	0.3				0.05	0.058			0.4	Nb 0.4
			0.4	0.3				0.10 min	0.6-1.35	0.3				0.035	0.04			0.4	
	750																		
	290-540																		
				0.4				0.10 min	0.29-1.06	0.3				0.025	0.025				
	300-500																		
	460-500																		
197HB	660		0.4	0.3		0.12		0.15-0.30	0.6-1.35	0.3				0.035	0.04			0.4	Nb 0.4
	750																		
	750																		
	460-580																		
								0.1-0.35	1.4	0.2				0.05	0.05				
								0.1-0.35	1.6	0.22				0.04	0.04				

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Unalloyed Steels											
A537 / A52CP				2101/2102	A537Cl.1/ A414Gr.G/A612	1.0473	19Mn6	A52CP		A52RCI/RAII	SGV410/SGV450/ SGV480
A570 / A50-2			Fe490-2FN/4360-50B	1550/2172	A570Gr.50/ A572Gr.50	1.0050	Fe490-2 (St50-2)	A50-2	Fe490	A490-2/Fe490-2FN	SS490
A570 / E24-2			Fe360B/4360-40B	1311/1312	A570Gr.33,36	1.0036	Fe360B (Ust37-2)	E24-2	Fe360BFU	AE235B/Fe360B	
A570 / E28-2			Fe430BFN/144943/25HR, HS/4360-43B	1411/1412	A570Gr.40	1.0044	Fe430B (St44-2)	E28-2	FE430B/Fe430BFN	AE275B/Fe430BFN	SM400A;B;C
A570.36 / E24.2Ne			4360 40 C	1311	A570 36	1.0038	RSt37.2	E24.2Ne			
A572 / A60-2			Fe590-2FN/4360-55E;55C	1650	A572Gr.65	1.0060	Fe590-2 (St60-2)	A60-2	Fe60-2/Fe590	A590-2/Fe590-2FN	SM570
A572.60 / E36								E36			
A573 / E38-3			Fe430D1FF/4360-43C;43D	1411/1412/1414	A573Gr.70/ A611Gr.D	1.0144	Fe430D1 (St44-3)	E28-3/E28-4	Fe430B/Fe430C(FN)/ Fe430D(FF)	AE275D/Fe-430D1FF	SM400A;B;C
A573.81.65 / E24.U				1312	A573.81 65	1.0116	St37.3	E24.U	Fe37.3		
A619			14493CR		A619(1008)	1.0347	RRSt3	E	FeP02		
A633 / FeE355KGN			A588		A633Gr.C	1.0562	StE355	FeE355KGN/ E335R/FP	FeE355KG;KW	AE355KG;DD	SM490A;B;C;YA;YB
A70-2			Fe690-2FN	1655		1.0070	Fe690-2 (St70-2)	A70-2	Fe70-2/Fe690	A690-2/Fe690-2FN	
A738 / A52FP			Fe510D2F-F/1501Gr.224-460/1501Gr.224-490		A738	1.0577	Fe510D2 (Ast52)	A52FP		A52RBII	
C25			070M26		(M)1025	1.0406	C25	C25/1C25	C25/1C25		
E24-2			Fe360B/144937/23HR	1311		1.0037	Fe360B (St37-2)	E24-2	Fe360B;C;D	AE235B/Fe360B	STKM12A;C
E36-3			Fe510D1FF/144950/35HR, HS/4360-50D	2132/2133/2134		1.0570	Fe510D1 (St52-3)	E36-3/E36-4	Fe510CFN/ Fe510510B;C;D/ Fe510BFN	AE355D/Fe-510D1FF	SM490A;B;C;YA;YB
L6 / 55NCDV07	L6			2550	L6	1.2713	55NiCrMoV6	55NCDV7		F.520.S	SKT4
P2 / 20MC5					P2	1.2162	21MnCr5	20MC5			SCR420H
P20 / 40CMD8			P20		P20	1.2311	40CrMnMo7	40CMD8			
P20+S / 40CMD8+S			P20+S		P20+S	1.2312	40CrMnMoS86	40CMD8+S			
S1 / 55WC20	S1		BS1	2710	S1	1.2542	45WCrV7	55WC20	45WCrV8KU	45WCrSi8	
S4					S4	1.2826	60MnSiCr4				
W110 / Y1105								Y1105			
W112 / Y2120					W112	1.1663	C125W	Y2120	C120KU	C120	SK2
W210 / Y1105V			BW2		W210	1.2833	100V1	Y1105V	102V2KUSKS43		
Alloyed Steels											
12CD4			1501620	2216	A38712-2	1.7262	15CrMo5	12CD4	12CrMo910	12CrMo4	SCM415(H)
1330 / 20M5			150M28		1330	1.1170	28Mn6	20M5	C28Mn		SCMn1
1335 / 40M5				2120	1335	1.1167	36Mn5	40M5		36Mn5	SMn438(H)
20AP											
22CMSD4								22CMS4			
3135 / 35NC6			640A35		3135	1.5710	36NiCr6	35NC6			SNC236
3415 / 14NC11					3415	1.5732	14NiCr10	14NC11	16NiCr11	15NiCr11	SNC415(H)
35NCD14								35NCD14			
40CMD8								40CMD8			
420 / Z40C14				2314	420	1.2083	X42Cr13	Z40C14			SUS420J2
429					429						
4340 / 35NCD6					4340			35NCD6			
440C / Z100CD17					440C	1.4125	X105CrMo17	Z100CD17			
4520					4520						

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Unalloyed Steels																			
	480-650																		
	470-800																		
	340-690																		
	410-790																		
	750																		
	570-920																		
	750																		
	790																		
	750																		
	210-690																		
	490-800																		
	670-1000																		
	450-680																		
	470-650																		
	340-690																		
	490-800																		
	800-850																		
	705																		
	790																		
	790																		
	750-800																		
	740																		
	640-830																		
	650-750																		
	675																		
Alloyed Steels																			
	640-1080																		
	640-840																		
	600																		
	720-950							0.3	0.25-0.50	1				0.035	0.045				Pb0.2
255-300HB	970																		
	690-930																		
	830-1180																		
	1100-1350																		
	1100-1300																		
	770																		
	600																		
	900-1200																		
	870																		
	450-590																		

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Alloyed Steels											
45NCD17 / 6F7			EN30B		6F7	1.2767	X45NiCrMo4	45NCD17	KV		
5115 / 16MC5			527M20	2511	5115	1.7131	16MnCr5	16MC5	16MnCr5	16MnCr5	
5120 / 20MC5			150M19	2172	5120	1.0841	St52-3	20MC5	Fe52BFN/Fe52CFN	F.431	
5140 / 42C4 (HT)			530M40		5140	1.7035	41Cr4	42C4	41Cr4	42Cr4	SCr440(H)
52100 / 100C6			534A99	2258	52100	1.3505	100Cr6	100C6	100Cr6	F.131	SUJ2
55MnSi4-4								55MS4-4			
55W1								XC55			
8630					8630						
8740 / 40NiCrMo22			311Type7		8740	1.6546	40NiCrMo22		40NiCrMo2(KB)	40NiCrMo2	SNCM240
9255 / 55S7			250A53	2090	9254	1.0904	55Si7	55S7	55Si8	F.144	
9262 / 60SC7					9262	1.0961	60SiCr7	60SC7	60SiCr8	60SiCr8	
9840 / 40NCD3			816M40		9840	1.6511	36CrNiMo4	40NCD3	38NiCrMo4(KB)	35NiCrMo4	
A128.75 / Z120M12			BW10	2183	A12875	1.3401	GX120Mn12	Z120M12	XG120Mn12	X120Mn12	
A2 / Z100CDV5	A2		BA2	2260	A2	1.2363	X100CrMoV51	Z100CDV5	X100CrMoV51KU	X100CrMoV5F5227	SKD12
A350LF5 / 16N6					ASTMA350LF5	1.5622	14Ni6	16N6	14Ni6	15Ni6	
A355A / 40CAD06.12					A335A			40CAD0612			
A6	A6				A6						
A7	A7				A7						
Aermet 100		UNSK92580									
Aermet 310											
Aermet 340											
D2 / Z160CDV12	D2		BD2	2310	D2	1.2601	X165CrMoV12	Z160CDV12	X165CrMoW12KU	X160CrMoV12	
D2 / Z210CW12			BD2		D2	1.2379	X155CrVMo12.1	Z210CW12			
D3 / Z200Cr12			BD3		D3	1.2080	X210Cr12	Z200Cr12	X210Cr13KU / X250Cr12KU	X210Cr12	SKD1
D4(D6) / Z200CD12			BD6	2312	D4(D6)	1.2436	X210CrW12	Z200CD12	X215CrW121KU	X210CrW12	SKD2
FV535	ATIFV535™										
H10 / 30CDV12-28			BH10		H10	1.2365	X32CrMoV33	30CDV12-28	30CrMoV1227KU	F.5313	
H10A / 30CKDV28			BH10A		H10A	1.2885	X32CrMoCoV33.3	30CKDV28			
H11 / Z38CDV5			BH11		H11	1.2343	X38CrMoV51	Z38CDV5	X37CrMoV51KU	F.5137	SKD6
H13 / Z40CDV5	H13		BH13	2242	H13	1.2344	X40CrMoV51	Z40CDV5	X35CrMoV05KU / X40CrMoV511KU	X40CrMoV5	SKD61
H21 / Z30WCV9-3			BH21		H21	1.2581	X30WCrV93	Z30WCV9-3	X30WCrV93KU	F.5323	SKD5
Hardox400											
HardoxHiTuf											
HW3 / Z45CS9			401S45		HW3	1.4718	X45GrSi93	Z45CS9	X45GrSi8	F.322	SUH1
L1					L1						
L3 / Y100C6	L3		BL3		L3	1.2067	100Cr6	Y100C6		100Cr6	
M2 / Z85WDCV06050402	M2				M2			Z85WDCV06050402			
M3	M3				M3						
M35 / Z85WDKCV				2723	M35	1.3243	S6/5/2/5	Z85WDKCV	HS6.5.2.5	F.5613	SKH55
M7 / Z100WCV09040202								Z100WCV09040202			
O1	O1				O1						
P21					P21	1.2764	X19NiCrMo4				
P4					P4	1.2341	X6CrMo4				
S7	S7				S7						
T1 / Z80WCV180401			BT1		T1	1.3355	S18.0.1	Z80WCV180401	X75W18KU	HS18.0.1	SKH2

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Materials Cross Reference Chart

Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Alloyed Steels																			
	880																		
	640-1080																		
	650																		
	800-1100																		
	650-750																		
269-302HB	970																		
248-285HB	900																		
	690-930																		
	690-930																		
	950-1050																		
	1050-1100																		
	800-1100																		
	780-1080																		
	750-850																		
	490-640																		
	700																		
	720-775																		
	795-910																		
40HRC	1250	71	11.1	3	13.4	1.2				0.23									
40HRC	1250	70	11	2.4	15	1.4				0.25									
37-42HRC	1330	68	12	2.25	15.6	1.85				0.33									
	850-900																		
	850																		
	850-900																		
	850-900																		
34HRC	1070		0.2-0.8	9.8-11.2		0.5-1.0	0.7	0.1-0.7	0.6-1.15	0.06-0.11									
	770																		
	770																		
	770																		
	1180-1620																		
	850																		
400HBW	1300																		
350HBW	1130																		
	970																		
	630																		
	750-850																		
	775-990																		
	795-870																		
	775-990																		
	775-990																		
	640-670																		
	850																		
	400																		
	640-720																		
	800-1050																		

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Alloyed Steels / Stainless Steels

