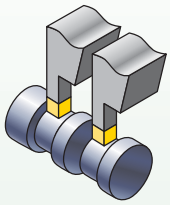
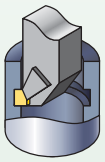
WIDIA
MANCHESTER

Grooving, Cut-Off, and Turning

Grooving





WMT™

- Insert cutting widths: .079"–.315" (2,0mm–8,0mm).
- OD cutting depths: .65"–1.0" (16,5mm–25,4mm).
- ID boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Geometry for deep grooving.

Pages: D4–D29

TopGroove™

- Insert cutting widths: .02"–.25" (0,5mm–6,35mm).
- Insert cutting depths: .025"–.50" (0,64mm–12,7mm).
- ID boring bar minimum bore diameter: .440" (11,2mm).
- Integral shank toolholders available.

Pages: D30–D71

ProGroove™

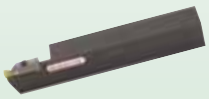
- Insert cutting depths: .394"–1.58" (10,0mm–40,0mm).
- Inserts enable precision sintered execution, good tolerances, and repeatability.
- Screw-clamping integral shank toolholders available.
- Grooving and OD turning.

Pages: D72–D84

Chipmaker™

- Insert cutting widths: .118"–.376" (3,0mm–9,53mm).
- OD cutting depths: .312"–1.5" (7,9mm–38,1mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Multiple insert geometries for deep grooving.

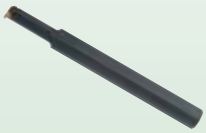
Pages: D122–D135



S-LOC™

- Insert cutting widths: .041"–.108" (1,04mm–3,81mm).
- Maximum cutting depth: .094" (2,4mm).
- ID boring bar minimum bore diameter: 14,2mm (.560").
- Inserts for boring or threading available.
- Screw-clamping integral shank holder for ID applications.

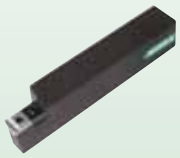
Pages: D116–D121



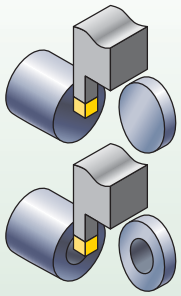
LG

- Insert cutting widths: .315"–.630" (8,0mm–16,0mm).
- OD cutting depths: .787"–1.26" (20,0mm–32,0mm).
- Wedge-clamping integral shanks tooling available.

Pages: D75–D84



Cut-Off



WMT

- Cut-off widths: .059"–.157" (1,5mm–4,0mm);
- Maximum cutting depth: .857" (22,2mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Economical double-sided inserts for rigidity and dimensional accuracy.
- Right-/left-hand styles: 5° and 12° lead angles.

Pages: D4–D29

Separator™

- Cut-off widths: .079"–.157" (2,0mm–4,0mm).
- Positive mechanical, self-clamping blades.
- Right-/left-hand style toolholders available.
- Single-edge inserts for maximum depth capacity.

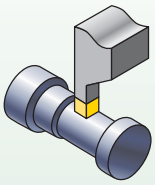
Pages: D86–D103

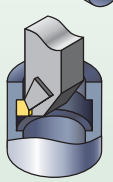
ProGroove

- Cut-off widths: .079"–.315" (2,0mm–8,0mm).
- Single-edge inserts for maximum depth capacity.
- Right-/left-hand styles with 6° lead angles.
- Self-clamping blades/screw-clamping integral shank toolholders available.

Pages: D72–D84

Plunge and Turn





WMT

Heavy Stock Removal in Turning Applications

- Double-sided inserts, cutting widths: .079"–.315" (2,0mm–8,0mm).
- OD cutting depths: .650"–1.0" (16,5mm–25,4mm).
- ID boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages: D4–D29

ProGroove

For Light-Cutting Inserts

- Cutting widths: .079"–.315" (2,0mm–8,0mm).
- OD cutting depths: .394"–1.58" (10,0mm–40,0mm).
- Single-edge inserts for maximum depth capacity.
- Screw-clamping integral shank toolholders available.

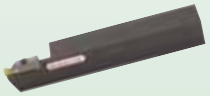
Pages: D72–D84

Chipmaker

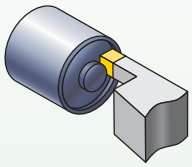
Heavy Stock Removal in Plunge Mode Applications

- Insert cutting widths: .118"–.376" (3,0mm–9,53mm).
- OD cutting depths: .312"–1.5" (7,9mm–38,1mm).
- ID boring bar minimum bore diameter: .984" (25,0mm).
- Variety of geometries for deep grooving.
- Screw-clamping integral shank/cartridge toolholders available.

Pages: D122–D135



Face Grooving



WMT

- Cutting widths: .118"–.250" (3,0mm–6,35mm).
- Cutting depths: .5"–1.0" (13,0mm–25,4mm).
- Minimum face groove diameter: 1.5"–8.0" (38,0mm–205,0mm).

Pages: D4–D29

Ranger™

- Cutting widths: .126"–.25" (3,18mm–6,35mm).
- Cutting depths: .75"–1.00" (19,0mm–25,4mm).
- Minimum face groove OD diameter: 2.25"–16" (57,0mm–400,0mm).
- Square right-angle shank and round shank toolholders available.
- Screw-clamping, adjustable cartridge toolholders with different widths and spindle rotations.

Pages: D108–D114

S-LOC

- Cutting widths: .041"–.108" (1,04mm–3,81mm).
- Maximum cutting depth: .094" (2,4mm).
- Minimum face groove diameter: .500" (12,7mm) or larger.
- Screw-clamping integral toolholder.

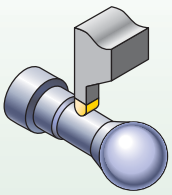
Pages: D116–D121

TopGroove

- NF/NFD face groove insert range: .94"–2.25" (24,0mm–57,0mm).
- Cutting width range for standard inserts: .079"–.156" (0,8mm–9,5mm).
- Cutting depth range for standard inserts: .070"–.500" (1,27mm–12,70mm).
- Cutting width range for NF/NFD face grooving inserts: .079"–.25" (2,0mm–6,35mm).
- Standard insert minimum face groove diameter range: 2.125"–13" (54,0mm–330,0mm).
- Cutting depth range for NF/NFD face grooving inserts: .060"–.500" (1,52mm–12,70mm).
- Cutting depth range for NF: .060"–.150" (1,52mm–3,81mm).
- Cutting depth range for NFD: .250"–.500" (6,35mm–12,7mm).

Pages: D30–D71

Profiling



WMT

For Heavy Stock Removal

- Full radius insert cutting widths: .118"–.315" (3,0mm–8,0mm).
- OD cutting depths: .650"–1.0" (16,5mm–25,4mm)
- Screw-clamping integral shank/cartridge toolholders available.

Pages: D4–D29

TopGroove

Moderate/Heavy Stock Removal at Shallow Profile Depths

- Full-radius insert cutting widths: .062"–.250" (1,57mm–6,35mm).
- Insert cutting depths: .094"–.250" (2,39mm–6,35mm).
- Integral shank toolholders and Erickson™ heads available.

Pages: D30–D71

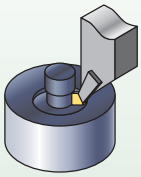
ProGroove

For Light Cutting

- Full-radius insert cutting widths: .118"–.236" (3,0mm–6,0mm).
- OD cutting depths: .394"–1.26" (10,0mm–32,0mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages: D72–D84

Undercutting



TopGroove

- Undercutting insert widths: .094"–.157" (2,4mm–4,0mm).
- Economical double-ended inserts.

Pages: D30–D71

WMT™ System

One System for Grooving, Cut-Off, Turning, and Profiling.

The WIDIA™ line of WMT Toolholders is the economical and reliable option for all your grooving, cut-off, turning, and profiling applications. Trust the WMT system to ensure precise insert positioning and provide only the most accurate machining with exceptionally fast cycle times and superior performance.

Versatile and Well Constructed

- Specifically designed to increase speeds and feeds.
- Excellent geometry for even your most demanding deep grooving applications.
- The WMT system enables heavy stock removal in turning applications.
- Ensures finer surface finishes and a long, reliable tool life.

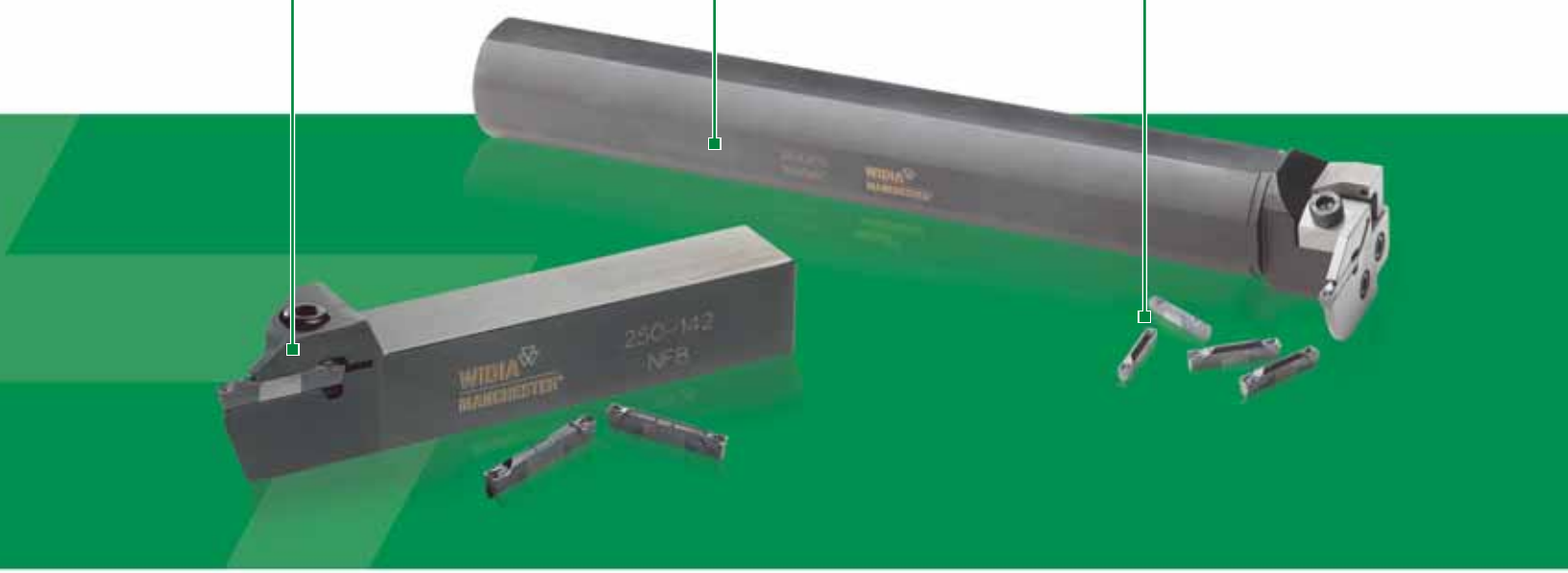
WMT Toolholders

- Outstanding system rigidity and clamping capabilities.
- Guarantees fast cycles times and limited turret indexes.
- Precise insert positioning for accurate machining.
- Double-V shape means operator-friendly insert indexing and optimum insert positioning.

Exceptional versatility in one tool for all your OD and ID applications.

Extra-long clamping area for unsurpassed grooving and turning stability.

Interchangeable grooving and cut-off inserts designed for excellent chip control.



WMT™ SLS

- Integral and modular Serrated Locking System (SLS) accepts SX, SX Ultra, and PT/PC inserts.
- Replaceable cartridge makes changing applications quick and easy.
- Adaptable and easy to use, it reduces setup time and downtime between jobs.
- A variety of insert widths available to meet your specific needs.

The Most Advanced Turning Solutions in the Industry

For unsurpassed quality, value, and performance, look no further than the WIDIA™ comprehensive line of specially engineered and dependable grooving and cut-off solutions. All the tools you need from the reliable name you can trust!

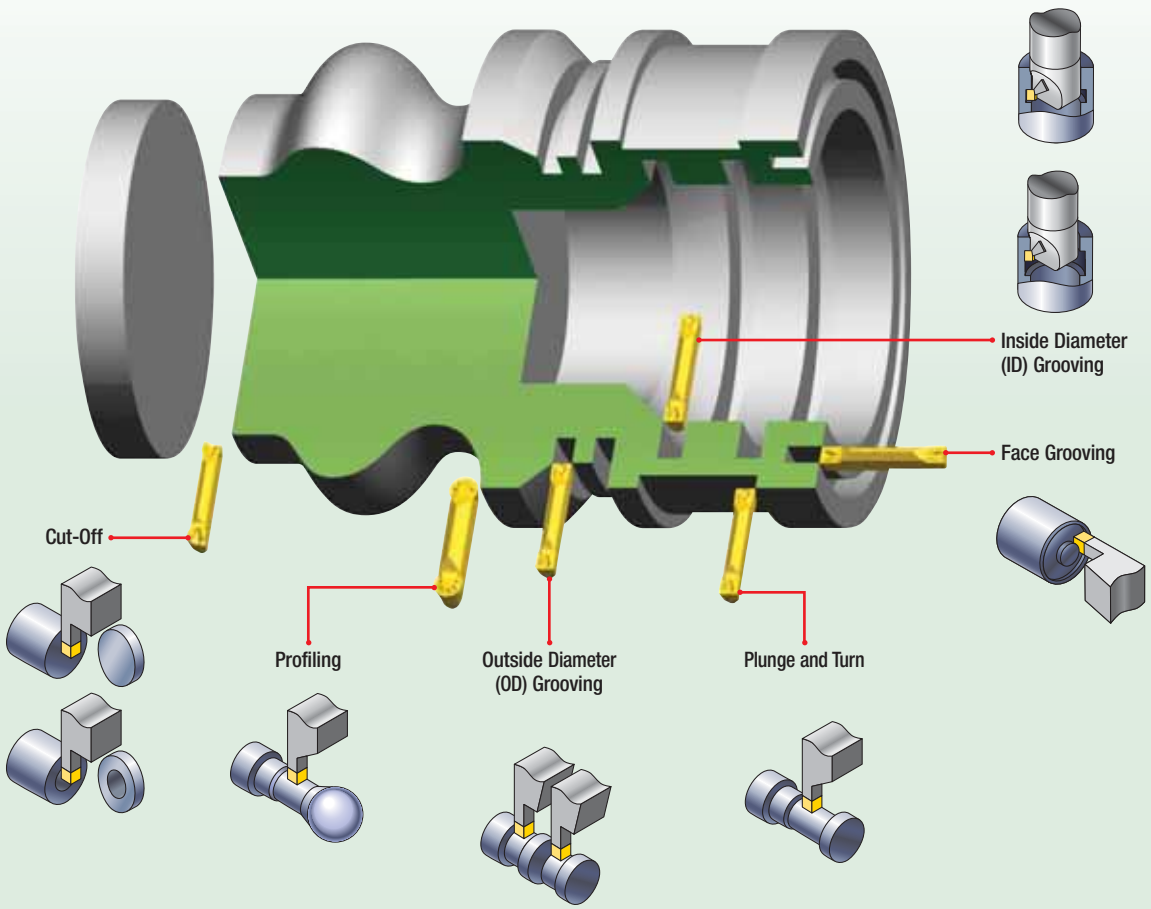
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

It is perfect for all general purpose operations, including both shallow and deep grooving.

Utilize this handy, easy-to-use guide to identify and select the appropriate grooving and cut-off tools for your specific needs.

1 Choose the application to be performed:

Groove depth, width, and profile.



2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

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

3 Select your toolholder based on the application:

A Choose the appropriate width "W" required for the application.

B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

WMT Grooving, Cut-Off, and Turning

Integral Toolholders

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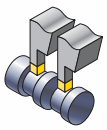
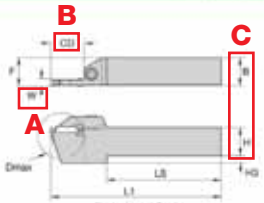
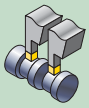
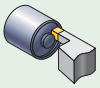




Right Hand Tool

■ OD Grooving

order number	catalog number	A W	B CD	D max	F	C H	C B	H3	L1	LS	clamp screw
	Right hand										
3656137	250319	.059	.650	–	.991	1.000	1.000	–	6.000	4.679	606266
3655938	250301	.079	–	1.062	.375	.375	.369	.125	4.500	3.500	606249
3655940	250303	.079	–	1.125	.500	.500	.494	.188	4.500	3.500	606249
3655942	250305	.079	.650	–	.625	.625	.603	.250	5.000	4.060	606249
3655944	250307	.079	.650	–	.750	.750	.719	–	5.000	3.680	606249
3655946	250309	.079	.650	–	1.000	1.000	.969	–	6.000	4.680	606249
3655888	250109	.094	–	1.062	.375	.375	.365	.125	4.500	3.500	606249
3655892	250111	.094	–	1.250	.500	.500	.490	.190	4.500	3.290	606249
3655894	250113	.094	.750	–	.625	.625	.603	.250	5.000	3.480	619205
3655896	250115	.094	.750	–	.750	.750	.719	.250	5.000	3.480	619205
3655834	250189	.094	.420	–	.750	.750	.719	–	5.000	3.695	619205
3655836	250193	.094	.750	–	.990	1.000	.969	–	6.000	4.500	619205
3655898	250117	.125	.440	–	.625	.625	.603	–	5.000	3.695	619205
3655900	250119	.125	.875	–	.625	.625	.603	.250	5.000	3.355	619205
3655906	250127	.125	.440	–	.750	.750	.719	–	5.000	3.695	619205
3655908	250129	.125	.875	–	.750	.750	.719	.250	5.000	3.355	619205
3655916	250141	.125	.440	–	1.000	1.000	.969	–	6.000	4.695	619205
3655918	250143	.125	.875	–	1.000	1.000	.969	–	6.000	4.375	619205
3655920	250145	.156	.875	–	1.000	1.000	.969	–	6.000	4.375	619205
3655930	250181	.156	.440	–	.625	.625	.603	–	5.000	3.695	619205
3655932	250183	.156	.440	–	.750	.750	.719	–	5.000	3.695	619205
3655902	250123	.188	.560	–	.629	.629	.603	–	5.000	3.562	619168
3655904	250125	.188	1.000	–	.629	.625	.603	.250	5.500	3.655	619168
3655910	250133	.188	.560	–	.750	.750	.719	–	5.000	3.562	619168
3655912	250135	.188	1.000	–	.750	.750	.719	.250	5.500	3.655	619168
3655922	250147	.188	.560	–	1.000	1.000	.969	–	6.000	4.562	619168
3655924	250149	.188	1.000	–	1.000	1.000	.969	–	6.000	4.175	619168
3655914	250137	.250	.560	–	.754	.750	.719	–	5.000	3.562	619168
3655926	250151	.250	.560	–	1.004	1.000	.969	–	6.000	4.562	619168
3655928	250153	.250	1.000	–	1.002	1.000	.969	–	6.000	4.174	619168
3539143	250175	.312	.560	–	1.250	1.250	1.207	–	6.000	4.553	619168
3539145	250177	.312	1.000	–	–	1.250	1.207	–	6.000	4.174	619168

