FEATURING THE LATEST PRODUCTS FROM WIDIA™

ADVANCES

2020 INCH

WIDIA™

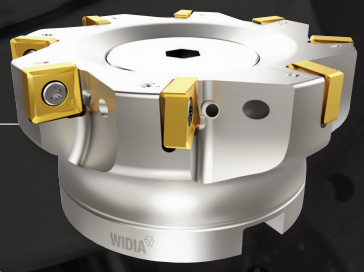
INTRODUCING...

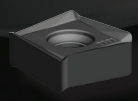
NEW PRODUCTS

VSM890™-12

pages 4–12

NEW!

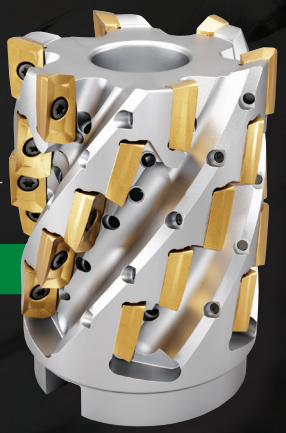




VSM

pages 34–57

NEW! **New helical cutters**



VXF™

pages 14–31

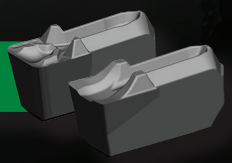
NEW! **New cutter sizes -07, -09, and -16**

NEW!

WGC

pages 154–175

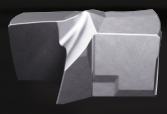
NEW! **New PT and F precision molded and ground inserts**



TDMX™

pages 92–115

NEW! **New 1.5 x D and 12 x D bodies**



FPE(M)

VariMill™

pages 58–79

NEW! **VariMill I, VariMill II, VariMill III expansions**

WK15CT

pages 176–185

NEW! **New Victory™ grade for cast iron turning**

WIDIA™

ALL-STAR

THE ALL-STAR PROGRAM PROVIDES PROVEN SOLUTIONS THAT ARE EASY TO FIND AND ALWAYS AVAILABLE.

All-Star includes products from our most popular platforms, grades, and sizes grouped into our program and guaranteed to be in stock with same-day shipping on orders placed before 6pm EST.

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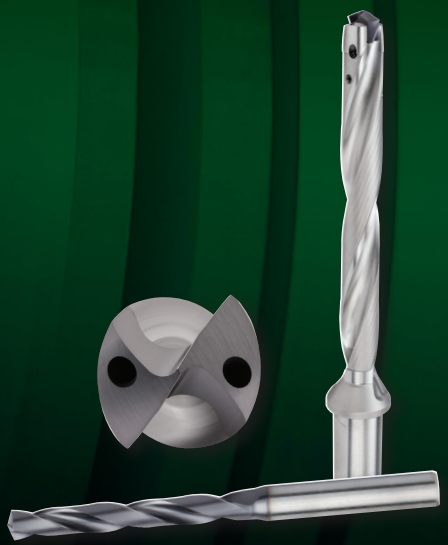
Turning

Tapping

Holemaking



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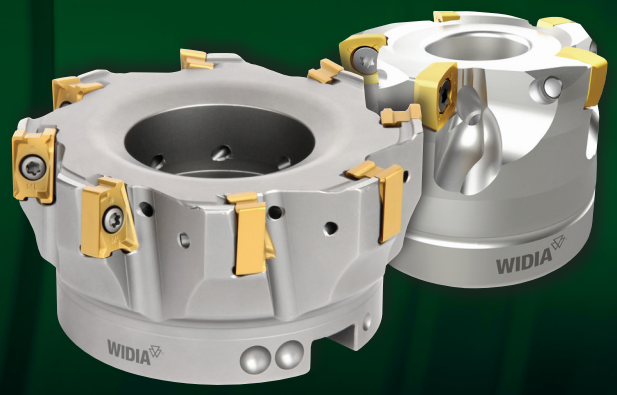


Solid End Milling

WIDIA™

widia.com

VSM890™-12

UNIQUE 8-EDGED SOLUTION FOR SHOULDER AND FACE MILLING

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

VSM890™-12

Weldon® End Mills: 1.25" and 1.5"

Shell Mills: 2–10"

8-Edged, Double-Sided True 0° Victory™ Shoulder-Face Mill (VSM)

Superior Metal Removal Rates (MRR) delivered through high-performance grades and chipbreakers.

Coarse, medium, and fine pitch cutter density to perfectly translate machining capability into higher productivity.

New pocket seat design for improved insert seating and great stability at roughing applications.

Applicable in a wide range of workpiece materials: aluminum, steel, cast iron, titanium, stainless steel, and high-temp alloys.

Comprehensive standard offering for cutter bodies and inserts to address light machining to heavy roughing jobs.

NEW! **SNHX-MM • Universal Geometry for Medium Machining. Corner Radii Expansion for -MM Chipbreaker**

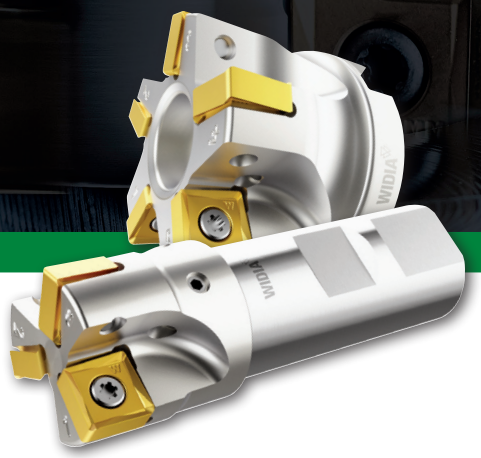
NEW! **WK15CM**

WIDIA™

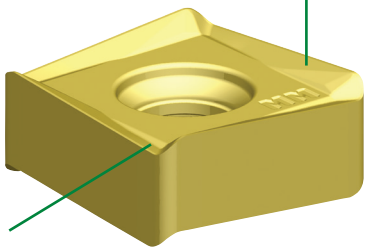
widia.com

VSM890™-12

0°/90° Shoulder Mills • VSM890-12



- True 0° wall and stepping down capability.
- Axial depth of cut capability; Ap1 max up to .386".
- Optimized chip gash design for proper chip evacuation.
- User-friendly pocket numbering system.
- Cutter bodies with internal coolant supply.
- Less bur creation on the workpiece.



Unique insert rake design to reduce and perfectly balance axial and radial cutting forces. Engineered for light machining to heavy roughing in all material groups.

-ALP

N

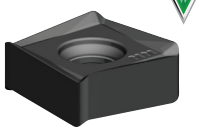
First choice for Non-Ferrous materials.

-ML

P M S

First choice for Stainless Steel, light machining, and finishing jobs.

-MM NEW!



P M K S H

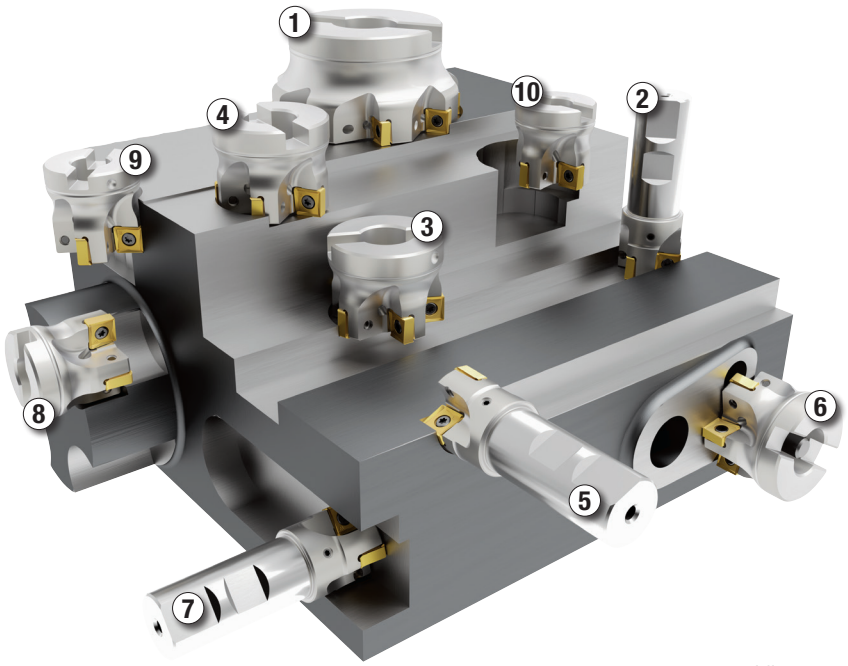
First choice for general purpose in all workpiece materials. Engineered for high-feed rates.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening/Stronger Cutting Edge Protection

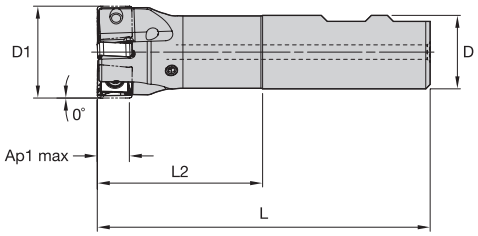
Applications

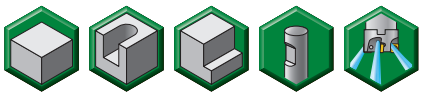
1. Face milling.
2. Full slotting with 100% radial engagement.
3. Shoulder milling with stepping down and great wall finish.
4. Shoulder milling with low axial and high radial engagement.
5. Shoulder milling with low radial and high axial engagement.
6. HPC face milling. First choice to clean up castings.
7. Dynamic/trochoidal slot milling.
8. Z-axis plunge milling.
9. Z-axis contour plunge milling.
10. Z-axis zig-zag slot plunge milling.



0°/90° Shoulder Mills • VSM890™-12

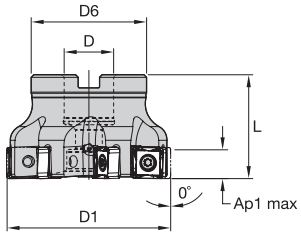
Weldon® End Mills • Inch

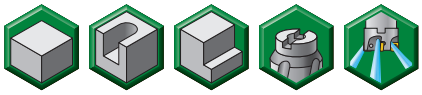




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
6596129	VSM890D125Z03W100SN12	1.250	1.000	4.530	2.250	.387	3	33400	Yes	.89
6596130	VSM890D150Z04W100SN12	1.500	1.000	4.530	2.250	.387	4	29100	Yes	1.18

Shell Mills • Inch





order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
6596131	VSM890D200Z04S075SN12	2.000	.750	1.750	1.575	.387	4	23800	Yes	.73
6596132	VSM890D200Z05S075SN12	2.000	.750	1.750	1.575	.387	5	23800	Yes	.70
6596133	VSM890D250Z05S075SN12	2.500	.750	1.750	1.575	.387	5	20700	Yes	1.06
6596134	VSM890D250Z07S075SN12	2.500	.750	1.750	1.575	.387	7	20700	Yes	.99
6596135	VSM890D300Z05S100SN12	3.000	1.000	2.190	1.750	.387	5	18500	Yes	1.63
6596136	VSM890D300Z07S100SN12	3.000	1.000	2.190	1.750	.387	7	18500	Yes	1.73
6596137	VSM890D300Z09S100SN12	3.000	1.000	2.190	1.750	.387	9	18500	Yes	1.69
6596138	VSM890D400Z06S150SN12	4.000	1.500	3.810	2.000	.387	6	15700	Yes	3.51
6596139	VSM890D400Z08S150SN12	4.000	1.500	3.810	2.000	.387	8	15700	Yes	3.76
6596151	VSM890D400Z11S150SN12	4.000	1.500	3.810	2.000	.387	11	15700	Yes	3.67
6596152	VSM890D500Z07S150SN12	5.000	1.500	3.810	2.380	.387	7	13800	Yes	6.02
6596153	VSM890D500Z10S150SN12	5.000	1.500	3.810	2.380	.387	10	13800	Yes	6.40
6596154	VSM890D500Z14S150SN12	5.000	1.500	3.810	2.380	.387	14	13800	Yes	6.14
6596155	VSM890D600Z08S200SN12	6.000	2.000	4.875	2.380	.387	8	12500	Yes	9.44
6596156	VSM890D600Z12S200SN12	6.000	2.000	4.875	2.380	.387	12	12500	Yes	9.43
6596157	VSM890D600Z16S200SN12	6.000	2.000	4.875	2.380	.387	16	12500	Yes	9.64
6596158	VSM890D800Z10S250SN12	8.000	2.500	5.118	2.380	.387	10	10700	Yes	12.08
6596159	VSM890D800Z14S250SN12	8.000	2.500	5.118	2.380	.387	14	10700	Yes	12.60
6596160	VSM890D800Z22S250SN12	8.000	2.500	5.118	2.380	.387	22	10700	Yes	12.45
6613696	VSM890D1000Z16S250SN12	10.000	2.500	5.118	2.380	.387	16	9500	Yes	18.01

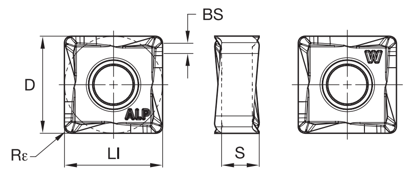
FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

VSM890™-12

0°/90° Shoulder Mills • VSM890-12

Inserts • SNHX-ALP • For Aluminum and Other Non-Ferrous Alloys

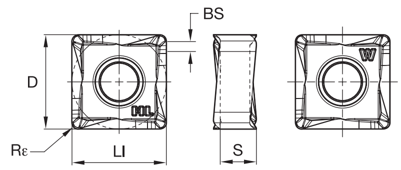


● first choice
○ alternate choice

	WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
P			●	●	○	
M			●	●	●	
K	●		○			●
N		●				
S			●	○	●	
H						●

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
SNHX120408PNERALP	SNHX1202PNERALP	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	–	6596397	–	–	–	–

Inserts • SNHX-ML • Precision Finishing and Light Machining



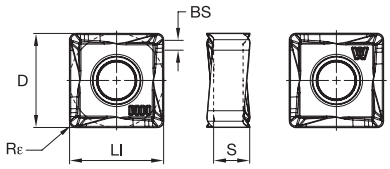
● first choice
○ alternate choice

	WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
P			●	●	○	
M			●	●	●	
K	●		○			●
N		●				
S			●	○	●	
H						●

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
SNHX120408PNERML	SNHX1202PNERML	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	–	–	6596398	–	6596399	–

WIDIA

Inserts • SNHX-MM • Universal Geometry for Medium Machining



● first choice
○ alternate choice

		WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
P				●	●	○	
M				●	●	●	
K	●		○				●
N		●					
S				●	○	●	
H							●

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	BS mm	BS in	Rε mm	Rε in	WK15CM	WN25PM	WP25PM	WP40PM	WS40PM	WU10PM
SNHX120408PNSRMM	SNHX1202PNSRMM	8	12,00	.472	4,61	.181	12,00	.472	1,34	.053	0,80	.032	6712874	6667462	-	6596431	6596432	6596433	6596400
SNHX120416PNSRMM	SNHX1204PNSRMM	8	12,00	.472	4,58	.180	12,00	.472	1,00	.039	1,60	.063	6712874	-	-	6712875	6712876	6712877	-

For M4000 cartridge milling system, please see page 12.

VSM890™-12
M4000CA-XN10
(MM6433216)

P M K S

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	SNHX-ML	WS40PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
P3–P4	SNHX-ML	WS40PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
P5–P6	SNHX-ML	WP25PM	**SNHX-MM**	**WP40PM**	SNHX-MM	WP40PM
M1–M2	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
M3	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
K1–K2	SNHX-MM	WK15CM	**SNHX-MM**	**WK15CM**	SNHX-MM	WK15CM
K3	SNHX-MM	WK15CM	**SNHX-MM**	**WK15CM**	SNHX-MM	WK15CM
N1–N2	SNHX-ALP	WN25PM	**SNHX-ALP**	**WN25PM**	SNHX-ALP	WN25PM
N3	SNHX-ALP	WN25PM	**SNHX-ALP**	**WN25PM**	SNHX-ALP	WN25PM
S1–S2	SNHX-ML	WP25PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
S3	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
S4	SNHX-ML	WS40PM	**SNHX-ML**	**WS40PM**	SNHX-MM	WS40PM
H1	SNHX-MM	WU10PM	**SNHX-MM**	**WU10PM**	–	–

VSM890™-12

0°/90° Shoulder Mills • VSM890-12

Recommended Starting Speeds [SFM]*

Material Group		WK15CM			WN25PM			WP25PM			WP40PM			WS40PM			WU10PM		
P	1	–	–	–	–	–	–	1085	**935**	885	970	**855**	805	–	–	–	–	–	–
	2	–	–	–	–	–	–	900	**785**	655	820	**705**	590	–	–	–	–	–	–
	3	–	–	–	–	–	–	835	**705**	575	755	**640**	525	–	–	–	–	–	–
	4	–	–	–	–	–	–	740	**605**	490	675	**560**	445	–	–	–	–	–	–
	5	–	–	–	–	–	–	605	**560**	490	560	**510**	445	560	**475**	395	–	–	–
	6	–	–	–	–	–	–	540	**410**	330	490	**375**	295	490	**360**	260	–	–	–
M	1	–	–	–	–	–	–	675	**590**	540	640	**560**	510	690	**560**	460	–	–	–
	2	–	–	–	–	–	–	605	**525**	425	575	**490**	410	590	**475**	395	–	–	–
	3	–	–	–	–	–	–	460	**395**	310	425	**375**	295	475	**360**	280	–	–	–
K	1	1380	**1265**	1115	–	–	–	755	**675**	605	–	–	–	–	–	–	970	**870**	785
	2	1100	**970**	900	–	–	–	590	**525**	490	–	–	–	–	–	–	755	**675**	625
	3	920	**820**	755	–	–	–	490	**445**	395	–	–	–	–	–	–	640	**575**	525
N	1	–	–	–	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	80	–	–	–
	2	–	–	–	–	–	–	130	**115**	80	–	–	–	130	**115**	80	–	–	–
	3	–	–	–	–	–	–	165	**130**	80	–	–	–	165	**130**	80	–	–	–
	4	–	–	–	–	–	–	230	**165**	115	–	–	–	195	**165**	100	–	–	–
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	525	**425**	295

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

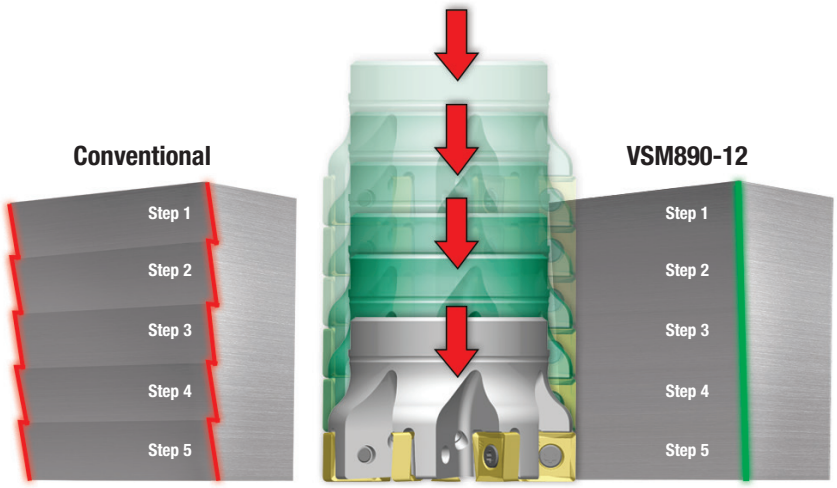
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..ALP	.005	**.010**	.015	.003	**.007**	.011	.003	**.005**	.008	.002	**.005**	.007	.002	**.004**	.006	.E..ALP
.E..ML	.007	**.012**	.023	.005	**.009**	.017	.004	**.007**	.012	.003	**.006**	.011	.003	**.005**	.010	.E..ML
.S..MM	.009	**.014**	.032	.007	**.010**	.023	.005	**.008**	.017	.004	**.007**	.015	.004	**.006**	.014	.S..MM

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

Best Practices

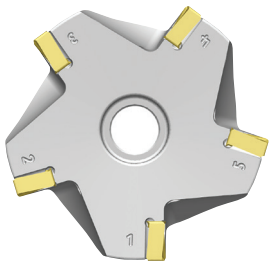
True 0° roughing tool with embedded finishing capabilities all in one tool.

Best-in-class wall finish with VSM890-12 in axial stepping-down jobs. For many shop floor setups, no additional finishing is required resulting in shorter machining time and lower tooling cost.



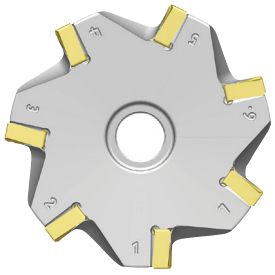
Excellent wall finish with VSM890-12

Coarse Pitch



- Unstable setup.
- Low spindle power.
- High axial depth of cut Ap1.
- Low feed rate.
- Machining aluminum.
- Driven tools.

Medium Pitch

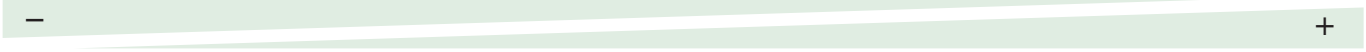


- Regular setup.
- Regular spindle power.
- Medium feed rate.

Fine Pitch

- Rigid setup.
- High spindle power.
- Low axial depth of cut Ap1.
- High feed rate.
- Boost productivity and cut into cycle time.

Machining Stability

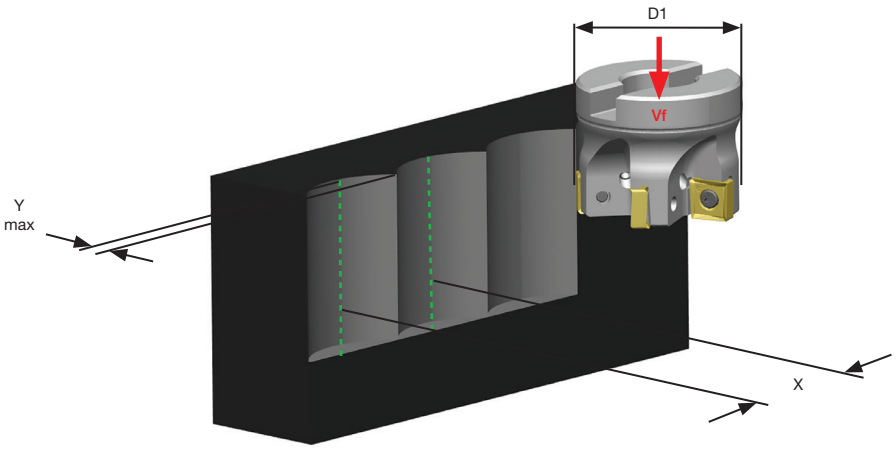


VSM890™-12

0°/90° Shoulder Mills • VSM890-12

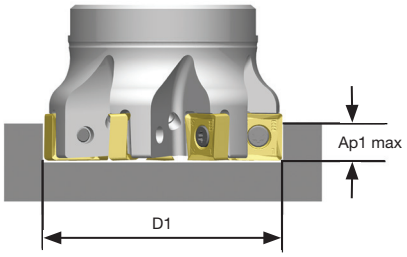
VSM890-12 Z-Axis Plunge Milling

cutting diameter (D1)	Y max	X
1.25	0.3504	1.1228
1.5	0.3504	1.2693
2	0.3504	1.5205
2.5	0.3504	1.7358
3	0.3504	1.9272
4	0.3504	2.2618
5	0.3504	2.5528
6	0.3504	2.8138
8	0.3504	3.2744
10	0.3504	3.6776



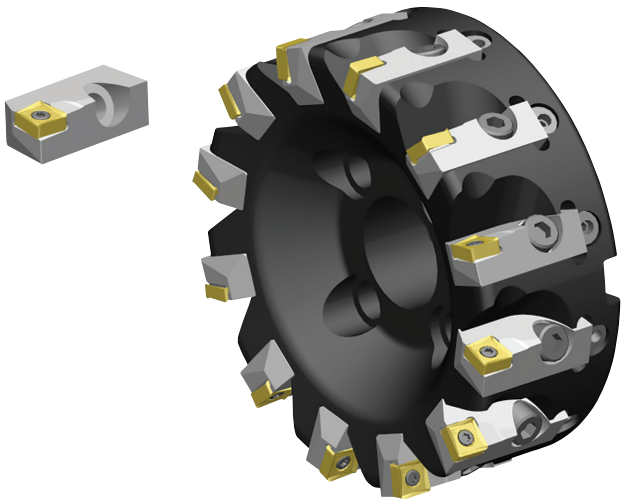
VSM890-12 Ap1 max at Full Slotting, 100% Radial Cutter Engagement

	Recommended Cutter Density	Ap1 max		
D1 diameter	Z	Gray Cast Iron EN-GJL-250 EN-JL1040 GG25	Steel AISI 4140 1.7225 42CrMo4	Stainless Steel AISI 316L, 1.4404, X2CrNiMo1810
1.5"	4	.300"	.250"	.195"
2.0"	4	.300"	.250"	.195"
2.5"	5	.300"	.250"	.195"
3.0"	5	.300"	.250"	.195"
4.0"	6	.300"	.250"	.195"



VSM890-12 Cartridge for M4000

M4000CA-SNHX12
(MM6602179)



NEW!

WIDIA™ Victory™

WS40PM

Breakthrough in the latest substrate and coating technology to boost productivity in **stainless steels and high-temp alloys**

Advanced Milling Grade for Titanium

Multilayer PVD AlTiN-TiN Coating

- Improved chemical and abrasive wear resistance.
- Consistent tool life performance.
- Primarily for wet machining. Also great results in dry machining.

New Medium-Grained Substrate

- Minimizes tendency for thermal cracking.
- Excellent fatigue resistance and edge strength.
- Rich in cobalt content for improved toughness.

widia.com

WIDIA™

VXF™

VICTORY™ X-FEED™

NEXT LEVEL OF HIGH-FEED MILLING

VXF is a high-feed productivity booster designed to establish new industry standards with market-leading milling grades like WS40PM.

AEROSPACE

GENERAL ENGINEERING

TRANSPORTATION

ENERGY

NEW!

VXF™-07

Ap1 max: .035"
fz max: .047" IPT

NEW!

VXF™-09

Ap1 max: .059"
fz max: .078" IPT

VXF™ -12

Ap1 max: .089"
fz max: .118" IPT

NEW!

VXF™ -16

Ap1 max: .137"
fz max: .078" IPT

Optimized cutter body and chip gash design perfectly serves high-feed requirements.

PSTS inserts for powerful low cost per edge high-feed milling.

Cutters with internal coolant supply.

Nickel-plated surface protection.

WIDIA™

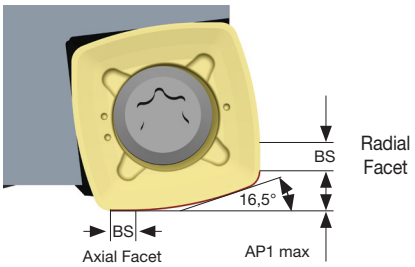
widia.com

VXF™

High-Feed Mills • VXF-07, VXF-09, VXF-12, and VXF-16

- 16.5° lead angle redistributes cutting forces in the spindle z-axis direction.
- Greatly reduces tool deflection and vibrations for improved tool life.
- Suitable for long tool reach.
- Unique integrated radial wiping facet to achieve a nice wall finish at pocket and helical interpolation milling.
- Durable cutting edges qualified to machine a wide range of materials.
- WS40PM — best-in-class milling grade for machining stainless steel and HTA.

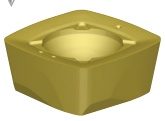
Perfect combination of round and square insert style.



Specifically engineered chipbreakers for powerful high-feed milling.

VXF-07

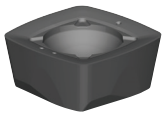
-MM



P M S

First choice for Soft Steel, Stainless Steel, and High-Temp Alloys. Best fit for pocketing and profiling operations.

-MH

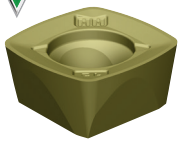


P H

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs and hardened steel up to 48HRc.

VXF-09

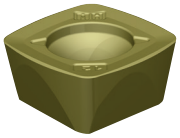
-MM



P M S

First choice for Soft Steel, Stainless Steel, and High-Temp Alloys. Best fit for pocketing and profiling operations.

-MH

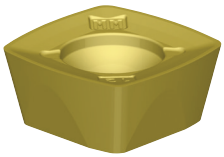


P

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs.

VXF-12

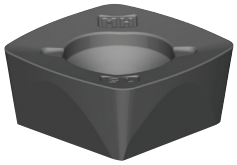
-MM



P M S

First choice for Soft Steel, Stainless Steel, and High-Temp Alloys. Best fit for pocketing and profiling operations.

-MH

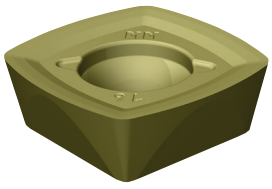


P

First choice for P3 and P4 materials. Stronger edge protection for heavy roughing jobs.

VXF-16

-MM



P M S

First choice for soft steel, stainless steel, and high-temp alloys. Best fit for pocketing and profiling operations.

Lower Cutting Forces

Geometry Strengthening/Stronger Cutting Edge Protection

High-Feed Mills • VXF-07, VXF-09, VXF-12, and VXF-16

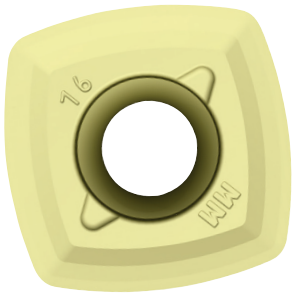
Comprehensive standard offering at one glance to match all shop-floor needs for high-feed milling.

VXF-07

VXF-09

VXF-12

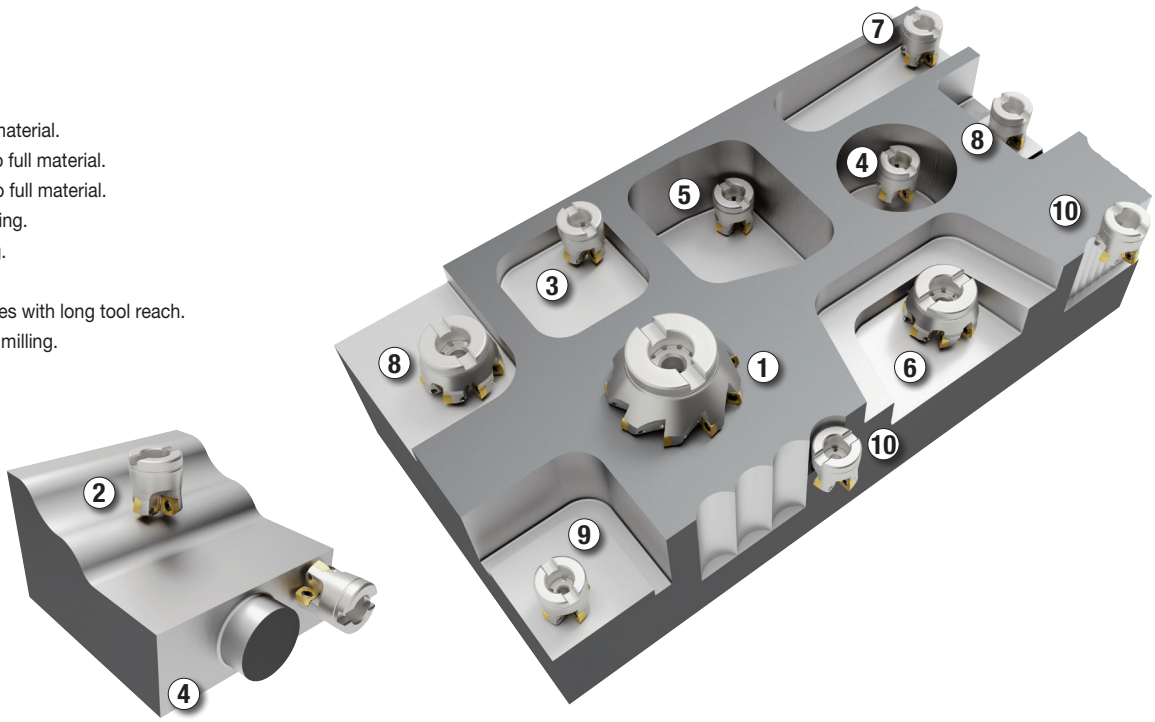
VXF-16



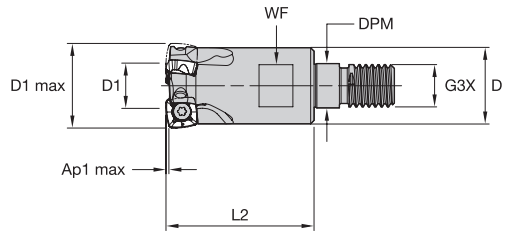
VXF Platform	Ap1 max (Inch)	fz max (IPT)
07	.035	< .047
09	.059	< .078
12	.089	< .118
16	.137	< .078

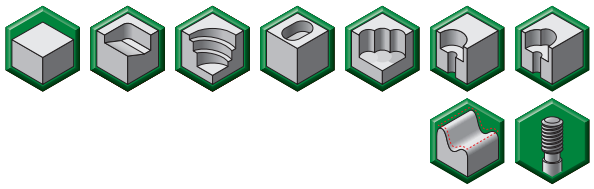
Applications

1. Face milling.
2. 3D profile milling.
3. Pocket milling into full material.
4. Helical interpolation into full material.
5. Deep pocket milling into full material.
6. Dynamic/trochoidal milling.
7. Aggressive ramp milling.
8. Contour Milling.
9. Face milling deep cavities with long tool reach.
10. Z-axis contour plunge milling.



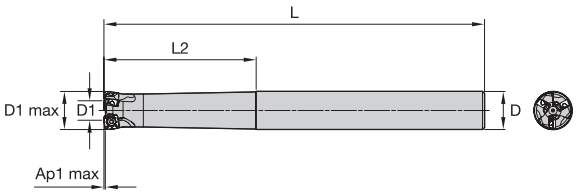
Screw-On End Mills • Inch

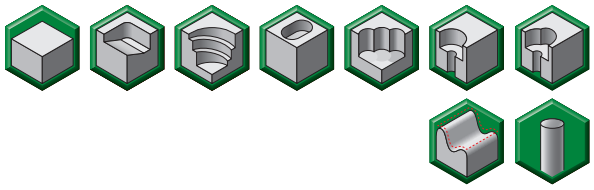




order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712878	VXF075Z03M10XP07	.750	.384	.709	.413	M10	1.378	.589	.035	3	6.7°	57000	Yes	.13
6712879	VXF100Z04M12XP07	1.000	.631	.827	.492	M12	1.378	.667	.035	4	4.3°	49000	Yes	.21
6712880	VXF125Z05M16XP07	1.250	.879	1.142	.669	M16	1.693	.943	.035	5	2.7°	41500	Yes	.48

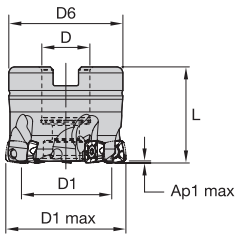
Cylindrical End Mills • Inch

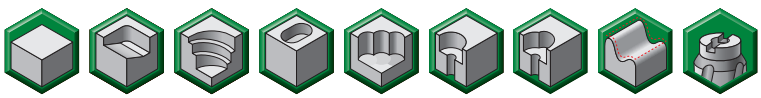




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712971	VXF062Z02C062XP07L700	.625	.271	.625	7.000	2.500	.035	2	8.2°	65000	Yes	.51
6712972	VXF075Z03C075XP07L750	.750	.384	.750	7.500	3.000	.035	3	6.7°	57000	Yes	.51
6712973	VXF100Z04C100XP07L800	1.000	.631	1.000	8.000	3.500	.035	4	2.2°	49000	Yes	1.56
6712974	VXF125Z05C125XP07L800	1.250	.879	1.250	8.000	3.500	.035	5	2.7°	41500	Yes	2.47

Shell Mills • Inch



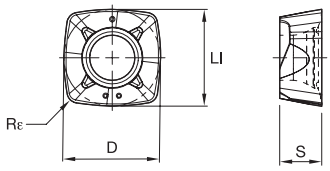


order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6712975	VXF150Z05S075XP07	1.500	1.129	.750	1.417	1.260	.035	5	1.0°	35800	Yes	.33
6712976	VXF200Z07S075XP07	2.000	1.629	.750	1.654	1.575	.035	7	.7°	31000	Yes	.80

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

Inserts • XPPT-MM • Best Fit for Pocketing and Profiling Operations

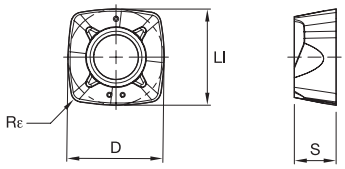


● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM	WU10PM
XPPT070308ERMM	XPPT070308ERMM	4	7,30	.288	3,17	.125	7,30	.288	0,80	.031	6595819	▪	6595820	▪

Inserts • XPPW-MH • Dedicated Geometry for Heavy Roughing



● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM	WU10PM
XPPW070310SRMH	XPPW070310SRMH	4	7,30	.288	3,17	.125	7,30	.288	1,00	.039	▪	6595770	▪	6595769

For M4000 cartridge milling system, please see page 12.

VSM890™-12
M4000CA-XN10
(MM6433216)

P M K S

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
P3–P4	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
P5–P6	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
M1–M2	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
M3	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	XPPW-MH	WP40PM
K1–K2	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	XPPW-MH	WU10PM
K3	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	XPPW-MH	WU10PM
S1–S2	XPPT-MM	WP25PM	**XPPT-MM**	**WS40PM**	–	–
S3	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	–	–
S4	XPPT-MM	WS40PM	**XPPT-MM**	**WS40PM**	–	–
H1	XPPW-MH	WU10PM	**XPPW-MH**	**WU10PM**	–	–

Recommended Starting Speeds [SFM]*

Material Group		WP25PM			WP40PM			WS40PM			WU10PM		
P	1	1295	**1115**	1065	1165	**1015**	970	1085	**920**	785	–	–	–
	2	1085	**950**	785	985	**855**	705	900	**805**	605	–	–	–
	3	1000	**855**	690	900	**770**	625	835	**705**	540	–	–	–
	4	885	**720**	590	805	**675**	525	755	**625**	490	–	–	–
	5	720	**675**	590	675	**605**	525	675	**575**	475	–	–	–
	6	655	**490**	395	590	**460**	360	590	**425**	310	–	–	–
M	1	805	**705**	655	770	**675**	605	820	**675**	560	–	–	–
	2	720	**625**	510	690	**590**	490	705	**575**	475	–	–	–
	3	560	**475**	375	510	**460**	360	575	**425**	330	–	–	–
K	1	900	**805**	720	–	–	–	–	–	–	1165	**1050**	950
	2	705	**625**	590	–	–	–	–	–	–	900	**805**	755
	3	590	**525**	475	–	–	–	–	–	–	770	**690**	625
S	1	165	**130**	100	165	**130**	115	165	**130**	100	–	–	–
	2	165	**130**	100	165	**130**	115	165	**130**	100	–	–	–
	3	195	**165**	100	195	**165**	115	195	**165**	100	–	–	–
	4	280	**195**	130	260	**195**	130	230	**195**	115	–	–	–
H	1	475	**360**	280	–	–	–	–	–	–	625	**510**	360

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .024 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.020	**.058**	.109	.014	**.039**	.067	.010	**.028**	.047	.009	**.025**	.041	.008	**.022**	.037	.E..MM
.S..MH	.036	**.080**	.141	.025	**.052**	.080	.019	**.037**	.056	.016	**.032**	.048	.015	**.029**	.043	.S..MH

At .028 Axial Depth of Cut (AP1)

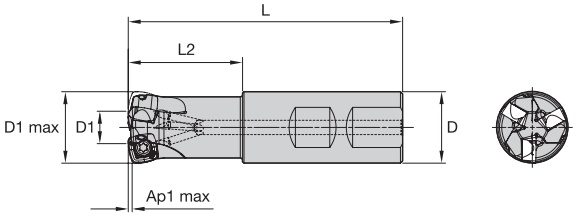
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023	**.046**	.071	.017	**.033**	.050	.014	**.029**	.043	.013	**.026**	.039	.S..MH

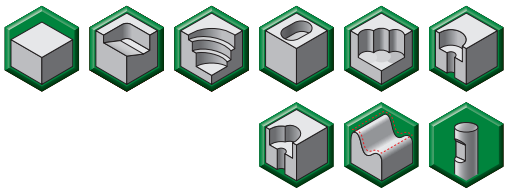
At .035 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.043**	.076	.011	**.029**	.050	.008	**.022**	.036	.007	**.019**	.031	.006	**.017**	.028	.E..MM
.S..MH	.027	**.058**	.093	.019	**.039**	.059	.014	**.028**	.042	.012	**.024**	.036	.011	**.022**	.033	.S..MH

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

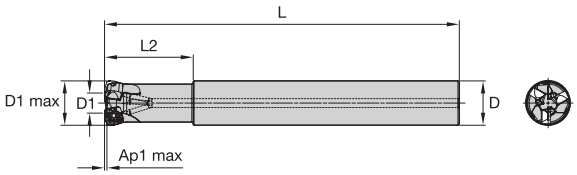
Weldon® End Mills • Inch

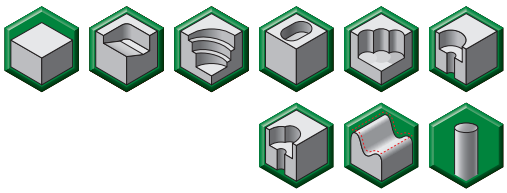




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597756	VXF100Z03W100XD09	1.000	.462	1.000	3.856	1.575	.059	3	2.7°	48000	Yes	.67
6597757	VXF125Z03W100XD09	1.250	.711	1.000	3.856	1.575	.059	3	1.5°	40500	Yes	.82
6597758	VXF125Z04W100XD09	1.250	.711	1.000	3.856	1.575	.059	4	1.5°	40500	Yes	.82

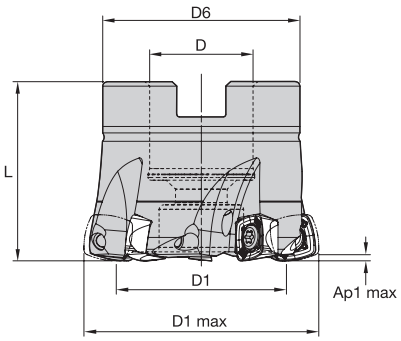
Cylindrical End Mills • Inch

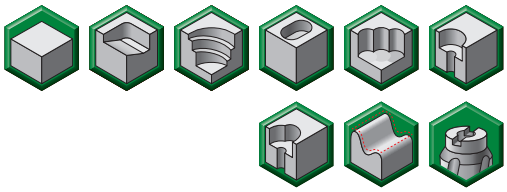




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597759	VXF100Z02C100XD09L780	1.000	.462	1.000	7.874	1.969	.059	2	2.7°	48000	Yes	1.52
6597760	VXF100Z03C100XD09L780	1.000	.462	1.000	8.000	2.000	.059	3	2.7°	48000	Yes	1.54
6597771	VXF125Z03C125XD09L980	1.250	.711	1.250	9.843	2.756	.059	3	1.5°	40500	Yes	3.03

Shell Mills • Inch



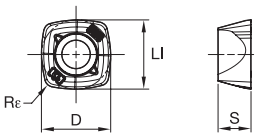


order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597772	VXF150Z04S050XD09	1.500	.960	.500	1.339	1.260	.059	4	1.1°	36000	Yes	.32
6597773	VXF150Z05S050XD09	1.500	.960	.500	1.339	1.260	.059	5	1.1°	36000	Yes	.32
6597774	VXF200Z05S075XD09	2.000	1.458	.750	1.654	1.575	.059	5	.7°	30000	Yes	.76
6597775	VXF200Z06S075XD09	2.000	1.458	.750	1.654	1.575	.059	6	.7°	30000	Yes	.75

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

Inserts • XDPT-MM

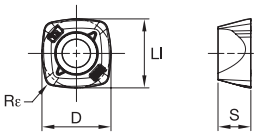


● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT090412ERMM	XDPT090412ERMM	4	10,00	.394	4,76	.187	10,00	.394	1,20	.047	6596471	-	6596472

Inserts • XDPT-MH



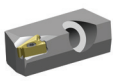
● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT090412SRMH	XDPT090412SRMH	4	10,00	.394	4,76	.187	10,00	.394	1,20	.047	-	6596822	-

For M4000 cartridge milling system, please see page 12.

VSM890™-12
M4000CA-XN10
(MM6433216)



P M K S

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P3–P4	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M1–M2	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S1–S2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S4	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM

Recommended Starting Speeds [SFM]*

Material Group		WP25PM			WP40PM			WS40PM		
P	1	1295	**1115**	1065	1165	**1015**	970	–	**–**	–
	2	1085	**950**	785	985	**855**	705	–	**–**	–
	3	1000	**855**	690	900	**770**	625	–	**–**	–
	4	885	**720**	590	805	**675**	525	–	**–**	–
	5	720	**675**	590	675	**605**	525	675	**575**	475
	6	655	**490**	395	590	**460**	360	590	**425**	310
M	1	805	**705**	655	770	**675**	605	820	**675**	560
	2	720	**625**	510	690	**590**	490	705	**575**	475
	3	560	**475**	375	510	**460**	360	575	**425**	330
S	1	165	**130**	100	165	**130**	115	165	**130**	100
	2	165	**130**	100	165	**130**	115	165	**130**	100
	3	195	**165**	100	195	**165**	115	195	**165**	100
	4	280	**195**	130	260	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .035 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.021	**.062**	.097	.015	**.043**	.066	.011	**.032**	.048	.010	**.028**	.042	.009	**.025**	.038	.E..MM
.S..MH	.030	**.068**	.114	.021	**.047**	.077	.016	**.035**	.056	.014	**.030**	.048	.013	**.028**	.044	.S..MH

At .040 Axial Depth of Cut (AP1)

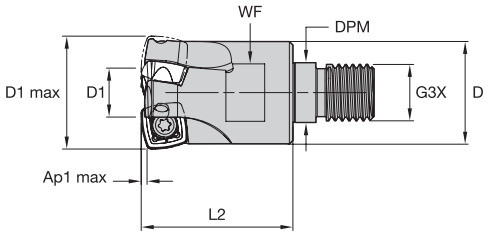
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.053**	.083	.013	**.038**	.057	.010	**.028**	.042	.009	**.024**	.036	.008	**.022**	.033	.E..MM
.S..MH	.026	**.058**	.097	.019	**.041**	.067	.014	**.030**	.049	.012	**.026**	.042	.011	**.024**	.038	.S..MH

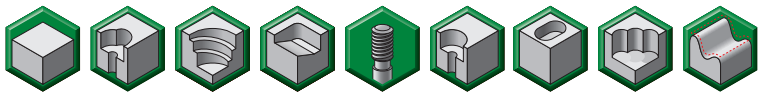
At .060 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.044**	.067	.011	**.031**	.047	.008	**.023**	.034	.007	**.020**	.030	.006	**.018**	.027	.E..MM
.S..MH	.021	**.048**	.079	.015	**.034**	.054	.011	**.025**	.040	.010	**.022**	.035	.009	**.020**	.032	.S..MH

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

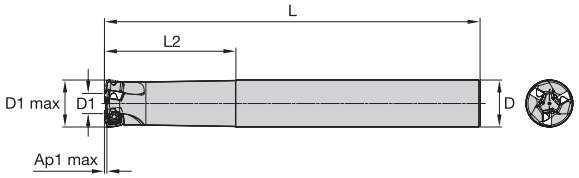
Screw-On End Mills • Inch

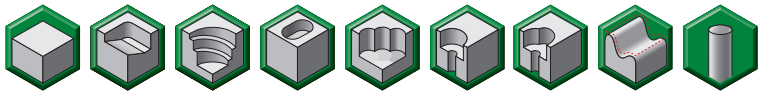




order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6733676	VXF125Z03M16XD12	1.250	.537	1.142	.669	M16	1.700	.394	.106	3	2.6°	31500	Yes	.42

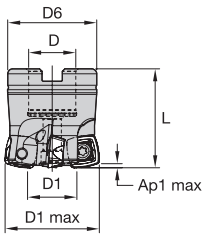
Cylindrical End Mills • Inch

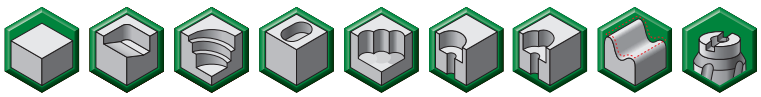




order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6733677	VXF125Z03C125XD12L1000	1.250	.537	1.250	10.000	3.500	.098	3	2.6°	31500	Yes	3.09

Shell Mills • Inch



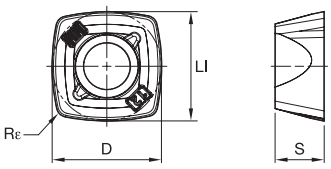


order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6596763	VXF150Z04S075XD12	1.500	.785	.750	1.417	1.575	.098	4	1.0°	27500	Yes	.38
6596764	VXF200Z05S075XD12	2.000	1.284	.750	1.811	1.575	.098	5	.9°	22500	Yes	.69
6596765	VXF200Z06S075XD12	2.000	1.284	.750	1.811	1.575	.098	6	.9°	22500	Yes	.72
6596766	VXF250Z05S100XD12	2.500	1.784	1.000	1.969	1.575	.098	5	.6°	19500	Yes	.92
6596767	VXF250Z07S100XD12	2.500	1.784	1.000	1.969	1.575	.098	7	.6°	19500	Yes	.99
6596768	VXF300Z05S100XD12	3.000	2.283	1.000	2.087	1.969	.098	5	.5°	17500	Yes	1.56
6596769	VXF300Z08S100XD12	3.000	2.283	1.000	2.087	1.969	.098	8	.5°	17500	Yes	1.76
6596770	VXF400Z06S125XD12	4.000	3.283	1.250	2.559	1.969	.098	6	.3°	14500	Yes	3.10
6596780	VXF400Z09S125XD12	4.000	3.283	1.250	2.559	1.969	.098	9	.3°	14500	Yes	3.34
6596781	VXF500Z08S150XD12	5.000	4.283	1.500	3.150	2.480	.098	8	.2°	13000	Yes	6.50

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

Inserts • XDPT-MM • Best Fit for Pocketing and Profiling Operations

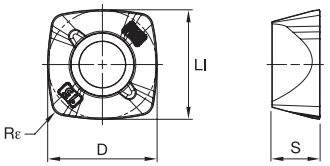


● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT120512ERMM	XDPT120512ERMM	4	12,70	.500	5,56	.219	12,70	.500	1,20	.047	6596438	-	6596439

Inserts • XDPT-MH • Dedicated Geometry for Heavy Roughing



● first choice
○ alternate choice

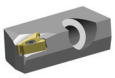
P	●	●	○
M	●	●	●
K	○		
N			
S	●	○	●
H			

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WP40PM	WS40PM
XDPT120515SRMH	XDPT120515SRMH	4	12,70	.500	5,56	.219	12,70	.500	1,50	.059	-	6596440	-

For M4000 cartridge milling system, please see page 12.

VSM890™-12
M4000CA-XN10
(MM6433216)

P M K S



Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P3–P4	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M1–M2	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
M3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S1–S2	XDPT-MM	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S3	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM
S4	XDPT-MM	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WP40PM

Recommended Starting Speeds [SFM]*

Material Group		WP25PM			WP40PM			WS40PM		
P	1	1295	**1115**	1065	1165	**1015**	970	–	**–**	–
	2	1085	**950**	785	985	**855**	705	–	**–**	–
	3	1000	**855**	690	900	**770**	625	–	**–**	–
	4	885	**720**	590	805	**675**	525	–	**–**	–
	5	720	**675**	590	675	**605**	525	675	**575**	475
	6	655	**490**	395	590	**460**	360	590	**425**	310
M	1	805	**705**	655	770	**675**	605	820	**675**	560
	2	720	**625**	510	690	**590**	490	705	**575**	475
	3	560	**475**	375	510	**460**	360	575	**425**	330
S	1	165	**130**	100	165	**130**	115	165	**130**	100
	2	165	**130**	100	165	**130**	115	165	**130**	100
	3	195	**165**	100	195	**165**	115	195	**165**	100
	4	280	**195**	130	260	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .055 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.020	**.058**	.109	.014	**.039**	.067	.010	**.028**	.047	.009	**.025**	.041	.008	**.022**	.037	.E..MM
.S..MH	.036	**.080**	.141	.025	**.052**	.080	.019	**.037**	.056	.016	**.032**	.048	.015	**.029**	.043	.S..MH

At .070 Axial Depth of Cut (AP1)

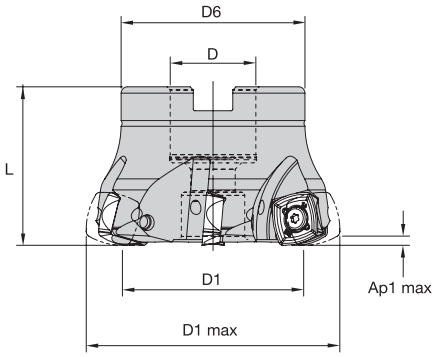
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.018	**.051**	.094	.013	**.035**	.059	.009	**.025**	.042	.008	**.022**	.037	.007	**.020**	.033	.E..MM
.S..MH	.032	**.070**	.118	.023	**.046**	.071	.017	**.033**	.050	.014	**.029**	.043	.013	**.026**	.039	.S..MH

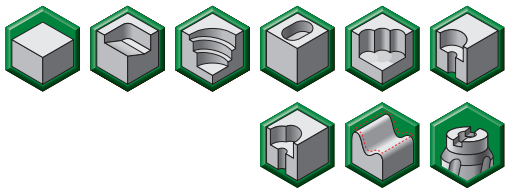
At .100 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.015	**.043**	.076	.011	**.029**	.050	.008	**.022**	.036	.007	**.019**	.031	.006	**.017**	.028	.E..MM
.S..MH	.027	**.058**	.093	.019	**.039**	.059	.014	**.028**	.042	.012	**.024**	.036	.011	**.022**	.033	.S..MH

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

Shell Mills • Inch



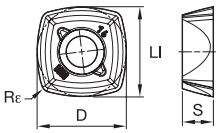


order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
6597783	**VXF200Z04S075XE16**	2.000	1.103	.750	1.772	1.772	.138	4	1.4°	27000	Yes	.72
6597784	**VXF250Z05S100XE16**	2.500	1.602	1.000	1.969	1.575	.138	5	1.0°	22000	Yes	.79
6597785	**VXF300Z06S100XE16**	3.000	2.102	1.000	2.087	1.969	.138	5	.7°	19500	Yes	1.61
6597788	**VXF400Z07S150XE16**	4.000	3.100	1.500	3.189	2.480	.138	5	.5°	16500	Yes	4.35
6597789	**VXF500Z10S150XE16**	5.000	4.099	1.500	3.307	2.480	.138	10	.4°	14500	Yes	6.39

FOR SPARE PARTS, PLEASE VISIT WIDIA NOVO™ OR WIDIA.COM.

MOUNTING SCREWS ARE NOT INCLUDED IN STANDARD PACKAGING.

Inserts • XEPT-MM



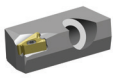
● first choice
○ alternate choice

P		●	○
M		●	●
K		○	
N			
S		●	●
H			

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	S mm	S in	D mm	D in	Rε mm	Rε in	WP25PM	WS40PM
XEPT160516ERMM	**XEPT160516ERMM**	4	16,00	.630	5,56	.219	16,00	.630	1,60	.064	6596823	6596824

For M4000 cartridge milling system, please see page 12.

VSM890™-12
M4000CA-XN10
(MM6433216)



P M K S

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
P3–P4	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
P5–P6	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
M1–M2	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
M3	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S1–S2	XEPT-MM	WP25PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S3	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM
S4	XEPT-MM	WS40PM	**XEPT-MM**	**WS40PM**	XEPT-MM	WS40PM

Recommended Starting Speeds [SFM]*

Material Group		WP25PM			WS40PM		
P	1	1295	**1115**	1065	–	**–**	–
	2	1085	**950**	785	–	**–**	–
	3	1000	**855**	690	–	**–**	–
	4	885	**720**	590	–	**–**	–
	5	720	**675**	590	675	**575**	475
	6	655	**490**	395	590	**425**	310
M	1	805	**705**	655	820	**675**	560
	2	720	**625**	510	705	**575**	475
	3	560	**475**	375	575	**425**	330
S	1	165	**130**	100	165	**130**	100
	2	165	**130**	100	165	**130**	100
	3	195	**165**	100	195	**165**	100
	4	280	**195**	130	230	**195**	115

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

At .080 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.016	**.051**	.086	.011	**.036**	.061	.009	**.027**	.045	.007	**.024**	.039	.007	**.022**	.036	.E..MM

At .100 Axial Depth of Cut (AP1)

Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.014	**.046**	.077	.010	**.033**	.055	.008	**.024**	.041	.007	**.021**	.036	.006	**.019**	.032	.E..MM

At .140 Axial Depth of Cut (AP1)

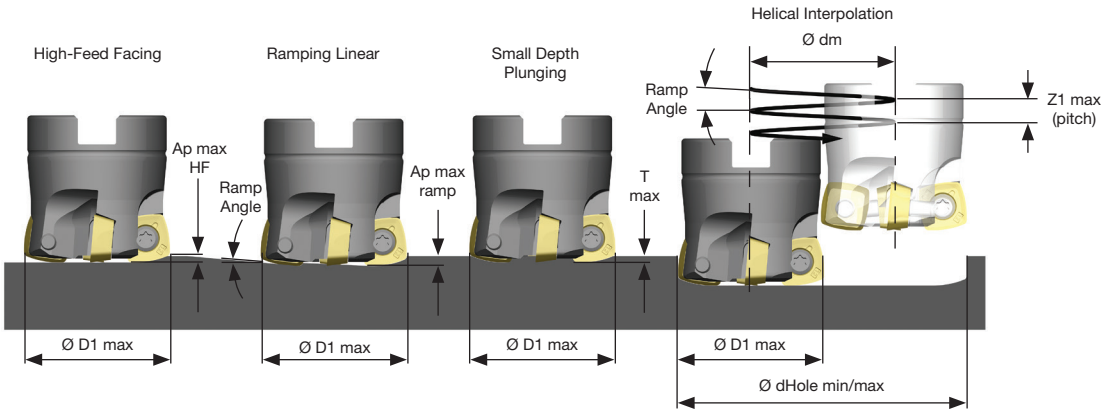
Insert Geometry	Recommended Starting Feed per Tooth (Fz) in Relation to % of Radial Engagement (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.E..MM	.012	**.039**	.066	.009	**.028**	.047	.007	**.021**	.035	.006	**.018**	.030	.005	**.017**	.028	.E..MM

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

VXF™

High-Feed Mills • VXF-07, VXF-09, VXF-12, and VXF-16

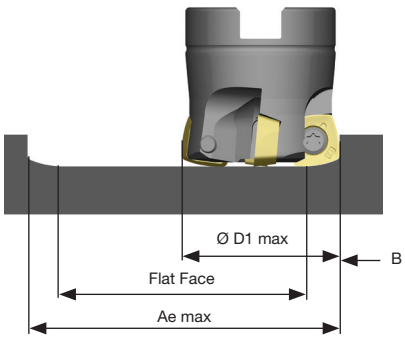
Best Practices



		High-feed Facing	Ramping Linear		Helical Interpolation				Small Depth Plunging
series	D1 max	Ap max HF	Ramp Angle max	Ap max Ramp	Ramp Angle max	d Hole min	d Hole max	Z1 max Helical	T max
VXF-07	.625	.024	8.2	.024	8.2	.850	1.170	.024	.018
	.750	.024	6.7	.024	6.7	1.100	1.420	.024	.018
	1.000	.024	4.3	.024	4.3	1.600	1.920	.024	.018
	1.250	.024	2.7	.024	2.7	2.100	2.420	.024	.018
	1.500	.024	1.0	.024	1.0	2.550	2.920	.024	.018
	2.000	.024	0.7	.024	0.7	3.400	3.920	.024	.018
VXF-09	1.000	.035	2.7	.039	2.7	1.370	1.920	.039	.025
	1.250	.035	1.5	.039	1.5	1.870	2.420	.039	.025
	1.500	.035	1.1	.039	1.1	2.370	2.920	.039	.025
	2.000	.035	0.7	.039	0.7	3.370	3.920	.039	.025
VXF-12	1.500	.051	1.0	.070	1.0	2.130	2.920	.070	.031
	2.000	.051	0.9	.070	0.9	3,130	3.920	.070	.031
	2.500	.051	0.6	.070	0.6	4.130	4.920	.070	.031
	3.000	.051	0.5	.070	0.5	5.130	5.920	.070	.031
	4.000	.051	0.3	.070	0.3	7.130	7.920	.070	.031
	5.000	.051	0.2	.070	0.2	9.130	9.920	.070	.031
VXF-16	2.000	.080	1.4	.100	1.4	3,000	4,000	.100	.027
	2.500	.080	1.0	.100	1.0	4,000	5,000	.100	.027
	3.000	.080	0.7	.100	0.7	5,000	6,000	.100	.027
	4.000	.080	0.5	.100	0.5	7,000	8,000	.100	.027
	5.000	.080	0.4	.100	0.4	8,820	9,920	.100	.027

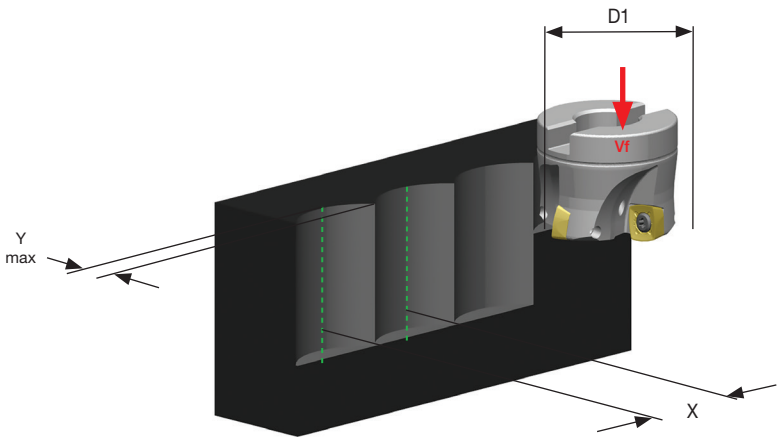
Ødm = ØHole–ØD1 max
Z1 = Ødm x 3,14 x tan ramp angle. Z1 ≤ Z1 max and ≤ ramp angle max
Ramp angle = arc tan x ((Z1)/Ødm x 3,14))

series	D1 max	X
VXF-07	.625–2.000	.165
VXF-09	1.000–2.000	.268
VXF-12	1.250–5.000	.358
VXF-16	2.000–5.000	.449



Ae max ≤ 2 x ØD1 max–2 x B
Flat Face = Ae max–2 x B

Z-Axis Plunge Milling



VXF-07

D1 max	Y max	X
.625	0.118	0.489
.750	0.118	0.546
1.000	0.118	0.645
1.250	0.118	0.731
1.500	0.118	0.808
2.000	0.118	0.942

VXF-09

D1 max	Y max	X
1,000	0.236	0.849
1.250	0.236	0.978
1.500	0.236	1.092
2.000	0.236	1.290

VXF-12

D1 max	Y max	X
1.250	.354	-
1.500	.354	1.274
2.000	.354	1.527
2.500	.354	1.743
3.000	.354	1.936
4.000	.354	2.272
5.000	.354	2.565

VXF-16

D1 max	Y max	X
2.000	0.512	1.746
2.500	0.512	2.018
3.000	0.512	2.257
4.000	0.512	2.673
5.000	0.512	3.032

Feed Rate Guide • Z-Axis Plunge Milling • fz (IPT)

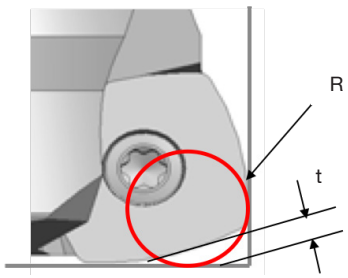
Light Machining	General Purpose	Heavy Machining

	Insert Geometry	Recommended Starting Feed per Tooth (Fz)			Insert Geometry	Y max
VXF-07	.E..MM	.002	**.006**	–	.E..MM	.118
	.S..MH	.004	**.008**	–	.S..MH	.118
VXF-09	.E..MM	.003	**.008**	.012	.E..MM	.236
	.S..MH	.004	**.009**	.014	.S..MH	.236
VXF-12	.E..MM	.003	**.008**	.012	.E..MM	.354
	.S..MH	.004	**.010**	.015	.S..MH	.354
VXF-16	.E..MM	.003	**.009**	.015	.E..MM	.512

CAM Programming

Programming Data

insert size	insert radius	R (to be programmed)	t
07	1/32	0.055	0.016
	1	0.059	0.017
09	1/32	0.078	0.028
	3/64	0.091	0.026
12	3/64	0.106	0.038
	1.5	0.110	0.037
16	3/64	0.165	0.057

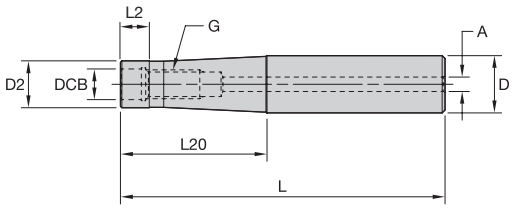


Heavy Metal Extensions

Anti-Vibration Tungsten Alloy with Through Coolant

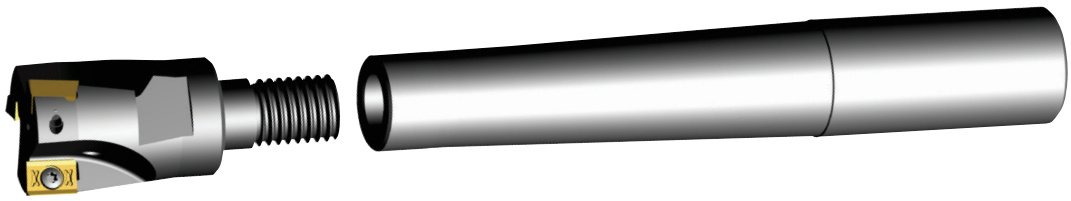
Cylindrical Shank Extensions for Modular Heads

ERICKSON™



order number	catalog number	DCB	G	D	D2	A	L	L2	L20
5673704	M-13-M8-CA.625-3.543	.335	M8	.625	.512	.158	3.543	—	1.600
5673705	M-13-M8-CA.625-4.331	.335	M8	.625	.512	.158	4.331	—	2.500
5672833	M-13-M8-CA.625-6.693	.335	M8	.625	.512	.158	6.693	—	4.750
5672470	M-18-M10-CA.750-4.331	.413	M10	.750	.709	.158	4.331	—	2.500
5672834	M-18-M10-CA.750-5.118	.413	M10	.750	.709	.158	5.118	—	3.000
5672990	M-18-M10-CA.750-6.693	.413	M10	.750	.709	.158	6.693	—	4.750
5672835	M-21-M12-CA1-5.157	.492	M12	1.000	.827	.157	5.157	.476	3.000
5672991	M-21-M12-CA1-6.142	.492	M12	1.000	.827	.158	6.142	.476	4.000
5673353	M-21-M12-CA1-7.126	.492	M12	1.000	.827	.158	7.126	.476	5.000
5673588	M-21-M12-CA1-8.110	.492	M12	1.000	.827	.158	8.110	.476	6.000
5672471	M-21-M12-CA1-9.094	.492	M12	1.000	.827	.158	9.095	.476	6.992
5672992	M-29-M16-CA1.25-6.3	.669	M16	1.250	1.142	1.969	6.299	.476	4.000
5672836	M-29-M16-CA1.25-8.27	.669	M16	1.250	1.142	.197	8.268	.476	6.000
5672993	M-29-M16-CA1.25-10.2	.669	M16	1.250	1.142	1.969	10.236	.476	8.000
5673706	M-29-M16-CA1.25-12.2	.669	M16	1.250	1.142	.197	12.205	.476	10.000

NOTE: Cylindrical shank extensions can be used with all modular heads found in several product family series.