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Alloyed Steels											
T4 / Z80WKCV18050401			BT4		T4	1.3255	S18.1.2.5	Z80WKCV18050401	X78WCo1805KU	HS18.1.1.5	SKH3
Z2NKDT18-10-5						1.2709	X3NiCoMoTi18.9.5	Z2NKDT18-10-5			
Z38CDV5-3						1.2367	X40CrMoV53	Z38CDV5-3	Z155CVD12-1		
Stainless Steels											
50	ATI 50™	UNS S20910									
202			284S16		202	1.4371	X3CrMnNiN18-8-7	Z8CMN18.08.05			
215											
284											
301	ATI 301™			2331	301	1.4310	X12CrNi17-7	Z12CN17.07	X12CrNi17 07	F.3517	SUS301
302	ATI 302™		302S31	2330	302	1.4319	X12CrNi18-9	Z10CN18.09	X10CrNi18 09	F.314	
303	ATI 303™		303S21, 58M	2346	303	1.4305	X8CrNiS18-9	Z10CNF18.09	X10CrNiS 18.09	F.3508	SUS303
304	ATI 304™		304S31, 58E	2332/2333	304	1.4350	X5CrNi18-9	Z6CN18.09	X5CrNi18 10	F.3551;F.3541;F.3504	SUS304
305	ATI 305™		305S19		305	1.4312	X8CrNi18-12		X8CrNi1910	F.3503	
311											
315											
316	ATI 316™		316S33, 58J	2343	316	1.4401	X5CrNiMo17-13-3	Z6CND19.12.03	X5CrNiMo1713	F.3543	SUS316
317	AL 317L		317S16		317	1.4449	X5CrNiMo17-13				
318					318	1.4583	X10CrNiMoNb18-12	Z6CNDNb17.13B	X6CrNiMoNb17 13		
320											
321	ATI 321™	UNS S32100	321S12, 58B	2337	321	1.4541	X10CrNiTi18-9	Z6CNT18.10	X6CrNiTi18 11	F.3553;F.3523	SUS321
325											
326											
329				2324	329	1.4460	X8CrNiMo27-5	Z5CND27.05AZ			SUS329L
331											
332	ATI 332™										
334	ATI 334™				70334		X8CrNiAlTi20-20				
347	ATI 347™	UNS S34700	347S17, 58F	2338	347	1.4550	X10CrNiNb18-9	Z6CNNb18.10	X6CrNiNb18 11	F.3552;F.3524	SUS347
348	ATI 348™	UNS S34800				1.4546	X5CrNiNb18-10	Z10CrNiNb18 10			
394											
403	ATI 403™		403S17	2301	403	1.4000	X7Cr13	Z6C13	X6Cr13	F.3110	SUS403
409			409S19		409	1.4510	X6CrTi12	Z6CT12	X6CrTi12		
410	ATI 410™		410S21, 56A	2302	410	1.4006	X10Cr13	Z10C14	X12Cr13	F.3401	SUS410
416	ATI 416™		416S21	2380	41600	1.4005	X12CrS13	Z11CF13	X12CrS13	F.3411	SUS416
420	ATI 420™		420S37	2303	420	1.4021	X20Cr13	Z20C13	X20Cr13	F.5261	
425											
430	ATI 430™		430S15, 60	2320	430	1.4016	X8Cr17	Z8C17	X8Cr17	F.3113	SUS430
431			431S29, 57	2321	431	1.4057	X22CrNi17	Z15CNi16.02	X16CrNi16	F.3427	SUS431
433	ATI 433™										
434	AL 434™		434S17	2325	434	1.4113	X6CrMo17	Z8CD17.01	X8CrMo17		SUS434
441											
444	ATI 444™	UNS S44400		2326	444	1.4521		Z3CDT18 02			
452											
455	ATI 455™	UNS S45500									

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Alloyed Steels																			
	820-1050																		
	1125																		
	785																		
Stainless Steels																			
		63.7	6	21					9										
			4.0/6.0	17.0/19.0		-		1	7.5/10.0	0.15				0.06	0.03				
			9.00/11.00	14.0/16.0		0.08/1.20		0.20/1.00	5.50/7.00	0.06/0.15				0.04	0.03				
			4.00/6.50	16.5/18.5		-		1	7.00/10.0	0.07				0.06	0.03				
	700-950		7.00	17.00				1.00	2.00	0.14				0.05	0.03				
			6.0/10.0	17.0/22.0		1.5		2	2	0.2/0.4				0.05	0.05				
	500-700		10.50	19.50		0.60		2.00	1.50	0.16				0.04	0.30				
	500-700		9.00	19.50				2.00	1.50	0.08				0.04	0.04				
	490-690		11.50	18.00				1.00	2.00	0.12				0.04	0.03				
			23.0/28.0	17.0/23.0		1.5		3	2	0.5				0.05	0.05				
			9.0/11.0	16.5/18.5		1.25/1.75		1	2	0.07				0.045	0.03				
	510-710		13.00	17.00		1.50		0.75	2.00	0.08				0.04	0.03				Cu 0.5
	490-690		13.00	19.00		3.50		1.00	1.00	0.02				0.02	0.02				
	490-740		9.0 min	17.0/21.0		2.0/3.0		1.5	2	0.08				0.04	0.04				
			10.5/13.5	16.5/18.5		2.00/2.50		1	2	0.08		5C/0.80		0.045	0.03				
	500-730		9.50	18.00				1.00	2.00	0.08		0.40		0.04	0.03				
			8.0/11.0	17.0/19.0		0.7		1	2	0.12		5C/0.90		0.06	0.15/0.35				
			10.0/13.0	16.5/18.5		2.25/3.00		1	2	0.12				0.06	0.06				
	640-900		3.50	25.50		1.00				0.10				0.04	0.03				
			36.0/46.0	15.0/25.0		1.5		3	2	0.75				0.05	0.05				
			4.0/7.00	21.0/27.0		1.75/3.00		1.5	1.5	0.08				0.04	0.04				
			55.0/65.0	10.0/20.0		1.5		3	2	0.75				0.05	0.05				
	510-740		9.0/13.0	17.0/19.0				0.75	2.00	0.08				0.05	0.03				
	510-740		9.0/13.0	17.0/19.0	0.2			0.75	2.00	0.08				0.05	0.03				Ta 0.10
			8.0/10.5	17.0/19.0		-		1	2	0.07				0.045	0.03				Cu 3.00/4.00
	400-600		0.50	12.00				0.50	0.50	0.15				0.02	0.01				
			1	10.5/12.5		-		1	1	0.08		6C/1.0		0.04	0.03				
	450-650		1.00	12.00		0.50		0.50	0.50	0.15				0.02	0.01				Cu 0.5
	590-780		1.00	13.00		0.60		1.00	1.25	0.15				0.07	0.07				
	750-950		1.00	12.50				1.00	1.00	0.20				0.04	0.04				
			3.5/4.5	11.5/14.0		0.40/1.0		1	1	0.06				0.04	0.03				
	450-650		1.00	16.00				1.00	1.00	0.08				0.04	0.03				
	950		2.00	16.00				1.00	1.00	0.20				0.04	0.03				
79HRB	510	78	0.25	20.00				0.39	0.30	0.01				0.02	0.00			0.50	Nb 0.8
	450-650		1.00	17.00		0.75				0.08									
			2.0/3.0	15.0/18.0		0.6		1	1.5	0.12/0.20				0.04	0.03				
80HRB	500		0.5	18.2		1.9		0.45	0.3	0.013		0.13		0.03	0.002				
			4	25.0/30.0		1.5		2	1	1.0/2.0				0.05	0.05				
40-49HRC	1270-1650		7.5/9.5	11.0/12.5		0.5		0.5	0.5	0.05		0.8/1.4		0.04	0.03			1.5/2.5	

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Materials Cross Reference Chart

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Stainless Steels											
610	ATI 610™	UNS S30600									
611	ATI 611™	UNS S30601									
0Cr19Ni9											
1Cr12Ni3Mo2VN-5											
201LN	ATI 201LN™-MIL	UNS S20153									
304 L	ATI 304L™		304S11	2352	304L	1.4306		Z2CN1810	X2CrNi18 11		
304 LN			304S62	2371	304LN	1.4311	X2CrNiN18-10	Z2CN18.10	X2CrNiN1811		SUS304LN
316 L	ATI 316L™	UNS S31603 & S31673	316S13	2348	316L	1.4404	X2CrNiMo18-12	Z2CND17.12	X2CrNiMo17 12		SCS16;SUS316L
316 LN	ATI 316LN™		316S63	2375	316LN	1.4429	X2CrNiMoN18-13	Z2CND17.13			SUS316LN
316 LXN	AL 316LXN					1.4429	X2CrNiMoN17-13-3	Z2CND17 13	X2CrNiMoN17-13-3		
316 Ti	ATI 316Ti™		320S31		316Ti	1.4571	X8CrNiMoTi17-12-2		X6CrNiTi18 11	F.3535	
316L (S+Cu)							X2CrNi-Mo17-12-2+S+Cu				
316L Decolletage							X2CrNiMo17-12-2 improved				
317 L	ATI 317L™	UNS S31703	317S12	2367	317L	1.4438	X2CrNiMo18-16	Z2CND19.15	X2CrNiMo18 16		SUS317L
321 H							X8CrNiTi18-10				
403Cb					403Cb						
403Cb+						1.4914	X19CrMoVNb11-1	Z20CDNbV11			SUH600
409 Cb	ATI 409Cb™										
409 HP	ATI 409HP™	UNS S40930									
410 S	ATI 410S™	UNS S41008									
420 F		UNS S42020	420S45	2304	420F	1.4028	X30Cr13	Z29CF13 / Z40C14	X40Cr14	F.3404 / X40Cr13	SUS420J2
430 F				2383	430F	1.4104	X12CrMoS17	Z10CF17	X10CrS17	F.3117	SUS430F
431 (HT)					431	1.4057	X17CrNi16-2				
436 S	ATI 436S™										
439 HP	ATI 439 HP™	UNS S43035									
440 A	ATI 440A™					1.4109	X70CrMo15				
440 C	ATI 440C™				440C		X105CrMo17	Z100CD17	X102CrMo17KU		SUS 440C
441 HP	ATI 441 HP™										
904 L	ATI 904L™	UNS N08904		2562		1.4539	X1CrNiMoCu25-20-5				
A286	A286 Altemp®	UNS S66286	HR5152		ASTM 638		X5NiCrTi26-15	Z06NCT25			
AL 29-4C	AL 29-4C®	UNS S44735									
AL-6XN	AL-6XN®	UNS N08367									
AL-6XN Plus	AL-6XN Plus®	UNS N08367									
AM 350	AM 350®										
Bioline 4C27A					420F						
CF-8			304C15	2333	CF-8	1.4308	X6CrNi18-9	Z6CN18.10M			SCS13
CF-8M			316C6 ANC4B	2343	CF-8M	1.4408	X6CrNiMo18-10		X2CrNiMoN17-12	F.8414-AM-X7CrNi-Mo20-10	SCS14
Custom 465											
Datalloy 2	ATI Datalloy 2®										
Duplex 2003	ATI 2003®	UNS S32003									
Duplex 2102	ATI 2102®	UNS S80211									