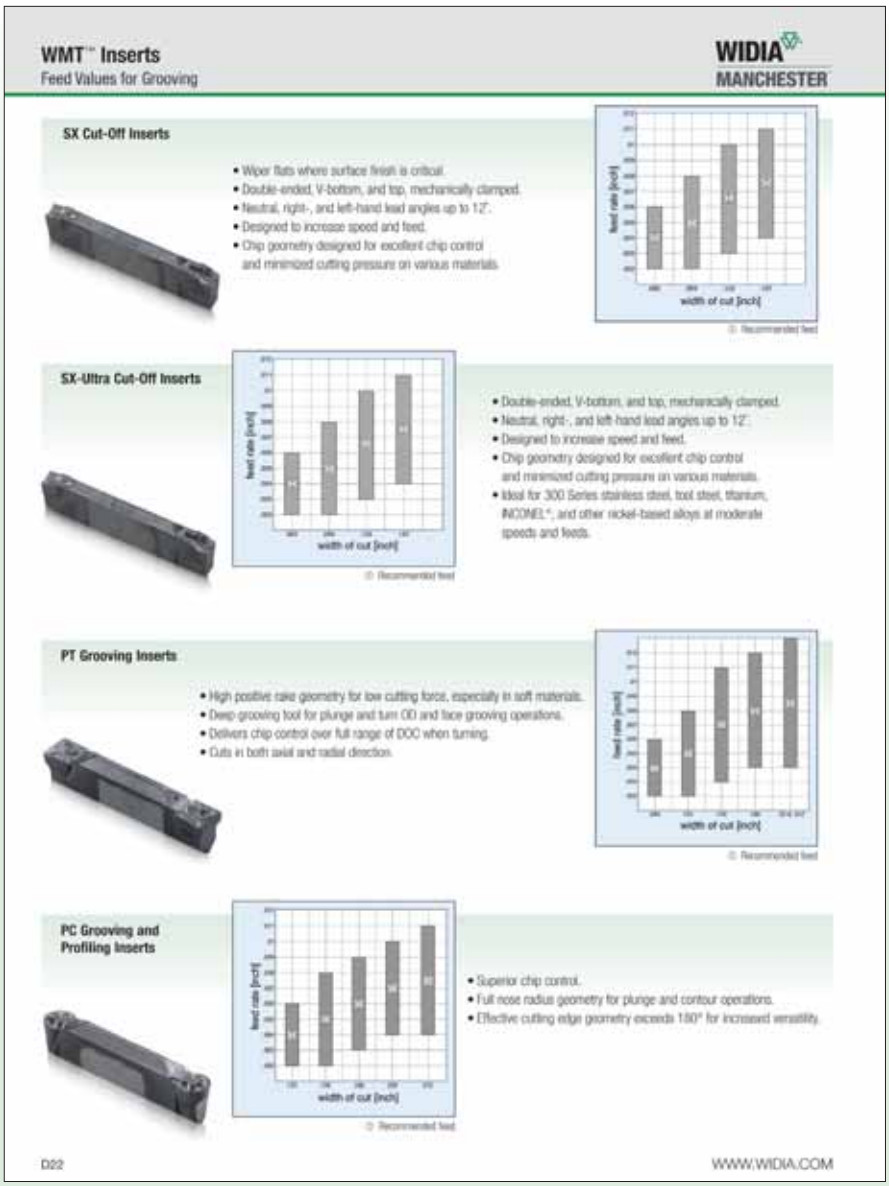
	application	conventional toolholders	modular blades
 	OD Grooving and Cut-Off	pages D10–D12	pages D16–D17
	Face Grooving	pages D13–D14	pages D18–D19
	ID Grooving	—	pages D20–D21
	Plunge and Turn	pages D10–D12	pages D16–D17

4 Select chipbreaker style for the application:

SX-Ultra (1st choice)	Cut-off
SX	Cut-off with wipers
PT	Grooving and turning
PC	Profiling and turning

NOTE: Chart shows recommended starting feed rates.

See page D22.



WMT™ Inserts
Feed Values for Grooving

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SX Cut-Off Inserts

- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.

SX-Ultra Cut-Off Inserts

- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.

PT Grooving Inserts

- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn OD and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Cuts in both axial and radial direction.

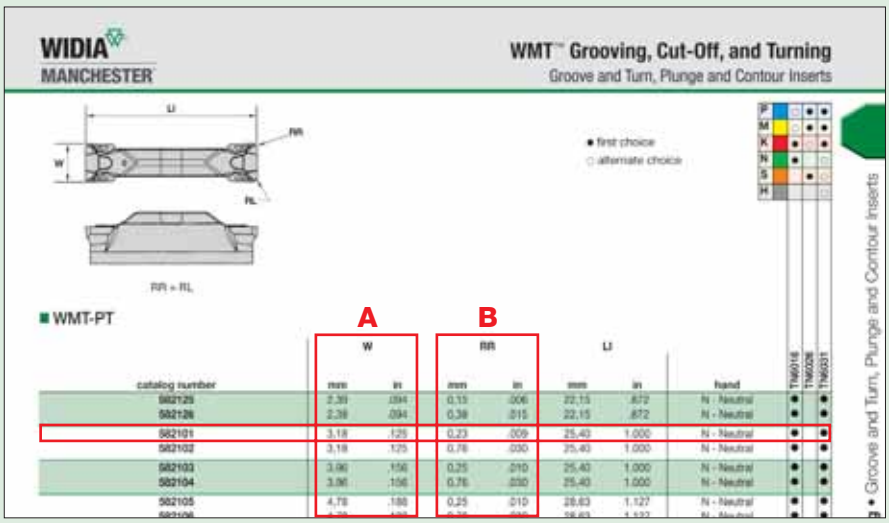
PC Grooving and Profiling Inserts

- Superior chip control.
- Full nose radius geometry for plunge and contour operations.
- Effective cutting edge geometry exceeds 180° for increased versatility.

D22 WWW.WIDIA.COM

A Choose the appropriate insert width "W" for your specific application.

B Select the required corner radius value "RR".



WIDIA MANCHESTER

WMT™ Grooving, Cut-Off, and Turning
Groove and Turn, Plunge and Contour Inserts

LI, W, RR, RL

RR = RL

● first choice
○ alternate choice

■ WMT-PT

catalog number	A W mm	A W in	B RR mm	B RR in	LI mm	LI in	hand	TM6016	TM6026	TM6031
582125	2,39	.094	0,13	.006	22,15	.872	N - Neutral	●		●
582126	2,39	.094	0,38	.015	22,15	.872	N - Neutral	●		●
582101	3,18	.125	0,23	.009	25,40	1.000	N - Neutral	●		●
582102	3,18	.125	0,76	.030	25,40	1.000	N - Neutral	●		●
582103	3,96	.156	0,25	.010	25,40	1.000	N - Neutral	●		●
582104	3,96	.156	0,76	.030	25,40	1.000	N - Neutral	●		●
582105	4,78	.188	0,25	.010	28,63	1.127	N - Neutral	●		●

• Groove and Turn, Plunge and Contour Inserts

5 Select grade:

cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		TN6016	TN6026	TN6016	TN6016	TN6026	TN6026
varying depth of cut, casting, or forging skin		TN6016	TN6026	TN6016	TN6016	TN6026	TN6026
lightly interrupted cut		TN6031	TN6026	TN6031	TN6031	TN6026	TN6026
heavily interrupted cut		TN6031	TN6026	TN6031	TN6031	TN6026	TN6026

See page D23 for Grades and Grade Descriptions.

6 Determine cutting data:

A Based on material group and grade, identify starting speed (vc).

B First choice starting speed is in **bold**.

See page D24 for cutting data.

WMT™ Grooving, Cut-Off, and Turning
Recommended Cutting Speed Starting Conditions

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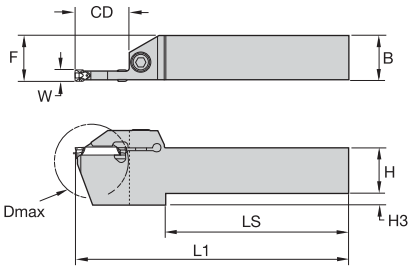
ANSI ISO 513	VDI 3323	Material Group	Cutting Speed • vc SFM								
			min	Start	max	min	Start	max	min	Start	max
			TN6016 (M93)			TN6031 (M43)			TN6026 (M4338)		
P	1		550	650	750	440	540	640	395	495	595
	2		550	650	750	495	595	695	445	545	645
	3		450	550	650	405	505	605	365	465	565
	4		500	600	700	450	550	650	405	505	605
	5		450	550	650	405	505	605	365	465	565
	6		450	550	650	405	505	605	365	465	565
	7		540	640	740	485	585	685	435	535	635
	8		450	550	650	405	505	605	365	465	565
	9		450	550	650	405	505	605	365	465	565
	10		475	575	675	430	530	630	385	485	585
	11		400	500	600	360	460	560	325	425	525
	12		450	550	650	405	505	605	365	465	565
	13.1		450	550	650	405	505	605	365	465	565
	13.2		400	500	600	360	460	560	325	425	525
			TN6016 (M93)			TN6031 (M43)			TN6026 (M4338)		
M	14.1		350	450	550	315	415	515	285	385	485
	14.2		280	380	480	250	350	450	225	325	425
	14.3		225	325	425	205	305	405	180	280	380
	14.4		175	275	375	160	260	360	140	240	340
			TN6016 (M93)			TN6031 (M43)			TN6026 (M4338)		
K	15		600	700	800	540	640	740	485	585	685
	16		450	550	650	405	505	605	365	465	565
	17		500	600	700	450	550	650	405	505	605
	18		475	575	675	430	530	630	385	485	585
	19		650	750	850	585	685	785	525	625	725
	20		450	550	650	405	505	605	365	465	565
			TN6016 (M93)			TN6031 (M43)			TN6026 (M4338)		
N	21		1000	1100	1200	900	1000	1100			
	22		800	900	1000	720	820	920			
	23		1000	1100	1200	900	1000	1100			
	24		800	900	1000	720	820	920			
	25		700	800	900	630	730	830			
	26		500	600	700	450	550	650			
	27		500	600	700	450	550	650			
	28		500	600	700	450	550	650			
	29		450	550	650	405	505	605			
	30		450	550	650	405	505	605			
			TN6016 (M93)			TN6031 (M43)			TN6026 (M4338)		
S	31		170	270	370	155	255	355	140	240	340
	32		120	220	320	110	210	310	95	195	295
	33		125	225	325	115	215	315	100	200	300
	34		100	200	300	90	190	290	80	180	280
	35		110	210	310	100	200	300	90	190	290
	36		220	320	420	200	300	400	180	280	380
	37		125	225	325	115	215	315	100	200	300



Right Hand Tool

OD Grooving and Cut-Off

order number	catalog number	H	W	CD	D max	F	B	H3	L1	LS	clamp screw
	Right hand										
3655938	250301	.375	.079	—	1.062	.375	.369	.125	4.500	3.410	606249
3655888	250109	.375	.094	—	1.062	.375	.365	.125	4.500	3.410	606249
3655940	250303	.500	.079	—	1.125	.500	.494	.188	4.500	3.410	606249
3655892	250111	.500	.094	—	1.250	.500	.490	.190	4.500	3.290	606249
3655942	250305	.625	.079	.650	—	.625	.603	.250	5.000	3.680	606249
3655894	250113	.625	.094	.750	—	.625	.603	.250	5.000	3.480	619205
3655898	250117	.625	.125	.440	—	.625	.603	—	5.000	3.695	619205
3655900	250119	.625	.125	.875	—	.625	.603	.250	5.000	3.355	619205
3655930	250181	.625	.156	.440	—	.625	.603	—	5.000	3.695	619205
3655902	250123	.625	.188	.560	—	.629	.603	—	5.000	3.562	619168
3655904	250125	.625	.188	1.000	—	.629	.603	.250	5.500	3.655	619168
3655944	250307	.750	.079	.650	—	.750	.719	—	5.000	3.680	606249
3655896	250115	.750	.094	.750	—	.750	.719	.250	5.000	3.480	619205
3655934	250189	.750	.094	.420	—	.750	.719	—	5.000	3.695	619205
3655906	250127	.750	.125	.440	—	.750	.719	—	5.000	3.695	619205
3655908	250129	.750	.125	.875	—	.750	.719	.250	5.000	3.355	619205
3655932	250183	.750	.156	.440	—	.750	.719	—	5.000	3.695	619205
3655910	250133	.750	.188	.560	—	.750	.719	—	5.000	3.562	619168
3655912	250135	.750	.188	1.000	—	.750	.719	.250	5.500	3.655	619168
3655914	250137	.750	.250	.560	—	.754	.719	—	5.000	3.562	619168
3656137	250319	1.000	.059	.650	—	.991	1.000	—	6.000	4.679	606266
3655946	250309	1.000	.079	.650	—	1.000	.969	—	6.000	4.680	606249
3655936	250193	1.000	.094	.750	—	.990	.969	—	6.000	4.500	619205
3655916	250141	1.000	.125	.440	—	1.000	.969	—	6.000	4.695	619205
3655918	250143	1.000	.125	.875	—	1.000	.969	—	6.000	4.375	619205
3655920	250145	1.000	.156	.875	—	1.000	.969	—	6.000	4.375	619205
3655922	250147	1.000	.188	.560	—	1.000	.969	—	6.000	4.562	619168
3655924	250149	1.000	.188	1.000	—	1.000	.969	—	6.000	4.175	619168
3655926	250151	1.000	.250	.560	—	1.004	.969	—	6.000	4.562	619168
3655928	250153	1.000	.250	1.000	—	1.002	.969	—	6.000	4.174	619168
3539143	250175	1.250	.312	.560	—	1.250	1.207	—	6.000	4.553	619168
3539145	250177	1.250	.312	1.000	—	—	1.207	—	6.000	4.174	619168

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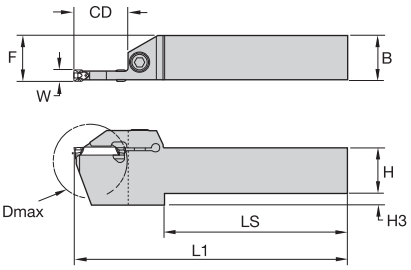
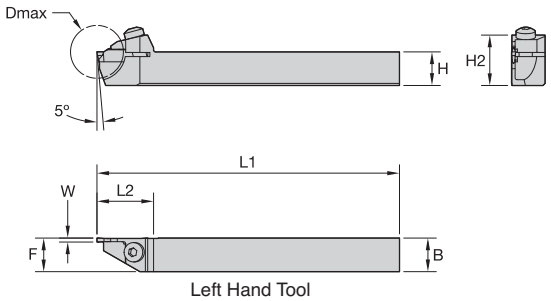


Right Hand Tool

OD Grooving and Cut-Off

order number	catalog number	H	W	CD	D max	F	B	H3	L1	LS	clamp screw
	Left hand										
3655939	**250302**	.375	.079	—	1.062	.375	.369	.125	4.500	3.410	**606249**
3655889	**250110**	.375	.094	—	1.062	.375	.365	.125	4.500	3.410	**606249**
3655941	**250304**	.500	.079	—	1.125	.500	.494	.188	4.500	3.410	**606249**
3655893	**250112**	.500	.094	—	1.250	.500	.490	.190	4.500	3.290	**606249**
3655943	**250306**	.625	.079	.650	—	.625	.603	.250	5.000	3.680	**606249**
3655895	**250114**	.625	.094	.750	—	.625	.603	.250	5.000	3.480	**619205**
3655899	**250118**	.625	.125	.440	—	.625	.603	—	5.000	3.695	**619205**
3655901	**250120**	.625	.125	.875	—	.625	.603	.250	5.000	3.355	**619205**
3655931	**250182**	.625	.156	.440	—	.625	.603	—	5.000	3.695	**619205**
3655903	**250124**	.625	.188	.560	—	.629	.603	—	5.000	3.562	**619168**
3655905	**250126**	.625	.188	1.000	—	.629	.603	.250	5.500	3.655	**619168**
3655945	**250308**	.750	.079	.650	—	.750	.719	—	5.000	3.680	**606249**
3655897	**250116**	.750	.094	.750	—	.750	.719	.250	5.000	3.480	**619205**
3655935	**250190**	.750	.094	.420	—	.750	.719	—	5.000	3.695	**619205**
3655907	**250128**	.750	.125	.440	—	.750	.719	—	5.000	3.695	**619205**
3655909	**250130**	.750	.125	.875	—	.750	.719	.250	5.000	3.355	**619205**
3655933	**250184**	.750	.156	.440	—	.750	.719	—	5.000	3.697	**619205**
3655911	**250134**	.750	.188	.560	—	.750	.719	—	5.000	3.562	**619168**
3655913	**250136**	.750	.188	1.000	—	.750	.719	.250	5.500	3.655	**619168**
3655915	**250138**	.750	.250	.560	—	.754	.719	—	5.000	3.562	**619168**
3656138	**250320**	1.000	.059	.650	—	.991	1.000	—	6.000	4.679	**606249**
3655947	**250310**	1.000	.079	.650	—	1.000	.969	—	6.000	4.680	**606249**
3655937	**250194**	1.000	.094	.750	—	1.000	.969	—	6.000	4.500	**619205**
3655917	**250142**	1.000	.125	.440	—	1.000	.969	—	6.000	4.695	**619205**
3655919	**250144**	1.000	.125	.875	—	1.000	.969	—	6.000	4.375	**619205**
3655921	**250146**	1.000	.156	.875	—	1.000	.969	—	6.000	4.375	**619205**
3655923	**250148**	1.000	.188	.560	—	1.000	.969	—	6.000	4.562	**619168**
3655925	**250150**	1.000	.188	1.000	—	1.000	.969	—	6.000	4.175	**619168**
3655927	**250152**	1.000	.250	.560	—	1.004	.969	—	6.000	4.562	**619168**
3655929	**250154**	1.000	.250	1.000	—	1.004	.969	—	6.000	4.174	**619168**
3539144	**250176**	1.250	.312	.560	—	1.250	1.207	—	6.000	4.553	**619168**
3539146	**250178**	1.250	.312	1.000	—	—	1.2070	—	6.000	4.174	**619168**