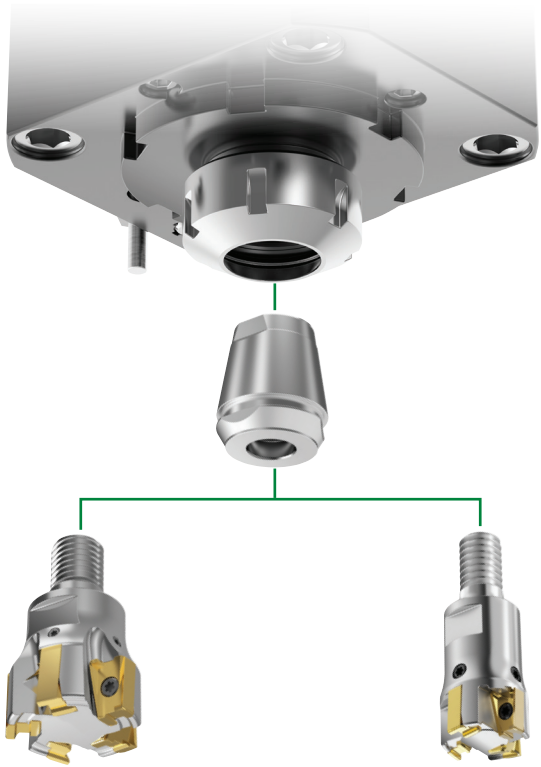
Compatible with all Standard ER Collet Chucks and ER Driven Units

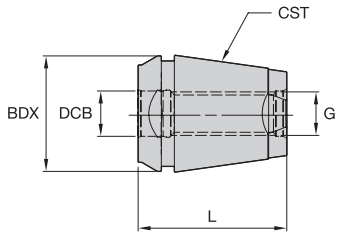
Solid ER Collets

Threaded solid ER collets turn CNC lathe machines into multitasking machines by providing access of any small diameter screw-on milling cutter to ER driven units.

These new solid ER collets increase machine utilization through modular flexibility.

The short projection from the face of the collet nut provides rigid toolholding and a smaller required machine envelope.





ERICKSON™

order number	catalog number	CST	DCB	G	BDX	L
6587968	**ER25STM08**	ER25	9	M8	26	35
6587969	**ER25STM10**	ER25	11	M10	26	35
6587970	**ER25STM12**	ER25	13	M12	26	35
6588001	**ER32STM08**	ER32	9	M8	33	41
6588002	**ER32STM10**	ER32	11	M10	33	41
6588003	**ER32STM12**	ER32	13	M12	33	41
6588004	**ER32STM16**	ER32	17	M16	33	41
6588005	**ER40STM08**	ER40	9	M8	41	47
6588006	**ER40STM10**	ER40	11	M10	41	47
6588007	**ER40STM12**	ER40	13	M12	41	47
6588008	**ER40STM16**	ER40	17	M16	41	47

VSM

VICTORY™ SHOULDER MILLS EXPANSION

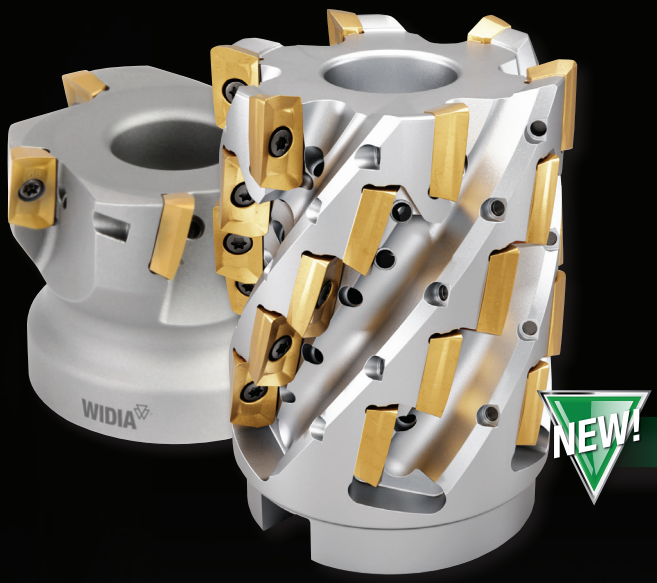
THE MOST VERSATILE 0° SHOULDER MILL PLATFORM IN THE WIDIA™ PORTFOLIO

AEROSPACE

GENERAL ENGINEERING

TRANSPORTATION

ENERGY



VSM11™

Ap Capabilities: Up to .453"

Screw-On End Mills: .75–1.5"

Weldon® End Mills: .625–1.25"

Cylindrical End Mills: .5–1.25"

Shell Mills: 1.5–4"

Helical Cutters: 1–2"

M4000 Cartridge Milling System: 6–12"

VSM11H Helical Cutters

Ap Capabilities: Up to 2.000"

Weldon End Mills: 1–1.25"

Shell Mills: 1.5–2"

VSM17™

Ap Capabilities: Up to .638"

Screw-On End Mills: 1–1.5"

Weldon End Mills: 1–1.5"

Cylindrical End Mills: 1–1.5"

Shell Mills: 1.5–6"

Helical Cutters: 2–2.5"

M4000 Cartridge Milling System: 6–12"

VSM17H Helical Cutters

Ap Capabilities: 4.100"

Shell Mills: 2–3"

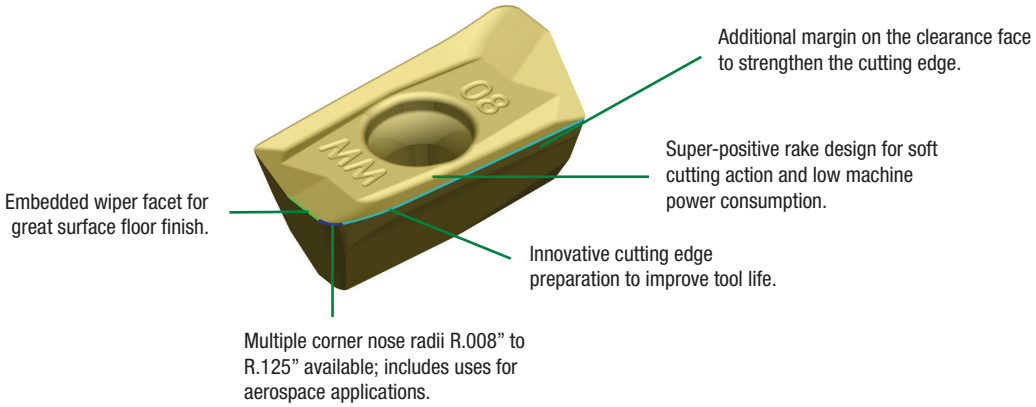
WIDIA™

widia.com

VSM11™

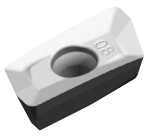
0°/90° Shoulder Mills • VSM11

- True 0° shoulder milling platform; up to Ap1 max = .453".
- Aggressive ramping capability up to 12.5° with end mills with a diameter of .625".
- Optimized chip gash for improv ed cutter stability and chip flow.
- Well-guided internal coolant supply to the cutting edge.
- Best-in-class milling grade WS40PM boosts productivity when machining stainless steel and high-temp alloys.



Geometries for all material groups in shoulder milling applications.

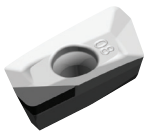
-ALP



N

Roughing and finishing of aluminum alloys. High precision. Periphery ground.

-PCD



N

Roughing and finishing of aluminum alloys. Abrasive non-ferrous materials. High precision. Periphery ground.

-ML

P M S H

Light machining and finishing. First choice for stainless steel and titanium. Periphery ground.

-MM

P M K S H

Medium machining. First choice for general purpose. Precision pressed to size.

-MH

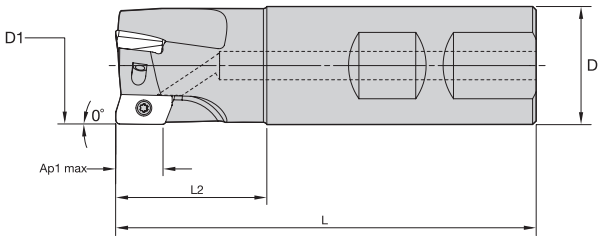
P M K S

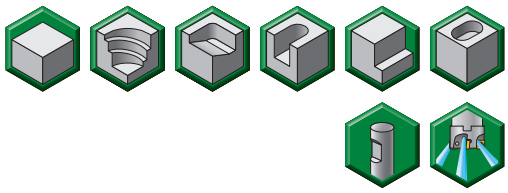
First choice for heavy-duty machining. Steel and cast iron materials. Precision pressed to size.

Finishing Capabilities/Lower Cutting Forces

Geometry Strengthening

Weldon® End Mills • Inch

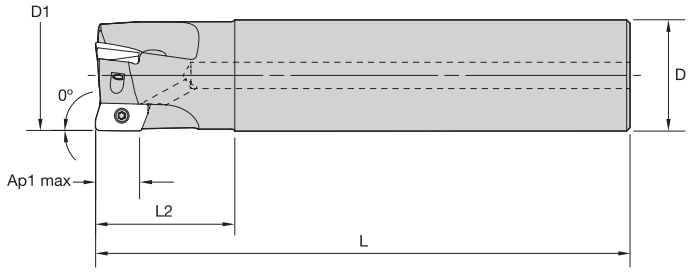


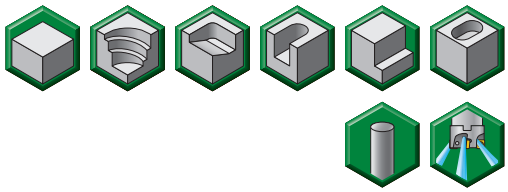


order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416416	VSM11D062Z02W062XD11	.625	.625	2.750	.844	.454	2	12.5°	41700	Yes	.18
5416417	VSM11D075Z02W075XD11	.750	.750	3.200	1.170	.455	2	8.6°	36300	Yes	.30
5416418	VSM11D075Z03W075XD11	.750	.750	3.200	1.170	.455	3	8.6°	36300	Yes	.31
6025663	VSM11D100Z03W075XD11	1.000	.750	3.250	1.220	.453	3	5.1°	29900	Yes	.37
5416419	VSM11D100Z03W100XD11	1.000	1.000	3.500	1.220	.453	3	5.1°	29900	Yes	.62
5416450	VSM11D100Z04W100XD11	1.000	1.000	3.500	1.220	.453	4	5.1°	29900	Yes	.64
5416451	VSM11D125Z04W125XD11	1.250	1.250	4.000	1.720	.451	4	3.6°	25900	Yes	1.12
5416452	VSM11D125Z05W125XD11	1.250	1.250	4.000	1.720	.451	5	3.6°	25900	Yes	1.12

NOTE: Weldon type not recommended for finishing operations.

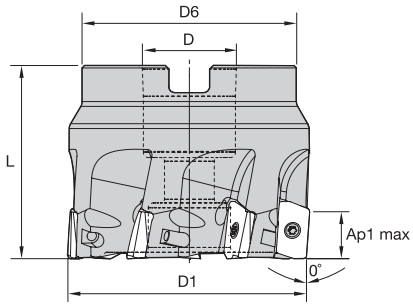
Cylindrical End Mills (Regular and Long Version) • Inch

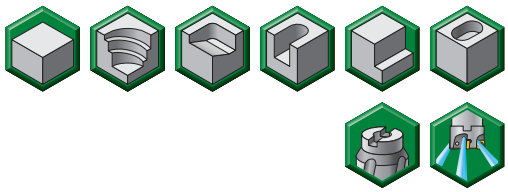




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416485	VSM11D050Z01C062XD11L400	.500	.625	4.000	.800	.461	1	4.2°	50400	Yes	.29
5416486	VSM11D062Z02C062XD11L400	.625	.625	4.000	1.000	.454	2	12.5°	41700	Yes	.28
5416487	VSM11D075Z02C075XD11L450	.750	.750	4.500	1.100	.455	2	8.6°	36300	Yes	.46
5416726	VSM11D075Z02C075XD11L670	.750	.750	6.700	1.610	.455	2	8.6°	36300	Yes	.69
5416488	VSM11D075Z03C075XD11L450	.750	.750	4.500	1.100	.455	3	8.6°	36300	Yes	.47
5416727	VSM11D075Z03C075XD11L670	.750	.750	6.700	1.610	.455	3	8.6°	36300	Yes	.70
6025664	VSM11D100Z03C075XD11L480	1.000	.750	4.800	1.282	.453	3	5.1°	29900	Yes	–
5416489	VSM11D100Z03C100XD11L480	1.000	1.000	4.800	1.250	.453	3	5.1°	29900	Yes	.90
5416728	VSM11D100Z03C100XD11L800	1.000	1.000	8.000	2.100	.453	3	5.1°	29900	Yes	1.54
5416520	VSM11D100Z04C100XD11L480	1.000	1.000	4.800	1.250	.453	4	5.1°	29900	Yes	.92
5416729	VSM11D100Z04C100XD11L800	1.000	1.000	8.000	2.100	.453	4	5.1°	29900	Yes	1.56
5416750	VSM11D125Z03C125XD11L980	1.250	1.250	9.800	2.510	.451	3	3.6°	25900	Yes	3.00
5416522	VSM11D125Z05C125XD11L520	1.250	1.250	5.200	1.600	.451	5	3.6°	25900	Yes	1.56

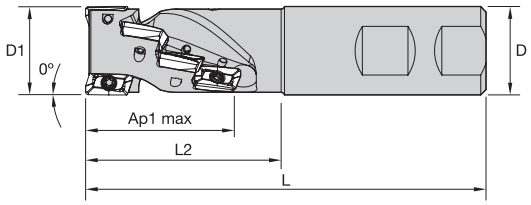
Shell Mills • Inch





order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416391	**VSM11D150Z04S075XD11**	1.500	.750	1.420	1.575	.449	4	2.8°	23300	Yes	.41
5416392	**VSM11D150Z06S075XD11**	1.500	.750	1.420	1.575	.449	6	2.8°	23300	Yes	.42
5416393	**VSM11D200Z05S075XD11**	2.000	.750	1.750	1.575	.446	5	1.9°	19700	Yes	.79
5416394	**VSM11D200Z08S075XD11**	2.000	.750	1.750	1.575	.446	8	1.9°	19700	Yes	.80
5416395	**VSM11D250Z06S075XD11**	2.500	.750	1.750	1.575	.446	6	1.5°	17400	Yes	1.19
5416396	**VSM11D250Z09S075XD11**	2.500	.750	1.750	1.575	.446	9	1.5°	17400	Yes	1.21
5416397	**VSM11D300Z08S100XD11**	3.000	1.000	2.190	1.750	.446	8	1.2°	15700	Yes	1.96
5416399	**VSM11D400Z09S150XD11**	4.000	1.500	3.380	2.000	.446	9	.9°	13500	Yes	3.95

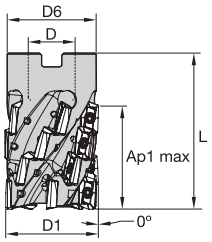
Helical End Mills with Weldon® Shank



order number	catalog number	D1	D	L	L2	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740596	**VSM11H100Z02W100XD11**	1.000	1.000	4	2.200	1.690	8	2	4.5°	30000	Yes	.71
6740598	**VSM11H125Z03W125XD11**	1.250	1.250	5	2.200	1.650	12	3	3.2°	26500	Yes	1.24
6740599	**VSM11H125Z04W125XD11**	1.250	1.250	5	2.200	1.650	16	4	3.2°	26500	Yes	1.21

NOTE: Z = number of pockets; ZU = number of flutes.

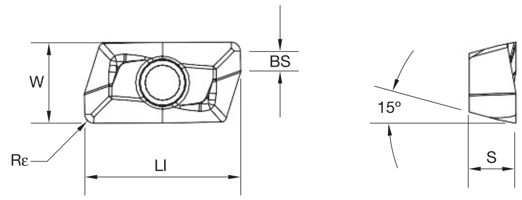
Helical Shell Mills



order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply	lbs
6740600	**VSM11H150Z04S075XD11**	1.500	.750	1.420	2	1.650	16	4	2.4°	22100	Yes	.66
6740671	**VSM11H150Z05S075XD11**	1.500	.750	1.420	2	1.650	20	5	2.4°	22100	Yes	.64
6740672	**VSM11H200Z04S075XD11**	2.000	.750	1.750	3	2.000	20	4	1.8°	19800	Yes	1.28
6740673	**VSM11H200Z06S075XD11**	2.000	.750	1.750	3	2.000	30	6	1.8°	19800	Yes	1.20

NOTE: Z = number of pockets; ZU = number of flutes.

Inserts • XDCT-ALP



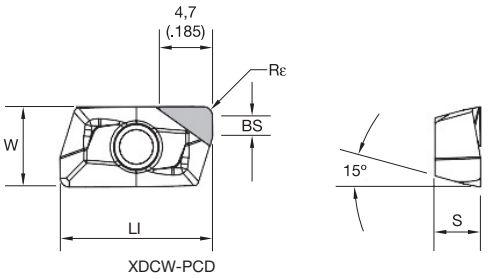
XDCT-ALP

● first choice
○ alternate choice

	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P						○	●	●		○	●
M						●	○	●		●	●
K		●	●			○	○				
N	●			●	●						
S						●		○	●	●	●
H											

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDCT110402PDFRALP	XDCT1100RALP	2	13,42	.529	2,29	.090	4,00	.157	6,90	.272	0,20	.008	—	—	–	–	–	6407444	6407445	–	–	–	–	–	–
XDCT110404PDFRALP	XDCT1101RALP	2	13,43	.529	2,09	.082	4,00	.157	6,90	.272	0,40	.016	0,02	.001	–	–	–	5933940	5417054	–	–	–	–	–	–
XDCT110408PDFRALP	XDCT1102RALP	2	13,44	.529	1,69	.067	4,00	.157	6,90	.272	0,80	.031	0,02	.001	–	–	–	5936171	5417053	–	–	–	–	–	–
XDCT110412PDFRALP	XDCT1103RALP	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,02	.001	–	–	–	6055634	6055635	–	–	–	–	–	–
XDCT110416PDFRALP	XDCT1104RALP	2	13,44	.529	0,88	.035	4,00	.157	6,89	.271	1,60	.063	0,02	.001	–	–	–	6055598	6055599	–	–	–	–	–	–
XDCT110420PDFRALP	XDCT1105RALP	2	13,44	.529	0,49	.019	4,00	.157	6,89	.271	2,00	.078	—	—	–	–	–	6407446	6407447	–	–	–	–	–	–
XDCT110424PDFRALP	XDCT1106RALP	2	13,44	.529	0,16	.006	4,00	.157	6,88	.271	2,40	.095	0,02	.001	–	–	–	6055600	6055631	–	–	–	–	–	–
XDCT110432PDFRALP	XDCT1108RALP	2	12,86	.506	—	—	4,00	.157	6,89	.271	3,20	.125	0,02	.001	–	–	–	6055632	6055633	–	–	–	–	–	–

Inserts • XDCW-PCD



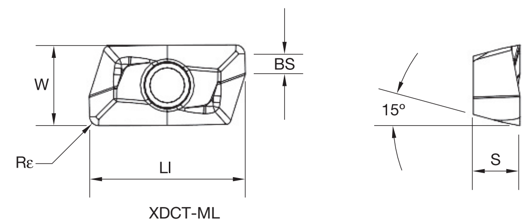
XDCW-PCD

● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P							○	●	●		○	●
M							●	○	●		●	●
K			●	●			○	○				
N		●			●	●						
S							●		○	●	●	●
H												

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	5415420	5415421
XDCW110404PDFRPCD	**XDCW1101RPCD**	1	13,41	.528	2,22	.088	4,00	.157	6,90	.272	0,40	.016	0,02	.001	▮	
XDCW110408PDFRPCD	**XDCW1102RPCD**	1	13,42	.528	1,80	.071	4,00	.157	6,90	.272	0,80	.031	0,02	.001		▮

Inserts • XDCT-ML

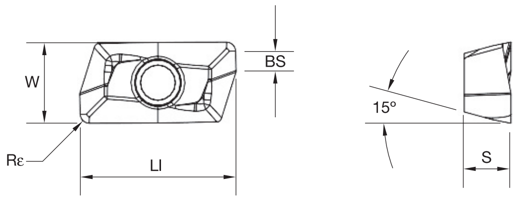


● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P							○	●	●		○	●
M							●	○	●		●	●
K			●	●			○	○				
N		●			●	●						
S							●		○	●	●	●
H												

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDCT110404PDERML	XDCT1101ERML	2	13,43	.529	2,09	.082	4,00	.157	6,90	.272	0,40	.016	0,04	.002	-	-	6242456	-	-	5536671	5536670	5642230	-	6180174	-
XDCT110408PDERML	XDCT1102ERML	2	13,44	.529	1,69	.067	4,00	.157	6,90	.272	0,80	.031	0,04	.002	-	5415549	6242457	-	-	5415548	5415547	5545065	5517826	6180173	5415546
XDCT110412PDERML	XDCT1103ERML	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	–	–	-	-	-	-	-	6408003	-	-	-	6408002	-
XDCT110416PDERML	XDCT1104ERML	2	13,44	.529	0,88	.035	4,00	.157	6,89	.271	1,60	.063	0,04	.002	-	-	-	-	-	5964861	-	5964810	-	6408004	-
XDCT110420PDERML	XDCT1105ERML	2	13,44	.529	0,49	.019	4,00	.157	6,89	.271	2,00	.078	–	–	-	-	-	-	-	-	-	-	-	6408005	-
XDCT110424PDERML	XDCT1106ERML	2	13,44	.529	0,16	.006	4,00	.157	6,88	.271	2,40	.095	–	–	-	-	-	-	-	-	-	-	-	6408006	-
XDCT110432PDERML	XDCT1108ERML	2	12,86	.506	–	–	4,00	.157	6,89	.271	3,20	.125	–	–	-	-	-	-	-	-	-	-	-	6408007	-

Inserts • XDPT-MM



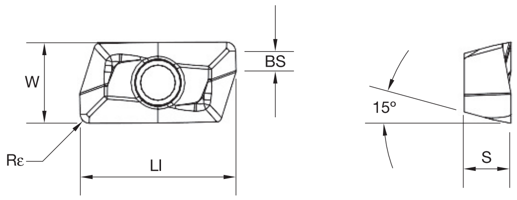
XDPT-MM

● first choice
○ alternate choice

	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P						○	●	●		○	●
M						●	○	●		●	●
K		●	●			○	○				
N	●			●	●						
S						●		○	●	●	●
H											

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDPT110404PDSRMM	**XDPT1101SRMM**	2	13,49	.531	2,06	.081	4,13	.163	6,94	.273	0,39	.015	0,06	.003	-	5415428	6242458	-	-	5642237	5415450	5642231	-	6180149	-
XDPT110408PDSRMM	**XDPT1102SRMM**	2	13,50	.531	1,66	.065	4,13	.163	6,94	.273	0,78	.031	0,06	.003	-	5415315	6242459	-	-	5415319	5415318	5545063	5519921	6180148	5415317
XDPT110412PDSRMM	**XDPT1103SRMM**	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,06	.003	-	5415310	-	-	-	5415314	5415313	5642232	-	6180150	5415312
XDPT110416PDSRMM	**XDPT1104SRMM**	2	13,51	.532	0,85	.034	4,13	.163	6,95	.274	1,60	.062	0,06	.003	-	5415250	-	-	-	5415254	5415253	5642233	-	6180172	-
XDPT110420PDSRMM	**XDPT1105SRMM**	2	13,51	.532	0,45	.018	4,13	.163	6,95	.274	2,00	.078	0,06	.003	-	-	-	-	-	5980399	5980400	5980398	-	6408095	-
XDPT110424PDSRMM	**XDPT1106SRMM**	2	13,37	.526	—	—	4,01	.158	6,94	.273	2,40	.094	0,06	.003	-	-	-	-	-	5901355	-	5901354	-	6408096	-
XDPT110431PDSRMM	**XDPT1108SRMM**	2	12,94	.509	—	—	4,01	.158	6,94	.273	3,10	.122	0,06	.003	-	5415422	-	-	-	5415426	5415425	5642234	5517827	6279204	-

Inserts • XDPT-MH



XDPT-MH

● first choice
○ alternate choice

		WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
P							○	●	●		○	●
M							●	○	●		●	●
K			●	●			○	○				
N		●			●	●						
S							●		○	●	●	●
H												

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WDN10U	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WS40PM	WU35PM
XDPT110408PDSRMH	XDPT1102SRMH	2	13,44	.529	1,68	.066	4,00	.157	6,90	.272	0,79	.031	0,13	.005	-	5415255	-	-	-	-	5415257	5545064	-	6408098	5415256
XDPT110412PDSRMH	XDPT1103SRMH	2	13,44	.529	1,29	.051	4,00	.157	6,90	.272	1,20	.047	0,13	.005	-	5415360	-	-	-	-	5415362	5642235	-	6408099	-
XDPT110416PDSRMH	XDPT1104SRMH	2	13,44	.529	0,90	.035	4,00	.157	6,90	.272	1,59	.062	0,13	.005	-	5415364	-	-	-	-	5415366	5642236	-	6408100	-

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	XDPT-MH	WP40PM
P3–P4	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WP35CM**	XDPT-MH	WP40PM
M1–M2	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
M3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
K1–K2	XDCT-ML	WK15CM	**XDPT-MM**	**WK15CM**	XDPT-MH	WK15CM
K3	XDCT-ML	WP35CM	**XDPT-MM**	**WP35CM**	XDPT-MH	WP35CM
N1–N2	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	XDCT-ALP	WN25PM
N3	XDCW-PCD	WDN10U	**XDCW-PCD**	**WDN10U**	XDCW-PCD	WDN10U
S1–S2	XDCT-ML	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
S3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
S4	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
H1	XDCT-ML	WP25PM	**XDPT-MM**	**WP25PM**	–	–

Recommended Starting Speeds [SFM]*

Material Group		WDN10U			WK15CM			WK15PM			WN10HM			WN25PM			WP25PM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1085	**935**	885
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	900	**785**	655
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	835	**705**	575
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	740	**605**	490
	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	605	**560**	490
	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	540	**410**	330
M	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	675	**590**	540
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	605	**525**	425
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	460	**395**	310
K	1	–	–	–	1380	**1265**	1115	885	**805**	705	–	–	–	–	–	–	755	**675**	605
	2	–	–	–	1100	**970**	900	690	**625**	575	–	–	–	–	–	–	590	**525**	490
	3	–	–	–	920	**820**	755	575	**525**	475	–	–	–	–	–	–	490	**445**	395
N	1	13155	**11500**	9810	–	–	–	–	–	–	2605	**2275**	1965	3525	**3100**	2870	–	–	–
	2	5250	**4905**	4595	–	–	–	–	–	–	2605	**2275**	1965	3100	**2870**	2495	–	–	–
	3	5250	**4905**	4595	–	–	–	–	–	–	1835	**1590**	1375	3100	**2870**	2495	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	165	**130**	80
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	230	**165**	115
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	395	**295**	230

Material Group		WP35CM			WP40PM			WS30PM			WS40PM			WU35PM		
P	1	1495	**1295**	1215	970	**855**	805	–	–	–	–	–	–	855	**755**	705
	2	920	**835**	755	820	**705**	590	–	–	–	–	–	–	720	**625**	525
	3	835	**755**	675	755	**640**	525	–	–	–	–	–	–	655	**560**	460
	4	625	**575**	525	675	**560**	445	–	–	–	–	–	–	590	**490**	395
	5	855	**755**	690	560	**510**	445	–	–	–	560	**475**	395	490	**445**	395
	6	525	**445**	360	490	**375**	295	–	–	–	490	**360**	260	425	**330**	260
M	1	675	**605**	510	640	**560**	510	740	**655**	605	690	**560**	460	560	**490**	445
	2	605	**525**	460	575	**490**	410	675	**590**	475	590	**475**	395	510	**425**	360
	3	475	**425**	375	425	**375**	295	510	**445**	345	475	**360**	280	375	**330**	260
K	1	970	**870**	785	–	–	–	–	–	–	–	–	–	–	–	–
	2	770	**690**	625	–	–	–	–	–	–	–	–	–	–	–	–
	3	640	**575**	525	–	–	–	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	150	**130**	100	130	**115**	80	115	**100**	80
	2	–	–	–	–	–	–	150	**130**	100	130	**115**	80	115	**100**	80
	3	–	–	–	–	–	–	180	**150**	100	165	**130**	80	150	**115**	80
	4	–	–	–	–	–	–	230	**195**	130	195	**165**	100	195	**150**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

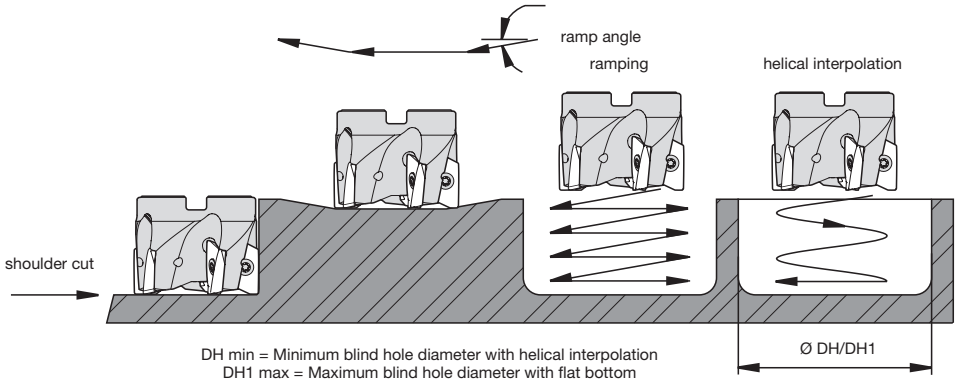
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)																Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..PCD	.005	**.007**	.011	.003	**.005**	.008	.003	**.004**	.006	.002	**.003**	.005	.002	**.003**	.005	.F..PCD
.F..ALP	.005	**.009**	.013	.003	**.006**	.009	.003	**.005**	.007	.002	**.004**	.006	.002	**.004**	.005	.F..ALP
.E..ML	.007	**.011**	.014	.005	**.008**	.010	.004	**.006**	.008	.003	**.005**	.007	.003	**.005**	.006	.E..ML
.S..MM	.009	**.013**	.019	.007	**.009**	.013	.005	**.007**	.010	.004	**.006**	.009	.004	**.006**	.008	.S..MM
.S..MH	.009	**.014**	.022	.007	**.010**	.016	.005	**.008**	.012	.004	**.007**	.010	.004	**.006**	.009	.S..MH

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

VSM11™

0°/90° Shoulder Mills • VSM11

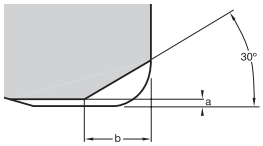
Best Practices



cutting diameter (D1)	max RPM	max ramp angle to steel body interference	max flat-bottom hole diameter (DH1 max)	min hole diameter (DH min)
.062	41700	12.500°	1.240	0.730
.075	36300	8.600°	1.490	0.980
1.00	29900	5.100°	1.990	1.480
1.25	25900	3.600°	2.490	1.980
1.50	23300	2.800°	3.000	2.490
2.00	19700	1.900°	4.000	3.490
2.50	17400	1.500°	5.000	4.490
3.00	15700	1.200°	6.000	5.490
4.00	13500	.900°	8.000	7.490

NOTE: For DH1 max, subtract the insert corner radius from the max hole diameter.

Modification Instructions for Use of Larger Radii Inserts (Shoulder Mills and Helical Mills)

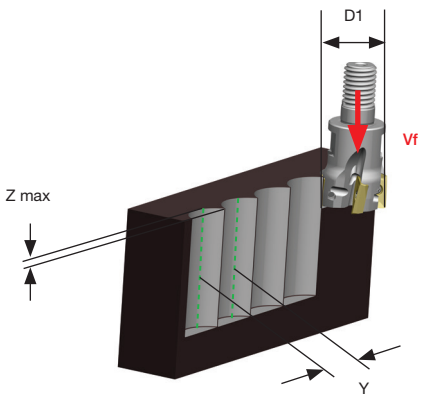


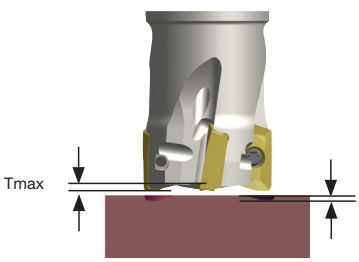
insert corner radius	material to remove a	material to remove b
.079–.122"	.008"	.071"

NOTE: Standard milling cutters will accept insert nose radii up to 0.062" without modification.

VSM11 Z-Axis Plunging

cutting diameter (D1)	Z max	Y
.75	.252	.1714
1	.252	.1982
1.25	.252	.2218
1.5	.252	.2432
2	.252	.2810
2.5	.252	.3143
3	.252	.3445
4	.252	.3979
5	.252	.4450
6	.252	.4875





Maximum axial plunge depth into full material

Tmax = .058”

VARIable by WIDIA™

VARIable by WIDIA is a new tooling program that offers customers more ways to save while reducing tooling costs. This program will help you save on steel costs based on the number of inserts you buy — the more inserts you buy, the more you save.

Contact your local WIDIA sales representative for more information.

*Available Product Families:

- M1200
- VSM890™
- VSM490-10™
- VSM490-15™
- VSM11™
- VSM17™
- WGC

*VHM17 cutters are not included in this program.

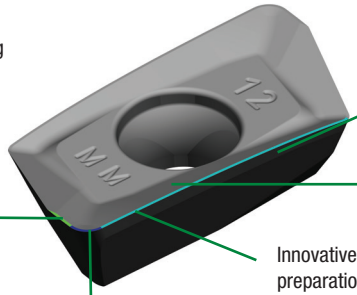
Program Guidelines For VARIable by WIDIA

- Applicable for U.S. only.
- Free tooling limited to steel with no additional discounts on carbide.
- Please reference the appropriate ordering code on your P.O. when order is placed.
- Offer applies to qualified, standard catalog products only (Ferts), and is not valid in combination with any other offer or on exchange of current WIDIA products.
- Purchased and free items must be on the same order number.
- Program to be used for new business opportunities and not for existing repeat business.
- All orders must be for immediate shipment. Previous purchases, scheduled agreements, contract releases, blanked orders, and price concession orders are not covered by this program.
- All transactions are final. No returns are permitted other than defective products.
- Program is void where prohibited by law. All local, state, and federal laws apply.
- Ongoing program until further notice.

VSM17™

0°/90° Shoulder Mills • VSM17

- True 0° shoulder milling platform; up to Ap1 max = .638".
- Aggressive ramping capability up to 8.5° with end mills with a diameter of 1".
- Optimized chip gash for improved cutter stability and chip flow.
- Well-guided internal coolant supply to the cutting edge.
- Best-in-class milling grade WS40PM boosts productivity when machining stainless steel and high-temp alloys.



Additional margin on the clearance face to strengthen the cutting edge.

Super-positive rake design for soft cutting action and low machine power consumption.

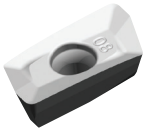
Embedded wiper facet for great surface floor finish.

Innovative cutting edge preparation to improve tool life.

Multiple corner nose radii R.016" to R.235" available; includes uses for aerospace applications.

Geometries for all material groups in shoulder milling applications.

- ALP



N

Roughing and finishing of aluminum alloys. High precision. Periphery ground.

-ML

P M S H

Light machining and finishing. First choice for stainless steel and titanium. Periphery ground.

-MM

P M K S H

Medium machining. First choice for general purpose. Precision pressed to size.

-MH

P M K S

First choice for heavy-duty machining. Steel and cast iron materials. Precision pressed to size.

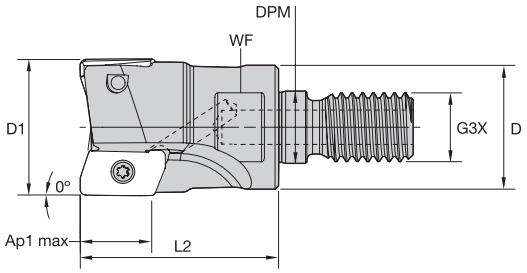
Finishing Capabilities/Lower Cutting Forces — Geometry Strengthening

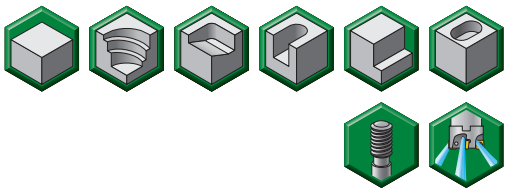
2x Higher Metal Removal Rate!

WIDIA™ CUSTOMER VICTORY

Specifications	Before VSM	WIDIA™
Workpiece	–	K2 – Ductile Iron
Insert	–	XDPT170408PESRMM
Grade	–	WK15CM
Cutter	–	VSM17D080Z7S27XD17
Diameter	–	3.15"
No. cutting edges (z)	6	7
Vc	525 SFM	**689 SFM**
Feed rate (fz)	.0031 IPT	**.0043" IPT**
Vf	12 IPM	**.1126 IPM**
Ap	.118"	**.118"**
ae	2.362"	**2.362"**
MRR	3.3 in^3/min	**7.3 in^3/min**
Coolant	Dry	**Dry**

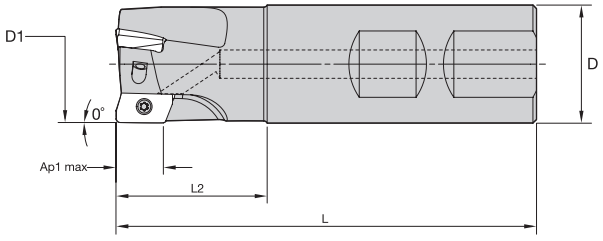
Screw-On End Mills • Inch

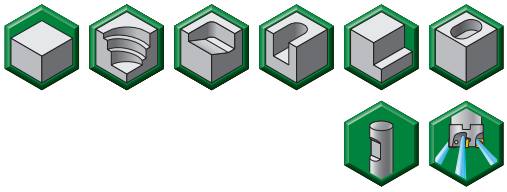




order number	catalog number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988017	**VSM17D100Z02M12XD17**	1.000	.827	.492	M12	1.250	.667	.642	2	8.5°	41300	Yes	.17
5988046	**VSM17D125Z02M16XD17**	1.250	1.142	.669	M16	1.500	.943	.641	2	5.8°	34700	Yes	.36
5988018	**VSM17D125Z03M16XD17**	1.250	1.142	.669	M16	1.500	.943	.641	3	5.8°	34700	Yes	.35
5988045	**VSM17D150Z03M16XD17**	1.500	1.142	.669	M16	1.500	.943	.638	3	4.3°	30700	Yes	.40
5988019	**VSM17D150Z04M16XD17**	1.500	1.142	.669	M16	1.500	.943	.638	4	4.3°	30700	Yes	.38

Weldon® End Mills • Inch





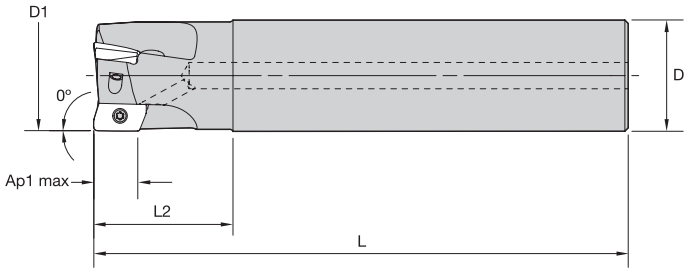
order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988028	**VSM17D100Z02W100XD17**	1.000	1.000	3.500	1.220	.642	2	8.5°	41300	Yes	.59
5988052	**VSM17D125Z02W125XD17**	1.250	1.250	4.000	1.720	.641	2	5.8°	34700	Yes	1.06
5988029	**VSM17D125Z03W125XD17**	1.250	1.250	4.000	1.720	.641	3	5.8°	34700	Yes	1.05
5988051	**VSM17D150Z03W150XD17**	1.500	1.500	4.500	1.810	.638	3	4.3°	30700	Yes	1.77
5988030	**VSM17D150Z04W150XD17**	1.500	1.500	4.500	1.810	.638	4	4.3°	30700	Yes	1.77

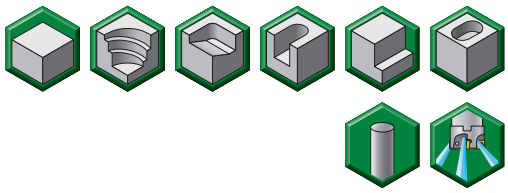
NOTE: Weldon type not recommended for finishing operations.

VSM17™

0°/90° Shoulder Mills • VSM17

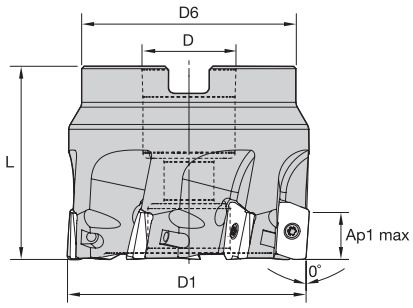
Cylindrical End Mills (Regular and Long Version) • Inch

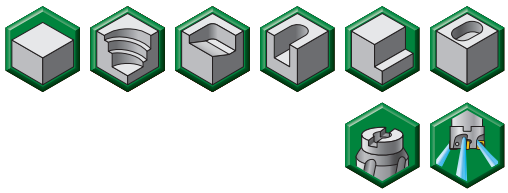




order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988011	VSM17D100Z02C100XD17L450	1.000	1.000	4.500	1.750	.642	2	8.5°	41300	Yes	.78
5988012	VSM17D100Z02C100XD17L670	1.000	1.000	6.700	1.750	.642	2	8.5°	41300	Yes	1.23
5988013	VSM17D125Z03C125XD17L480	1.250	1.250	4.800	2.000	.641	3	5.8°	34700	Yes	1.31
5988014	VSM17D125Z03C125XD17L800	1.250	1.250	8.000	2.000	.641	3	5.8°	34700	Yes	2.36
5988043	VSM17D150Z03C150XD17L520	1.500	1.500	5.200	2.000	.638	3	4.3°	30700	Yes	2.11
5988044	VSM17D150Z03C150XD17L980	1.500	1.500	9.800	2.000	.638	3	4.3°	30700	Yes	4.33
5988015	VSM17D150Z04C150XD17L520	1.500	1.500	5.200	2.000	.638	4	4.3°	30700	Yes	2.11
5988016	VSM17D150Z04C150XD17L980	1.500	1.500	9.800	2.000	.638	4	4.3°	30700	Yes	4.33

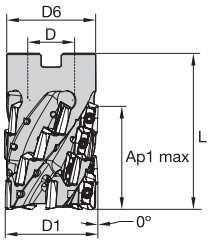
Shell Mills • Inch





order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988020	VSM17D150Z04S075XD17	1.500	.750	1.417	1.575	.638	4	4.3°	30700	Yes	.38
5988021	VSM17D200Z04S075XD17	2.000	.750	1.750	1.575	.635	4	3.0°	25600	Yes	.68
5988022	VSM17D200Z05S075XD17	2.000	.750	1.750	1.575	.635	5	3.0°	25600	Yes	.71
5988050	VSM17D200Z06S075XD17	2.000	.750	1.750	1.575	.635	6	3.0°	25600	Yes	.66
5988023	VSM17D250Z05S075XD17	2.500	.750	1.750	1.575	.629	5	2.1°	22300	Yes	.98
5988048	VSM17D250Z06S075XD17	2.500	.750	1.750	1.575	.629	6	2.1°	22300	Yes	.97
5988024	VSM17D300Z06S100XD17	3.000	1.000	2.188	1.750	.626	6	1.7°	20100	Yes	1.73
5988047	VSM17D300Z07S100XD17	3.000	1.000	2.188	1.750	.626	7	1.7°	20100	Yes	1.68
5988025	VSM17D400Z08S150XD17	4.000	1.500	3.375	2.000	.623	8	1.2°	17100	Yes	3.52
5988026	VSM17D500Z09S150XD17	5.000	1.500	3.375	2.000	.617	9	.9°	15100	Yes	5.07
5988027	VSM17D600Z12S150XD17	6.000	1.500	3.375	2.000	.616	12	.7°	13700	Yes	6.88

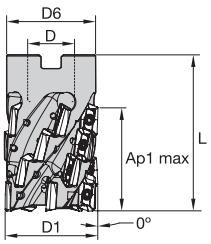
Helical Shell Mills



order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply
6740681	VSM17H200Z04S075XD17	2.000	.750	1.750	3	2.380	16	4	3.0°	25600	Yes
6740682	VSM17H200Z05S075XD17	2.000	.750	1.750	3	2.380	20	5	3.0°	25600	Yes
6740683	VSM17H250Z04S100XD17	2.500	1.000	2.190	4	2.950	20	4	2.1°	22300	Yes
6740684	VSM17H250Z05S100XD17	2.500	1.000	2.190	4	2.950	30	6	2.1°	22300	Yes
6740685	VSM17H300Z05S125XD17	3.000	1.250	2.875	4	2.950	30	6	1.6°	18000	Yes

NOTE: Z = number of pockets; ZU = number of flutes.

Helical Shell Mills • Long Reach



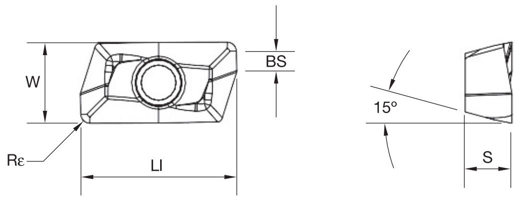
order number	catalog number	D1	D	D6	L	Ap1 max	Z	Z U	max ramp angle	max RPM	coolant supply
6083085	VHM17D200Z04S550XD17	2.000	1.000	1.910	6	4.120	28	4	3.0°	25600	Yes
6083086	VHM17D200Z05S550XD17	2.000	1.000	1.910	6	4.120	35	5	3.0°	26500	Yes

NOTE: Z = number of pockets; ZU = number of flutes.

VSM17™

0°/90° Shoulder Mills • VSM17

Inserts • XDCT-ML



XDCT-ML

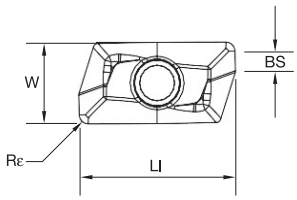
● first choice
○ alternate choice

	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P					○	●	●	○	●
M					●	○	●	●	●
K	●	●			○	○			
N			●	●					
S					●		○	●	●
H									

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XDCT170404PEERML	XDCT1701ERML	2	19,15	.754	2,62	.103	4,90	.193	9,60	.378	0,40	.016	0,04	.002	–	–	–	–	5989010	–	–	–	–
XDCT170408PEERML	XDCT1702ERML	2	19,15	.754	2,22	.088	4,90	.193	9,60	.378	0,80	.031	0,04	.002	–	–	–	–	5988983	5988982	5988981	6180180	–
XDCT170412PEERML	XDCT1703ERML	2	19,16	.754	1,82	.072	4,90	.193	9,60	.378	1,20	.047	0,04	.002	–	–	–	–	5988988	5988987	5988986	6180211	–
XDCT170416PEERML	XDCT1704ERML	2	19,17	.755	1,42	.056	4,90	.193	9,60	.378	1,60	.062	0,04	.002	–	–	–	–	6001257	–	–	6425261	–
XDCT170420PEERML	XDCT1705ERML	2	19,17	.755	1,01	.040	4,90	.193	9,60	.378	2,00	.079	0,04	.002	–	–	–	–	6001255	–	–	6425263	–
XDCT170424PEERML	XDCT1706ERML	2	19,17	.755	0,63	.025	4,90	.193	9,60	.378	2,40	.094	0,04	.002	–	–	–	–	6001253	–	–	6425264	–
XDCT170432PEERML	XDCT1708ERML	2	18,85	.742	—	—	4,89	.192	9,59	.378	3,20	.125	0,04	.002	–	–	–	–	6001251	–	–	6425265	–
XDCT170440PEERML	XDCT1710ERML	2	18,33	.722	—	—	4,87	.192	9,59	.377	4,00	.157	0,04	.002	–	–	–	–	6001239	–	–	6425266	–
XDCT170460PEERML	XDCT1715ERML	2	17,02	.670	—	—	4,80	.189	9,56	.376	6,00	.235	0,04	.002	–	–	–	–	–	–	6118069	6232053	–

WIDIA

Inserts • XDCT-ALP



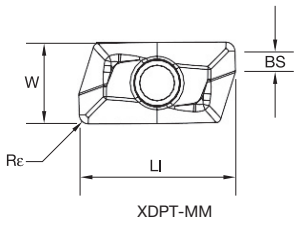
XDCT-ALP

● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XDCT170404PEFRALP	XDCT1701RALP	2	19,15	.754	2,62	.103	4,90	.193	9,60	.378	0,40	.016	0,02	.001	■	■	6007341	6007220	■	■	■	■	■
XDCT170408PEFRALP	XDCT1702RALP	2	19,15	.754	2,22	.088	4,90	.193	9,60	.378	0,80	.031	0,02	.001	■	■	6007345	6007344	■	■	■	■	■
XDCT170412PEFRALP	XDCT1703RALP	2	19,16	.754	1,82	.072	4,90	.193	9,60	.378	1,20	.047	0,02	.001	■	■	6007342	6001537	■	■	■	■	■
XDCT170416PEFRALP	XDCT1704RALP	2	19,17	.755	1,42	.056	4,90	.193	9,60	.378	1,60	.063	0,02	.001	■	■	■	6001256	■	■	■	■	■
XDCT170420PEFRALP	XDCT1705RALP	2	19,17	.755	1,01	.040	4,90	.193	9,60	.378	2,00	.079	0,02	.001	■	■	■	6001254	■	■	■	■	■
XDCT170424PEFRALP	XDCT1706RALP	2	19,17	.755	0,63	.025	4,90	.193	9,60	.378	2,40	.094	0,02	.001	■	■	■	6001252	■	■	■	■	■
XDCT170432PEFRALP	XDCT1708RALP	2	18,85	.742	–	–	4,88	.192	9,59	.378	3,20	.125	0,02	.001	■	■	■	6001240	■	■	■	■	■
XDCT170440PEFRALP	XDCT1710RALP	2	18,33	.722	–	–	4,87	.192	9,59	.377	4,00	.157	0,02	.001	■	■	■	6001238	■	■	■	■	■
XDCT170460PEFRALP	XDCT1715RALP	2	17,02	.670	–	–	4,80	.189	9,56	.376	6,00	.235	0,02	.001	■	■	■	6118070	■	■	■	■	■

Inserts • XDPT-MM



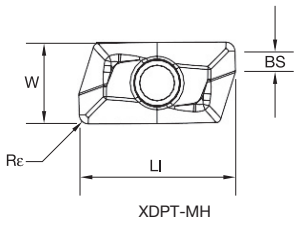
XDPT-MM

● first choice
○ alternate choice

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

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XDPT170404PESRMM	XDPT1701SRMM	2	19,15	.754	2,52	.099	4,90	.193	9,60	.378	0,40	.016	0,10	.004	-	-	-	-	-	-	5987689	-	5987690
XDPT170408PESRMM	XDPT1702SRMM	2	19,15	.754	2,15	.085	4,90	.193	9,60	.378	0,80	.031	0,10	.004	5987948	6242460	-	-	5987949	5987947	5987946	6180212	5987950
XDPT170412PESRMM	XDPT1703SRMM	2	19,16	.754	1,77	.070	4,90	.193	9,60	.378	1,20	.047	0,10	.004	5988138	-	-	-	5988151	5988140	5988139	6180213	5988152
XDPT170416PESRMM	XDPT1704SRMM	2	19,17	.755	1,38	.054	4,90	.193	9,60	.378	1,60	.063	0,10	.004	5988153	-	-	-	5988155	5988156	5988154	6180214	-
XDPT170420PESRMM	XDPT1705SRMM	2	19,17	.755	0,99	.039	4,90	.193	9,60	.378	2,00	.079	0,10	.004	-	-	-	-	5988158	5988160	5988159	6425145	-
XDPT170424PESRMM	XDPT1706SRMM	2	19,17	.755	0,62	.024	4,90	.193	9,60	.378	2,40	.094	0,10	.004	-	-	-	-	5988203	-	5988202	6425146	-
XDPT170432PESRMM	XDPT1708SRMM	2	18,85	.742	–	–	4,89	.192	9,59	.378	3,20	.125	0,10	.004	-	-	-	-	5988206	5988204	5988205	6277261	-
XDPT170440PESRMM	XDPT1710SRMM	2	18,33	.722	–	–	4,87	.192	9,59	.377	4,00	.157	0,10	.004	-	-	-	-	5988970	-	5988969	6425147	-

Inserts • XDPT-MH



XDPT-MH

● first choice
○ alternate choice

		WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
P						○	●	●	○	●
M						●	○	●	●	●
K		●	●			○	○			
N				●	●					
S						●		○	●	●
H										

ISO catalog number	ANSI catalog number	cutting edges	LI mm	LI in	BS mm	BS in	S mm	S in	W mm	W in	Rε mm	Rε in	hm mm	hm in	WK15CM	WK15PM	WN10HM	WN25PM	WP25PM	WP35CM	WP40PM	WS40PM	WU35PM
XDPT170408PESRMH	**XDPT1702SRMH**	2	19,15	.754	2,10	.083	4,91	.193	9,60	.378	0,80	.031	0,13	.005	5989053	■	■	■	■	5989054	5989052	6425148	■
XDPT170412PESRMH	**XDPT1703SRMH**	2	19,16	.754	1,73	.068	4,91	.193	9,60	.378	1,20	.047	0,13	.005	5991817	■	■	■	■	5991816	5991815	6425149	■

Insert Selection Guide

Material Group	Light Machining Geometry	Light Machining Grade	General Purpose Geometry	General Purpose Grade	Heavy Machining Geometry	Heavy Machining Grade
P1–P2	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	XDPT-MH	WP40PM
P3–P4	XDCT-ML	WP40PM	**XDPT-MM**	**WP40PM**	XDPT-MH	WP40PM
P5–P6	XDPT-MM	WP25PM	**XDPT-MM**	**WP35CM**	XDPT-MH	WP40PM
M1–M2	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MM	WS40PM
M3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MH	WS40PM
K1–K2	XDPT-MM	WK15CM	**XDPT-MM**	**WK15CM**	XDPT-MH	WK15CM
K3	XDPT-MM	WP35CM	**XDPT-MM**	**WP35CM**	XDPT-MH	WP35CM
N1–N2	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	XDCT-ALP	WN25PM
N3	XDCT-ALP	WN10HM	**XDCT-ALP**	**WN25PM**	XDCT-ALP	WN25PM
S1–S2	XDCT-ML	WP25PM	**XDPT-MM**	**WS40PM**	XDPT-MM	WS40PM
S3	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MM	WS40PM
S4	XDCT-ML	WS40PM	**XDPT-MM**	**WS40PM**	XDPT-MM	WS40PM
H1	–	–	–	–	–	–

VSM17™

0°/90° Shoulder Mills • VSM17

Recommended Starting Speeds [SFM]*

Material Group		WK15CM			WK15PM			WN10HM			WN25PM			WP25PM			WP35CM			WP40PM			WS40PM			WU35PM		
P	1	–	–	–	–	–	–	–	–	–	–	–	–	1085	**935**	885	1495	**1295**	1215	970	**855**	805	–	–	–	855	**755**	705
	2	–	–	–	–	–	–	–	–	–	–	–	–	900	**785**	655	920	**835**	755	820	**705**	590	–	–	–	720	**625**	525
	3	–	–	–	–	–	–	–	–	–	–	–	–	835	**705**	575	835	**755**	675	755	**640**	525	–	–	–	655	**560**	460
	4	–	–	–	–	–	–	–	–	–	–	–	–	740	**605**	490	625	**575**	525	675	**560**	445	–	–	–	590	**490**	395
	5	–	–	–	–	–	–	–	–	–	–	–	–	605	**560**	490	855	**755**	690	560	**510**	445	560	**475**	395	490	**445**	395
	6	–	–	–	–	–	–	–	–	–	–	–	–	540	**410**	330	525	**445**	360	490	**375**	295	490	**360**	260	425	**330**	260
M	1	–	–	–	–	–	–	–	–	–	–	–	–	675	**590**	540	675	**605**	510	640	**560**	510	690	**560**	460	560	**490**	445
	2	–	–	–	–	–	–	–	–	–	–	–	–	605	**525**	425	605	**525**	460	575	**490**	410	590	**475**	395	510	**425**	360
	3	–	–	–	–	–	–	–	–	–	–	–	–	460	**395**	310	475	**425**	375	425	**375**	295	475	**360**	280	375	**330**	260
K	1	1380	**1265**	1115	885	**805**	705	–	–	–	–	–	–	755	**675**	605	970	**870**	785	–	–	–	–	–	–	–	–	–
	2	1100	**970**	900	690	**625**	575	–	–	–	–	–	–	590	**525**	490	770	**690**	625	–	–	–	–	–	–	–	–	–
	3	920	**820**	755	575	**525**	475	–	–	–	–	–	–	490	**445**	395	640	**575**	525	–	–	–	–	–	–	–	–	–
N	1	–	–	–	–	–	–	2605	**2275**	1965	3525	**3100**	2870	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	2605	**2275**	1965	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	1835	**1590**	1375	3100	**2870**	2495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	–	–	–	130	**115**	80	115	**100**	80
	2	–	–	–	–	–	–	–	–	–	–	–	–	130	**115**	80	–	–	–	–	–	–	130	**115**	80	115	**100**	80
	3	–	–	–	–	–	–	–	–	–	–	–	–	165	**130**	80	–	–	–	–	–	–	165	**130**	80	150	**115**	80
	4	–	–	–	–	–	–	–	–	–	–	–	–	230	**165**	115	–	–	–	–	–	–	195	**165**	100	195	**150**	100
H	1	–	–	–	–	–	–	–	–	–	–	–	–	395	**295**	230	–	–	–	–	–	–	–	–	–	–	–	–

*NOTE: FIRST choice starting speeds are in **bold** type. As the average chip thickness increases, the speed should be decreased.*
**Material groups P, M, K, and H show recommended starting speeds for dry machining. For wet machining, reduce speed by 20%.*
**Material groups N and S show recommended starting speeds for wet machining. Not recommended for dry machining.*

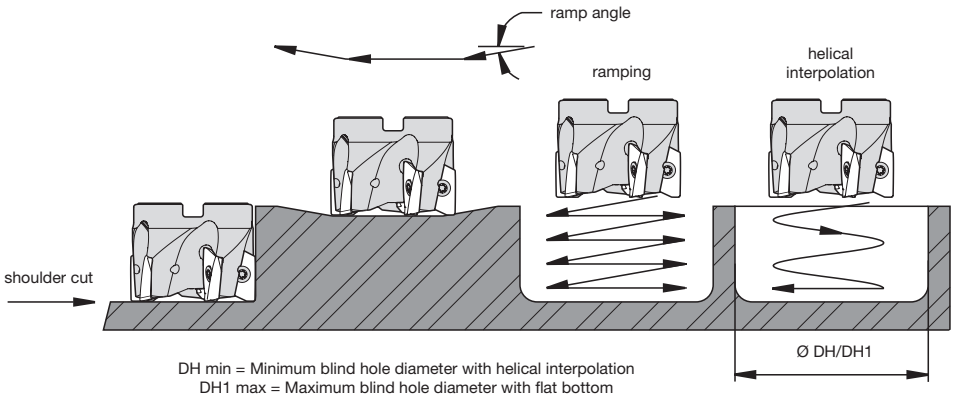
Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40–100%			
.F..ALP	.005	**.009**	.016	.003	**.007**	.012	.003	**.005**	.009	.002	**.004**	.008	.002	**.004**	.007	.F..ALP
.E..ML	.007	**.014**	.019	.005	**.010**	.013	.004	**.008**	.010	.003	**.007**	.009	.003	**.006**	.008	.E..ML
.S..MM	.007	**.016**	.026	.005	**.012**	.018	.004	**.009**	.014	.003	**.008**	.012	.003	**.007**	.011	.S..MM
.S..MH	.009	**.019**	.030	.007	**.013**	.021	.005	**.010**	.016	.004	**.009**	.014	.004	**.008**	.013	.S..MH

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

Best Practices

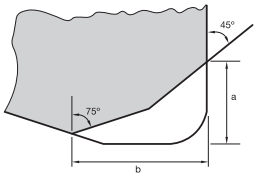


DH min = Minimum blind hole diameter with helical interpolation
DH1 max = Maximum blind hole diameter with flat bottom

cutting diameter (D1)	max RPM	max ramp angle to steel body interference	max flat-bottom hole diameter (DH1 max)	min hole diameter (DH min)
1.00	41300	8.5°	2.00	1.29
1.25	34700	5.8°	2.50	1.79
1.50	30700	4.3°	3.00	2.29
2.00	25600	3.0°	4.00	3.29
2.50	22300	2.1°	5.00	4.29
3.00	20100	1.7°	6.00	5.29
4.00	17100	1.2°	8.00	7.29
5.00	15100	.9°	10.00	9.29
6.00	13700	.7°	12.00	11.29

NOTE: For DH1 max, subtract the insert corner radius from the max hole diameter.