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Stainless Steels																			
HRB86	560	58.9/65.3	14/15.5	17/18.5		2		3.7/4.3	2	0.018				0.02	0.02			0.5	
HRB91	620	58/60	17/18	17/18.5		0.2		5.0/5.6	0.5/0.8	0.015				0.03	0.013			0.35	
			9.00	19.00															
			3.00	12.00		2.00													
217-241HB	840	67.7	5.5	18				1	7.5	0.15				0.06	0.03				
	460-680		10.00	19.00				0.50	1.00	0.02				0.02	0.02				
	550-760		10.00	18.00				1.00	2.00	0.03				0.05	0.03				
	490-690		12.00	17.00		2.50		0.50	1.00	0.02				0.02	0.02				
	490-600		12.00	17.00		2.50		0.50	1.00	0.02				0.02	0.02				Nitrogene 0.14
	580-800		13.00	17.50		2.75		1.00	2.00	0.03				0.05	0.03				
	500-730		12.00	17.50		2.25		1.00	2.00	0.08		5.00		0.05	0.03				
	600-980																		
	600-980																		
HB217	900	63	11.0/15.0	18.0/20.0		3.0/4.0		0.75	2.00	0.03				0.04	0.03				
			9.0/12.0	17.0/19.0		-		1	2	0.04/0.10		5C/0.80		0.04	0.03				
	800-950		0.50	12.00				0.35	0.50	0.14									Nb 0.18
	930-1080		0.55	11.10		0.60		0.35	0.70	0.17									V 0.3 Nb 0.28
84-97HRB	700	86	0.25	12.3		0.04		0.35	0.35	0.15	0.1	0.005		0.025	0.005				Nb 0.45
71HRB	430																		
75HRB	450	87	0.60	12.00				1.00	1.00	0.08				0.04	0.03				
300-500HB	1050-1300			12/14		0.60		1.00	1.25	0.15				0.06	0.15				
	640-840		1.00	17.00		0.50		1.00	1.25	0.12				0.06	0.15				
45/56HRc	1270-1650																		
			-	16.0/18.0		0.75/1.25		1	1	0.12				0.04	0.03				
	568-818	81	0.23	17.0/19.0				0.55	0.45	0.012		0.4		0.02	0.001				
31-54HRC	1000-1800	81	0.5	16.0/18.0		0.75		1	1	0.07				0.04	0.03				
		82		16.5						1									
HRB82	520	79	0.3	18				0.34	0.35	0.009	0.05	0.29		0.023	0.002				Nb 0.71
	620		24.50	20.50		4.50		0.50	1.60	0.02				0.04					Cu 1.5
	620		25.00	14.50		1.25		0.20	0.20	0.04		2.10		0.02	0.00				
90HRB	610	65	0.3	29		4		0.35	0.5	0.02				0.03	0.01				Nb 0.6
183HB	600	48	24	20.5		6.3		0.4	0.4	0.02								0.2	N 0.22
183HB	600	45	25.3	21.8		6.7		0.3	0.3	0.02				0.02				0.2	N 0.24
	1175		4.30	16.50		2.80		0.30	0.80	0.09				0.02					
350-575HV	1130-1860	82.4	< 0.8	13		1.2		0.6	1.6	0.22				0.03	0.18				
	440-640																		
	440-640																		
	1300-1700		10.8/11.3	11/12		0.8/1.2						1.5/1.8							
300-350HB	1100		2.30	15.30		2.10		0.30	15.10	0.03									N 0.4
31HRC	1000	73.8	3.5	21		1.7													
246HB	800		1.5	22		0.55		0.75	2.5	0.03				0.04	0.02			0.4	

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Materials Cross Reference Chart

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Stainless Steels											
Duplex 2205	ATI 2205™	UNS S31803 & S32205			ASTM A240						
Duplex 2304	ATI 2304™	UNS S32304									
Duplex 255	ATI 255™	UNS S32550									
Duplex F51			318S13	2377	F51	1.4462	X2CrNiMoN22-5-3	Z2CND22.05.03			
Duplex F55											
Duplex LDX2101											
E-Brite Alloy	ATI E-BRITE®				ASTM B625						
FV607	ATI FV607™										
H46	ATI H-46™										
Jethete M152	ATI Jethete™ M152	UNS S64152			5718.9	1.4939	X12CrNiMoV12-3	Z12CND12			
Jethete M448											
Jethete X19							X19CrMoNbVN11-1				
Jethete X20						1.4923	X21CrMoV12-1	Z21CDV12			
Nitronic 50											
Nitronic 60											
REX 734	ATI REX 734™	UNS S31675			ASTM F1586						
S240	ATI S240®										
Staballoy AG17	ATI Staballoy® AG17®										
Staybrite® 4435NCu							X2CrNi18-13-3				
Super duplex 2507							X2CrNiMoCuN25-6-3				
Super Duplex 4565	ATI 4565™	UNS S34565									
Super Duplex Zeron 100	Zeron® 100				ASTM 32760						
Uranus 35N		UNS S32304					X2CrNiN23-4				
Uranus 45N+		UNS S31803		2377		1.4462	X2CrNiMoN22-5-3	Z3CND2205Az			
Uranus 45N22CrMo							X2CrNiMoN22-5-3				
Uranus 47N+							X2CrNiMoN25-6-3				
Uranus 52N+							X2CrNiMoCuN25-6-3				
Uranus 65							X1CrNi25-21				
Uranus B25 6Mo							X1NiCrMoCuN20-18-7				
Uranus B26 6Mo		UNS N08926					X1NiCrMoCuN25-20-7				
Uranus B28		UNS N08028					X1NiCrMoCu31-27-4				
Uranus B6	ATI 904L™	UNS N08904		2562		1.4539	X1NiCrMoCuN25-20-5				
Uranus B66							X1NiCrMoCu22-24-6				
Uranus S1 4%Si		UNS S30600					X1CrNiSi18-15-4				
X12CrNiMoS18-11						1.4427	X12CrNiMoS18-11	Z3CNDF17.13			
X12CrNiWTi16-3							X12CrNiWTi16-3				
X17CrNi16-02						1.4057	X17CrNi16-02				
X20CrNi17-2							X20CrNi17-2				
X20CrNiMo22-5-3							X20CrNiMo22-5-3				
X20CrNiMoS13-1							X20CrNiMoS13-1				
X22CrMoV12.1	ATI FV448™				ASTM A437-76 Grade B4B		X22CrMoV12-1 = ST12T				
X2CrNiMo18-15-3							X2CrNiMo18-15-3				
X30Cr13							X30Cr13				
X30CrMoN15-1			420S45	2304		1.4028	X30CrMoN15-1	Z33C13			
X3CrNiCuTiNb12-9							X3CrNiCuTiNb12-9				

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Stainless Steels																			
	1000	68.9	5.8	22		3.3													
	950		4.50	22.50				1.00	2.00	0.03				0.04	0.02				
HRC32	1000	57.0/64.0	4.5/6.5	24.0/27.0		2.9/3.9		1	1.5	0.04				0.04	0.03			1.5/2.5	
225-290HB	900	72.6	4.5/6.5	21.0/23.0		2.50/3.5		1	2	0.03				0.035	0.015				
335HB	1100	58.7	4.5/6.5	24.0/26.0		3.0/4.0	0.08/0.2	1	2	0.03				0.03	0.02				N 2.5/3.5
248HB	850																		
	550			26.00		1.00				0.00									
290-349HV	930-1130		0.62	11.6		0.89		0.4	0.77	0.13									
304HB	1050	86	0.60	11.00		0.75		0.45	0.65	0.16				0.01	0.01			0.20	
	1100		2.60	16.80		1.80		0.18	0.70	0.12				0.03	0.02				
	> 930		1.00	10.50		0.60		0.40	1.00	0.13									Nb 0.4
	980		0.40	10.80		0.70		0.30	0.60	0.20									
			0.60	11.80		1.00		0.30	0.60	0.20									
260HB	860		13.50	23.50		3.00		1.00	6.00	0.06									
260HB	860		9.00	18.00		0.75		4.50	9.00	0.10									
22HRC	780	62	10.00	20.80		2.50		0.38	3.12	0.04				0.01	0.01			0.12	
32-34HRC	1070	69.2	10.75	12.5		1.75	1.5	0.25	0.25	0.03	1.5	0.7		0.01	0.01			1.5	
			0.50	17.00		0.05		0.30	20.00	0.03									N 0.5
	490-690		13	18		2.5		0.7	1.3	0.02								0.5	N 0.12
			7.50	25.00		4.00		0.70	2.00	0.03					0.02			2.50	
180HB	600		16.0/18.0	23.0/25.0		4.0/5.0			5.0/7.0	0.03									
284HB	1000		7	25		3.5		0.75	1	0.05				0.03	0.01			0.75	W 0.75
220HB	770	69.5	3.5/5.5	22.0/24.0		0.10/0.60		1	2	0.03				0.035	0.015				Cu 0.10/0.60
225HB	800	67.8	6	22.6		3.4				0.02					0.001				
225HB	800	72.6	4	23		2		1	2	0.03				0.035	0.015				
28HRC	1000	64.6	6.5	25		3.6				0.03									
28HRC	1000	63	6.5	25		3.5				0.03								1.5	
155HB	600	52.5	20.5	25		0.3			2	0.015									
230HV	810	55	18	20		6.1				0.01					0.001			0.7	
220HV	800	47	25	20.5		6.3				0.01					0.001			1	
300HB	1050	37.4	31	27		3.5		0.7	2	0.02				0.03	0.01			1	
200HB	620		24.50	20.50		4.50		0.50	1.60	0.02				0.04				1.5	
240HB	840	41.1	22	24		6	2		3									1.5	
		64.5	14.5	17				4		0.015									
	750-1000																		
			13.50	16.00				0.50	1.00	0.15		0.50		0.05	0.03				
296HB	950		1.5-2.5	16				1	1.5	0.12-0.22				0.04	0.03				
	750-950		2.00	17.00				0.80	0.80	0.20				0.04	0.03				
			5.00	22.00		3.00													
	1500																		
	980		0.60	11.80		1.00		0.30	0.60	0.21				0.04	0.04				
	900-1150																		
	1000		1	13				1	1	0.26-0.35				0.04	0.03				
53-57HRc																			
	1300-1700																		

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Stainless Steels											
X40CrMoVN16-2			420S25		ASTM F899	1.4123	X40CrMoVN16-2	Z40CDV16.02			
X46CrS13							X46CrS13				
X4CrNiMo16-5-1						1.4418	X4CrNiMo16-5-1	Z8CND17.04			
X8CrCoNiMo10-6	ATI FV535™										
X8CrMnMoN23-21-1							X8CrMnMoN23-21-1				
X8CrNiSCu18-9							X8CrNiSCu18-9				
X90CrMoV18							X90CrMoV18				
XM19	ATI XM-19™	UNS S20910			ASTM F1314						
Stainless Steel Refractory PH											
13-8PH	ATI 13-8Mo™	UNS S13800									
15-5PH	ATI 15-5™	UNS S15500				1.454	X4CrNiCuNb16.4	Z6CNU15.05			
15-7PH	ATI 15-7™					1.4532	X7CrNiMoAl15.7	Z8CNDA15.07			
17-4PH	ATI 17-4™	UNS S17400				1.4542	X5CrNiCuNb17-4 = 0Cr17Ni4Cu4Nb	Z6CNU17.04			
17-7PH	ATI 17-7™		316S111		177PH	1.4568/1.4504	X7CrNiAl17.7	Z8CNA17.07	X2CrNiMo17 12		
309	ATI 309™		309S24		309	1.4828	X15CrNiSi20-12	Z15CNS20.12			SUH309
309 S			309S24		309 S	1.4833	X7CrNi23-14	Z20CN24-13	X6CrNi23-14		SUS309S
310 S	ATI 310S™		310S24	2361	310S	1.4845	X12CrNi25-20	Z12CN25.20	X6CrNi25 20	F.331	SUH310
314			314		30314	1.4841	X15CrNiSi25-20				
330			NA17		330	1.4864	X12NiCrSi36-16	Z12NCS35.16			SUH330
405	AL 405		405S17		405	1.4724	X10CrAl13	Z10C13	X6CrAl112	F.311	SUS405
446				2322	446	1.4762	X10CrAl24	Z10CAS24	X16Cr26		SUH446
B163			NA15(H)		B163	1.4876	X10NiCrAlTi32-20	Z10NC32.21		F.3314-X10NiCrAl-Ti32-20	NCF800(TP)
EV8			349S54		EV8	1.4871	X53CrMnNiN21-9	Z52CMN21.09	X53CrMnNiN21-9	F.3217-X53CrMn-NiN21-09	SUH35 / SUH36
HK			310C40 / 310C45		HK	1.4848	X40CrNiSi25-20		GX40CrNi26-20	F.8452-AM-X40Cr-Ni2520	SCH21 / SCH22
HNV3			401S45		HNV3	1.4718	X45CrSi9-3	Z45CS9	X45CrSi8	F.3220-X4SCrSi09-03	SUH1
X10CrAl18						1.4742	X10CrAl18	Z10CAS18	X8Cr17	F.3153-X10CrAl18	SUH21
X40CrSiMo10-2						1.4731	X40CrSiMo10-2	Z40CSD10		F.3221-X40CrSi-Mo10-02	SUH3
X40NiCrSi38-18			330C11 / 330C40 / 331C40			1.4865	X40NiCrSi38-18		GX50NiCr39-19		SCH15 / SCH16
X45CrNiW18-9						1.4873	X45CrNiW18-9	Z35CNWS14.14	X45CrNiW18-9	F.3211-X45CrNi-SiW18-09	SUH31