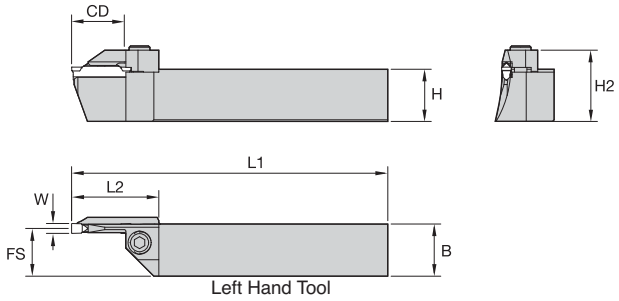


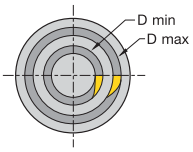
Left Hand Tool

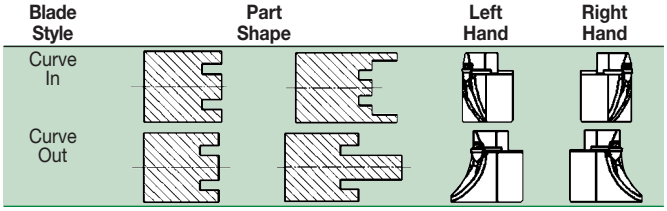
Swiss Grooving and Cut-Off

order number	catalog number	W	D max	B	H	H2	F	L1	L2	clamp screw
	Right hand									
3655948	**250311**	.059	.787	.375	.375	.625	.375	4.500	.842	**606249**
3655949	**250313**	.059	.787	.500	.500	.750	.500	4.500	.842	**606249**
3656133	**250315**	.059	1.024	.625	.625	.925	.626	5.000	.952	**606266**
3656135	**250317**	.059	1.024	.750	.750	1.050	.750	5.000	.952	**606266**
3656139	**250321**	.079	.787	.375	.375	.625	.375	4.500	.843	**606249**
3656141	**250323**	.079	.787	.500	.500	.750	.500	4.500	.843	**606249**
3656143	**250325**	.079	1.024	.625	.625	.925	.625	5.000	.953	**606266**
3656145	**250327**	.079	1.024	.750	.750	1.050	.750	5.000	.953	**606266**
	Left hand									
3656186	**250312**	.059	.787	.375	.375	.625	.375	4.500	.842	**606249**
3656101	**250314**	.059	.787	.500	.500	.750	.500	4.500	.842	**606249**
3656134	**250316**	.059	1.024	.625	.625	.925	.626	5.000	.952	**606266**
3656136	**250318**	.059	1.024	.750	.750	1.050	.750	5.000	.952	**606266**
3656140	**250322**	.079	.787	.375	.375	.625	.375	4.500	.843	**606249**
3656142	**250324**	.079	.787	.500	.500	.750	.500	4.500	.843	**606249**
3656144	**250326**	.079	1.024	.625	.625	.925	.625	5.000	.953	**606266**
3656146	**250328**	.079	1.024	.750	.750	1.050	.750	5.000	.953	**606266**

NOTE: Insert exterior edge in line with toolholder edge for .375" and .500" shank toolholders.



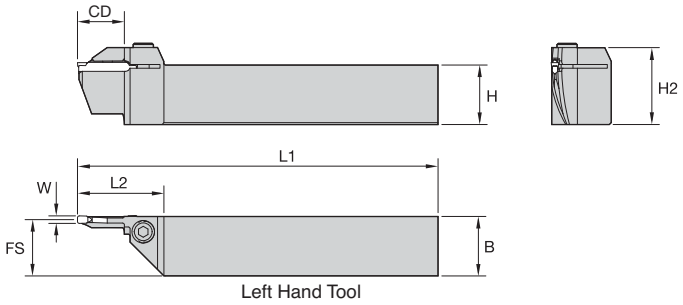


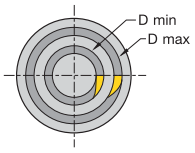


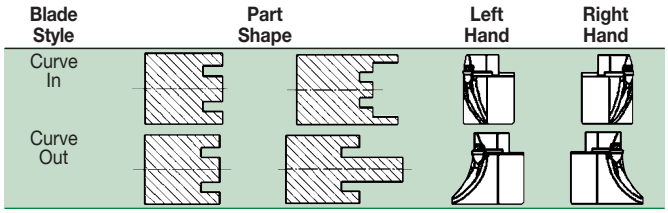
Curve Out

order number	catalog number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
	Right hand												
3656147	**251117**	.125	.500	2.000	1.500	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656149	**251119**	.125	.625	2.750	2.000	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656151	**251121**	.125	.625	4.000	2.750	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656153	**251123**	.125	.750	8.000	4.000	.937	1.280	.990	.990	6.000	1.438	**—**	**619205**
3656155	**251133**	.188	.625	2.000	1.500	.906	1.355	.990	.990	6.000	1.500	**446102**	**619168**
3656157	**251135**	.188	.750	2.750	2.000	.906	1.352	.990	.990	6.000	1.500	**446102**	**619168**
3656159	**251137**	.188	.750	4.000	2.750	.906	1.352	.990	.990	6.000	1.655	**446104**	**619168**
3656161	**251139**	.188	1.000	8.000	4.000	.906	1.352	.990	.990	6.000	1.655	**446104**	**619168**
3656163	**251149**	.250	.625	2.000	1.500	.877	1.377	.990	.990	6.000	1.500	**446102**	**619168**
3656165	**251151**	.250	.750	2.750	2.000	.875	1.372	.990	.990	6.000	1.500	**446102**	**619168**
3656168	**251155**	.250	1.000	8.000	4.000	.875	1.372	.990	.990	6.000	1.655	**446104**	**619168**
3656187	**251153**	.251	.750	4.000	2.750	.875	1.372	.990	.990	6.000	1.655	**446104**	**619168**
	Left hand												
3656148	**251118**	.125	.500	2.000	1.500	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656152	**251122**	.125	.625	4.000	2.750	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656150	**251120**	.125	.625	2.750	2.000	.937	1.280	.990	.990	6.000	1.343	**—**	**619205**
3656154	**251124**	.125	.750	8.000	4.000	.937	1.280	.990	.990	6.000	1.438	**—**	**619205**
3656156	**251134**	.188	.625	2.000	1.500	.906	1.355	.990	.990	6.000	1.500	**446101**	**619168**
3656160	**251138**	.188	.750	4.000	2.750	.906	1.352	.990	.990	6.000	1.655	**446103**	**619168**
3656158	**251136**	.188	.750	2.750	2.000	.906	1.352	.990	.990	6.000	1.500	**446101**	**619168**
3656162	**251140**	.188	1.000	8.000	4.000	.906	1.352	.990	.990	6.000	1.655	**446103**	**619168**
3656164	**251150**	.250	.625	2.000	1.500	.875	1.377	.990	.990	6.000	1.500	**446101**	**619168**
3656166	**251152**	.250	.750	2.750	2.000	.875	1.372	.990	.990	6.000	1.500	**446101**	**619168**
3656167	**251154**	.250	.750	4.000	2.750	.875	1.372	.990	.990	6.000	1.655	**446103**	**619168**
3656169	**251156**	.250	1.000	8.000	4.000	.875	1.372	.990	.990	6.000	1.655	**446103**	**619168**

NOTE: Insert cutting edge for WMT Face Grooving system is positioned +.030" above center.
The WMT Face Grooving system is not designed to cut diameters of less than .850".
Toolholders that accept .125" width inserts have an integral clamp.
Toolholders that accept .187" and .250" width inserts are supplied with a detachable clamp.







Curve In

order number	catalog number	W	CD	D max	D min	B	H	H2	FS	L1	L2	clamp	clamp screw
	Right hand												
3539321	**252109**	.125	.625	4.000	2.750	.990	.990	1.280	.937	6.000	1.343	**—**	**MS326**
3539323	**252111**	.125	.750	8.000	4.000	.990	.990	1.280	.937	6.000	1.438	**—**	**MS326**
3539325	**252117**	.187	.750	4.000	2.750	.990	.990	1.336	.906	6.000	1.655	**446104**	**619168**
3539327	**252119**	.187	1.000	8.000	4.000	.990	.990	1.336	.906	6.000	1.655	**446104**	**619168**
3539329	**252125**	.250	.765	4.000	2.750	.990	.990	1.336	.875	6.000	1.655	**446104**	**619168**
3539331	**252127**	.250	1.000	8.000	4.000	.990	.990	1.336	.875	6.000	1.655	**446104**	**619168**
	Left hand												
3539322	**252110**	.125	.625	4.000	2.750	.990	.990	1.280	.937	6.000	1.343	**—**	**MS326**
3539324	**252112**	.125	.750	8.000	4.000	.990	.990	1.280	.937	6.000	1.438	**—**	**MS326**
3539326	**252118**	.187	.750	4.000	2.750	.990	.990	1.336	.906	6.000	1.655	**446103**	**619168**
3539328	**252120**	.187	1.000	8.000	4.000	.990	.990	1.336	.906	6.000	1.655	**446103**	**619168**
3539330	**252126**	.250	.765	4.000	2.750	.990	.990	1.336	.875	6.000	1.655	**446103**	**619168**
3539332	**252128**	.250	1.000	8.000	4.000	.990	.990	1.336	.875	6.000	1.655	**446103**	**619168**

NOTE: Insert cutting edge for WMT Face Grooving system is positioned +.030" above center.
The WMT Face Grooving system is not designed to cut diameters of less than .850".
Toolholders that accept .125" width inserts have an integral clamp.
Toolholders that accept .187" and .250" width inserts are supplied with a detachable clamp.

WIN WITH WIDIA™

WIDIA™

WMT™ System

The WIDIA WMT System is the economical and reliable option for all of your grooving, cut-off, turning, and profiling applications. Trust the WMT system to ensure precise insert positioning and provide only the most accurate machining with exceptionally fast cycle times and superior performance.

WMT Toolholders

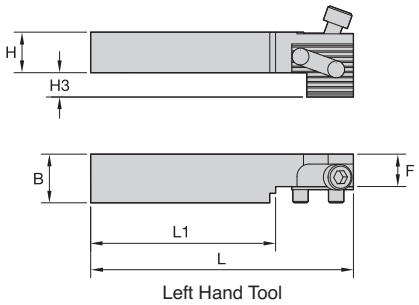
- Guarantees fast cycle times and limited turret indexes.
- Precise insert positioning for accurate machining.

WMT SLS

- A variety of insert widths available to meet your specific needs.
- Integral and modular Serrated Locking System (SLS) accepts SX, SX Ultra, and PT/PC inserts.

To learn more, contact your local Authorized Distributor or visit **www.widia.com**.

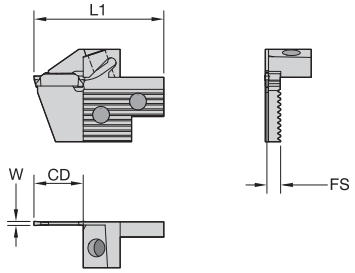
WIDIA™
Win with WIDIA™



Left Hand Tool

Grooving, Cut-Off, and Face Grooving

order number	catalog number	H	B	L	L1	F	H3	cartridge screw
	Right hand							
3656170	**253101**	.625	.750	4.050	2.850	.547	.375	**606255**
3656172	**253103**	.750	.750	4.050	2.850	.547	.250	**606255**
3656176	**253107**	1.000	1.000	5.050	3.850	.797	—	**619419**
3656174	**253105**	1.250	1.250	5.050	3.850	1.047	—	**619419**
	Left hand							
3656171	**253102**	.625	.750	4.050	2.850	.547	.375	**606255**
3656173	**253104**	.750	.750	4.050	2.850	.547	.250	**606255**
3656177	**253108**	1.000	1.000	5.050	3.850	.797	—	**619419**
3656175	**253106**	1.250	1.250	5.050	3.850	1.047	—	**619168**

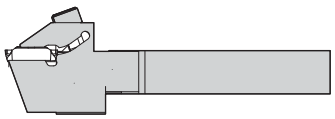


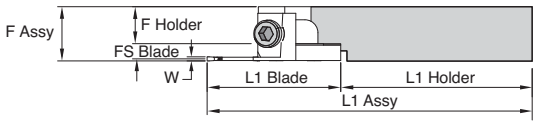
Left Hand Tool

Grooving and Cut-Off

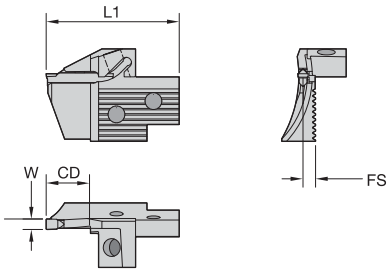
order number	catalog number	W	CD	L1	FS
	Right hand				
3653461	**348101**	.059	.650	1.934	.204
3653463	**348103**	.079	.650	1.932	.195
3653465	**348105**	.094	.752	2.050	.185
3653467	**348107**	.118	.874	2.150	.175
3653469	**348109**	.158	.874	2.150	.187
3653703	**348111**	.188	1.000	2.250	.170
3653705	**348113**	.250	1.000	2.250	.159
	Left hand				
3653462	**348102**	.059	.650	1.934	.204
3653464	**348104**	.079	.650	1.932	.195
3653466	**348106**	.094	.752	2.050	.185
3653468	**348108**	.118	.874	2.150	.175
3653470	**348110**	.158	.874	2.150	.187
3653704	**348112**	.188	1.000	2.250	.170
3653706	**348114**	.250	1.000	2.250	.159

NOTE: Widths of .156", .187", and .250" are not recommended for .625" shank toolholders.
Width of .250" is not recommended for .750" shank toolholders.





L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2 + .031"



Left Hand Tool


Right Hand Assembly

Face Grooving • Curve Out

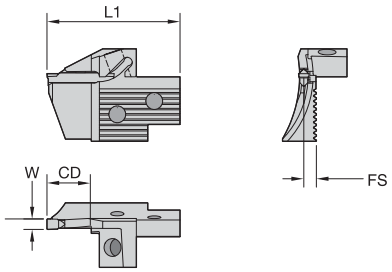
order number	catalog number	W	D min	D max	CD	FS	L1
	Right hand						
3653707	**349101**	.125	1.500	2.000	.500	.174	1.980
3653708	**349102**	.125	2.000	2.750	.625	.175	1.980
3653709	**349103**	.125	2.750	4.000	.625	.175	1.980
3653710	**349104**	.125	4.000	8.000	.750	.175	2.075
3653715	**349109**	.156	1.500	2.000	.500	.187	1.980
3653716	**349110**	.156	2.000	2.750	.625	.187	1.980
3653717	**349111**	.156	2.750	4.000	.625	.187	1.980
3653718	**349112**	.156	4.000	8.000	.750	.187	2.075
3653723	**349117**	.187	1.500	2.000	.625	.170	2.074
3653724	**349118**	.187	2.000	2.750	.750	.170	2.074
3653725	**349119**	.187	2.750	4.000	.750	.170	2.230
3653726	**349120**	.187	4.000	8.000	1.000	.170	2.230
3653731	**349125**	.250	1.200	2.000	.625	.222	2.075
3653732	**349126**	.250	2.000	2.750	.750	.222	2.075
3653733	**349127**	.250	2.750	4.000	.750	.222	2.230
3653734	**349128**	.250	4.000	8.000	1.000	.222	2.230

NOTE: Width of .250" is not recommended for .750" shank toolholders.

(continued)

See page D16 for shank tooling.

(continued)



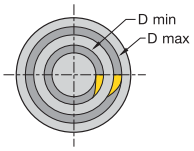
Left Hand Tool

Right Hand Assembly

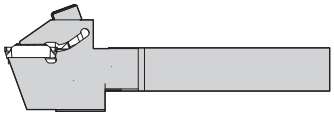
Face Grooving • Curve Out

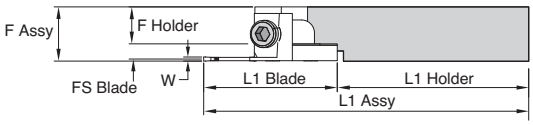
order number	catalog number	W	D min	D max	CD	FS	L1
	Left hand						
3653711	**349105**	.125	1.500	2.000	.500	.174	1.980
3653712	**349106**	.125	2.000	2.750	.625	.175	1.980
3653713	**349107**	.125	2.750	4.000	.625	.175	1.980
3653714	**349108**	.125	4.000	8.000	.750	.175	2.075
3653719	**349113**	.156	1.500	2.000	.500	.187	1.980
3653720	**349114**	.156	2.000	2.750	.625	.187	1.980
3653721	**349115**	.156	2.750	4.000	.625	.187	1.980
3653722	**349116**	.156	4.000	8.000	.750	.187	2.075
3653727	**349121**	.187	1.500	2.000	.625	.170	2.074
3653728	**349122**	.187	2.000	2.750	.750	.170	2.074
3653729	**349123**	.187	2.750	4.000	.750	.170	2.230
3653730	**349124**	.187	4.000	8.000	1.000	.170	2.230
3653735	**349129**	.250	1.200	2.000	.625	.222	2.075
3653736	**349130**	.250	2.000	2.750	.750	.222	2.075
3653737	**349131**	.250	2.750	4.000	.750	.222	2.230
3653738	**349132**	.250	4.000	8.000	1.000	.222	2.230

NOTE: Width of .250" is not recommended for .750" shank toolholders.
See page D16 for shank tooling.