Modification Instructions for Use of Larger Radii Inserts (Shoulder Mills and Helical Mills)

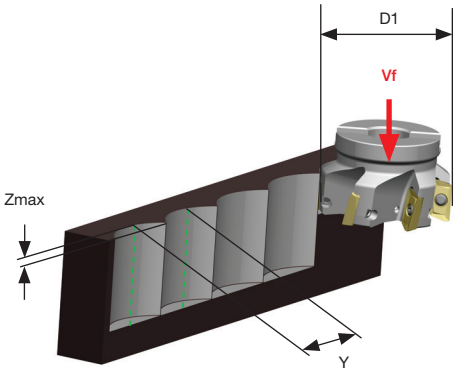


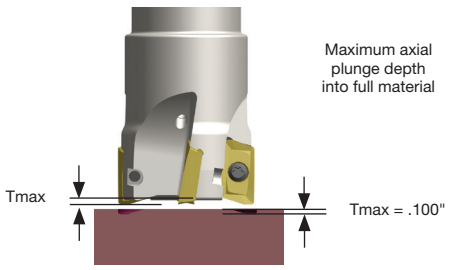
insert corner radius	material to remove	
	a	b
.094–.157"	.079"	.118"
.157–.236"	.157"	.197"

NOTE: Standard milling cutters will accept insert nose radii up to .079" without modification.

VSM17 Z-Axis Plunging

cutting diameter (D1)	Z max	Y
1	0.354	0.2346
1.25	0.354	0.2626
1.5	0.354	0.2880
2	0.354	0.3329
2.5	0.354	0.3725
3	0.354	0.4082
4	0.354	0.4716
5	0.354	0.5275
6	0.354	0.5779





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NEW!

Series 4V05
Series 4V15
Series 4V45
Series 4V65
Series 4VN5

This 4-flute geometry is designed with unequal flute spacing for plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials.

NEW!

VariMill II™ Line Expansion

Series 5V0C
Series 5V0E

This 5-flute geometry is designed with unequal flute spacing for advanced milling jobs in a wide range of materials.

NEW!

VariMill III™ Line Expansion

Series 7V1E
Series 7V2E

This 7-flute geometry is designed with unequal flute spacing and is designed to provide the highest Metal Removal Rates (MRR) and extended tool life in the most demanding materials in the aerospace industry.

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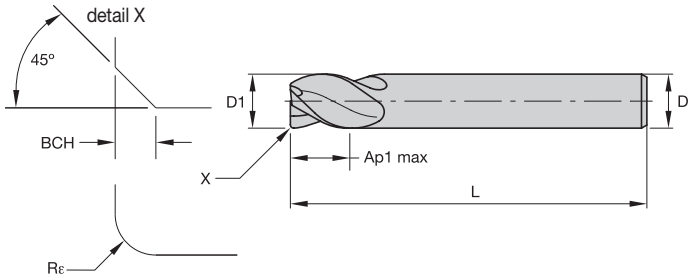
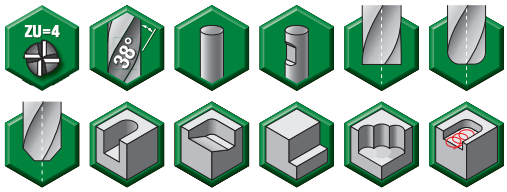
VariMill I™ • Series 4V05 4V15 4V45 4V65 • Inch





● first choice
○ alternate choice

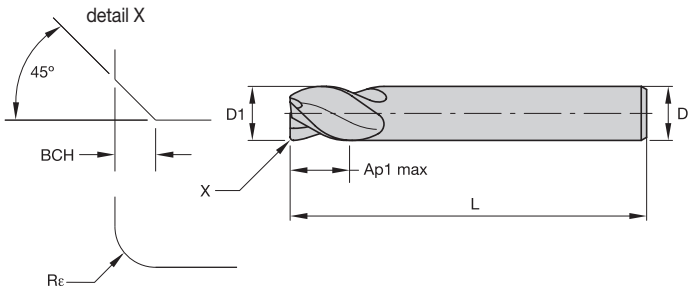
P		●
M		●
K		●
N		
S		○
H		○

WIDIA HANITA

catalog number	D1	D	length of cut Ap1 max	length L	Rε	BCH	SS	WP15PE
4V4503001NT	1/8	1/8	1/4	1 1/2	–	.010	–	5576590
4V4503001ST	1/8	1/8	1/4	1 1/2	–	–	–	5576591
4V0503001AT	1/8	1/8	1/2	2	.015	–	–	5576530
4V0503001ST	1/8	1/8	1/2	2	–	–	–	5576346
4V0503001NT	1/8	1/8	1/2	2	–	.010	–	5576345
4V4505000AT	3/16	3/16	5/16	1 1/2	.015	–	–	6571628
4V4505000NT	3/16	3/16	5/16	1 1/2	–	.010	–	5576592
4V4505000ST	3/16	3/16	5/16	1 1/2	–	–	–	5576593
4V0505000AT	3/16	3/16	5/8	2 1/4	.015	–	–	5576531
4V0505000BT	3/16	3/16	5/8	2 1/4	.030	–	–	5576532
4V0505000NT	3/16	3/16	5/8	2 1/4	–	.010	–	5576347
4V0505000ST	3/16	3/16	5/8	2 1/4	–	–	–	5576348
4V4507002BT	1/4	1/4	3/8	2	.030	–	–	5576610
4V4507002NT	1/4	1/4	3/8	2	–	.016	–	5576595
4V4507002ST	1/4	1/4	3/8	2	–	–	–	5576596
4V0507002AT	1/4	1/4	3/4	2 1/2	.015	–	–	5576533
4V0507002BT	1/4	1/4	3/4	2 1/2	.030	–	–	5576534
4V0507002CT	1/4	1/4	3/4	2 1/2	.060	–	–	5576535
4V0507002NT	1/4	1/4	3/4	2 1/2	–	.016	–	5576349
4V0507002ST	1/4	1/4	3/4	2 1/2	–	–	–	5576510
4V1507002AT	1/4	1/4	1 1/4	3 1/4	.015	–	–	5576577
4V1507002BT	1/4	1/4	1 1/4	3 1/4	.030	–	–	5576579
4V1507002ST	1/4	1/4	1 1/4	3 1/4	–	–	–	5576566
4V4508003BT	5/16	5/16	1/2	2	.030	–	–	5576611
4V4508003NT	5/16	5/16	1/2	2	–	.016	–	5576597
4V4508003ST	5/16	5/16	1/2	2	–	–	–	5576598
4V0508003AT	5/16	5/16	3/4	2 1/2	.015	–	–	5576536
4V0508003BT	5/16	5/16	3/4	2 1/2	.030	–	–	5576537
4V0508003CT	5/16	5/16	3/4	2 1/2	.060	–	–	5576538
4V0508003ST	5/16	5/16	3/4	2 1/2	–	–	–	5576512
4V0508003NT	5/16	5/16	3/4	2 1/2	–	.016	–	5576511
4V1508003BT	5/16	5/16	1 1/4	3 1/4	.030	–	–	5576580
4V1508003ST	5/16	5/16	1 1/4	3 1/4	–	–	–	5576567
4V4510004BT	3/8	3/8	1/2	2	.030	–	–	5576612
4V4510004NT	3/8	3/8	1/2	2	–	.020	–	5576599
4V4510004ST	3/8	3/8	1/2	2	–	–	–	5576600

VariMill I™ • Series 4V05 4V15 4V45 4V65 • Inch

(continued)



● first choice
○ alternate choice

P		●
M		●
K		●
N		
S		○
H		○

catalog number	D1	D	length of cut Ap1 max	length L	Rε	BCH	SS	WP15PE
4V0510004AT	3/8	3/8	7/8	2 1/2	.015	–	–	5576539
4V0510004BT	3/8	3/8	7/8	2 1/2	.030	–	–	5576540
4V0510004CT	3/8	3/8	7/8	2 1/2	.060	–	–	5576542
4V0510004DT	3/8	3/8	7/8	2 1/2	.090	–	–	5576543
4V0510004NT	3/8	3/8	7/8	2 1/2	–	.020	–	5576513
4V0510004ST	3/8	3/8	7/8	2 1/2	–	–	–	5576514
4V1510004BT	3/8	3/8	1 1/2	4	.030	–	–	5576581
4V1510004CT	3/8	3/8	1 1/2	4	.060	–	W	5576582
4V1510004ST	3/8	3/8	1 1/2	4	–	–	–	5576568
4V451101ANT	7/16	7/16	5/8	2 1/2	–	.020	–	5576601
4V451101AST	7/16	7/16	5/8	2 1/2	–	–	–	5576602
4V051101ANT	7/16	7/16	7/8	2 1/2	–	.020	–	5576515
4V051101AST	7/16	7/16	7/8	2 1/2	–	–	–	5576516
4V151100AST	7/16	7/16	2	4	–	–	–	5576569
4V4513005BT	1/2	1/2	5/8	2 1/2	.030	–	–	6522632
4V4513005BW	1/2	1/2	5/8	2 1/2	.030	–	W	5576613
4V4513005CW	1/2	1/2	5/8	2 1/2	.060	–	W	5576614
4V4513005NW	1/2	1/2	5/8	2 1/2	–	.020	W	5576604
4V4513005ST	1/2	1/2	5/8	2 1/2	–	–	–	6522623
4V4513005SW	1/2	1/2	5/8	2 1/2	–	–	W	5576605
4V0513005SW	1/2	1/2	1	3	–	–	W	5576518
4V0513005NW	1/2	1/2	1	3	–	.020	W	5576517
4V0513015AW	1/2	1/2	1 1/4	3	.015	–	W	5576544
4V0513015BW	1/2	1/2	1 1/4	3	.030	–	W	5576545
4V0513015BT	1/2	1/2	1 1/4	3	.030	–	–	6522633
4V0513015CW	1/2	1/2	1 1/4	3	.060	–	W	5576546
4V0513015CT	1/2	1/2	1 1/4	3	.060	–	–	6522638
4V0513015DW	1/2	1/2	1 1/4	3	.090	–	W	5576547
4V0513015ET	1/2	1/2	1 1/4	3	.120	–	–	6522653
4V0513015EW	1/2	1/2	1 1/4	3	.120	–	W	5576548
4V0513015ST	1/2	1/2	1 1/4	3	–	–	–	6522624
4V0513015SW	1/2	1/2	1 1/4	3	–	–	W	5576520
4V0513015NW	1/2	1/2	1 1/4	3	–	.020	W	5576519
4V6513015BW	1/2	1/2	1 1/2	4	.030	–	W	5576636
4V6513015CW	1/2	1/2	1 1/2	4	.060	–	W	5576637
4V6513015NW	1/2	1/2	1 1/2	4	–	.020	W	5576621
4V6513015SW	1/2	1/2	1 1/2	4	–	–	W	5576622
4V1513005BW	1/2	1/2	2	4	.030	–	W	5576583
4V1513005CW	1/2	1/2	2	4	.060	–	W	5576584
4V1513005SW	1/2	1/2	2	4	–	–	W	5576570

VariMill I™ • Series 4V05 4V15 4V45 4V65 • Inch

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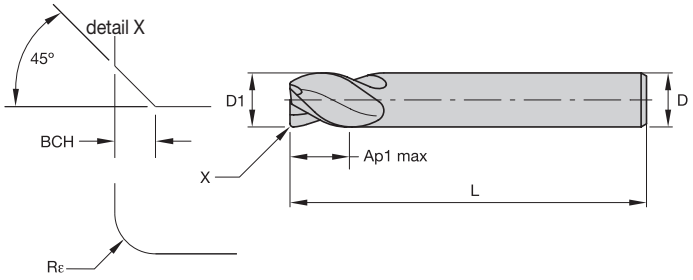

● first choice
○ alternate choice

P		●
M		●
K		●
N		
S		○
H		○

catalog number	D1	D	length of cut Ap1 max	length L	Rε	BCH	SS	WP15PE
4V6513025BW	1/2	1/2	2 1/4	4 1/2	.030	–	W	5576638
4V6513025CW	1/2	1/2	2 1/4	4 1/2	.060	–	W	5576639
4V6513025SW	1/2	1/2	2 1/4	4 1/2	–	–	W	5576623
4V4516006CW	5/8	5/8	3/4	3	.060	–	W	5576615
4V4516006EW	5/8	5/8	3/4	3	.120	–	W	5576617
4V4516006NW	5/8	5/8	3/4	3	–	.020	W	5576606
4V4516006SW	5/8	5/8	3/4	3	–	–	W	5576607
4V0516006BW	5/8	5/8	1 1/4	3 1/2	.030	–	W	5576549
4V0516006CW	5/8	5/8	1 1/4	3 1/2	.060	–	W	5576550
4V0516006EW	5/8	5/8	1 1/4	3 1/2	.120	–	W	5576552
4V0516006ST	5/8	5/8	1 1/4	3 1/2	–	–	–	6522625
4V0516006NW	5/8	5/8	1 1/4	3 1/2	–	.020	W	5576521
4V0516006SW	5/8	5/8	1 1/4	3 1/2	–	–	W	5576528
4V6516016BT	5/8	5/8	1 5/8	4 1/8	.030	–	–	6522634
4V6516016CT	5/8	5/8	1 5/8	4 1/8	.060	–	–	6522639
4V6516016CW	5/8	5/8	1 5/8	4 1/8	.060	–	W	5576650
4V6516016ET	5/8	5/8	1 5/8	4 1/8	.120	–	–	6522654
4V6516016NW	5/8	5/8	1 5/8	4 1/8	–	.020	W	5576624
4V6516016ST	5/8	5/8	1 5/8	4 1/8	–	–	–	6522626
4V6516016SW	5/8	5/8	1 5/8	4 1/8	–	–	W	5576625
4V1516006CW	5/8	5/8	2 1/4	5	.060	–	W	5576585
4V1516006NW	5/8	5/8	2 1/4	5	–	.020	W	5576571
4V1516006SW	5/8	5/8	2 1/4	5	–	–	W	5576572
4V4519007BW	3/4	3/4	7/8	3 1/2	.030	–	W	5576618
4V4519007CW	3/4	3/4	7/8	3 1/2	.060	–	W	5576619
4V4519007EW	3/4	3/4	7/8	3 1/2	.120	–	W	5576620
4V4519007NW	3/4	3/4	7/8	3 1/2	–	.020	W	5576608
4V4519007SW	3/4	3/4	7/8	3 1/2	–	–	W	5576609
4V0519007BW	3/4	3/4	1 1/2	4	.030	–	W	5576553
4V0519007CW	3/4	3/4	1 1/2	4	.060	–	W	5576554
4V0519007DW	3/4	3/4	1 1/2	4	.090	–	W	5576555
4V0519007EW	3/4	3/4	1 1/2	4	.120	–	W	5576557
4V0519007NW	3/4	3/4	1 1/2	4	–	.020	W	5576522
4V0519007SW	3/4	3/4	1 1/2	4	–	–	W	5576529
4V6519017BT	3/4	3/4	1 5/8	4	.030	–	–	6522635
4V6519017CT	3/4	3/4	1 5/8	4	.060	–	–	6522640
4V6519017ET	3/4	3/4	1 5/8	4	.120	–	–	6522655
4V6519017NW	3/4	3/4	1 5/8	4	–	.020	W	5576630
4V6519017ST	3/4	3/4	1 5/8	4	–	–	–	6522627
4V6519017SW	3/4	3/4	1 5/8	4	–	–	W	5576631
4V1519007BT	3/4	3/4	2 1/4	5	.030	–	–	6522636
4V1519007BW	3/4	3/4	2 1/4	5	.030	–	W	5576586
4V1519007CT	3/4	3/4	2 1/4	5	.060	–	–	6522651
4V1519007CW	3/4	3/4	2 1/4	5	.060	–	W	5576587

VariMill I™ • Series 4V05 4V15 4V45 4V65 • Inch

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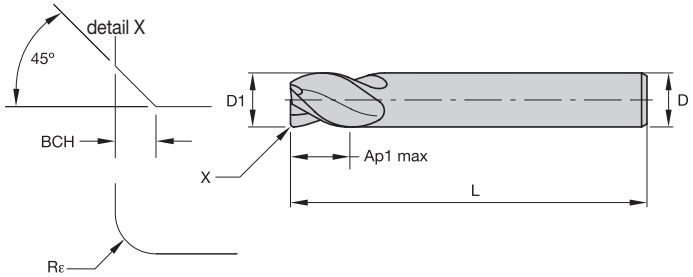

● first choice
○ alternate choice

P		●
M		●
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N		
S		○
H		○

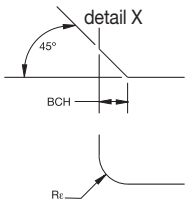
catalog number	D1	D	length of cut Ap1 max	length L	Rε	BCH	SS	WP15PE
4V1519007ET	3/4	3/4	2 1/4	5	.120	–	–	**6522656**
4V1519007ST	3/4	3/4	2 1/4	5	–	–	–	**6522628**
4V1519007SW	3/4	3/4	2 1/4	5	–	–	W	**5576574**
4V1519007NW	3/4	3/4	2 1/4	5	–	.020	W	**5576573**
4V6519007BW	3/4	3/4	3	6	.030	–	W	**5576651**
4V6519007NW	3/4	3/4	3	6	–	.020	W	**5576626**
4V6519007ST	3/4	3/4	3	6	–	–	–	**6522629**
4V6519007SW	3/4	3/4	3	6	–	–	W	**5576627**
4V0525008BT	1	1	1 1/2	4	.030	–	–	**6522637**
4V0525008BW	1	1	1 1/2	4	.030	–	W	**5576558**
4V0525008CW	1	1	1 1/2	4	.060	–	W	**5576560**
4V0525008CT	1	1	1 1/2	4	.060	–	–	**6522652**
4V0525008DW	1	1	1 1/2	4	.090	–	W	**5576561**
4V0525008ET	1	1	1 1/2	4	.120	–	–	**6522657**
4V0525008FW	1	1	1 1/2	4	.250	–	W	**5576563**
4V0525008ST	1	1	1 1/2	4	–	–	–	**6522630**
4V0525008SW	1	1	1 1/2	4	–	–	W	**5576525**
4V0525008NW	1	1	1 1/2	4	–	.020	W	**5576523**
4V6525018NW	1	1	2	5	–	.020	W	**5576632**
4V6525018SW	1	1	2	5	–	–	W	**5576633**
4V1525008BW	1	1	2 1/4	5	.030	–	W	**5576588**
4V1525008CW	1	1	2 1/4	5	.060	–	W	**5576589**
4V1525008SW	1	1	2 1/4	5	–	–	W	**5576576**
4V1525008NW	1	1	2 1/4	5	–	.020	W	**5576575**
4V2525008ST	1	1	3	6	–	–	–	**6522631**
4V6525028BW	1	1	4	7	.030	–	W	**5576653**
4V6525028CW	1	1	4	7	.060	–	W	**5576654**
4V6525028NW	1	1	4	7	–	.020	W	**5576634**
4V6525028SW	1	1	4	7	–	–	W	**5576635**
4V0532009SW	1 1/4	1 1/4	2 1/4	5	–	–	W	**5576527**
4V0532009NW	1 1/4	1 1/4	2 1/4	5	–	.020	W	**5576526**

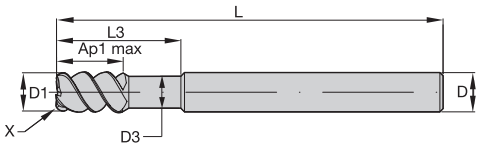
NOTE: SS = Shank Style
W = Weldon®

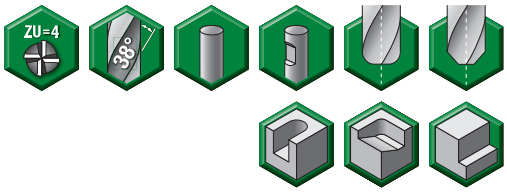
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
–	–	> 1/8–1/4"	0/.00031
–	–	> 1/4–3/8"	0/.00035
–	–	> 3/8–23/32"	0/.00043
–	–	> 23/32–1 3/16"	0/.00051

VariMill I™ • Series 4VN5 • Inch







● first choice
○ alternate choice

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

WIDIA HANITA

catalog number	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BCH	SS	TiAlN-LT	TiAlN-LW
TF4VN507012A	1/4	1/4	.24	3/8	1 1/4	4	.015	–	–	3738940	–
TF4VN507012B	1/4	1/4	.24	3/8	1 1/4	4	.030	–	–	3738941	–
TF4VN507012	1/4	1/4	.24	3/8	1 1/4	4	–	.016	–	2837188	–
TF4VN510014B	3/8	3/8	.35	1/2	1 7/8	4	.030	–	–	3738973	–
TF4VN510014C	3/8	3/8	.35	1/2	1 7/8	4	.060	–	–	3738974	–
TF4VN510014	3/8	3/8	.35	1/2	1 7/8	4	–	.020	–	2837182	–
TF4VN513005B	1/2	1/2	.47	5/8	2 1/4	4	.030	–	W	–	3738975
TF4VN513005BT	1/2	1/2	.47	5/8	–	4	.030	–	–	6522611	–
TF4VN513005C	1/2	1/2	.47	5/8	2 1/4	4	.060	–	W	–	3738976
TF4VN513005CT	1/2	1/2	.47	5/8	–	4	.060	–	–	6522612	–
TF4VN513005E	1/2	1/2	.47	5/8	2 1/4	4	.120	–	W	–	3738977
TF4VN513005ET	1/2	1/2	.47	5/8	–	4	.120	–	–	6522613	–
TF4VN513005	1/2	1/2	.47	5/8	2 1/4	4	–	.020	W	–	2837178
TF4VN516006E	5/8	5/8	.59	3/4	2 1/4	4 1/8	.120	–	W	–	3738979
TF4VN516006	5/8	5/8	.59	3/4	2 1/4	4 1/8	–	.020	W	–	2837171
TF4VN516016	5/8	5/8	.59	3/4	3 1/8	5	–	.020	W	–	2837160
TF4VN519007	3/4	3/4	.71	1	2 1/4	4 1/4	–	.020	W	–	2837154
TF4VN519017B	3/4	3/4	.71	1	3 1/4	5 1/4	.030	–	W	–	3738980
TF4VN519017BT	3/4	3/4	.71	1	–	5 1/4	.030	–	–	6522614	–
TF4VN519017C	3/4	3/4	.71	1	3 1/4	5 1/4	.060	–	W	–	3738981
TF4VN519017CT	3/4	3/4	.71	1	–	5 1/4	.060	–	–	6522615	–
TF4VN519017E	3/4	3/4	.71	1	3 1/4	5 1/4	.120	–	W	–	3738982
TF4VN519017ET	3/4	3/4	.71	1	–	5 1/4	.120	–	–	6522616	–
TF4VN519017	3/4	3/4	.71	1	3 1/4	5 1/4	–	.020	W	–	2837146
TF4VN525008	1	1	.94	1 1/8	2 1/4	4 1/2	–	.020	W	–	2837125
TF4VN525018B	1	1	.94	1 1/8	3 1/4	5 1/2	.030	–	W	–	3738993
TF4VN525018BT	1	1	.94	1 1/8	–	5 1/2	.030	–	–	6522617	–
TF4VN525018CT	1	1	.94	1 1/8	–	5 1/2	.060	–	–	6522618	–
TF4VN525018E	1	1	.94	1 1/8	3 1/4	5 1/2	.120	–	W	–	3738995
TF4VN525018ET	1	1	.94	1 1/8	–	5 1/2	.120	–	–	6522619	–
TF4VN525018	1	1	.94	1 1/8	3 1/4	5 1/2	–	.020	W	–	2837117
TF4VN525028BT	1	1	.94	1 1/8	–	6 1/2	.030	–	–	6522620	–

VariMill I™ • Series 4VN5 • Inch

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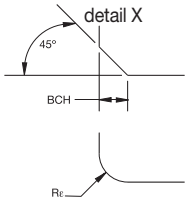
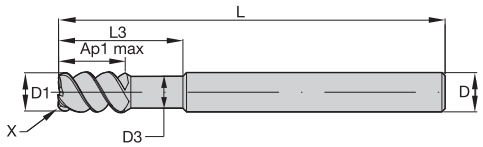




● first choice
○ alternate choice

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

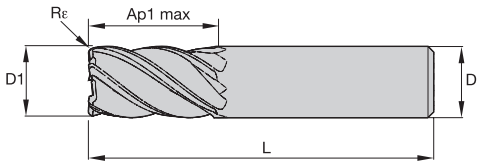
catalog number	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BCH	SS	TiAlN-LT	TiAlN-LW
TF4VN525028CT	1	1	.94	1 1/8	—	6 1/2	.060	—	—	**6522621**	**–**
TF4VN525028ET	1	1	.94	1 1/8	—	6 1/2	.120	—	—	**6522622**	**–**
TF4VN525028	1	1	.94	1 1/8	4 1/4	6 1/2	—	.020	W	**–**	**2837110**

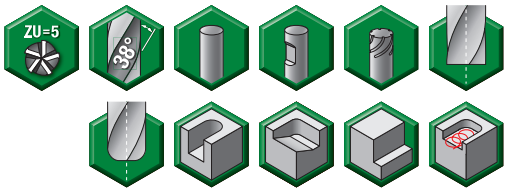
NOTE: SS = Shank Style
W = Weldon®

End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
—	—	> 1/8–1/4"	0/.00031
—	—	> 1/4–3/8"	0/.00035
—	—	> 3/8–23/32"	0/.00043
—	—	> 23/32–1 3/16"	0/.00051

VariMill II™ • Series 5V0C • Inch





● first choice
○ alternate choice

P		●
M		●
K		●
N		
S		○
H		○

WIDIA HANITA

catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WP15PE
5V0C05000AT	3/16	3/16	5/8	2 1/4	.015	–	5577051
5V0C05000BT	3/16	3/16	5/8	2 1/4	.030	–	5577052
5V0C05000ST	3/16	3/16	5/8	2 1/4	–	–	5577053
5V1C05020AT	3/16	3/16	3/4	2 1/2	.015	–	6513583
5V1C05020ST	3/16	3/16	3/4	2 1/2	–	–	6513582
5V4C07002AT	1/4	1/4	3/8	2	.015	–	6513585
5V4C07002BT	1/4	1/4	3/8	2	.030	–	6513586
5V4C07002ST	1/4	1/4	3/8	2	–	–	6513584
5V0C07002AT	1/4	1/4	3/4	2 1/2	.015	–	5577054
5V0C07002BT	1/4	1/4	3/4	2 1/2	.030	–	5577055
5V0C07002CT	1/4	1/4	3/4	2 1/2	.060	–	5577056
5V0C07002ST	1/4	1/4	3/4	2 1/2	–	–	5577057
5V1C07002AT	1/4	1/4	1 1/8	3	.015	–	6513588
5V1C07002BT	1/4	1/4	1 1/8	3	.030	–	6513589
5V1C07002ST	1/4	1/4	1 1/8	3	–	–	6513587
5V0C08003AT	5/16	5/16	3/4	2 1/2	.015	–	5577058
5V0C08003BT	5/16	5/16	3/4	2 1/2	.030	–	5577059
5V0C08003CT	5/16	5/16	3/4	2 1/2	.060	–	5577100
5V0C08003ST	5/16	5/16	3/4	2 1/2	–	–	5577101
5V4C10004AT	3/8	3/8	1/2	2	.015	–	6513591
5V4C10004BT	3/8	3/8	1/2	2	.030	–	6513592
5V4C10004ST	3/8	3/8	1/2	2	–	–	6513590
5V0C10004AT	3/8	3/8	7/8	2 1/2	.015	–	5577102
5V0C10004BT	3/8	3/8	7/8	2 1/2	.030	–	5577103
5V0C10004CT	3/8	3/8	7/8	2 1/2	.060	–	5577104
5V0C10004ST	3/8	3/8	7/8	2 1/2	–	–	5577105
5V1C10014AT	3/8	3/8	1 1/4	3	.015	–	6513594
5V1C10014BT	3/8	3/8	1 1/4	3	.030	–	6513595
5V1C10014ST	3/8	3/8	1 1/4	3	–	–	6513593
5V4C13015AT	1/2	1/2	5/8	2 1/2	.015	–	6666077
5V4C13015BT	1/2	1/2	5/8	2 1/2	.030	–	6517095
5V4C13015CT	1/2	1/2	5/8	2 1/2	.060	–	6517096

VariMill II™ • Series 5V0C • Inch

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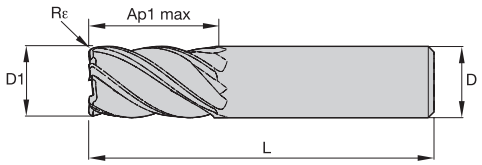

● first choice
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catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WP15PE
5V4C13015ST	1/2	1/2	5/8	2 1/2	–	–	6517094
5V0C13005BT	1/2	1/2	1	3	.030	–	6517098
5V0C13005ST	1/2	1/2	1	3	–	–	6517097
5V0C13015AT	1/2	1/2	1 1/4	3	.015	–	5577106
5V0C13015AW	1/2	1/2	1 1/4	3	.015	W	5577107
5V0C13015BT	1/2	1/2	1 1/4	3	.030	–	5577108
5V0C13015BW	1/2	1/2	1 1/4	3	.030	W	5577109
5V0C13015CW	1/2	1/2	1 1/4	3	.060	W	5577111
5V0C13015CT	1/2	1/2	1 1/4	3	.060	–	5577110
5V0C13015DT	1/2	1/2	1 1/4	3	.090	–	5577112
5V0C13015DW	1/2	1/2	1 1/4	3	.090	W	5577113
5V0C13015ET	1/2	1/2	1 1/4	3	.120	–	5577114
5V0C13015EW	1/2	1/2	1 1/4	3	.120	W	5577115
5V0C13015ST	1/2	1/2	1 1/4	3	–	–	5577116
5V0C13015SW	1/2	1/2	1 1/4	3	–	W	5577117
5V1C13015AT	1/2	1/2	1 5/8	4	.015	–	6517100
5V1C13015BT	1/2	1/2	1 5/8	4	.030	–	6517111
5V1C13015CT	1/2	1/2	1 5/8	4	.060	–	6517112
5V1C13015ST	1/2	1/2	1 5/8	4	–	–	6517099
5V1C13025BT	1/2	1/2	2 1/8	4	.030	–	6517114
5V1C13025CT	1/2	1/2	2 1/8	4	.060	–	6517115
5V1C13025ET	1/2	1/2	2 1/8	4	.120	–	6517116
5V1C13025ST	1/2	1/2	2 1/8	4	–	–	6517113
5V4C16006BT	5/8	5/8	3/4	3	.030	–	6517118
5V4C16006ST	5/8	5/8	3/4	3	–	–	6517117
5V0C16006BT	5/8	5/8	1 1/4	3 1/2	.030	–	5577118
5V0C16006BW	5/8	5/8	1 1/4	3 1/2	.030	W	5577119
5V0C16006CT	5/8	5/8	1 1/4	3 1/2	.060	–	5577130
5V0C16006CW	5/8	5/8	1 1/4	3 1/2	.060	W	5577131
5V0C16006DT	5/8	5/8	1 1/4	3 1/2	.090	–	5577132
5V0C16006DW	5/8	5/8	1 1/4	3 1/2	.090	W	5577133
5V0C16006SW	5/8	5/8	1 1/4	3 1/2	–	W	5577135
5V0C16006ST	5/8	5/8	1 1/4	3 1/2	–	–	5577134
5V1C16006BT	5/8	5/8	1 5/8	3 1/2	.030	–	6517120
5V1C16006CT	5/8	5/8	1 5/8	3 1/2	.060	–	6517121
5V1C16006ET	5/8	5/8	1 5/8	3 1/2	.120	–	6517122

VariMill II™ • Series 5V0C • Inch

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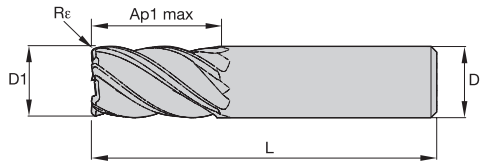

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catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WP15PE
5V1C16006ST	5/8	5/8	1 5/8	3 1/2	–	–	6517119
5V6C16006ST	5/8	5/8	2 1/8	4 1/2	–	–	6517123
5V1C16016BT	5/8	5/8	2 5/8	5	.030	–	6517125
5V1C16016ST	5/8	5/8	2 5/8	5	–	–	6517124
5V0C19007BT	3/4	3/4	1 1/2	4	.030	–	5577136
5V0C19007BW	3/4	3/4	1 1/2	4	.030	W	5577137
5V0C19007CT	3/4	3/4	1 1/2	4	.060	–	5577138
5V0C19007CW	3/4	3/4	1 1/2	4	.060	W	5577139
5V0C19007DT	3/4	3/4	1 1/2	4	.090	–	5577160
5V0C19007DW	3/4	3/4	1 1/2	4	.090	W	5577161
5V0C19007ET	3/4	3/4	1 1/2	4	.120	–	5577162
5V0C19007EW	3/4	3/4	1 1/2	4	.120	W	5577163
5V0C19007SW	3/4	3/4	1 1/2	4	–	W	5577165
5V0C19007ST	3/4	3/4	1 1/2	4	–	–	5577164
5V0C19027BT	3/4	3/4	1 3/4	4	.030	–	6517141
5V0C19027CT	3/4	3/4	1 3/4	4	.060	–	6517142
5V0C19027ET	3/4	3/4	1 3/4	4	.120	–	6517143
5V0C19027ST	3/4	3/4	1 3/4	4	–	–	6517130
5V1C19007BT	3/4	3/4	2 1/4	5	.030	–	6517146
5V1C19007CT	3/4	3/4	2 1/4	5	.060	–	6517147
5V1C19007ET	3/4	3/4	2 1/4	5	.120	–	6517148
5V1C19007ST	3/4	3/4	2 1/4	5	–	–	6517145
5V2C19017BT	3/4	3/4	3 1/4	6	.030	–	6517150
5V2C19017CT	3/4	3/4	3 1/4	6	.060	–	6517151
5V2C19017ET	3/4	3/4	3 1/4	6	.120	–	6517152
5V2C19017ST	3/4	3/4	3 1/4	6	–	–	6517149
5V0C25008BT	1	1	1 3/4	4 1/2	.030	–	5577166
5V0C25008BW	1	1	1 3/4	4 1/2	.030	W	5577167
5V0C25008CW	1	1	1 3/4	4 1/2	.060	W	5577169
5V0C25008CT	1	1	1 3/4	4 1/2	.060	–	5577168
5V0C25008ET	1	1	1 3/4	4 1/2	.120	–	5577182
5V0C25008EW	1	1	1 3/4	4 1/2	.120	W	5577183
5V0C25008ST	1	1	1 3/4	4 1/2	–	–	5577184
5V0C25008SW	1	1	1 3/4	4 1/2	–	W	5577185
5V6C25008BT	1	1	2 1/4	5	.030	–	6517154
5V6C25008CT	1	1	2 1/4	5	.060	–	6517155

VariMill II™ • Series 5V0C • Inch

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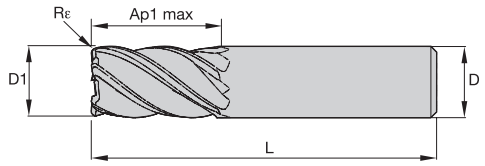

● first choice
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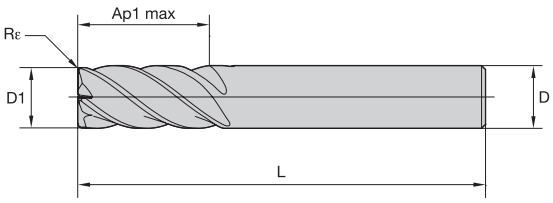
catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WP15PE
5V6C25008ST	1	1	2 1/4	5	—	—	**6517153**
5V1C25008BT	1	1	3 1/4	6	.030	—	**6517157**
5V1C25008CT	1	1	3 1/4	6	.060	—	**6517158**
5V1C25008ET	1	1	3 1/4	6	.120	—	**6517159**
5V1C25008ST	1	1	3 1/4	6	—	—	**6517156**
5V2C25008BT	1	1	4 1/4	7	.030	—	**6517161**
5V2C25008ST	1	1	4 1/4	7	—	—	**6517160**

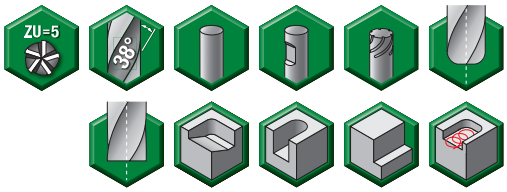
NOTE: SS = Shank Style
W = Weldon®

End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
—	—	> 1/8–1/4"	0/.00031
—	—	> 1/4–3/8"	0/.00035
—	—	> 3/8–23/32"	0/.00043
—	—	> 23/32–1 3/16"	0/.00051

VariMill II™ ER • Series 5V0E • Inch





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WIDIA HANITA

catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
5V4E05000AT	3/16	3/16	5/16	2	.015	–	6146484
5V4E05000BT	3/16	3/16	5/16	2	.030	–	6146485
5V4E05000ST	3/16	3/16	5/16	2	–	–	6146483
5V0E05000AT	3/16	3/16	9/16	2	.015	–	6146487
5V0E05000BT	3/16	3/16	9/16	2	.030	–	6146488
5V0E05000ST	3/16	3/16	9/16	2	–	–	6146486
5V1E05000AT	3/16	3/16	3/4	2 1/2	.015	–	6146490
5V1E05000BT	3/16	3/16	3/4	2 1/2	.030	–	6146521
5V1E05000ST	3/16	3/16	3/4	2 1/2	–	–	6146489
5V4E07002AT	1/4	1/4	3/8	2	.015	–	6146523
5V4E07002BT	1/4	1/4	3/8	2	.030	–	6146524
5V4E07002CT	1/4	1/4	3/8	2	.060	–	6146525
5V4E07002ST	1/4	1/4	3/8	2	–	–	6146522
5V0E07002AT	1/4	1/4	3/4	2 1/2	.015	–	6146528
5V0E07002BT	1/4	1/4	3/4	2 1/2	.030	–	6146529
5V0E07002CT	1/4	1/4	3/4	2 1/2	.060	–	6146530
5V0E07002ST	1/4	1/4	3/4	2 1/2	–	–	6146526
5V1E07002AT	1/4	1/4	1 1/8	3	.015	–	6146532
5V1E07002BT	1/4	1/4	1 1/8	3	.030	–	6146533
5V1E07002CT	1/4	1/4	1 1/8	3	.060	–	6146534
5V1E07002ST	1/4	1/4	1 1/8	3	–	–	6146531
5V0E08003AT	5/16	5/16	13/16	2 1/2	.015	–	6146536
5V0E08003BT	5/16	5/16	13/16	2 1/2	.030	–	6146537
5V0E08003CT	5/16	5/16	13/16	2 1/2	.060	–	6146538
5V0E08003ST	5/16	5/16	13/16	2 1/2	–	–	6146535
5V4E10004AT	3/8	3/8	1/2	2	.015	–	6146540
5V4E10004BT	3/8	3/8	1/2	2	.030	–	6146541
5V4E10004CT	3/8	3/8	1/2	2	.060	–	6146542
5V4E10004ET	3/8	3/8	1/2	2	.120	–	6146543
5V4E10004ST	3/8	3/8	1/2	2	–	–	6146539
5V0E10004AT	3/8	3/8	7/8	2 1/2	.015	–	5594857
5V0E10004BT	3/8	3/8	7/8	2 1/2	.030	–	5594858

VariMill II™ ER • Series 5V0E • Inch

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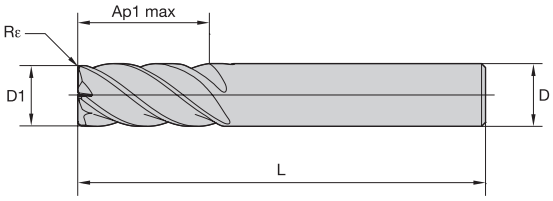

● first choice
○ alternate choice

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catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
5V0E10004ST	3/8	3/8	7/8	2 1/2	–	–	5594859
5V0E10014AT	3/8	3/8	1	2 1/2	.015	–	6146545
5V0E10014BT	3/8	3/8	1	2 1/2	.030	–	6146546
5V0E10014CT	3/8	3/8	1	2 1/2	.060	–	6146547
5V0E10014ET	3/8	3/8	1	2 1/2	.120	–	6146548
5V0E10014ST	3/8	3/8	1	2 1/2	–	–	6146544
5V1E10004AT	3/8	3/8	1	3	.015	–	6146550
5V1E10004BT	3/8	3/8	1	3	.030	–	6146551
5V1E10004ST	3/8	3/8	1	3	–	–	6146549
5V4E13015AV	1/2	1/2	5/8	2 1/2	.015	V	6146552
5V4E13015BV	1/2	1/2	5/8	2 1/2	.030	V	6146553
5V4E13015CV	1/2	1/2	5/8	2 1/2	.060	V	6146554
5V4E13015DV	1/2	1/2	5/8	2 1/2	.090	V	6146555
5V4E13015EV	1/2	1/2	5/8	2 1/2	.120	V	6146556
5V4E13015SV	1/2	1/2	5/8	2 1/2	–	V	6146557
5V0E13005BT	1/2	1/2	1	3	.030	–	6146558
5V0E13005CT	1/2	1/2	1	3	.060	–	6146559
5V0E13005ET	1/2	1/2	1	3	.120	–	6146560
5V0E13005ST	1/2	1/2	1	3	–	–	6146561
5V0E13015AT	1/2	1/2	1 1/4	3	.015	–	6146562
5V0E13015AV	1/2	1/2	1 1/4	3	.015	V	5594860
5V0E13015AW	1/2	1/2	1 1/4	3	.015	W	5594861
5V0E13015BT	1/2	1/2	1 1/4	3	.030	–	6146563
5V0E13015BV	1/2	1/2	1 1/4	3	.030	V	5594862
5V0E13015BW	1/2	1/2	1 1/4	3	.030	W	5594863
5V0E13015CV	1/2	1/2	1 1/4	3	.060	V	5594864
5V0E13015CW	1/2	1/2	1 1/4	3	.060	W	5594865
5V0E13015CT	1/2	1/2	1 1/4	3	.060	–	6146564
5V0E13015DT	1/2	1/2	1 1/4	3	.090	–	6146565
5V0E13015DV	1/2	1/2	1 1/4	3	.090	V	5594866
5V0E13015DW	1/2	1/2	1 1/4	3	.090	W	5594867
5V0E13015ET	1/2	1/2	1 1/4	3	.120	–	6146566
5V0E13015EV	1/2	1/2	1 1/4	3	.120	V	5594868
5V0E13015EW	1/2	1/2	1 1/4	3	.120	W	5594869
5V0E13015ST	1/2	1/2	1 1/4	3	–	–	6146567
5V0E13015SV	1/2	1/2	1 1/4	3	–	V	5594870
5V0E13015SW	1/2	1/2	1 1/4	3	–	W	5594871
5V1E13015BT	1/2	1/2	1 5/8	4	.030	–	6146568
5V1E13015CT	1/2	1/2	1 5/8	4	.060	–	6146569
5V1E13015ET	1/2	1/2	1 5/8	4	.120	–	6146570

VariMill II™ ER • Series 5V0E • Inch

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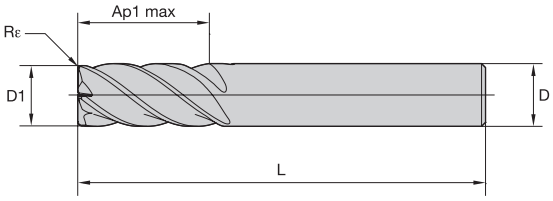

● first choice
○ alternate choice

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catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
5V1E13015ST	1/2	1/2	1 5/8	4	–	–	6146571
5V6E13015BT	1/2	1/2	2 1/8	4	.030	–	6525205
5V6E13015CT	1/2	1/2	2 1/8	4	.060	–	6525206
5V6E13015ET	1/2	1/2	2 1/8	4	.120	–	6525207
5V6E13015ST	1/2	1/2	2 1/8	4	–	–	6525204
5V4E16006BV	5/8	5/8	3/4	3	.030	V	6146572
5V4E16006CV	5/8	5/8	3/4	3	.060	V	6146573
5V4E16006EV	5/8	5/8	3/4	3	.120	V	6146574
5V4E16006SV	5/8	5/8	3/4	3	–	V	6146575
5V0E16006BT	5/8	5/8	1 1/4	3 1/2	.030	–	6146576
5V0E16006BV	5/8	5/8	1 1/4	3 1/2	.030	V	5594872
5V0E16006BW	5/8	5/8	1 1/4	3 1/2	.030	W	5594873
5V0E16006CT	5/8	5/8	1 1/4	3 1/2	.060	–	6146577
5V0E16006CV	5/8	5/8	1 1/4	3 1/2	.060	V	5594874
5V0E16006CW	5/8	5/8	1 1/4	3 1/2	.060	W	5594875
5V0E16006ET	5/8	5/8	1 1/4	3 1/2	.120	–	6146578
5V0E16006SV	5/8	5/8	1 1/4	3 1/2	–	V	5594876
5V0E16006SW	5/8	5/8	1 1/4	3 1/2	–	W	5594877
5V0E16006ST	5/8	5/8	1 1/4	3 1/2	–	–	6146579
5V1E16006BV	5/8	5/8	1 5/8	3 1/2	.030	V	6146580
5V1E16006CV	5/8	5/8	1 5/8	3 1/2	.060	V	6146581
5V1E16006CW	5/8	5/8	1 5/8	3 1/2	.060	W	6146582
5V1E16006DV	5/8	5/8	1 5/8	3 1/2	.090	V	6146583
5V1E16006EV	5/8	5/8	1 5/8	3 1/2	.120	V	6146584
5V1E16006SV	5/8	5/8	1 5/8	3 1/2	–	V	6146585
5V6E16006BT	5/8	5/8	2 5/8	5	.030	–	6525209
5V6E16006CT	5/8	5/8	2 5/8	5	.060	–	6525210
5V6E16006ET	5/8	5/8	2 5/8	5	.120	–	6525231
5V6E16006ST	5/8	5/8	2 5/8	5	–	–	6525208
5V0E19007BT	3/4	3/4	1 1/2	4	.030	–	6146591
5V0E19007BV	3/4	3/4	1 1/2	4	.030	V	5594878
5V0E19007BW	3/4	3/4	1 1/2	4	.030	W	5594879
5V0E19007CT	3/4	3/4	1 1/2	4	.060	–	6146592
5V0E19007CV	3/4	3/4	1 1/2	4	.060	V	5594880
5V0E19007CW	3/4	3/4	1 1/2	4	.060	W	5594881
5V0E19007DV	3/4	3/4	1 1/2	4	.090	V	5594882

VariMill II™ ER • Series 5V0E • Inch

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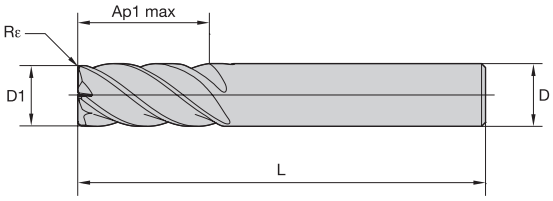

● first choice
○ alternate choice

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S		●
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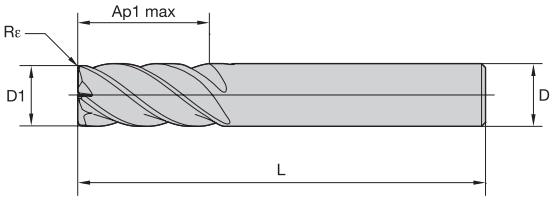
catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
5V0E19007DW	3/4	3/4	1 1/2	4	.090	W	5594883
5V0E19007EV	3/4	3/4	1 1/2	4	.120	V	5594884
5V0E19007EW	3/4	3/4	1 1/2	4	.120	W	5594885
5V0E19007ET	3/4	3/4	1 1/2	4	.120	–	6146593
5V0E19007FW	3/4	3/4	1 1/2	4	.250	W	6146590
5V0E19007ST	3/4	3/4	1 1/2	4	–	–	6146594
5V0E19007SW	3/4	3/4	1 1/2	4	–	W	5594887
5V0E19007SV	3/4	3/4	1 1/2	4	–	V	5594886
5V0E19017BV	3/4	3/4	1 5/8	4	.030	V	6146595
5V0E19017CV	3/4	3/4	1 5/8	4	.060	V	6146596
5V0E19017EV	3/4	3/4	1 5/8	4	.120	V	6146597
5V0E19017SV	3/4	3/4	1 5/8	4	–	V	6146598
5V0E19027BT	3/4	3/4	1 3/4	4	.030	–	6525233
5V0E19027CT	3/4	3/4	1 3/4	4	.060	–	6525234
5V0E19027ET	3/4	3/4	1 3/4	4	.120	–	6525235
5V0E19027ST	3/4	3/4	1 3/4	4	–	–	6525232
5V1E19007BT	3/4	3/4	2 1/4	5	.030	–	6525237
5V1E19007CV	3/4	3/4	2 1/4	5	.060	V	6146599
5V1E19007CT	3/4	3/4	2 1/4	5	.060	–	6525238
5V1E19007ET	3/4	3/4	2 1/4	5	.120	–	6525239
5V1E19007EV	3/4	3/4	2 1/4	5	.120	V	6146600
5V1E19007ST	3/4	3/4	2 1/4	5	–	–	6525236
5V1E19007SV	3/4	3/4	2 1/4	5	–	V	6146601
5V2E19007BT	3/4	3/4	3 1/4	6	.030	–	6525261
5V2E19007ST	3/4	3/4	3 1/4	6	–	–	6525240
5V4E25008FV	1	1	1 1/4	4	.250	V	6146607
5V4E25008SV	1	1	1 1/4	4	–	V	6146608
5V0E25008BT	1	1	1 3/4	4 1/2	.030	–	6525263
5V0E25008BV	1	1	1 3/4	4 1/2	.030	V	5594888
5V0E25008BW	1	1	1 3/4	4 1/2	.030	W	5594889
5V0E25008CT	1	1	1 3/4	4 1/2	.060	–	6525264
5V0E25008CV	1	1	1 3/4	4 1/2	.060	V	5594890
5V0E25008CW	1	1	1 3/4	4 1/2	.060	W	5594891
5V0E25008EV	1	1	1 3/4	4 1/2	.120	V	5594892
5V0E25008EW	1	1	1 3/4	4 1/2	.120	W	5594893
5V0E25008ET	1	1	1 3/4	4 1/2	.120	–	6525265

VariMill II™ ER • Series 5V0E • Inch

(continued)



● first choice
○ alternate choice

P		○
M		○
K		
N		
S		●
H		○

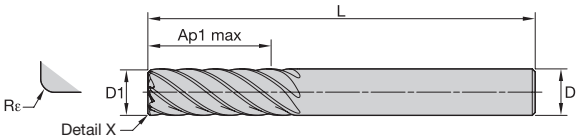
catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
5V0E25008FV	1	1	1 3/4	4 1/2	.250	V	5594894
5V0E25008FW	1	1	1 3/4	4 1/2	.250	W	5594895
5V0E25008ST	1	1	1 3/4	4 1/2	–	–	6525262
5V0E25008SV	1	1	1 3/4	4 1/2	–	V	5594896
5V0E25008SW	1	1	1 3/4	4 1/2	–	W	5594897
5V1E25008AW	1	1	3 1/4	6	.015	W	6146609
5V1E25008BT	1	1	3 1/4	6	.030	–	6525267
5V1E25008BW	1	1	3 1/4	6	.030	W	6146610
5V1E25008CT	1	1	3 1/4	6	.060	–	6525268
5V1E25008CW	1	1	3 1/4	6	.060	W	6146611
5V1E25008DW	1	1	3 1/4	6	.090	W	6146612
5V1E25008ET	1	1	3 1/4	6	.120	–	6525269
5V1E25008EW	1	1	3 1/4	6	.120	W	6146613
5V1E25008FW	1	1	3 1/4	6	.250	W	6146614
5V1E25008ST	1	1	3 1/4	6	–	–	6525266
5V1E25008SW	1	1	3 1/4	6	–	W	6146615
5V0E32009CW	1 1/4	1 1/4	3 1/4	6	.060	W	6146618
5V0E32009SW	1 1/4	1 1/4	3 1/4	6	–	W	6146619
5V1E32009CW	1 1/4	1 1/4	5	8	.060	W	6146620
5V1E32009SW	1 1/4	1 1/4	5	8	–	W	6146621

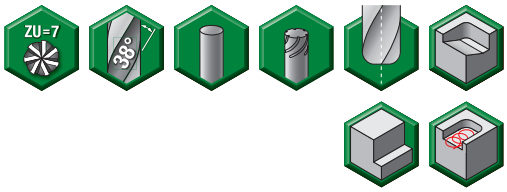
NOTE: SS = Shank Style
W = Weldon®
V = Safe-Lock™

End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
–	–	> 1/8–1/4"	0/.00031
–	–	> 1/4–3/8"	0/.00035
–	–	> 3/8–23/32"	0/.00043
–	–	> 23/32–1 3/16"	0/.00051

VariMill III™ ER • Series 7V1E 7V2E • Inch





● first choice
○ alternate choice

P		○
M		○
K		
N		
S		●
H		○

WIDIA HANITA

catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
7V0E10004AT	3/8	3/8	7/8	2 1/2	.015	–	6566337
7V0E10004BT	3/8	3/8	7/8	2 1/2	.030	–	6566338
7V0E10004ST	3/8	3/8	7/8	2 1/2	–	–	6566336
7V1E10004AT	3/8	3/8	1 1/8	3	.015	–	5971350
7V1E10004BT	3/8	3/8	1 1/8	3	.030	–	5971421
7V1E10004ST	3/8	3/8	1 1/8	3	–	–	6566339
7V2E10004AT	3/8	3/8	1 7/8	4	.015	–	5971422
7V2E10004BT	3/8	3/8	1 7/8	4	.030	–	5971423
7V0E13005BT	1/2	1/2	1 1/4	3	.030	–	6566411
7V0E13005CT	1/2	1/2	1 1/4	3	.060	–	6566412
7V0E13005ST	1/2	1/2	1 1/4	3	–	–	6566340
7V1E13005BT	1/2	1/2	1 1/2	3 1/2	.030	–	5971427
7V1E13005CT	1/2	1/2	1 1/2	3 1/2	.060	–	5971428
7V1E13005ET	1/2	1/2	1 1/2	3 1/2	.120	–	5971429
7V2E13005BV	1/2	1/2	2 1/2	4 1/2	.030	V	5971430
7V2E13005CV	1/2	1/2	2 1/2	4 1/2	.060	V	5971431
7V2E13005EV	1/2	1/2	2 1/2	4 1/2	.120	V	5971432
7V0E16006BT	5/8	5/8	1 1/4	3 1/2	.030	–	6566414
7V0E16006ST	5/8	5/8	1 1/4	3 1/2	–	–	6566413
7V1E16006BT	5/8	5/8	1 7/8	4	.030	–	5971435
7V1E16006CT	5/8	5/8	1 7/8	4	.060	–	5971436
7V2E16006BV	5/8	5/8	3 1/8	5 1/2	.030	V	5971437
7V2E16006CV	5/8	5/8	3 1/8	5 1/2	.060	V	5971438
7V0E19007BT	3/4	3/4	1 3/4	4	.030	–	6566416
7V0E19007CT	3/4	3/4	1 3/4	4	.060	–	6566417
7V0E19007ET	3/4	3/4	1 3/4	4	.120	–	6566418
7V0E19007ST	3/4	3/4	1 3/4	4	–	–	6566415
7V1E19007BT	3/4	3/4	2 1/4	5	.030	–	5971445
7V1E19007BV	3/4	3/4	2 1/4	5	.030	V	5971448
7V1E19007CV	3/4	3/4	2 1/4	5	.060	V	5971449
7V1E19007CT	3/4	3/4	2 1/4	5	.060	–	5971446
7V1E19007EV	3/4	3/4	2 1/4	5	.120	V	5971450

VariMill III™ ER • Series 7V1E 7V2E • Inch

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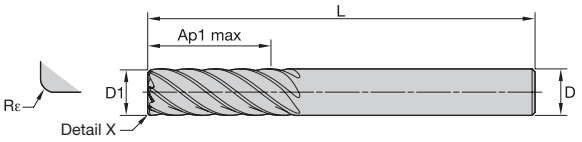

● first choice
○ alternate choice

P		○
M		○
K		
N		
S		●
H		○

catalog number	D1	D	length of cut Ap1 max	length L	Rε	SS	WS15PE
7V1E19007ET	3/4	3/4	2 1/4	5	.120	—	**5971447**
7V1E19007ST	3/4	3/4	2 1/4	5	—	—	**6566421**
7V2E19007BV	3/4	3/4	3 3/4	6	.030	V	**5971451**
7V2E19007CV	3/4	3/4	3 3/4	6	.060	V	**5971452**
7V2E19007EV	3/4	3/4	3 3/4	6	.120	V	**5971453**
7V1E25008CT	1	1	3	5 1/2	.060	—	**5971456**
7V1E25008CV	1	1	3	5 1/2	.060	V	**5971457**
7V2E25008CV	1	1	5	7 1/2	.060	V	**5971458**

NOTE: SS = Shank Style
V= Safe-Lock™

End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	≤ 1/8"	0/.00024
—	—	> 1/8–1/4"	0/.00031
—	—	> 1/4–3/8"	0/.00035
—	—	> 3/8–23/32"	0/.00043
—	—	> 23/32–1 3/16"	0/.00051

Application Data • VariMill I™ • Series 4V05 4V15 4V45 4V65 • Inch

Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
		A		B	Cutting Speed — vc SFM				D1 — Diameter									
								frac.	1/8	3/16	1/4	5/16	7/16	3/8	1/2	5/8	3/4	1	1 1/4
		ap	ae	ap	min		max	dec.	.1250	.1875	.2500	.3125	.4375	.3750	.5000	.6250	.7500	1.0000	1.2500
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0023	.0020	.0026	.0030	.0034	.0039	.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0014	.0012	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0019	.0017	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0023	.0020	.0026	.0030	.0034	.0039	.0040
	2	1.5 D	0.2 x D	0.5 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • VariMill I • Series 4VN5 • Inch

Material Group		Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
		A		B	Cutting Speed — vc SFM				D1 — Diameter					
								frac.	1/4	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications — for longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — for longest reach (L3) tools, reduce ap by 30%.
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • VariMill II™ • Series 5V0C • Inch

Material Group		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
		A		B	Cutting Speed — vc SFM				D1 — Diameter							
								frac.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1.5 x D	0.3 x D	0.3 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • VariMill II ER • Series 5V0E • Inch

Material Group		Side Milling (A) and Slotting (B)			WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
		A		B	Cutting Speed — vc SFM				D1 — Diameter						
								frac.	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4
		ap	ae	ap	min		max	dec.	.1875	.2500	.3750	.5000	.6250	.7500	1.0000	1.2500
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0009	.0012	.0018	.0023	.0027	.0031	.0036	.0039
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0008	.0010	.0015	.0019	.0022	.0025	.0028	.0029
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0011	.0014	.0023	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0009	.0012	.0018	.0023	.0027	.0031	.0036	.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0008	.0010	.0015	.0019	.0022	.0025	.0028	.0029
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0011	.0014	.0023	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0012	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D	0.3 x D	0.3 x D	200	–	260	IPT	.0009	.0012	.0018	.0023	.0027	.0031	.0036	.0039
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0008	.0011	.0017	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0010	.0013	.0020	.0026	.0030	.0034	.0039	.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0008	.0010	.0015	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • VariMill III™ ER • Series 7V1E • Semi-Finishing • Inch

Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed — vc SFM				D1 — Diameter				
							frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	4	3 x D	0.2 x D	300	–	490	IPT	.0020	.0026	.0030	.0034	.0039
	5	3 x D	0.2 x D	200	–	330	IPT	.0018	.0023	.0027	.0031	.0036
M	1	3 x D	0.2 x D	300	–	380	IPT	.0023	.0029	.0034	.0039	.0045
	2	3 x D	0.2 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	3	3 x D	0.2 x D	200	–	230	IPT	.0015	.0019	.0022	.0025	.0028
S	1	3 x D	0.2 x D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	3 x D	0.2 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	3 x D	0.2 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	4	3 x D	0.2 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	3 x D	0.2 x D	260	–	460	IPT	.0020	.0026	.0030	.0034	.0039
	2	3 x D	0.2 x D	230	–	390	IPT	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • VariMill III ER • Series 7V1E • Finishing • Inch

Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed — vc SFM				D1 — Diameter				
							frac.	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	4	3 x D	0.06 x D	590	–	980	IPT	.0025	.0031	.0036	.0040	.0046
	5	3 x D	0.06 x D	390	–	660	IPT	.0022	.0028	.0033	.0037	.0043
M	1	3 x D	0.06 x D	590	–	750	IPT	.0027	.0035	.0041	.0046	.0054
	2	3 x D	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	3	3 x D	0.06 x D	390	–	460	IPT	.0018	.0023	.0027	.0030	.0034
S	1	3 x D	0.06 x D	330	–	590	IPT	.0027	.0035	.0041	.0046	.0054
	2	3 x D	0.06 x D	160	–	260	IPT	.0015	.0018	.0022	.0025	.0029
	3	3 x D	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	4	3 x D	0.06 x D	330	–	390	IPT	.0020	.0026	.0030	.0034	.0040
H	1	3 x D	0.06 x D	520	–	920	IPT	.0025	.0031	.0036	.0040	.0046
	2	3 x D	0.06 x D	460	–	790	IPT	.0018	.0023	.0027	.0030	.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
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Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

7FNS

VICTORY™ X-FEED™

PRODUCTIVITY IMPROVED IN HIGH-FEED MILLING OF STAINLESS STEEL AND TITANIUM MATERIALS

AEROSPACE

7FNS Series

Designed for high feed rates.