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Stainless Steels																			
58HRc																			
55HRc																			
	1200		6.00	15.50		1.50		1.00	1.50	0.05				0.04	0.02				
34HRC	1070		0.2-0.8	9.8-11.2		0.5-1.0	0.7	0.1-0.7	0.6-1.15	0.06-0.11									
	1300																		
	500-700																		
60HRC																			
90HRB	600	57	12.00	22.00		2.30		0.50	5.00	0.03				0.02	0.02				
Stainless Steel Refractory PH																			
	1300		8.00	13.00		2.20		0.10	0.20	0.05				0.01	0.01				
	<1400		4.50	14.80				0.50	0.50	0.03				0.02	0.02			3.50	
	<1620		7.00	15.00		2.50		0.50	0.50	0.05				0.02	0.02				
	<1380		4.00	16.30				0.50	0.50	0.04				0.02	0.02			4.00	
	<1560		7.00	17.00				0.50	0.50	0.05				0.02	0.02				
	500-750		14.00	23.50				2.00	1.50	0.20				0.04	0.04				
	500-700																		
	500-750		20.50	25.00				0.75	2.00	0.15				0.05	0.03				
			19.0/22.0	23.0/26.0		-		1.50/3.00	2.5	0.25				0.045	0.03				
	390-590		38.00	18.80				1.75	1.00	0.40				0.05	0.03				
	450-650		0.50	12.00				0.50	1.00	0.08				0.04	0.03				
	520-720			25.00				1.00	1.00	0.12				0.04	0.03				
	450-680																		
	950-1300																		
	440-640																		
	900-1100																		
	500-700																		
	130-1100																		
	400-600																		
	800-1300																		

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Gray Iron											
GG-30 / EN-GJL-300			Grade 300	130-00	A48-45B	0.6030	GG-30	Ft30D	G30	FG30	FC30
GG-35 / EN-GJL-350			Grade 350	135-00	A48-50B	0.6035	GG-35	Ft35D	G35	FG35	FC35
GG-40 / EN-GJL-400			Grade 400	140-00	A48-55B	0.6040	GG-40	Ft40D			
GG10 / EN-GJL-100			Grade 100	110-00	A48-20B	0.6010	GG10	Ft10D	G10	FG10	FC10
GG15 / EN-GJL-150			Grade 150	115-00	A48-25B	0.6015	GG15	Ft15D	G15	FG15	Fc15
GG20 / EN-GJL-200			Grade 200	120-00	A48-30B	0.6020	GG20	Ft20D	G20	FG20	FC20
GG25 / EN-GJL-250			Grade 250	125-00	A48-35B	0.6025	GG25	Ft25D	G25	FG25	FC25
Spheroidal-Ductile Iron											
GGG--40Mo0.5			500/7	0727-02	65-45-12	0.7050	GGG-50	FGS 500-7	GS 500/7	FGE 50-7	FCD 50
GGG--SiMo3.08											
GGG--SiMo4.10											
GGG--SiMo5.10											
GGG-35.3 / EN-GJS350-22				0717-15		0.7033	GGG-35.3				
GGG-40 / EN-GJS400-1			420/12	0717-02	60-40-18	0.7040	GGG-40	FGS 400-12	GS 400-12	FGE 38-17	FCD 40
GGG-50 / EN-GJS500-7											
GGG-60 / EN-GJS600-3			600/3	0732-03	80-55-06	0.7060	GGG-60	FGS 600-3	GS 600/3		FCD 60
GGG-70 / EN-GJS700-2			700/2	0737-01	100-70-03	0.7070	GGG-70	FGS 700-2	GS 700-2	FGS 70-2	FCD 70
GGG-80 / EN-GJS800-2			800/2		120-90-02	0.7080	GGG-80	FGS 800-2	GS 800-2		
GGG-Ni22 / EN-GJSAXNi22			S-Ni 22		A 439 Type D-2C	0.7670	GGG-Ni22	S-N 22			
GGG-Ni35 / EN-GJSAXNi35			S-Ni 35		A 439 Type D-5	0.7683	GGG-Ni35	S-N 35			
GGG-NiCr20.3			S-NiCr 20 3		A 439 Type D-2B	0.7661	GGG-NiCr20.3	S-NC 20 3			
GGG-NiCr202 / EN-GJSAXNiCr20-2			S-NiCr 20 2		A 439 Type D-2	0.7660	GGG-NiCr20.2	S-NC 20 2			
GGG-NiCr30.1			S-NiCr 30 1		A 439 Type D-3A	0.7677	GGG-NiCr30.1	S-NC 30 1			
GGG-NiCr303 / EN-GJSAXNiCr30-3			S-NiCr 30 3		A 439 Type D-3	0.7676	GGG-NiCr30.3	S-NC 30 3			
GGG-NiCr353 / EN-GJSAXNiCr35-3			S-NiCr 35 3		A 439 Type D-5B	0.7685	GGG-NiCr35.3	S-NC 35 3			
GGG-NiCrNb20.2						0.7659	GGG-NiCrNb20.2				
GGG-NiMn13.7			S-NiMn 13 7			0.7652	GGG-NiMn13.7	S-NM 13 7			
GGG-NiMn234 / EN-GJSAXNiMn23-4			S-NiMn 23 4		A 571 Type D-2M	0.7673	GGG-NiMn23.4	S-NM 23 4			
GGG-NiSi3055 / EN-GJSAXNiSi-Cr30-5-5			S-NiSiCr 30 5 5		A 439 Type D-4	0.7680	GGG-NiSiCr30.5.5	S-NSC 30 5 5			
GGG-NiSiCr20.5.2			S-NiSiCr 20 5 2			0.7665	GGG-NiSiCr20.5.2	S-NSC 20 5 2			
GGG-NiSiCr30.5.2						0.7679	GGG-NiSiCr30.5.2				
GGG-NiSiCr35.5.2						0.7688	GGG-NiSiCr35.5.2				
Malleable Iron											
GTS-35-10 / MN35-10			B 340/12	815	32510	0.8135	GTS-35-10	MN 35-10			
GTS-45-06 / MN450-6							GTS-45-06	MN450-6			
GTS-55-04 / MP50-5								MP50-5			
GTS-65-02 / MN650-3			P 570/3	858	70003	0.8165	GTS-65-02	MN650-3			
GTS-70-02 / MN700-2			P 690/2	862	A220-80002	0.8170	GTS-70-02	MN700-2	GMN 70		
GTW-35-04						0.8035	GTW-35-04				
GTW-40-05						0.8040	GTW-40-05				
GTW-45-07						0.8045	GTW-45-07				

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Gray Iron																			
230HB	760																		
235HB	770																		
250HB	810																		
175HB	570																		
185HB	620																		
205HB	660																		
220HB	730																		
Spheroidal-Ductile Iron																			
150-200HB	660																		
200-250HB	810																		
200-250HB	810																		
200-250HB	810																		
150-180HB	600																		
155-220HB	730																		
190-255HB	820																		
200-260HB	840																		
240-300HB	970																		
265-300HB	970																		
130-170HB	570																		
130-180HB	600																		
	390																		
140-200HB	660																		
	370																		
140-200HB	660																		
140-190HB	630																		
	370																		
	390																		
120-170HB	570																		
170-240HB	780																		
	370																		
	380																		
	370																		
Malleable Iron																			
150HB	350-500																		
175HB	580																		
205HB	670																		
230HB	650-880																		
265HB	700-950																		
	340-740																		
	360-740																		
	400-740																		

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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

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Aluminum & Alloys <16% Si											
1050			1B			3.0255	Al99,5	A5	4507		
1070						3.0275	Al99,7		4508		
1080			1A			3.0128	Al99,8	A8	4509		
1100											
2011			FC1		2011	3.1655	AlCuBiPb	A-U5PbBi	6362		
2014			H15			3.1255	AlCuSiMn	A-U4SG	3581		
2017					2017	3.1325	AlCuMg1	A-U4G	3579		
2024			L97		2024	3.1355	AlCuMg2	A-U4G1			
2117											
2218							AlCuMgNi2				
2224											
3003						3.0517	AlMnCu	A-M1	3568		
3004						3.0526	AlMn1Mg1	A-M1G			
3005						3.0525	AlMn1Mg0.5	A-MG0.5			
3103			N3			3.0515	AlMn1		7780		
3105											
5005			N41		5005	3.3315	AlMg1	A-G0,6	5764-66		
5052			2L56		5052	3.3523	AlMg2,5	A-G2,5C	4574		
5056			N6		5056	3.3555	AlMg5	A-G5	3576		
5083			N8		5083	3.3547	ASIMg4,5Mn	A-G4,5MC	7790		
5086						3.3545	AlMg4Mn				
5154			N5			3.3535	AlMg3,5	A-G3	3575		
5251			N4			3.3525	AlMg2Mo3	A-G2M	3574		
5454			N51		5454	3.3537	AlMg2,5Mn	A-G2,5MC	7789		
5657							AlMg0,8Si				
5754			N5		5754	3.3535	AlMg3	A-G3M	3575		
6061			H20					A-GSUC	6170		
6063			H9		6063	3.3206	AlMgSi0,5	A-GS	3569		
6070											
6151											
6262											
6351			H30		6351	3.2315	AlMgSi1	A-SGM0,7	3571		
6463			91E			3.3207	EAlMgSi0,5		3570		
7001											
7003											
7020			H17			3.4335	AlZn4,5Mg1	A-Z5G	7791		
7022						3.4345	AlZnMgCu0,5				
7050											
7075			DTD5074		7075	3.4365	AlZnMgCu1,5	A-Z5GU	3735		
7175								AS5U3			
7178											
7475											
AS7G							AlSi7Mg				
Aluminum & Alloys >16% Si											
4032											

Material Guide – Key to Recommended Inserts

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Materials Cross Reference Chart