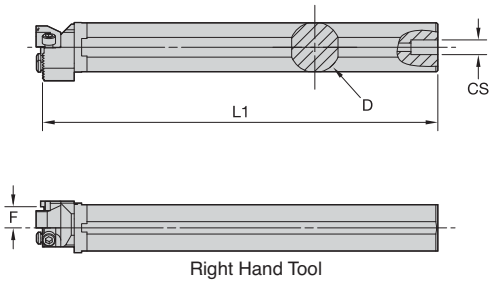


Blade Style	Part Shape	Left Hand	Right Hand
Curve In			
Curve Out			

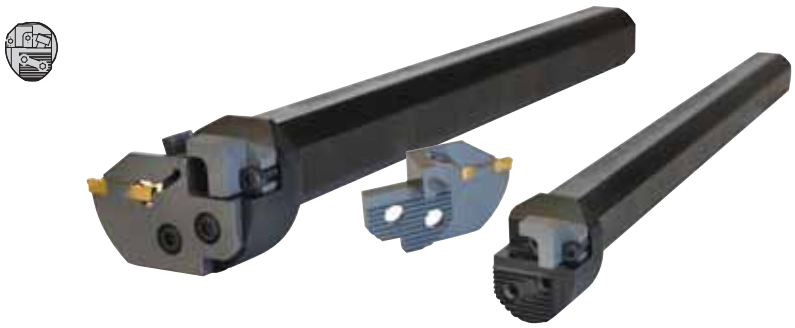




L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2 + .031"



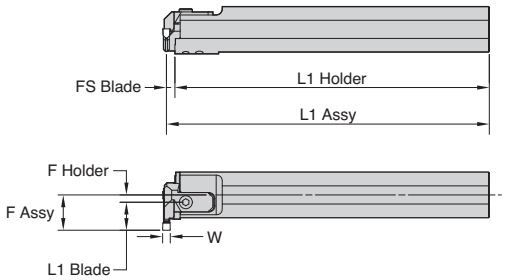
Right Hand Tool


Left Hand Assembly

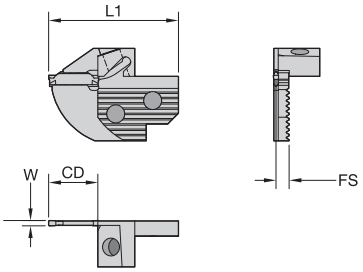
ID Grooving

order number	catalog number	D	F	L1	CS	coolant support screw	coolant spout	coolant support screw	clamp screw
	Right hand								
3656178	**254101**	1.000	-0.630	7.766	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3656180	**254103**	1.250	-0.630	9.766	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3656182	**254105**	1.500	-0.630	11.766	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3656184	**254107**	2.000	-0.512	11.766	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
	Left hand								
3656179	**254102**	1.000	-0.630	7.766	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3656181	**254104**	1.250	-0.630	9.766	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3656183	**254106**	1.500	-0.630	11.766	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3656185	**254108**	2.000	-0.512	11.766	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**

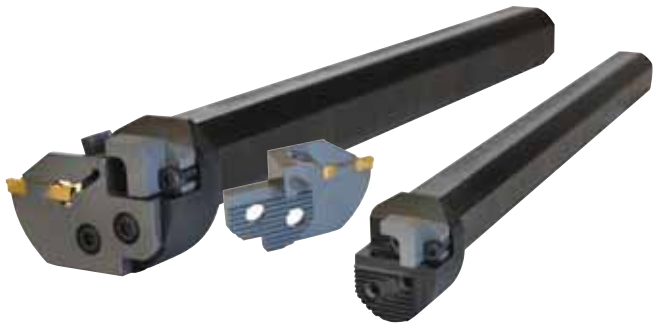
NOTE: Right-hand holders use left-hand cartridges.



L1 Assy = L1 (holder) + FS (blade) + W/2 + .031"
F Assy = F (holder) + L1 (blade)



Left Hand Tool


Left Hand Assembly

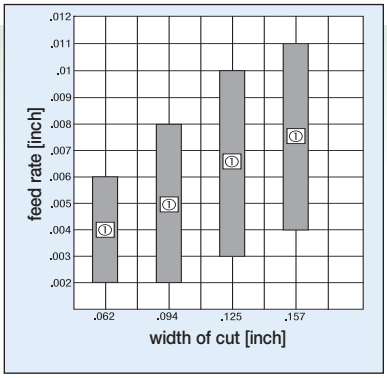
ID Grooving

order number	catalog number	W	CD	FS	L1
	Right hand				
3653739	**350103**	.079	.500	.195	1.932
3653741	**350105**	.094	.625	.185	2.050
3653743	**350107**	.125	.750	.175	2.150
3653745	**350109**	.156	.750	.187	2.150
3653747	**350111**	.187	.850	.170	2.250
3653749	**350113**	.250	.850	.159	2.250
	Left hand				
3653740	**350104**	.079	.500	.195	1.932
3653742	**350106**	.094	.625	.185	2.050
3653744	**350108**	.125	.750	.175	2.150
3653746	**350110**	.156	.750	.187	2.150
3653748	**350112**	.187	.850	.170	2.250
3653750	**350114**	.250	.850	.159	2.250

NOTE: Widths of .187" and .250" are not recommended for 1.000" shank toolholders.
Right-hand holders use left-hand cartridges.

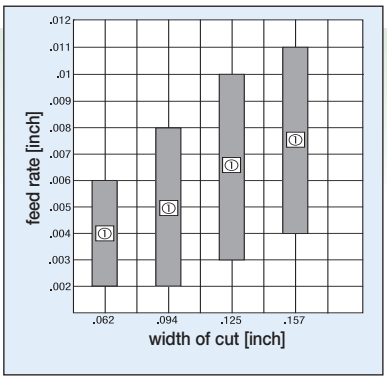
SX Cut-Off Inserts

- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12˚.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.



① Recommended feed

SX-Ultra Cut-Off Inserts

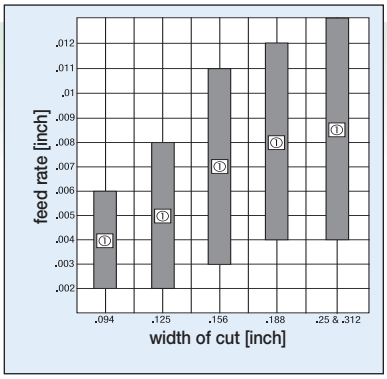


① Recommended feed

- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12˚.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.

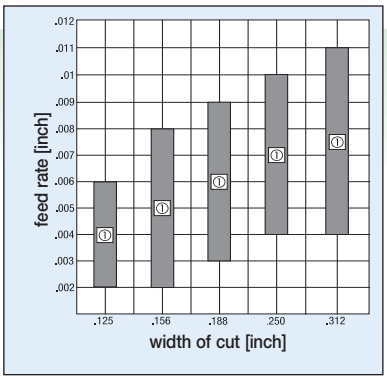
PT Grooving Inserts

- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn OD and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Cuts in both axial and radial direction.



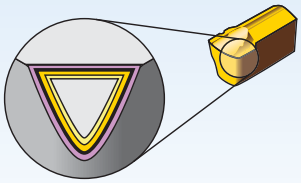
① Recommended feed

PC Grooving and Profiling Inserts



① Recommended feed

- Superior chip control.
- Full nose radius geometry for plunge and contour operations.
- Effective cutting edge geometry exceeds 180° for increased versatility.



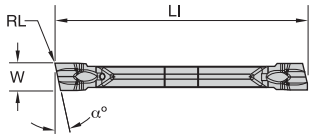
Coatings provide high-speed capability and are engineered for finishing to light roughing.

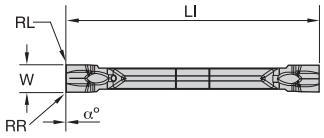
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

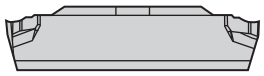
Grade

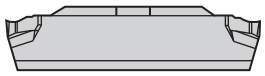
Coating		Grade Description	05	10	15	20	25	30	35	40	45
TN6016	HC-P15	An advanced PVD-TiAlN coating over a tough, fine-grained carbide substrate with increased resistance to heat. Recommended on medium to higher cutting speeds under moderate conditions.	P									
			M									
			K									
			N									
			S									
TN6026	HC-M25	An advanced PVD-TiAlN coating over a superior tough fine-grained carbide substrate, outstanding temperature properties with excellent resistance to avoid built-up edges. Medium to high speeds and feeds. For stainless steels and high-temperature alloys.	P									
			M									
			S									
			H									
TN6031	HC-P30	An advanced PVD-TiAlN coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P									
			M									
			K									
			N									
			S									
			H									

ANSI ISO 513	VDI 3323									
Material Group		Cutting Speed • vc SFM								
		min	Start	max	min	Start	max	min	Start	max
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
P	1	550	**650**	750	440	**540**	640	395	**495**	595
	2	550	**650**	750	495	**595**	695	445	**545**	645
	3	450	**550**	650	405	**505**	605	365	**465**	565
	4	500	**600**	700	450	**550**	650	405	**505**	605
	5	450	**550**	650	405	**505**	605	365	**465**	565
	6	450	**550**	650	405	**505**	605	365	**465**	565
	7	540	**640**	740	485	**585**	685	435	**535**	635
	8	450	**550**	650	405	**505**	605	365	**465**	565
	9	450	**550**	650	405	**505**	605	365	**465**	565
	10	475	**575**	675	430	**530**	630	385	**485**	585
	11	400	**500**	600	360	**460**	560	325	**425**	525
	12	450	**550**	650	405	**505**	605	365	**465**	565
	13.1	450	**550**	650	405	**505**	605	365	**465**	565
	13.2	400	**500**	600	360	**460**	560	325	**425**	525
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
M	14.1	350	**450**	550	315	**415**	515	285	**385**	485
	14.2	280	**380**	480	250	**350**	450	225	**325**	425
	14.3	225	**325**	425	205	**305**	405	180	**280**	380
	14.4	175	**275**	375	160	**260**	360	140	**240**	340
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
K	15	600	**700**	800	540	**640**	740	485	**585**	685
	16	450	**550**	650	405	**505**	605	365	**465**	565
	17	500	**600**	700	450	**550**	650	405	**505**	605
	18	475	**575**	675	430	**530**	630	385	**485**	585
	19	650	**750**	850	585	**685**	785	525	**625**	725
	20	450	**550**	650	405	**505**	605	365	**465**	565
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
N	21	1000	**1100**	1200	900	**1000**	1100			
	22	800	**900**	1000	720	**820**	920			
	23	1000	**1100**	1200	900	**1000**	1100			
	24	800	**900**	1000	720	**820**	920			
	25	700	**800**	900	630	**730**	830			
	26	500	**600**	700	450	**550**	650			
	27	500	**600**	700	450	**550**	650			
	28	500	**600**	700	450	**550**	650			
	29	450	**550**	650	405	**505**	605			
	30	450	**550**	650	405	**505**	605			
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
S	31	170	**270**	370	155	**255**	355	140	**240**	340
	32	120	**220**	320	110	**210**	310	95	**195**	295
	33	125	**225**	325	115	**215**	315	100	**200**	300
	34	100	**200**	300	90	**190**	290	80	**180**	280
	35	110	**210**	310	100	**200**	300	90	**190**	290
	36	220	**320**	420	200	**300**	400	180	**280**	380
	37	125	**225**	325	115	**215**	315	100	**200**	300









RR = RL

● first choice
○ alternate choice

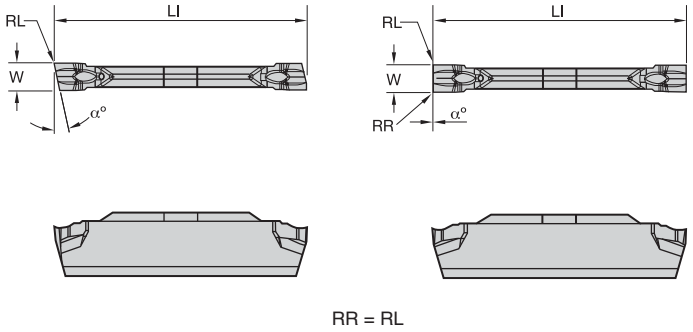
		TN6016	TN6026	TN6031
P		○	●	●
M		○	●	○
K		●	○	●
N		●		○
S			●	○
H				○

■ WMT-SX

	W		RR		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583106	2,39	.094	0,13	.005	22,33	.879	—	N - Neutral	●		●
583111	3,18	.125	0,17	.007	25,44	1.000	—	N - Neutral	●		●

	W		RR		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583108	2,39	.094	0,13	.005	22,33	.879	5	L - Left	●		●
583110	2,39	.094	0,13	.005	22,38	.881	12	L - Left			●
583113	3,18	.125	0,17	.007	25,40	1.000	5	L - Left	●		●
583115	3,18	.125	0,17	.007	25,45	1.002	12	L - Left			●

	W		RL		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583107	2,39	.094	0,13	.005	22,33	.879	5	R - Right	●		●
583109	2,39	.094	0,13	.005	22,38	.881	12	R - Right			●
583112	3,18	.125	0,17	.007	25,40	1.000	5	R - Right	●		●
583114	3,18	.125	0,17	.007	25,45	1.002	12	R - Right			●



RR = RL

● first choice
○ alternate choice

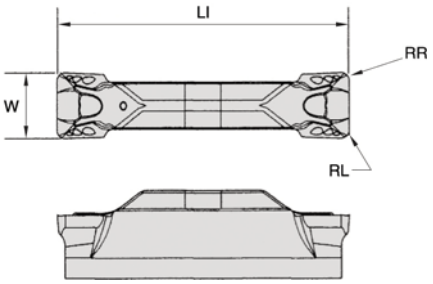
		TN6016	TN6026	TN6031
P		○	●	●
M		○	●	●
K		●	○	●
N		●		○
S			●	○
H				○

WMT-SX Ultra

	W		RR		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583140	2,39	.094	0,13	.005	22,33	.879	—	N - Neutral		●	
583145	3,18	.125	0,17	.007	25,44	1.000	—	N - Neutral		●	

	W		RR		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583142	2,39	.094	0,13	.005	22,33	.879	5	L - Left		●	
583144	2,39	.094	0,13	.005	22,38	.881	12	L - Left		●	
583147	3,18	.125	0,17	.007	25,40	1.000	5	L - Left		●	
583149	3,18	.125	0,17	.007	25,45	1.002	12	L - Left		●	

	W		RL		LI						
catalog number	mm	in	mm	in	mm	in	α°	hand	TN6016	TN6026	TN6031
583141	2,39	.094	0,13	.005	22,33	.879	5	R - Right		●	
583143	2,39	.094	0,13	.005	22,38	.881	12	R - Right		●	
583146	3,18	.125	0,17	.007	25,40	1.000	5	R - Right		●	
583148	3,18	.125	0,17	.007	25,45	1.002	12	R - Right		●	



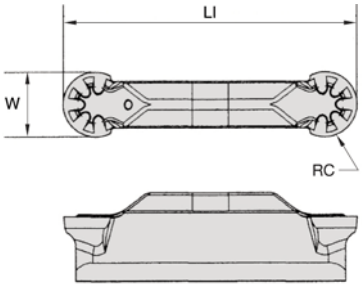
RR = RL

● first choice
○ alternate choice

		TN6016	TN6026	TN6031
P		○	●	●
M		○	●	●
K		●	○	●
N		●		○
S			●	○
H				○

■ WMT-PT

	W		RR		LI					
catalog number	mm	in	mm	in	mm	in	hand	TN6016	TN6026	TN6031
582125	2,39	.094	0,15	.006	22,15	.872	N - Neutral	●		●
582126	2,39	.094	0,38	.015	22,15	.872	N - Neutral	●		●
582101	3,18	.125	0,23	.009	25,40	1.000	N - Neutral	●		●
582102	3,18	.125	0,76	.030	25,40	1.000	N - Neutral	●		●
582103	3,96	.156	0,25	.010	25,40	1.000	N - Neutral	●		●
582104	3,96	.156	0,76	.030	25,40	1.000	N - Neutral	●		●
582105	4,78	.188	0,25	.010	28,63	1.127	N - Neutral	●		●
582106	4,78	.188	0,76	.030	28,63	1.127	N - Neutral	●		●
582107	6,35	.250	0,25	.010	28,63	1.127	N - Neutral	●		●
582108	6,35	.250	0,76	.030	28,63	1.127	N - Neutral	●		●
582110	7,93	.312	0,76	.030	28,58	1.125	N - Neutral	●		●
582148	7,93	.312	1,52	.060	28,58	1.125	N - Neutral	●		●



■ WMT-PC

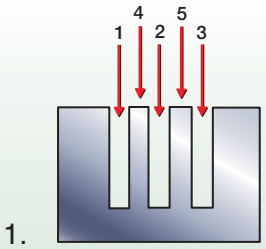
	W		RC		LI				
catalog number	mm	in	mm	in	mm	in	TN6016	TN6026	TN6031
581101	3,18	.125	1,59	.063	25,55	1.006	●		●
581102	3,96	.156	1,98	.078	25,40	1.000	●		●
581103	4,78	.188	2,39	.094	28,65	1.128	●		●
581104	6,35	.250	3,18	.125	29,01	1.142	●		●
581105	7,93	.312	3,96	.156	29,01	1.142	●		●

Troubleshooting

When groove width is greater than insert width, two methods are possible:

1 Multiple-Pass Grooving

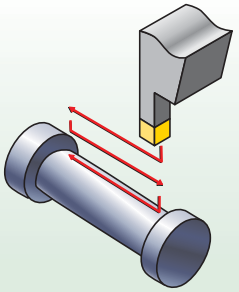
Use the widest possible insert width to achieve optimal chip control and tool life. Make grooves 1, 2, and 3 first, then connect with passes 4 and 5. For passes 4 and 5, the material removed should be no more than 0.8 times the insert width.



1.

2 Grooving and Turning

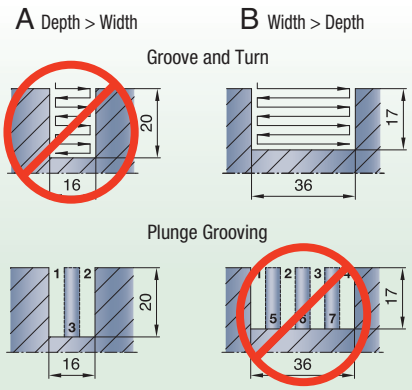
For small and unstable workpieces, this is the preferred method to reduce vibrations experienced when axial grooving. The depth of cut in longitudinal turning should generally be 60–70% of the groove width. Turning in both directions improves tool life.


2.

Choosing the Best Method:

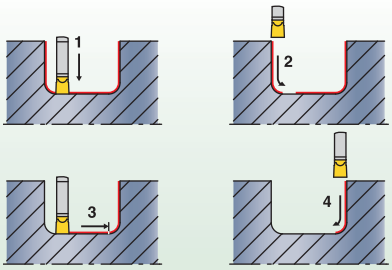
A When the groove depth is greater than the groove width, multiple-pass plunge grooving offers the best results.

B When the groove width is greater than the groove depth, groove and turn (plunge/longitudinal turning) is easier and faster.



Finish Profiling

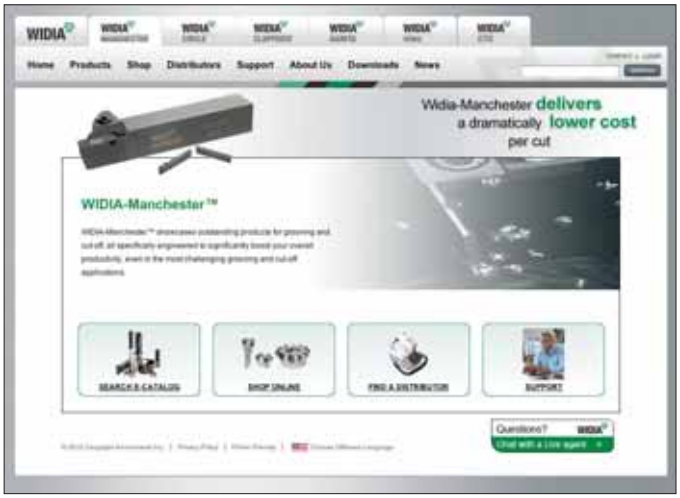
When finish profile machining internal chamfers or radii, take into account that the effective feed rate and chip cross section are reduced (the tool is cutting in both radial and axial directions). The drawing (right) shows the suggested processing sequence for the final pass to reduce vibrations.