6 flutes and 3 x D diameter neck reach.

Designed for circular plunging and ramping, 3D machining, face milling, and pocketing applications.

Stainless steel and high-temp alloys.

Improved tool life due to reduced radial forces.

Larger radial engagement vs. standard ball nose end mills.

5–10%
Radial engagement

55%
Radial engagement

WIDIA™ HANITA™

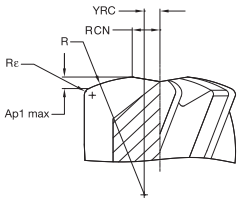
WIDIA™

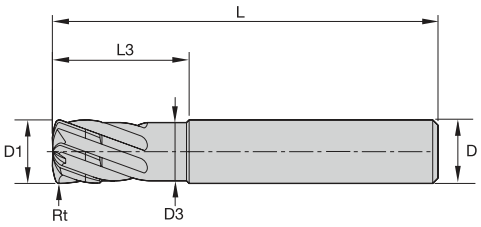
widia.com

X-Feed™

High-Performance Solid Carbide End Mills • High Feed

Series 7FNS • Stainless Steel/High-Temp • X-Feed





● first choice
○ alternate choice

P		
M		●
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S		●
H		

WIDIA HANITA

catalog number	D1	D	D3	L3	length L	Rε	Rt	AlTiN-MT
7FNS07002	1/4	1/4	.21	.73	2 1/2	.016	.027	**6441876**
7FNS10004	3/8	3/8	.34	1.23	3 1/2	.023	.040	**6441877**
7FNS13005	1/2	1/2	.46	1.48	4	.031	.054	**6441878**
7FNS16006	5/8	5/8	.59	1.98	4 1/2	.039	.067	**6441879**
7FNS19007	3/4	3/4	.71	2.48	5	.047	.080	**6441880**
7FNS25008	1	1	.96	2.98	5 1/2	.063	.106	**6441881**

NOTE: YRC = distance from center line to the crown of the R radius.
RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
R = the head radius size.
Rε = the shoulder radius or radius at the corner of the cutter.

End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-.002	< 1/8"	0/.00024
–	–	1/8–7/32"	0/.00031
–	–	1/4–3/8"	0/.00035
–	–	13/32–11/16"	0/.00043
–	–	23/32–1 3/16"	0/.00051

High-Performance Solid Carbide End Mills • High Feed

Programming Data

7FNS Inch															
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number			Ramp Angle (degree)				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes	Smallest	Largest	1	2	3	4	5
1/4	0.0133	1/4	0.0269	0.0160	0.0133	0.0313	0.0525	6	0.355	0.5	0.76	0.38	0.25	0.19	0.15
3/8	0.0200	3/8	0.0399	0.0235	0.0200	0.0469	0.0788	6	0.5325	0.75	1.14	0.57	0.38	0.29	0.23
1/2	0.0266	1/2	0.0538	0.0320	0.0266	0.0625	0.1050	6	0.71	1	1.52	0.76	0.51	0.38	0.30
5/8	0.0333	5/8	0.0672	0.0400	0.0333	0.0781	0.1313	6	0.8875	1.25	1.91	0.95	0.63	0.48	0.38
3/4	0.0399	3/4	0.0798	0.0470	0.0399	0.0938	0.1575	6	1.065	1.5	2.29	1.14	0.76	0.57	0.46
1	0.0532	1	0.1059	0.0620	0.0532	0.1250	0.2100	6	1.42	2	3.05	1.52	1.02	0.76	0.61
Recommended Feed											30%	30%	30%	30%	10%

Application Data • Series 7FNS • X-Feed™

Material Group		Profile Milling		AlTiN-MT			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)							
		A		Cutting Speed — Vc SFM				D1 — Diameter						
							frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.000
M	1	0.5 x D	0.55 x D	290	–	375	IPT	.0118	.0156	.0188	.0213	.0281	.0338	.0450
	2	0.5 x D	0.55 x D	190	–	260	IPT	.0094	.0125	.0150	.0189	.0250	.0300	.0400
	3	0.5 x D	0.55 x D	190	–	230	IPT	.0094	.0125	.0150	.0189	.0250	.0300	.0400
S	1	0.5 x D	0.55 x D	165	–	295	IPT	.0106	.0141	.0169	.0197	.0254	.0300	.0400
	2	0.5 x D	0.55 x D	165	–	260	IPT	.0094	.0125	.0150	.0189	.0234	.0263	.0360
	3	0.5 x D	0.55 x D	80	–	130	IPT	.0071	.0094	.0113	.0138	.0168	.0188	.0240
	4	0.5 x D	0.55 x D	165	–	190	IPT	.0083	.0109	.0131	.0165	.0219	.0263	.0350

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
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For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

4U50 & 4U80

AEROSPACE ROUGHING

AEROSPACE

4U50

Shallow pitch rougher.

4–6 flutes with variable spacing.

Short length of cut and 3 x D diameter neck length.

Stainless steel and high-temp alloys.

Center cutting.

4U80

Shallow pitch rougher.

4–6 flutes with variable spacing.

Regular length of cut.

Stainless steel and high-temp alloys.

Center cutting.

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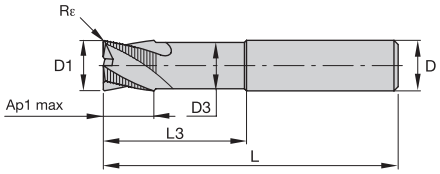
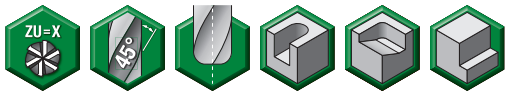
widia.com

High-Performance Roughers

High-Performance Solid Carbide End Mills • Roughing

Series 4U50 • Inch





● first choice
○ alternate choice

P		
M		●
K		
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S		●
H		

WIDIA HANITA

catalog number	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	ZU	WS15PE
4U50E0700R2BT	1/4	1/4	.24	3/8	.75	2 1/2	.030	4	**6441870**
4U50E1000R4BT	3/8	3/8	.35	1/2	1.13	3	.030	4	**6441871**
4U50E1300R5BT	1/2	1/2	.47	5/8	1.50	3 1/2	.030	4	**6441872**
4U50E1601R6BT	5/8	5/8	.59	5/8	1.88	4	.030	6	**6441873**
4U50E1901R7XT	3/4	3/4	.71	3/4	2.25	4 1/2	.050	6	**6441874**
4U50E2501R8XT	1	1	.94	1	3.00	5 1/2	.050	6	**6441875**

End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/-.0031	< 1/8"	0/.00024
1/8–7/32"	-.0012/-.0041	1/8–7/32"	0/.00031
1/4–3/8"	-.0016/-.0051	1/4–3/8"	0/.00035
13/32–11/16"	-.002/-.0063	13/32–11/16"	0/.00043
23/32–1-3/16"	-.0026/-.0077	23/32–1 3/16"	0/.00051

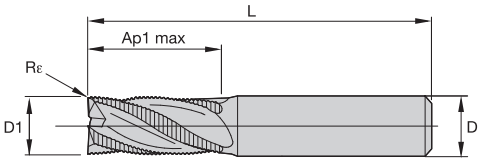
Application Data • Series 4U50 • Inch

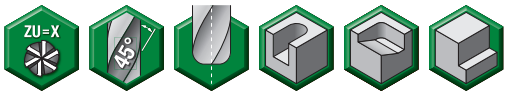
Material Group		Side Milling (A) and Slotting (B)			WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
		A		B	Cutting Speed — Vc SFM				D1 — Diameter					
								frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
M	1	1 x D	0.5 x D	0.75 x D	297	–	379.5	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.5 x D	0.75 x D	198	–	264	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	1 x D	0.5 x D	0.75 x D	198	–	231	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
S	1	1 x D	0.3 x D	0.75 x D	165	–	297	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.3 x D	0.3 x D	82.5	–	132	IPT	.0008	.0010	.0012	.0016	.0018	.0020	.0025
	3	1 x D	0.4 x D	0.75 x D	198	–	264	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	4	1 x D	0.4 x D	0.75 x D	165	–	198	IPT	.0011	.0014	.0017	.0022	.0025	.0028	.0033

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

High-Performance Solid Carbide End Mills • Roughing

Series 4U80 • Inch





● first choice
○ alternate choice

P		
M		●
K		
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S		●
H		

WIDIA HANITA

catalog number	D1	D	length of cut Ap1 max	length L	Rε	ZU	WS15PE
4U80E0700R2BT	1/4	1/4	3/4	2 1/2	.030	4	**6441861**
4U80E0800R3BT	5/16	5/16	13/16	2 1/2	.030	4	**6441862**
4U80E1000R4BT	3/8	3/8	7/8	2 1/2	.030	4	**6441863**
4U80E1300R5BT	1/2	1/2	1 1/4	3	.030	4	**6441864**
4U80E1600R6BT	5/8	5/8	1 7/8	4	.030	6	**6441865**
4U80E1900R7XT	3/4	3/4	1 1/2	4	.050	4	**6441866**
4U80E1901R7XT	3/4	3/4	1 1/2	4	.050	6	**6441867**
4U80E2500R8XT	1	1	1 1/2	4	.050	4	**6441868**
4U80E2501R8XT	1	1	1 1/2	4	.050	6	**6441869**

End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/-.0031	< 1/8"	0/.00024
1/8–7/32"	-.0012/-.0041	1/8–7/32"	0/.00031
1/4–3/8"	-.0016/-.0051	1/4–3/8"	0/.00035
13/32–11/16"	-.002/-.0063	13/32–11/16"	0/.00043
23/32–1-3/16"	-.0026/-.0077	23/32–1 3/16"	0/.00051

Application Data • Series 4U80 • Inch

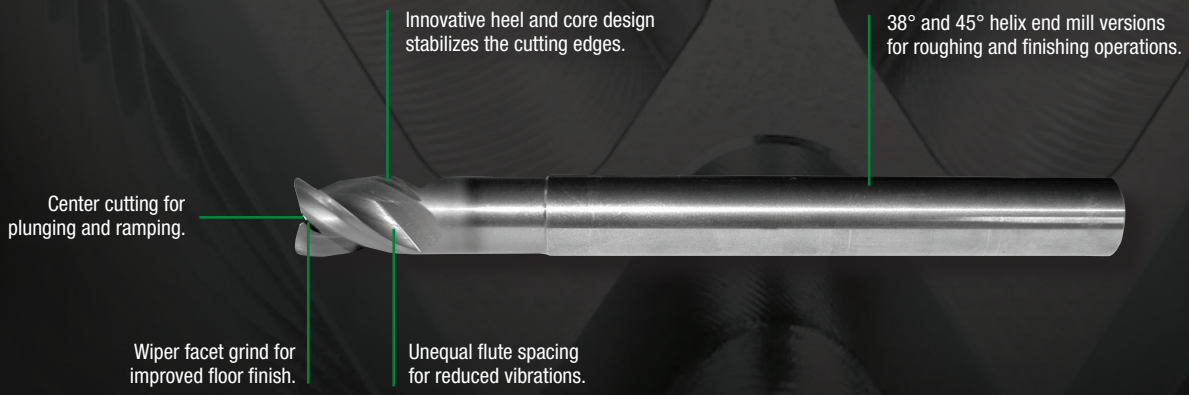
Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	WS15PE Cutting Speed — Vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/4	5/16	3/8	1/2	5/8	3/4	1
		ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
M	1	1 x D	0.5 x D	0.75 x D	290	–	380	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.5 x D	0.75 x D	200	–	265	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	1 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
S	1	1 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0010	.0012	.0016	.0018	.0020	.0025
	3	1 x D	0.4 x D	0.75 x D	200	–	265	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	4	1 x D	0.4 x D	0.75 x D	165	–	200	IPT	.0011	.0014	.0017	.0022	.0025	.0028	.0033

NOTE: Lower value of cutting speed is used for high-stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

ALUSURF™ 5AN2

LINE EXPANSION

AluSurf end mills provide extraordinary Metal Removal Rates (MRR) by combining roughing and finishing operations for any aluminum plunging, slotting, and profiling application. Its proprietary flute geometry is designed for rigidity and improved chip evacuation generating exceptional wall-to-floor perpendicularity, even in thin wall applications. To ensure a superior floor surface finish, the AluSurf front geometry is equipped with a wiper facet grind.



AEROSPACE

GENERAL ENGINEERING

TRANSPORTATION

AluSurf™ 5AN2 Series

One tool for roughing and finishing operations.

Slotting depths up to 1 x D and peripheral milling up to 1.5 x D axial at .5 x D radially.

Unequal flute spacing for chatter-free performance (3-flute series only).

Multiple corner radii and extended neck configurations available as standard.

Increase your output due to less tool changes and increased Metal Removal Rates (MRR).

No specific tools for roughing and finishing necessary.

Less passes due to 1 x D slotting capability.

Perfect for MQL (Minimum Quantity Lubrication) methods.

WIDIA™ HANITA™

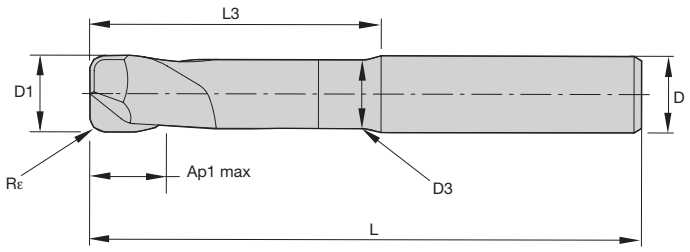
WIDIA™

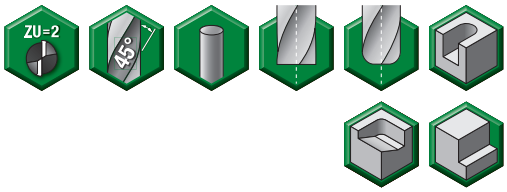
widia.com

AluSurf™

High-Performance Solid Carbide End Mills • AluSurf

Series 5AN2 • Aluminum • Inch





● first choice
○ alternate choice

P		
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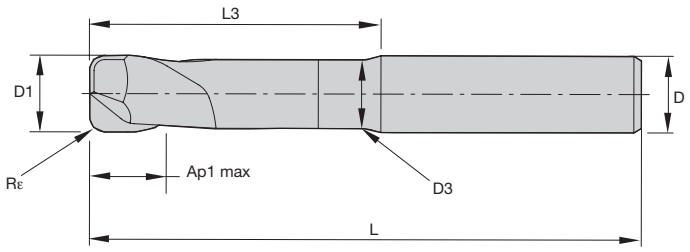
S		
H		

WIDIA HANITA

catalog number	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	UNCOATED
5AN203042A	1/8	1/4	.12	3/16	.50	3	.015	3336000
5AN205042A	3/16	1/4	.18	1/4	.56	3	.015	3336001
5AN207042A	1/4	1/4	.23	5/16	.75	3	.015	3336002
5AN207042	1/4	1/4	.23	5/16	.75	3	–	3659287
5AN207012B	1/4	1/4	.23	3/8	2.25	4	.030	3683906
5AN207012	1/4	1/4	.23	3/8	2.25	4	–	3659288
5AN208043B	5/16	5/16	.29	3/8	1.00	4	.030	3336083
5AN208023	5/16	5/16	.29	3/8	2.00	4	–	3659289
5AN210044B	3/8	3/8	.35	7/16	1.13	4	.030	3336084
5AN210014C	3/8	3/8	.35	7/16	2.25	4	.060	3683910
5AN210014	3/8	3/8	.35	7/16	2.25	4	–	3474843
5AN213005B	1/2	1/2	.47	9/16	2.25	5	.030	3683913
5AN213005C	1/2	1/2	.47	9/16	2.25	5	.060	3683914
5AN213045C	1/2	1/2	.47	9/16	1.50	5	.060	3683911
5AN213005E	1/2	1/2	.47	9/16	2.25	5	.120	6457801
5AN213045E	1/2	1/2	.47	9/16	1.50	5	.120	6457780
5AN213005	1/2	1/2	.47	9/16	2.25	5	–	3474844
5AN213045	1/2	1/2	.47	9/16	1.50	5	–	3659292
5AN213015B	1/2	1/2	.47	9/16	3.25	6	.030	3683916
5AN213015E	1/2	1/2	.47	9/16	3.25	6	.120	6457802
5AN213015	1/2	1/2	.47	9/16	3.25	6	–	3659487
5AN216016B	5/8	5/8	.59	3/4	3.25	6	.030	3683919
5AN216016	5/8	5/8	.59	3/4	3.25	6	–	3659488
5AN219017B	3/4	3/4	.70	1	3.25	6	.030	3683928
5AN219057B	3/4	3/4	.70	1	1.50	6	.030	3683922
5AN219077B	3/4	3/4	.70	1	2.25	6	.030	3683925
5AN219017C	3/4	3/4	.70	1	3.25	6	.060	3683929
5AN219057C	3/4	3/4	.70	1	1.50	6	.060	3683923
5AN219077C	3/4	3/4	.70	1	2.25	6	.060	3683926
5AN219017D	3/4	3/4	.70	1	3.25	6	.090	3683930
5AN219057E	3/4	3/4	.71	1	1.50	6	.120	6457803
5AN219017E	3/4	3/4	.71	1	3.25	6	.120	6457805

Series 5AN2 • Aluminum • Inch

(continued)



● first choice
○ alternate choice

P	
M	
K	
N	●
S	
H	

catalog number	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	UNCOATED
5AN219077E	3/4	3/4	.71	1	2.25	6	.120	**6457804**
5AN219057	3/4	3/4	.70	1	1.50	6	—	**3659489**
5AN219017	3/4	3/4	.70	1	3.25	6	—	**3659491**
5AN225048B	1	1	.94	1 1/8	3.00	5 1/2	.030	**3683931**
5AN225048C	1	1	.94	1 1/8	3.00	5 1/2	.060	**3336088**
5AN225048E	1	1	.94	1 1/2	3.00	5 1/2	.120	**6457806**
5AN225048	1	1	.94	1 1/8	3.00	5 1/2	—	**3659492**
5AN225028C	1	1	.94	1 1/8	4.25	7	.060	**3683933**
5AN225028E	1	1	.94	1 1/2	4.25	7	.120	**6457807**

End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/-.0031	< 1/8"	0/.00024
1/8–7/32"	-.0012/-.0041	1/8–7/32"	0/.00031
1/4–3/8"	-.0016/-.0051	1/4–3/8"	0/.00035
13/32–11/16"	-.002/-.0063	13/32–11/16"	0/.00043
23/32–1-3/16"	-.0026/-.0077	23/32–1 3/16"	0/.00051

Application Data • Series 5AN2 5AN3 • Aluminum • Inch

Material Group		Side Milling (A) and Slotting (B) A ap	A ae	B ap	Uncoated Cutting Speed — vc SFM min		max	Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%. frac.	D1 — Diameter 1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
								dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000
N	1	1 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.5 x D	1 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.
For cutting aluminum with high silicon, coating is recommended.
For spindles with ceramic bearings, multiply ap by 0.5.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".

TDMX

TOP DRILL™ MODULAR X

STABILITY AND RELIABILITY COMBINED INTO ONE MODULAR DRILL SYSTEM

WIDIA™ TOP DRILL Modular X (TDMX) is the ultimate choice for high-demanding drilling applications when stability and reliability are required.

GENERAL ENGINEERING

ENERGY

TRANSPORTATION

NEW!

Platform

Standard cutter bodies in 1.5 x D, 3 x D, 5 x D, 8 x D, and 12 x D.

Insert diameter range from .629” up to 1.574”.

Two geometries, one grade to cover steel and cast iron applications.

Easy to Apply

Front clamping design. No need to disassemble the body from the holder to change insert.

Easy insert nomenclature logic to identify the targeted material group.

Increased Stability and Performance

Highly engineered pocket seat design to ensure maximum stability, even in challenging applications like cross hole, inclined entry/exit, and interrupted cuts.

Suitable for high feed rates.

Flanged shank for higher rigidity.

Polished flutes for improved chip evacuation.

Brand new WP40PD grade for longer tool life in steel and cast iron applications.

NEW!

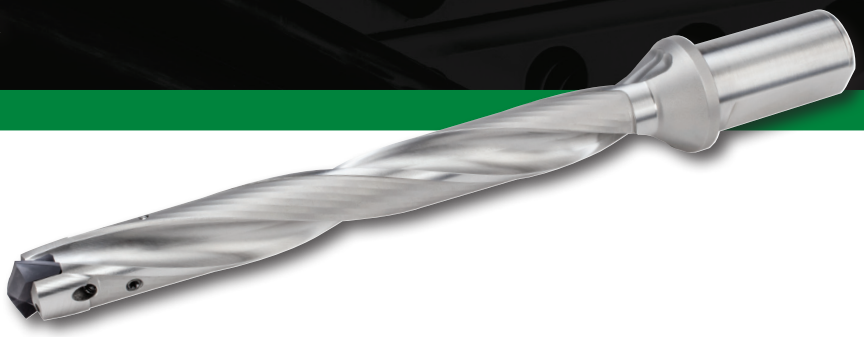
FPE: P, M, K Flat bottom drilling, stacked plates, piloting for deep-hole drilling.
New 1.5 x D and 12 x D bodies

WIDIA™

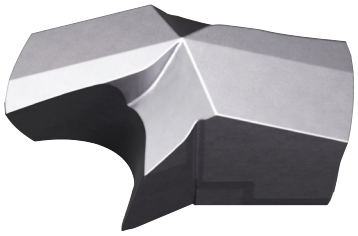
widia.com

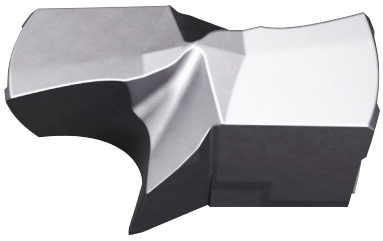
TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X



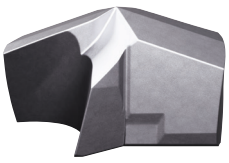
- Augmented insert stability thanks to the highly engineered pocket seat design.
- Front clamping for an easy insert change, without disassembling the holder from the machine spindle.
- Diameter range from .629” up to 1.574”.
- L/D ratio of 1.5 x D, 3 x D, 5 x D, 8 x D, and 12 x D.





Two geometries to cover two material groups in modular drilling.

PK(M)



P K

First choice for Steel and Cast Iron drilling.

NEW!

FPE(M)

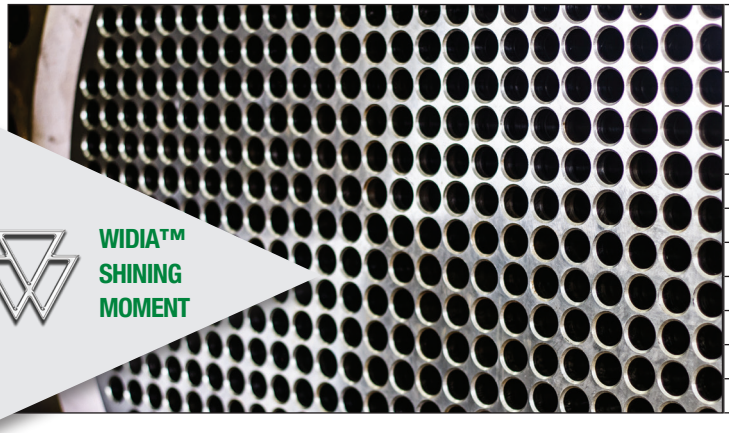
P M K

Flat bottom drilling, stacked plates, piloting for deep-hole drilling.

TDMX — Tube Sheet Drilling

P Steel

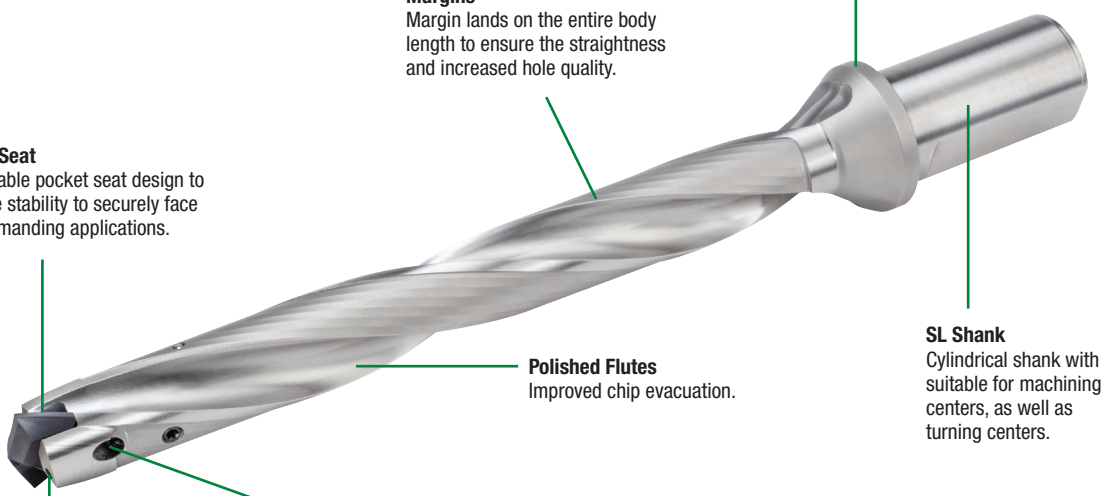
Material: Fe510/1.0553/A441
Condition: rough surface



WIDIA™ SHINING MOMENT

Specifications	Competitor	WIDIA
Diameter (Inch)	1.00”	1.00”
Grade	–	WP40PD
Geometry	–	PK
Vc (SFM)	300	300
n (rev/min)	1.247	1.247
f (IPR)	0.013	0.014
Vf (in/min)	15.7	17.2
LOC (in)	2	2
Coolant	Internal Emulsion	Internal Emulsion
Tool Life (ft)	98.4	157.4

TDMX Body — Technical Details



Flanged Shank
Increase the overall drill stability, above all in deep-drilling applications.

Margins
Margin lands on the entire body length to ensure the straightness and increased hole quality.

Pocket Seat
Extra-stable pocket seat design to increase stability to securely face high-demanding applications.

Polished Flutes
Improved chip evacuation.

SL Shank
Cylindrical shank with flat: suitable for machining centers, as well as turning centers.

Front Clamping
Two standard screws to clamp and unclamp the insert, without disassembling the tool from the holder.

Coolant Channels
Coolant channel exit right behind the cutting edge.

TDMX Pocket Seat — Technical Details

Double-Seating Angle
Ensure the maximum stability under severe cutting conditions.

Coolant Channels

Clamping Screw
Front clamping for an easy-to-change insert.

Gash
Gash is included in the carbide tip geometry to protect the steel body from the chips.

Ejection Pin
Necessary to remove the insert due to the extreme tight pocket seat tolerance.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX Components

Drilling is not always a simple, straightforward job. Workpiece instability, vibrations, and chip control are just a few challenges typically encountered in drilling applications. In addition to these challenges, the cost per hole becomes a critical subject in many shops with pressure to achieve sustainable production at the lowest cost possible. The TOP DRILL Modular X (TDMX) holemaking solution is able to address such machining applications and economic requirements with ease.

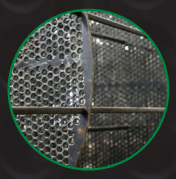
Tube sheets, baffles, I-beams, valves, axles and track drive units are just a few examples of components that can be machined with more confidence thanks to the TDMX drill, its material-specific inserts, and optimized body design.

The combination of an extra stable pocket seat design, reinforced cutting corners, and a through grade, ensures increased process reliability and consequently longer tool life associated, with better hole quality.

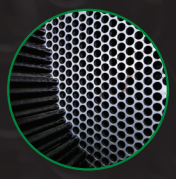
The WP40PD grade provides the right toughness to face even the most unstable cutting conditions while also suitable for MQL applications.

The PK(M) point geometry is designed to operate high feed rates and provide the right guidance for improved hole straightness.

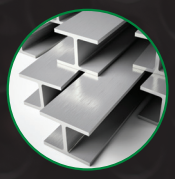
The FPE(M) flat bottom geometry is the solution to address the most challenging operations such as thin stack plate drilling, half holes, and any other applications where the standard 140° shows limits. FPE(M) can also be used as pilot for deep-hole drills.



Baffles



Tube Sheets



I-Beams

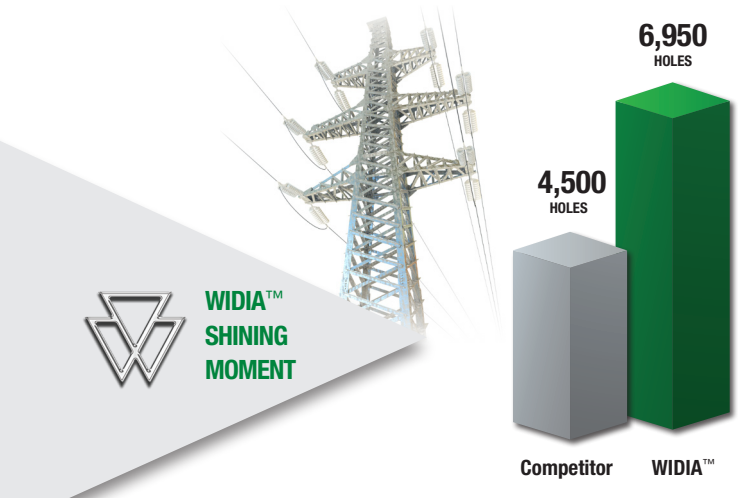
Valves

Cable Tensioner - Post Tension System

Axles

Track Drive Components

Longer tool life, reliability, and increased chip control on a steel structural component for a high-voltage electrical line customer



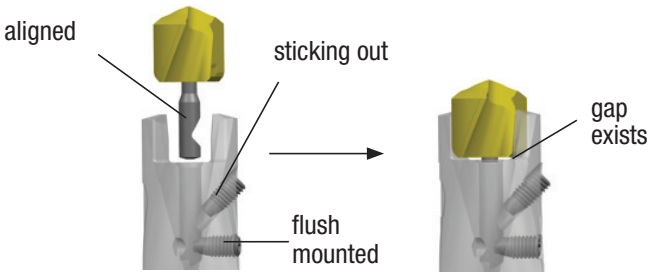
19-224648

Specifications	Competitor	WIDIA
Tool body	Dia. 17mm 3 x D	TDMX
Insert	–	TDMX
Grade	–	WP40PD
Diameter	17,99mm	18mm
L/D Ratio	1.5 x D	3 x D
LOC	.787" (20mm)	.787" (20mm)
Cutting Speed Vc	210 SFM (70m/min)	70m/min 210sfm
Feed Rate in	.0098 IPR (0,25mm/rev)	.25mm/rev (.0098ipr)
Coolant	Internal MQL	
Tool Life	4500 Holes	6950 Holes

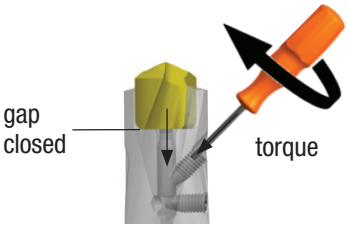
Assembling and Disassembling Instructions

Assembly

1 Insert positioning



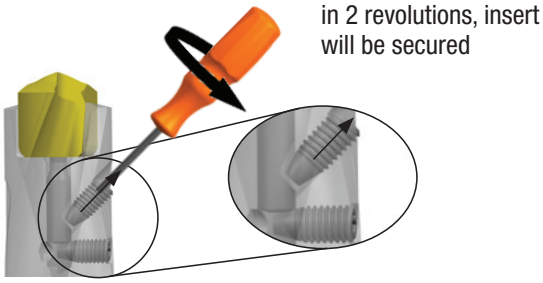
2 Insert clamping



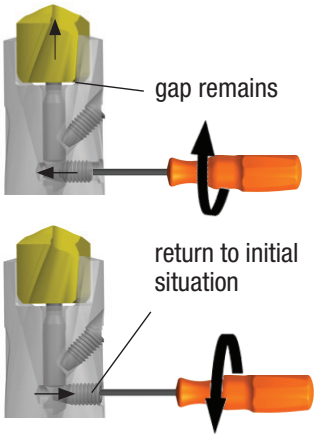
Drill diameter	Torque
ø .6300–.7874"	1.1 ft. lbs.
ø .7875–.9448"	1.5 ft. lbs.
ø .9449–1.1023"	2.2 ft. lbs.
ø 1.1024–1.5748"	3.3 ft. lbs.

Disassembly

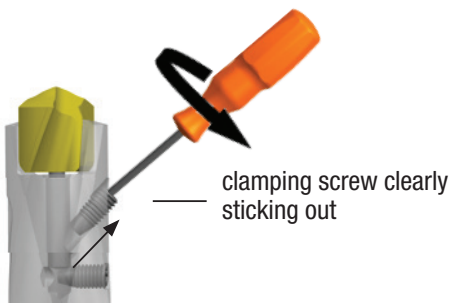
1 Clamping screw loosening



2 Insert pushing out



3 Further clamping screw loosening

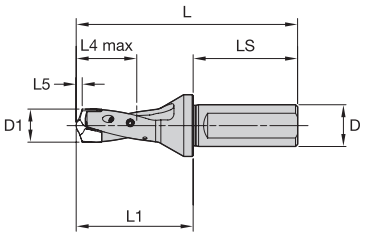


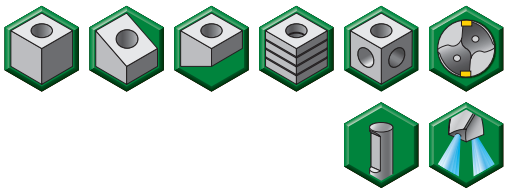
4 Insert removal

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX • 1.5 x D • Side Lock Shank • Inch

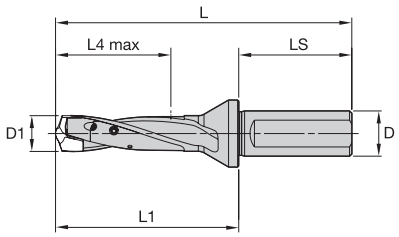


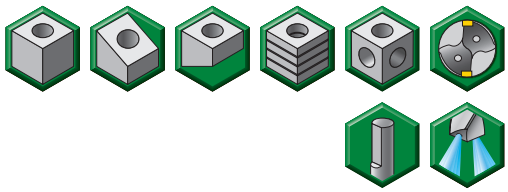


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680912	**TDMX0630R1SL075**	A	.6300	.6692	1.97	.75	4.17	2.20	1.02
6680914	**TDMX0670R1SL075**	B	.6693	.7086	1.97	.75	4.29	2.32	1.06
6680915	**TDMX0709R1SL100**	C	.7087	.7480	2.20	1.00	4.65	2.44	1.14
6680916	**TDMX0749R1SL100**	D	.7481	.7874	2.20	1.00	4.76	2.56	1.18
6680917	**TDMX0788R1SL100**	E	.7875	.8267	2.20	1.00	4.88	2.68	1.26
6680918	**TDMX0827R1SL100**	F	.8268	.8661	2.20	1.00	5.00	2.80	1.30
6680919	**TDMX0867R1SL100**	G	.8662	.9055	2.20	1.00	5.12	2.91	1.38
6680920	**TDMX0906R1SL100**	H	.9056	.9448	2.20	1.00	5.24	3.03	1.42
6680931	**TDMX0945R1SL125**	I	.9449	.9842	2.36	1.25	5.51	3.15	1.50
6680932	**TDMX0985R1SL125**	J	.9843	1.0236	2.36	1.25	5.63	3.27	1.54
6680933	**TDMX1024R1SL125**	K	1.0237	1.0629	2.36	1.25	5.75	3.39	1.61
6680934	**TDMX1063R1SL125**	L	1.0630	1.1023	2.36	1.25	5.87	3.50	1.65
6680935	**TDMX1103R1SL125**	M	1.1024	1.1417	2.36	1.25	5.98	3.62	1.73
6680937	**TDMX1142R1SL125**	N	1.1418	1.1811	2.36	1.25	6.10	3.74	1.77
6680938	**TDMX1182R1SL125**	O	1.1812	1.2204	2.36	1.25	6.22	3.86	1.85
6680940	**TDMX1221R1SL125**	P	1.2205	1.2598	2.36	1.25	6.34	3.98	1.89

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • 3 x D • Side Lock Shank • Inch





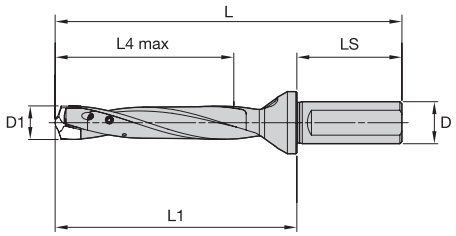
order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572186	**TDMX0630R3SL075**	A	.6300	.6692	1.97	.75	5.16	3.19	2.01
6572187	**TDMX0670R3SL075**	B	.6693	.7086	1.97	.75	5.35	3.39	2.13
6572188	**TDMX0709R3SL100**	C	.7087	.7480	2.20	1.00	5.75	3.54	2.24
6572189	**TDMX0749R3SL100**	D	.7481	.7874	2.20	1.00	5.94	3.74	2.36
6572190	**TDMX0788R3SL100**	E	.7875	.8267	2.20	1.00	6.10	3.90	2.48
6572191	**TDMX0827R3SL100**	F	.8268	.8661	2.20	1.00	6.30	4.09	2.60
6572192	**TDMX0867R3SL100**	G	.8662	.9055	2.20	1.00	6.46	4.25	2.72
6572193	**TDMX0906R3SL100**	H	.9056	.9448	2.20	1.00	6.65	4.45	2.83
6572194	**TDMX0945R3SL125**	I	.9449	.9842	2.36	1.25	6.97	4.61	2.95
6572195	**TDMX0985R3SL125**	J	.9843	1.0236	2.36	1.25	7.17	4.80	3.07
6572196	**TDMX1024R3SL125**	K	1.0237	1.0629	2.36	1.25	7.32	4.96	3.19
6572197	**TDMX1063R3SL125**	L	1.0630	1.1023	2.36	1.25	7.52	5.16	3.31
6572198	**TDMX1103R3SL125**	M	1.1024	1.1417	2.36	1.25	7.68	5.32	3.43
6572199	**TDMX1142R3SL125**	N	1.1418	1.1811	2.36	1.25	7.87	5.51	3.54
6572200	**TDMX1182R3SL125**	O	1.1812	1.2204	2.36	1.25	8.03	5.67	3.66
6572201	**TDMX1221R3SL125**	P	1.2205	1.2598	2.36	1.25	8.23	5.87	3.78
6572202	**TDMX1260R3SL150**	Q	1.2599	1.3385	2.76	1.50	8.98	6.22	4.02
6572203	**TDMX1339R3SL150**	R	1.3386	1.4173	2.76	1.50	9.33	6.57	4.25
6572204	**TDMX1418R3SL150**	S	1.4174	1.4960	2.76	1.50	9.69	6.93	4.49
6572205	**TDMX1497R3SL150**	T	1.4961	1.5748	2.76	1.50	10.04	7.28	4.72

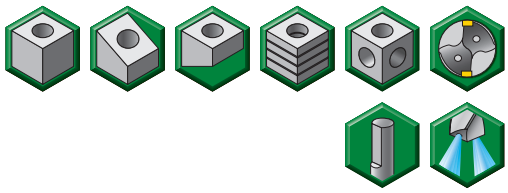
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX • 5 x D • Side Lock Shank • Inch

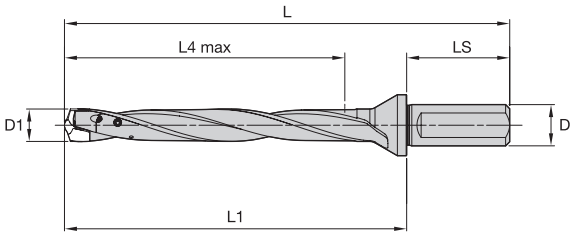


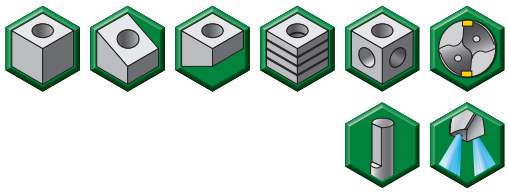


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572206	TDMX0630R5SL075	A	.6300	.6692	1.97	.75	6.50	4.53	3.35
6572207	TDMX0670R5SL075	B	.6693	.7086	1.97	.75	6.77	4.80	3.54
6572208	TDMX0709R5SL100	C	.7087	.7480	2.20	1.00	7.24	5.04	3.74
6572210	TDMX0749R5SL100	D	.7481	.7874	2.20	1.00	7.52	5.32	3.94
6572231	TDMX0788R5SL100	E	.7875	.8267	2.20	1.00	7.76	5.55	4.13
6572232	TDMX0827R5SL100	F	.8268	.8661	2.20	1.00	8.03	5.83	4.33
6572233	TDMX0867R5SL100	G	.8662	.9055	2.20	1.00	8.27	6.06	4.53
6572234	TDMX0906R5SL100	H	.9056	.9448	2.20	1.00	8.54	6.34	4.72
6572235	TDMX0945R5SL125	I	.9449	.9842	2.36	1.25	8.94	6.57	4.92
6572236	TDMX0985R5SL125	J	.9843	1.0236	2.36	1.25	9.21	6.85	5.12
6572237	TDMX1024R5SL125	K	1.0237	1.0629	2.36	1.25	9.45	7.09	5.32
6572238	TDMX1063R5SL125	L	1.0630	1.1023	2.36	1.25	9.72	7.36	5.51
6572239	TDMX1103R5SL125	M	1.1024	1.1417	2.36	1.25	9.96	7.60	5.71
6572240	TDMX1142R5SL125	N	1.1418	1.1811	2.36	1.25	10.24	7.87	5.91
6572241	TDMX1182R5SL125	O	1.1812	1.2204	2.36	1.25	10.47	8.11	6.10
6572242	TDMX1221R5SL125	P	1.2205	1.2598	2.36	1.25	10.75	8.39	6.30
6572243	TDMX1260R5SL150	Q	1.2599	1.3385	2.76	1.50	11.65	8.90	6.69
6572244	TDMX1339R5SL150	R	1.3386	1.4173	2.76	1.50	12.17	9.41	7.09
6572245	TDMX1418R5SL150	S	1.4174	1.4960	2.76	1.50	12.68	9.92	7.48
6572246	TDMX1497R5SL150	T	1.4961	1.5748	2.76	1.50	13.19	10.43	7.87

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • 8 x D • Side Lock Shank • Inch





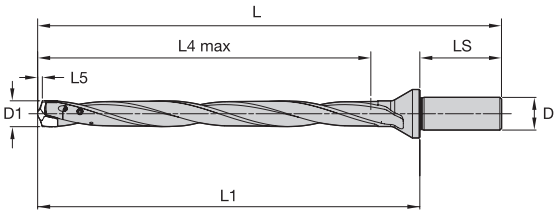
order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572247	**TDMX0630R8SL075**	A	.6300	.6692	1.97	.75	8.50	6.54	5.35
6572248	**TDMX0670R8SL075**	B	.6693	.7086	1.97	.75	8.90	6.93	5.67
6572249	**TDMX0709R8SL100**	C	.7087	.7480	2.20	1.00	9.49	7.28	5.98
6572250	**TDMX0749R8SL100**	D	.7481	.7874	2.20	1.00	9.88	7.68	6.30
6572251	**TDMX0788R8SL100**	E	.7875	.8267	2.20	1.00	10.24	8.03	6.61
6572252	**TDMX0827R8SL100**	F	.8268	.8661	2.20	1.00	10.63	8.43	6.93
6572253	**TDMX0867R8SL100**	G	.8662	.9055	2.20	1.00	10.98	8.78	7.24
6572254	**TDMX0906R8SL100**	H	.9056	.9448	2.20	1.00	11.38	9.17	7.56
6572255	**TDMX0945R8SL125**	I	.9449	.9842	2.36	1.25	11.89	9.53	7.87
6572256	**TDMX0985R8SL125**	J	.9843	1.0236	2.36	1.25	12.28	9.92	8.19
6572257	**TDMX1024R8SL125**	K	1.0237	1.0629	2.36	1.25	12.64	10.28	8.50
6572258	**TDMX1063R8SL125**	L	1.0630	1.1023	2.36	1.25	13.03	10.67	8.82
6572259	**TDMX1103R8SL125**	M	1.1024	1.1417	2.36	1.25	13.39	11.02	9.13
6572260	**TDMX1142R8SL125**	N	1.1418	1.1811	2.36	1.25	13.78	11.42	9.45
6572261	**TDMX1182R8SL125**	O	1.1812	1.2204	2.36	1.25	14.13	11.77	9.76
6572262	**TDMX1221R8SL125**	P	1.2205	1.2598	2.36	1.25	14.53	12.17	10.08
6572263	**TDMX1260R8SL150**	Q	1.2599	1.3385	2.76	1.50	15.67	12.91	10.71
6572264	**TDMX1339R8SL150**	R	1.3386	1.4173	2.76	1.50	16.42	13.66	11.34
6572265	**TDMX1418R8SL150**	S	1.4174	1.4960	2.76	1.50	17.17	14.41	11.97
6572266	**TDMX1497R8SL150**	T	1.4961	1.5748	2.76	1.50	17.91	15.16	12.60

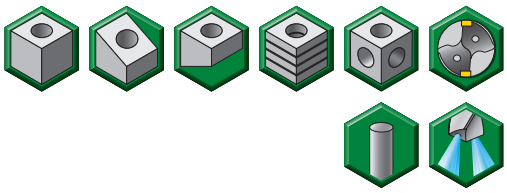
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX • 12 x D • Flanged Round Shank • Inch

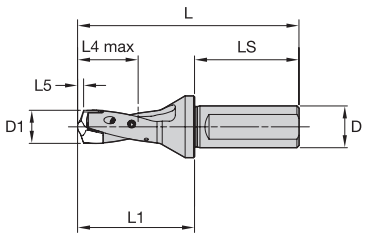


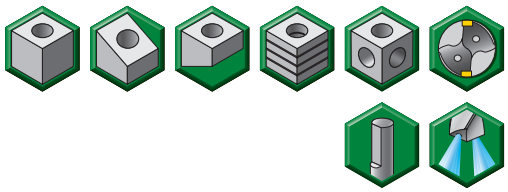


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680978	**TDMX0630R12SF075**	A	.6300	.6692	1.97	.75	11.18	9.21	8.03
6680979	**TDMX0670R12SF075**	B	.6693	.7086	1.97	.75	11.73	9.76	8.50
6680980	**TDMX0709R12SF100**	C	.7087	.7480	2.20	1.00	12.48	10.28	8.98
6681001	**TDMX0749R12SF100**	D	.7481	.7874	2.20	1.00	13.03	10.83	9.45
6681002	**TDMX0788R12SF100**	E	.7875	.8267	2.20	1.00	13.54	11.34	9.92
6681003	**TDMX0827R12SF100**	F	.8268	.8661	2.20	1.00	14.09	11.89	10.39
6681004	**TDMX0867R12SF100**	G	.8662	.9055	2.20	1.00	14.61	12.40	10.87
6681005	**TDMX0906R12SF100**	H	.9056	.9448	2.20	1.00	15.16	12.95	11.34
6681006	**TDMX0945R12SF125**	I	.9449	.9842	2.36	1.25	15.83	13.46	11.81
6681007	**TDMX0985R12SF125**	J	.9843	1.0236	2.36	1.25	16.38	14.02	12.28
6681008	**TDMX1024R12SF125**	K	1.0237	1.0629	2.36	1.25	16.89	14.53	12.76
6681010	**TDMX1063R12SF125**	L	1.0630	1.1023	2.36	1.25	17.44	15.08	13.23
6681011	**TDMX1103R12SF125**	M	1.1024	1.1417	2.36	1.25	17.95	15.59	13.70
6681012	**TDMX1142R12SF125**	N	1.1418	1.1811	2.36	1.25	18.50	16.14	14.17
6681013	**TDMX1182R12SF125**	O	1.1812	1.2204	2.36	1.25	19.02	16.65	14.65
6681015	**TDMX1221R12SF125**	P	1.2205	1.2598	2.36	1.25	19.57	17.20	15.12

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • 1.5 x D • Side Lock Shank • Metric





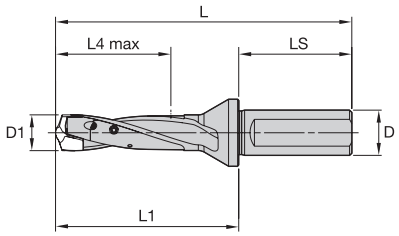
order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6680951	**TDMX160R1SL20M**	A	16,000	16,999	50	20	106	56	26
6680952	**TDMX170R1SL20M**	B	17,000	17,999	50	20	109	59	27
6680953	**TDMX180R1SL25M**	C	18,000	18,999	56	25	118	62	29
6680954	**TDMX190R1SL25M**	D	19,000	19,999	56	25	121	65	30
6680955	**TDMX200R1SL25M**	E	20,000	20,999	56	25	124	68	32
6680956	**TDMX210R1SL25M**	F	21,000	21,999	56	25	127	71	33
6680957	**TDMX220R1SL25M**	G	22,000	22,999	56	25	130	74	35
6680958	**TDMX230R1SL25M**	H	23,000	23,999	56	25	133	77	36
6680959	**TDMX240R1SL32M**	I	24,000	24,999	60	32	140	80	38
6680960	**TDMX250R1SL32M**	J	25,000	25,999	60	32	143	83	39
6680971	**TDMX260R1SL32M**	K	26,000	26,999	60	32	146	86	41
6680972	**TDMX270R1SL32M**	L	27,000	27,999	60	32	149	89	42
6680973	**TDMX280R1SL32M**	M	28,000	28,999	60	32	152	92	44
6680974	**TDMX290R1SL32M**	N	29,000	29,999	60	32	155	95	45
6680975	**TDMX300R1SL32M**	O	30,000	30,999	60	32	158	98	47
6680976	**TDMX310R1SL32M**	P	31,000	31,999	60	32	161	101	48

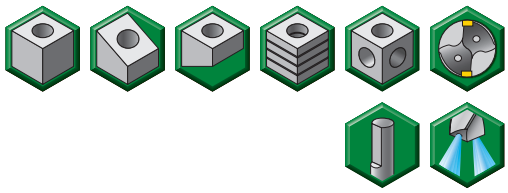
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX • 3 x D • Side Lock Shank • Metric

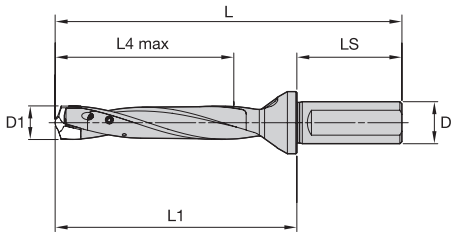


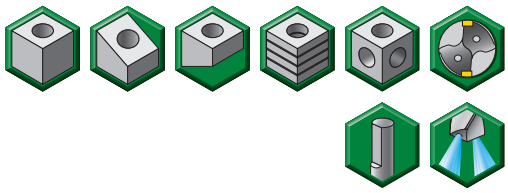


order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572091	TDMX160R3SL20M	A	16,000	16,999	50	20	131	81	51
6572092	TDMX170R3SL20M	B	17,000	17,999	50	20	136	86	54
6572093	TDMX180R3SL25M	C	18,000	18,999	56	25	146	90	57
6572094	TDMX190R3SL25M	D	19,000	19,999	56	25	151	95	60
6572096	TDMX200R3SL25M	E	20,000	20,999	56	25	155	99	63
6572097	TDMX210R3SL25M	F	21,000	21,999	56	25	160	104	66
6572098	TDMX220R3SL25M	G	22,000	22,999	56	25	164	108	69
6572099	TDMX230R3SL25M	H	23,000	23,999	56	25	169	113	72
6572100	TDMX240R3SL32M	I	24,000	24,999	60	32	177	117	75
6572101	TDMX250R3SL32M	J	25,000	25,999	60	32	182	122	78
6572102	TDMX260R3SL32M	K	26,000	26,999	60	32	186	126	81
6572104	TDMX270R3SL32M	L	27,000	27,999	60	32	191	131	84
6572105	TDMX280R3SL32M	M	28,000	28,999	60	32	195	135	87
6572106	TDMX290R3SL32M	N	29,000	29,999	60	32	200	140	90
6572107	TDMX300R3SL32M	O	30,000	30,999	60	32	204	144	93
6572108	TDMX310R3SL32M	P	31,000	31,999	60	32	209	149	96
6572109	TDMX320R3SL40M	Q	32,000	33,999	70	40	228	158	102
6572110	TDMX340R3SL40M	R	34,000	35,999	70	40	237	167	108
6572121	TDMX360R3SL40M	S	36,000	37,999	70	40	246	176	114
6572122	TDMX380R3SL40M	T	38,000	40,000	70	40	255	185	120

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • 5 x D • Side Lock Shank • Metric





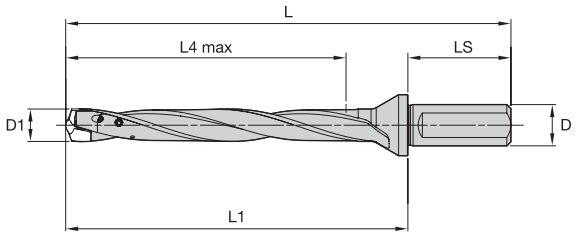
order number	catalog number	SSC	D1	D1 max	LS	D	L	L1	L4 max
6572125	**TDMX160R5SL20M**	A	16,000	16,999	50	20	165	115	85
6572126	**TDMX170R5SL20M**	B	17,000	17,999	50	20	172	122	90
6572127	**TDMX180R5SL25M**	C	18,000	18,999	56	25	184	128	95
6572128	**TDMX190R5SL25M**	D	19,000	19,999	56	25	191	135	100
6572129	**TDMX200R5SL25M**	E	20,000	20,999	56	25	197	141	105
6572130	**TDMX210R5SL25M**	F	21,000	21,999	56	25	204	148	110
6572141	**TDMX220R5SL25M**	G	22,000	22,999	56	25	210	154	115
6572142	**TDMX230R5SL25M**	H	23,000	23,999	56	25	217	161	120
6572143	**TDMX240R5SL32M**	I	24,000	24,999	60	32	227	167	125
6572144	**TDMX250R5SL32M**	J	25,000	25,999	60	32	234	174	130
6572145	**TDMX260R5SL32M**	K	26,000	26,999	60	32	240	180	135
6572146	**TDMX270R5SL32M**	L	27,000	27,999	60	32	247	187	140
6572147	**TDMX280R5SL32M**	M	28,000	28,999	60	32	253	193	145
6572148	**TDMX290R5SL32M**	N	29,000	29,999	60	32	260	200	150
6572149	**TDMX300R5SL32M**	O	30,000	30,999	60	32	266	206	155
6572150	**TDMX310R5SL32M**	P	31,000	31,999	60	32	273	213	160
6572151	**TDMX320R5SL40M**	Q	32,000	33,999	70	40	296	226	170
6572152	**TDMX340R5SL40M**	R	34,000	35,999	70	40	309	239	180
6572153	**TDMX360R5SL40M**	S	36,000	37,999	70	40	322	252	190
6572154	**TDMX380R5SL40M**	T	38,000	40,000	70	40	335	265	200

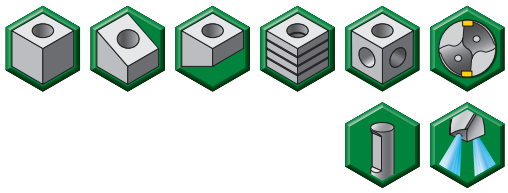
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

TDMX • 8 x D • Side Lock Shank • Metric

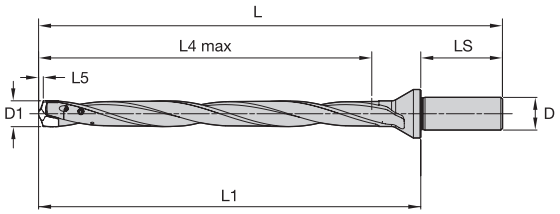


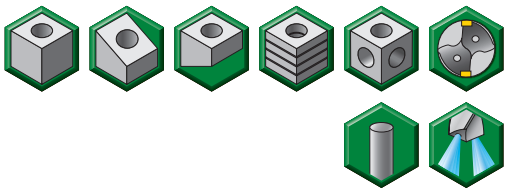


order number	catalog number	SSC	D1	D1 max	LS	D	LATTH	L	L1	L4 max
6572155	TDMX160R8SL20M	A	16,000	16,999	50	20	153,8	216	166	136
6572156	TDMX170R8SL20M	B	17,000	17,999	50	20	163,8	226	176	144
6572157	TDMX180R8SL25M	C	18,000	18,999	56	25	171,7	241	185	152
6572158	TDMX190R8SL25M	D	19,000	19,999	56	25	181,7	251	195	160
6572159	TDMX200R8SL25M	E	20,000	20,999	56	25	189,6	260	204	168
6572160	TDMX210R8SL25M	F	21,000	21,999	56	25	199,6	270	214	176
6572171	TDMX220R8SL25M	G	22,000	22,999	56	25	207,5	279	223	184
6572172	TDMX230R8SL25M	H	23,000	23,999	56	25	217,5	289	233	192
6572173	TDMX240R8SL32M	I	24,000	24,999	60	32	225,4	302	242	200
6572174	TDMX250R8SL32M	J	25,000	25,999	60	32	235,4	312	252	208
6572175	TDMX260R8SL32M	K	26,000	26,999	60	32	243,3	321	261	216
6572176	TDMX270R8SL32M	L	27,000	27,999	60	32	253,3	331	271	224
6572177	TDMX280R8SL32M	M	28,000	28,999	60	32	261,2	340	280	232
6572178	TDMX290R8SL32M	N	29,000	29,999	60	32	271,2	350	290	240
6572179	TDMX300R8SL32M	O	30,000	30,999	60	32	279,0	359	299	248
6572180	TDMX310R8SL32M	P	31,000	31,999	60	32	289,1	369	309	256
6572181	TDMX320R8SL40M	Q	32,000	33,999	70	40	306,0	398	328	272
6572182	TDMX340R8SL40M	R	34,000	35,999	70	40	325,0	417	247	288
6572183	TDMX360R8SL40M	S	36,000	37,999	70	40	341,8	436	366	304
6572184	TDMX380R8SL40M	T	38,000	40,000	70	40	360,8	455	385	320

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • 12 x D • Flanged Round Shank • Metric

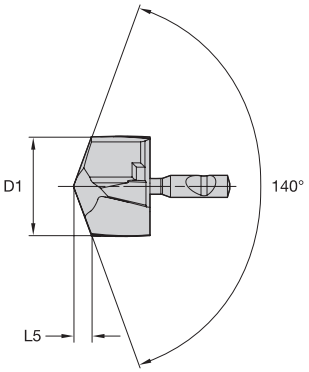


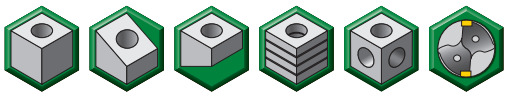


order number	catalog number	SSC	D1	D1 max	LS	D	LATTH	L	L1	L4 max
6681017	**TDMX160R12SF20M**	A	16,000	16,999	50	20	221,8	284	234	204
6681018	**TDMX170R12SF20M**	B	17,000	17,999	50	20	235,8	298	248	216
6681019	**TDMX180R12SF25M**	C	18,000	18,999	56	25	247,7	317	261	228
6681020	**TDMX190R12SF25M**	D	19,000	19,999	56	25	261,7	331	275	240
6681041	**TDMX200R12SF25M**	E	20,000	20,999	56	25	273,6	344	288	252
6681042	**TDMX210R12SF25M**	F	21,000	21,999	56	25	287,6	358	302	264
6681043	**TDMX220R12SF25M**	G	22,000	22,999	56	25	299,5	371	315	276
6681044	**TDMX230R12SF25M**	H	23,000	23,999	56	25	313,5	385	329	288
6681045	**TDMX240R12SF32M**	I	24,000	24,999	60	32	325,4	402	342	300
6681046	**TDMX250R12SF32M**	J	25,000	25,999	60	32	339,4	416	356	312
6681047	**TDMX260R12SF32M**	K	26,000	26,999	60	32	351,3	429	369	324
6681049	**TDMX270R12SF32M**	L	27,000	27,999	60	32	365,3	443	383	336
6681050	**TDMX280R12SF32M**	M	28,000	28,999	60	32	377,2	456	396	348
6681051	**TDMX290R12SF32M**	N	29,000	29,999	60	32	391,2	470	410	360
6681052	**TDMX300R12SF32M**	O	30,000	30,999	60	32	403,1	483	423	372
6681053	**TDMX310R12SF32M**	P	31,000	31,999	60	32	417,1	497	437	384

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.
L5 is dependent on the insert.