Aluminum & Alloys

Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Aluminum & Alloys <16% Si																			
	105	0.4		-				0.25	0.5		99.50min	-				0.05	0.05	0.05	-
	100	0.25						0.25	0.03		rem	0.03				0.03	0.04	0.04	
	100	0.15						0.25	0.02		rem	0.03				0.02	0.03	0.03	
	90	Si+Fe1.0max		-					0.05		99.00min	-				-	0.1	0.05~0.20	-
	310	0.7		-				0.4	-		rem	-				-	0.3	50.~60.	Pb,Bi 0.2~0.6
	430	0.7		0.1				0.5~1.2	0.4~1.2		rem	0.15				0.2~0.8	0.25	3.9~5.0	-
	390	0.7		0.1				0.2~0.8	0.4~1.0		rem	0.15				0.4~0.8	0.25	3.5~4.5	-
	465	0.5		0.1				0.5	0.3~0.9		rem	0.15				1.2~1.8	0.25	3.8~4.9	-
	296	0.7		0.1				0.8	0.2		rem					0.2-0.5	0.25	2.2-3.0	
	331	1	1.7~2.3	0.1				0.9	0.2		rem	-				1.2~1.8	0.25	3.5~4.5	
		0.15		0.1				0.12	0.30~0.9		rem	0.15				1.2~1.8	0.25	3.8~4.4	-
	140	0.7		-				0.6	1.0~1.5		rem	-				-	0.1	0.05~0.20	-
	200	0.7						0.3	0.51-1.0		rem					0.8-1.3	0.25	0.25	
	165	0.7		0.1				0.6	1.0-1.5		rem	0.1				0.2-0.6	0.25	0.3	
		0.7		0.1				0.5	0.9-1.5		rem	0.1+Zr				0.3	0.2	0.1	
	175	0.7		0.2				0.6	0.3-0.8		rem	0.1				0.2-0.8	0.4	0.3	
	159	0.7		0.1				0.3	0.2		rem					0.5-1.1	0.25	0.2	
	260	0.4		0.15~0.35				0.25	0.1		rem	-				2.2~2.8	0.1	0.1	-
	300	0.4		0.05~0.20				0.3	0.05~0.20		rem	-				4.5~5.6	0.1	0.1	-
	335	0.4		0.05~0.25				0.4	0.4~1.0		rem	0.15				4.0~4.9	0.25	0.1	-
	300	0.5		0.05~0.25				0.4	0.20~0.7		rem	0.15				3.5~4.5	0.25	0.1	-
	269	0.4						0.45	0.1		rem					3.1-3.9	0.2	0.1	
		0.7		0.1				0.5	0.2-0.7		rem	0.1				1.6-2.2	0.25	0.25	
	276	0.4		0.05-0.2				0.25	0.5-1.0		rem	0.05-0.2				2.4-3.0	0.25	0.1	
	193	0.1						0.08	0.03		rem					0.6-1.0		0.1	
		0.4		0.3				0.4	0.5		rem	0.15				2.6-3.6	0.2	0.1	
	300	0.7		0.04~0.35				0.4~0.8	0.15		rem	0.15				0.8~1.2	0.25	0.15~0.40	-
	200	0.35		0.1				0.2~0.6	0.1		rem	0.1				0.45~0.9	0.1	0.1	-
	379	0.5		0.1				1.0~1.7	0.40~1.0		rem	0.15				0.50~1.2	0.25	0.15~0.40	-
		1		0.15~0.35				0.6~1.2	0.2		rem	0.15				0.45~0.8	0.25	0.35	-
	400	0.7		0.04~0.14				0.4~0.8	0.15		rem	0.15				0.8~1.2	0.25	0.15~0.40	Pb, Bi 0.40~0.7
	310	0.5		-				0.7~1.3	0.4~0.8		rem	0.2				0.40~0.8	0.2	0.1	-
	241	0.15		-				0.20~0.6	0.05		rem	-				0.45~0.9	0.05	0.2	-
		0.4		0.18~0.35				0.35	0.2		rem	0.2				2.6~3.4	6.8~8.0	1.6~2.6	-
	400	0.35		0.2				0.3	0.3		rem	0.2				0.50~1.0	5.0~6.5	0.2	Zr0.05~0.25
		0.4		0.1-0.35				0.35	0.05-0.5		rem					1.0-1.4	4.0-5.0	0.2	Zr0.08-0.2
		0.5		0.1-0.3				0.5	0.1-0.4		rem					2.6-3.7	4.3-5.2	0.5-1.0	
	530	0.15		0.04				0.12	0.1		rem	0.06				1.9~2.6	5.7~6.7	2.0~2.6	Zr0.08~0.15
	570	0.5		0.18~0.28				0.4	0.3		rem	0.2				2.1~2.9	5.1~6.1	1.2~2.0	-
	590	0.2		0.18-0.28				0.15	0.1		rem	0.1				2.1-2.9	5.1-6.1	1.2-2.0	
	600	0.5		0.18~0.35				0.4	0.3		rem	0.2				2.4~3.1	6.3~7.3	1.6~2.4	-
	565	0.12		0.18~0.25				0.1	0.06		rem	0.06				1.9~2.6	5.2~6.2	1.2~1.9	-
50/90HB	250																		
Aluminum & Alloys >16% Si																			
	379	1	0.5~1.3	0.1				11.0~13.5	-		rem	-				0.8~1.3	0.25	0.5~1.3	

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Materials Cross Reference Chart

Aluminum & Alloys / High Temp. Alloys

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
Aluminum Lithium											
2050											
2090											
2091											
2094											
2095											
2097											
2098											
2099											
2195											
2196											
2197											
2198											
2199											
2297											
2397											
8017											
8024											
8090											
8091											
8093											
HTA Iron Based Alloys											
20CB-3	AL 20				ASTM B463						
21-6-9	AL 40				ASTM A666						
AL 4750	AL 4750				ASTM B753						
Armco 18											
Armco 20-45-5											
RA 330					5592, 5716						
Crucible A-286	ATI A286™	UNS S66286	HR 5152		ASTM 368	1.4980	X5NiCrTi2515	Z06 NCT 25			
Discaloy 16/25/6					5725			Z3NCT25			
Discaloy 24					ASTM A638			Z3NCT25			
Greek Ascoloy	AL 418™				5508						
Haynes 556					5768		X12CrCoNi2120	Z12CKND-WNb21.20.20			
Incoloy 800	ATI 800™	UNS N08800	3082.76		ASME SB409		X10NiCrAlTi3220	Z10NC3221			
Incoloy 801		UNS N08801			5552	1.4868	G.X50CrNi3030	Z5NCT3220			
Incoloy 802								Z4NC3221			
Incoloy 803											
Incoloy DS			3072.76				X12NiCrSi3616				
Invar 36	ATI 36™	UNS K93600 K93603			ASTM F1684						
Invar 42	AL 42™				ASTM F30						
Maraging C200	ATI VascoMax® C-200	UNS K92810									
Maraging C250	ATI VascoMax® C-250	UNS K92890			6501, 6512, 6520			Z2NKD18.8			
Maraging C300	ATI VascoMax® C-300	UNS K93120			6514						
Maraging C350	ATI VascoMax® C-350										
Maraging T200	ATI VascoMax® T-200										

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Hardness HRB HRC HB	Rm N/mm^2	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
Aluminum Lithium																			
	520			0.05				0.08	0.20-0.50		rem	0.1	0.70-1.30			0.20-0.60	0.25	3.20-3.90	Zr0.25
	510			0.05				0.1	0.05		rem	0.15	1.90-2.60			0.25	0.1	2.40-3.0	Zr0.08-0.15
	400			0.1				0.2	0.1		rem	0.1	1.70-2.3			1.10-1.90	0.25	1.80-2.50	Zr0.04-0.16
								0.12	0.25		rem	0.1	0.70-1.40			0.25-0.80	0.25	4.40-5.20	Zr0.04-0.18
								0.12	0.25		rem	0.1	0.70-1.40			0.25-0.80	0.25	3.90-4.60	Zr0.04-0.18
								0.12	0.10-0.60		rem	0.15	1.20-1.80			0.35	0.35	2.50-3.10	Zr0.08-0.16
								0.12	0.35		rem	0.1	0.80-1.30			0.25-0.80	0.35	3.20-3.80	Zr0.04-0.18
								0.05	0.10-0.50		rem	0.1	1.60-2.00			0.10-0.50	0.40-1.00	2.40-3.00	Zr0.05-0.12
								0.12	0.25		rem	0.1	0.08-0.16			0.25-0.80	0.25	3.70-4.30	Zr0.08-0.16
								0.12	0.35		rem	0.1	1.40-2.10			0.25-0.80	0.35	2.50-3.30	Zr0.04-0.18
								0.1	0.10-0.50		rem	0.12	1.20-1.70			0.25	0.05	2.50-3.10	Zr0.08-0.15
				0.05				0.08	0.5		rem	0.1	0.80-1.10			0.25-0.80	0.35	2.90-3.50	Zr0.04-0.18
								0.05	0.10-0.50		rem	0.1	1.40-1.80			0.050-0.40	0.20-0.90	2.30-2.90	Zr0.05-0.12
								0.1	0.10-0.50		rem	0.12	1.10-1.70			0.25	0.05	2.50-3.10	Zr0.08-0.15
								0.1	0.10-0.50		rem	0.12	1.10-1.70			0.25	0.05-0.15	2.50-3.10	Zr0.08-0.15
								0.1	0.01-0.05		rem		0.003				0.05	0.10-0.20	
								0.1			rem		3.40-4.20						Zr0.08-0.25
	450			0.1				0.2	0.1		rem	0.1	2.20-2.70			0.60-1.30	0.25	1.00-1.60	Zr0.04-0.16
				0.1				0.3	0.1		rem	0.1	2.40-2.80			0.50-1.20	0.25	1.60-2.20	Zr0.08-0.16
				0.1				0.1	0.1		rem	0.1	1.90-2.60			0.90-1.60	0.25	1.00-1.60	Zr0.04-0.14
HTA Iron Based Alloys																			
95HRB	690	41.0	33.0	20.0		2.2		1	2	0.07									Cu 3.3
93HRB	660	62.0	6.5	21.0				1	9	0.08									No 0.3
55HRB	350	50.0	48.0	0.1	0.5	0.3			0.3	0.01				0.03	0.01				Cu 0.3
		66.0	3.7	17.2				0.47	12.5	0.06									
		25.6	46.0	20.0		2.3		1	5	0.08									Nb 0.4
		43.8	35.5	18.5				1.13	1	0.04				0.01	0.01				Cu 0.5
250HB	810	56.0	25.0	14.5		1.3		0.2	0.2	0.05	0.2	2.1							
290HB	930	50.1	25.0	16.0		6.0		0.7	1.35	0.12		0.3							Nb 0.4
280HB	900	54.3	26.0	13.5		2.7		0.8	0.9	0.04	0.1	1.7							
300HB	970	80.0	2.0	12.0		0.2	2.5	0.3	0.4	0.15									
260HB	840	29.0	20.0	21.0	20.0	3.0	2.5	0.4	1.5	0.1	0.3								Nb + Ta
184HB	630	44.5	32.5	21.0				0.5	0.75	0.05	0.37	0.37			0.007				Cu 0.37
180HB	600	45.1	32.0	20.5				0.5	0.8	0.05		1.1							
180HB	600	44.4	32.5	21.5				0.4	0.8	0.4									
		39.0	35.0	25.0						0.08	0.15	0.15							
180HB	600	41.7	37.0	18.0				2.3	1	0.06									
75HRB	460	62.0	36.0		0.4	0.0		0.15	0.3	0.008	0.03				0.001				
55HRB	350	58.0	41.0	0.2	0.0				0.2	0.01	0.001			0.01	0.007				
43-48HRC	1360	69.0	18.5		8.5	3.3		0.05	0.05	0.01		0.2		0.005	0.005				
48-52HRC	1590	68.0	18.5		7.8	4.8		0.05	0.05	0.02	0.1	0.4		0.005	0.005				
50-55HRC	1700	67.0	18.5		8.8	4.8		0.05	0.05	0.02	0.1	0.73		0.005	0.005				
55-60HRC	2010	63.0	18.5		12.0	4.8		0.05	0.05	0.02	0.1	1.4		0.005	0.005				
43-47HRC	1400	77.6	18.5			3.0		0.05	0.05	0.01		0.7		0.005	0.005				

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Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
HTA Iron Based Alloys											
Maraging T250	ATI VascoMax® T-250				6518, 6519, 6591						
Maraging T300	ATI VascoMax® T-300										
Marval 18											
Marval X12											
Multimet N-155					5768	1.4971		Z12CNKDW20			
Multimet N-156											
S 590					5533		X40CoCrNi2020	Z42CKNDW			
Sanicro 30							X2NiCrAlTi3220				
Super Invar 32-5											
Udimet B-250											
Udimet B-300											
W-545					AISI:665			Z8NCTDA2613			
HTA Cobalt Based Alloys											
F 1537	ATI TJA-1537 ®	UNS R31537 & R31538			ASTM F1537			CoCr28Mo			
Fe50Co50											
HS 21			3531		ASTM F-75		CoCr28Mo	KC27D5NFe			
HS 25					AISI 670		CoCr20W15Ni	KC20WN			
HS 30					5380		CoCr26Ni14Mo				
HS 31			3146		ASTM A567		CoCr25NiW	KC25NW			
HS 36							CoCr19W14NiB				
Jetalloy 209											
K13C20N126		UNS R3003 & R3008			ASTM F1058		K13C20N126Fe15D7	K13C20N126Fe15D7			
L 251											
L 605	ATI L-605™	UNS R30605			5759	2.4964	CoCr20W15Ni	KC20WN			
M 203											
M 204											
M 205											
MAR-M 247											
MAR-M 302							CoCrW10TaZrB	KC21W10Ta9			
MAR-M 322							CoCr22W9TaZrNb	KC21W9Ta			
MAR-M 509			3146.3				CoCr24Ni10WTaZrB	KC23N10W7Ta			
MAR-M 905								KC20N20Ta7			
MAR-M 918							CoCr20Ni20Ta	KC20N20Ta7			
MP159		UNS R30159									
MP35N	ATI 35N™	UNS R30035									
S 816	ALTEMP ® S 816				5534	2.4979	CoCr20Ni20W				
Stellite 1								KC33W13			
Stellite 100											
Stellite 12								KC28W8			
Stellite 151											
Stellite 188	ATI 188™							KC22N22W14Fe			
Stellite 19											
Stellite 20											
Stellite 21											
Stellite 23											