WMT Grooving Tool Application Guidelines

- Always use good general machining practices.
- Make the machine and workpiece setup as rigid as possible.
- Integral shank toolholders offer the best rigidity. They should be your first toolholder choice when possible.
- When changing inserts, make sure the new insert locates securely against the toolholder's positive stop.
- Never tighten the clamping screw without an insert in the pocket.
- Toolholder extension out of the tool block should be as short as possible.
- Inserts should cut as close to center as possible or slightly above.
- Dwell time in bottom of groove should be less than three revolutions.
- Recommended cutting speeds and feeds are a starting point. Adjust, as necessary, for optimum tool life and chip control.

On the Web



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Whether your operation is turning, milling, or holemaking, WIDIA brands are the high-performance tooling you need.
We offer standard and custom solutions for the general engineering market.

WIDIA™ TopGroove™

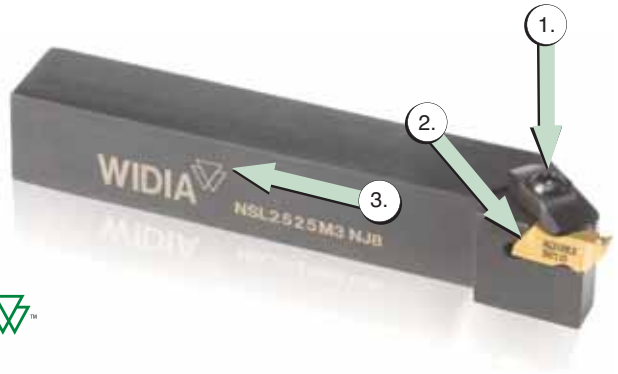
WIDIA has set the industry standard for threading and grooving productivity with the TopGroove clamping design. The proven performance of this system has been enhanced with the addition of new insert geometries and the expansion of our carbide grade offering.

Let us help you select the correct insert for your application needs or upgrade your current TopGroove tooling inventory to include chip control geometries and the high productivity grades available from WIDIA.

Rigidity, Versatility, and Chip Control

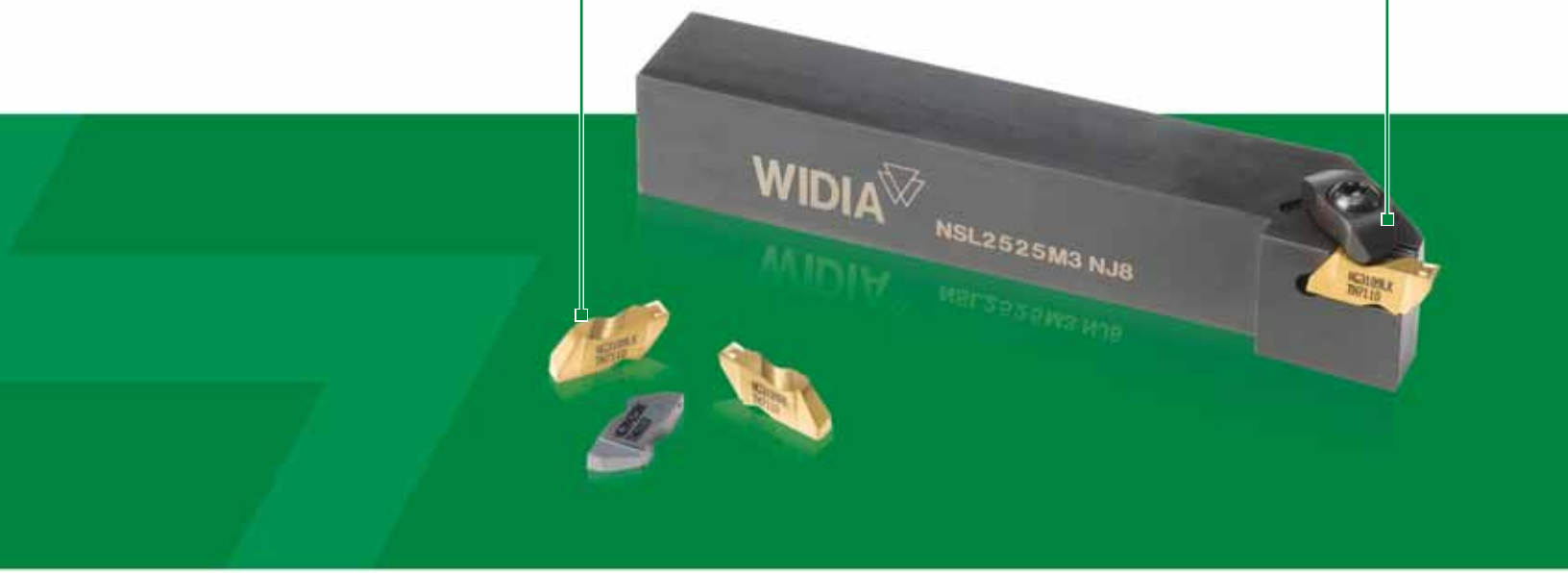
- TopGroove clamping design features a rugged bridge clamp, which locates in a groove molded into the insert to provide superior resistance to side and radial cutting forces.
- TopGroove inserts are available for shallow grooving, deep grooving, light turning, profiling, shallow and deep face grooving, back turning, undercutting, and Poly-Vee grooving
- The patented WIDIA chip control design works in multi-directional turning as well as radial feed applications to provide excellent chip evacuation in deep grooving applications.

Rigid clamping generates locking forces in three directions to hold inserts in place through the toughest cuts.



TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts faster.

The WIDIA™ TopGroove™ clamping system offers a complete line of grooving geometries and an extensive grade selection.



Carbide Grades and Proven Solutions for High Productivity

- The TopGroove system has a carbide grade to match your application needs that includes uncoated grades, PVD-coated grades, CVD-coated grades, and advanced material grades, including cermets, ceramics, PCBNs, and PCDs.
- New, improved PVD TiAlN-coated grades are designed to cut a variety of workpiece materials.
- Versatile design enables one system to handle OD and ID grooving, face grooving, back turning, undercutting, and even threading operations.
- New CVD TN7110 grade.

The Most Advanced Turning Solutions in the Industry

Perfect for shallow grooving operations, the WIDIA TopGroove clamping system provides a complete line of grooving geometries and an extensive grade selection to meet even the most demanding application requirements. For increased rigidity, versatility, chip control, and carbide grade options, the TopGroove clamping system is the proven solution.

With maximum clamping rigidity and superior versatility, TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts, faster than ever before.

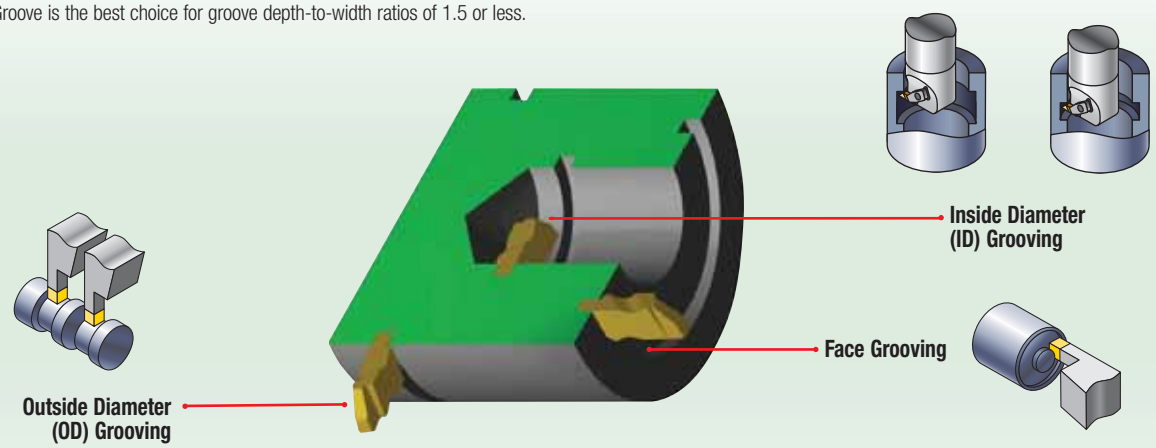
Utilize this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

What you need to know:

- Material being machined.
- Groove depth, width, and profile.
- Application to be performed (face, OD, or ID grooving).
- Toolholder requirements (e.g., KM™, Erickson™, square shank, right/left).

1 Choose the application to be performed:

Groove depth, width, and profile.
TopGroove is the best choice for groove depth-to-width ratios of 1.5 or less.



For deep grooving, use WMT™ on page D4.

TopGroove™ for Internal, External, and Face Grooving Applications

system capabilities			minimum	maximum
	OD/ID Grooving	width	.020" (0,50mm)	.375" (9,53mm)
		depth	—	.500" (12,7mm)
	Face Grooving	width	.125" (3,2mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)
	Internal Grooving	diameter	.440" (11,2mm)	—
	Face Grooving Diameter	standard	.940" (23,9mm)	—
		deep	—	—
	Deep OD/ID Grooving	width	.059" (1,50mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)
	Deep Face Grooving	width	.125" (3,18mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)

2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

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

3 Select your toolholder based on the application:

A Choose the appropriate gage insert (width) required for the application.

B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

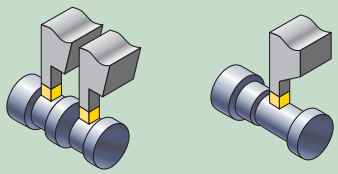
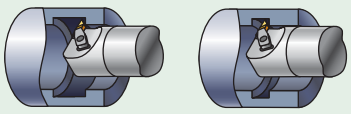
C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

TopGroove™
Toolholders

WIDIA MANCHESTER

■ NS

		C						B	A			
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639035	NSR062V	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639026	NSR122B	.750	.750	1.000	4.50	.75	.35	.138	N.2R	CM74	S310	7/64
3639025	NSR162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	CM74	S310	7/64
3639027	NSR123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3639023	NSR123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3638592	NSR163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3638591	NSR163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3639028	NSR203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3637506	NSR243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM72LP	S2112	25 IP
3637535	NSR243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM72LP	S2112	25 IP
3637496	NSR853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	S2112	25 IP
3637509	NSR205D	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	CM80	S352	1/4
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	1/4
	Left hand											
3632161	NSL062	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	7/64
3637495	NSL062V	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	7/64
3637510	NSL102B	.625	.625	.875	4.50	.75	.35	.138	N.2L	CM75	S310	7/64
3632145	NSL122B	.750	.750	1.000	4.50	.75	.35	.138	N.2L	CM75	S310	7/64
3632138	NSL162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	CM75	S310	7/64
3632152	NSL123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	CM73LP	S2112	25 IP

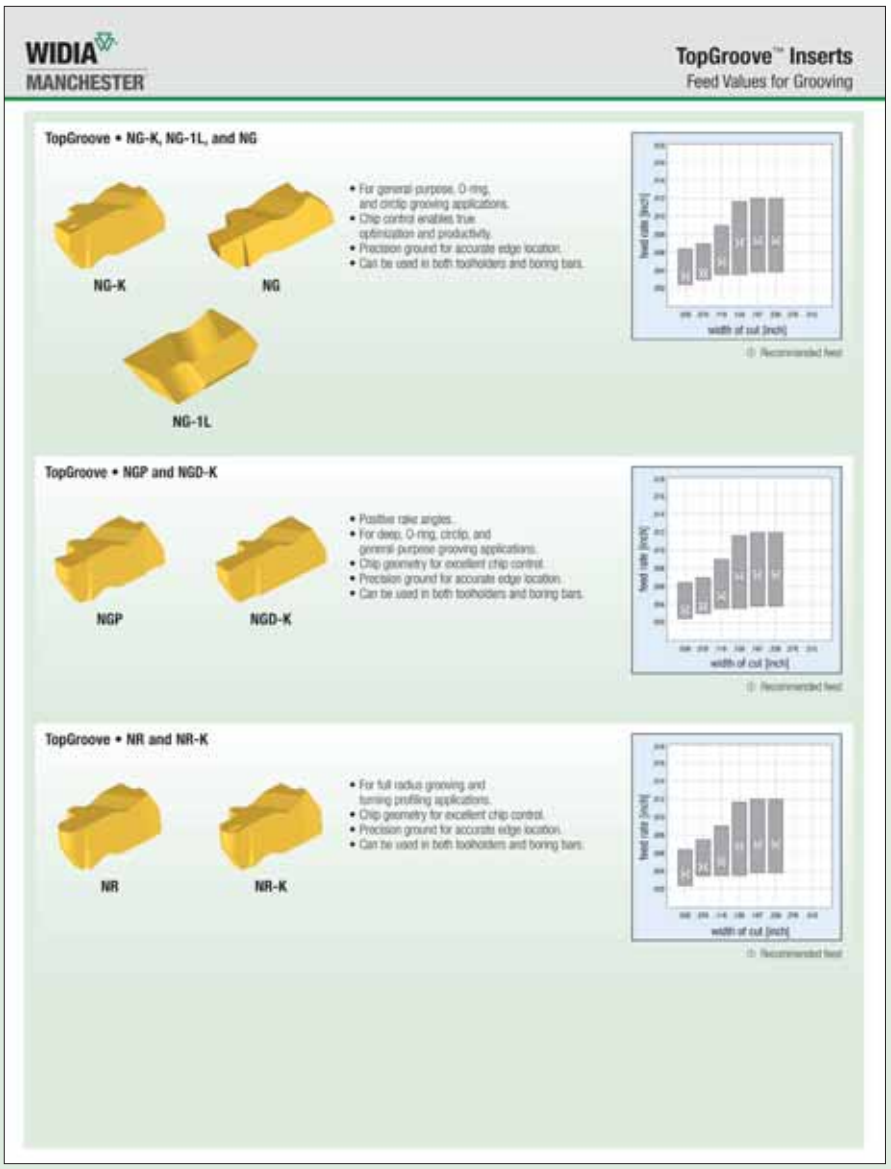
	application	conventional toolholders	modular blades
	OD Grooving and Plunge and Turn	page D38	—
	ID Grooving	page D42	—

4 Select chipbreaker style for the application:

See application guide on page D44 for a complete list of insert styles.

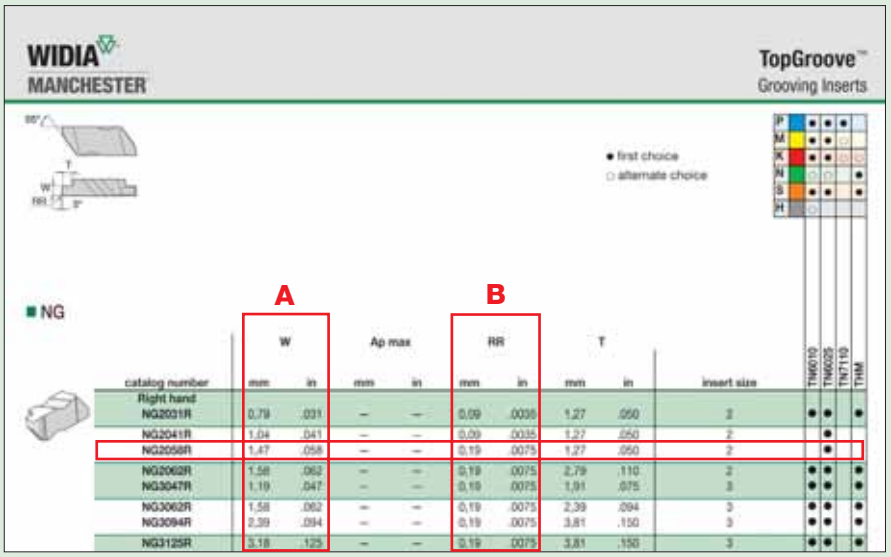
NOTE: Chart shows recommended starting feed rates.

See page D45.



A Choose the appropriate insert width "W" for your specific application.

B Select the required corner radius value "RR".



5 Select grade:

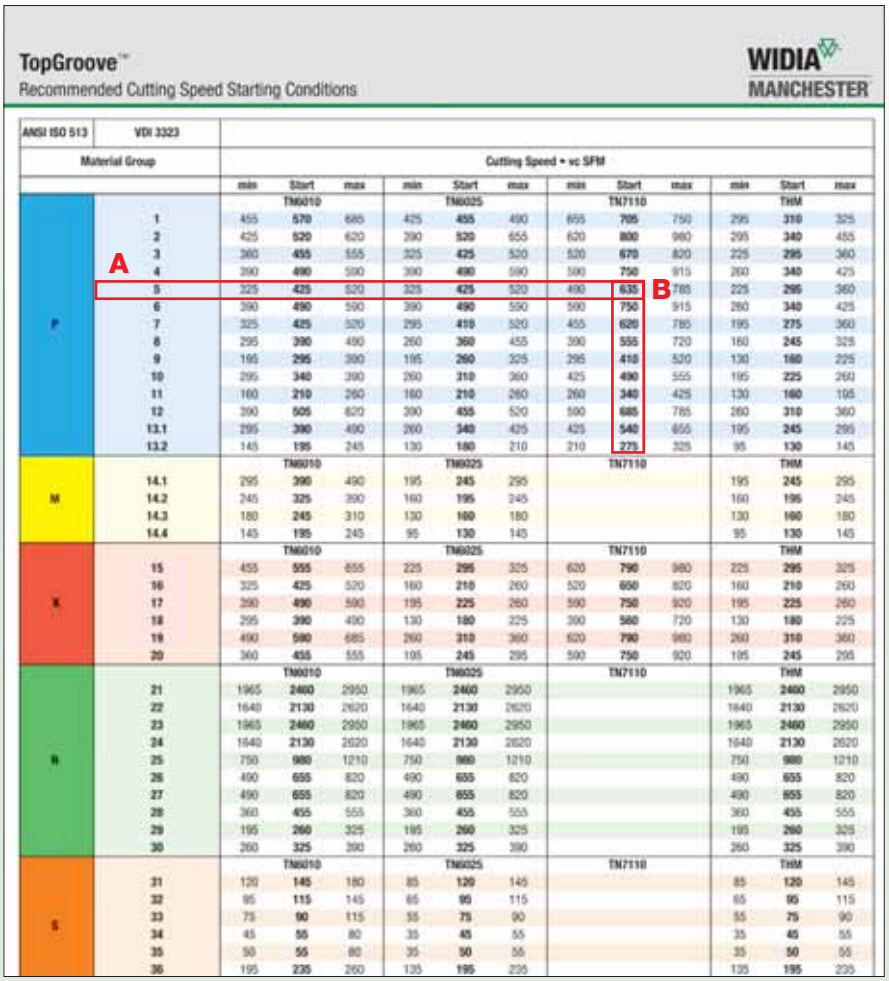
cutting condition		Recommended Grades: steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		TN7110	TN6010	TN7110	TN6010	TN6010	TN6010
varying depth of cut, casting, or forging skin		TN6010	TN6010	TN6010	TN6010	TN6010	TN6010
lightly interrupted cut		TN6025	TN6025	TN6025	TN6025	TN6025	TN6025
heavily interrupted cut		TN6025	TN6025	TN6025	TN6025	TN6025	TN6025

See page D46 for Grades and Grade Descriptions.