TDMX • Inserts • PK(M)





● first choice
○ alternate choice

P		●
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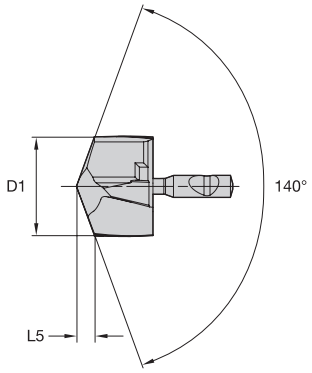
catalog number	D1 mm	D1 in	L5 mm	L5 in	SSC	WP40PD
TDMX16000PKM	16,00	.630	3,21	.126	A	6568446
TDMX16200PKM	16,20	.638	3,25	.128	A	6568447
TDMX16281PKM	16,28	.641	3,26	.128	A	6568448
TDMX16500PKM	16,50	.650	3,30	.130	A	6568449
TDMX16667PKM	16,67	.656	3,33	.131	A	6568450
TDMX17000PKM	17,00	.669	3,39	.134	B	6568461
TDMX17064PKM	17,06	.672	3,41	.134	B	6568462
TDMX17463PKM	17,46	.688	3,48	.137	B	6568464
TDMX17500PKM	17,50	.689	3,49	.137	B	6568465
TDMX17600PKM	17,60	.693	3,50	.138	B	6568467
TDMX17800PKM	17,80	.701	3,54	.139	B	6568471
TDMX17859PKM	17,86	.703	3,55	.140	B	6568472
TDMX18000PKM	18,00	.709	3,58	.141	C	6568473
TDMX18255PKM	18,26	.719	3,64	.143	C	6568474
TDMX18500PKM	18,50	.728	3,68	.145	C	6568475
TDMX18651PKM	18,65	.734	3,71	.146	C	6568476
TDMX18800PKM	18,80	.740	3,74	.147	C	6568477
TDMX19000PKM	19,00	.748	3,78	.149	D	6568478
TDMX19050PKM	19,05	.750	3,78	.149	D	6568479
TDMX19200PKM	19,20	.756	3,81	.150	D	6568480
TDMX19270PKM	19,27	.759	3,82	.150	D	6568481
TDMX19450PKM	19,45	.766	3,86	.152	D	6568482
TDMX19500PKM	19,50	.768	3,87	.152	D	6568483
TDMX19700PKM	19,70	.776	3,90	.154	D	6568484
TDMX19840PKM	19,84	.781	3,93	.155	D	6568485
TDMX20000PKM	20,00	.787	3,97	.156	E	6568813
TDMX20100PKM	20,10	.791	3,99	.157	E	6568814
TDMX20200PKM	20,20	.795	4,01	.158	E	6568815
TDMX20239PKM	20,24	.797	4,02	.158	E	6568816
TDMX20300PKM	20,30	.799	4,03	.159	E	6568817
TDMX20400PKM	20,40	.803	4,05	.159	E	6568818
TDMX20500PKM	20,50	.807	4,06	.160	E	6568819
TDMX20600PKM	20,60	.811	4,08	.161	E	6568820
TDMX20650PKM	20,65	.813	4,09	.161	E	6568841
TDMX20700PKM	20,70	.815	4,10	.161	E	6568842
TDMX20800PKM	20,80	.819	4,12	.162	E	6568843

TDMX • Inserts • PK(M)

(continued)



● first choice
○ alternate choice

P		●
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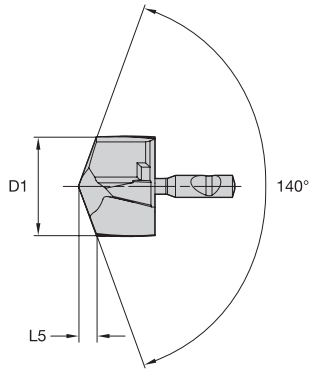
catalog number	D1 mm	D1 in	L5 mm	L5 in	SSC	WP40PD
TDMX20900PKM	20,90	.823	4,14	.163	E	**6568844**
TDMX21000PKM	21,00	.827	4,16	.164	F	**6568845**
TDMX21430PKM	21,43	.844	4,23	.167	F	**6568846**
TDMX21500PKM	21,50	.847	4,25	.167	F	**6568847**
TDMX22000PKM	22,00	.866	4,35	.171	G	**6568848**
TDMX22225PKM	22,23	.875	4,39	.173	G	**6568849**
TDMX22450PKM	22,45	.884	4,44	.175	G	**6568850**
TDMX22500PKM	22,50	.886	4,44	.175	G	**6568851**
TDMX23000PKM	23,00	.906	4,54	.179	H	**6568852**
TDMX23500PKM	23,50	.925	4,63	.182	H	**6568853**
TDMX23813PKM	23,81	.938	4,68	.184	H	**6568854**
TDMX24000PKM	24,00	.945	4,73	.186	I	**6568856**
TDMX24500PKM	24,50	.965	4,82	.190	I	**6568857**
TDMX24605PKM	24,61	.969	4,84	.191	I	**6568858**
TDMX25000PKM	25,00	.984	4,91	.193	J	**6568859**
TDMX25400PKM	25,40	1.000	4,99	.197	J	**6568860**
TDMX25500PKM	25,50	1.004	5,01	.197	J	**6568861**
TDMX25670PKM	25,67	1.011	5,04	.198	J	**6568862**
TDMX25700PKM	25,70	1.012	5,04	.198	J	**6568863**
TDMX25760PKM	25,76	1.014	5,05	.199	J	**6568864**
TDMX25796PKM	25,80	1.016	5,06	.199	J	**6568865**
TDMX26000PKM	26,00	1.024	5,11	.201	K	**6568866**
TDMX26192PKM	26,19	1.031	5,15	.203	K	**6568867**
TDMX26400PKM	26,40	1.039	5,18	.204	K	**6568868**
TDMX26500PKM	26,50	1.043	5,20	.205	K	**6568869**
TDMX26589PKM	26,59	1.047	5,22	.206	K	**6568870**
TDMX27000PKM	27,00	1.063	5,29	.208	L	**6568871**
TDMX27500PKM	27,50	1.083	5,38	.212	L	**6568872**
TDMX27780PKM	27,78	1.094	5,43	.214	L	**6568873**
TDMX28000PKM	28,00	1.102	5,49	.216	M	**6568874**
TDMX28176PKM	28,18	1.109	5,52	.217	M	**6568875**
TDMX28500PKM	28,50	1.122	5,58	.220	M	**6568876**
TDMX28575PKM	28,58	1.125	5,59	.220	M	**6568877**
TDMX29000PKM	29,00	1.142	5,67	.223	N	**6568878**
TDMX29367PKM	29,37	1.156	5,74	.226	N	**6568879**
TDMX29500PKM	29,50	1.161	5,76	.227	N	**6568880**

TDMX • Inserts • PK(M)

(continued)



● first choice
○ alternate choice

P		●
M		○
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N		
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	D1		L5			
catalog number	mm	in	mm	in	SSC	WP40PD
TDMX29764PKM	29,76	1.172	5,81	.229	N	**6568891**
TDMX30000PKM	30,00	1.181	5,87	.231	O	**6568892**
TDMX30163PKM	30,16	1.188	5,90	.232	O	**6568893**
TDMX30500PKM	30,50	1.201	5,96	.235	O	**6568896**
TDMX30955PKM	30,96	1.219	6,04	.238	O	**6568897**
TDMX31000PKM	31,00	1.221	6,05	.238	P	**6568898**
TDMX31500PKM	31,50	1.240	6,14	.242	P	**6568899**
TDMX31750PKM	31,75	1.250	6,18	.243	P	**6568900**
TDMX32000PKM	32,00	1.260	6,25	.246	Q	**6568901**
TDMX32500PKM	32,50	1.280	6,34	.250	Q	**6568902**
TDMX33000PKM	33,00	1.299	6,43	.253	Q	**6568903**
TDMX33338PKM	33,34	1.313	6,49	.256	Q	**6568904**
TDMX34000PKM	34,00	1.339	6,61	.260	R	**6568905**
TDMX34130PKM	34,13	1.344	6,64	.261	R	**6568906**
TDMX34925PKM	34,93	1.375	6,78	.267	R	**6568907**
TDMX35000PKM	35,00	1.378	6,79	.267	R	**6568908**
TDMX35500PKM	35,50	1.398	6,89	.271	R	**6568909**
TDMX36000PKM	36,00	1.417	7,00	.276	S	**6568910**
TDMX36500PKM	36,50	1.437	7,09	.279	S	**6568911**
TDMX37000PKM	37,00	1.457	7,18	.283	S	**6568912**
TDMX37500PKM	37,50	1.476	7,27	.286	S	**6568913**
TDMX38000PKM	38,00	1.496	7,36	.290	T	**6568914**
TDMX38100PKM	38,10	1.500	7,38	.291	T	**6568915**
TDMX38500PKM	38,50	1.516	7,46	.294	T	**6568916**
TDMX39000PKM	39,00	1.535	7,55	.297	T	**6568917**
TDMX39289PKM	39,29	1.547	7,60	.299	T	**6568918**
TDMX39500PKM	39,50	1.555	7,64	.301	T	**6568919**
TDMX40000PKM	40,00	1.575	7,73	.304	T	**6568920**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

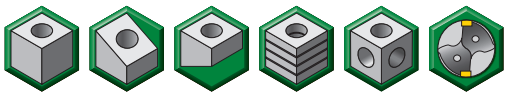
Inch tolerance

D1	tolerance k8
.3125–.3906	.000/+.0009
>.3906–.6250	.000/+.0011
>.6692–.7090	.000/+.0010
>.7090–.8228	.000/+.0013

Metric tolerance

D1	tolerance k8
8–10	0,000/+0,022
>10–17	0,000/+0,027
>17–18	0,000/+0,027
>18–21	0,000/+0,033

TDMX • Inserts • FPE(M)



● first choice
○ alternate choice

P		●
M		○
K		●
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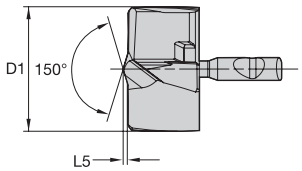
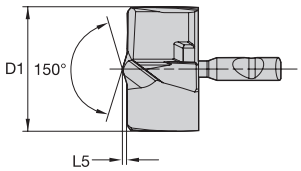


catalog number	D1 mm	D1 in	L5 mm	L5 in	SSC	WP40PD
TDMX16000FPEM	16,00	.630	1,16	.046	A	**6693048**
TDMX16281FPEM	16,28	.641	1,17	.046	A	**6693049**
TDMX16500FPEM	16,50	.650	1,17	.046	A	**6693050**
TDMX16667FPEM	16,67	.656	1,17	.046	A	**6693111**
TDMX17000FPEM	17,00	.669	1,18	.047	B	**6693112**
TDMX17064FPEM	17,06	.672	1,18	.047	B	**6693113**
TDMX17500FPEM	17,50	.689	1,19	.047	B	**6693114**
TDMX18000FPEM	18,00	.709	1,28	.050	C	**6693115**
TDMX18500FPEM	18,50	.728	1,28	.050	C	**6693116**
TDMX19000FPEM	19,00	.748	1,29	.051	D	**6693117**
TDMX19050FPEM	19,05	.750	1,29	.051	D	**6693118**
TDMX19500FPEM	19,50	.768	1,30	.051	D	**6693119**
TDMX19840FPEM	19,84	.781	1,31	.052	D	**6693120**
TDMX20000FPEM	20,00	.787	1,39	.055	E	**6693131**
TDMX20500FPEM	20,50	.807	1,40	.055	E	**6693132**
TDMX21000FPEM	21,00	.827	1,40	.055	F	**6693133**
TDMX21500FPEM	21,50	.847	1,41	.056	F	**6693134**
TDMX22000FPEM	22,00	.866	1,50	.059	G	**6693135**
TDMX22500FPEM	22,50	.886	1,51	.059	G	**6693136**
TDMX23000FPEM	23,00	.906	1,51	.059	H	**6693137**
TDMX23500FPEM	23,50	.925	1,52	.060	H	**6693138**
TDMX24000FPEM	24,00	.945	1,61	.063	I	**6693139**
TDMX24500FPEM	24,50	.965	1,62	.064	I	**6693140**
TDMX25000FPEM	25,00	.984	1,62	.064	J	**6693151**
TDMX25400FPEM	25,40	1.000	1,63	.064	J	**6693152**
TDMX25500FPEM	25,50	1.004	1,63	.064	J	**6693153**
TDMX26000FPEM	26,00	1.024	1,72	.068	K	**6693154**
TDMX26400FPEM	26,40	1.039	1,72	.068	K	**6693194**
TDMX26500FPEM	26,50	1.043	1,72	.068	K	**6693155**
TDMX27000FPEM	27,00	1.063	1,73	.068	L	**6693156**
TDMX27500FPEM	27,50	1.083	1,74	.069	L	**6693157**
TDMX28000FPEM	28,00	1.102	1,83	.072	M	**6693158**
TDMX28500FPEM	28,50	1.122	1,83	.072	M	**6693160**
TDMX29000FPEM	29,00	1.142	1,84	.072	N	**6693161**
TDMX29500FPEM	29,50	1.161	1,85	.073	N	**6693162**
TDMX30000FPEM	30,00	1.181	1,93	.076	O	**6693163**

TDMX • Inserts • FPE(M)

(continued)



● first choice
○ alternate choice

P		●
M		○
K		●
N		
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H		

catalog number	D1 mm	D1 in	L5 mm	L5 in	SSC	WP40PD
TDMX30500FPEM	30,50	1.201	1,94	.076	O	**6693164**
TDMX31000FPEM	31,00	1.221	1,94	.076	P	**6693165**
TDMX31500FPEM	31,50	1.240	1,95	.077	P	**6693166**
TDMX31750FPEM	31,75	1.250	1,95	.077	P	**6693167**
TDMX32000FPEM	32,00	1.260	2,08	.082	Q	**6693168**
TDMX32500FPEM	32,50	1.280	2,08	.082	Q	**6693169**
TDMX33000FPEM	33,00	1.299	2,09	.082	Q	**6693170**
TDMX34000FPEM	34,00	1.339	2,10	.083	R	**6693181**
TDMX35000FPEM	35,00	1.378	2,11	.083	R	**6693182**
TDMX35500FPEM	35,50	1.398	2,12	.084	R	**6693183**
TDMX36000FPEM	36,00	1.417	2,29	.090	S	**6693184**
TDMX36500FPEM	36,50	1.437	2,29	.090	S	**6693185**
TDMX37000FPEM	37,00	1.457	2,30	.091	S	**6693186**
TDMX37500FPEM	37,50	1.476	2,30	.091	S	**6693187**
TDMX38000FPEM	38,00	1.496	2,31	.091	T	**6693188**
TDMX38100FPEM	38,10	1.500	2,31	.091	T	**6693189**
TDMX38500FPEM	38,50	1.516	2,32	.091	T	**6693190**
TDMX39000FPEM	39,00	1.535	2,32	.091	T	**6693191**
TDMX39500FPEM	39,50	1.555	2,33	.092	T	**6693192**
TDMX40000FPEM	40,00	1.575	2,33	.092	T	**6693193**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Inch tolerance	
D1	**tolerance k8**
.3125–.3906	.000/+.0009
>.3906–.6250	.000/+.0011
>.6692–.7090	.000/+.0010
>.7090–.8228	.000/+.0013

Metric tolerance	
D1	**tolerance k8**
8–10	0,000/+0,022
>10–17	0,000/+0,027
>17–18	0,000/+0,027
>18–21	0,000/+0,033

Application Data • PK(M) • WP40PD • Inch

Material Group		Cutting Speed — Vc Range — SFM			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (inch)	.630	.787	1.000	1.260	1.575
P	1	295	**410**	558	IPR	.007–.018	.010–.019	.010–.020	.011–.022	.011–.024
	2	344	**459**	590	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	3	164	**246**	328	IPR	.009–.018	.011–.020	.012–.020	.013–.022	.014–.024
	4	164	**246**	328	IPR	.007–.018	.009–.019	.010–.020	.011–.022	.011–.023
	5	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
	6	164	**213**	262	IPR	.006–.013	.007–.014	.009–.017	.009–.018	.010–.019
M	1	131	**262**	361	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	2	115	**180**	246	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
	3	66	**115**	164	IPR	.004–.010	.005–.012	.005–.013	.006–.014	.006–.015
K	1	197	**312**	558	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	2	197	**246**	295	IPR	.010–.019	.011–.020	.013–.022	.014–.024	.015–.026
	3	131	**213**	295	IPR	.008–.017	.009–.019	.010–.020	.011–.022	.011–.023

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

Application Data • PK(M) • WP40PD • Metric

Material Group		Cutting Speed — Vc Range — m/min			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (mm)	16,0	20,0	25,0	32,0	40,0
P	1	90	**125**	170	mm/r	0,19–0,45	0,25–0,48	0,25–0,52	0,28–0,57	0,29–0,60
	2	105	**140**	180	mm/r	0,23–0,46	0,28–0,50	0,30–0,52	0,33–0,57	0,35–0,60
	3	50	**75**	100	mm/r	0,23–0,46	0,28–0,50	0,30–0,52	0,33–0,57	0,35–0,60
	4	50	**75**	100	mm/r	0,19–0,45	0,22–0,48	0,25–0,50	0,28–0,55	0,29–0,58
	5	50	**65**	80	mm/r	0,16–0,32	0,18–0,36	0,22–0,42	0,24–0,46	0,25–0,48
	6	50	**65**	80	mm/r	0,16–0,32	0,18–0,36	0,22–0,42	0,24–0,46	0,25–0,48
M	1	40	**80**	110	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
	2	35	**55**	75	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
	3	20	**35**	50	mm/r	0,11–0,26	0,13–0,28	0,13–0,32	0,14–0,35	0,15–0,37
K	1	60	**95**	170	mm/r	0,25–0,48	0,28–0,52	0,32–0,56	0,35–0,62	0,37–0,65
	2	60	**75**	90	mm/r	0,25–0,48	0,28–0,52	0,32–0,56	0,35–0,62	0,37–0,65
	3	40	**65**	90	mm/r	0,21–0,44	0,23–0,48	0,25–0,50	0,28–0,55	0,29–0,58

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

TDMX — TOP DRILL™ Modular X

Modular Drills • TOP DRILL Modular X

Application Data • FPE(M) • WP40PD • Inch

Material Group		Cutting Speed — Vc Range — SFM			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (inch)	.630	.787	1.000	1.260	1.575
P	1	360	**460**	560	IPR	.007–.010	.007–.011	.009–.015	.010–.017	.013–.030
	2	330	**390**	460	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	3	260	**330**	390	IPR	.006–.009	.007–.010	.009–.013	.010–.015	.013–.026
	4	230	**300**	360	IPR	.005–.009	.006–.010	.007–.013	.008–.015	.010–.026
M	1	130	**200**	260	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	2	110	**180**	230	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	3	70	**130**	200	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
K	1	300	**440**	570	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	2	260	**390**	460	IPR	.007–.010	.009–.011	.011–.015	.013–.017	.013–.030
	3	230	**360**	410	IPR	.007–.010	.008–.011	.009–.015	.010–.017	.011–.022
S	1	70	**130**	200	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012
	3	50	**100**	150	IPR	.004–.007	.005–.008	.006–.010	.007–.011	.008–.012

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

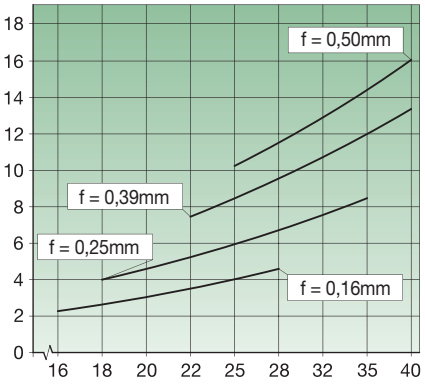
Application Data • FPE(M) • WP40PD • Metric

Material Group		Cutting Speed — Vc Range — m/min			Recommended Feed Rate (f) by Diameter					
		min	Starting Value	max	Tool Diameter (mm)	16,0	20,0	25,0	32,0	40,0
P	1	110	**140**	170	mm/r	0,17–0,25	0,19–0,29	0,23–0,38	0,26–0,43	0,33–0,76
	2	100	**120**	140	mm/r	0,19–0,25	0,22–0,29	0,29–0,38	0,32–0,43	0,33–0,76
	3	80	**100**	120	mm/r	0,15–0,23	0,17–0,25	0,23–0,34	0,26–0,38	0,33–0,66
	4	70	**90**	110	mm/r	0,13–0,23	0,14–0,25	0,18–0,34	0,21–0,38	0,26–0,66
M	1	40	**60**	80	mm/r	0,11–0,17	0,13–0,20	0,16–0,25	0,18–0,28	0,21–0,31
	2	35	**55**	70	mm/r	0,11–0,17	0,13–0,20	0,16–0,25	0,18–0,28	0,21–0,31
	3	20	**40**	60	mm/r	0,11–0,17	0,13–0,20	0,16–0,25	0,18–0,28	0,21–0,31
K	1	90	**135**	175	mm/r	0,19–0,25	0,22–0,29	0,29–0,38	0,32–0,43	0,33–0,76
	2	80	**120**	140	mm/r	0,19–0,25	0,22–0,29	0,29–0,38	0,32–0,43	0,33–0,76
	3	70	**110**	125	mm/r	0,18–0,26	0,21–0,29	0,23–0,37	0,25–0,42	0,27–0,57
S	1	20	**40**	60	mm/r	0,11–0,17	0,13–0,20	0,16–0,25	0,18–0,28	0,21–0,31
	3	15	**30**	45	mm/r	0,11–0,17	0,13–0,20	0,16–0,25	0,18–0,28	0,21–0,31

NOTE: Through coolant recommended for greater than 3 x D applications.
Material group M is recommended for secondary applications.

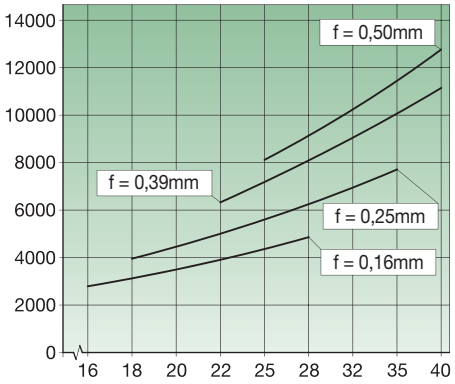
TDMX Application Notes • Power and Coolant Requirements

Drive Power (kW)



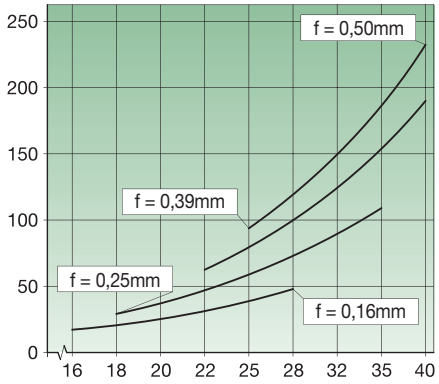
Ò Drive power Ps [kW]
Drill diameter d1 [mm]

Feed Force (kN)



Ò Feed force Ff [kN]
Drill diameter d1 [mm]

Torque (Nm)



Ò Torque Md Md [Nm]
Drill diameter d1 [mm]

NOTE: The diagrams above are used to determine the drive power, feed force, and torque. They are based on cutting force measurement in tempered steels in Cgr. 6. Tensile strength: Rm = 600 N/mm². The base cutting speed used is: vc = 80 m/min.

TDMX • Regrinding Length • FPE(M) • Inch

SSC	diameter range D	L min.	L new
A	.6300–.6692	.3858	.4252
B	.6693–.7086	.3858	.4252
C	.7087–.7480	.4173	.4606
D	.7481–.7874	.4173	.4606
E	.7875–.8267	.4488	.4961
F	.8268–.8661	.4488	.4961
G	.8662–.9055	.4764	.5276
H	.9056–.9448	.4764	.5276
I	.9449–.9842	.5118	.5669
J	.9843–1.0236	.5118	.5669
K	1.0237–1.0629	.5433	.6024
L	1.063–1.1023	.5433	.6024
M	1.1024–1.1417	.5827	.6457
N	1.1418–1.1811	.5827	.6457
O	1.1812–1.2204	.6142	.6811
P	1.2205–1.2598	.6142	.6811
Q	1.2599–1.3385	.7008	.7756
R	1.3386–1.4173	.7008	.7756
S	1.4174–1.4960	.7638	.8465
T	1.4961–1.5748	.7638	.8465

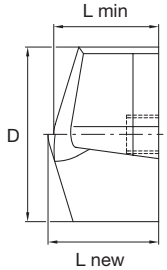
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

TDMX • Regrinding Length • PK(M) • Inch

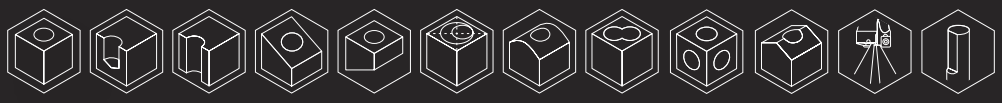
SSC	diameter range D	L min.	L new
A	.63–.6692	.4409	.4921
B	.6693–.7086	.4409	.4921
C	.7087–.748	.4803	.5354
D	.7481–.7874	.4803	.5354
E	.7875–.8267	.5197	.5787
F	.8268–.8661	.5197	.5787
G	.8662–.9055	.5591	.622
H	.9056–.9448	.5591	.622
I	.9449–.9842	.5984	.6654
J	.9843–1.0236	.5984	.6654
K	1.0237–1.0629	.6378	.7087
L	1.063–1.1023	.6378	.7087
M	1.1024–1.1417	.6772	.752
N	1.1418–1.1811	.6772	.752
O	1.1812–1.2204	.7165	.7953
P	1.2205–1.2598	.7165	.7953
Q	1.2599–1.3385	.7913	.878
R	1.3386–1.4173	.7913	.878
S	1.4174–1.496	.8701	.9646
T	1.4961–1.5748	.8701	.9646

The following coolant pressure is recommended:

relative drilling depth	coolant pressure
1–3 x D	8 bars
5 x D	12 bars
7 x D	20 bars
10 x D	30 bars



TOP CUT 4™



THE NEXT GENERATION OF INDEXABLE DRILLING

AEROSPACE

GENERAL ENGINEERING

One Comprehensive Platform

Standard diameter range covering .473–2.677"
in 2 x D, 3 x D, 4 x D, and 5 x D.

Four real cutting edges on each insert for entire platform.

Eight insert sizes to cover complete diameter range.

Easy to Apply

No risk of mixing up inner and outer insert due to clear visual differences.

Easy-to-change inserts, laser marked with geometries and grades.

Easy-to-use nomenclature guide enabling the tool body and the related insert selection to avoid order failures.

Highly Versatile

Breadth of application capabilities include through and cross holes, inclined entry and exit opportunity, 45° corner, half cylindrical, concave, or chain drilling.

Various geometries and grades available.

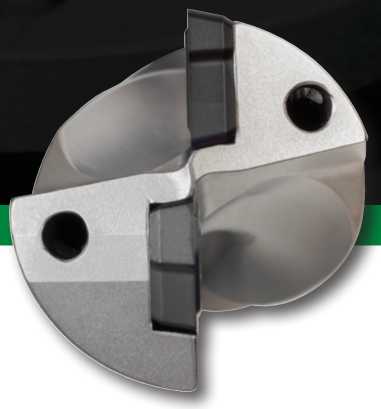
WIDIA™ Top Cut 4™ (TC4) portfolio is a broad offering for customers looking for a versatile indexable drilling platform.

WIDIA™

widia.com

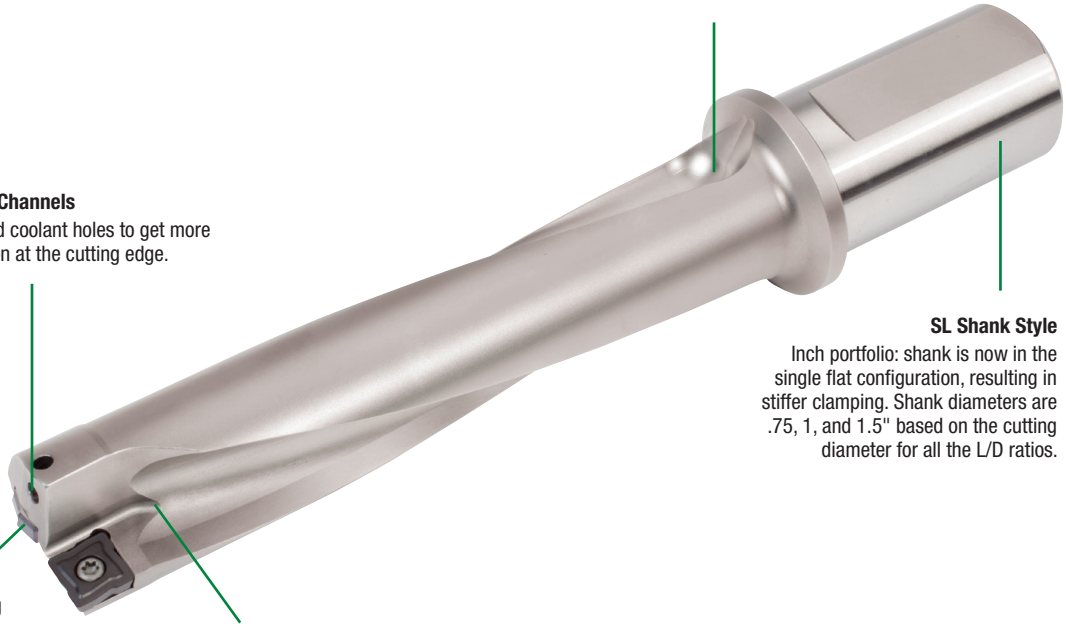
Top Cut 4™

Indexable Drills • Top Cut 4



- 2x four true cutting edges.
- Cutting edge profile of central and periphery insert work together, leading to high stabilization of the drill, preventing drifting of the tool even on irregular surfaces.
- X-offset design to adjust diameter size on turning machines and optimize tolerances on machining centers.
- Apply where speed and economy are prime considerations.
- Four grades to achieve higher tool life at accelerated speeds:
  — WU25CH grade for highest metal removal rate in general applications.
  — WU40PH grade for high toughness demands.
  — WPK10CH grade for high-speed applications.
  — WN10PH grade specific for aluminum and other non-ferrous materials.

Chip Flute Exit
Steeper chip flute exit to reduce the overall length and increase rigidity.



Coolant Channels
Enhanced coolant holes to get more lubrication at the cutting edge.

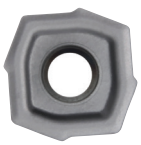
SL Shank Style
Inch portfolio: shank is now in the single flat configuration, resulting in stiffer clamping. Shank diameters are .75, 1, and 1.5" based on the cutting diameter for all the L/D ratios.

Insert Positioning
Optimized insert positioning to achieve the maximum drill stability, hole tolerance, and surface quality, above all in deep-drilling applications.

Gash
Improved gash design on both insert pocket seats for a better chip evacuation.

Top Cut 4 Inserts Expansion — Long Chip Materials — Non-Ferrous Materials.

-V34



P K

First choice for machining Steel, Cast Iron, and short chipping materials. Suitable for severe cutting conditions.

-V36

P M K

First choice for Stainless Steel. Suitable for deep drilling and where low power consumption is required.

-V36 WN10PH

N

First choice for Non-Ferrous materials.

-V38

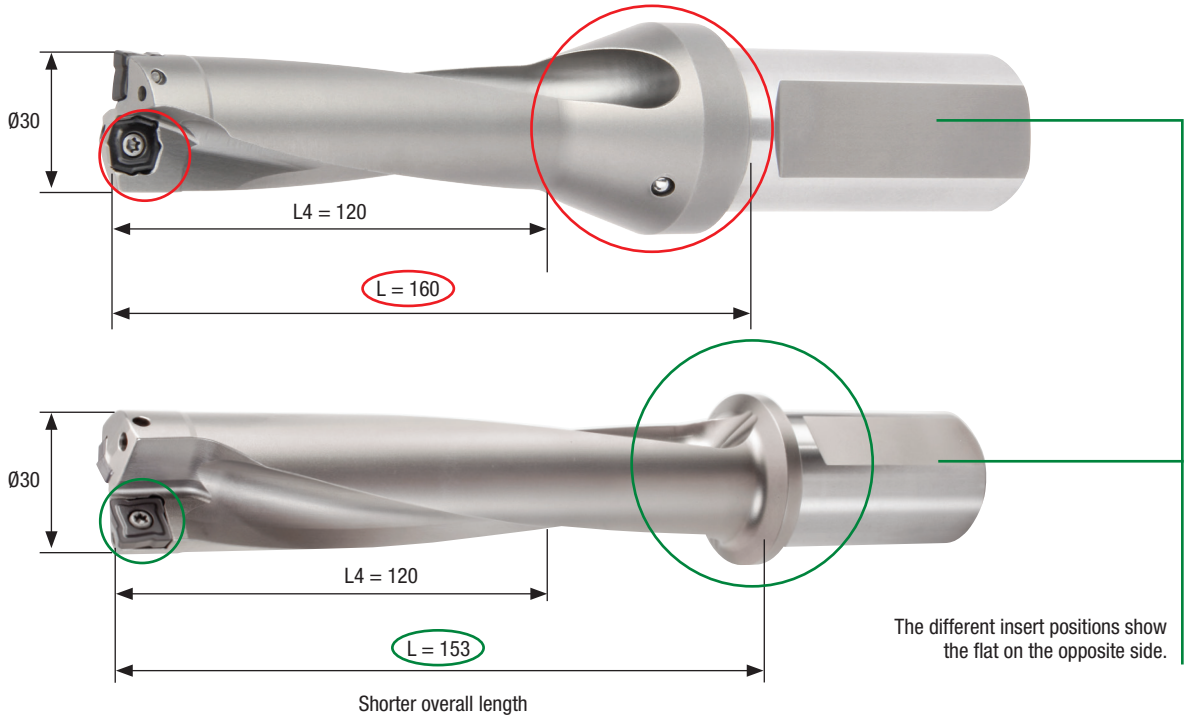
P M S

Ideal for long chipping materials.

Top Cut 4™ Bodies Upgrade

Diameter 30mm, 4 x D example

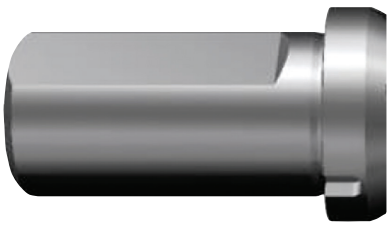
Current



Gash
Optimized gash for improved chip flow and more precise **insert pocket seat positioning.**

Shank
The SSF style shank (double flat) will be moved to SL style with inch dimensions (industry standard).

Current



Top Cut 4™

-V36 WN10PH for Non-Ferrous Materials

Productivity

- Perfect combination of edge preparation and grade for aluminum machining.
- TiB_2 based coating specific for non-ferrous materials.
- Optimal chip control and no built-up edge, even in very soft aluminums.

Performance

- High cutting speed capability thanks to the state-of-the-art TiB_2 coating.
- The WN10PH grade geometry is available on the inboard insert, as well as on the outboard insert.
- Better general hole quality (surface and dimension) thanks to edge preparation and coating combination when compared to a standard universal insert.
- Longer and predictable tool life leads to avoiding the generation of built-up edge.

Technical Details

- PSTS inserts.
- Positive and sharp cutting edge.
- First choice for aluminum and other non-ferrous materials.
- Periphery insert with wiper land.

Top Cut 4 Inserts Expansion — Non-Ferrous Materials.

-V36 WN10PH

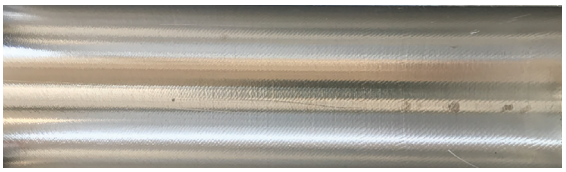
N

First choice for Non-Ferrous materials.

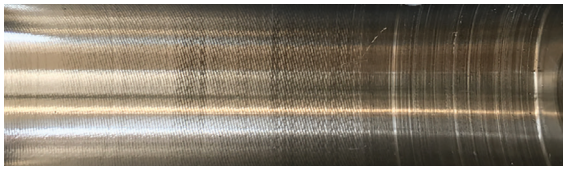
Hole Quality — Surface Finish

Diameter: 1,1811" 4 x D hole
Material: GAlSi 7 Mg

-V36 WN10PH



Standard multipurpose grade and geometry



-V38 Chipbreaker

Productivity

- Eliminates the formation of bird-nesting on the tool in long chip materials drilling.
- Improves the chip formation dramatically to guarantee a smooth chip flow.
- No machine stops due to bad chip evacuation on low carbon steels, stainless steels, and titanium — high process reliability.

Performance

- Larger feed rate window compared to the -V36 geometry when applied to low carbon steels and stainless steel.
- -V38 geometry is available on the inboard insert, as well as on the outboard insert.
- Better general hole quality (surface and dimension) thanks to the improved chip flow:
  — No drifting of the tool body causing deviation in the hole size.
  — No contact of the chips with the hole surface causing bad finishing.

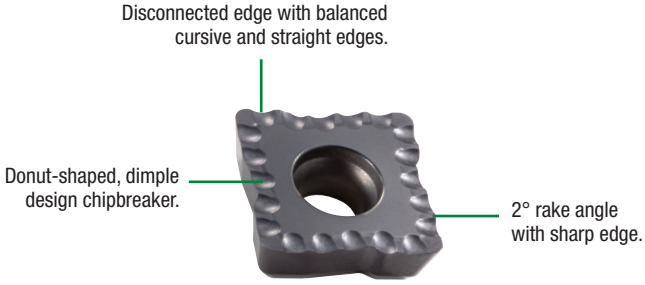
Technical Details

- PSTS inserts.
- Special edge geometry for more effective chipbreaking action.
- First choice for low carbon steel, stainless steel, and super alloys.
- Periphery insert with wiper land.

-V38 Chipbreaker Application Areas

The new -V38 geometry is the first choice when:

- The drilling application with Top Cut 4™ platform bodies and inserts is applied to:
  — Low carbon steel (typically P0 and P1).
  — Stainless steels, such as AISI304, AISI316, and similar materials.
  — Titanium alloys, like Grade 2 and Grade 5.
- Bird-nesting on the tool body is an issue.
- Vibrations are generated due to a bad chip flow. Chip can't evacuate from the hole and generates big noise during machining.
- Bad surface quality caused by the chip in contact with the hole.
- Bigger hole size. Bad chip flow can generate tool drifting.
- Lower power consumption and less torque are needed.



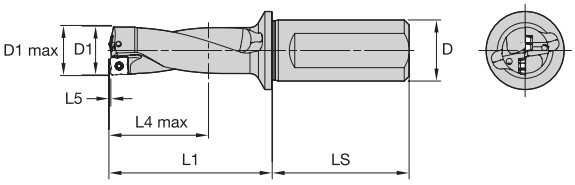
Top Cut 4 Inserts Expansion — Long Chip Materials.

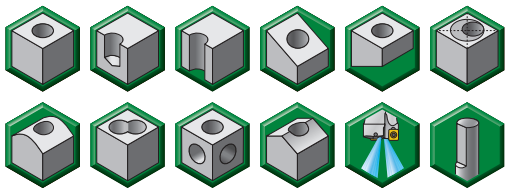
-V38

P M S

Ideal for long chip materials.

TC4 • 2 x D • SLR Shanks • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537879	TCF0473R2SLR075A	.473	.493	.75	1.688	.963	.017	1.969	A	TCF040204AP	TCF040203AC
5537880	TCF0500R2SLR075A	.500	.520	.75	1.776	1.018	.018	1.969	A	TCF040204AP	TCF040203AC
5537881	TCF0531R2SLR075A	.531	.551	.75	1.876	1.081	.019	1.969	A	TCF040204AP	TCF040203AC
5578226	TCF0563R2SLR075B	.563	.583	.75	1.923	1.146	.020	1.969	B	TCF050204BP	TCF060203BC
5578227	TCF0594R2SLR075B	.594	.614	.75	2.021	1.210	.022	1.969	B	TCF050204BP	TCF060203BC
5578228	TCF0625R2SLR075B	.625	.645	.75	2.118	1.273	.023	1.969	B	TCF050204BP	TCF060203BC
5578229	TCF0656R2SLR075B	.656	.676	.75	2.215	1.336	.024	1.969	B	TCF050204BP	TCF060203BC
5578300	TCF0688R2SLR075B	.688	.708	.75	2.315	1.401	.025	1.969	B	TCF050204BP	TCF060203BC
5578301	TCF0703R2SLR075B	.703	.723	.75	2.362	1.431	.025	1.969	B	TCF050204BP	TCF060203BC
5578302	TCF0719R2SLR075B	.719	.739	.75	2.412	1.463	.026	1.969	B	TCF050204BP	TCF060203BC
5578303	TCF0734R2SLR075B	.734	.754	.75	2.459	1.494	.026	1.969	B	TCF050204BP	TCF060203BC
5578379	TCF0750R2SLR100C	.750	.770	1.00	2.510	1.527	.027	2.205	C	TCF070306CP	TCF070304CC
5578400	TCF0781R2SLR100C	.781	.801	1.00	2.607	1.590	.028	2.205	C	TCF070306CP	TCF070304CC
5578401	TCF0813R2SLR100C	.813	.833	1.00	2.707	1.655	.029	2.205	C	TCF070306CP	TCF070304CC
5578402	TCF0844R2SLR100C	.844	.864	1.00	2.804	1.718	.030	2.205	C	TCF070306CP	TCF070304CC
5578403	TCF0875R2SLR100C	.875	.895	1.00	2.901	1.781	.031	2.205	C	TCF070306CP	TCF070304CC
5578404	TCF0906R2SLR100C	.906	.926	1.00	2.998	1.844	.032	2.205	C	TCF070306CP	TCF070304CC
5578405	TCF0938R2SLR100C	.938	.958	1.00	3.097	1.908	.032	2.205	C	TCF070306CP	TCF070304CC
5537845	TCF0969R2SLR100D	.969	1.008	1.00	3.100	1.973	.035	2.205	D	TCF080308DP	TCF090305DC
5537846	TCF0984R2SLR100D	.984	1.023	1.00	3.146	2.004	.036	2.205	D	TCF080308DP	TCF090305DC
5537847	TCF1000R2SLR100D	1.000	1.039	1.00	3.194	2.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537848	TCF1031R2SLR125D	1.031	1.070	1.25	3.327	2.099	.037	2.362	D	TCF080308DP	TCF090305DC
5537849	TCF1063R2SLR125D	1.063	1.102	1.25	3.424	2.164	.038	2.362	D	TCF080308DP	TCF090305DC
5537910	TCF1094R2SLR125D	1.094	1.133	1.25	3.518	2.227	.039	2.362	D	TCF080308DP	TCF090305DC
5537911	TCF1125R2SLR125D	1.125	1.164	1.25	3.612	2.290	.040	2.362	D	TCF080308DP	TCF090305DC
5537912	TCF1156R2SLR125D	1.156	1.195	1.25	3.706	2.353	.041	2.362	D	TCF080308DP	TCF090305DC
5537965	TCF1188R2SLR125E	1.188	1.227	1.25	3.685	2.419	.043	2.362	E	TCF100408EP	TCF120405EC
5537966	TCF1210R2SLR125E	1.210	1.249	1.25	3.750	2.464	.044	2.362	E	TCF100408EP	TCF120405EC
5537967	TCF1219R2SLR125E	1.219	1.258	1.25	3.776	2.482	.044	2.362	E	TCF100408EP	TCF120405EC
5537968	TCF1250R2SLR125E	1.250	1.289	1.25	3.867	2.545	.045	2.362	E	TCF100408EP	TCF120405EC
5537969	TCF1280R2SLR125E	1.281	1.320	1.25	3.958	2.608	.046	2.362	E	TCF100408EP	TCF120405EC
5538060	TCF1313R2SLR125E	1.313	1.352	1.25	4.052	2.673	.047	2.362	E	TCF100408EP	TCF120405EC
5538061	TCF1375R2SLR125E	1.375	1.414	1.25	4.233	2.799	.049	2.362	E	TCF100408EP	TCF120405EC
5538062	TCF1406R2SLR150E	1.406	1.445	1.50	4.364	2.862	.050	2.756	E	TCF100408EP	TCF120405EC
5538063	TCF1438R2SLR150E	1.438	1.438	1.50	4.457	2.926	.050	2.756	E	TCF100408EP	TCF120405EC
5578651	TCF1469R2SLR150F	1.469	1.508	1.50	4.550	2.991	.054	2.756	F	TCF120412FP	TCF150406FC
5578652	TCF1500R2SLR150F	1.500	1.539	1.50	4.641	3.055	.055	2.756	F	TCF120412FP	TCF150406FC
5578653	TCF1531R2SLR150F	1.531	1.570	1.50	4.732	3.118	.056	2.756	F	TCF120412FP	TCF150406FC
5578654	TCF1563R2SLR150F	1.563	1.602	1.50	4.826	3.183	.057	2.756	F	TCF120412FP	TCF150406FC
5578655	TCF1625R2SLR150F	1.625	1.664	1.50	5.007	3.308	.058	2.756	F	TCF120412FP	TCF150406FC

TC4 • 2 x D • SLR Shanks • Inch

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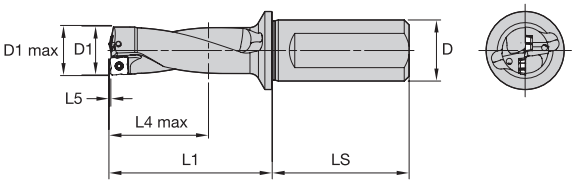
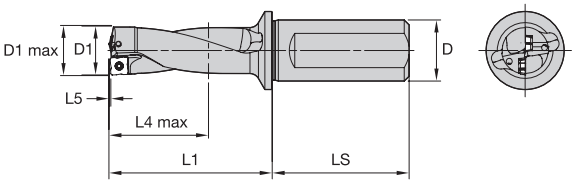


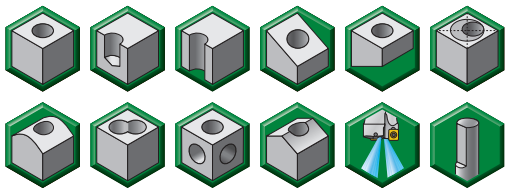
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578656	**TCF1656R2SLR150F**	1.656	1.695	1.50	5.098	3.371	.059	2.756	F	**TCF120412FP**	**TCF150406FC**
5578657	**TCF1688R2SLR150F**	1.688	1.727	1.50	5.192	3.436	.060	2.756	F	**TCF120412FP**	**TCF150406FC**
5578658	**TCF1750R2SLR150F**	1.750	1.789	1.50	5.373	3.562	.062	2.756	F	**TCF120412FP**	**TCF150406FC**
5578765	**TCF1813R2SLR150G**	1.813	1.852	1.50	5.379	3.692	.066	2.756	G	**TCF150512GP**	**TCF180508GC**
5578766	**TCF1875R2SLR150G**	1.875	1.914	1.50	5.554	3.818	.068	2.756	G	**TCF150512GP**	**TCF180508GC**
5578767	**TCF1938R2SLR150G**	1.938	1.977	1.50	5.732	3.945	.069	2.756	G	**TCF150512GP**	**TCF180508GC**
5578768	**TCF2000R2SLR150G**	2.000	2.039	1.50	5.907	4.071	.071	2.756	G	**TCF150512GP**	**TCF180508GC**
5578769	**TCF2125R2SLR150G**	2.125	2.164	1.50	6.261	4.324	.075	2.756	G	**TCF150512GP**	**TCF180508GC**
5578790	**TCF2219R2SLR150G**	2.219	2.258	1.50	6.527	4.515	.077	2.756	G	**TCF150512GP**	**TCF180508GC**
5538500	**TCF2250R2SLR150H**	2.250	2.289	1.50	6.392	4.581	.081	2.756	H	**TCF180614HP**	**TCF210608HC**
5538501	**TCF2375R2SLR150H**	2.375	2.414	1.50	6.734	4.835	.085	2.756	H	**TCF180614HP**	**TCF210608HC**
5538502	**TCF2500R2SLR150H**	2.500	2.539	1.50	7.074	5.088	.088	2.756	H	**TCF180614HP**	**TCF210608HC**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 2 x D • SLR Shanks • Metric





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537778	TCF120R2SLR20MA	12,00	12,50	20	43,4	24,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537779	TCF125R2SLR20MA	12,50	13,00	20	44,5	25,5	0,45	50,00	A	TCF040204AP	TCF040203AC
5537860	TCF127R2SLR20MA	12,70	13,20	20	45,9	25,9	0,46	50,00	A	TCF040204AP	TCF040203AC
5537861	TCF130R2SLR20MA	13,00	13,50	20	46,5	26,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537862	TCF135R2SLR20MA	13,50	14,00	20	48,5	27,5	0,48	50,00	A	TCF040204AP	TCF040203AC
5577828	TCF140R2SLR25MB	14,00	14,50	25	48,5	28,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577829	TCF145R2SLR25MB	14,50	15,00	25	49,5	29,5	0,52	56,00	B	TCF050204BP	TCF060203BC
5577920	TCF150R2SLR25MB	15,00	15,50	25	51,5	30,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577921	TCF155R2SLR25MB	15,50	16,00	25	53,6	31,6	0,56	56,00	B	TCF050204BP	TCF060203BC
5577922	TCF160R2SLR25MB	16,00	16,50	25	54,6	32,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577923	TCF165R2SLR25MB	16,50	17,00	25	56,6	33,6	0,60	56,00	B	TCF050204BP	TCF060203BC
5577924	TCF170R2SLR25MB	17,00	17,50	25	57,6	34,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577925	TCF175R2SLR25MB	17,50	18,00	25	59,6	35,6	0,63	56,00	B	TCF050204BP	TCF060203BC
5577926	TCF180R2SLR25MB	18,00	18,50	25	60,6	36,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577927	TCF185R2SLR25MB	18,50	19,00	25	62,7	37,7	0,65	56,00	B	TCF050204BP	TCF060203BC
5578820	TCF190R2SLR25MC	19,00	19,50	25	63,7	38,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578821	TCF195R2SLR25MC	19,50	20,00	25	65,7	39,7	0,71	56,00	C	TCF070306CP	TCF070304CC
5578822	TCF200R2SLR25MC	20,00	20,50	25	66,7	40,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578823	TCF205R2SLR25MC	20,50	21,00	25	68,7	41,7	0,74	56,00	C	TCF070306CP	TCF070304CC
5578824	TCF210R2SLR25MC	21,00	21,50	25	70,8	42,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578825	TCF220R2SLR25MC	22,00	22,50	25	73,8	44,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578826	TCF225R2SLR25MC	22,50	23,00	25	74,8	45,8	0,79	56,00	C	TCF070306CP	TCF070304CC
5578827	TCF230R2SLR25MC	23,00	23,50	25	76,8	46,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537167	TCF240R2SLR25MD	24,00	25,00	25	76,9	48,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537168	TCF250R2SLR32MD	25,00	26,00	32	80,9	50,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537169	TCF260R2SLR32MD	26,00	27,00	32	83,9	52,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537820	TCF265R2SLR32MD	26,50	27,50	32	86,0	54,0	0,95	60,00	D	TCF080308DP	TCF090305DC
5537821	TCF270R2SLR32MD	27,00	28,00	32	87,0	55,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537822	TCF280R2SLR32MD	28,00	29,00	32	90,0	57,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537823	TCF290R2SLR32MD	29,00	30,00	32	93,0	59,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537937	TCF300R2SLR32ME	30,00	31,00	32	93,1	61,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537938	TCF310R2SLR32ME	31,00	32,00	32	96,1	63,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537939	TCF320R2SLR32ME	32,00	33,00	32	99,2	65,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537940	TCF330R2SLR40ME	33,00	34,00	40	103,2	67,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537941	TCF340R2SLR40ME	34,00	35,00	40	106,2	69,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537942	TCF350R2SLR40ME	35,00	36,00	40	109,2	71,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537943	TCF360R2SLR40ME	36,00	37,00	40	112,3	73,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578539	TCF370R2SLR40MF	37,00	38,00	40	115,3	75,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578600	TCF375R2SLR40MF	37,50	38,50	40	116,4	76,4	1,36	70,00	F	TCF120412FP	TCF150406FC
5578601	TCF380R2SLR40MF	38,00	39,00	40	118,4	77,4	1,38	70,00	F	TCF120412FP	TCF150406FC

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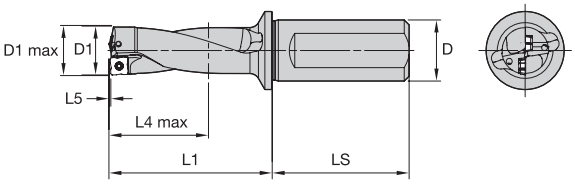
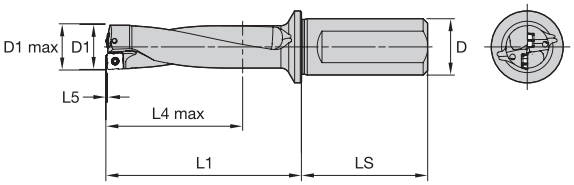


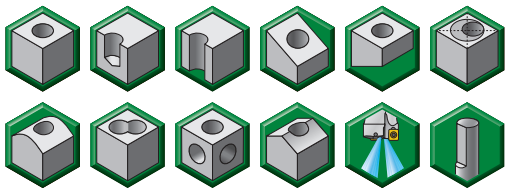
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578602	TCF390R2SLR40MF	39,00	40,00	40	121,4	79,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578603	TCF400R2SLR40MF	40,00	41,00	40	123,4	81,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578604	TCF410R2SLR40MF	41,00	42,00	40	126,5	83,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578605	TCF420R2SLR40MF	42,00	43,00	40	129,5	85,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578606	TCF430R2SLR40MF	43,00	44,00	40	132,5	87,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578607	TCF440R2SLR40MF	44,00	45,00	40	135,6	89,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578608	TCF450R2SLR40MF	45,00	46,00	40	138,6	91,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578694	TCF460R2SLR40MG	46,00	47,00	40	136,7	93,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578695	TCF470R2SLR40MG	47,00	48,00	40	139,7	95,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578696	TCF480R2SLR40MG	48,00	49,00	40	142,7	97,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578697	TCF490R2SLR40MG	49,00	50,00	40	145,8	99,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578698	TCF500R2SLR40MG	50,00	51,00	40	147,8	101,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578699	TCF505R2SLR40MG	50,50	51,50	40	149,8	102,8	1,80	70,00	G	TCF150512GP	TCF180508GC
5578710	TCF510R2SLR40MG	51,00	52,00	40	150,8	103,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578711	TCF520R2SLR40MG	52,00	53,00	40	153,8	105,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578712	TCF530R2SLR40MG	53,00	54,00	40	156,9	107,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578713	TCF540R2SLR40MG	54,00	55,00	40	159,9	109,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578714	TCF550R2SLR40MG	55,00	56,00	40	161,9	111,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578715	TCF560R2SLR40MG	56,00	57,00	40	164,9	113,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538613	TCF570R2SLR40MH	57,00	58,00	40	162,1	116,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538614	TCF580R2SLR40MH	58,00	59,00	40	165,1	118,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538615	TCF590R2SLR40MH	59,00	60,00	40	168,1	120,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538616	TCF600R2SLR40MH	60,00	61,00	40	170,1	122,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538617	TCF610R2SLR40MH	61,00	62,00	40	173,2	124,2	2,18	70,00	H	TCF180614HP	TCF210608HC
5538618	TCF620R2SLR40MH	62,00	63,00	40	176,2	126,2	2,20	70,00	H	TCF180614HP	TCF210608HC
5538619	TCF630R2SLR40MH	63,00	64,00	40	179,2	128,2	2,23	70,00	H	TCF180614HP	TCF210608HC
5538630	TCF640R2SLR40MH	64,00	65,00	40	181,3	130,3	2,26	70,00	H	TCF180614HP	TCF210608HC
5538631	TCF650R2SLR40MH	65,00	66,00	40	184,3	132,3	2,28	70,00	H	TCF180614HP	TCF210608HC
5538632	TCF660R2SLR40MH	66,00	67,00	40	187,3	134,3	2,31	70,00	H	TCF180614HP	TCF210608HC
5538633	TCF670R2SLR40MH	67,00	68,00	40	189,3	136,3	2,33	70,00	H	TCF180614HP	TCF210608HC
5538634	TCF680R2SLR40MH	68,00	69,00	40	192,4	138,4	2,36	70,00	H	TCF180614HP	TCF210608HC

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 3 x D • SLR Shanks • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537882	TCF0473R3SLR075A	.473	.493	.75	2.161	1.436	.017	1.969	A	TCF040204AP	TCF040203AC
5537883	TCF0500R3SLR075A	.500	.520	.75	2.276	1.518	.018	1.969	A	TCF040204AP	TCF040203AC
5537884	TCF0531R3SLR075A	.531	.551	.75	2.407	1.612	.019	1.969	A	TCF040204AP	TCF040203AC
5578304	TCF0563R3SLR075B	.563	.583	.75	2.486	1.709	.020	1.969	B	TCF050204BP	TCF060203BC
5578305	TCF0594R3SLR075B	.594	.614	.75	2.615	1.804	.022	1.969	B	TCF050204BP	TCF060203BC
5578306	TCF0625R3SLR075B	.625	.645	.75	2.743	1.898	.023	1.969	B	TCF050204BP	TCF060203BC
5578307	TCF0656R3SLR075B	.656	.676	.75	2.871	1.992	.024	1.969	B	TCF050204BP	TCF060203BC
5578308	TCF0688R3SLR075B	.688	.708	.75	3.003	2.089	.025	1.969	B	TCF050204BP	TCF060203BC
5578309	TCF0703R3SLR075B	.703	.723	.75	3.065	2.134	.025	1.969	B	TCF050204BP	TCF060203BC
5578310	TCF0719R3SLR075B	.719	.739	.75	3.131	2.182	.026	1.969	B	TCF050204BP	TCF060203BC
5578311	TCF0734R3SLR075B	.734	.754	.75	3.193	2.228	.026	1.969	B	TCF050204BP	TCF060203BC
5578406	TCF0750R3SLR100C	.750	.770	1.00	3.260	2.277	.027	2.205	C	TCF070306CP	TCF070304CC
5578407	TCF0781R3SLR100C	.781	.801	1.00	3.388	2.371	.028	2.205	C	TCF070306CP	TCF070304CC
5578408	TCF0813R3SLR100C	.813	.833	1.00	3.520	2.468	.029	2.205	C	TCF070306CP	TCF070304CC
5578409	TCF0844R3SLR100C	.844	.864	1.00	3.648	2.562	.030	2.205	C	TCF070306CP	TCF070304CC
5578410	TCF0875R3SLR100C	.875	.895	1.00	3.776	2.656	.031	2.205	C	TCF070306CP	TCF070304CC
5578411	TCF0906R3SLR100C	.906	.926	1.00	3.904	2.750	.032	2.205	C	TCF070306CP	TCF070304CC
5578412	TCF0938R3SLR100C	.938	.958	1.00	4.035	2.846	.032	2.205	C	TCF070306CP	TCF070304CC
5537913	TCF0969R3SLR100D	.969	1.008	1.00	4.069	2.942	.035	2.205	D	TCF080308DP	TCF090305DC
5537914	TCF0984R3SLR100D	.984	1.023	1.00	4.130	2.988	.036	2.205	D	TCF080308DP	TCF090305DC
5537915	TCF1000R3SLR100D	1.000	1.039	1.00	4.194	3.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537916	TCF1031R3SLR125D	1.031	1.070	1.25	4.358	3.130	.037	2.362	D	TCF080308DP	TCF090305DC
5537917	TCF1063R3SLR125D	1.063	1.102	1.25	4.487	3.227	.038	2.362	D	TCF080308DP	TCF090305DC
5537918	TCF1094R3SLR125D	1.094	1.133	1.25	4.612	3.321	.039	2.362	D	TCF080308DP	TCF090305DC
5537919	TCF1125R3SLR125D	1.125	1.164	1.25	4.737	3.415	.040	2.362	D	TCF080308DP	TCF090305DC
5537920	TCF1156R3SLR125D	1.156	1.195	1.25	4.862	3.509	.041	2.362	D	TCF080308DP	TCF090305DC
5538064	TCF1188R3SLR125E	1.188	1.227	1.25	4.873	3.607	.043	2.362	E	TCF100408EP	TCF120405EC
5538065	TCF1210R3SLR125E	1.210	1.249	1.25	4.960	3.674	.044	2.362	E	TCF100408EP	TCF120405EC
5538066	TCF1219R3SLR125E	1.219	1.258	1.25	4.995	3.701	.044	2.362	E	TCF100408EP	TCF120405EC
5538067	TCF1250R3SLR125E	1.250	1.289	1.25	5.117	3.795	.045	2.362	E	TCF100408EP	TCF120405EC
5538068	TCF1280R3SLR125E	1.281	1.320	1.25	5.239	3.889	.046	2.362	E	TCF100408EP	TCF120405EC
5538069	TCF1313R3SLR125E	1.313	1.352	1.25	5.365	3.986	.047	2.362	E	TCF100408EP	TCF120405EC
5538080	TCF1375R3SLR125E	1.375	1.414	1.25	5.608	4.174	.049	2.362	E	TCF100408EP	TCF120405EC
5538081	TCF1406R3SLR150E	1.406	1.445	1.50	5.770	4.268	.050	2.756	E	TCF100408EP	TCF120405EC
5538082	TCF1438R3SLR150E	1.438	1.477	1.50	5.895	4.364	.050	2.756	E	TCF100408EP	TCF120405EC
5578659	TCF1469R3SLR150F	1.469	1.508	1.50	6.019	4.460	.054	2.756	F	TCF120412FP	TCF150406FC
5578670	TCF1500R3SLR150F	1.500	1.539	1.50	6.141	4.555	.055	2.756	F	TCF120412FP	TCF150406FC
5578671	TCF1531R3SLR150F	1.531	1.570	1.50	6.263	4.649	.056	2.756	F	TCF120412FP	TCF150406FC
5578672	TCF1563R3SLR150F	1.563	1.602	1.50	6.389	4.746	.057	2.756	F	TCF120412FP	TCF150406FC
5578673	TCF1625R3SLR150F	1.625	1.664	1.50	6.632	4.933	.058	2.756	F	TCF120412FP	TCF150406FC

TC4 • 3 x D • SLR Shanks • Inch

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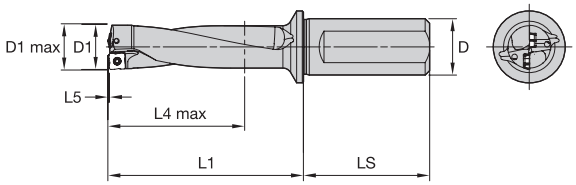
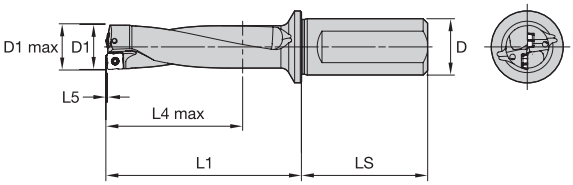


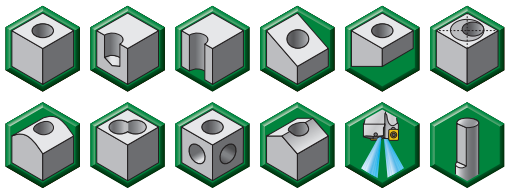
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578674	**TCF1656R3SLR150F**	1.656	1.695	1.50	6.754	5.027	.059	2.756	F	**TCF120412FP**	**TCF150406FC**
5578675	**TCF1688R3SLR150F**	1.688	1.727	1.50	6.880	5.124	.060	2.756	F	**TCF120412FP**	**TCF150406FC**
5578676	**TCF1750R3SLR150F**	1.750	1.789	1.50	7.123	5.312	.062	2.756	F	**TCF120412FP**	**TCF150406FC**
5578791	**TCF1813R3SLR150G**	1.813	1.852	1.50	7.192	5.505	.066	2.756	G	**TCF150512GP**	**TCF180508GC**
5578792	**TCF1875R3SLR150G**	1.875	1.914	1.50	7.429	5.693	.068	2.756	G	**TCF150512GP**	**TCF180508GC**
5578793	**TCF1938R3SLR150G**	1.938	1.977	1.50	7.670	5.883	.069	2.756	G	**TCF150512GP**	**TCF180508GC**
5578794	**TCF2000R3SLR150G**	2.000	2.039	1.50	7.832	6.071	.071	2.756	G	**TCF150512GP**	**TCF180508GC**
5578795	**TCF2125R3SLR150G**	2.125	2.164	1.50	8.307	6.450	.075	2.756	G	**TCF150512GP**	**TCF180508GC**
5578796	**TCF2219R3SLR150G**	2.219	2.258	1.50	8.665	6.734	.077	2.756	G	**TCF150512GP**	**TCF180508GC**
5538503	**TCF2250R3SLR150H**	2.250	2.289	1.50	8.642	6.831	.081	2.756	H	**TCF180614HP**	**TCF210608HC**
5538504	**TCF2375R3SLR150H**	2.375	2.414	1.50	9.109	7.210	.085	2.756	H	**TCF180614HP**	**TCF210608HC**
5538505	**TCF2500R3SLR150H**	2.500	2.539	1.50	9.574	7.588	.088	2.756	H	**TCF180614HP**	**TCF210608HC**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 3 x D • SLR Shanks • Metric