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
HTA Iron Based Alloys																			
49-52HRC	1600	76.8	18.5			3.0		0.03	0.05	0.02	0.1	1.4		0.005	0.005				
52-55HRC	1800	76.8	18.5			3.0		0.03	0.05	0.02	0.1	1.4		0.005	0.005				
50HRC	1700	68.0	18.0		8.5	5.0		0.1		0.01	0.1	0.5							
32HRC	1000	75.0	9.4	12.0		2.0		0.05	0.02	0.01	0.7	0.3							
266HB	850	32.0	20.0	21.0	20.0	3.0				0.1									
260HB	840	19.7	33.0	17.0	24.0	3.0	2.0			0.33									
270HB	870	24.9	20.0	21.0	20.0	4.0	4.0	1.25	0.4	0.43									
150HB	510	14.6	34.0	22.0				0.55	0.55	0.03	0.3	0.5							Cu 0.1
	600	62.0	31.8	0.03	5.4			0.09	0.39	0.05	0.07							.08	
470HB	1590	68.6	18.0		7.9	4.9		0.1	0.1	0.08	0.1								
470HB	1590	67.0	18.0		9.0	5.0		0.1	0.1	0.08	0.1								
280HB	900	53.0	26.0	13.3		1.8		0.8	1.5	0.08	0.15								
HTA Cobalt Based Alloys																			
41HRC	1290	0.3	0.2	28.0	64.0	6.0		0.5	0.5	0.1									N 0.2
1050HV																			
		1.0	3.0	27.0	62.0	5.0		0.6	0.6	0.2		0.3							
		3.0	10.0	20.0	48.0		15.0	2.0	1.5			0.1							
		1.0	16.0	24.0	51.4	6.0		0.6	0.6			0.4							
		1.5	10.0	25.0	54.0		8.0	0.8	0.6			0.4							
		2.0	10.0	18.0	53.1		15.0		1.5			0.4							
180/230HB		1.0	10.0	20.0	52.0		15.0				2.0	0.0							
500/700HV	1450-1650																		
		1.0	10.0	19.0	55.6		14.0					0.4							
80HRB	510	0.5	10.0	20.0	52.0		15.0		1.7	0.1									
		1.0	24.5	19.5	38.0		12.0	1.0	0.8	2.2	0.7	0.1							
			24.5	18.5	43.0		12.0	1.0	1.0			0.1							
			24.5	18.5	42.0		12.0			2.8		0.1							
	800	0.5	59.0	8.3	10.0	0.7	10.0				5.5	1.0							Ta 3.0
				21.5	57.0		10.0					0.9							Ta 9.0
				21.5	60.0		9.0	0.1	0.1	1.0	0.8	1.0							Ta 4.5, Zr 2.25
		1.0	10.0	21.5	50.0		7.0	0.1	0.1		0.2	0.6							Ta 3.5, Zr 0.5
			20.0	20.0	55.0						0.5	0.1							Ta 7.5, Zr 0.1
		0.5	20.0	20.0	50.0			0.1	0.1			0.1							Ta 7.5, Zr 0.1
		9.0	25.5	19.0	35.7	7.0					0.2	3.0							Zr 0.6
28HRC	900		35.0	20.0	35.0	9.8				0.013									
		4.0	20.0	20.0	46.0	4.0	4.0	0.4	1.2			0.4							
				33.0	50.0		13.0			2.5									
				34.0	43.0		19.0			2.0									
463HB	1560	2.0	3.0	29.0	59.0		9.0			1.8									
		2.0	1.0	20.0	65.0		13.0			0.5									
		3.0	22.0	22.0	37.0		14.0			0.1									
52HRC	1800	3.0	3.0	31.0	52.0		10.5			1.7									
				33.0	45.0		18.0			2.5									
		3.0	2.5	27.0	60.0	5.5				0.3									
		2.0	1.5	25.0	65.0		5.0			0.4									

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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

Materials Cross Reference Chart

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
HTA Cobalt Based Alloys											
Stellite 25 (L605)					5759	2.4964	CoCr20W15Ni	KC20WN			
Stellite 3											
Stellite 30											
Stellite 31 (X40)			3146.2		ASTM A567		CoCr25NiW	KC25N10W7Fe			
Stellite 4											
Stellite 45											
Stellite 6								KC26NW			
Stellite 7											
Stellite 8 (F75)											
V-36							CoCr25Ni20MoWNb	KC25N20DFeWNb			
WI-52							CoCr21Mo11W	KC21W11ANbT			
X 40			3146.2		ASTM A567		CoCr25NiW	KC25N10W7Fe			
X 45								KC25N10W7Fe			
X 50											
X 63											
HTA Nickel Based Alloys											
200	ATI 200™	UNS N02200									
201	ATI 201™	UNS N02201									
718 Plus	ATI 718 Plus ®										
Allcorr	Allcorr ®										
Astroloy	ATI Astroloy™	UNS N13017						NK17C15D5AT			
Duraloy 22H											
Duraloy Super 22H											
GMR 235					AISI 686			NC15Fe10D5AT			
GMR 235-D							NiCr16MoAl	NC15D5FeAT			
Hastelloy B	ATI HB				5396A	2.48	S.NiMo30	ND27FeV			
Hastelloy B-2	ATI HB-2™	UNS N10665									
Hastelloy C		UNS N10002			5388C		NiCr17Mo17FeW	NC17DWY			
Hastelloy C-22											
Hastelloy C-276		UNS N10276				2.4819	G-NiMo30	NC15D14KFe			
Hastelloy C-4		UNS N06455									
Hastelloy G		UNS N06007						NC22Fe19D6KTa			
Hastelloy G-3		UNS N06985				2.4619					
Hastelloy N	ATI HN™	UNS N10003									
Hastelloy R235											
Hastelloy S		UNS N06635						NC15D14KFe			
Hastelloy W	ATI HW™	UNS N10004									
Hastelloy X	ATI HX™	UNS N06002	HR6, 204		5536	2.4603	NiCr22FeMo	NC22FeD			
Haynes 188	ATI 188™	UNS R30188			5772			KC22N22W14Fe			
Haynes 25		UNS R30605			5759		LW2.4964	KC20WN			
Haynes 263	ATI C-263™	UNS N07263						NC20K20D6T			
Haynes 600	ATI 600™	UNS N06600			5540	2.4816	NiCr15Fe				
Haynes 601	ATI 601™	UNS N06601			5715	2.4851					
Haynes 625	ATI 625™	UNS N06625			ASME SB443	2.4856	NiCr22Mo9Nb	NC22FeDNB			
Haynes 690	ATI 690™	UNS N06690				2.4642	NiCr29Fe	NC30Fe			
Haynes 75											
Haynes X-750	X-750 Nickelvac®	UNS N07750			5542	2.4669		NC15TNbA			

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
HTA Cobalt Based Alloys																			
350HB	1130	2.0	10.0	20.0	52.0		15.0			0.2									
450HB	1490			30.0	52.0		13.0			2.4									
		2.0	15.0	26.0	50.0	6.0				0.5									
			10.0	25.0	56.0		7.0			0.3									
47HRC	1560	3.0	3.0	31.0	53.0		14.0			1.0									
		2.0	10.5	25.0	56.0	0.5	7.5			0.3									
300HB	970	3.0	3.0	26.0	66.0		5.0			1.0									Nb 6.0
				26.0	66.0		5.0			0.4									
				20.0	63.0	6.0				0.2									
		3.0	20.0	25.0	43.2	4.0	2.0	0.4	1.0			0.3							Nb 2.0
		2.0	1.0	21.0	62.6		11.0	0.3	0.3		0.3	0.5							Nb 2.0
		2.0	10.5	25.5	53.0		7.5	0.8	0.8			0.5							
		2.0	10.5	25.5	54.7		7.0		0.7			0.3							B 0.01
		4.0	20.5	22.5	40.3		12.0					0.8							
		1.0	10.0	25.0	57.6	6.0													
HTA Nickel Based Alloys																			
45HRB	310	0.4	99.8					0.35	0.35	0.15					0.01			0.25	
45HRB	310	0.4	99.9					0.35	0.35	0.2					0.01			0.25	
42HRC	1330	9.0	53.0	19.0	9.0	2.8	1	0.01	0.35	0.06	1.6	0.75		0.02	0.01				
85HRB	550		56.0	31.0			2			0.02	0.25	0.25							Nb 0.4
40HRC	1270		55.4	15.0	17.0	5.25				0.06	4	3.5							
			50.0	30.0															
			48.0	28.0	3.0														
	620	10.0	63.3	15.5		5.2		0.4	0.2	0.15	3	2							
	620	4.5	63.0	15.5		5				0.15	3.5	2.5							
90HRB	600	5.0	62.0	1.5	2.5	28		0.05	0.5	0.02									V 0.4
90HRB	600	1.0	81.0	0.5	0.5	16		0.05	0.5	0.01				0.02	0.015				
200HB	660	6.0	54.1	15.0	2.0	17	5			0.04									
94HRB	660	3.0	56.0	22.0	2.5														
191HV	630	5.5	56.0	15.0	2.5														
	750	3.0	58.0	16.0	2.0														
		20.0	46.0	22.0	2.5														
		20.0	40.0	22.0	5.0														
80HRB	510	4.0	72.5	7.0		16.5				0.02									
		10.0	61.0	15.5	2.5	5.5				0.15	2	2.5							
61HRA	780	3.0	67.0	16.0	2.0														
94HRB	660	4.0	66.5	5.0	1.3	24.5				0.02									
80HRB	510	18.5	48.6	21.8	1.5	9	0.6			0.1									
		3.0	22.0	22.0	37.0														
	1000	3.0	10.0	20.0	bal		15		1.5	0.1									
		0.7	51.4	20.0	20.0	6				0.06	1	1.5							
85HRB	550	8.0	72.0	15.5						0.08									
65HRB	430	14.0	60.5	23.0															
95HRB	660	5.0	61.4	21.5		9				0.1									
88HRB	570	9.0	58.0	29.0				0.2	0.2	0.25					0.007				Cu 0.2
		5.0	73.7	20.0						0.12	0.25	0.4							Cu 0.5
		7.0	74.9	16.0						0.08	0.8	0.25							

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HTA Nickel Based Alloys											
IN100		UNS N13100			5397	2.4674	NiCo15Cr10MoAlTi	NK15CAT			
Incoloy 020					ASTM B463	2.4660		20CB-3			
Incoloy 804								NC29Fe25			
Incoloy 825	ATI 825™	UNS N08825	3072.76		ASME SB163	2.4858	NiCr21Mo	NC21FeDU			
Incoloy 901	ATI 901™	UNS N09901			5660	2.4662	NiFe35Cr14MoTi	Z8NCDT42			
Incoloy 903		UNS N19903					NiFe42K15Nb	Z3NK28			
Incoloy 925	ATI 925™	UNS N09925									
Inconel alloy 050											
Inconel alloy 182											
Inconel alloy 22					ASME SB575			NiMo16Cr15			
Inconel alloy 230											
Inconel alloy 600	ATI 600™	UNS N06600	3072.76		5540	2.4640	NiCr15Fe	NC15Fe			
Inconel alloy 600SP											
Inconel alloy 601	ATI 601™	UNS N06601			5715	2.4851		NC23Fe14A			
Inconel alloy 601GC											
Inconel alloy 603XL											
Inconel alloy 604											
Inconel alloy 606											
Inconel alloy 613											
Inconel alloy 617	ATI 617	UNS N06617				2.4663	NiCr23Co12Mo	NC22K12D9A			
Inconel alloy 62											
Inconel alloy 622						2.4602					
Inconel alloy 625	ATI 625™	UNS N06625			ASME SB443.4	2.4856	NiCr22Mo9Nb	NC22FeDNB			
Inconel alloy 625LCF		UNS N06626									
Inconel alloy 657											
Inconel alloy 671											
Inconel alloy 672											
Inconel alloy 686											
Inconel alloy 690	ATI 690™	UNS N06690				2.4642		NC30Fe			
Inconel alloy 691											
Inconel alloy 693											
Inconel alloy 702					5550			NC15A			
Inconel alloy 706	ATI 706™	UNS N09706			AMS 5702			NFe10C16NbT			
Inconel alloy 718	ATI 718™	UNS N07718	HR8		5383	2.4668	NiCr19Fe19NbMo	NC19FeNb			
Inconel alloy 718 DA	ATI 718-DA®										
Inconel alloy 718 OP	ATI 718-OP®	UNS N07718									
Inconel alloy 720	ATI 720™										
Inconel alloy 721								NC16Fe8TM			
Inconel alloy 722	ATI W-722™	UNS N07722			5541		NiCr16FeTi	NC16FeTi			
Inconel alloy 725											
Inconel alloy 725HS											
Inconel alloy 738											
Inconel alloy 740											
Inconel alloy 783		UNS R30783									
Inconel alloy 800	AL 800										
Inconel alloy 800H	ATI 800H™	UNS N08810									