6 Determine cutting data:

- **A** Based on material group and grade, identify starting speed (vc).
- **B** First choice starting speed is in **bold**.

See page D48 for cutting data.

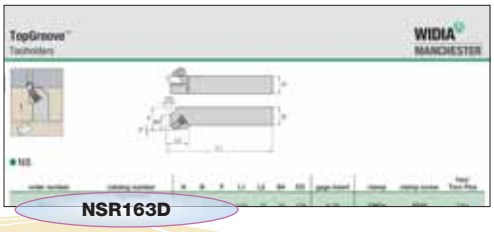


TopGroove™
Recommended Cutting Speed Starting Conditions

WIDIA MANCHESTER

ANSI ISO 513	VDI 3323		Cutting Speed • vc SFM											
Material Group			min	Start	max	min	Start	max	min	Start	max	min	Start	max
			TN6010			TN6025			TN7110			THM		
P		1	455	570	685	425	455	490	655	705	750	295	310	325
		2	425	520	620	390	520	655	620	800	980	295	340	455
		3	360	455	555	325	425	520	520	670	820	225	295	360
	A	4	390	490	590	390	490	590	590	750	915	260	340	425
		5	325	425	520	325	425	520	490	635	785	225	295	360
		6	390	490	590	390	490	590	590	750	915	260	340	425
		7	325	425	520	295	410	520	455	620	785	195	275	360
		8	295	390	490	260	360	455	390	555	720	160	245	325
		9	195	295	390	195	260	325	295	410	520	130	180	225
		10	295	340	390	260	310	360	425	490	555	195	225	260
		11	160	210	260	160	210	260	260	340	425	130	160	195
		12	390	505	620	390	455	520	590	685	785	260	310	360
		13.1	295	390	490	260	340	425	425	540	655	195	245	295
		13.2	145	195	245	130	180	210	210	275	325	95	130	145
			TN6010			TN6025			TN7110			THM		
M		14.1	295	390	490	195	245	295				195	245	295
		14.2	245	325	390	160	195	245				160	195	245
		14.3	180	245	310	130	160	180				130	160	180
		14.4	145	195	245	95	130	145				95	130	145
			TN6010			TN6025			TN7110			THM		
K		15	455	555	655	225	295	325	620	790	980	225	295	325
		16	325	425	520	160	210	260	520	650	820	160	210	260
		17	390	490	590	195	225	260	590	750	920	195	225	260
		18	295	390	490	130	180	225	390	560	720	130	180	225
		19	490	590	685	260	310	360	620	790	980	260	310	360
		20	360	455	555	195	245	295	590	750	920	195	245	295
			TN6010			TN6025			TN7110			THM		
N		21	1965	2460	2950	1965	2460	2950				1965	2460	2950
		22	1640	2130	2620	1640	2130	2620				1640	2130	2620
		23	1965	2460	2950	1965	2460	2950				1965	2460	2950
		24	1640	2130	2620	1640	2130	2620				1640	2130	2620
		25	750	980	1210	750	980	1210				750	980	1210
		26	490	655	820	490	655	820				490	655	820
		27	490	655	820	490	655	820				490	655	820
		28	360	455	555	360	455	555				360	455	555
		29	195	260	325	195	260	325				195	260	325
		30	260	325	390	260	325	390				260	325	390
			TN6010			TN6025			TN7110			THM		
S		31	120	145	180	85	120	145				85	120	145
		32	95	115	145	65	95	115				65	95	115
		33	75	90	115	55	75	90				55	75	90
		34	45	55	80	35	45	55				35	45	55
		35	50	55	80	35	50	55				35	50	55
		36	195	235	260	135	195	235				135	195	235

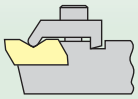
TopGroove Holder Identification System



N	S	R		16	3	D
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length

N — Insert Holding Method

N — TopGroove*

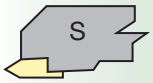


*Proprietary standard only.

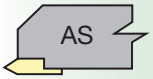
S — Insert Mounting Location

End mount

Side mount Offset



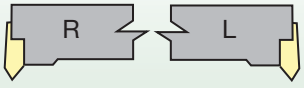
Side mount No offset for swiss machining



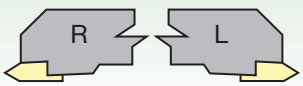
NRR Undercut

R — Hand of Tool

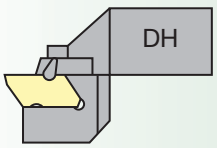
End mount



Side mount



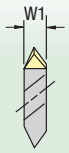
Drop Head



16 — Shank Size

Inch:
For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

3 — Insert Size



insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

D — Qualified Surface and Length

A – qualified back and end, 4" long

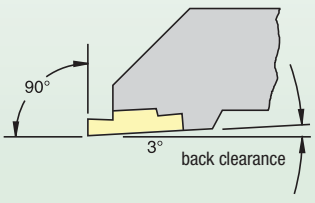
B – qualified back and end, 4.5" long

C – qualified back and end, 5" long

D – qualified back and end, 6" long

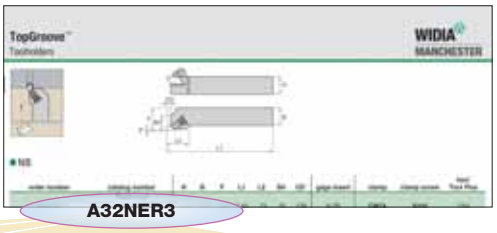
E – qualified back and end, 7" long

V – qualified back and end, 3.5" long*



NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

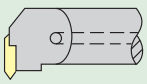
TopGroove
Boring Bar Identification System



A	32	N	E	R	3
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size

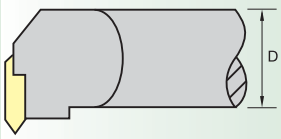
A — Bar Type

Steel with coolant



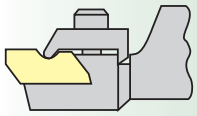
32 — Bar Diameter

A two-digit number that indicates the bar diameter in 1/16" increments.



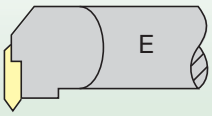
N — Insert Holding Method

N — TopGroove



E — Insert Location

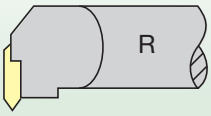
End mount



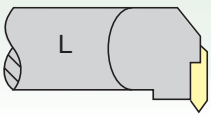
Side mount

R — Hand of Tool

Right hand

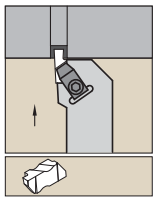


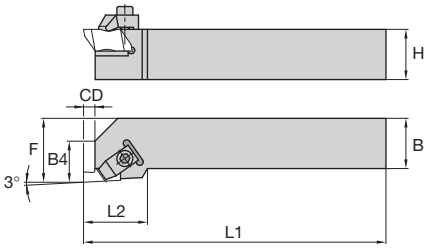
Left hand



3 — Insert Size

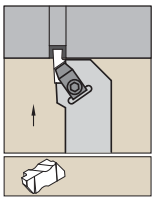
insert size	T
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

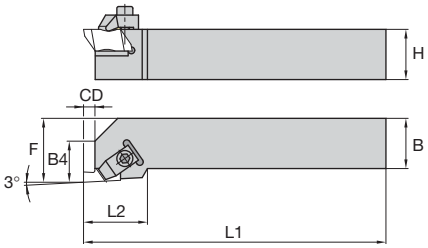




NS

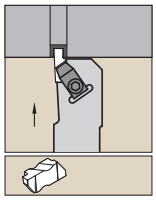
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3632147	**NSR062**	.375	.375	.562	2.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639035	**NSR082V**	.500	.500	.750	3.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639044	**NSR102B**	.625	.625	.875	4.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639026	**NSR122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639025	**NSR162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	**CM74**	**S310**	7/64
3639027	**NSR123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639023	**NSR123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3638592	**NSR163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3638591	**NSR163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639028	**NSR203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637506	**NSR243D**	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637535	**NSR243E**	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637496	**NSR853D**	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637509	**NSR205D**	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	**CM80**	**S352**	1/4
3637540	**NSR245D**	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	**CM80**	**S352**	1/4
	Left hand											
3632161	**NSL062**	.375	.375	.562	2.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3637485	**NSL082V**	.500	.500	.750	3.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3637510	**NSL102B**	.625	.625	.875	4.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632145	**NSL122B**	.750	.750	1.000	4.50	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632138	**NSL162C**	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	**CM75**	**S310**	7/64
3632152	**NSL123A**	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639032	**NSL123B**	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639029	**NSL163C**	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639024	**NSL163D**	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639037	**NSL203D**	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637515	**NSL243D**	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637548	**NSL243E**	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637508	**NSL853D**	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637536	**NSL205D**	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5L	**CM81**	**S352**	1/4

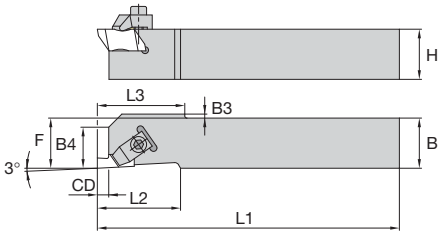




NS (with shim)

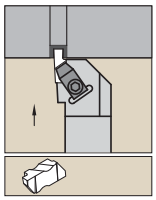
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus	shim	shim screw	shim screw ID drive size
	Right hand														
3639031	**NSR164C**	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3639033	**NSR164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637529	**NSR204C**	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3639034	**NSR204D**	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637484	**NSR244D**	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637501	**NSR244E**	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637526	**NSR854D**	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637534	**NSR864E**	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4R	**CM72LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3632153	**NSR166D**	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R	**CM120**	**S412**	5/32	**SM416**	**S111**	1/16
3637472	**NSR206D**	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R	**CM120**	**S412**	5/32	**SM416**	**S111**	1/16
3637520	**NSR246D**	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6R	**CM120**	**S412**	5/32	**SM416**	**S111**	1/16
3637539	**NSR168D**	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R	**CM144**	**S422**	3/16	**SM419**	**S112**	1/16
	Left hand														
3632151	**NSL164C**	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3639040	**NSL164D**	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3641699	**NSL204C**	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3639036	**NSL204D**	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637505	**NSL244D**	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637533	**NSL244E**	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637541	**NSL854D**	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3641700	**NSL864E**	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4L	**CM73LP**	**S2112**	25 IP	**SM420**	**SL344**	–
3637487	**NSL166D**	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6L	**CM121**	**S412**	5/32	**SM416**	**S111**	1/16
3637507	**NSL206D**	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6L	**CM121**	**S412**	5/32	**SM416**	**S111**	1/16
3637546	**NSL246D**	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6L	**CM121**	**S412**	5/32	**SM416**	**S111**	1/16

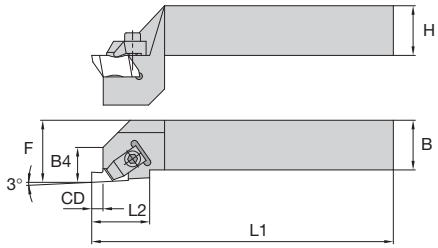




NAS (for Swiss Machines)

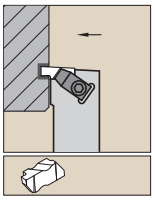
order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand													
3632140	**NASR062D**	.375	.375	.375	6.00	.75	.35	.138	.07	.88	N.2R	**CM182**	**S310**	7/64
3636529	**NASR082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	**CM182**	**S310**	7/64
3639039	**NASR102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R	**CM74**	**S310**	7/64
3639042	**NASR083D**	.500	.500	.500	6.00	1.25	.50	.210	.13	1.32	N.3R	**CM184LP**	**S2112**	25 IP
3636532	**NASR103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R	**CM184LP**	**S2112**	25 IP
	Left hand													
3637531	**NASL062D**	.375	.375	.375	6.00	.75	.35	.138	.07	.88	N.2L	**CM183**	**S310**	7/64
3636534	**NASL082D**	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L	**CM183**	**S310**	7/64
3637489	**NASL102B**	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2L	**CM75**	**S310**	7/64
3637497	**NASL083D**	.500	.500	.500	6.00	1.25	.50	.210	.13	1.32	N.3L	**CM185**	**S412**	25 IP
3636524	**NASL103B**	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L	**CM185LP**	**S2112**	25 IP

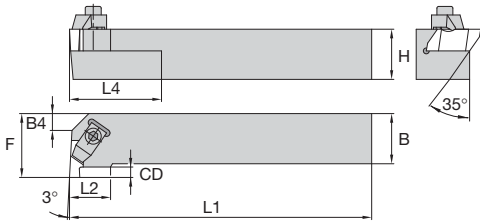




NS-DH

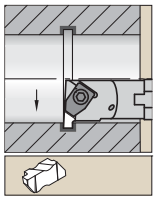
order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus	jack screw	wrench size jack screw
	Right hand													
3637547	**NSRDH122B**	.750	.750	1.000	4.50	.75	.40	.138	N.2R	**CM74**	**S310**	7/64	**—**	—
3637499	**NSRDH163C**	1.000	1.000	1.250	5.00	1.25	.58	.210	N.3R	**CM72LP**	**S2112**	25 IP	**—**	—
3637528	**NSRDH163D**	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R	**CM72LP**	**S2112**	25 IP	**—**	—
3637511	**NSRDH203D**	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3R	**CM72LP**	**S2112**	25 IP	**S965**	3/16
3637530	**NSRDH204D**	1.250	1.250	1.500	6.00	1.38	.62	.294	N.4R	**CM72LP**	**S2112**	25 IP	**S965**	3/16
	Left hand													
3637518	**NSLDH203D**	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3L	**CM73LP**	**S2112**	25 IP	**S965**	3/16



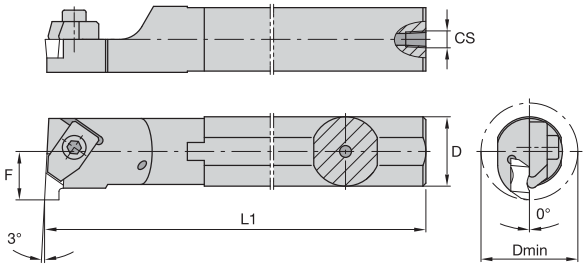


NE

order number	catalog number	H	B	F	L1	L2	L4	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand												
3637521	**NER062**	.375	.375	.750	2.50	.50	.50	—	.138	N.2L	**CM75**	**S310**	7/64
3637494	**NER082V**	.500	.500	.750	3.50	.50	1.00	—	.138	N.2L	**CM75**	**S310**	7/64
3637517	**NER102B**	.625	.625	.750	4.50	—	1.00	—	.138	N.2L	**CM75**	**S310**	7/64
3632156	**NER122B**	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2L	**CM75**	**S310**	7/64
3637486	**NER162C**	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2L	**CM75**	**S310**	7/64
3632133	**NER123B**	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639030	**NER163D**	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639038	**NER163C**	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3632150	**NER203D**	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637523	**NER853D**	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	**CM73LP**	**S2112**	25 IP
3637524	**NER243D**	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3L	**CM73LP**	**S2112**	25 IP
3639043	**NER164D**	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4L	**CM73LP**	**S2112**	25 IP
3637492	**NER164C**	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4L	**CM73LP**	**S2112**	25 IP
3632157	**NER204D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4L	**CM73LP**	**S2112**	25 IP
3637522	**NER244D**	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4L	**CM73LP**	**S2112**	25 IP
3637542	**NER205D**	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5L	**CM81**	**S352**	1/4
3637544	**NER206D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6L	**CM121**	**S412**	5/32
	Left hand												
3637525	**NEL062**	.375	.375	.750	2.50	.50	.50	—	.138	N.2R	**CM74**	**S310**	7/64
3632158	**NEL082V**	.500	.500	.750	3.50	.50	1.00	—	.138	N.2R	**CM74**	**S310**	7/64
3637532	**NEL102B**	.625	.625	.750	4.50	—	1.00	—	.138	N.2R	**CM74**	**S310**	7/64
3637503	**NEL122B**	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2R	**CM74**	**S310**	7/64
3637500	**NEL162C**	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2R	**CM74**	**S310**	7/64
3632144	**NEL123B**	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3639041	**NEL163D**	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3632155	**NEL163C**	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3632154	**NEL203D**	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637538	**NEL853D**	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637537	**NEL243D**	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3R	**CM72LP**	**S2112**	25 IP
3637493	**NEL164C**	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4R	**CM72LP**	**S2112**	25 IP
3632162	**NEL164D**	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4R	**CM72LP**	**S2112**	25 IP
3632159	**NEL204D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4R	**CM72LP**	**S2112**	25 IP
3637543	**NEL244D**	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4R	**CM72LP**	**S2112**	25 IP
3637549	**NEL205D**	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5R	**CM80**	**S352**	1/4
3641697	**NEL206D**	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6R	**CM120**	**S412**	5/32



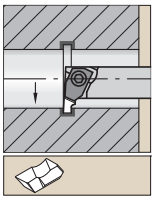
Steel shank with through coolant.