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537863	TCF120R3SLR20MA	12,00	12,50	20	55,4	36,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537864	TCF125R3SLR20MA	12,50	13,00	20	57,0	38,0	0,45	50,00	A	TCF040204AP	TCF040203AC
5537866	TCF127R3SLR20MA	12,70	13,20	20	58,6	38,6	0,46	50,00	A	TCF040204AP	TCF040203AC
5537867	TCF130R3SLR20MA	13,00	13,50	20	59,5	39,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537868	TCF135R3SLR20MA	13,50	14,00	20	61,0	41,0	0,48	50,00	A	TCF040204AP	TCF040203AC
5577928	TCF140R3SLR25MB	14,00	14,50	25	62,5	42,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577929	TCF145R3SLR25MB	14,50	15,00	25	64,0	44,0	0,52	56,00	B	TCF050204BP	TCF060203BC
5577930	TCF150R3SLR25MB	15,00	15,50	25	66,5	45,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577931	TCF155R3SLR25MB	15,50	16,00	25	69,1	47,1	0,56	56,00	B	TCF050204BP	TCF060203BC
5577932	TCF160R3SLR25MB	16,00	16,50	25	70,6	48,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577933	TCF165R3SLR25MB	16,50	17,00	25	73,1	50,1	0,60	56,00	B	TCF050204BP	TCF060203BC
5577934	TCF170R3SLR25MB	17,00	17,50	25	74,6	51,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577935	TCF175R3SLR25MB	17,50	18,00	25	77,1	53,1	0,63	56,00	B	TCF050204BP	TCF060203BC
5577936	TCF180R3SLR25MB	18,00	18,50	25	78,6	54,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577937	TCF185R3SLR25MB	18,50	19,00	25	81,2	56,2	0,65	56,00	B	TCF050204BP	TCF060203BC
5578828	TCF190R3SLR25MC	19,00	19,50	25	82,7	57,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578829	TCF195R3SLR25MC	19,50	20,00	25	85,2	59,2	0,71	56,00	C	TCF070306CP	TCF070304CC
5578830	TCF200R3SLR25MC	20,00	20,50	25	86,7	60,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578831	TCF205R3SLR25MC	20,50	21,00	25	89,2	62,2	0,74	56,00	C	TCF070306CP	TCF070304CC
5578832	TCF210R3SLR25MC	21,00	21,50	25	91,8	63,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578833	TCF220R3SLR25MC	22,00	22,50	25	95,8	66,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578834	TCF225R3SLR25MC	22,50	23,00	25	97,3	68,3	0,79	56,00	C	TCF070306CP	TCF070304CC
5578835	TCF230R3SLR25MC	23,00	23,50	25	99,8	69,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537824	TCF240R3SLR25MD	24,00	25,00	25	100,9	72,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537825	TCF250R3SLR32MD	25,00	26,00	32	105,9	75,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537826	TCF260R3SLR32MD	26,00	27,00	32	109,9	78,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537827	TCF265R3SLR32MD	26,50	27,50	32	112,5	80,5	0,95	60,00	D	TCF080308DP	TCF090305DC
5537828	TCF270R3SLR32MD	27,00	28,00	32	114,0	82,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537829	TCF280R3SLR32MD	28,00	29,00	32	118,0	85,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537830	TCF290R3SLR32MD	29,00	30,00	32	122,0	88,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537944	TCF300R3SLR32ME	30,00	31,00	32	123,1	91,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537945	TCF310R3SLR32ME	31,00	32,00	32	127,1	94,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537946	TCF320R3SLR32ME	32,00	33,00	32	131,2	97,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537947	TCF330R3SLR40ME	33,00	34,00	40	136,2	100,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537948	TCF340R3SLR40ME	34,00	35,00	40	140,2	103,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537949	TCF350R3SLR40ME	35,00	36,00	40	144,2	106,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537950	TCF360R3SLR40ME	36,00	37,00	40	148,3	109,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578609	TCF370R3SLR40MF	37,00	38,00	40	152,3	112,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578610	TCF375R3SLR40MF	37,50	38,50	40	153,9	113,9	1,36	70,00	F	TCF120412FP	TCF150406FC
5578611	TCF380R3SLR40MF	38,00	39,00	40	156,4	115,4	1,38	70,00	F	TCF120412FP	TCF150406FC

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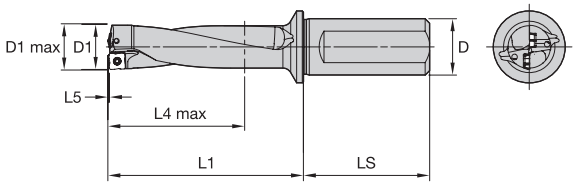
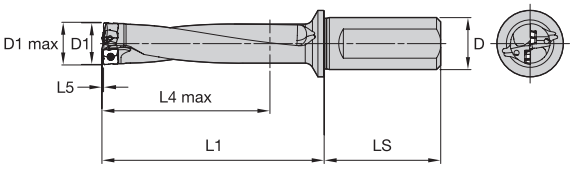


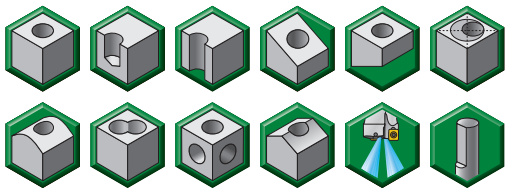
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578612	TCF390R3SLR40MF	39,00	40,00	40	160,4	118,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578613	TCF400R3SLR40MF	40,00	41,00	40	163,4	121,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578614	TCF410R3SLR40MF	41,00	42,00	40	167,5	124,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578615	TCF420R3SLR40MF	42,00	43,00	40	171,5	127,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578616	TCF430R3SLR40MF	43,00	44,00	40	175,5	130,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578617	TCF440R3SLR40MF	44,00	45,00	40	179,6	133,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578618	TCF450R3SLR40MF	45,00	46,00	40	183,6	136,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578716	TCF460R3SLR40MG	46,00	47,00	40	182,7	139,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578717	TCF470R3SLR40MG	47,00	48,00	40	186,7	142,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578718	TCF480R3SLR40MG	48,00	49,00	40	190,7	145,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578719	TCF490R3SLR40MG	49,00	50,00	40	194,8	148,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578720	TCF500R3SLR40MG	50,00	51,00	40	197,8	151,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578721	TCF505R3SLR40MG	50,50	51,50	40	200,3	153,3	1,80	70,00	G	TCF150512GP	TCF180508GC
5578722	TCF510R3SLR40MG	51,00	52,00	40	201,8	154,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578723	TCF520R3SLR40MG	52,00	53,00	40	205,8	157,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578724	TCF530R3SLR40MG	53,00	54,00	40	209,9	160,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578726	TCF540R3SLR40MG	54,00	55,00	40	213,9	163,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578727	TCF550R3SLR40MG	55,00	56,00	40	216,9	166,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578728	TCF560R3SLR40MG	56,00	57,00	40	220,9	169,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538635	TCF570R3SLR40MH	57,00	58,00	40	219,1	173,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538636	TCF580R3SLR40MH	58,00	59,00	40	223,1	176,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538637	TCF590R3SLR40MH	59,00	60,00	40	227,1	179,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538638	TCF600R3SLR40MH	60,00	61,00	40	230,1	182,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538639	TCF610R3SLR40MH	61,00	62,00	40	234,2	185,2	2,18	70,00	H	TCF180614HP	TCF210608HC
5538640	TCF620R3SLR40MH	62,00	63,00	40	238,2	188,2	2,20	70,00	H	TCF180614HP	TCF210608HC
5538641	TCF630R3SLR40MH	63,00	64,00	40	242,2	191,2	2,23	70,00	H	TCF180614HP	TCF210608HC
5538642	TCF640R3SLR40MH	64,00	65,00	40	245,3	194,3	2,26	70,00	H	TCF180614HP	TCF210608HC
5538643	TCF650R3SLR40MH	65,00	66,00	40	249,3	197,3	2,28	70,00	H	TCF180614HP	TCF210608HC
5538644	TCF660R3SLR40MH	66,00	67,00	40	253,3	200,3	2,31	70,00	H	TCF180614HP	TCF210608HC
5538645	TCF670R3SLR40MH	67,00	68,00	40	256,3	203,3	2,33	70,00	H	TCF180614HP	TCF210608HC
5538646	TCF680R3SLR40MH	68,00	69,00	40	260,4	206,4	2,36	70,00	H	TCF180614HP	TCF210608HC

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 4 x D • SLR Shanks • Inch





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537885	TCF0473R4SLR075A	.473	.493	.75	2.634	1.909	.017	1.969	A	TCF040204AP	TCF040203AC
5537886	TCF0500R4SLR075A	.500	.520	.75	2.776	2.018	.018	1.969	A	TCF040204AP	TCF040203AC
5537887	TCF0531R4SLR075A	.531	.551	.75	2.938	2.143	.019	1.969	A	TCF040204AP	TCF040203AC
5578312	TCF0563R4SLR075B	.563	.583	.75	3.049	2.272	.020	1.969	B	TCF050204BP	TCF060203BC
5578313	TCF0594R4SLR075B	.594	.614	.75	3.209	2.398	.022	1.969	B	TCF050204BP	TCF060203BC
5578314	TCF0625R4SLR075B	.625	.645	.75	3.368	2.523	.023	1.969	B	TCF050204BP	TCF060203BC
5578315	TCF0656R4SLR075B	.656	.676	.75	3.527	2.648	.024	1.969	B	TCF050204BP	TCF060203BC
5578316	TCF0688R4SLR075B	.688	.708	.75	3.691	2.777	.025	1.969	B	TCF050204BP	TCF060203BC
5578317	TCF0703R4SLR075B	.703	.723	.75	3.768	2.837	.025	1.969	B	TCF050204BP	TCF060203BC
5578318	TCF0719R4SLR075B	.719	.739	.75	3.850	2.901	.026	1.969	B	TCF050204BP	TCF060203BC
5578319	TCF0734R4SLR075B	.734	.754	.75	3.927	2.962	.026	1.969	B	TCF050204BP	TCF060203BC
5578413	TCF0750R4SLR100C	.750	.770	1.00	4.010	3.027	.027	2.205	C	TCF070306CP	TCF070304CC
5578414	TCF0781R4SLR100C	.781	.801	1.00	4.169	3.152	.028	2.205	C	TCF070306CP	TCF070304CC
5578415	TCF0813R4SLR100C	.813	.833	1.00	4.333	3.281	.029	2.205	C	TCF070306CP	TCF070304CC
5578416	TCF0844R4SLR100C	.844	.864	1.00	4.492	3.406	.030	2.205	C	TCF070306CP	TCF070304CC
5578417	TCF0875R4SLR100C	.875	.895	1.00	4.651	3.531	.031	2.205	C	TCF070306CP	TCF070304CC
5578418	TCF0906R4SLR100C	.906	.926	1.00	4.810	3.656	.032	2.205	C	TCF070306CP	TCF070304CC
5578419	TCF0938R4SLR100C	.938	.958	1.00	4.973	3.784	.032	2.205	C	TCF070306CP	TCF070304CC
5537921	TCF0969R4SLR100D	.969	1.008	1.00	5.038	3.911	.035	2.205	D	TCF080308DP	TCF090305DC
5537922	TCF0984R4SLR100D	.984	1.023	1.00	5.114	3.972	.036	2.205	D	TCF080308DP	TCF090305DC
5537923	TCF1000R4SLR100D	1.000	1.039	1.00	5.194	4.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537924	TCF1031R4SLR125D	1.031	1.070	1.25	5.389	4.161	.037	2.362	D	TCF080308DP	TCF090305DC
5537925	TCF1063R4SLR125D	1.063	1.102	1.25	5.550	4.290	.038	2.362	D	TCF080308DP	TCF090305DC
5537926	TCF1094R4SLR125D	1.094	1.133	1.25	5.706	4.415	.039	2.362	D	TCF080308DP	TCF090305DC
5537927	TCF1125R4SLR125D	1.125	1.164	1.25	5.862	4.540	.040	2.362	D	TCF080308DP	TCF090305DC
5537928	TCF1156R4SLR125D	1.156	1.195	1.25	6.018	4.665	.041	2.362	D	TCF080308DP	TCF090305DC
5538083	TCF1188R4SLR125E	1.188	1.227	1.25	6.061	4.795	.043	2.362	E	TCF100408EP	TCF120405EC
5538084	TCF1210R4SLR125E	1.210	1.249	1.25	6.170	4.884	.044	2.362	E	TCF100408EP	TCF120405EC
5538085	TCF1219R4SLR125E	1.219	1.258	1.25	6.214	4.920	.044	2.362	E	TCF100408EP	TCF120405EC
5538086	TCF1250R4SLR125E	1.250	1.289	1.25	6.367	5.045	.045	2.362	E	TCF100408EP	TCF120405EC
5538087	TCF1280R4SLR125E	1.281	1.320	1.25	6.520	5.170	.046	2.362	E	TCF100408EP	TCF120405EC
5538088	TCF1313R4SLR125E	1.313	1.352	1.25	6.678	5.299	.047	2.362	E	TCF100408EP	TCF120405EC
5538089	TCF1375R4SLR125E	1.375	1.414	1.25	6.983	5.549	.049	2.362	E	TCF100408EP	TCF120405EC
5538090	TCF1406R4SLR150E	1.406	1.445	1.50	7.176	5.674	.050	2.756	E	TCF100408EP	TCF120405EC
5538091	TCF1438R4SLR150E	1.438	1.477	1.50	7.333	5.802	.050	2.756	E	TCF100408EP	TCF120405EC
5578677	TCF1469R4SLR150F	1.469	1.508	1.50	7.488	5.929	.054	2.756	F	TCF120412FP	TCF150406FC
5578678	TCF1500R4SLR150F	1.500	1.539	1.50	7.641	6.054	.055	2.756	F	TCF120412FP	TCF150406FC
5578679	TCF1531R4SLR150F	1.531	1.570	1.50	7.794	6.180	.056	2.756	F	TCF120412FP	TCF150406FC
5578680	TCF1563R4SLR150F	1.563	1.602	1.50	7.952	6.309	.057	2.756	F	TCF120412FP	TCF150406FC
5578681	TCF1625R4SLR150F	1.625	1.664	1.50	8.257	6.558	.058	2.756	F	TCF120412FP	TCF150406FC

TC4 • 4 x D • SLR Shanks • Inch

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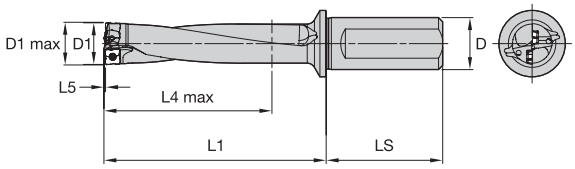
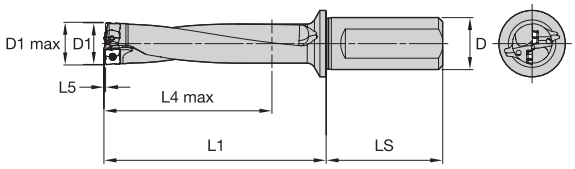


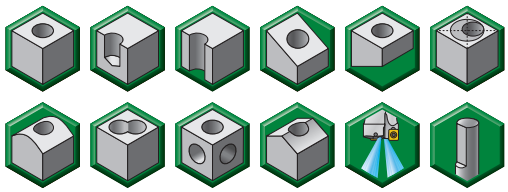
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578682	**TCF1656R4SLR150F**	1.656	1.695	1.50	8.410	6.683	.059	2.756	F	**TCF120412FP**	**TCF150406FC**
5578683	**TCF1688R4SLR150F**	1.688	1.727	1.50	8.568	6.812	.060	2.756	F	**TCF120412FP**	**TCF150406FC**
5578684	**TCF1750R4SLR150F**	1.750	1.789	1.50	8.873	7.062	.062	2.756	F	**TCF120412FP**	**TCF150406FC**
5578797	**TCF1813R4SLR150G**	1.813	1.852	1.50	9.005	7.318	.066	2.756	G	**TCF150512GP**	**TCF180508GC**
5578798	**TCF1875R4SLR150G**	1.875	1.914	1.50	9.304	7.568	.068	2.756	G	**TCF150512GP**	**TCF180508GC**
5578799	**TCF1938R4SLR150G**	1.938	1.977	1.50	9.608	7.821	.069	2.756	G	**TCF150512GP**	**TCF180508GC**
5578800	**TCF2000R4SLR150G**	2.000	2.039	1.50	9.907	8.071	.071	2.756	G	**TCF150512GP**	**TCF180508GC**
5578801	**TCF2125R4SLR150G**	2.125	2.164	1.50	10.511	8.574	.075	2.756	G	**TCF150512GP**	**TCF180508GC**
5578802	**TCF2219R4SLR150G**	2.219	2.258	1.50	10.965	8.953	.077	2.756	G	**TCF150512GP**	**TCF180508GC**
5538506	**TCF2250R4SLR150H**	2.250	2.289	1.50	10.892	9.081	.081	2.756	H	**TCF180614HP**	**TCF210608HC**
5538507	**TCF2375R4SLR150H**	2.375	2.414	1.50	11.484	9.585	.085	2.756	H	**TCF180614HP**	**TCF210608HC**
5538508	**TCF2500R4SLR150H**	2.500	2.539	1.50	12.074	10.088	.088	2.756	H	**TCF180614HP**	**TCF210608HC**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 4 x D • SLR Shanks • Metric





order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537869	TCF120R4SLR20MA	12,00	12,50	20	67,4	48,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537870	TCF125R4SLR20MA	12,50	13,00	20	69,5	50,5	0,45	50,00	A	TCF040204AP	TCF040203AC
5537871	TCF127R4SLR20MA	12,70	13,20	20	71,3	51,3	0,46	50,00	A	TCF040204AP	TCF040203AC
5537872	TCF130R4SLR20MA	13,00	13,50	20	72,5	52,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537873	TCF135R4SLR20MA	13,50	14,00	20	75,5	54,5	0,48	50,00	A	TCF040204AP	TCF040203AC
5577938	TCF140R4SLR25MB	14,00	14,50	25	76,5	56,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577939	TCF145R4SLR25MB	14,50	15,00	25	78,5	58,5	0,52	56,00	B	TCF050204BP	TCF060203BC
5577940	TCF150R4SLR25MB	15,00	15,50	25	81,5	60,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577941	TCF155R4SLR25MB	15,50	16,00	25	84,6	62,6	0,56	56,00	B	TCF050204BP	TCF060203BC
5577942	TCF160R4SLR25MB	16,00	16,50	25	86,6	64,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577943	TCF165R4SLR25MB	16,50	17,00	25	89,6	66,6	0,60	56,00	B	TCF050204BP	TCF060203BC
5577944	TCF170R4SLR25MB	17,00	17,50	25	91,6	68,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577945	TCF175R4SLR25MB	17,50	18,00	25	94,6	70,6	0,63	56,00	B	TCF050204BP	TCF060203BC
5577946	TCF180R4SLR25MB	18,00	18,50	25	96,6	72,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577947	TCF185R4SLR25MB	18,50	19,00	25	99,7	74,7	0,65	56,00	B	TCF050204BP	TCF060203BC
5578836	TCF190R4SLR25MC	19,00	19,50	25	101,7	76,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578837	TCF195R4SLR25MC	19,50	20,00	25	104,7	78,7	0,71	56,00	C	TCF070306CP	TCF070304CC
5578838	TCF200R4SLR25MC	20,00	20,50	25	106,7	80,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578839	TCF205R4SLR25MC	20,50	21,00	25	109,7	82,7	0,74	56,00	C	TCF070306CP	TCF070304CC
5578840	TCF210R4SLR25MC	21,00	21,50	25	112,8	84,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578841	TCF220R4SLR25MC	22,00	22,50	25	117,8	88,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578842	TCF225R4SLR25MC	22,50	23,00	25	119,8	90,8	0,79	56,00	C	TCF070306CP	TCF070304CC
5578843	TCF230R4SLR25MC	23,00	23,50	25	122,8	92,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537831	TCF240R4SLR25MD	24,00	25,00	25	124,9	96,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537832	TCF250R4SLR32MD	25,00	26,00	32	130,9	100,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537833	TCF260R4SLR32MD	26,00	27,00	32	135,9	104,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537834	TCF265R4SLR32MD	26,50	27,50	32	139,0	107,0	0,95	60,00	D	TCF080308DP	TCF090305DC
5537835	TCF270R4SLR32MD	27,00	28,00	32	141,0	109,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537836	TCF280R4SLR32MD	28,00	29,00	32	146,0	113,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537837	TCF290R4SLR32MD	29,00	30,00	32	151,0	117,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537951	TCF300R4SLR32ME	30,00	31,00	32	153,1	121,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537952	TCF310R4SLR32ME	31,00	32,00	32	158,1	125,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537953	TCF320R4SLR32ME	32,00	33,00	32	163,2	129,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537954	TCF330R4SLR40ME	33,00	34,00	40	165,2	133,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537955	TCF340R4SLR40ME	34,00	35,00	40	174,2	137,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537956	TCF350R4SLR40ME	35,00	36,00	40	179,2	141,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537957	TCF360R4SLR40ME	36,00	37,00	40	184,3	145,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578619	TCF370R4SLR40MF	37,00	38,00	40	189,3	149,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578620	TCF375R4SLR40MF	37,50	38,50	40	191,4	151,4	1,36	70,00	F	TCF120412FP	TCF150406FC
5578621	TCF380R4SLR40MF	38,00	39,00	40	194,4	153,4	1,38	70,00	F	TCF120412FP	TCF150406FC

TC4 • 4 x D • SLR Shanks • Metric

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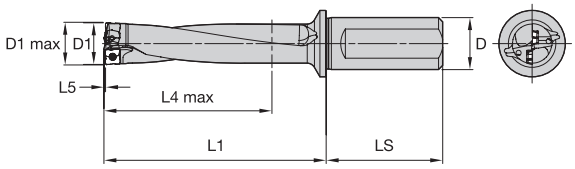
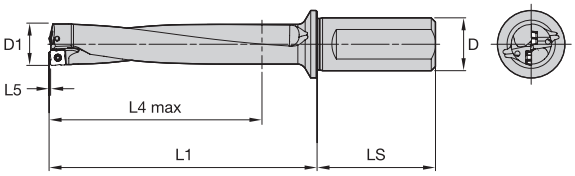


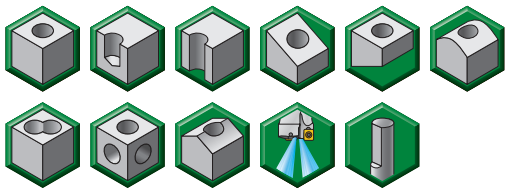
order number	catalog number	D1	D1 max	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578622	TCF390R4SLR40MF	39,00	40,00	40	199,4	157,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578623	TCF400R4SLR40MF	40,00	41,00	40	203,4	161,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578624	TCF410R4SLR40MF	41,00	42,00	40	208,5	165,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578625	TCF420R4SLR40MF	42,00	43,00	40	213,5	169,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578626	TCF430R4SLR40MF	43,00	44,00	40	218,5	173,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578627	TCF440R4SLR40MF	44,00	45,00	40	223,6	177,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578628	TCF450R4SLR40MF	45,00	46,00	40	228,6	181,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578729	TCF460R4SLR40MG	46,00	47,00	40	228,7	185,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578730	TCF470R4SLR40MG	47,00	48,00	40	233,7	189,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578731	TCF480R4SLR40MG	48,00	49,00	40	238,7	193,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578732	TCF490R4SLR40MG	49,00	50,00	40	243,8	197,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578733	TCF500R4SLR40MG	50,00	51,00	40	247,8	201,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578734	TCF505R4SLR40MG	50,50	51,50	40	250,8	203,8	1,80	70,00	G	TCF150512GP	TCF180508GC
5578735	TCF510R4SLR40MG	51,00	52,00	40	252,8	205,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578736	TCF520R4SLR40MG	52,00	53,00	40	257,8	209,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578737	TCF530R4SLR40MG	53,00	54,00	40	262,9	213,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578738	TCF540R4SLR40MG	54,00	55,00	40	267,9	217,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578739	TCF550R4SLR40MG	55,00	56,00	40	271,9	221,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578750	TCF560R4SLR40MG	56,00	57,00	40	276,9	225,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538647	TCF570R4SLR40MH	57,00	58,00	40	276,1	230,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538648	TCF580R4SLR40MH	58,00	59,00	40	281,1	234,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538649	TCF590R4SLR40MH	59,00	60,00	40	286,1	238,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538650	TCF600R4SLR40MH	60,00	61,00	40	290,1	242,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538651	TCF610R4SLR40MH	61,00	62,00	40	295,2	246,2	2,18	70,00	H	TCF180614HP	TCF210608HC
5538652	TCF620R4SLR40MH	62,00	63,00	40	300,2	250,2	2,20	70,00	H	TCF180614HP	TCF210608HC
5538653	TCF630R4SLR40MH	63,00	64,00	40	305,2	254,2	2,23	70,00	H	TCF180614HP	TCF210608HC
5538654	TCF640R4SLR40MH	64,00	65,00	40	309,3	258,3	2,26	70,00	H	TCF180614HP	TCF210608HC
5538655	TCF650R4SLR40MH	65,00	66,00	40	314,3	262,3	2,28	70,00	H	TCF180614HP	TCF210608HC
5538656	TCF660R4SLR40MH	66,00	67,00	40	319,3	266,3	2,31	70,00	H	TCF180614HP	TCF210608HC
5538657	TCF670R4SLR40MH	67,00	68,00	40	323,3	270,3	2,33	70,00	H	TCF180614HP	TCF210608HC
5538658	TCF680R4SLR40MH	68,00	69,00	40	328,4	274,4	2,36	70,00	H	TCF180614HP	TCF210608HC

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 5 x D • SLR Shanks • Inch

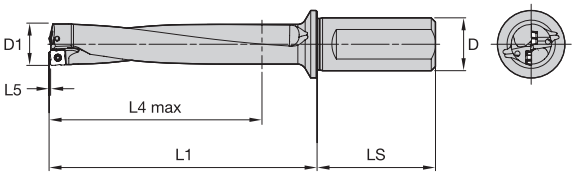




order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537888	TCF0473R5SLR075A	.473	.75	3.107	2.382	.017	1.969	A	TCF040204AP	TCF040203AC
5537889	TCF0500R5SLR075A	.500	.75	3.276	2.518	.018	1.969	A	TCF040204AP	TCF040203AC
5537890	TCF0531R5SLR075A	.531	.75	3.469	2.674	.019	1.969	A	TCF040204AP	TCF040203AC
5578320	TCF0563R5SLR075B	.563	.75	3.612	2.835	.020	1.969	B	TCF050204BP	TCF060203BC
5578321	TCF0594R5SLR075B	.594	.75	3.803	2.992	.022	1.969	B	TCF050204BP	TCF060203BC
5578322	TCF0625R5SLR075B	.625	.75	3.993	3.148	.023	1.969	B	TCF050204BP	TCF060203BC
5578323	TCF0656R5SLR075B	.656	.75	4.183	3.304	.024	1.969	B	TCF050204BP	TCF060203BC
5578324	TCF0688R5SLR075B	.688	.75	4.379	3.465	.025	1.969	B	TCF050204BP	TCF060203BC
5578325	TCF0703R5SLR075B	.703	.75	4.471	3.540	.025	1.969	B	TCF050204BP	TCF060203BC
5578326	TCF0719R5SLR075B	.719	.75	4.569	3.620	.026	1.969	B	TCF050204BP	TCF060203BC
5578327	TCF0734R5SLR075B	.734	.75	4.661	3.696	.026	1.969	B	TCF050204BP	TCF060203BC
5578420	TCF0750R5SLR100C	.750	1.00	4.760	3.777	.027	2.205	C	TCF070306CP	TCF070304CC
5578421	TCF0781R5SLR100C	.781	1.00	4.950	3.933	.028	2.205	C	TCF070306CP	TCF070304CC
5578422	TCF0813R5SLR100C	.813	1.00	5.146	4.094	.029	2.205	C	TCF070306CP	TCF070304CC
5578423	TCF0844R5SLR100C	.844	1.00	5.336	4.250	.030	2.205	C	TCF070306CP	TCF070304CC
5578424	TCF0875R5SLR100C	.875	1.00	5.526	4.406	.031	2.205	C	TCF070306CP	TCF070304CC
5578425	TCF0906R5SLR100C	.906	1.00	5.716	4.562	.032	2.205	C	TCF070306CP	TCF070304CC
5578426	TCF0938R5SLR100C	.938	1.00	5.911	4.722	.032	2.205	C	TCF070306CP	TCF070304CC
5537929	TCF0969R5SLR100D	.969	1.00	6.007	4.880	.035	2.205	D	TCF080308DP	TCF090305DC
5537930	TCF0984R5SLR100D	.984	1.00	6.098	4.956	.036	2.205	D	TCF080308DP	TCF090305DC
5537931	TCF1000R5SLR100D	1.000	1.00	6.194	5.036	.036	2.205	D	TCF080308DP	TCF090305DC
5537932	TCF1031R5SLR125D	1.031	1.25	6.420	5.192	.037	2.362	D	TCF080308DP	TCF090305DC
5537933	TCF1063R5SLR125D	1.063	1.25	6.613	5.353	.038	2.362	D	TCF080308DP	TCF090305DC
5537934	TCF1094R5SLR125D	1.094	1.25	6.800	5.509	.039	2.362	D	TCF080308DP	TCF090305DC
5537935	TCF1125R5SLR125D	1.125	1.25	6.987	5.665	.040	2.362	D	TCF080308DP	TCF090305DC
5537936	TCF1156R5SLR125D	1.156	1.25	7.174	5.821	.041	2.362	D	TCF080308DP	TCF090305DC
5538092	TCF1188R5SLR125E	1.188	1.25	7.249	5.983	.043	2.362	E	TCF100408EP	TCF120405EC
5538093	TCF1210R5SLR125E	1.210	1.25	7.380	6.094	.044	2.362	E	TCF100408EP	TCF120405EC
5538094	TCF1219R5SLR125E	1.219	1.25	7.433	6.139	.044	2.362	E	TCF100408EP	TCF120405EC
5538095	TCF1250R5SLR125E	1.250	1.25	7.617	6.295	.045	2.362	E	TCF100408EP	TCF120405EC
5538096	TCF1280R5SLR125E	1.281	1.25	7.801	6.451	.046	2.362	E	TCF100408EP	TCF120405EC
5538097	TCF1313R5SLR125E	1.313	1.25	7.991	6.612	.047	2.362	E	TCF100408EP	TCF120405EC
5538098	TCF1375R5SLR125E	1.375	1.25	8.358	6.924	.049	2.362	E	TCF100408EP	TCF120405EC
5538099	TCF1406R5SLR150E	1.406	1.50	8.582	7.080	.050	2.756	E	TCF100408EP	TCF120405EC
5538100	TCF1438R5SLR150E	1.438	1.50	8.771	7.240	.050	2.756	E	TCF100408EP	TCF120405EC
5578685	TCF1469R5SLR150F	1.469	1.50	8.957	7.398	.054	2.756	F	TCF120412FP	TCF150406FC
5578686	TCF1500R5SLR150F	1.500	1.50	9.141	7.554	.055	2.756	F	TCF120412FP	TCF150406FC
5578687	TCF1531R5SLR150F	1.531	1.50	9.325	7.711	.056	2.756	F	TCF120412FP	TCF150406FC
5578688	TCF1563R5SLR150F	1.563	1.50	9.515	7.872	.057	2.756	F	TCF120412FP	TCF150406FC
5578689	TCF1625R5SLR150F	1.625	1.50	9.882	8.183	.058	2.756	F	TCF120412FP	TCF150406FC

TC4 • 5 x D • SLR Shanks • Inch

(continued)

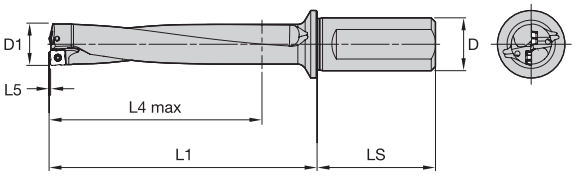


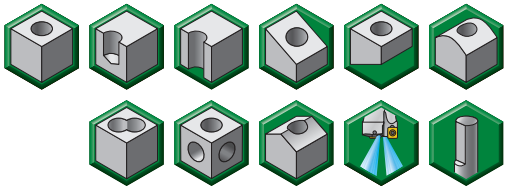
order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578690	**TCF1656R5SLR150F**	1.656	1.50	10.066	8.339	.059	2.756	F	**TCF120412FP**	**TCF150406FC**
5578691	**TCF1688R5SLR150F**	1.688	1.50	10.256	8.500	.060	2.756	F	**TCF120412FP**	**TCF150406FC**
5578693	**TCF1750R5SLR150F**	1.750	1.50	10.623	8.812	.062	2.756	F	**TCF120412FP**	**TCF150406FC**
5578803	**TCF1813R5SLR150G**	1.813	1.50	10.818	9.131	.066	2.756	G	**TCF150512GP**	**TCF180508GC**
5578804	**TCF1875R5SLR150G**	1.875	1.50	11.179	9.443	.068	2.756	G	**TCF150512GP**	**TCF180508GC**
5578805	**TCF1938R5SLR150G**	1.938	1.50	11.546	9.759	.069	2.756	G	**TCF150512GP**	**TCF180508GC**
5578806	**TCF2000R5SLR150G**	2.000	1.50	11.907	10.071	.071	2.756	G	**TCF150512GP**	**TCF180508GC**
5578807	**TCF2125R5SLR150G**	2.125	1.50	12.636	10.699	.075	2.756	G	**TCF150512GP**	**TCF180508GC**
5578808	**TCF2219R5SLR150G**	2.219	1.50	13.184	11.172	.077	2.756	G	**TCF150512GP**	**TCF180508GC**
5538509	**TCF2250R5SLR150H**	2.250	1.50	13.142	11.331	.081	2.756	H	**TCF180614HP**	**TCF210608HC**
5538510	**TCF2375R5SLR150H**	2.375	1.50	13.859	11.960	.085	2.756	H	**TCF180614HP**	**TCF210608HC**
5538511	**TCF2500R5SLR150H**	2.500	1.50	14.574	12.588	.088	2.756	H	**TCF180614HP**	**TCF210608HC**

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • 5 x D • SLR Shanks • Metric





order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5537874	TCF120R5SLR20MA	12,00	20	79,4	60,4	0,43	50,00	A	TCF040204AP	TCF040203AC
5537875	TCF125R5SLR20MA	12,50	20	82,0	63,0	0,45	50,00	A	TCF040204AP	TCF040203AC
5537876	TCF127R5SLR20MA	12,70	20	84,0	64,0	0,46	50,00	A	TCF040204AP	TCF040203AC
5537877	TCF130R5SLR20MA	13,00	20	85,5	65,5	0,47	50,00	A	TCF040204AP	TCF040203AC
5537878	TCF135R5SLR20MA	13,50	20	89,0	68,0	0,48	50,00	A	TCF040204AP	TCF040203AC
5577948	TCF140R5SLR25MB	14,00	25	90,5	70,5	0,49	56,00	B	TCF050204BP	TCF060203BC
5577949	TCF145R5SLR25MB	14,50	25	93,0	73,0	0,52	56,00	B	TCF050204BP	TCF060203BC
5577950	TCF150R5SLR25MB	15,00	25	96,5	75,5	0,55	56,00	B	TCF050204BP	TCF060203BC
5577951	TCF155R5SLR25MB	15,50	25	100,1	78,1	0,56	56,00	B	TCF050204BP	TCF060203BC
5577952	TCF160R5SLR25MB	16,00	25	102,6	80,6	0,58	56,00	B	TCF050204BP	TCF060203BC
5577953	TCF165R5SLR25MB	16,50	25	106,1	83,1	0,60	56,00	B	TCF050204BP	TCF060203BC
5577954	TCF170R5SLR25MB	17,00	25	108,6	85,6	0,61	56,00	B	TCF050204BP	TCF060203BC
5577955	TCF175R5SLR25MB	17,50	25	112,1	88,1	0,63	56,00	B	TCF050204BP	TCF060203BC
5577956	TCF180R5SLR25MB	18,00	25	114,6	90,6	0,64	56,00	B	TCF050204BP	TCF060203BC
5577957	TCF185R5SLR25MB	18,50	25	118,2	93,2	0,65	56,00	B	TCF050204BP	TCF060203BC
5578844	TCF190R5SLR25MC	19,00	25	120,7	95,7	0,68	56,00	C	TCF070306CP	TCF070304CC
5578845	TCF195R5SLR25MC	19,50	25	124,2	98,2	0,71	56,00	C	TCF070306CP	TCF070304CC
5578846	TCF200R5SLR25MC	20,00	25	126,7	100,7	0,72	56,00	C	TCF070306CP	TCF070304CC
5578847	TCF205R5SLR25MC	20,50	25	130,2	103,2	0,74	56,00	C	TCF070306CP	TCF070304CC
5578848	TCF210R5SLR25MC	21,00	25	133,8	105,8	0,75	56,00	C	TCF070306CP	TCF070304CC
5578849	TCF220R5SLR25MC	22,00	25	139,8	110,8	0,78	56,00	C	TCF070306CP	TCF070304CC
5578850	TCF225R5SLR25MC	22,50	25	142,3	113,3	0,79	56,00	C	TCF070306CP	TCF070304CC
5578851	TCF230R5SLR25MC	23,00	25	145,8	115,8	0,80	56,00	C	TCF070306CP	TCF070304CC
5537838	TCF240R5SLR25MD	24,00	25	148,9	120,9	0,87	56,00	D	TCF080308DP	TCF090305DC
5537839	TCF250R5SLR32MD	25,00	32	155,9	125,9	0,91	60,00	D	TCF080308DP	TCF090305DC
5537840	TCF260R5SLR32MD	26,00	32	161,9	130,9	0,94	60,00	D	TCF080308DP	TCF090305DC
5537841	TCF265R5SLR32MD	26,50	32	165,5	133,5	0,95	60,00	D	TCF080308DP	TCF090305DC
5537842	TCF270R5SLR32MD	27,00	32	168,0	136,0	0,97	60,00	D	TCF080308DP	TCF090305DC
5537843	TCF280R5SLR32MD	28,00	32	174,0	141,0	0,99	60,00	D	TCF080308DP	TCF090305DC
5537844	TCF290R5SLR32MD	29,00	32	180,0	146,0	1,02	60,00	D	TCF080308DP	TCF090305DC
5537958	TCF300R5SLR32ME	30,00	32	183,1	151,1	1,09	60,00	E	TCF100408EP	TCF120405EC
5537959	TCF310R5SLR32ME	31,00	32	189,1	156,1	1,12	60,00	E	TCF100408EP	TCF120405EC
5537960	TCF320R5SLR32ME	32,00	32	195,2	161,2	1,15	60,00	E	TCF100408EP	TCF120405EC
5537961	TCF330R5SLR40ME	33,00	40	202,2	166,2	1,18	70,00	E	TCF100408EP	TCF120405EC
5537962	TCF340R5SLR40ME	34,00	40	208,2	171,2	1,21	70,00	E	TCF100408EP	TCF120405EC
5537963	TCF350R5SLR40ME	35,00	40	214,2	176,2	1,24	70,00	E	TCF100408EP	TCF120405EC
5537964	TCF360R5SLR40ME	36,00	40	220,3	181,3	1,27	70,00	E	TCF100408EP	TCF120405EC
5578629	TCF370R5SLR40MF	37,00	40	226,3	186,3	1,35	70,00	F	TCF120412FP	TCF150406FC
5578640	TCF375R5SLR40MF	37,50	40	228,9	188,9	1,36	70,00	F	TCF120412FP	TCF150406FC
5578641	TCF380R5SLR40MF	38,00	40	232,4	191,4	1,38	70,00	F	TCF120412FP	TCF150406FC

TC4 • 5 x D • SLR Shanks • Metric

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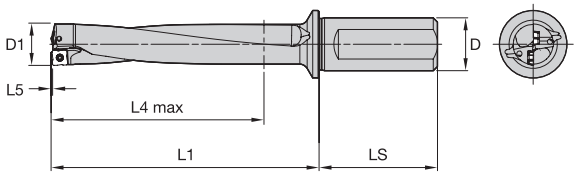
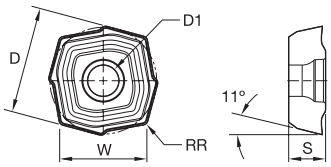


order number	catalog number	D1	D	L1	L4 max	L5	LS	SSC	periphery insert	center insert
5578642	TCF390R5SLR40MF	39,00	40	238,4	196,4	1,41	70,00	F	TCF120412FP	TCF150406FC
5578643	TCF400R5SLR40MF	40,00	40	243,4	201,4	1,45	70,00	F	TCF120412FP	TCF150406FC
5578644	TCF410R5SLR40MF	41,00	40	249,5	206,5	1,48	70,00	F	TCF120412FP	TCF150406FC
5578645	TCF420R5SLR40MF	42,00	40	255,5	211,5	1,51	70,00	F	TCF120412FP	TCF150406FC
5578646	TCF430R5SLR40MF	43,00	40	261,5	216,5	1,53	70,00	F	TCF120412FP	TCF150406FC
5578647	TCF440R5SLR40MF	44,00	40	267,6	221,6	1,56	70,00	F	TCF120412FP	TCF150406FC
5578648	TCF450R5SLR40MF	45,00	40	273,6	226,6	1,59	70,00	F	TCF120412FP	TCF150406FC
5578751	TCF460R5SLR40MG	46,00	40	274,7	231,7	1,67	70,00	G	TCF150512GP	TCF180508GC
5578752	TCF470R5SLR40MG	47,00	40	280,7	236,7	1,70	70,00	G	TCF150512GP	TCF180508GC
5578753	TCF480R5SLR40MG	48,00	40	286,7	241,7	1,73	70,00	G	TCF150512GP	TCF180508GC
5578754	TCF490R5SLR40MG	49,00	40	292,8	246,8	1,76	70,00	G	TCF150512GP	TCF180508GC
5578755	TCF500R5SLR40MG	50,00	40	297,8	251,8	1,79	70,00	G	TCF150512GP	TCF180508GC
5578756	TCF505R5SLR40MG	50,50	40	301,3	254,3	1,80	70,00	G	TCF150512GP	TCF180508GC
5578757	TCF510R5SLR40MG	51,00	40	303,8	256,8	1,81	70,00	G	TCF150512GP	TCF180508GC
5578758	TCF520R5SLR40MG	52,00	40	309,8	261,8	1,84	70,00	G	TCF150512GP	TCF180508GC
5578759	TCF530R5SLR40MG	53,00	40	315,9	266,9	1,87	70,00	G	TCF150512GP	TCF180508GC
5578760	TCF540R5SLR40MG	54,00	40	321,9	271,9	1,89	70,00	G	TCF150512GP	TCF180508GC
5578761	TCF550R5SLR40MG	55,00	40	326,9	276,9	1,92	70,00	G	TCF150512GP	TCF180508GC
5578762	TCF560R5SLR40MG	56,00	40	332,9	281,9	1,94	70,00	G	TCF150512GP	TCF180508GC
5538659	TCF570R5SLR40MH	57,00	40	333,1	287,1	2,06	70,00	H	TCF180614HP	TCF210608HC
5538680	TCF580R5SLR40MH	58,00	40	339,1	292,1	2,09	70,00	H	TCF180614HP	TCF210608HC
5538681	TCF590R5SLR40MH	59,00	40	345,1	297,1	2,12	70,00	H	TCF180614HP	TCF210608HC
5538682	TCF600R5SLR40MH	60,00	40	350,1	302,1	2,15	70,00	H	TCF180614HP	TCF210608HC
5538683	TCF610R5SLR40MH	61,00	40	356,2	307,2	2,18	70,00	H	TCF180614HP	TCF210608HC
5538684	TCF620R5SLR40MH	62,00	40	362,2	312,2	2,20	70,00	H	TCF180614HP	TCF210608HC
5538685	TCF630R5SLR40MH	63,00	40	368,2	317,2	2,23	70,00	H	TCF180614HP	TCF210608HC
5538686	TCF640R5SLR40MH	64,00	40	373,3	322,3	2,26	70,00	H	TCF180614HP	TCF210608HC
5538687	TCF650R5SLR40MH	65,00	40	379,3	327,3	2,28	70,00	H	TCF180614HP	TCF210608HC
5538688	TCF660R5SLR40MH	66,00	40	385,3	332,3	2,31	70,00	H	TCF180614HP	TCF210608HC
5538689	TCF670R5SLR40MH	67,00	40	390,3	337,3	2,33	70,00	H	TCF180614HP	TCF210608HC
5538700	TCF680R5SLR40MH	68,00	40	396,4	342,4	2,36	70,00	H	TCF180614HP	TCF210608HC

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the inserts.

WARNING
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.

TC4 • Center Inserts • Aluminum • V36



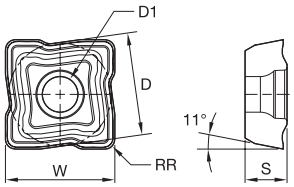
● first choice
○ alternate choice

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

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WPK10CH	WU25CH	WU40PH	WN10PH
TCF040203ACV36	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A	●	●	●	6407887
TCF060203BCV36	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.011	B	●	●	●	6372041
TCF070304CCV36	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	●	●	●	6372042
TCF090305DCV36	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	●	●	●	6372045
TCF120405ECV36	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	●	●	●	6372047
TCF150406FCV36	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	●	●	●	6346757
TCF180508GCV36	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	●	●	●	6407890
TCF210608HCV36	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	●	●	●	6372049

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

TC4 • Periphery Inserts • Aluminum • V36



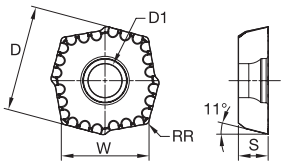
● first choice
○ alternate choice

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

	D		D1		W		S		RR						
catalog number	mm	in	mm	in	mm	in	mm	in	mm	in	SSC	WPK10CH	WU25CH	WU40PH	WN10PH
TCF040204APV36	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	●	●	●	6407888
TCF050204BPV36	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	●	●	●	6371850
TCF070306CPV36	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	●	●	●	6372043
TCF080308DPV36	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	●	●	●	6372044
TCF100408EPV36	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	●	●	●	6372046
TCF120412FPV36	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	●	●	●	6348893
TCF150512GPV36	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	●	●	●	6407889
TCF180614HPV36	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	●	●	●	6372048

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

TC4 • Center Inserts • Long Chip Materials • V38



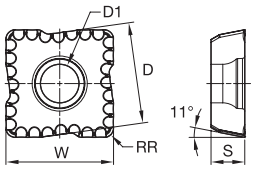
● first choice
○ alternate choice

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

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WPK10CH	WU25CH	WU40PH
TCF040203ACV38	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.012	A	'	'	6429458
TCF060203BCV38	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.012	B	'	'	6429459
TCF070304CCV38	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C	'	'	6429460
TCF090305DCV38	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D	'	'	6429461
TCF120405ECV38	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E	'	'	6429462
TCF150406FCV38	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F	'	'	6429463
TCF180508GCV38	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G	'	'	6324383
TCF210608HCV38	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H	'	'	6429464

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

TC4 • Periphery Inserts • Long Chip Materials • V38



● first choice
○ alternate choice

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

catalog number	D mm	D in	D1 mm	D1 in	W mm	W in	S mm	S in	RR mm	RR in	SSC	WPK10CH	WU25CH	WU40PH
TCF040204APV38	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	▪	6429424	6429425
TCF050204BPV38	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	▪	6429426	6429427
TCF070306CPV38	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	▪	6429466	6429428
TCF080308DPV38	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	▪	6429429	6429430
TCF100408EPV38	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	▪	6429451	6429452
TCF120412FPV38	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	▪	6429453	6429454
TCF150512GPV38	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	▪	6429455	6324381
TCF180614HPV38	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	▪	6429456	6429457

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Top Cut 4 • Insert Selection Guide

Material Group	Geometry	Stable Cutting Conditions		Unstable Cutting Conditions		Interrupted Cutting Conditions	
		periphery insert	center insert	periphery insert	center insert	periphery insert	center insert
P1	V38	WU25CH	WU40PH	**WU40PH**	**WU40PH**	WU40PH	WU40PH
P2–P4	V34	WPK10CH	WU40PH	**WU25CH**	**WU40PH**	WU40PH	WU40PH
P5–P6	V36	WU25CH	WU40PH	**WU40PH**	**WU40PH**	WU40PH	WU40PH
M1–M3	V36	WU25CH	WU40PH	**WU40PH**	**WU40PH**	WU40PH	WU40PH
K1–K3	V34	WPK10CH	WU40PH	**WU40PH**	**WU40PH**	WU40PH	WU40PH
N1–N4	V36	WN10PH	WN10PH	**WN10PH**	**WN10PH**	WN10PH	WN10PH
S1–S4	V38	WU40PH	WU40PH	**WU40PH**	**WU40PH**	WU40PH	WU40PH

Top Cut 4 • Cutting Data • Inch

Material Group	Geometry	Grade		Cutting Speed — Vc SFM			Inch — Recommended Feed Rate per Revolution				
		center	periphery	min	Start	max	Tool Diameter	.473–.531" Insert Size A	.563–.734" Insert Size B	.750–.938" Insert Size C	.969–1.156" Insert Size D
P0	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0024–0.0031	0.0031–0.0043	0.0039–0.0051	0.0043–0.0055
P1	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0024–0.0039	0.0031–0.0051	0.0039–0.0059	0.0043–0.0063
P2	–V34	WU40PH	WU25CH	360	**570**	840	IPR	0.0024–0.0039	0.0031–0.0059	0.0039–0.0063	0.0043–0.0067
P3	–V34	WU40PH	WPK10CH	360	**600**	930	IPR	0.0031–0.0059	0.0039–0.0063	0.0043–0.0071	0.0047–0.0079
P4	–V34	WU40PH	WPK10CH	360	**570**	930	IPR	0.0031–0.0059	0.0039–0.0063	0.0043–0.0071	0.0047–0.0079
P5	–V36	WU40PH	WU25CH	360	**540**	750	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
P6	-V36	WU40PH	WU25CH	360	**480**	630	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
M1	-V38	WU40PH	WU40PH	360	**480**	720	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
M2	–V36	WU40PH	WU40PH	330	**420**	630	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
M3	-V36	WU40PH	WU40PH	300	**360**	600	IPR	0.0024–0.0047	0.0028–0.0051	0.0031–0.0059	0.0039–0.0063
K1	-V34	WU25CH	WPK10CH	360	**600**	840	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
K2	–V34	WU40PH	WPK10CH	300	**540**	780	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
K3	-V34	WU40PH	WPK10CH	300	**510**	720	IPR	0.0031–0.0055	0.0031–0.0063	0.0039–0.0071	0.0047–0.0094
N1	-V36	WN10PH	WN10PH	750	**1050**	1500	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
N2	–V36	WN10PH	WN10PH	450	**900**	1350	IPR	0.0024–0.0039	0.0031–0.0055	0.0039–0.0059	0.0043–0.0063
N3	-V36	WN10PH	WN10PH	240	**360**	450	IPR	0.0024–0.0039	0.0028–0.0043	0.0031–0.0047	0.0039–0.0055
S3	-V38	WU40PH	WU40PH	60	**90**	135	IPR	0.0031–0.0047	0.0031–0.0051	0.0039–0.0059	0.0047–0.0075
S4	–V38	WU40PH	WU40PH	105	**120**	195	IPR	0.0031–0.0047	0.0031–0.0051	0.0039–0.0059	0.0047–0.0075

Material Group	Geometry	Grade		Cutting Speed — Vc SFM			Tool Diameter	1.188–1.438" Insert Size E	1.469–1.750" Insert Size F	1.813–2.219" Insert Size G	2.250–2.500" Insert Size H
		center	periphery	min	Start	max					
P0	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0051–0.0063	0.0059–0.0071	0.0063–0.0091	0.0067–0.0094
P1	–V38	WU40PH	WU25CH	360	**540**	780	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0106	0.0067–0.0114
P2	–V34	WU40PH	WU25CH	360	**570**	840	IPR	0.0051–0.0079	0.0059–0.0083	0.0063–0.0110	0.0067–0.0118
P3	–V34	WU40PH	WPK10CH	360	**600**	930	IPR	0.0053–0.0094	0.0063–0.0094	0.0071–0.0118	0.0075–0.0126
P4	–V34	WU40PH	WPK10CH	360	**570**	930	IPR	0.0055–0.0087	0.0063–0.0094	0.0071–0.0118	0.0075–0.0126
P5	–V36	WU40PH	WU25CH	360	**540**	750	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
P6	-V36	WU40PH	WU25CH	360	**480**	630	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0114
M1	-V38	WU40PH	WU40PH	360	**480**	720	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
M2	–V36	WU40PH	WU40PH	330	**420**	630	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
M3	-V36	WU40PH	WU40PH	300	**360**	600	IPR	0.0047–0.0079	0.0055–0.0098	0.0063–0.0110	0.0063–0.0118
K1	-V34	WU25CH	WPK10CH	360	**600**	840	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
K2	–V34	WU40PH	WPK10CH	300	**540**	780	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
K3	-V34	WU40PH	WPK10CH	300	**510**	720	IPR	0.0055–0.0102	0.0063–0.0118	0.0071–0.0126	0.0079–0.0142
N1	-V36	WN10PH	WN10PH	750	**1050**	1500	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
N2	–V36	WN10PH	WN10PH	450	**900**	1350	IPR	0.0051–0.0071	0.0059–0.0079	0.0063–0.0110	0.0067–0.0118
N3	-V36	WN10PH	WN10PH	240	**360**	450	IPR	0.0047–0.0067	0.0055–0.0083	0.0063–0.0091	0.0063–0.0094
S3	-V38	WU40PH	WU40PH	60	**90**	135	IPR	0.0055–0.0083	0.0063–0.0094	0.0071–0.0102	0.0079–0.0118
S4	–V38	WU40PH	WU40PH	105	**120**	195	IPR	0.0055–0.0083	0.0063–0.0094	0.0071–0.0102	0.0079–0.0118

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range .473–.938" (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range .969–2.5" (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

Top Cut 4 • Cutting Data • Metric

Material Group	Geometry	Grade		Cutting Speed — Vc m/min			Metric: Recommended Feed Rate per Revolution				
		center	periphery	min	Start	max	Tool Diameter	12,00–13,99 Insert Size A	14,00–18,99 Insert Size B	19,00–23,99 Insert Size C	24,00–29,99 Insert Size D
P0	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,06–0,08	0,08–0,11	0,10–0,13	0,11–0,14
P1	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,06–0,10	0,08–0,13	0,10–0,15	0,11–0,16
P2	–V34	WU40PH	WU25CH	120	**190**	280	mm/rev	0,06–0,10	0,08–0,15	0,10–0,16	0,11–0,17
P3	–V34	WU40PH	WPK10CH	120	**200**	310	mm/rev	0,08–0,15	0,10–0,16	0,11–0,18	0,12–0,20
P4	–V34	WU40PH	WPK10CH	120	**190**	310	mm/rev	0,08–0,15	0,10–0,16	0,11–0,18	0,12–0,20
P5	–V36	WU40PH	WU25CH	120	**180**	250	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
P6	-V36	WU40PH	WU25CH	120	**160**	210	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
M1	-V38	WU40PH	WU40PH	120	**160**	240	mm/rev	0,06–0,11	0,07–0,11	0,08–0,12	0,10–0,14
M2	–V36	WU40PH	WU40PH	110	**140**	210	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
M3	-V36	WU40PH	WU40PH	100	**120**	200	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
K1	-V34	WU25CH	WPK10CH	120	**200**	280	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
K2	–V34	WU40PH	WPK10CH	100	**180**	260	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
K3	-V34	WU40PH	WPK10CH	100	**170**	240	mm/rev	0,08–0,14	0,08–0,16	0,10–0,18	0,12–0,24
N1	-V36	WN10PH	WN10PH	250	**350**	500	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
N2	–V36	WN10PH	WN10PH	150	**300**	450	mm/rev	0,06–0,10	0,08–0,14	0,10–0,15	0,11–0,16
N3	-V36	WN10PH	WN10PH	80	**120**	150	mm/rev	0,06–0,10	0,07–0,11	0,08–0,12	0,10–0,14
S3	-V38	WU40PH	WU40PH	20	**30**	45	mm/rev	0,08–0,12	0,08–0,13	0,10–0,15	0,12–0,19
S4	–V38	WU40PH	WU40PH	35	**40**	65	mm/rev	0,08–0,12	0,08–0,13	0,10 –0,15	0,12–0,19

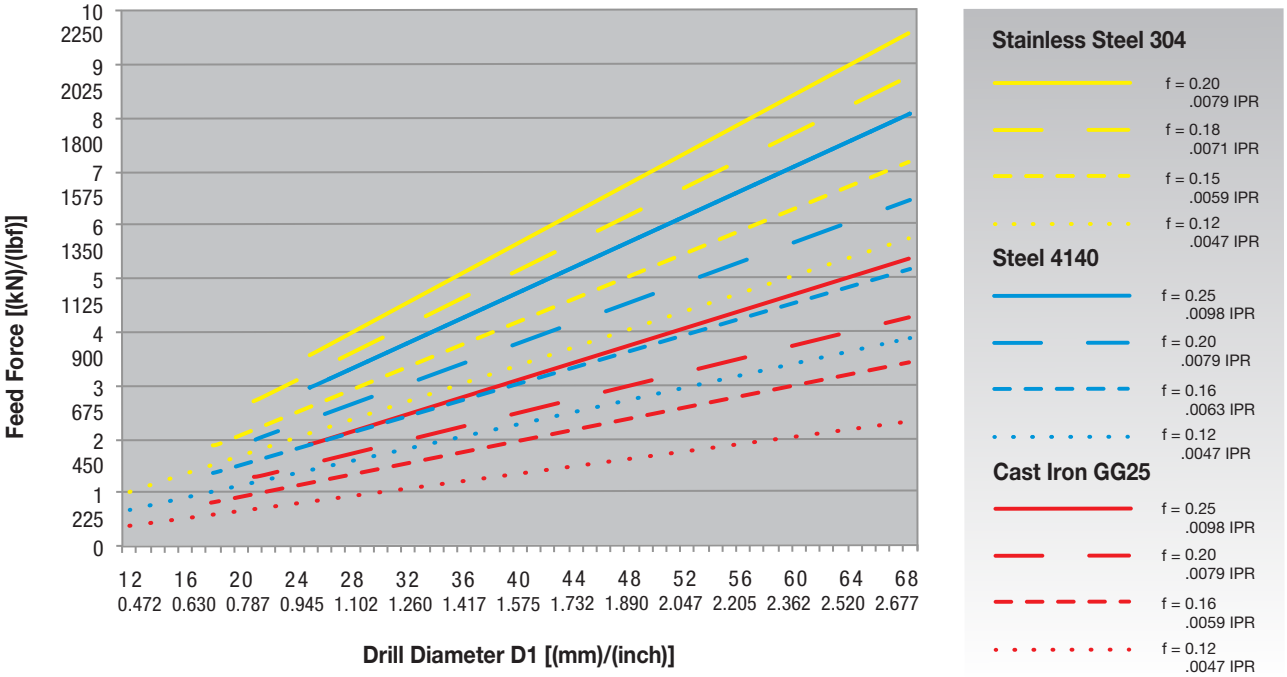
Material Group	Geometry	Grade		Cutting Speed — vc m/min							
		center	periphery	min	Start	max	Tool Diameter	30,00–36,99 Insert Size E	37,00–45,99 Insert Size F	46,00–56,99 Insert Size G	57,00–68,00 Insert Size H
P0	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,13–0,16	0,15–0,18	0,16–0,23	0,17–0,24
P1	–V38	WU40PH	WU25CH	120	**180**	260	mm/rev	0,13–0,17	0,15–0,19	0,16–0,24	0,17–0,25
P2	–V34	WU40PH	WU25CH	120	**190**	280	mm/rev	0,13–0,20	0,15–0,21	0,16–0,28	0,17–0,30
P3	–V34	WU40PH	WPK10CH	120	**200**	310	mm/rev	0,16–0,24	0,16–0,24	0,18–0,30	0,19–0,32
P4	–V34	WU40PH	WPK10CH	120	**190**	310	mm/rev	0,14–0,22	0,16–0,24	0,18–0,30	0,19–0,32
P5	–V36	WU40PH	WU25CH	120	**180**	250	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
P6	-V36	WU40PH	WU25CH	120	**160**	210	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,29
M1	-V38	WU40PH	WU40PH	120	**160**	240	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
M2	–V36	WU40PH	WU40PH	110	**140**	210	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
M3	-V36	WU40PH	WU40PH	100	**120**	200	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
K1	-V34	WU25CH	WPK10CH	120	**200**	280	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
K2	–V34	WU40PH	WPK10CH	100	**180**	260	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
K3	-V34	WU40PH	WPK10CH	100	**170**	240	mm/rev	0,14–0,26	0,16–0,30	0,18–0,32	0,20–0,36
N1	-V36	WN10PH	WN10PH	250	**350**	500	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
N2	–V36	WN10PH	WN10PH	150	**300**	450	mm/rev	0,13–0,18	0,15–0,20	0,16–0,28	0,17–0,30
N3	-V36	WN10PH	WN10PH	80	**120**	150	mm/rev	0,12–0,17	0,14–0,21	0,16–0,23	0,16–0,24
S3	-V38	WU40PH	WU40PH	20	**30**	45	mm/rev	0,14–0,21	0,16–0,24	0,18–0,26	0,20–0,30
S4	–V38	WU40PH	WU40PH	35	**40**	65	mm/rev	0,14–0,21	0,16–0,24	0,18–0,26	0,20–0,30

NOTE: All speed conditions are for stable conditions. For unstable conditions, it is suggested to reduce starting speeds by 10%. For interrupted cuts, reduce by 20%.
For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above data.
For 5 x D, diameter range 12–23,99mm (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above data.
For 5 x D, diameter range 25–68mm (inserts sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above data.
For 4 x D and 5 x D, it is recommended to reduce feed rate during entry and exit by 30–50%.