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Stellram®
Cutting Tool Systems

Materials Cross Reference Chart

High Temp. Alloys

Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
HTA Nickel Based Alloys																			
			61.6	10.0	15.0	3				0.18	5.5	4.7							V 1.0
		38.0	34.0	20.0	2.5														Nb 0.6 Cu 3.5
		25.4	41.0	29.5				0.5	0.75	0.06	0.25	0.6							Cu 0.4
80HRB	510	29.5	42.0	21.5			3	0.5	0.65	0.03	0.2	0.9							Cu 2.25
180-300HB	600-970	34.0	44.3	12.5		6.2		0.22	0.48	0.05		2.5							
380HB	1250	41.0	39.0		15.0						0.7	1.4							Nb 3.0
32HRC	1000	25.4	45.0	21.0		3					0.3	2.1							Cu 1.8
36HRC	1130	18.0	50.0	20.0	3.0														
		7.5	66.0	16.0															
90HRB	600	2.5	58.0	22.0															
		1.0	60.0	22.0	1.0														
85HRB	550	8.0	76.0	16.0						0.075									
		8.0	77.0	15.0															
65HRB	400	14.0	61.0	24.0				0.2	0.5	0.05	1.3				0.008				Cu 0.5
77HRB	480	14.0	61.0	24.0															
			73.0	22.0															
		8.0	72.0	16.0				0.2	0.2	0.04									
		1.0	73.0	20.0															
		6.0	76.0	16.0															
180HB	600	1.0	53.0	22.0	13.0	9				0.07	1								
		8.0	74.0	15.0															
100HRB	780	2.5	58.0	22.0		14.2	3.2												
95HRB	690	4.0	61.0	22.0		9				0.05	0.3	0.3							Cb 3.7
		4.0	61.0	22.0															
		0.5	47.5	50.0															
			51.5	48.0															
			54.0	45.0															
90HRB	600	1.0	58.0	21.0															
85HRB	550	9.0	62.0	29.0				0.2	0.2	0.25					0.007				
		9.0	59.0	30.0															
		5.0	60.0	30.0															
		1.0	79.0	16.0				0.2	0.05	0.04	3.4	0.7							
40HRC	1270	37.0	42.0	16.0						0.03		1.8							Cb 2.9
42HRC	1330	18.0	54.0	18.0		3.1				0.02	0.5	0.9							Cb 5.2
40-47HRC	1560	bal	50-55	17-21	1.0	2.8-3.3		0.35	0.35	0.08	.2-.8	.65-1.15		0.015	0.015				Cb+Ta 5-5.5
38HRC	1200	18.0	54.0	18.0		3.1				0.02	0.5	0.9							Cb 5.2
43HRC	1380	14.7	58.0	18.0	14.7	3	1.25				2.5	5							
		7.0	71.0	16.0				0.15	2.25	0.07	0.1	3							Cu 0.2
34HRC	1070	7.0	74.0	16.0						0.04	0.7	2.4							
37HRC	1170	9.0	58.0	21.0		8					0.3	1.5							Nb 3.5
		9.0	58.0	21.0															
		0.5		16.0	8.5	1.8	2.6	0.3	0.2	0.17	3.4	3.4							Nb 0.9 Ta 1.8 Zr 0.1
		1.0	48.0	25.0	20.0														
34HRC	1070	26.0	28.5	3.0	34.0						5.4	0.1							Nb 0.3
86HRB	550	46.0	31.0	21.0															
70HRB	450	44.0	32.0	21.0				0.35	1	0.08	0.4	0.4		0.02	0.01			0.3	

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HTA Nickel Based Alloys											
Inconel alloy 82											
Inconel alloy 939											
Inconel alloy C-276	ATI C-276™	UNS N10276									
Inconel alloy G											
Inconel alloy G-3											
Inconel alloy HX	ATI HX™	UNS N06002					NiCr22Fe18Mo	NC22FeD			
Inconel alloy MA 6000											
Inconel alloy MA754		UNS N07754									
Inconel alloy MA758											
Inconel alloy X-750	ATI X-750™	UNS N07750			5542	2.4669	NiCr16FeTi	NC15FeTNb			
Inconel alloy X-751		UNS N07751									
Jessop G81							NiCr20Co18Ti				
M-252	ATI M-252™	UNS N07252			5551		G-NiCr19Co				
Monel 400	ATI 400™	UNS N04400	3072.76		4544	2.4360	NiCu30Fe	NU30			
Monel K500	ATI K-500™	UNS N05500	3072.76		4676	2.4375	NiCu30Al				
Monel R405		UNS N04405			4674						
Nimocast 713			HC203		5391A		G.NiCr13Al16MoNb	NC13AD			
Nimocast 80			3146								
Nimocast 90											
Nimocast PD16							NiFe33Cr17Mo				
Nimocast PE10			HC202					NC20N13			
Nimocast PK24											
Nimonic 101											
Nimonic 105			HR3			2.4634	NiCo20Cr15MoAlTi	NCKD20ATV			
Nimonic 115			HR401, 601			2.4636	NiCo15Cr15MoAlTi	NCVK15ATD			
Nimonic 75		UNS N06075	HR5, 203.4			2.4630	NiCr20Ti	NC20T			
Nimonic 80A	ATI 80 A™	UNS N07080	HR401, 601			2.4631	NiCr20TiAl	NC20TA			
Nimonic 86											
Nimonic 90	ATI N-90™	UNS N07090	HR2, 202			2.4632	NiCr20Co18Ti	Nc20ATV			
Nimonic 901	ATI 901™	UNS N09901			5660, 5661	2.4662	NiCr15MoTi	Z8NCDT42			
Nimonic 91											
Nimonic 95								NC19K18Fe5TA			
Nimonic C22	ATI 22™	UNS N06022			ASME SB575						
Nimonic C263	ATI 263™	UNS N07263	HR10			2.4650	NiCr20CoMoTi	NCK20D			
Nimonic C276	ATI 276™	UNS N10276			ASME SB575	2.4819		NiMo16Cr15			
Nimonic PE13			HR6, 204		5536E		NiCr22Fe18Mo	NC22FeD			
Nimonic PE16			HR207				NiFe33Cr17Mo	NW11AC			
Nimonic PK25					5751A	2.4666	NiCr18CoMo	NKCD20ATU			
Nimonic PK31											
Nimonic PK33			5057				NiCr20Co16MoTi	NC19KDUN			
R-235					AISI 686						
Refractaloy 26					AISI 690			Z6NKCDT38			
René 100						2.4674	NiCo15Cr10MoAlTi	NK15C10A5T			
René 104											
René 125								NK10C8W7ATaTD			
René 41	ATI Rene™ 41	UNS N07041			5712, 5713	2.4973	NiCr19Co11MoTi	NC19KDT			
René 63								NK15C14D6AWT			

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
HTA Nickel Based Alloys																			
		2.0	72.0	19.0															
			48.0	22.5	19.0														
90HRB	600	5.0	59.0	15.5	0.5	16	3.5			0.01									
		20.0	44.0	22.0	1.0														
		20.0	44.0	22.0	3.0														
90HRB	600	18.0	47.0	22.0	1.5	9	0.6												
			55.0	15.0	15.0														
29HRC	930	1.0	77.5	20.0							0.3	0.5							
320HV	1050		68.0	30.0															
32HRC	1000	7.0	72.0	16.0															
35HRC	1100	7.0	73.0	15.0				0.2	0.5	0.05	1.2	2.3			0.005				Cb 1.1 Cu 0.2
		0.5	79.3	20.0	13.0			0.2	0.5	0.08	1.5	2.5							
27-30HRC	900			18.0-20.0	9.0-11.0	9.0-10.5		0.5	0.5	0.15	0.75-1.25	2.25-2.75			0.015				
70HRB	440	1.2	66.0					0.25		0.15					0.01				
27HRC	860	1.0	66.0					0.25	0.7	0.1	2.7	0.6			0.01				
150HB	510	1.3	63.0					0.25	1	0.15									Cu 31.5
			72.6	13.5		4.5				0.12	6	0.9							
		5.0	69.9	20.0	2.0														
		5.0	52.9	20.0	18.0														
		34.0	43.8	16.5						0.06	1.2	1.2							
			56.4	20.0		6	2.5			0.03									
			61.1	9.5	15.5	9				0.17	5.5	4.7							
			48.0	24.2	19.7	1.5					1.4	3							Nb 1
320HB	1040	1.0	54.0	15.0	20.0	5		0.5	0.5	0.1	4.7	1.2							
350HB	1130	1.0	59.0	15.0	14.0	4				0.16	5	4							
170HB	570	4.0	76.0	20.0				0.45	0.45	0.45	0.1	0.35							
350HB	1130	1.5	70.0	19.5	1.0			0.2	0.55	0.08	1.4	2.4							
			65.0	25.0		10													Ce 0.03
28HRC	870	0.3	58.3	19.5	18.0					0.065	1.4	2.4							
36HRC	1130	35.6	43.0	12.5		6				0.05		2.8							B 0.015
			48.0	29.0	20.0														
		5.0	49.9	19.5	18.0			1	1	0.1	2	3.5							
85HRB	550	4.0	57.0	21.2	1.2	13.5	3	0.04	0.2	0.07				0.01					V 0.17
28HRC	870	0.7	54.9	20.0	20.0	5.85				0.06	0.45	2.15							
80HRB	510	5.0	59.5	15.5	0.5	16	3.5			0.01									
		18.5	49.0	21.8	1.5	9	0.6	0.5	0.5	0.1									
250HB	810	1.2	43.0	16.0	2.0	3.5				0.05	1.2	1.2							
			49.9	19.0	19.5	4		0.75	0.75	0.08	2.9	2.9							B 0.01
			53.0	20.0	14.0	4.5					0.4	2.3							Nb 5.0
350HB	1130	1.0	55.0	18.0	14.0	7		0.25	0.25	0.05	2.1	2							
		10.0	63.3	15.0	1.2	5.5		0.3	0.1	0.12	20	2.5							
		16.0	38.0	19.0	20.0	3.2		1	0.8	0.03	0.2	2.8							
			60.6	10.0	15.0	3				0.18	5.5	4.7							V 1.0
			52.4	11.0	20.5	3.7	2			0.04	3.4	3.6							Nb 0.9 Ta 2.4 B 0.03
			60.0	8.9	10.0	2	7			0.1	4.7	2.5							Hf 1.05 Ta 3.0
36HRC	1130	3.0	52.5	19.0	11.0	9.75				0.06	1.6	2.5							B 0.007
		3.5	54.4	14.0	15.0	6	3.5	0.2	0.1	0.05	3.8	2.5							

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Materials Cross Reference Chart