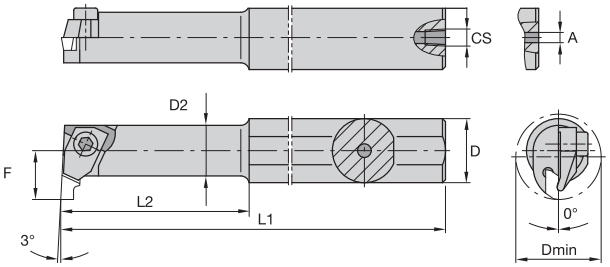
A-NE

order number	catalog number	D	D min	L1	F	CS	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand									
3632117	**A08NER2**	.500	.730	8.000	.437	1/16-27 NPT	N.2L	**CM147**	**S39**	7/64
3632114	**A10NER2**	.625	1.000	10.000	.500	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632118	**A12NER2**	.750	1.125	10.000	.562	1/8-27 NPT	N.2L	**CM75**	**S310**	7/64
3632130	**A16NER2**	1.000	1.375	12.000	.688	1/4-18 NPT	N.2L	**CM75**	**S310**	7/64
3632113	**A16NER3**	1.000	1.375	12.000	.688	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632116	**A20NER3**	1.250	1.750	14.000	.875	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632115	**A24NER3**	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632132	**A28NER3**	1.750	2.250	14.000	1.125	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632122	**A32NER3**	2.000	2.500	16.000	1.250	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632146	**A40NER3**	2.500	3.000	16.000	1.500	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3632123	**A28NER4**	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632125	**A32NER4**	2.000	2.750	16.000	1.375	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3632136	**A40NER4**	2.500	3.250	16.000	1.625	1/4-18 NPT	N.4L	**CM73LP**	**S2112**	25 IP
3637514	**A32NER5**	2.000	2.812	16.000	1.406	1/4-18 NPT	N.5L	**CM81**	**S352**	1/4
3632143	**A32NER6**	2.000	2.750	16.000	1.375	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
3637498	**A40NER6**	2.500	3.250	16.000	1.625	1/4-18 NPT	N.6L	**CM121**	**S412**	5/32
	Left hand									
3632131	**A08NEL2**	.500	.730	8.000	.437	1/16-27 NPT	N.2R	**CM146**	**S39**	7/64
3632127	**A10NEL2**	.625	1.000	10.000	.500	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632126	**A12NEL2**	.750	1.125	10.000	.562	1/8-27 NPT	N.2R	**CM74**	**S310**	7/64
3632142	**A16NEL2**	1.000	1.375	12.000	.688	1/4-18 NPT	N.2R	**CM74**	**S310**	7/64
3632120	**A16NEL3**	1.000	1.375	12.000	.688	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632124	**A20NEL3**	1.250	1.750	14.000	.875	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632128	**A24NEL3**	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637490	**A28NEL3**	1.750	2.250	14.000	1.125	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632139	**A32NEL3**	2.000	2.500	16.000	1.250	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637504	**A40NEL3**	2.500	3.000	16.000	1.500	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632141	**A28NEL4**	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3632149	**A32NEL4**	2.000	2.750	16.000	1.375	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637491	**A40NEL4**	2.500	3.250	16.000	1.625	1/4-18 NPT	N.4R	**CM72LP**	**S2112**	25 IP
3637527	**A32NEL5**	2.000	2.812	16.000	1.406	1/4-18 NPT	N.5R	**CM80**	**S352**	1/4
3637512	**A32NEL6**	2.000	2.750	16.000	1.375	1/4-18 NPT	N.6R	**CM120**	**S412**	5/32

NOTE: Minimum bore capability varies with depth of groove. See pages D66–D67 for details.



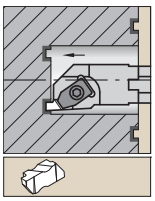
Necked steel shank
with through coolant.



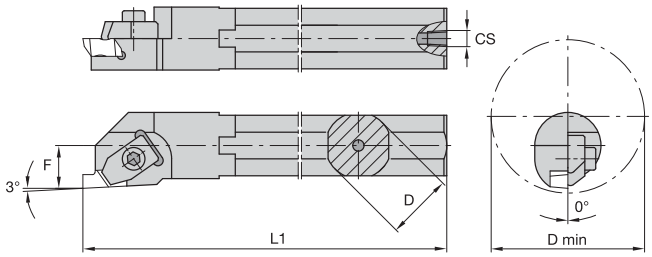
A-NE-1

order number	catalog number	D	D min	D2	L1	L2	F	A	CS	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand												
3632121	**A06NER1**	.375	.440	.312	6	1.25	.258	.125	—	N.1L	**CM109**	**S304**	5/64
3632119	**A08NER1**	.500	.440	.312	8	1.25	.258	—	1/16-27 NPT	N.1L	**CM109**	**S304**	5/64
3632148	**A10NER1**	.625	.800	—	10	—	.406	—	1/8-27 NPT	N.1L	**CM109**	**S304**	5/64

NOTE: Minimum bore capability varies with depth of groove. See pages D66–D67 for details.



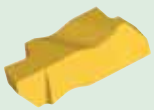
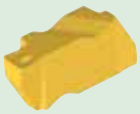
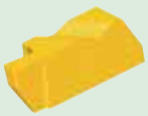
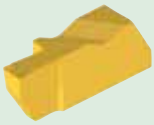
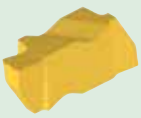
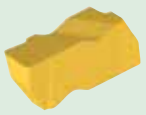
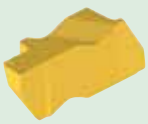
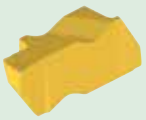
Steel shank with
through coolant.

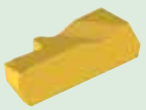
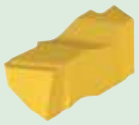
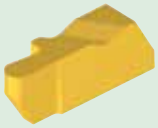
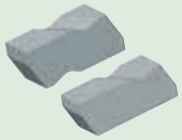


A-NS

order number	catalog number	D	D min	L1	F	CS	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand									
3632129	**A16TNSR3**	1.000	2.250	12	.640	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632135	**A20UNSR3**	1.250	2.250	14	.765	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632134	**A24UNSR3**	1.500	2.250	14	.890	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637516	**A28UNSR3**	1.750	2.250	14	1.015	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3632160	**A32VNSR3**	2.000	2.375	16	1.281	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
3637513	**A40VNSR3**	2.500	2.875	16	1.531	1/4-18 NPT	N.3R	**CM72LP**	**S2112**	25 IP
	Left hand									
3632137	**A16TNSL3**	1.000	2.250	12	.640	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3637495	**A20UNSL3**	1.250	2.250	14	.765	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3637488	**A24UNSL3**	1.500	2.250	14	.890	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP
3637502	**A32VNSL3**	2.000	2.375	16	1.281	1/4-18 NPT	N.3L	**CM73LP**	**S2112**	25 IP

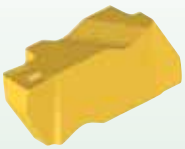
NOTE: Minimum bore capability varies with depth of groove. See pages D66–D67 for details.

insert style	application	rake angle	page(s)
NG 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	neutral	**D49**
NG-K 	• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive	**D50**
NGC-K* 	• Combined groove and chamfered edge break in one positive plunge with chip control. • Designed for DIN 471/472 standard circlip grooves.	10° positive	—
NGD* 	• Deep grooving.	neutral	—
NGD-K 	• Chip control geometry. • Deep grooving. • Light turning.	10° positive	**D53**
NGP 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive	**D54**
NF* 	• Face grooving. • Additional side clearance.	neutral	—
NF-K 	• Face grooving with chip control. • Additional side clearance.	10° positive	**D55**
NFD-K 	• Deep face grooving with chip control. • Additional side clearance.	10° positive	**D55**

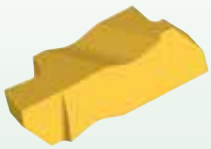
insert style	application	rake angle	page(s)
NFD-KI* 	• Internal deep face grooving with chip control. • For use in boring bars for internal face grooves.	10° positive	—
NP-K 	• Turning. • Back turning positive. • Profiling with chip control.	10° positive	**D56**
NR 	• Full radius grooving. • Turning and profiling.	neutral	**D56**
NR-K 	• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive	**D58**
NRD 	• Deep grooving. • Full radius end-form.	neutral	**D58**
NRP* 	• Full radius grooving. • Light-turning profiling.	5° positive	—
NU* 	• Undercutting.	neutral	—
NV* 	• Poly-Vee grooving.	neutral	—
NB/NBD 	• Blanks. • Blanks for deep grooving. • Available in uncoated grades only.	—	**D59**

*Inserts are available as custom solutions.

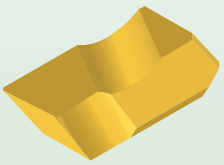
TopGroove • NG-K, NG-1L, and NG



NG-K

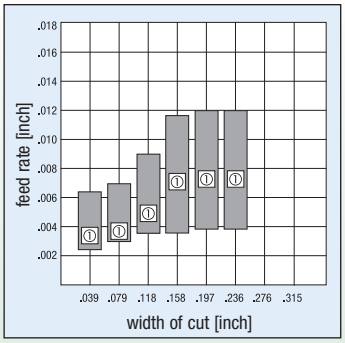


NG



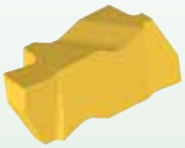
NG-1L

- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

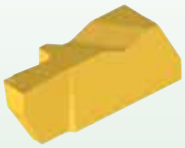


① Recommended feed

TopGroove • NGP and NGD-K

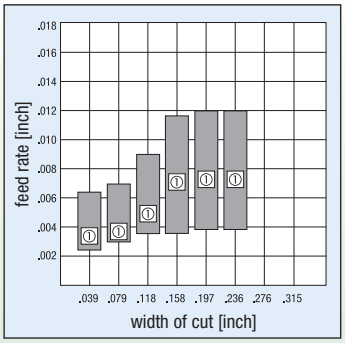


NGP



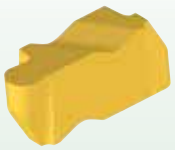
NGD-K

- Positive rake angles.
- For deep, O-ring, circlip, and general-purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

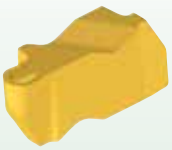


① Recommended feed

TopGroove • NR and NR-K

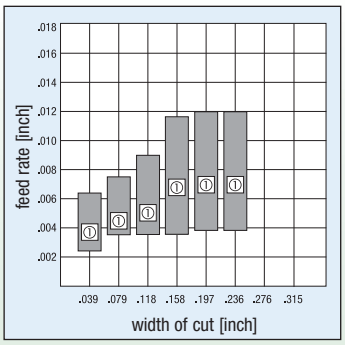


NR

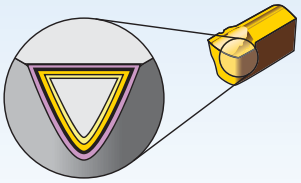


NR-K

- For full radius grooving and turning profiling applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



① Recommended feed



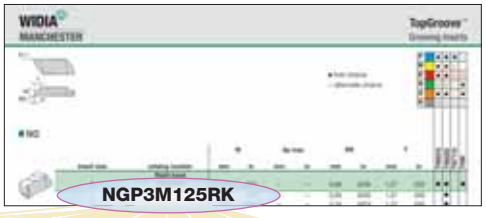
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade

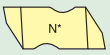
Coating		Grade Description	05	10	15	20	25	30	35	40	45
TN6010	HC-S10	Coated carbide. PVD — TiAlN Nano-multi-layer. Light machining. For difficult-to-machine alloys.	P	P	P	P					
			M	M	M	M					
			K	K	K	K					
			N	N	N	N					
			S	S	S	S					
			H	H							
TN6025	HC-S25	Coated carbide. PVD — TiAlN Nano-multi-layer. Light and medium machining. For difficult-to-machine alloys.				P	P	P			
						M	M	M			
						K	K	K			
						N	N	N			
						S	S	S			
TN7110	HC-P10	Coated carbide. MTCVD/CVD — TiN-TiCN-Al_2O_3-TiN. Very wear resistant. Light and medium machining. For steels and nodular cast iron.	P	P	P	P					
			K		K	K					
THM	HW-K15	Uncoated carbide. Extraordinarily good balance of hardness, wear resistance, edge stability, and toughness. Light and medium machining. For cast iron and all non-ferrous metals and non-metals. Useful in unfavorable conditions.	P	P	P	P					
			M	M	M	M					
			K	K	K	K					
			N	N	N	N					
			S	S	S	S					
			H	H	H	H					

TopGroove
Insert Identification System



N — Type of Insert

N — TopGroove



G — Insert Style

B — Blank (for special forms)

F — Face grooving

G — Grooving

P — Back turning

R — Full radius

U — Undercutting (or relieving)

V — Poly-Vee

P — Additional Information

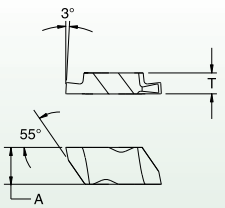
D — Deep grooving

P — Positive

C — Groove and chamfer

3 — Insert Size

insert size	S inch	S mm	W1 inch	W1 mm
1	.100	2,54	.100	2,54
2	.219	5,56	.150	3,81
3	.344	8,74	.195	4,95
4	.453	11,51	.255	6,98
5	.688	17,48	.380	9,65
6	.453	11,51	.383	9,73



M — Size Identification

M — Metric insert groove width

C — Circlip groove insert width is nominal circlip size

Blank — indicates inch width insert

125 — Groove Size**

Groove width for F-, G-, and U-style inserts; radii for R-style grooving inserts; and circlip size for groove and chamfer inserts. Dimension in .001".

inch example
1/32 = .031"

Width Tolerance: ±.001" unless otherwise specified

**Omit position for TopGroove NB-style blanks.

R — Hand of Insert

L — Left hand

R — Right hand

Cutting Depth

Shown for groove and chamfer inserts in .0004" increments.

K — Chipbreaker Design

K — Standard chip control

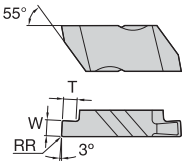
E — Hone only

Definition of Inserts

Groove size

J or L — Poly-Vee inserts
I — Internal face grooving

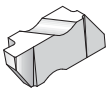
ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			TN6010			TN6025			TN7110			THM	
P	1	455	**570**	685	425	**455**	490	655	**705**	750	295	**310**	325
	2	425	**520**	620	390	**520**	655	620	**800**	980	295	**340**	455
	3	360	**455**	555	325	**425**	520	520	**670**	820	225	**295**	360
	4	390	**490**	590	390	**490**	590	590	**750**	915	260	**340**	425
	5	325	**425**	520	325	**425**	520	490	**635**	785	225	**295**	360
	6	390	**490**	590	390	**490**	590	590	**750**	915	260	**340**	425
	7	325	**425**	520	295	**410**	520	455	**620**	785	195	**275**	360
	8	295	**390**	490	260	**360**	455	390	**555**	720	160	**245**	325
	9	195	**295**	390	195	**260**	325	295	**410**	520	130	**160**	225
	10	295	**340**	390	260	**310**	360	425	**490**	555	195	**225**	260
	11	160	**210**	260	160	**210**	260	260	**340**	425	130	**160**	195
	12	390	**505**	620	390	**455**	520	590	**685**	785	260	**310**	360
	13.1	295	**390**	490	260	**340**	425	425	**540**	655	195	**245**	295
	13.2	145	**195**	245	130	**180**	210	210	**275**	325	95	**130**	145
			TN6010			TN6025			TN7110			THM	
M	14.1	295	**390**	490	195	**245**	295				195	**245**	295
	14.2	245	**325**	390	160	**195**	245				160	**195**	245
	14.3	180	**245**	310	130	**160**	180				130	**160**	180
	14.4	145	**195**	245	95	**130**	145				95	**130**	145
			TN6010			TN6025			TN7110			THM	
K	15	455	**555**	655	225	**295**	325	620	**790**	980	225	**295**	325
	16	325	**425**	520	160	**210**	260	520	**650**	820	160	**210**	260
	17	390	**490**	590	195	**225**	260	590	**750**	920	195	**225**	260
	18	295	**390**	490	130	**180**	225	390	**560**	720	130	**180**	225
	19	490	**590**	685	260	**310**	360	620	**790**	980	260	**310**	360
	20	360	**455**	555	195	**245**	295	590	**750**	920	195	**245**	295
			TN6010			TN6025			TN7110			THM	
N	21	1965	**2460**	2950	1965	**2460**	2950				1965	**2460**	2950
	22	1640	**2130**	2620	1640	**2130**	2620				1640	**2130**	2620
	23	1965	**2460**	2950	1965	**2460**	2950				1965	**2460**	2950
	24	1640	**2130**	2620	1640	**2130**	2620				1640	**2130**	2620
	25	750	**980**	1210	750	**980**	1210				750	**980**	1210
	26	490	**655**	820	490	**655**	820				490	**655**	820
	27	490	**655**	820	490	**655**	820				490	**655**	820
	28	360	**455**	555	360	**455**	555				360	**455**	555
	29	195	**260**	325	195	**260**	325				195	**260**	325
	30	260	**325**	390	260	**325**	390				260	**325**	390
			TN6010			TN6025			TN7110			THM	
S	31	120	**145**	180	85	**120**	145				85	**120**	145
	32	95	**115**	145	65	**95**	115				65	**95**	115
	33	75	**90**	115	55	**75**	90				55	**75**	90
	34	45	**55**	80	35	**45**	55				35	**45**	55
	35	50	**55**	80	35	**50**	55				35	**50**	55
	36	195	**235**	260	135	**195**	235				135	**195**	235
	37	95	**115**	145	65	**95**	115				65	**95**	115



● first choice
○ alternate choice

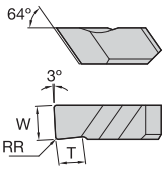
P	●	●	●
M	●	●	○
K	●	●	○ ○
N	○	○	●
S	●	●	●
H	○		

■ NG

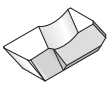


catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NG2031R	0,79	.031	—	—	0,09	.0035	1,27	.050	2	●	●		●
NG2041R	1,04	.041	—	—	0,09	.0035	1,27	.050	2		●		
NG2058R	1,47	.058	—	—	0,19	.0075	1,27	.050	2		●		
NG2062R	1,58	.062	—	—	0,19	.0075	2,79	.110	2	●	●		●
NG3047R	1,19	.047	—	—	0,19	.0075	1,91	.075	3	●	●		●
NG3062R	1,58	.062	—	—	0,19	.0075	2,39	.094	3	●	●		●
NG3094R	2,39	.094	—	—	0,19	.0075	3,81	.150	3	●	●		●
NG3125R	3,18	.125	—	—	0,19	.0075	3,81	.150	3	●	●		●
NG4250R	6,35	.250	—	—	0,57	.0225	6,35	.250	4	●	●		
Left hand													
NG2031L	0,79	.031	—	—	0,09	.0035	1,27	.050	2		●		
NG2058L	1,47	.058	—	—	0,19	.0075	1,27	.050	2		●		
NG2062L	1,58	.062	—	—	0,19	.0075	2,79	.110	2		●		
NG3047L	1,19	.047	—	—	0,19	.0075	1,91	.075	3	●	●		●
NG3062L	1,58	.062	—	—	0,19	.0075	2,39	.094	3	●	●		●
NG3094L	2,39	.094	—	—	0,19	.0075	3,81	.150	3	●	●		●
NG3125L	3,18	.125	—	—	0,19	.0075	3,81	.150	3	●	●		●
NG4250L	6,35	.250	—	—	0,57	.0225	6,35	.250	4	●	●		
NG5M500L	5,00	.197	—	—	0,32	.0125	9,52	.375	5		●		

NOTE: Right-hand insert shown; left-hand insert is mirror image.