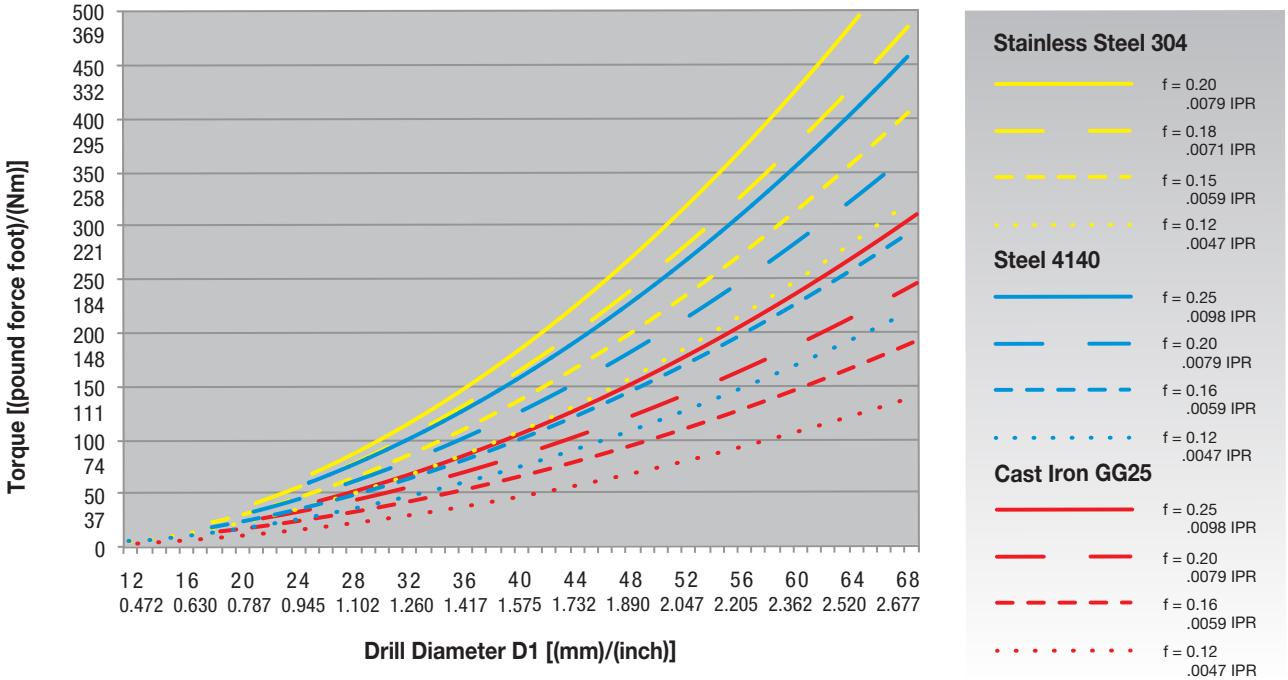
Top Cut 4™ • Drill Depth • X-Offset Capabilities • Hole Tolerance

Insert size	Diameter range mm (in)	2 x D/3 x D			4 x D			5 x D		
		X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)	X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)	X-offset value max. in mm (max. in inch)	D1 max value mm (in)	Hole tolerance mm (in)
A	12,00–13,99 (.473–.531)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	–	–	+/- 0,35 (+/- 0.014)
B	14,00–18,99 (.563–.734)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	–	–	+/- 0,35 (+/- 0.014)
C	19,00–23,99 (.750–.938)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,20 (+/- 0.008)	0,5 (0.020)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	–	–	+/- 0,35 (+/- 0.014)
D	24,00–29,99 (.969–1.156)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,20 (+/- 0.008)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	–	–	+/- 0,35 (+/- 0.014)
E	30,00–36,99 (1.188–1.438)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,20 (+/- 0.008)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,35 (+/- 0.014)	–	–	+/- 0,35 (+/- 0.014)
F	37,00–45,99 (1.469–1.750)	0,8 (0.031)	D1 + 1,6mm (D1 + 0.063")	+/- 0,25 (+/- 0.010)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,38 (+/- 0.015)	–	–	+/- 0,38 (+/- 0.015)
G	46,00–56,99 (1.813–2.219)	1 (0.039)	D1 + 2mm (D1 + 0.079")	+/- 0,25 (+/- 0.010)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,38 (+/- 0.015)	–	–	+/- 0,38 (+/- 0.015)
H	57,00–68,00 (2.250–2.500)	1 (0.039)	D1 + 2mm (D1 + 0.079")	+/- 0,28 (+/- 0.011)	0,8 (0.031)	D1 + 1mm (D1 + 0.039")	+/- 0,42 (+/- 0.017)	–	–	+/- 0,42 (+/- 0.017)

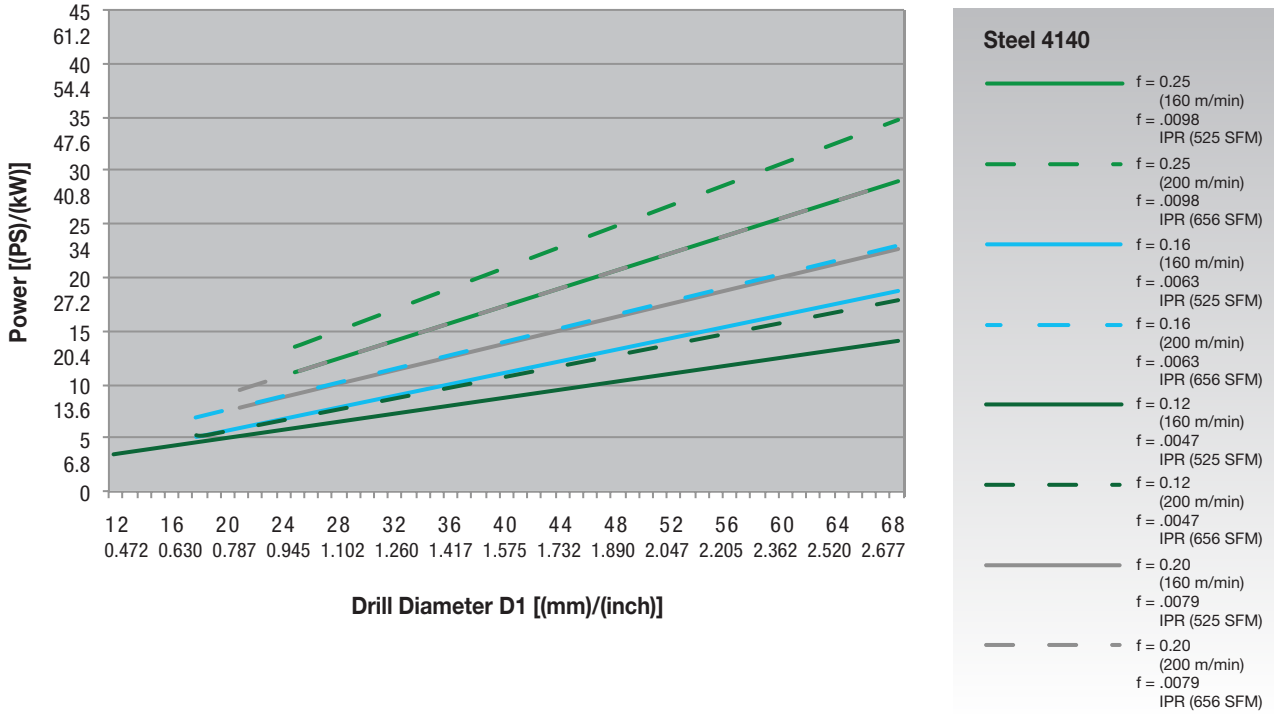
Feed Force Requirement



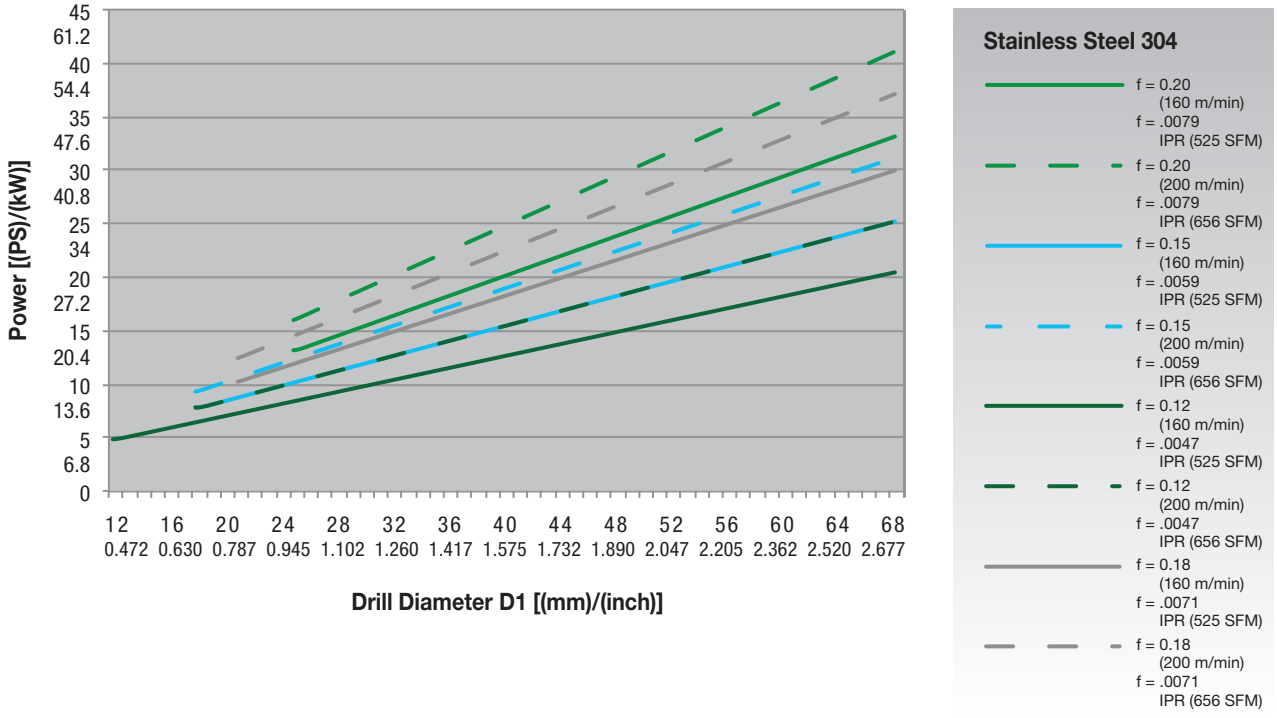
Torque Requirement



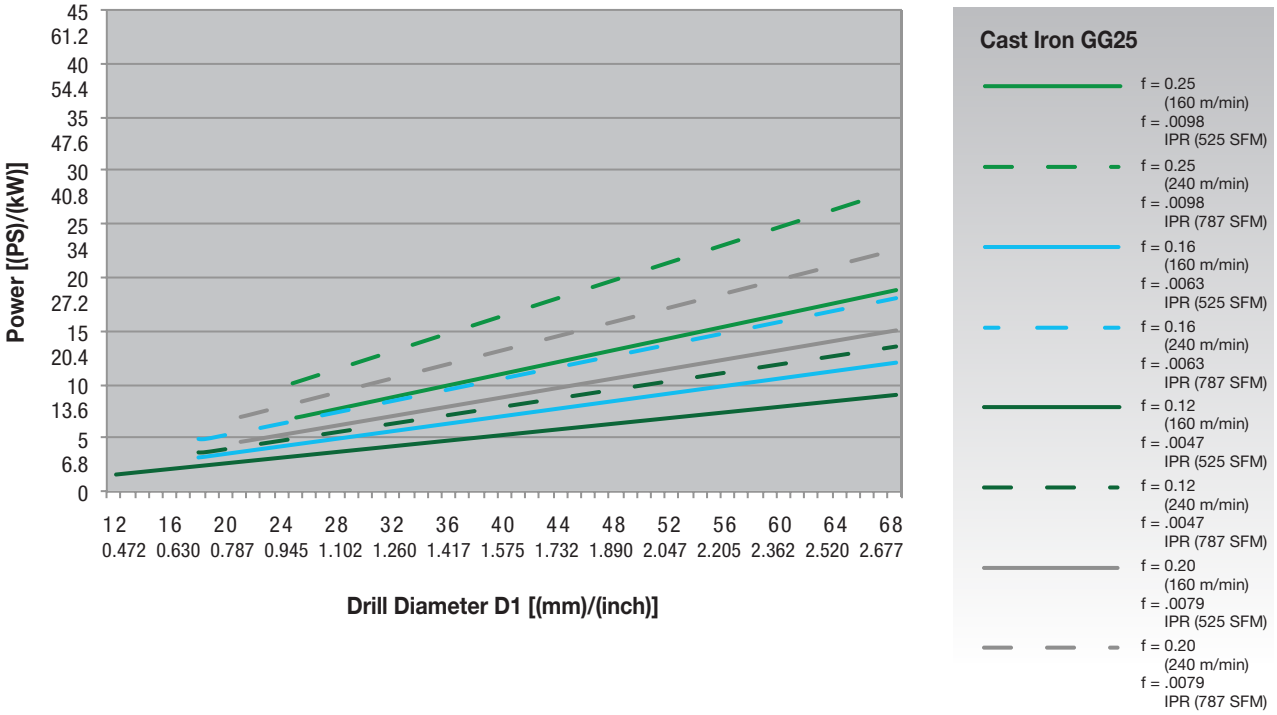
Power Requirement — Steel



Power Requirement — Stainless Steel



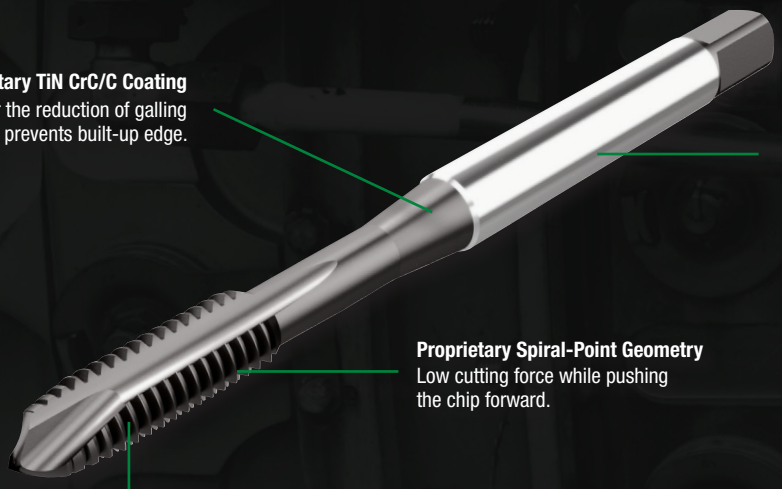
Power Requirement — Cast Iron



VT-AFT

VT-AFT AERO FASTENER TAPS

HIGH-PERFORMANCE TAPS FOR AEROSPACE FASTENERS



Proprietary TiN CrC/C Coating
For the reduction of galling and prevents built-up edge.

High-Vanadium HSS-E
For greater wear resistance in high-temp alloys.

Proprietary Spiral-Point Geometry
Low cutting force while pushing the chip forward.

Precision-Ground Spiral Geometry
Designed to allow tapping of solution-treated A286, 300 series stainless steel, and titanium.

AEROSPACE

HSS-E Aerospace Fastener Taps

High vanadium for higher wear resistance.

Patented geometry for low cutting forces.

Optimized geometry for a specific application.

Increased chamfer length to reduce chip load.

Improved tool life.

Increased process security.

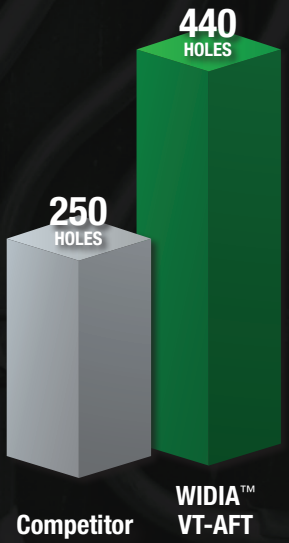
Improved productivity.

Application support.

+76% Increased Number of Holes

Field Test

Application Details	
Tool	VT-AFT
Material	A286
Component	Collar
Operation	Through Hole
Machine	CNC Rigid
Tap Size	10–32 UNF 2B
Toolholder	Rigid
Pre-Hole Diameter	.164"
RPM-WIDIA	900
SFM (Vc m/min)	47 (14)
RPM-Competitor	900
SFM (Vc m/min)	47 (14)
Coolant	External Cutting Oil



Results: Cost Saving $14,682.00 per year

Increased number of holes by 76%

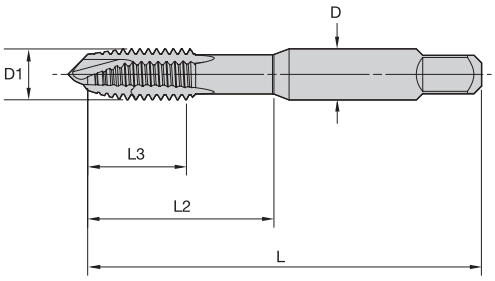
WIDIA™

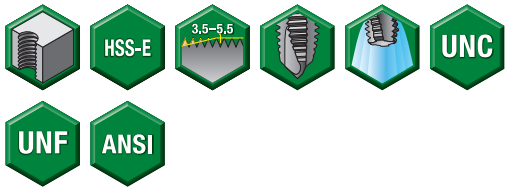
widia.com

VT-AFT

Aerospace Fastener Taps

High-Vanadium Spiral-Point HSS-E Taps • VT-AFT • Inch





● first choice
○ alternate choice

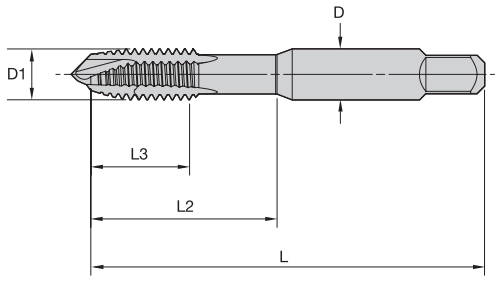
P		
M		●
K		
N		
S		●
H		

WIDIA GTD

catalog number	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit	WN44EG
VTAFT5040	4 - 40	1.88	.51	.69	.141	3	H3	6474960
VTAFT5041	4 - 40	1.88	.51	.69	.141	3	H4	6474971
VTAFT5042	4 - 40	1.88	.51	.69	.141	3	H5	6474972
VTAFT5043	4 - 40	1.88	.51	.69	.141	3	H6	6474973
VTAFT5044	4 - 40	1.88	.51	.69	.141	3	H7	6474974
VTAFT5050	4 - 48	1.88	.51	.69	.141	3	H3	6474975
VTAFT5051	4 - 48	1.88	.51	.69	.141	3	H4	6474976
VTAFT5052	4 - 48	1.88	.51	.69	.141	3	H5	6474977
VTAFT5053	4 - 48	1.88	.51	.69	.141	3	H6	6474978
VTAFT5054	4 - 48	1.88	.51	.69	.141	3	H7	6474979
VTAFT5060	6 - 32	2.03	.38	.71	.141	3	H3	6474980
VTAFT5061	6 - 32	2.03	.38	.71	.141	3	H4	6474981
VTAFT5062	6 - 32	2.03	.38	.71	.141	3	H5	6474982
VTAFT5063	6 - 32	2.03	.38	.71	.141	3	H6	6474983
VTAFT5064	6 - 32	2.03	.38	.71	.141	3	H7	6474984
VTAFT5065	6 - 32	2.03	.38	.71	.141	3	H8	6474985
VTAFT5072	6 - 40	2.02	.38	.71	.141	3	H5	6474986
VTAFT5073	6 - 40	2.02	.38	.71	.141	3	H6	6474987
VTAFT5074	6 - 40	2.02	.38	.71	.141	3	H7	6474988
VTAFT5080	8 - 32	2.16	.38	.76	.168	3	H3	6474989
VTAFT5081	8 - 32	2.12	.38	.76	.168	3	H4	6274214
VTAFT5082	8 - 32	2.12	.38	.76	.168	3	H5	6274215
VTAFT5083	8 - 32	2.12	.38	.76	.168	3	H6	6274216
VTAFT5084	8 - 32	2.16	.38	.76	.168	3	H7	6474990
VTAFT5085	8 - 32	2.16	.38	.76	.168	3	H8	6474991
VTAFT5092	8 - 36	2.16	.38	.76	.168	3	H5	6474992
VTAFT5093	8 - 36	2.16	.38	.76	.168	3	H6	6474993
VTAFT5094	8 - 36	2.16	.38	.76	.168	3	H7	6474994
VTAFT5100	10 - 24	2.42	.50	.91	.194	3	H3	6496033
VTAFT5101	10 - 24	2.42	.50	.91	.194	3	H4	6496034
VTAFT5102	10 - 24	2.42	.50	.91	.194	3	H5	6496035
VTAFT5103	10 - 24	2.42	.50	.91	.194	3	H6	6496036

High-Vanadium Spiral-Point HSS-E Taps • VT-AFT • Inch

(continued)



● first choice
○ alternate choice

P		
M		●
K		
N		
S		●
H		

catalog number	D1 size	L	L3	L2	D	number of flutes	pitch diameter limit	WN44EG
VTAFT5104	10 - 24	2.42	.50	.91	.194	3	H7	**6496037**
VTAFT5109	10 - 32	2.41	.50	.91	.194	3	H3	**6496038**
VTAFT5110	10 - 32	2.36	.50	.91	.194	3	H5	**6087704**
VTAFT5111	10 - 32	2.36	.50	.91	.194	3	H5	**6087705**
VTAFT5112	10 - 32	2.41	.50	.91	.194	3	H6	**6496039**
VTAFT5113	10 - 32	2.41	.50	.91	.194	3	H7	**6496040**
VTAFT5114	10 - 32	2.41	.50	.91	.194	3	H8	**6496081**
VTAFT5130	1/4 - 20	2.50	.63	1.00	.255	3	H3	**6496082**
VTAFT5131	1/4 - 20	2.50	.63	1.00	.255	3	H4	**6496083**
VTAFT5132	1/4 - 20	2.50	.63	1.00	.255	3	H5	**6496084**
VTAFT5133	1/4 - 20	2.50	.63	1.00	.255	3	H6	**6496086**
VTAFT5134	1/4 - 20	2.50	.63	1.00	.255	3	H7	**6496087**
VTAFT5135	1/4 - 20	2.50	.63	1.00	.255	3	H8	**6496088**
VTAFT5140	1/4 - 28	2.49	.62	1.00	.255	3	H3	**6496089**
VTAFT5141	1/4 - 28	2.49	.62	1.00	.255	3	H4	**6496090**
VTAFT5142	1/4 - 28	2.49	.62	1.00	.255	3	H5	**6496091**
VTAFT5143	1/4 - 28	2.49	.62	1.00	.255	3	H6	**6496092**
VTAFT5144	1/4 - 28	2.49	.62	1.00	.255	3	H7	**6496093**
VTAFT5145	1/4 - 28	2.49	.62	1.00	.255	3	H8	**6496095**
VTAFT5146	1/4 - 28	2.49	.62	1.00	.255	3	H9	**6496096**
VTAFT5160	5/16 - 24	2.71	.69	1.12	.318	3	H3	**6496097**
VTAFT5161	5/16 - 24	2.71	.69	1.12	.318	3	H4	**6496098**
VTAFT5162	5/16 - 24	2.71	.69	1.12	.318	3	H5	**6496099**
VTAFT5163	5/16 - 24	2.71	.69	1.12	.318	3	H6	**6496100**
VTAFT5164	5/16 - 24	2.71	.69	1.12	.318	3	H7	**6496111**
VTAFT5165	5/16 - 24	2.71	.69	1.12	.318	3	H8	**6496112**
VTAFT5166	5/16 - 24	2.71	.69	1.12	.318	3	H9	**6496113**
VTAFT5180	3/8 - 24	2.92	.75	1.25	.381	3	H3	**6496114**
VTAFT5181	3/8 - 24	2.92	.75	1.25	.381	3	H4	**6496115**
VTAFT5182	3/8 - 24	2.94	.75	1.27	.381	3	H5	**6445486**
VTAFT5183	3/8 - 24	2.92	.75	1.25	.381	3	H6	**6496116**
VTAFT5184	3/8 - 24	2.94	.75	1.27	.381	3	H7	**6445487**
VTAFT5185	3/8 - 24	2.92	.75	1.25	.381	3	H8	**6496117**
VTAFT5186	3/8 - 24	2.92	.75	1.25	.381	3	H9	**6496118**
VTAFT5222	1/2 - 20	3.38	.94	1.74	.367	3	H5	**6496119**
VTAFT5223	1/2 - 20	3.38	.94	1.74	.367	3	H6	**6496120**
VTAFT5224	1/2 - 20	3.38	.94	1.74	.367	3	H7	**6439284**
VTAFT5225	1/2 - 20	3.38	.94	1.74	.367	3	H8	**6439283**
VTAFT5226	1/2 - 20	3.38	.94	1.74	.367	3	H9	**6496121**

Application Data • VT-AFT • Inch

Material Group				
		Aerospace Fastener Taps VT-AFT		
		Cutting Speed — Vc SFM		
		Range		
		min	Starting Value	max
M	1	30	**40**	50
	2	13	**16**	23
S	1	20	**26**	40
	4	13	**16**	20

One Source, Many Applications

WIDIA™ APPROVED TAP/DRILL COMBINATIONS:

VariDrill™/VariTap™

P M K N S

Versatile:

VariDrill™ drilling tools, in combination with VariTap™ tapping tools, are designed for productivity in an array of different materials. These tools feature strong geometries that are ideal for small-batch and varied production.

TOP DRILL S™/GT Series

P
TDS401
TDS402
TDS403

GT00, 20, 24
Spiral Point
GT30, 32, 50
Spiral Flute
GT23, 24, 25
Forming

M
TDS451
TDS452
TDS453

GT20
GT30

K
TDS411
TDS412
TDS413

GT40
GT41

N
TDS421
TDS422

GT70
GT80
GT22
GT40

S
TDS451
TDS452
TDS453

GT60
GT90
GT62
GT92

Optimized:

TOP DRILL S™ drills, combined with GT Series Taps:

This combination is designed for, but not limited to, material-specific applications with medium to large batch production.

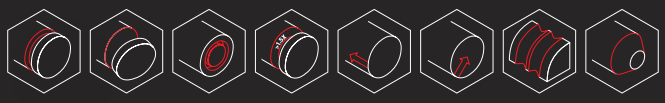
For more than 90 years, WIDIA has defined excellence in innovation, technology, and customer service. As an industry-leading manufacturer of cutting tools, WIDIA offers a complete portfolio of precision-engineered products. With drilling, tapping and tooling systems products, you will find everything you need from one single source.

- Extensive Portfolio
- Expertise
- Customized Solutions

widia.com

WIDIA™

WGC



THE MOST VERSATILE TOOL IN THE MARKET FOR GROOVING, PROFILING, AND CUT-OFF OPERATIONS

4 BENEFITS IN 1

VERSATILE
GROOVING, PROFILING, AND CUT-OFF OPERATIONS

SIMPLE
EASY TO SELECT AND APPLY

STABLE
TRIPLE-V SEATING FOR SECURE CLAMPING

PRODUCTIVE
LOW CUTTING FORCES IN THROUGH COOLANT FOR BETTER CHIP EVACUATION

GENERAL ENGINEERING

ENERGY

TRANSPORTATION

Grooving

First choice for external grooving applications in most workpiece materials.

Through coolant capability and efficient coolant delivery for enhanced productivity.

Available in integral and modular style toolholders.

Groove width: .079–.399".

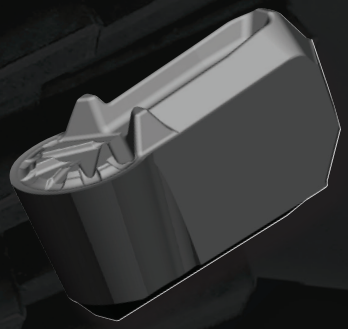
Cut-Off

Specially engineered chipbreakers for effective parting/cut-off and deep grooving.

Positive geometry for lower forces.

Secure seating offers greatest stability.

Groove width: 0.055–0.315".



Profiling

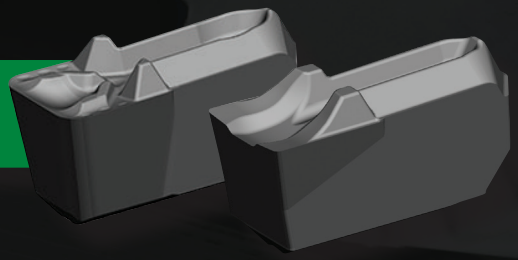
Full radius chipbreaker for multi-directional turning and generating complex profiles.

Rigid design ensures smooth surface finish.

Groove width: .079–.315".

NEW!

New precision ground grooving and cut-off inserts

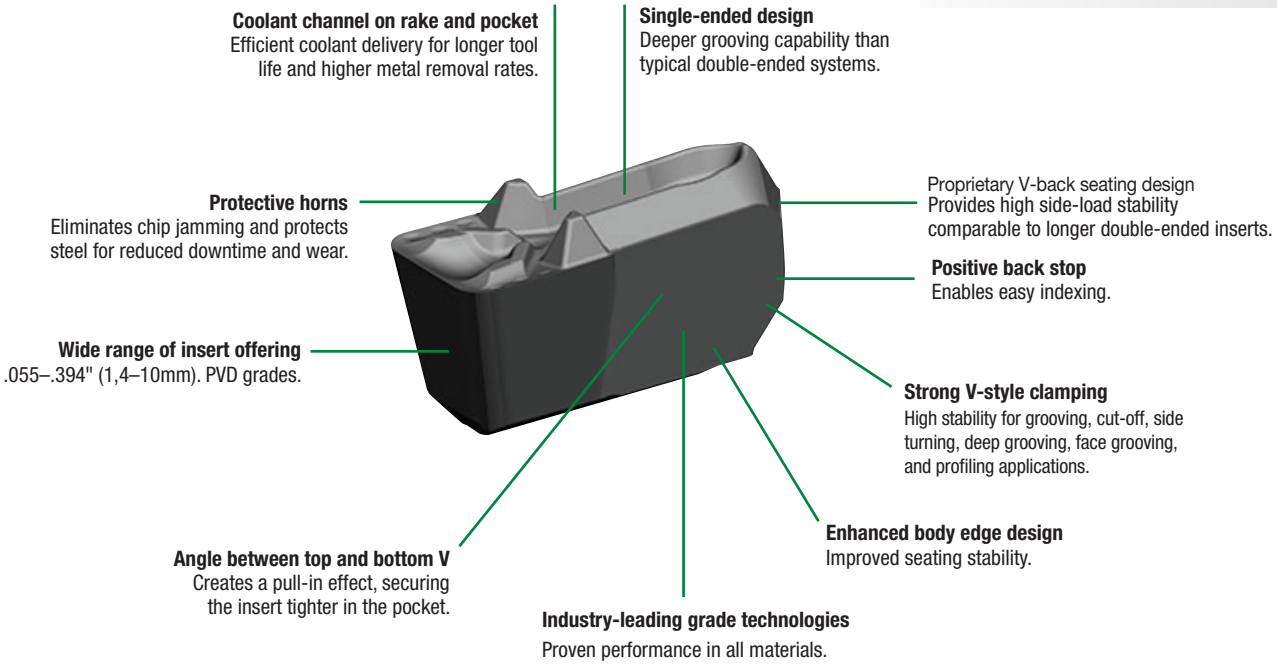


WIDIA™

widia.com

WGC

Proprietary negative chip geometry
Added chip control in steel, cast, stainless, and hardened materials.



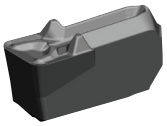
Grooving

Precision Molded and Ground

P M N S

PT-Positive Rake

Precision Molded

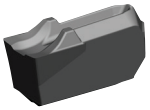


P M K H

PN-Negative Rake

Cut-Off

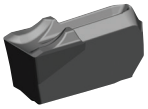
Precision Molded and Ground



P M N S

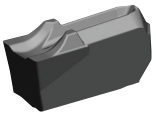
F-Fine

Precision Molded



P K

M-Medium



P M

R-Rough

Profiling

Precision Ground

P M N S

PC-Full Radius

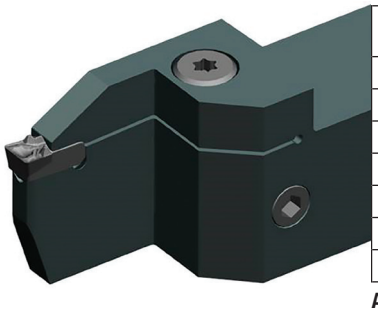
NOTE: Use the NOVO™ software to select appropriate tooholder and insert.

WGC Grooving — Competitive Edge

P Steel – P1

Type of cut: Plain
Coolant: External emulsion

19-224222



Specifications	Competitor	WIDIA WGC
Workpiece Diameter (inches)	3.33	3.33
Geometry & Grade	-	PT WU25PT
Speed (Vc) (sfm)	328	328
Spindle Speed n (RPM)	377	377
Feed (inches/rev)	0.002	0.002
Grooving Depth	0.4	0.4
Tool Life — No. of Components	5	6

Annual Savings 9%

WIDIA™ SHINING MOMENT

New WGC — available to swap out Ranger adjustable face grooving system!

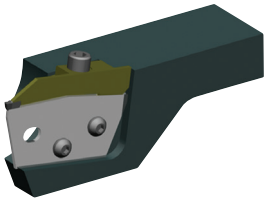
New WGC Ranger™ blades to fit into existing Ranger holders.

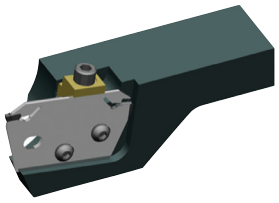
WGC Ranger Blades — Curve In

order number	catalogue number	description
6740388	WGCMRAL0319B317	WGC RANGER BLADE 1/8 W LH CURVE OUT
6740389	WGCMRAL0419B476	WGC RANGER BLADE 3/16 W LH CURVE OUT
6740390	WGCMRAL0619B635	WGC RANGER BLADE 1/4 W LH CURVE OUT
6740411	WGCMRAR0319B317	WGC RANGER BLADE 1/8 W RH CURVE OUT
6740412	WGCMRAR0419B476	WGC RANGER BLADE 3/16 W RH CURVE OUT
6740413	WGCMRAR0619B635	WGC RANGER BLADE 1/4 W RH CURVE OUT

WGC Ranger Blades — Curve Out

order number	catalogue number	description
6740382	WGCMRAL0319A317	WGC RANGER BLADE 1/8 W LH CURVE IN
6740383	WGCMRAL0419A476	WGC RANGER BLADE 3/16 W LH CURVE IN
6740384	WGCMRAL0619A635	WGC RANGER BLADE 1/4 W LH CURVE IN
6740385	WGCMRAR0319A317	WGC RANGER BLADE 1/8 W RH CURVE IN
6740386	WGCMRAR0419A476	WGC RANGER BLADE 3/16 W RH CURVE IN
6740387	WGCMRAR0619A635	WGC RANGER BLADE 1/4 W RH CURVE IN





New WGC Separator™ blades to swap out existing universal blades.

New WGC Separator™ blades to fit into existing Separator holders.

How Do Catalog Numbers Work?

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

WG0312M03U02PT

W	G	0312	M	03	U	02	PT
Family Name	Insert Type	Groove Width	Unit	Seat Size	Tolerance	Corner Radius	Chipbreaker/ Edge Condition
WGC	**G** = Square **R** = Full Radius	**Metric** = 1/100mm **Inch** = 1/1000"	**M** = Metric **I** = Inch		**U** = Precision Molded **P** = Precision Ground		**PT** = Groove-Turn Universal Positive **PN** = Groove-Turn Universal Negative

seat size (SSC)	groove width mm	groove width inch
1B	1,40	.055
1F	1,60–1,99	.063–.078
02	2,00–2,99	.079–.117
03	3,00–3,99	.118–.156
04	4,00–4,99	.157–.196
05	5,00–5,99	.197–.235
06	6,00–7,99	.236–.314
08	8,00–8,99	.315–.353
10	9,00–10,12	.354–.398

**.312" = seat size 08*

mm	
00	full radius
01	0,1
02	0,2
04	0,4
08	0,8
12	1,2

inch	
00	full radius
05	.008
1	.016
2	.032
3	.047

WC030M03N00F02

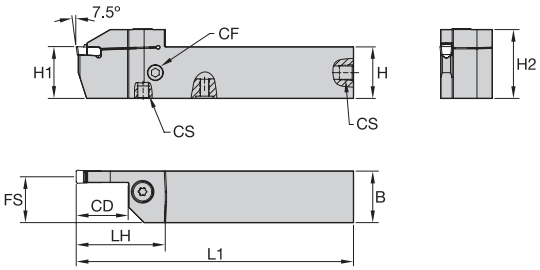
W	C	030	M	03	N	00	F	02
Family Name	Insert Type	Cutting Edge Width	Unit	Seat Size	Hand of Insert	Approach Angle	Chipbreaker	Corner Radius
WGC	**C** = Cut-Off		**M** = Metric **I** = Inch		**N** = Neutral **L** = Left hand **R** = Right hand	**00** = Neutral **06** = 6°	**CL** = Cut-Off Low Feed **CF** = Cut-Off Fine **R** = Cut-Off Rough	

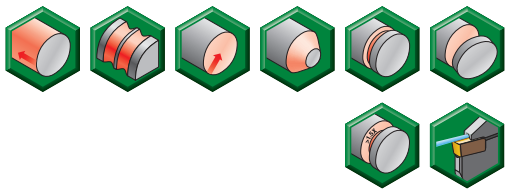
	mm	inch
014	1,4	.055
020	2,0	.079
030	3,0	.118
040	4,0	.157
050	5,0	.197
060	6,0	.236
070	7,0	.279
080	8,0	.315

	mm	inch
1B	1,4	.055
1F	2,0	.079
02	3,0	.118
03	4,0	.157
04	5,0	.197
05	6,0	.236
06	7,0	.279
08	8,0	.315

	mm	inch
01	0,1	.004
02	0,2	.008
04	0,4	.016

Integral Straight • Inch

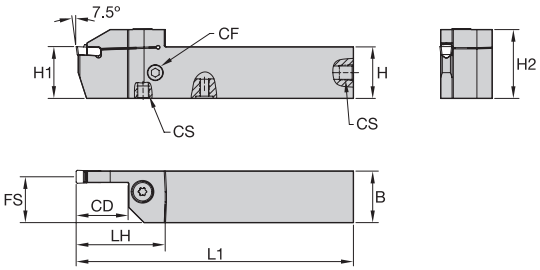


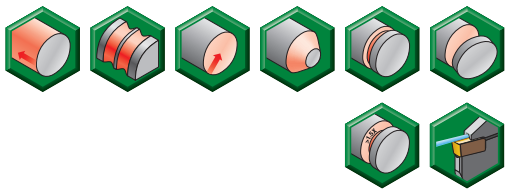


order number	catalog number	SSC	CD	H1	H	B	H2	L1	FS	LH	CF	CS
right hand												
6461884	**WGCSMR120216**	2	.63	.750	.750	.750	1.03	4.50	.71	1.22	–	–
6461885	**WGCSMR160216**	2	.63	1.000	1.000	1.000	1.28	6.00	.96	1.22	–	–
6461886	**WGCSMR120222**	2	.87	.750	.750	.750	1.10	4.50	.71	1.50	–	–
6461887	**WGCSMR160226**	2	1.02	1.000	1.000	1.000	1.35	6.00	.96	1.65	–	–
6461922	**WGCSMR120316C**	3	.63	.750	.750	.750	–	4.50	.69	1.46	M8X1	M8X1
6461923	**WGCSMR160316C**	3	.63	1.000	1.000	1.000	1.35	6.00	.94	1.46	G1/8-28	G1/8-28
6461924	**WGCSMR120322C**	3	.87	.750	.750	.750	1.12	4.50	.69	1.69	M8X1	M8X1
6461925	**WGCSMR160326C**	3	1.02	1.000	1.000	1.000	1.39	6.00	.94	1.85	G1/8-28	G1/8-28
6461926	**WGCSMR120416C**	4	.63	.750	.750	.750	1.10	4.50	.68	1.46	M8X1	M8X1
6461927	**WGCSMR160416C**	4	.63	1.000	1.000	1.000	1.34	6.00	.93	1.46	G 1/8	G 1/8
6461928	**WGCSMR120422C**	4	.87	.750	.750	.750	1.10	4.50	.68	1.69	M8X1	M8X1
6461929	**WGCSMR160426C**	4	1.02	1.000	1.000	1.000	1.38	6.00	.93	1.85	G 1/8	G 1/8
6461930	**WGCSMR200426C**	4	1.02	1.250	1.250	1.250	1.60	6.00	1.18	1.85	G1/8-28	G1/8-28
6461941	**WGCSMR200432C**	4	1.26	1.250	1.250	1.250	1.70	6.00	1.18	2.09	G 1/8	G 1/8
6461942	**WGCSMR160516C**	5	.63	1.000	1.000	1.000	1.40	6.00	.91	1.46	G 1/8	G 1/8
6461943	**WGCSMR160526C**	5	1.02	1.000	1.000	1.000	1.40	6.00	.91	1.85	G 1/8	G 1/8
6461944	**WGCSMR200526C**	5	1.02	1.250	1.250	1.250	1.60	6.00	1.16	1.85	G1/8-28	G1/8-28
6461945	**WGCSMR200532C**	5	1.26	1.250	1.250	1.250	1.70	6.00	1.16	2.09	G 1/8	G 1/8
6461947	**WGCSMR160616C**	6	.63	1.000	1.000	1.000	1.40	6.00	.89	1.46	G 1/8	G 1/8
6461949	**WGCSMR160626C**	6	1.02	1.000	1.000	1.000	1.40	6.00	.89	1.85	G 1/8	G 1/8
6461951	**WGCSMR200626C**	6	1.02	1.250	1.250	1.250	1.60	6.00	1.14	1.85	G1/8-28	G1/8-28
6461953	**WGCSMR200632C**	6	1.26	1.250	1.250	1.250	1.70	6.00	1.14	2.17	G 1/8	G 1/8
6461955	**WGCSMR240640C**	6	1.58	1.500	1.500	1.500	2.00	7.00	1.39	2.48	G 1/8	G 1/8
6461957	**WGCSMR160826C**	8	1.02	1.000	1.000	1.000	1.40	6.00	.86	1.93	G 1/8	G 1/8
6461959	**WGCSMR200826C**	8	1.02	1.250	1.250	1.250	1.70	6.00	1.11	1.93	G1/8-28	G1/8-28
6461961	**WGCSMR200832C**	8	1.26	1.250	1.250	1.250	1.70	6.00	1.11	2.17	G 1/8	G 1/8
6461962	**WGCSMR240840C**	8	1.58	1.500	1.500	1.500	2.00	7.00	1.36	2.48	G 1/8	G 1/8
6461963	**WGCSMR201032C**	10	1.26	1.250	1.250	1.250	1.70	6.00	1.08	2.17	G 1/8	G 1/8
6461964	**WGCSMR241040C**	10	1.58	1.500	1.500	1.500	2.00	7.00	1.33	2.48	G 1/8	G 1/8
left hand												
6461888	**WGCSML120216**	2	.63	.750	.750	.750	–	4.50	.71	1.22	–	–
6461889	**WGCSML160216**	2	.63	1.000	1.000	1.000	1.28	6.00	.96	1.22	–	–
6461890	**WGCSML120222**	2	.87	.750	.750	.750	1.10	4.50	.71	1.50	–	–
6461921	**WGCSML160226**	2	1.02	1.000	1.000	1.000	1.35	6.00	.96	1.65	–	–
6461965	**WGCSML120316C**	3	.63	.750	.750	.750	1.10	4.50	.69	1.46	M8X1	M8X1

Integral Straight • Inch

(continued)

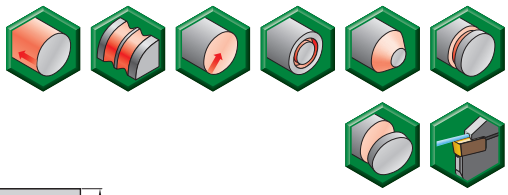


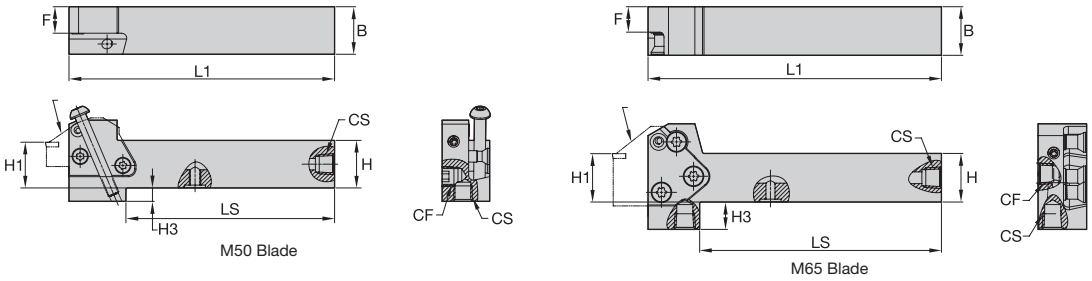


order number	catalog number	SSC	CD	H1	H	B	H2	L1	FS	LH	CF	CS
6461966	WGCSML160316C	3	.63	1.000	1.000	1.000	1.35	6.00	.94	1.46	G 1/8	G 1/8
6461967	WGCSML120322C	3	.87	.750	.750	.750	1.12	4.50	.69	1.69	M8X1	M8X1
6461968	WGCSML160326C	3	1.02	1.000	1.000	1.000	1.39	6.00	.94	1.85	G 1/8	G 1/8
6461969	WGCSML120416C	4	.63	.750	.750	.750	1.10	4.50	.68	1.46	M8X1	M8X1
6461970	WGCSML160416C	4	.63	1.000	1.000	1.000	1.34	6.00	.93	1.46	G1/8-28	G1/8-28
6461971	WGCSML120422C	4	.87	.750	.750	.750	1.10	4.50	.68	1.69	M8X1	M8X1
6461972	WGCSML160426C	4	1.02	1.000	1.000	1.000	1.38	6.00	.93	1.85	G 1/8	G 1/8
6461973	WGCSML200426C	4	1.02	1.250	1.250	1.250	1.60	6.00	1.18	1.85	G 1/8	G 1/8
6461974	WGCSML200432C	4	1.26	1.250	1.250	1.250	1.70	6.00	1.18	2.09	G 1/8	G 1/8
6461975	WGCSML160516C	5	.63	1.000	1.000	1.000	1.40	6.00	.91	1.46	G 1/8	G 1/8
6461976	WGCSML160526C	5	1.02	1.000	1.000	1.000	1.10	6.00	.91	1.85	G 1/8	G 1/8
6461977	WGCSML200526C	5	1.02	1.250	1.250	1.250	1.60	6.00	1.16	1.85	G 1/8	G 1/8
6461978	WGCSML200532C	5	1.26	1.250	1.250	1.250	1.70	6.00	1.16	2.09	G 1/8	G 1/8
6461979	WGCSML160616C	6	.63	1.000	1.000	1.000	1.40	6.00	.89	1.46	G 1/8	G 1/8
6461980	WGCSML160626C	6	1.02	1.000	1.000	1.000	1.40	6.00	.89	1.85	G1/8-28	G1/8-28
6461991	WGCSML200626C	6	1.02	1.250	1.250	1.250	1.60	6.00	1.14	1.85	G1/8-28	G1/8-28
6461992	WGCSML200632C	6	1.26	1.250	1.250	1.250	1.70	6.00	1.14	2.17	G 1/8	G 1/8
6461993	WGCSML240640C	6	1.58	1.500	1.500	1.500	2.00	7.00	1.39	2.48	G 1/8	G 1/8
6461994	WGCSML160826C	8	1.02	1.000	1.000	1.000	1.40	6.00	.86	1.93	G 1/8	G 1/8
6461995	WGCSML200826C	8	1.02	1.250	1.250	1.250	1.70	6.00	1.11	1.93	G 1/8	G 1/8
6461996	WGCSML200832C	8	1.26	1.250	1.250	1.250	1.70	6.00	1.11	2.17	G 1/8	G 1/8
6461997	WGCSML240840C	8	1.58	1.500	1.500	1.500	2.00	7.00	1.36	2.48	G 1/8	G 1/8
6461998	WGCSML201032C	10	1.26	1.250	1.250	1.250	1.70	6.00	1.08	2.17	G 1/8	G 1/8
6461999	WGCSML241040C	10	1.58	1.500	1.500	1.500	2.00	7.00	1.33	2.48	G 1/8	G 1/8

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

WGCMS-C • Inch

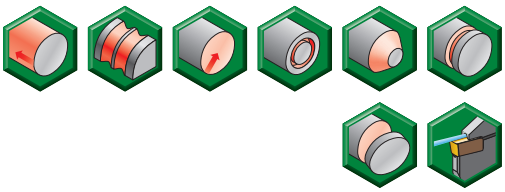


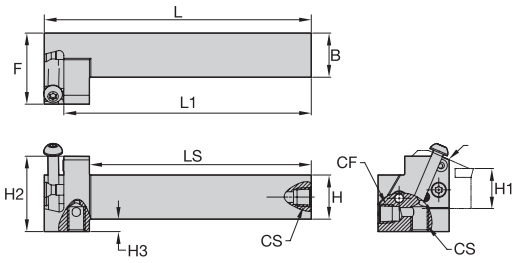


order number	catalog number	H	H1	B	L1	LS	F	CS	CF	H3	blade size
right hand											
6499230	**WGCMSR1650C**	1.00	1.00	1.00	5.5	4.33	.56	G 1/8-28	G 1/8-28	.25	50
6499271	**WGCMSR1665C**	1.00	1.00	1.00	6.0	4.90	.53	G 1/8-28	G 1/8-28	—	65
6499272	**WGCMSR2050C**	1.25	1.25	1.25	5.5	4.52	.81	G 1/8-28	G 1/8-28	—	50
6499273	**WGCMSR2065C**	1.25	1.25	1.25	6.0	4.90	.78	G 1/8-28	G 1/8-28	—	65
6499274	**WGCMSR2450C**	1.50	1.50	1.50	5.5	4.52	1.06	G 1/8-28	G 1/8-28	—	50
6499275	**WGCMSR2465C**	1.50	1.50	1.50	7.0	5.90	1.03	G 1/8-28	G 1/8-28	—	65
left hand											
6499276	**WGCMSL1650C**	1.00	1.00	1.00	5.5	4.33	.56	G 1/8-28	G 1/8-28	.25	50
6499277	**WGCMSL1665C**	1.00	1.00	1.00	6.0	4.90	.53	G 1/8-28	G 1/8-28	—	65
6499278	**WGCMSL2050C**	1.25	1.25	1.25	5.5	4.52	.81	G 1/8-28	G 1/8-28	—	50
6499279	**WGCMSL2065C**	1.25	1.25	1.25	6.0	4.90	.78	G 1/8-28	G 1/8-28	—	65
6499280	**WGCMSL2450C**	1.50	1.50	1.50	5.5	4.52	1.06	G 1/8-28	G 1/8-28	—	50
6499281	**WGCMSL2465C**	1.50	1.50	1.50	7.0	5.90	1.03	G 1/8-28	G 1/8-28	—	65

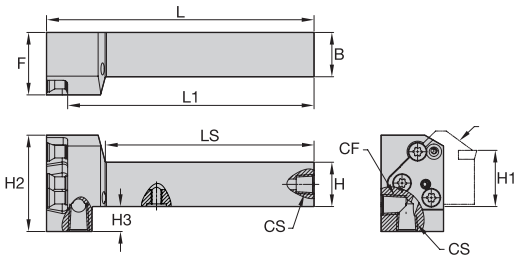
NOTE: WGCMS..: Right-hand holder uses right-hand blades.
WGCME..: Right-hand holder uses left-hand blades.
M50 blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).
M65 blade and clamp screw torque equals 159–177 in. lbs. (18–20 Nm).

WGCME-C • Inch





M50 Blade

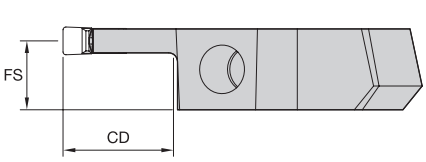


M65 Blade

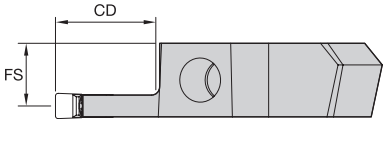
order number	catalog number	B	H	H1	L	L1	LS	F	CS	CF	H2	H3	blade size
right hand													
6498941	**WGCMER1650C**	1.00	1.00	1.00	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.67	.25	50
6498942	**WGCMER1665C**	1.00	1.00	1.00	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.50	65
6498943	**WGCMER2050C**	1.25	1.25	1.25	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.67	—	50
6498944	**WGCMER2065C**	1.25	1.25	1.25	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.25	65
6498945	**WGCMER2450C**	1.50	1.50	1.50	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.92	—	50
6498946	**WGCMER2465C**	1.50	1.50	1.50	7.0	6.5	5.70	1.49	G 1/8-28	G 1/8-28	2.09	—	65
left hand													
6498947	**WGCMEL1650C**	1.00	1.00	1.00	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.67	.25	50
6498948	**WGCMEL1665C**	1.00	1.00	1.00	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.50	65
6498949	**WGCMEL2050C**	1.25	1.25	1.25	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.67	—	50
6498950	**WGCMEL2065C**	1.25	1.25	1.25	6.0	5.5	4.70	1.38	G 1/8-28	G 1/8-28	2.09	.25	65
6498951	**WGCMEL2450C**	1.50	1.50	1.50	6.0	5.5	4.96	1.57	G 1/8-28	G 1/8-28	1.92	—	50
6498952	**WGCMEL2465C**	1.50	1.50	1.50	7.0	6.5	5.70	1.49	G 1/8-28	G 1/8-28	2.09	—	65

NOTE: WGCMS..: Right-hand holder uses right-hand blades.
WGCME..: Right-hand holder uses left-hand blades.
M50 blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).
M65 blade and clamp screw torque equals 159–177 in. lbs. (18–20 Nm).

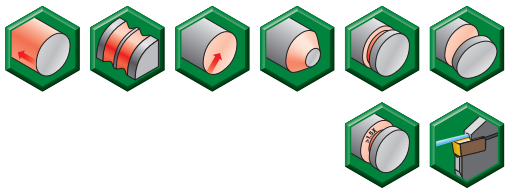
Modular Straight Blade with Coolant

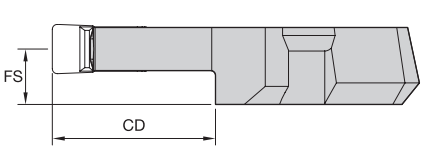


Left Hand

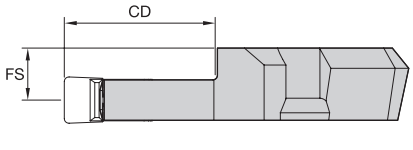


Right Hand





Left Hand

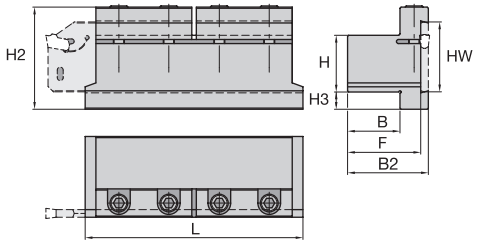


Right Hand

order number	catalog number	SSC	CD	FS	blade size
right hand					
6498457	**WGCM50R1F12M**	1F	12,0	11,00	50
6498458	**WGCM50R0212M**	2	12,0	10,88	50
6498459	**WGCM50R0216M**	2	16,0	10,88	50
6498460	**WGCM50R0312MC**	3	12,0	10,43	50
6498861	**WGCM50R0322MC**	3	22,0	10,43	50
6498862	**WGCM50R0412MC**	4	12,0	9,93	50
6498863	**WGCM50R0422MC**	4	22,0	9,93	50
6498864	**WGCM50R0432MC**	4	32,0	9,93	50
6498865	**WGCM50R0512MC**	5	12,0	9,43	50
6498866	**WGCM50R0516MC**	5	16,0	9,43	50
6498867	**WGCM50R0526MC**	5	26,0	9,43	50
6498868	**WGCM50R0532MC**	5	32,0	9,43	50
6498869	**WGCM65R0616MC**	6	16,0	9,88	65
6498870	**WGCM65R0626MC**	6	26,0	9,88	65
6498881	**WGCM65R0632MC**	6	32,0	9,88	65
6498882	**WGCM65R0816MC**	8	16,0	9,00	65
6498883	**WGCM65R0826MC**	8	26,0	9,00	65
left hand					
6498884	**WGCM50L1F12M**	1F	12,0	11,00	50
6498885	**WGCM50L0212M**	2	12,0	10,88	50
6498886	**WGCM50L0216M**	2	16,0	10,88	50
6498887	**WGCM50L0312MC**	3	12,0	10,43	50
6498888	**WGCM50L0322MC**	3	22,0	10,43	50
6498889	**WGCM50L0412MC**	4	12,0	9,93	50
6498890	**WGCM50L0422MC**	4	22,0	9,93	50
6498891	**WGCM50L0432MC**	4	32,0	9,93	50
6498892	**WGCM50L0512MC**	5	12,0	9,43	50
6498893	**WGCM50L0516MC**	5	16,0	9,43	50
6498894	**WGCM50L0526MC**	5	26,0	9,43	50
6498895	**WGCM50L0532MC**	5	32,0	9,43	50
6498896	**WGCM65L0616MC**	6	16,0	9,88	65
6498897	**WGCM65L0626MC**	6	26,0	9,88	65
6498898	**WGCM65L0632MC**	6	32,0	9,88	65
6498899	**WGCM65L0816MC**	8	16,0	9,00	65
6498900	**WGCM65L0826MC**	8	26,0	9,00	65

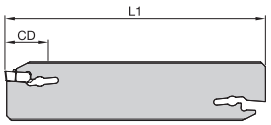
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.
Through the pocket coolant available in seat sizes 3 and higher.

Blade Holders • Inch

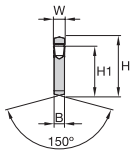


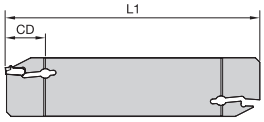
order number	catalog number	HW	H	B	F	H2	B2	H3	L
2968845	**32251221200**	1.024	.750	.750	1.161	1.57	1.34	.32	3.39
2968846	**32251221600**	1.260	1.000	1.000	1.417	1.89	1.63	.30	4.33
2968847	**32251222000**	1.260	1.250	1.250	1.673	1.97	1.89	.13	4.33

Double-Ended Cut-Off Blade

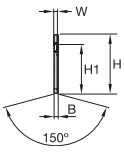


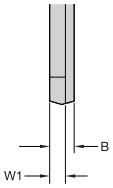
Straight

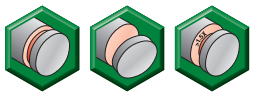




Reinforced







order number	catalog number	SSC	H	W	W1	H1	L1	B	CD
neutral hand									
6498987	**WGCBSN19G1B14**	1B	19	1,4	1,15	15,5	90	1,80	14
6498988	**WGCBSN26J1B15**	1B	26	1,4	1,15	21,5	110	1,80	15
6498989	**WGCBSN19G1F16**	1F	19	1,6	1,30	15,5	90	1,80	16
6498990	**WGCBSN26J1F17**	1F	26	1,6	1,30	21,5	110	1,80	17
6499211	**WGCBSN19G0220**	2	19	2,0	–	15,5	90	1,65	20
6499212	**WGCBSN26J0230**	2	26	2,0	–	21,5	110	1,65	30
6499213	**WGCBSN32M0250**	2	32	2,0	–	25,1	150	1,65	50
6499214	**WGCBSN26J0340**	3	26	3,0	–	21,5	110	2,40	40
6499215	**WGCBSN32M0350**	3	32	3,0	–	25,1	150	2,40	50
6499216	**WGCBSN26J0440**	4	26	4,0	–	21,5	110	3,40	40
6499217	**WGCBSN32M0450**	4	32	4,0	–	25,1	150	3,40	50
6499218	**WGCBSN32M0560**	5	32	5,0	–	25,1	150	4,40	60
6499219	**WGCBSN32M0660**	6	32	6,0	–	25,1	150	5,40	60
6499220	**WGCBSN32M0860**	8	32	8,0	–	25,1	150	7,00	60
6499221	**WGCBSN52X08120**	8	53	8,0	–	45,3	260	7,00	120

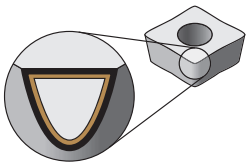
NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the insert.