Commercial Name	ATI Allvac ATI Allegheny Ludlum ATI WahChang	UNS Number	UK: BS,EN	Sweden: SS	USA: AISI/SAE	Germany: Wnr	Germany: DIN	France: AFNOR	Italy: UNI	Spain: UNF	Japan: JIS
HTA Nickel Based Alloys											
René 77								NC15K15ADT			
René 80								NC14K9T5DWA			
René 95								NC14K8			
Stelloy HS27							NiCo32Cr26Mo	KC20WN			
TRW VIA							NiTa9Co8W6CrAl	NTa9K7C6W5A5DT			
Udimet 500		UNS N07500			AISI 684	2.4983	NiCr18CoMoAlTi	NCK19DAT			
Udimet 520	ATI 520™										
Udimet 630							NiCr19NbMo	NC18Fe18Nb6DWT			
Udimet 700					AISI 687	2.4636	NiCo15Cr15MoAlTi	NCKD20AT			
Udimet 710								NCK18TDA			
Udimet 718			HR8		5383	2.4668	NiCr19Fe19NbMo	NC19FeNb			
Udimet 720								NC18K15TDA			
Waspaloy®	ATI Waspaloy	UNS N07001			5544	2.4654	NiCr20Co14MoTi	NC20K14			
HTA Titanium Based Alloys											
Ti-10.2.3	ATI 10-2-3™										
Ti-11.5Mo-6Zr-4.5Sn											
Ti-12Mo-6Zr-2Fe (TMZF)											
Ti-13Nb-13Zr											
Ti-13V-11Cr-3Al	13-11-3				4917		TiV13Cr11Al3				
Ti-15-333	ATI 15-333™	UNS R58153									
Ti-15Mo (Alpha + Beta)	ATI 15Mo™ (Alpha + Beta)										
Ti-15Mo (Beta)	ATI 15Mo™ (Beta)										
Ti-15Mo-3Nb-3Al-0.2Si					ASTM Grade 21						
Ti-3Al-2.5V	ATI 3-2.5-MIL™	UNS R56320			4943, 4944						
Ti-3Al-8V-6Cr-4Mo-4Zr	ATI 38-644™	UNS R58640									
Ti-425	ATI 425®										
Ti-425 MIL	ATI 425®-MIL										
Ti-45Nb	ATI 45Nb™										
Ti-48Al-2Cr-2Nb											
Ti-4Al-4Mo-2Sn-0.5Si	ATI 4-4-2™		5103				TiAl4Mo4Sn2Si0.5	T-A4DE			
Ti-4Al-4Mo-4Sn-0.5Si			5203				TiAl4Mo4Sn4Si0.5				
Ti-5Al-2.5Fe (Tikrutan)											
Ti-5Al-2.5Sn	ATI Grade 6	UNS R54520	TA 14,17		ASTM B 265	3.7115	TiAl5Sn2	T-A5E			
Ti-5Al-2Sn-2Zr-4Cr-4Mo	ATI 17™	UNS R58650			4995		Ti5Al2Sn2Zr4Cr4Mo				
Ti-5Al-5Mo-5V-1Cr-1Fe											TC18
Ti-5Al-5V-5Mo-3Cr	ATI 5-5-5-3 PM™										
Ti-6-2-4-6	ATI 6-2-4-6™	UNS R56260			4981						
Ti-6-7	ATI 6-7™	UNS R56700									
Ti-6Al-2Sn-2Zr-2Mn-2Cr-0.2Si	ATI 6-2222™										
Ti-6Al-4V	ATI 6-4™	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56		4906, 4920, 4928, 4965, 4967		TiAl6V4	T.A6V;AIR:9183			TC4
Ti-6Al-4V ELI	ATI 6-4 ELI™	UNS R56401			4907, 4930, 4931						
Ti-6Al-4V MIL	ATI 6-4-MIL™	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56		4906, 4920, 4928, 4965, 4967		TiAl6V4	T.A6V;AIR:9183			
Ti-6Al-4V MIL (HT)	ATI 6-4-MIL™	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56		4906, 4920, 4928, 4965, 4967		TiAl6V4	T.A6V;AIR:9183			

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Hardness HRB HRC HB	Rm N/mm²	Fe	Ni	Cr	Co	Mo	W	Si	Mn	C	Al	Ti	Li	P	S	Mg	Zn	Cu	Others
HTA Nickel Based Alloys																			
		0.4	58.0	15.0	15.0	4.2		0.1	0.1	0.17	4.3	3.3							
			61.0	14.0	9.5	4				0.15		4							
		0.3	64.5	14.0	8.0	3.5				0.15		2.5							
		2.0	30.0	25.0	30.0														
			70.5	6.0	7.5	2	5.8			0.13	5.4	1							
		4.0	52.0	19.0	18.0	4		0.1	0.1	0.07	3	3							
40HRC	1270		56.9	19.0	12.0	6	1				2	3							
		18.0	51.0	19.0	18.0	3				0.04	0.6	1.1							
		1.0	53.0	15.0	19.0					0.1	4.4	3.4							
		0.5	55.0	18.0	15.0	1.5				0.07	2.5	5							
42HRC	1330	19.0	54.0	18.0		3				0.05	0.6	1							
	1600		55.0	18.0	14.8	3	1.2			0.035	2.5	5							
38HRC	1200	1.0	57.7	19.5	13.0	4.3				0.05	1.4	3							Zr 0.07
HTA Titanium Based Alloys																			
HRC35	1100																		
	1037	0.085																	Nb13.18 Zr13.49
HRC40	1270																		
HRC32	1000	0.12		3						0.02	3								V 15.0
HRC38	1200	0.1				15													
HRC24	820	0.1				15													
	930	< 0.4				15					3	76.0/80.8							Nb 3.0
HRC24	820	0.13									3								V 2.5
HRC32	1000	0.35		6.5		4.5				0.05	4								V 8.5 Zr 4.5
HRC36	1130	1.5									4								V 2.5 O 0.25
HRC36	1130	1.2/1.8									4.5								V 2.5 O 0.25
												55							Nb 45
HRC22	800			2							48.03	47.97							Nb 2
HRC35	1100																		
	1020	2.5									5								
HRC36	1130																		
HRC38	1200	0.3		3.5/4.5		3.5/4.5					4.5/5.5								Sn 1.5/2.5 Zr 1.5/2.5
HRC40	1270																		
HRC40	1270																		
HRC36	1130																		
HRC32	1000	0.15								0.08	6								Nb 7
				2				0.2	2		6								Sn 2 Zr 2
HRC30-34	1130	0.3								0.1	5.5/6.75								V 4
HRC32	1000	0.25								0.08	5.5/6.75								V 3.5/4.5 O 0.13
HRC30-34	1130	0.3								0.1	5.5/6.75								V 3.5/4.5 O 0.2
HRC35-39	1200	0.3								0.1	5.5/6.75								V 3.5/4.5 O 0.2

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HTA Titanium Based Alloys											
Ti-6Al-4Zr-2Mo-2Sn	ATI 6-2-4-2 PM™	UNS R54620									
Ti-6Al-4Zr-2Mo-2Sn-0.2Si	ATI 6-2-4-2-Si PM™	UNS R54620 modified			4919, 4975, 4976		TiAl6Zr4Mo2Sn2				
Ti-6Al-5Zr-0.5Mo-0.25Si							TiA6Zr5Mo0.5Si0.25	T.AGZ.50			
Ti-6Al-5Zr-4Mo-Cu-0.2Si			M201				TiAl6Zr5Mo4CuSi0.2				
Ti-6Al-6V-2Sn	ATI 6-6-2™	UNS R56620			4971		TiAl16V6Sn2				
Ti-6Al-7Nb							TiAl7Nb				
Ti-7Al-4Mo					ASTM B381		TiAl7Mo4				
Ti-8Al-1Mo-1V	ATI 8-1-1™	UNS R54810			4915, 4933, 4972		TiAl8Mo1V1				
Ti-8Mo-8V-2Fe-3Al											
Ti-99.5	ATI CP Grade 4	UNS R50700			ASTM Grade 1 B381F4		Ti-99.5	AIR:9182T60			
Ti-99.6	ATI CP Grade 3	UNS R50550	TA2, TA3, TA4, TA5		ASTM Grade 2 B381F3		Ti-99.6	AIR:9182T50			
Ti-99.7	ATI CP Grade 2	UNS R50400	TA2.5		ASTM Grade 3 B381F2		Ti-99.7	AIR:9182T40			
Ti-99.8	ATI CP Grade 1	UNS R50250	TA6, TA7, TA8, TA9		ASTM Grade 4 B381F1		Ti-99.8	AIR:9182T35			
Hard Steel >1400Mpa											
500	ATI 500-MIL®										
521	ATI 521™										
600	ATI 600-MIL®										
60SPb20											
70SPb20											
A100											
A2 / Z100CDV5 (HT)	A2		BA2	2260	A2	1.2363	X100CrMoV5 1	Z100CDV5	X100CrMoV51KU	X100CrMoV5 F5227	SKD12
Durimphy							X2NiCoMoTi180905	Z2NKD180905			
Ferrium® S53®											
H10											
H11											
H12											
H19											
H21 / Z30WCV9											
Hardox 450											
Hardox 500											
Hardox 550											
Hardox 600											
K12	ATI K12®-MIL										
K12 (HT)	ATI K12®-MIL										
L6 / 55NCDV07 (HT)											
Mh97+Pb											
Z38CDV5											
Chilled Cast Iron 1400Mpa											
GGG120B / EN-GJS-1200-2											
GGG140B / EN-GJS-1400-1											
GGG80B / EN-GJS-800-8											
GGG90B / EN-GJS-1000-5											

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HTA Titanium Based Alloys																			
HRC28	900																		
HRC28	900	0.05				2		0.12		0.1	6								Zr 4.0
HRC35	1100	0.5								0.05	5.5							0.5	V 5.5 Sn 2 O 0.2
	1000										6	84.5/88.0							Nb 7.0
HRC35	1100	0.13				1					8								V 1 O 0.12
HRB100	780	0.5								0.1									O 0.4
HRB90	600	0.3								0.1									O 0.35
HRB80	510	0.3								0.1									O 0.25
HRB70	430	0.2								0.1									O 0.18
Hard Steel >1400Mpa																			
447-534HB	1490-1730	91.6	4	2		0.37		0.45	1.2	0.32				0.02	0.005				
470-550HB	1590-1800	91.4	4	2		0.5		0.5	1.2	0.32				0.025	0.005				
574-634HB	> 2060	91.8	4.25	1.5		0.37		0.5	1	0.52				0.02	0.005				
55/61HRc																			
63/65HRc																			
64/67HRc																			
55/64HRc																			
	1040-2000																		
54HRC	1930		5.5	10	14	2	1			0.21				0.02	0.005				V 0.3
	1180-1670																		
	1180-1570																		
	1080-1270																		
	1270-1670																		
	1180-1770																		
450HBW	1500																		
500HBW	1730																		
550HBW	1950																		
600HBW	>2000																		
48-54HRC	1590-1930																		
58-64HRC																			
	1200-1700																		
64/66HRC																			
	1400-1500																		
Chilled Cast Iron 1400Mpa																			
341-444HB	1490																		
444-555HB	2010																		
269-321HB	1040																		
302-363HB	1150																		

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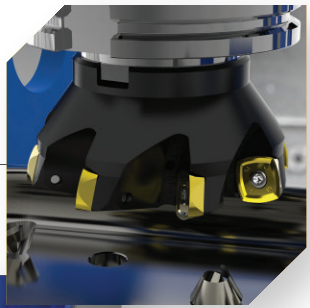
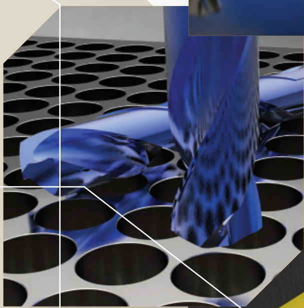
Notes:

Answering Your Tooling Needs

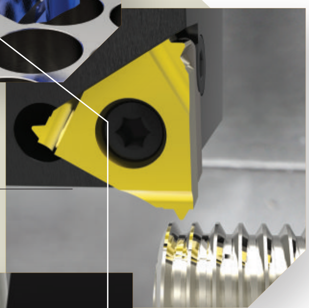
Milling



Drilling

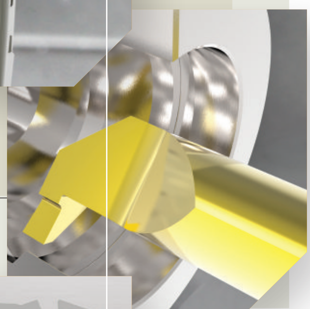


Threading

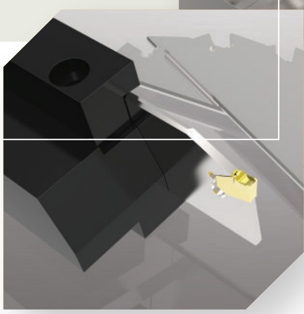


Turning

Grooving



Part-Off



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