Grade Recommendation: Ranger™/Separator™ Conversion to WGC

Separator/ Ranger Grade	Coating	Workpiece	WGC Replacement Grade
M40	PVD-TiN	P, M, K, N, S	WU25PT
M43	PVD-TiAlN	P, M, K, N, S	WU25PT
M45	PVD-TiCN	P, M, K, N, S	WU25PT
GC	CVD-81	P	WU25PT
M50	PVD-TiN	P, M	WU25PT
C5PD	PVD-TiN	-	WU25PT
M433B	PVD-TiAlN	M, S	WU35PT
M20, M92	-	-	WU10PT
M93	PVD-TiAlN	P, M, K, N, S	WU10PT
M24	CVD	K	WK20CT*
C2	Ucoated	K, N, S	WU10HT*
C5	Ucoated	P	WU20HT*

** Available only as special.*

Grades and Grade Descriptions



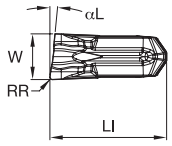
Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

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

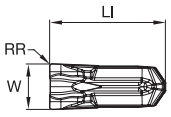
wear resistance ← → toughness

Coating	Grade Description	05	10	15	20	25	30	35	40	45
NEW! WU10PT	**Composition:** An advanced multilayer PVD coating over a very deformation-resistant unalloyed carbide substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. **Application:** The WU10PT™ grade is ideal for finishing to general machining of most workpiece materials at a wide range of speed and feed capabilities. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys with improved edge toughness and higher cutting speed/feed capability.		P	P	P					
			M	M	M					
			K	K	K					
			N	N	N					
			S	S	S					
				H						
WU25PT	**Composition:** An advanced PVD-TiAlN-coated grade with a tough, ultra-fine grain, unalloyed substrate. **Application:** For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.				P	P	P			
					M	M	M			
					K	K	K			
					N	N	N			
					S	S	S			
				H	H					
NEW! WU35PT	**Composition:** A multilayer PVD coated carbide grade with an advanced AlTiN-TiN coating over a super-tough substrate. **Application:** WU35PT is an excellent grade for machining stainless steels, all types of steels, super alloys in turning, and cut-off applications. The substrate provides improved toughness while the coating layers offer excellent abrasion resistance and dependability at a wide range of speeds and feeds. Improved edge toughness provides security in interrupted cuts.						P	P	P	
							M	M	M	
							S	S	S	

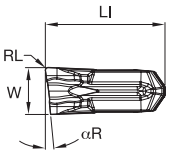
Cut-Off Inserts • F Precision Ground • Inch



Left Hand



Neutral



Right Hand

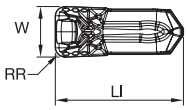
● first choice
○ alternate choice

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

catalog number	SSC	W mm	W in	W tol ± mm	W tol ± in	LI mm	LI in	αR	αL	RR mm	RR in	RL mm	RL in	WU10PT	WU25PT	WU35PT
WC014M1BPR06F00	1B	1,40	.055	0,025	.001	9,00	.355	6	–	–	–	–	–	–	6686392	–
WC014M1BPR12F00	1B	1,40	.055	0,025	.001	9,00	.355	12	–	–	–	–	–	–	6686394	–
WC094I02PL06F00	2	2,39	.094	0,025	.001	8,95	.352	–	6	–	–	–	–	–	6686395	–
WC094I02PL12F00	2	2,39	.094	0,025	.001	8,95	.352	–	12	–	–	–	–	–	6686396	–
WC094I02PN00F00	2	2,39	.094	0,025	.001	8,95	.352	–	–	–	–	–	–	–	6686398	–
WC094I02PR06F00	2	2,39	.094	0,025	.001	8,95	.352	6	–	–	–	–	–	–	6686411	–
WC094I02PR12F00	2	2,39	.094	0,025	.001	8,95	.352	–	12	–	–	–	–	–	6686413	–
WC094I02PL06F0	2	2,39	.094	0,025	.001	9,04	.360	–	6	0,10	.004	0,10	.004	–	–	6686474
WC094I02PN00F0	2	2,39	.094	0,025	.001	9,04	.356	–	–	0,10	.004	0,10	.004	–	6686397	6686475
WC094I02PN00F05	2	2,39	.094	0,025	.001	9,04	.356	–	–	0,20	.008	0,20	.008	6686067	6686399	–
WC094I02PR06F0	2	2,39	.094	0,025	.001	9,04	.356	6	–	0,10	.004	0,10	.004	–	6686400	6686477
WC094I02PR06F05	2	2,39	.094	0,025	.001	9,04	.356	6	–	0,20	.008	0,20	.008	6686082	6686412	–
WC025M02PR06F01	2	2,50	.098	0,025	.001	9,04	.356	6	6	0,15	.006	0,15	.006	–	–	6686472
WC030M03PN00F02	3	3,00	.118	0,075	.003	9,63	.379	–	–	0,20	.008	0,20	.008	–	–	6686473
WC125I03PL06F00	3	3,18	.125	0,025	.001	9,48	.373	–	6	–	–	–	–	–	6686414	–
WC125I03PL12F00	3	3,18	.125	0,025	.001	9,48	.373	–	12	–	–	–	–	–	6686416	–
WC125I03PN00F00	3	3,18	.125	0,025	.001	9,48	.373	–	–	–	–	–	–	6686086	6686418	–
WC125I03PR06F00	3	3,18	.125	0,025	.001	9,48	.373	6	–	–	–	–	–	6686089	6686421	–
WC125I03PL06F0	3	3,18	.125	0,025	.001	9,63	.379	–	6	0,10	.004	0,10	.004	–	–	6686478
WC125I03PL06F05	3	3,18	.125	0,025	.001	9,63	.379	–	6	0,20	.008	0,20	.008	–	6686415	–
WC125I03PN00F0	3	3,18	.125	0,025	.001	9,63	.379	–	–	0,10	.004	0,10	.004	6686083	6686417	6686479
WC125I03PN00F05	3	3,18	.125	0,025	.001	9,63	.379	–	–	0,20	.008	0,20	.008	6686087	6686419	–
WC125I03PR06F0	3	3,18	.125	0,025	.001	9,63	.379	6	–	0,10	.004	0,10	.004	6686088	6686420	6686480
WC125I03PR06F05	3	3,18	.125	0,025	.001	9,63	.379	6	–	0,20	.008	0,20	.008	6686090	6686422	–
WC125I03PR12F00	3	3,18	.125	0,025	.001	9,75	.373	12	–	–	–	–	–	–	6686423	–
WC040M04PR06F00	4	4,00	.158	0,025	.001	10,01	.394	6	–	–	–	–	–	–	6686430	–
WC040M04PR12F00	4	4,00	.158	0,025	.001	10,01	.394	12	–	–	–	–	–	–	6686431	–
WC188I04PR12F00	4	4,75	.187	0,025	.001	10,01	.394	12	–	–	–	–	–	–	6686429	–
WC188I04PR06F00	4	4,76	.188	0,025	.001	10,01	.394	6	–	–	–	–	–	6686102	6686427	–
WC188I04PL06F00	4	4,76	.188	0,025	.001	10,02	.395	–	6	–	–	–	–	–	6686424	–
WC188I04PN00F00	4	4,76	.188	0,025	.001	10,02	.395	–	–	–	–	–	–	–	6686425	–
WC188I04PN00F05	4	4,76	.188	0,025	.001	10,16	.400	–	–	0,20	.008	0,20	.008	6686101	6686426	–
WC188I04PR06F05	4	4,76	.188	0,025	.001	10,17	.400	6	–	0,20	.008	0,20	.008	–	6686428	–

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Grooving Inserts • PT Precision Molded • Inch



● first choice
○ alternate choice

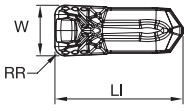
P	●
M	●
K	○
N	○
S	●
H	

		W		W tol ±		RR		LI		
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	WU25PT
WG130I03U1PT	3	3,30	.130	0,075	.003	0,40	.016	9,60	.378	6470487
WG130I03U05PT	3	3,30	.130	0,075	.003	0,20	.008	9,60	.378	6470486
WG192I04U1PT	4	4,88	.192	0,075	.003	0,40	.016	10,19	.401	6470488
WG192I04U2PT	4	4,88	.192	0,075	.003	0,78	.031	10,19	.401	6470489
WG255I06U1PT	6	6,48	.255	0,075	.003	0,40	.016	14,58	.574	6470490
WG255I06U2PT	6	6,48	.255	0,075	.003	0,80	.031	14,58	.574	6470541
WG317I08U3PT	8	8,05	.317	0,075	.003	1,19	.047	17,46	.687	6470542
WG380I10U3PT	10	9,65	.380	0,075	.003	1,19	.047	20,75	.817	6470543

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Grooving Inserts • PT Precision Ground • Inch

NEW!



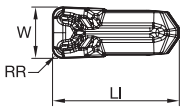
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	●
H	

		W		W tol ±		RR		LI		
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	WU25PT
WG125I03P05PT	3	3,18	.125	0,075	.003	0,20	.008	9,55	.376	6686432
WG188I04P08PT	4	4,76	.188	0,025	.001	0,32	.013	10,14	.399	6686433
WG250I06P08PT	6	6,35	.250	0,075	.001	0,32	.013	14,53	.572	6686434

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Grooving Inserts • PN Precision Molded • Inch



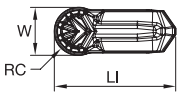
● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	●
H	

		W		W tol ±		RR		LI		
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	WU25PT
WG125I03U1PN	3	3,18	.125	0,075	.003	0,40	.016	9,60	.378	6470834
WG125I03U05PN	3	3,18	.125	0,075	.003	0,20	.008	9,60	.378	6470833
WG130I03U1PN	3	3,30	.130	0,075	.003	0,40	.016	9,60	.378	6470836
WG130I03U05PN	3	3,30	.130	0,075	.003	0,20	.008	9,60	.378	6470835
WG187I04U1PN	4	4,75	.187	0,075	.003	0,40	.016	10,19	.401	6470837
WG187I04U2PN	4	4,75	.187	0,075	.003	0,80	.032	10,20	.401	6470838
WG192I04U1PN	4	4,88	.192	0,075	.003	0,40	.016	10,20	.401	6470839
WG192I04U2PN	4	4,88	.192	0,075	.003	0,80	.031	10,20	.401	6470840
WG250I06U1PN	6	6,35	.250	0,075	.003	0,40	.016	14,58	.574	6470841
WG250I06U2PN	6	6,35	.250	0,075	.003	0,80	.032	14,58	.574	6470842
WG255I06U1PN	6	6,48	.255	0,075	.003	0,40	.016	14,58	.574	6470843
WG255I06U2PN	6	6,48	.255	0,075	.003	0,80	.031	14,58	.574	6470844
WG312I08U3PN	8	7,93	.312	0,075	.003	1,20	.047	17,46	.687	6470845
WG317I08U3PN	8	8,05	.317	0,075	.003	1,19	.047	17,46	.687	6470846
WG375I10U3PN	10	9,53	.375	0,075	.003	1,20	.047	20,75	.817	6470847
WG380I10U3PN	10	9,65	.380	0,075	.003	1,20	.047	20,70	.815	6470848

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

Grooving Inserts • PC Full Radius Precision Ground • Inch



● first choice
○ alternate choice

P	●
M	●
K	○
N	○
S	●
H	

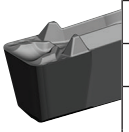
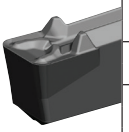
		W		W tol ±		RC		LI		
catalog number	SSC	mm	in	mm	in	mm	in	mm	in	WU25PT
WR125I03P00PC	3	3,18	.125	0,025	.001	1,59	.062	9,54	.376	6470263
WR187I04P00PC	4	4,76	.188	0,025	.001	2,38	.094	10,13	.399	6470264
WR250I06P00PC	6	6,35	.250	0,025	.001	3,18	.125	14,54	.572	6470265
WR312I08P00PC	8	7,92	.312	0,025	.001	3,96	.156	17,40	.685	6470266

NOTE: SSC = Pocket Seat Reference. To correspond with the SSC on the toolholder.

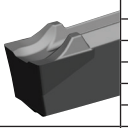
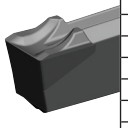
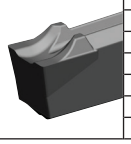
Plunge feed rates

● first choice
○ alternate choice

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

Chip Control	Description	Insert Geometry	Seat Size (SSC)	Corner Radius in (mm)	Starting Conditions in (mm)	Plunge Feed Rates inch/rev (mm/rev) .0020 (0,05)	.0040 (0,10)	.0060 (0,15)	.0080 (0,20)	.0100 (0,25)	.0120 (0,30)	.0140 (0,35)
-PT	Positive rake angle for lower cutting forces.		1F	.008 (0,2)	.0024 (0,06)	◇						
			2	.008 (0,2)	.0031 (0,08)	◇						
			3	.008 (0,2)	.0035 (0,09)	◇						
				.016 (0,4)	.0043 (0,11)		◇					
			4	.016 (0,4)	.0047 (0,12)		◇					
				.031 (0,8)	.0059 (0,15)			◇				
			5	.016 (0,4)	.0059 (0,15)			◇				
				.031 (0,8)	.0059 (0,16)			◇				
			6	.016 (0,4)	.0059 (0,15)			◇				
				.031 (0,8)	.0071 (0,18)			◇				
				.047 (1,2)	.0079 (0,20)				◇			
			8	.031 (0,8)	.0079 (0,20)				◇			
				.047 (1,2)	.0087 (0,22)					◇		
●●■●●○			10	.047 (1,2)	.0094 (0,24)					◇		
-PN	Stable negative cutting edge allowing for more aggressive applications.		1F	.008 (0,2)	.0024 (0,06)	◇						
			2	.008 (0,2)	.0031 (0,08)	◇						
			3	.008 (0,2)	.0035 (0,09)	◇						
				.016 (0,4)	.0043 (0,11)		◇					
			4	.016 (0,4)	.0047 (0,12)		◇					
				.031 (0,8)	.0059 (0,15)			◇				
			5	.016 (0,4)	.0059 (0,15)			◇				
				.031 (0,8)	.0059 (0,16)			◇				
			6	.016 (0,4)	.0059 (0,15)			◇				
				.031 (0,8)	.0071 (0,18)			◇				
				.047 (1,2)	.0079 (0,20)				◇			
			8	.031 (0,8)	.0079 (0,20)				◇			
				.047 (1,2)	.0087 (0,22)					◇		
●○■■■○			10	.047 (1,2)	.0094 (0,24)					◇		

Cut-Off Feed Rates

Geometry	Description	Insert Geometry	Seat Size (SSC)	Starting Conditions in (mm)	Cut-Off Feed Rates inch/rev (mm/rev) .0020 (0,05)	.0040 (0,10)	.0060 (0,15)	.0080 (0,20)	.0100 (0,25)	.0120 (0,30)	.0140 (0,35)	.0160 (0,40)
-F	Positive geometry for reduced cutting forces.		1B	.0024 (0,06)	◇							
			2	.0028 (0,07)	◇							
			3	.0035 (0,09)		◇						
			4	.0043 (0,11)			◇					
			5	.0051 (0,13)				◇				
●●■●●○												
-M	Stable cutting edge for aggressive feed rates. Primarily in cast iron.		1B	.0024 (0,06)	◇							
			2	.0028 (0,07)	◇							
			3	.0035 (0,09)		◇						
			4	.0043 (0,11)			◇					
			5	.0055 (0,14)				◇				
			6	.0063 (0,16)				◇				
			8	.0067 (0,17)					◇			
○■■■■○												
-R	Most stable cutting edge for steel.		2	.0039 (0,10)		◇						
			3	.0055 (0,14)			◇					
			4	.0063 (0,16)			◇					
			5	.0075 (0,19)				◇				
			6	.0083 (0,21)					◇			
			8	.0090 (0,23)						◇		
●○■■■○												

NOTE: For cut-off inserts with a lead angle, maximum feed rate should be reduced by up to 40%.

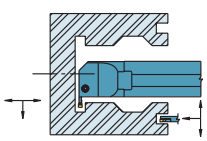
Maximum Feed Rate Values

Data above is for P and K material groups. **Maximum** feed rates should be adjusted by multiplying max feed rate values by following factors for shown material groups.

Material Group	Feed Factor
M	0.8
N	1.2
S	0.8
H	0.5

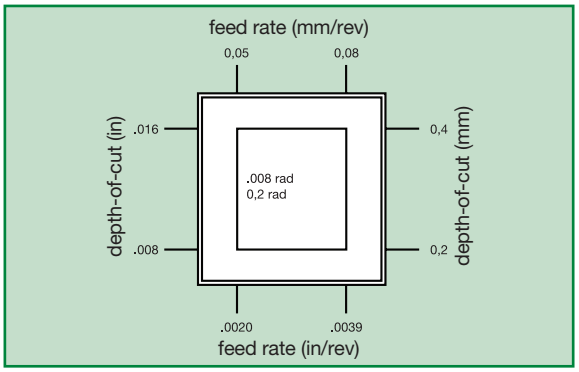
I.D. and Face Grooving

For I.D. and face grooving applications, reduce feed rate by 20%.

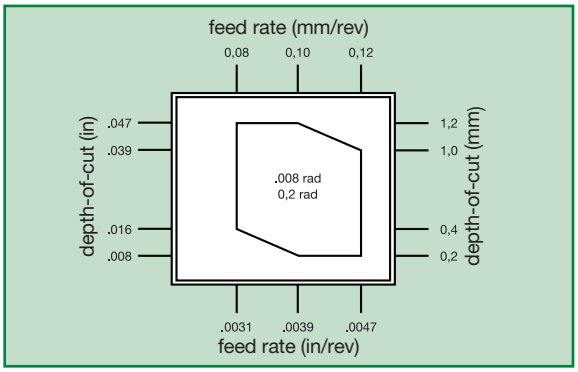


Turn and profile feed rates

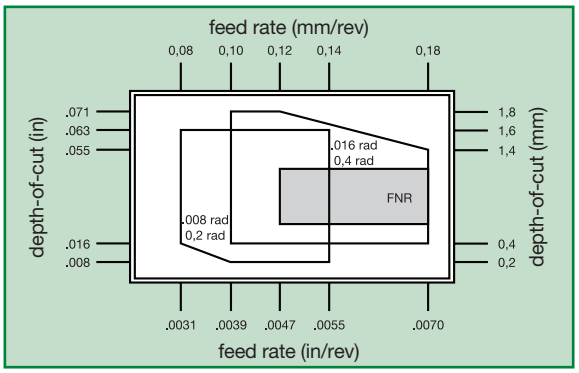
Seat Size 1F



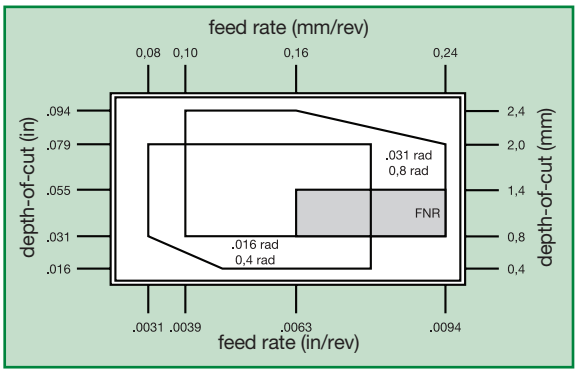
Seat Size 2



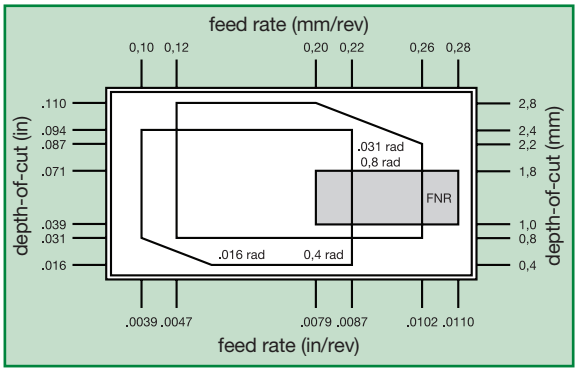
Seat Size 3



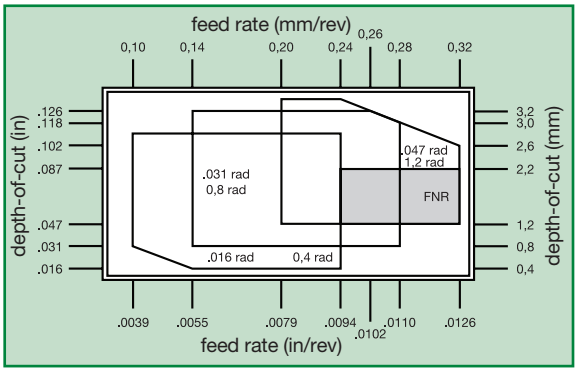
Seat Size 4



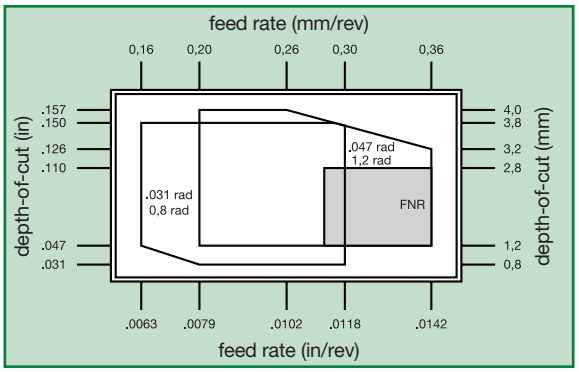
Seat Size 5



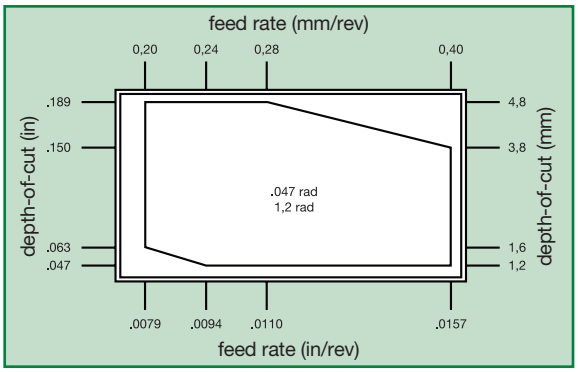
Seat Size 6



Seat Size 8



Seat Size 10



** FNR = Full Nose Radius*

Recommended Starting Speeds [SFM]

Material Group		WU10PT			WU25PT			WU35PT		
P	0-1	450	**450**	450	360	**740**	880	290	**590**	700
	2	450	**450**	450	360	**520**	880	290	**420**	510
	3	450	**450**	450	360	**410**	800	290	**330**	510
	4	250	**250**	250	200	**290**	540	160	**230**	350
	5	400	**400**	400	320	**530**	680	260	**420**	540
	6	350	**350**	350	280	**400**	600	220	**320**	480
M	1	450	**450**	450	300	**550**	800	250	**400**	450
	2	400	**400**	400	300	**500**	800	250	**350**	450
	3	400	**400**	400	300	**450**	700	250	**300**	450
K	1	400	**400**	400	320	**480**	760	–	**–**	–
	2	300	**300**	300	240	**400**	560	–	**–**	–
	3	200	**200**	200	160	**280**	400	–	**–**	–
N	1–2	500	**500**	500	400	**1440**	2560	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–
	4	400	**400**	400	320	**960**	1600	–	**–**	–
	5	300	**300**	300	240	**440**	640	–	**–**	–
	6	400	**400**	400	320	**560**	800	–	**–**	–
S	1	50	**50**	50	25	**125**	200	25	**125**	200
	2	50	**50**	50	25	**100**	250	25	**100**	200
	3	50	**50**	50	50	**125**	250	50	**125**	200
	4	50	**50**	50	25	**175**	350	50	**150**	300
H	1	100	**100**	100	–	**–**	–	–	**–**	–
	2	50	**50**	50	–	**–**	–	–	**–**	–
	3	–	**–**	–	–	**–**	–	–	**–**	–

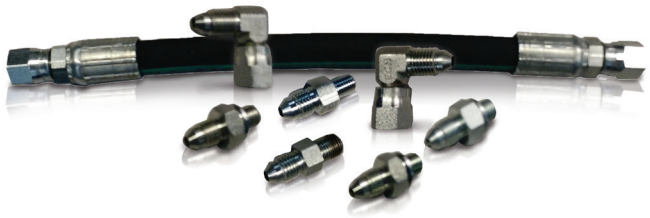
*NOTE: FIRST choice starting speeds are in **bold** type.*
As the average chip thickness increases, the speed should be decreased.

Coolant Kit

Kit Description	Order Number	Shank Size	Coolant Pressure	1/16 NPTF MALE TO JIC MALE	1/8 NPTF MALE TO JIC MALE	M8 X 1.25 MALE TO JIC MALE	M8 X 1.0 MALE TO JIC MALE	G1/8 MALE TO JIC MALE	M10 MALE TO JIC MALE	MALE JIC TO FEMALE JIC ELBOW	HEAVY DUTY 200MM COOLANT HOSE	HEAVY DUTY 300MM COOLANT HOSE	UNIV 200MM FLEX COOLANT HOSE	UNIV 300MM FLEX COOLANT HOSE	M8X1.0 BANJO 200MM FLEX HOSE	G1/8 BANJO 200MM FLEX HOSE	M8X1.0 BANJO 300MM FLEX HOSE	G1/8 BANJO 300MM FLEX HOSE
			Component Order Number	6145374	6145375	6145378	6475041	6145376	6145377	6145379	6145380	6145381	6432549	6432550	6475043	6475045	6475047	6475049
																		
Universal 200mm flex hose coolant kit	**6475019**	12–40mm 1/2–1-1/2"	200 Bar 2,901 psi		•	•	•	•	•	•			•					
Universal 300mm flex hose coolant kit	**6475021**	12–40mm 1/2–1-1/2"	200 Bar 2,901 psi	•	•	•	•	•	•	•				•				
M8x1.0 banjo 200mm flex hose coolant kit	**6475023**	12–20mm 1/2–3/4"	200 Bar 2,901 psi					•	•	•					•			
M8x1.0 banjo 300mm flex hose coolant kit	**6475025**	12–20mm 1/2–3/4"	200 Bar 2,901 psi					•	•	•							•	
G 1/8 banjo 200mm flex hose coolant kit	**6475027**	25–40mm 1–1-1/2"	200 Bar 2,901 psi					•	•	•						•		
G 1/8 banjo 300mm flex hose coolant kit	**6475029**	25–40mm 1–1-1/2"	200 Bar 2,901 psi					•	•	•								•
Universal 200mm heavy-duty coolant kit	**6145372**	25–40mm 1–1-1/2"	350 Bar* 5,076 psi*	•	•			•	•	•	•							
Universal 300mm heavy-duty coolant kit	**6145373**	25–40mm 1–1-1/2"	350 Bar* 5,076 psi*	•	•			•	•	•		•						

** Max pressure for seat size 02 holders is 200 bar/2901 psi.*

Individual Kit Component List



order number	catalog number	description
6145374	1-16NPTF-JIC	Straight fitting, 1/16 NPTF male thread to JIC male thread
6145375	1-8NPTF-JIC	Straight fitting, 1/8 NPTF male thread to JIC male thread
6145378	M8X1.25-JIC	Straight fitting, M8 x 1.25 male thread to JIC male thread
6475041	M8X1-JIC	Straight fitting, M8 x 1.0 male thread to JIC male thread
6145376	G18-JIC	Straight fitting, G 1/8 male thread to JIC male thread
6145377	M10X1.5-JIC	Straight fitting, M10 x 1.5 male thread to JIC male thread
6145379	JICM-JICF-ELB	Elbow fitting, male JIC thread to female JIC thread
6145380	COOL-HOSE-200-HD	Heavy Duty 200mm Coolant hose with JIC female fitting both ends
6145381	COOL-HOSE-300-HD	Heavy Duty 300mm Coolant hose with JIC female fitting both ends
6432549	COOL-HOSE-200-FLEX	Flexible braided 200mm Coolant hose with JIC female fitting both ends
6432550	COOL-HOSE-300-FLEX	Flexible braided 300mm Coolant hose with JIC female fitting both ends
6475043	M8X1-BAN-JIC-HOSE-200	Flexible braided 200mm Coolant hose, M8 x 1.0 male thread to JIC female thread. Contains (1) M8x1.0 banjo bolt and (2) M8 bonded washers
6475045	G18-BAN-JIC-HOSE-200	Flexible braided 200mm Coolant hose, G 1/8 male thread to JIC female thread. Contains (1) G 1/8 banjo bolt and (2) G 1/8 bonded washers
6475047	M8X1-BAN-JIC-HOSE-300	Flexible braided 300mm Coolant hose, M8 x 1.0 male thread to JIC female thread. Contains (1) M8x1.0 banjo bolt and (2) M8 bonded washers
6475049	G18-BAN-JIC-HOSE-300	Flexible braided 300mm Coolant hose, G 1/8 male thread to JIC female thread. Contains (1) G 1/8 banjo bolt and (2) G 1/8 bonded washers

Coolant Accessories

The items shown below are not part of any coolant kits shown on previous pages.

order number	catalog number	description
6145382	M6X1-JIC	Straight fitting, M6 x 1.0 male thread to JIC male thread
6145383	JICM-JICM-STR	Straight fitting, JIC male thread to JIC male thread
6145386	G14-G18-RED	Straight fitting, G 1/4 male thread to G 1/8th male thread
6475058	R18-JIC	Straight fitting, 1/8 BSPT male thread to JIC male thread
6475059	R14-JIC	Straight fitting, 1/4 BSPT male thread to JIC male thread

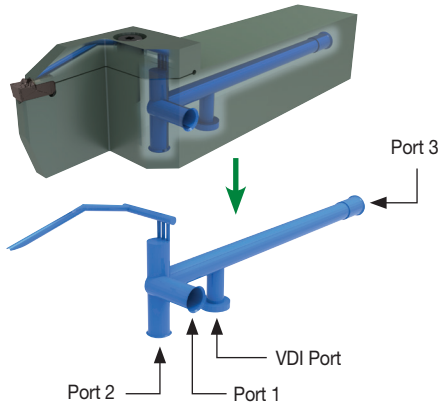
Coolant Spare Parts

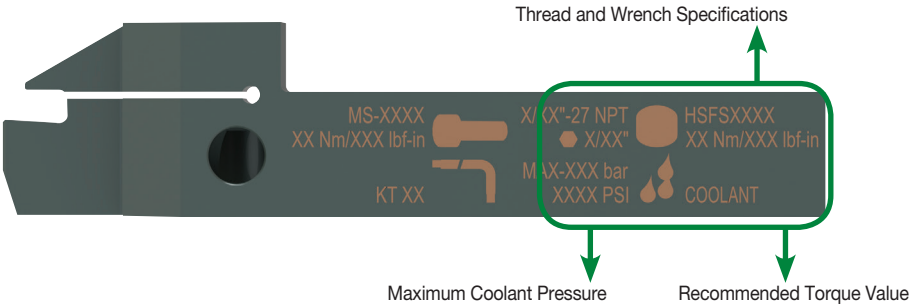
Included in kits; part of components.

order number	catalog number	description
6475051	M8X1-BAN-BOLT	Banjo bolt, M8 x 1.0 male thread
6475053	G18-BAN-BOLT	Banjo bolt, G1/8 male thread
6475060	M6-BON-WASHER	M6 bonded washer
6475055	M8-BON-WASHER	M8 bonded washer
6475061	M10-BON-WASHER	M10 bonded washer
6475056	G18-BON-WASHER	G 1/8 bonded washer

Internal Coolant Delivery Guidelines

1. WGC system capable of 5076 psi (350 bar).
2. Toolholder delivered with four entry holes.
3. A quality filtration system is necessary to prevent blockages in the toolholder that will affect coolant flow and performance.
4. Machines without a proper filtering system may require modification or an inline filter.
    - For pressure >1015 psi [70 bar], use 10–20 µm filter.
    - For pressure <1015 psi [70 bar], 50–100 µm.
    - Using fine filters in low-pressure applications may affect flow rate.





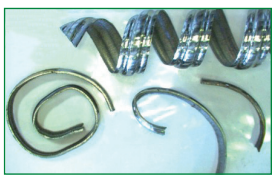
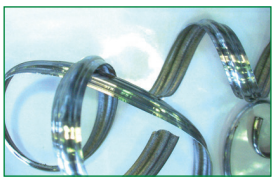
General Safety Guidelines

1. All safety doors and mechanisms must be in place before trying out the internal coolant to avoid any danger to the operator in the event of a failure.
2. Use the correct pipe fittings to connect the holders to the system. Ensure the maximum pressure recommended for the fittings are not exceeded.
3. While implementing pressure >1160 psi [80 bar], increase the pressure in steps to ensure proper functioning of insert clamping and leak-free joints.
4. While indexing inserts, ensure the pocket is free from chips and/or dirt. Also, inspect the insert and make sure there are no blockages in the coolant canal.
5. Periodically check all hoses and fittings for damage and wear for proper functioning of the system. This check should also include filters.

Internal Coolant Delivery Performance

Internal coolant offers a clear advantage in tool life and chip forming/evacuation vs. external coolant in difficult conditions and in high-pressure coolant.

Example: Chipbreaking in plunging of steel.

Flood Coolant	Internal Coolant	
		
Material steel ST52; Insert size 6mm; f = 0,25 mm/U	1,087 psi (75 bar)	2,900 psi (200 bar)

Low Pressure — If performance is at risk due to low coolant pressure, apply internal coolant in combination with external coolant to increase volume.

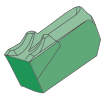
Recommendation to improve tool life and/or productivity: Apply high pressure coolant: 80–350 bar recommended.

VDI Assemblies

The WGC internal coolant delivery can be leveraged with VDI holding systems with both traditional or Quick-Change coolant connections.

WGC – QUICK FACTS

INSERTS

APPLICATION	TYPES	GROOVE WIDTH	INSERT GEOMETRY	MATERIALS
Grooving		2.0mm–10.13mm .079–0.399"	PT-Positive Rake	P M K N S
			PN-Negative Rake	P M K S
Cut-Off		1.4mm–8.0mm 0.055-0.315"	F-Fine	P M K N S
			M-Medium	P M K S
			R-Rough	P M K S
Profiling		2.0mm–8.0mm 0.079-0.315"	PC-Full Radius	P M K N S

APPLICATIONS

TURNING
PROFILING
FACING
CHAMFERING
GROOVING
CUT-OFF
DEEP GROOVING
THROUGH COOLANT

GEOMETRY

4 BENEFITS IN 1

Versatility

Single-sided, versatile grooving and cut-off solution with smooth surface finish

Productivity

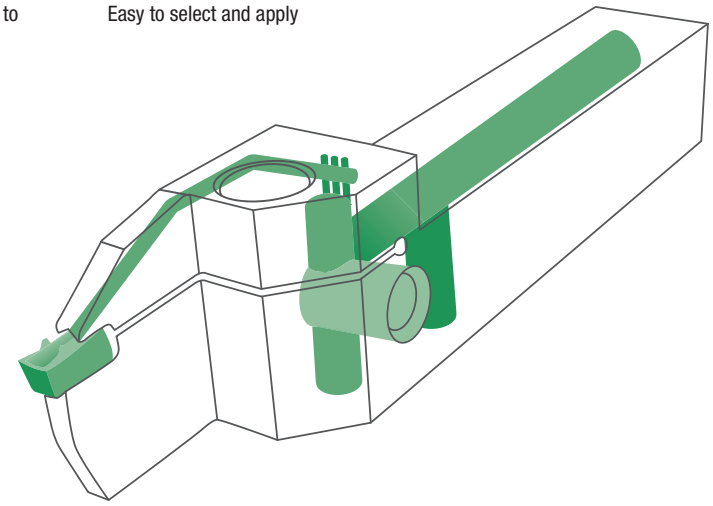
Through coolant capability with precise delivery for low cutting forces and better chip evacuation

Stability

In challenging applications due to V-shaped edges

Simplicity

Easy to select and apply



INDUSTRY

TRANSPORTATION
AEROSPACE
GENERAL ENGINEERING

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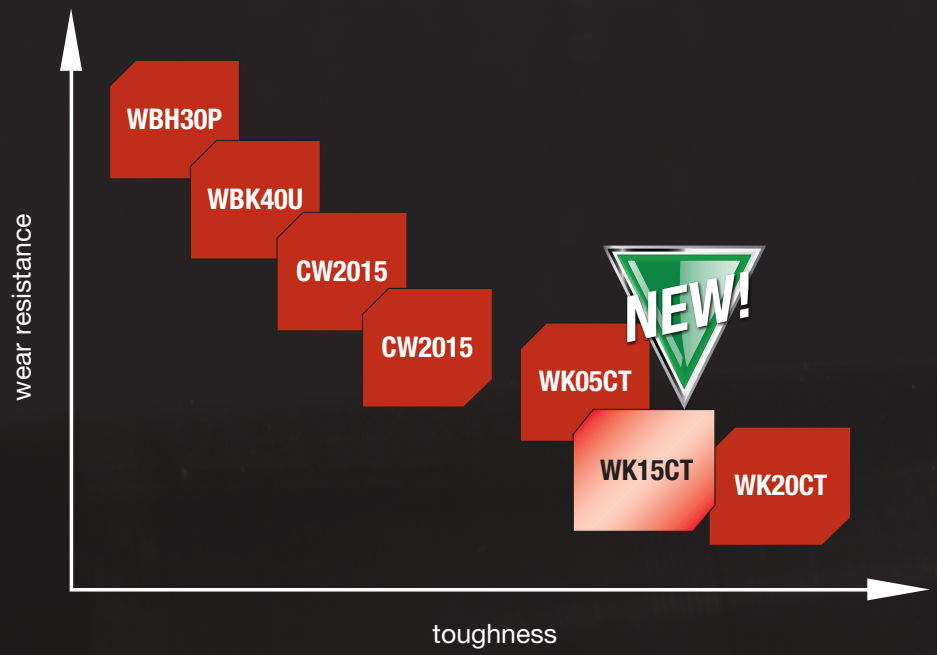
WIDIA™

WK15CT

NEW VICTORY™ GRADE FOR CAST IRON TURNING



GENERAL ENGINEERING

TRANSPORTATION

NEW! Coating

NEW: Substrate and Victory™ coating

Multilayer CVD coating of TiCN and Al_2O_3 with pre and post -coat treatment providing improved edge toughness and long predictable tool life at elevated cutting speeds.

NEW! Machining Capabilities

Developed to perform in roughing, semi-finishing, and finishing in all types of gray cast iron.

Also suitable for: Different types of nodular iron

WK15CT in cast iron turning not only helps in cost reduction, but also cycle time reduction through improved cutting parameters and better productivity.

WIDIA™

widia.com

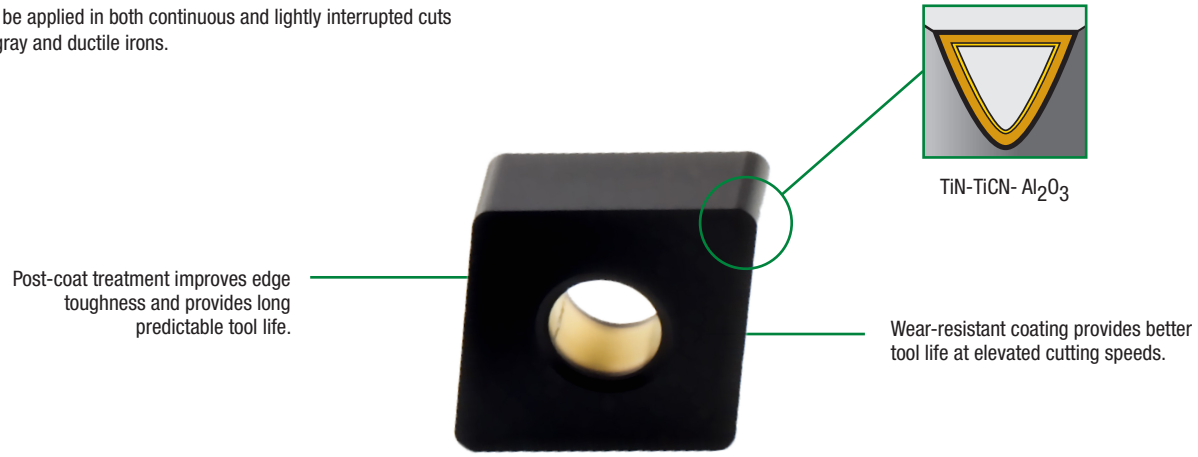
WK15CT

High-Performance Inserts • WIDIA™ Victory™

WK15CT provides consistent performance at high cutting speeds and feeds in machining gray cast iron and ductile irons in roughing to finishing applications.

Features:

- Improved productivity and reduced cycle times.
- Post-coat grinding provides secure seating surface.
- A multi-layer CVD coated grade with TiN-TiCN-Al_2O_3 over a wear-resistant substrate specially developed to give consistent performance and superior tool life while machining cast irons.
- The wear-resistant substrate resists deformation while machining at elevated cutting speeds.
- The thick CVD coating with post-coat treatment provides long and consistent tool life.
- Can be applied in both continuous and lightly interrupted cuts for gray and ductile irons.

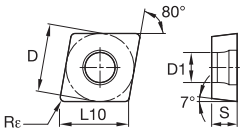


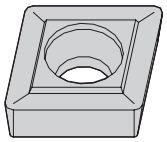
WK15CT replaces the old grades TN5120, HK150. Available in most popular geometries in both negative and positive ISO insert styles.

Negative style inserts	Geometry
CNMA	MA
CNMG	STD, -5, -RH
WNMA	MA
WNMG	STD, -5, -RH
TNMA	MA
TNMG	STD, -RH
SNMA	MA
SNMG	STD
DNMG	STD, -RH

Positive style inserts	Geometry
CCMT	STD, MP
DCMT	STD
SCMT	MP
TCMT	MP
VBMT	STD
VCMT	STD

CCMT





● first choice
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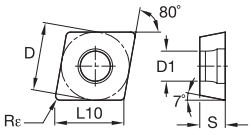
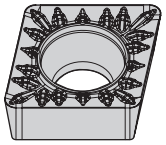
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CCMT060204	**CCMT2151**	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	**6671876**
CCMT090304	**CCMT321**	9,53	3/8	9,67	.381	3,18	1/8	0,4	.016	4,40	.173	**6671877**
CCMT09T304	**CCMT3251**	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	**6613610**
CCMT09T308	**CCMT3252**	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	**6613604**

CCMT-MP





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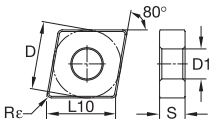
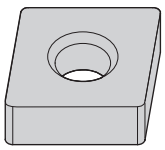
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CCMT120408MP	**CCMT432MP**	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,50	.217	**6730909**
CCMT120412MP	**CCMT433MP**	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,50	.217	**6730910**

CNMA





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ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CNMA120408	**CNMA432**	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	**6287922**
CNMA120412	**CNMA433**	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	**6287923**

WK15CT

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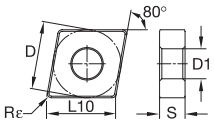
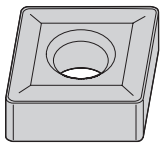
CNMG





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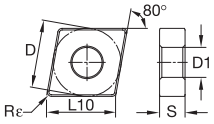
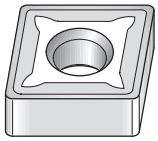
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CNMG120404	CNMG431	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,16	.203	6613606

CNMG-5





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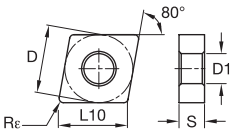
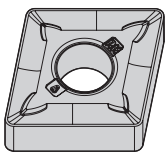
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CNMG120408-5	CNMG4325	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	6287924
CNMG120412-5	CNMG4335	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	6287925

CNMG-RH





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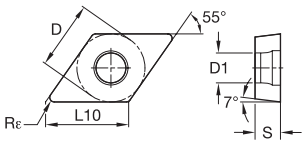
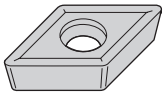
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
CNMG120408RH	CNMG432RH	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	6288264
CNMG120412RH	CNMG433RH	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	6288265

DCMT





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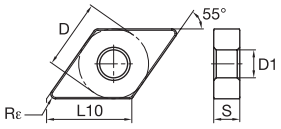
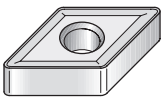
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
DCMT11T308	**DCMT3252**	9,53	3/8	11,63	.458	3,97	5/32	0,8	.031	4,45	.175	**6671913**

DNMG





● first choice
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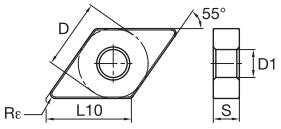
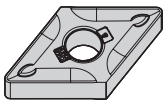
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
DNMG150608	**DNMG442**	12,70	1/2	15,50	.610	6,35	1/4	0,8	.031	5,16	.203	**6671912**

DNMG-RH





● first choice
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ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
DNMG150608RH	**DNMG442RH**	12,70	1/2	15,50	.610	6,35	1/4	0,8	.031	5,16	.203	**6730880**
DNMG150612RH	**DNMG443RH**	12,70	1/2	15,50	.610	6,35	1/4	1,2	.047	5,16	.203	**6730901**

WK15CT

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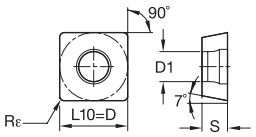
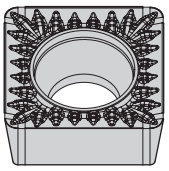
SCMT-MP





● first choice
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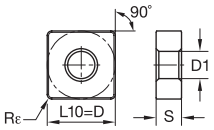
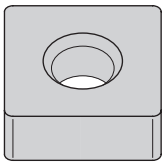
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
SCMT09T304MP	SCMT3251MP	9,53	3/8	9,53	.375	3,97	5/32	0,4	.016	4,40	.173	6730906
SCMT09T308MP	SCMT3252MP	9,53	3/8	9,53	.375	3,97	5/32	0,8	.031	4,40	.173	6730907
SCMT120408MP	SCMT432MP	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,50	.217	6730908

SNMA





● first choice
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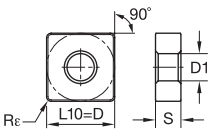
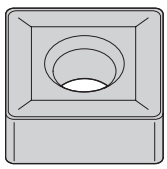
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
SNMA120408	SNMA432	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	6287926
SNMA120412	SNMA433	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	5,16	.203	6287927

SNMG





● first choice
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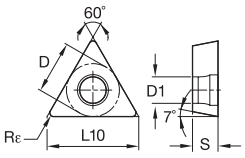
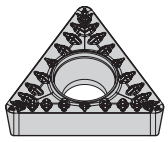
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
SNMG120408	SNMG432	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	6613608

TCMT-MP





● first choice
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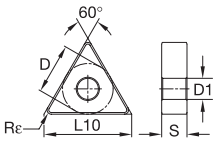
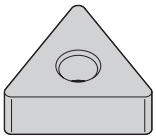
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
TCMT110208MP	**TCMT2152MP**	6,35	1/4	11,00	.433	2,38	3/32	0,8	.031	2,80	.110	**6730905**
TCMT16T308MP	**TCMT3252MP**	9,53	3/8	16,50	.650	3,97	5/32	0,8	.031	4,40	.173	**6730904**

TNMA





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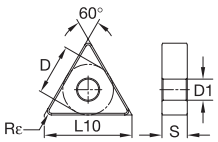
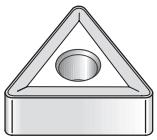
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
TNMA160408	**TNMA332**	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	**6287930**
TNMA160412	**TNMA333**	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	3,81	.150	**6287951**

TNMG





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ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
TNMG160404	**TNMG331**	9,53	3/8	16,50	.650	4,76	3/16	0,4	.016	3,81	.150	**6671911**
TNMG160408	**TNMG332**	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	**6617524**
TNMG160412	**TNMG333**	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	3,81	.150	**6671880**

WK15CT

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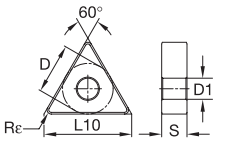
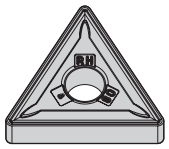
TNMG-RH





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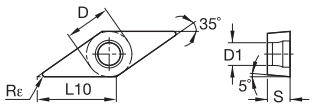
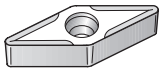
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
TNMG160408RH	TNMG332RH	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	6673946

VBMT





● first choice
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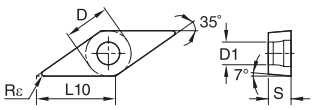
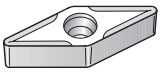
ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
VBMT160408	VBMT332	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	4,40	.173	6671879

VCMT





● first choice
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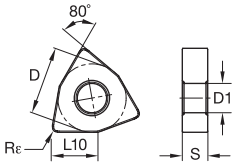
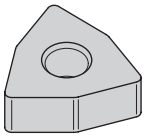
H		

ISO catalog number	ANSI catalog number	D mm	D in	L10 mm	L10 in	S mm	S in	Rε mm	Rε in	D1 mm	D1 in	WK15CT
VCMT16T308	VCMT3252	9,53	3/8	16,61	.654	3,97	5/32	0,8	.032	4,40	.180	6672411

WNMA





● first choice
○ alternate choice

P	○
M	
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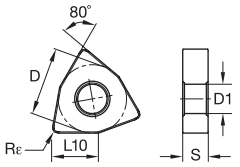
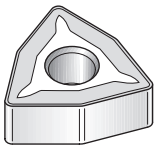
H	

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
WNMA080408	**WNMA432**	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	**6288267**
WNMA080412	**WNMA433**	12,70	1/2	8,69	.342	4,76	3/16	1,2	.047	5,16	.203	**6288268**

WNMG-5





● first choice
○ alternate choice

P	○
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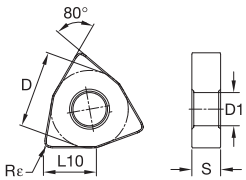
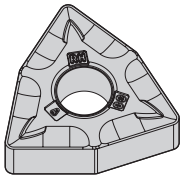
H	

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
WNMG080408-5	**WNMG4325**	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	**6613603**

WNMG-RH





● first choice
○ alternate choice

P	○
M	
K	●
N	
S	
H	

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WK15CT
		mm	in	mm	in	mm	in	mm	in	mm	in	
WNMG060408RH	**WNMG332RH**	9,53	3/8	6,52	.257	4,76	3/16	0,8	.031	3,81	.150	**6673948**
WNMG080408RH	**WNMG432RH**	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	**6290495**
WNMG080412RH	**WNMG433RH**	12,70	1/2	8,69	.342	4,76	3/16	1,2	.047	5,16	.203	**6288269**

WIDIA™ Tools for Railway Wheel Machining

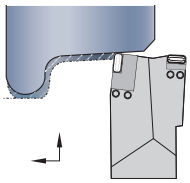
WIDIA offers toolholders and indexable inserts for all types of wheel lathes being used in the Industry.

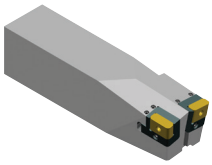
- The tooling for wheelset reprofiling/reconditioning has been developed in close cooperation with machine tool builders and railway workshops.
- The wheel profile wears during usage and also due to skidding, mismatched wheels, etc.
- Different chipbreaker profile and grades are available to machine the wheels with different wear condition.
- The upended design of inserts enhances the insert strength and the chipbreakers are designed to provide optimum performance with efficient chipbreaking while machining the profile.
- The toolholders adopt the robust lever clamping system.

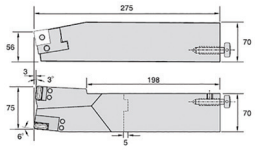
WIDIA tooling solutions for heavy-duty turning have a proven history of success in these extremely demanding applications around the world. Customers looking for maximum material removal and improved productivity can rely on WIDIA to provide the right tool, inserts, and grades for their workpiece, machine tool, and applications.

WIDIA™

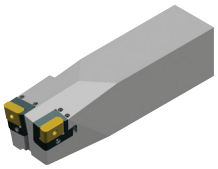
Railway Holders

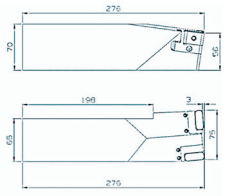






Right Hand Toolholder
69 391 458 10

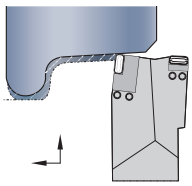


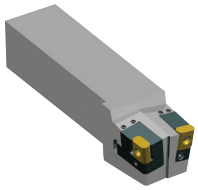


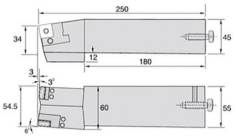
Left Hand Toolholder
69 391 458 21

catalog number	description	insert	turning cassette	facing cassette	retaining screw	allen key 1	locking screw	allen key 2	adjusting screw
Right Hand									
69 391 458 20	LS compound tool holder (LH)	LNUX 30 19 40	69 393 186 20	69 393 220 20	73 085 863	73 398 965	73 398 589	73 398 931	73 398 577
Left Hand									
69 391 458 20	LS compound tool holder (LH)	LNUX 30 19 40	69 393 186 20	69 393 220 20	73 085 863	73 398 965	73 398 589	73 398 931	73 398 577

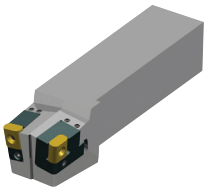
**Additional sizes available as specials.*

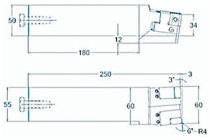






Right Hand Toolholder
69 391 431 10





Left Hand Toolholder
69 391 431 20

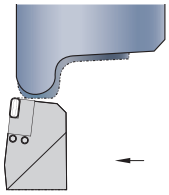
catalog number	description	insert	turning cassette	facing cassette	retaining screw	allen key 1	locking screw	allen key 2	adjusting screw
Right Hand									
69 391 431 10	LS compound tool holder (RH)	LNUX 30 19 40	69 393 186 10	-	73 085 863	73 398 965	-	-	73 398 577
Left Hand									
69 391 431 20	LS compound tool holder (LH)	LNUX 30 19 40	69 393 186 20	-	73 085 863	73 398 965	-	-	73 398 577

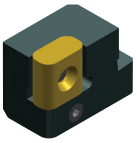
**Additional sizes available as specials.*

Tooling for Heavy-Duty Applications

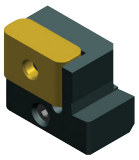
Railway Tooling

Railway Cassettes for Toolholders: Turning





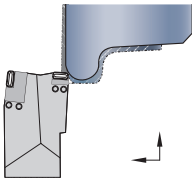
Turning Cassette
69 393 187 10

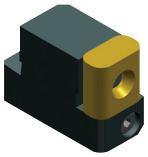


Turning Cassette
69 393 186 10

catalogue number	description	insert	lever	clamp	allen screw
Right Hand					
69 393 186 10	Turning Cassette (RH)	LNUX 30 19 40	214 85 667	214 85 627	73 398 965
69 393 187 10	Turning Cassette (RH)	LNUX 19 19 40	214 85 667	214 85 627	73 398 965
Left Hand					
69 393 186 20	Turning Cassette (LH)	LNUX 19 19 40	214 85 667	214 85 627	73 398 965
69 393 188 20	Turning Cassette (LH)	LNUX 30 19 40	214 85 667	214 85 627	73 398 965

**Additional sizes available as specials.*





Facing Cassette
69 393 189 20

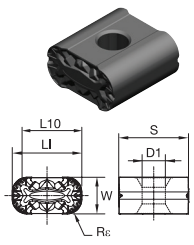
Railway Cassettes for Toolholders: Facing

catalogue number	description	insert	lever	clamp	allen screw
Right Hand					
69 393 190 10	Facing Cassette (RH)	LNUX 30 19 40	214 85 667	214 85 627	73 398 965
69 393 220 10	Facing Cassette (RH)	LNUX 19 19 40	214 85 667	214 85 627	73 398 965
Left Hand					
69 393 189 20	Facing Cassette (LH)	LNUX 19 19 40	214 85 667	214 85 627	73 398 965
69 393 221 20	Facing Cassette (LH)	LNUX 30 19 40	214 85 667	214 85 627	73 398 965

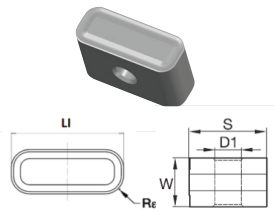
**Additional sizes available as specials.*

**Spare parts are the same for both facing and turning cassettes.*

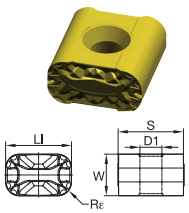
Inserts



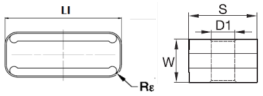
LNUX191940RRP



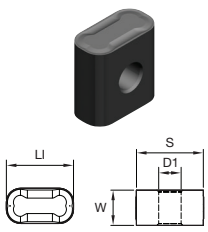
LNUX191940-16,
LNUX301940-16



LNUX191940-13,
LNUX301940-13



LNUX191940T,
LNUX301940T



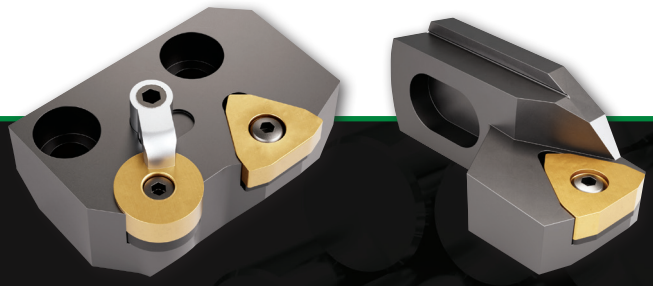
LNUX191940DB

catalog number	w/t	LI	S	R	D1
LNUX191940-13	.394	.750	3/4'	5/32'	.25
LNUX191940-16	.394	.750	3/4'	5/32'	.25
LNUX191940DB	.394	.750	3/4'	5/32'	.25
LNUX191940RRP	.394	.750	3/4'	5/32'	.25
LNUX191940T	.394	.750	3/4'	5/32'	.25
LNUX301940-13	.472	1.181	3/4'	5/32'	.25
LNUX301940-16	.472	1.181	3/4'	5/32'	.25
LNUX301940T	.472	1.181	3/4'	5/32'	.25

WIDIA™ Tools for Bar Peeling Applications

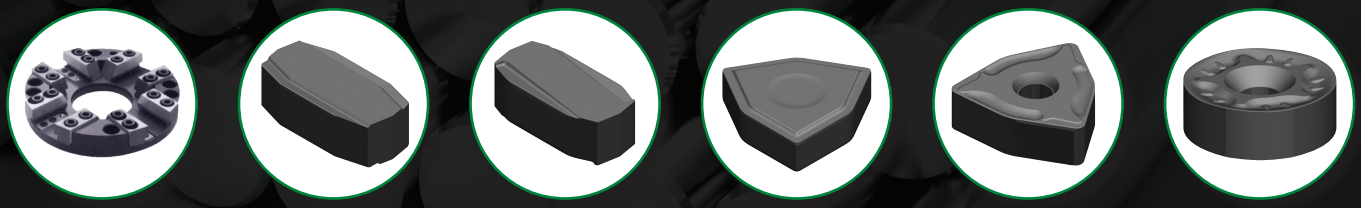
Bar peeling is a unique and economical machining operation for the production of cylindrical surfaces on blank bars (e.g., round bars, wires, blocks, and pipes) with high surface finishes and dimensional accuracies.

During the bar peeling process, scales, cracks, and sand inclusion are removed. Bar peeling is faster than conventional turning. Used when high volumes, high quality, and high productivity with good surface finish are required.



New bar peeling machines demand high performance from cutting tools. WIDIA offers a wide variety of inserts in different grades for cost-effective bar peeling operations in different types of steels, stainless steels, etc. WIDIA also offers toolholders and cartridges for bar peeling as a custom solution.

- Ideal in high feed rate applications, WIDIA bar peeling tools enable economical machining operations for the production of cylindrical surfaces on bright bars.
- High surface finishes, dimensional accuracy, and most efficient removal of scales, cracks, sand enclosures, and other errors.



Application Range of WIDIA™ Bar Peeling Tools

Bar peeling machines require a high level of utilization and demand high performance from the cutting tools. WIDIA offers specially developed WIDIA tools with indexable inserts for bar peeling, which are capable of meeting these demands, making manufacturing more cost-efficient.

WIDIA Victory™ CVD Coated Grades

WP15CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good balance of wear resistance and toughness properties. High productivity machining on smooth to lightly interrupted cuts. For steels.

WP25CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good toughness properties. Excellent first choice for steel machining, high productivity metal removal for all but the harshest interrupted cuts.

WP35CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Proven on all roughing and heavy roughing operations, wet or dry, on interrupted and uninterrupted cuts.

WM25CT

Coated carbide. MT-CVD/CVD — TiN-TiCN-Al_2O_3-ZrCN. Good balance of wear resistance and toughness properties. Light and medium machining. For austenitic stainless steel AISI series.

For more information on heavy-duty tooling, contact your local sales representative.

Informational Icons Guide

Indexable Milling Icons

 Counterboring	 Spiral Circular	 Face Milling	 Helical Milling	 Plunge Milling
 Ramping	 Slotting: Square End	 Side Milling/ Shoulder Milling: Square End	 3D Profiling: Inclined Square End Mill	 Pocketing
 Weldon® Shank	 Shell Mill	 Through Coolant		

Solid End Milling Icons

 Ramping: Blank	 Slotting: Square End	 Slotting: Square End with AP Dimension	 Side Milling/ Shoulder Milling: Square End	 Side Milling/ Shoulder Milling: Square End with AE/AP Dimension
 3D Profiling	 3D Profiling: 3D Profiling with AE/AP Dimensions	 Trochoidal Milling	 Corner Style: Corner Radius	 Corner Style: Square End
 Corner Style: Torus	 Cylindrical/Plain Shank	 Helix Angle: 20°	 Helix Angle: 45°	 Tool Dimensions: Flute Configuration: X (Variable)
 Tool Dimensions: Flute Configuration: 6				

Holemaking Icons

 Drilling	 Drilling: Inclined Entry	 Drilling: Inclined Exit	 Drilling: X-Offset	 Drilling: Stacked Plates
 Drilling: Convex	 Drilling: Blind	 Chain Drilling	 Drilling: Cross Hole	 Drilling: Half Cylinder
 Drilling: Corner Drilling 45°	Drilling Depth: 1x	Drilling Depth: 3x	Drilling Depth: 5x	Drilling Depth: 8x
Drilling Depth: 12x	Flat Shank	Shank: Cylindrical Plain	Through Coolant: Radial: Drilling	Through Coolant: Radial: Indexable Drilling
Tool Dimensions: 2-Flute/2-Margin/ Coolant				

Informational Icons Guide

Turning Icons

 Turning	 Profiling	 Facing	 Face Grooving	 Chamfering
 Grooving	 Cut-off	 Deep Grooving	 Through Coolant: Grooving	

Tapping Icons

 Threading: Through Hole	 HSS-E: High-Speed Steel with Cobalt Alloy for Materials with Higher Hardness	 Chamfer Form B (3.5–5.5)	 Multipurpose Taps: Spiral Point	 Unified Fine Thread
 Unified Course Thread	 ANSI	 Flood Coolant: Tapping		

DIN — German Institute for Standardization
ISO — International Standardization Organization

Customer Application Support (CAS)

Get fast and reliable answers to your toughest metalcutting problems.

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

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

Easy access to proven metalworking expertise!

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

Service Level Excellence:

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

Services Provided:

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

Best-in-Class Support Tools and Technology:

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

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

*Noted phone and fax numbers are not toll free.

Material Overview • ANSI

ANSI

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

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	A36, 1008, 1010, 1018 through 1029; 1108, 1117
P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	10L18, 1200 Series, 1213, 12L14
P2	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572
P3	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P4	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
P5	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
M1	Austenitic Stainless Steel	–	<600	130–200	–	200 Series, 301, 302, 304, 304L, 309
M2	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21
M3	Duplex Stainless Steel	–	<800	135–275	<30	323, 329, F55, 2205, S329000
K1	Gray Cast Iron	–	125–500	120–290	<32	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000
K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	60-40-18, 65-45-12, 80-55-06, SAE J434:D4018, D4512, D5506, ASTM A47: Grade 32510, 35018, SAE J158: Grade M3210, M4504, M5003, M5503, M7002, ASTMA842: Grade 250, 300, 350, 400, 450
K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158: Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185
N1	Wrought Aluminum	–	–	–	–	2025, 5050, 7050, 1000, 2017
N2	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	2024, 6061, 7075
N3	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	–
N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	C81500
N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	–
N6	Carbon, Graphite Composites, CFRP	–	–	–	–	Graphite, CFK, CFRP
N7	Metal Matrix Composites (MMC)	–	–	–	–	C63000
S1	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	A-286, INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608
S2	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 25 (L605), Haynes 188, J-1570, Stellite®, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52
S3	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102, INCOLOY 900 Series, Rene 41, Waspalloy®, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®
S4	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo, Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al
H1	Hardened Materials	–	–	–	44–48	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H2	Hardened Materials	–	–	–	48–55	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H3	Hardened Materials	–	–	–	56–60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
H4	Hardened Materials	–	–	–	>60	Tool Steel H10, H11, H13, D2, D3, 4340, P20

Material Overview • DIN

DIN

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

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

Notes

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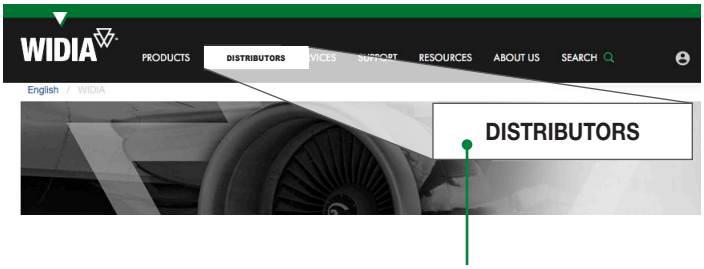

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IMPORTANT SAFETY INSTRUCTIONS: READ BEFORE USING THE TOOLS IN THIS CATALOG

METALCUTTING SAFETY

Projectile and Fragmentation Hazards

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

To avoid injury:

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

Breathing and Skin Contact Hazards

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

To avoid injury:

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

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

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

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

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