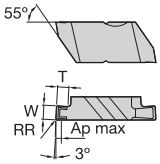


■ NG-1L



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Left hand														
NG1047L	1,19	.047	—	—	0,19	.0075	1,91	.075	1	1		●		
NG1062L	1,58	.062	—	—	0,19	.0075	1,91	.075	1	1		●		
NG1094L	2,39	.094	—	—	0,19	.0075	1,91	.075	1	1		●		

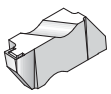
NOTE: Width tolerance is +/– .003" (+/- 0,076mm) on NG-1L inserts.



● first choice
○ alternate choice

		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

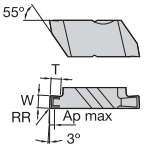
■ NG-K



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NG2M050RK	0,50	.020	0,64	.025	0,09	.0035	0,64	.025	2	●	●		
NG2031RK	0,79	.031	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M080RK	0,80	.032	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M100RK	1,00	.039	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2047RK	1,19	.047	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M120RK	1,20	.047	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M140RK	1,40	.055	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M150RK	1,50	.059	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2062RK	1,58	.062	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M170RK	1,70	.067	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M175RK	1,75	.069	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M195RK	1,95	.077	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M200RK	2,00	.079	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M220RK	2,20	.087	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M225RK	2,25	.088	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2094RK	2,39	.094	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M250RK	2,50	.098	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M275RK	2,75	.108	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M300RK	3,00	.118	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2125RK	3,18	.125	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M325RK	3,25	.128	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG3M100RK	1,00	.039	0,76	.030	0,19	.0075	1,91	.075	3		●		
NG3047RK	1,19	.047	0,76	.030	0,19	.0075	1,91	.075	3	●	●		
NG3M120RK	1,20	.047	0,76	.030	0,19	.0075	1,91	.075	3	●	●		
NG3M150RK	1,50	.059	1,02	.040	0,19	.0075	2,39	.094	3		●	●	
NG3062RK	1,58	.062	1,02	.040	0,19	.0075	2,39	.094	3	●	●	●	
NG3M175RK	1,75	.069	1,02	.040	0,19	.0075	2,39	.094	3		●		
NG3072RK	1,83	.072	1,02	.040	0,19	.0075	2,39	.094	3	●	●		
NG3078RK	1,98	.078	1,02	.040	0,19	.0075	2,39	.094	3	●	●		
NG3M200RK	2,00	.079	1,02	.040	0,19	.0075	2,39	.094	3		●	●	
NG3M220RK	2,20	.087	1,02	.040	0,19	.0075	2,39	.094	3		●		
NG3M225RK	2,25	.088	1,02	.040	0,19	.0075	2,39	.094	3	●	●	●	
NG3094RK	2,39	.094	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M250RK	2,50	.098	1,02	.040	0,19	.0075	3,81	.150	3		●	●	
NG3M275RK	2,75	.108	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M300RK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	3	●	●	●	
NG3125RK	3,18	.125	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M320RK	3,20	.126	1,02	.040	0,19	.0075	3,81	.150	3		●		
NG3M325RK	3,25	.128	1,02	.040	0,19	.0075	3,81	.150	3		●		
NG3M350RK	3,50	.138	2,92	.115	0,32	.0125	3,81	.150	3		●		
NG3156RK	3,96	.156	2,92	.115	0,19	.0075	3,81	.150	3	●	●		

(continued)

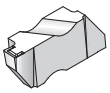
(continued)



● first choice
○ alternate choice

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

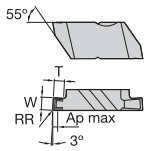
■ NG-K



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
NG3M400RK	4,00	.158	2,92	.115	0,32	.0125	3,81	.150	3	●	●	●	
NG3M425RK	4,25	.167	2,92	.115	0,32	.0125	3,81	.150	3	●	●		
NG3M450RK	4,50	.177	2,92	.115	0,32	.0125	3,81	.150	3		●		
NG3189RK	4,80	.189	2,92	.115	0,57	.0225	3,81	.150	3	●	●	●	
NG4M300RK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	4		●		
NG4125RK	3,18	.125	1,02	.040	0,19	.0075	3,81	.150	4	●	●		
NG4M350RK	3,50	.138	2,92	.115	0,57	.0225	6,35	.250	4		●	●	
NG4M400RK	4,00	.158	2,92	.115	0,57	.0225	6,35	.250	4	●	●	●	
NG4M450RK	4,50	.177	2,92	.115	0,57	.0225	6,35	.250	4		●		
NG4189RK	4,80	.189	2,92	.115	0,57	.0225	6,35	.250	4	●	●		
NG4M500RK	5,00	.197	2,92	.115	0,32	.0125	6,35	.250	4	●	●	●	
NG4M550RK	5,50	.217	3,81	.150	0,57	.0225	6,35	.250	4		●		
NG4M600RK	6,00	.236	3,81	.150	0,57	.0225	6,35	.250	4		●	●	
NG4250RK	6,35	.250	3,81	.150	0,57	.0225	6,35	.250	4	●	●		
Left hand													
NG2M050LK	0,50	.020	0,64	.025	0,09	.0035	0,64	.025	2	●	●		
NG2031LK	0,79	.031	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M080LK	0,80	.032	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M100LK	1,00	.039	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2047LK	1,19	.047	0,76	.030	0,09	.0035	1,27	.050	2		●		
NG2M120LK	1,20	.047	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M140LK	1,40	.055	0,76	.030	0,09	.0035	1,27	.050	2	●	●		
NG2M150LK	1,50	.059	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2062LK	1,58	.062	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M170LK	1,70	.067	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M175LK	1,75	.069	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M195LK	1,95	.077	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M200LK	2,00	.079	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M220LK	2,20	.087	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M225LK	2,25	.088	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2094LK	2,39	.094	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M250LK	2,50	.098	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG2M275LK	2,75	.108	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M300LK	3,00	.118	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2125LK	3,18	.125	1,09	.043	0,19	.0075	2,79	.110	2	●	●		
NG2M325LK	3,25	.128	1,09	.043	0,19	.0075	2,79	.110	2		●		
NG3M100LK	1,00	.039	0,76	.030	0,19	.0075	1,91	.075	3		●		
NG3047LK	1,19	.047	0,76	.030	0,19	.0075	1,91	.075	3	●	●		
NG3M120LK	1,20	.047	0,76	.030	0,19	.0075	1,91	.075	3	●	●		
NG3M150LK	1,50	.059	1,02	.040	0,19	.0075	2,39	.094	3		●	●	
NG3062LK	1,58	.062	1,02	.040	0,19	.0075	2,39	.094	3	●	●	●	
NG3M175LK	1,75	.069	1,02	.040	0,19	.0075	2,39	.094	3		●		

(continued)

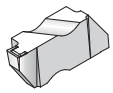
(continued)



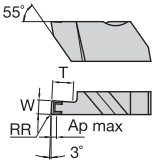
● first choice
○ alternate choice

		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NG-K



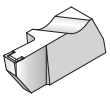
catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
NG3072LK	1,83	.072	1,02	.040	0,19	.0075	2,39	.094	3	●	●		
NG3078LK	1,98	.078	1,02	.040	0,19	.0075	2,39	.094	3	●	●		
NG3M200LK	2,00	.079	1,02	.040	0,19	.0075	2,39	.094	3		●	●	
NG3M220LK	2,20	.087	1,02	.040	0,19	.0075	2,39	.094	3		●		
NG3M225LK	2,25	.088	1,02	.040	0,19	.0075	2,39	.094	3	●	●	●	
NG3094LK	2,39	.094	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M250LK	2,50	.098	1,02	.040	0,19	.0075	3,81	.150	3		●	●	
NG3M275LK	2,75	.108	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M300LK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	3	●	●	●	
NG3125LK	3,18	.125	1,02	.040	0,19	.0075	3,81	.150	3	●	●		
NG3M320LK	3,20	.126	1,02	.040	0,19	.0075	3,81	.150	3		●		
NG3M325LK	3,25	.128	1,02	.040	0,19	.0075	3,81	.150	3		●		
NG3M350LK	3,50	.138	2,92	.115	0,32	.0125	3,81	.150	3		●		
NG3156LK	3,96	.156	2,92	.115	0,19	.0075	3,81	.150	3	●	●		
NG3M400LK	4,00	.158	2,92	.115	0,32	.0125	3,81	.150	3	●	●	●	
NG3M425LK	4,25	.167	2,92	.115	0,32	.0125	3,81	.150	3	●	●		
NG3M450LK	4,50	.177	2,92	.115	0,32	.0125	3,81	.150	3		●		
NG3189LK	4,80	.189	2,92	.115	0,57	.0225	3,81	.150	3	●	●	●	
NG4M300LK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	4		●		
NG4125LK	3,18	.125	1,02	.400	0,19	.0075	3,81	.150	4	●	●		
NG4M350LK	3,50	.138	2,92	.115	0,57	.0225	6,35	.250	4		●	●	
NG4M400LK	4,00	.158	2,92	.115	0,57	.0225	6,35	.250	4	●	●	●	
NG4M450LK	4,50	.177	2,92	.115	0,57	.0225	6,35	.250	4		●		
NG4189LK	4,80	.189	2,92	.115	0,57	.0225	6,35	.250	4	●	●		
NG4M500LK	5,00	.197	2,92	.115	0,32	.0125	6,35	.250	4	●	●	●	
NG4M550LK	5,50	.217	3,81	.150	0,57	.0225	6,35	.250	4		●		
NG4M600LK	6,00	.236	3,81	.150	0,57	.0225	6,35	.250	4		●	●	
NG4250LK	6,35	.250	3,81	.150	0,57	.0225	6,35	.250	4	●	●		



● first choice
○ alternate choice

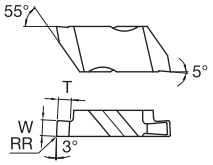
P	●	●	●		
M	●	●	○		
K	●	●	○	○	
N	○	○		●	
S	●	●		●	
H	○				

■ NGD-K



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Right hand														
NGD2M150RK	1,50	.059	1,09	.043	0,19	.0075	4,06	.160	2	1	●	●		
NGD2M200RK	2,00	.079	1,09	.043	0,19	.0075	5,08	.200	2	1	●	●		
NGD2M250RK	2,50	.098	1,09	.043	0,19	.0075	5,08	.200	2	1	●	●		
NGD3062RK	1,58	.062	1,02	.040	0,19	.0075	3,18	.125	3	2	●	●		
NGD3M200RK	2,00	.079	1,02	.040	0,19	.0075	4,06	.160	3	1	●	●		
NGD3094RK	2,39	.094	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		●
NGD3M250RK	2,50	.098	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3M300RK	3,00	.118	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3125RK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3M350RK	3,50	.138	2,92	.115	0,32	.0125	6,35	.250	3	1	●	●		
NGD3M400RK	4,00	.157	2,92	.115	0,32	.0125	6,35	.250	3	1	●	●		
NGD3189RK	4,80	.189	2,92	.115	0,57	.0225	6,35	.250	3	1	●	●		
NGD4125RK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	4	2	●	●		
NGD4M400RK	4,00	.157	2,92	.115	0,57	.0225	9,53	.375	4	1	●	●		
NGD4M450RK	4,50	.177	2,92	.115	0,57	.0225	12,70	.500	4	1	●	●		
NGD4189RK	4,80	.189	2,92	.115	0,57	.0225	9,53	.375	4	1	●	●		
NGD4M500RK	5,00	.197	2,92	.115	0,57	.0225	12,70	.500	4	1	●	●		
NGD4M550RK	5,50	.217	3,81	.150	0,57	.0225	12,70	.500	4	1	●	●		
NGD4250RK	6,35	.250	3,81	.150	0,57	.0225	12,70	.500	4	1	●	●		
Left hand														
NGD2M150LK	1,50	.059	1,09	.043	0,19	.0075	4,06	.160	2	1	●	●		
NGD2M200LK	2,00	.079	1,09	.043	0,19	.0075	5,08	.200	2	1	●	●		
NGD2M250LK	2,50	.098	1,09	.043	0,19	.0075	5,08	.200	2	1	●	●		
NGD3062LK	1,58	.062	1,02	.040	0,19	.0075	3,18	.125	3	2	●	●		
NGD3M200LK	2,00	.079	1,02	.040	0,19	.0075	4,06	.160	3	1	●	●		
NGD3094LK	2,39	.094	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		●
NGD3M250LK	2,50	.098	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3M300LK	3,00	.118	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3125LK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	3	1	●	●		
NGD3M350LK	3,50	.138	2,92	.115	0,32	.0125	6,35	.250	3	1	●	●		
NGD3M400LK	4,00	.157	2,92	.115	0,32	.0125	6,35	.250	3	1	●	●		
NGD3189LK	4,80	.189	2,92	.115	0,57	.0225	6,35	.250	3	1	●	●		
NGD4125LK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	4	2	●	●		
NGD4M400LK	4,00	.157	2,92	.115	0,57	.0225	9,53	.375	4	1	●	●		
NGD4M450LK	4,50	.177	2,92	.115	0,57	.0225	12,70	.500	4	1	●	●		
NGD4189LK	4,80	.189	2,92	.115	0,57	.0225	9,53	.375	4	1	●	●		
NGD4M500LK	5,00	.197	2,92	.115	0,57	.0225	12,70	.500	4	1	●	●		
NGD4M550LK	5,50	.217	3,81	.150	0,57	.0225	12,70	.500	4	1	●	●		
NGD4250LK	6,35	.250	3,81	.150	0,57	.0225	12,70	.500	4	1	●	●		

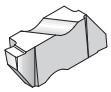
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

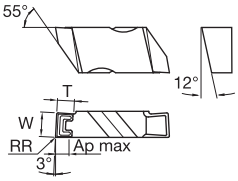
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NGP



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NGP2M150R	1,50	.059	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2062R	1,58	.062	–	–	0,19	.0075	2,79	.110	2	●			
NGP2M200R	2,00	.079	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2M250R	2,50	.098	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2M300R	3,00	.118	–	–	0,19	.0075	2,79	.110	2	●			●
NGP3M150R	1,50	.059	–	–	0,19	.0075	1,90	.075	3	●			●
NGP3M200R	2,00	.079	–	–	0,19	.0075	2,79	.110	3	●			●
NGP3M250R	2,50	.098	–	–	0,19	.0075	3,81	.150	3	●			●
NGP3M300R	3,00	.118	–	–	0,19	.0075	3,81	.150	3	●			●
Left hand													
NGP2M150L	1,50	.059	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2062L	1,58	.062	–	–	0,19	.0075	2,79	.110	2	●			
NGP2M200L	2,00	.079	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2M250L	2,50	.098	–	–	0,19	.0075	2,79	.110	2	●			●
NGP2M300L	3,00	.118	–	–	0,19	.0075	2,79	.110	2	●			●
NGP3M150L	1,50	.059	–	–	0,19	.0075	1,90	.075	3	●			●
NGP3M200L	2,00	.079	–	–	0,19	.0075	2,79	.110	3	●			●
NGP3M250L	2,50	.098	–	–	0,19	.0075	3,81	.150	3	●			●
NGP3M300L	3,00	.118	–	–	0,19	.0075	3,81	.150	3	●			●

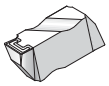
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

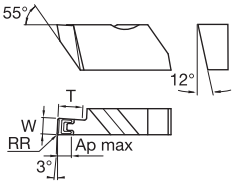
P	●	●	●	
M	●	●	○	
K	●	●	○	○
N	○	○		●
S	●	●		●
H	○			

■ NF-K

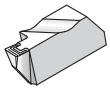


catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NF3M200RK	2,00	.079	1,02	.040	0,19	.0075	1,78	.070	3		●		
NF3M300RK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	3		●		
NF3125RK	3,18	.125	1,02	.040	0,19	.0075	3,81	.150	3		●		
Left hand													
NF3M200LK	2,00	.079	1,02	.040	0,19	.0075	1,78	.070	3		●		
NF3M300LK	3,00	.118	1,02	.040	0,19	.0075	3,81	.150	3		●		
NF3125LK	3,18	.125	1,02	.040	0,19	.0075	3,81	.150	3		●		
NF3156LK	3,96	.156	2,92	.115	0,19	.0075	3,81	.150	3		●		

NOTE: Right-hand insert shown; left-hand insert is mirror image.

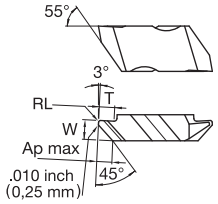


■ NFD-K



catalog number	W mm	W in	Ap max mm	Ap max in	RR mm	RR in	T mm	T in	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Right hand														
NFD3M300RK	3,00	.118	1,02	.040	0,19	.0075	6,35	.250	3	1		●		
NFD3125RK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	3	1		●		
NFD4189RK	4,80	.189	2,92	.115	0,57	.0225	9,53	.375	4	1		●		
NFD4250RK	6,35	.250	3,81	.150	0,57	.0225	12,70	.500	4	1		●		
Left hand														
NFD3M300LK	3,00	.118	1,02	.040	0,19	.0075	6,35	.250	3	1		●		
NFD3125LK	3,18	.125	1,02	.040	0,19	.0075	6,35	.250	3	1		●		
NFD4189LK	4,80	.189	2,92	.115	0,57	.0225	9,53	.375	4	1		●		

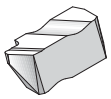
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

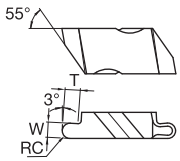
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NP-K

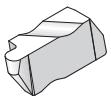


catalog number	W mm	W in	Ap max mm	Ap max in	RL mm	RL in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NP2002RK	3,68	.145	—	—	0,25	.0100	2,79	.110	2	●	●		
NP3002RK	4,83	.190	—	—	0,25	.0100	5,08	.200	3	●	●		
NP3012RK	4,83	.190	—	—	0,25	.0100	5,08	.200	3		●		

NOTE: Right-hand insert shown; left-hand insert is mirror image.
Width tolerance is +/– .005" (+/- 0,13mm).



■ NR

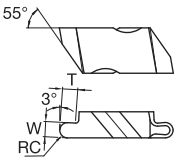


catalog number	W mm	W in	Ap max mm	Ap max in	RC mm	RC in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NR2M050R	1,00	.039	—	—	0,50	.0197	1,27	.050	2	●	●	●	
NR2M075R	1,50	.059	—	—	0,75	.0295	2,79	.110	2	●	●	●	
NR2031R	1,58	.062	—	—	0,79	.0310	2,79	.110	2	●	●		
NR2M100R	2,00	.079	—	—	1,00	.0394	2,79	.110	2	●	●	●	
NR2047R	2,39	.094	—	—	1,19	.0470	2,79	.110	2		●		
NR2M125R	2,50	.098	—	—	1,25	.0492	2,79	.110	2	●	●	●	
NR2M150R	3,00	.118	—	—	1,50	.0591	2,79	.110	2	●	●	●	
NR2M175R	3,50	.138	—	—	1,75	.0689	2,79	.110	2	●	●	●	
NR3031R	1,58	.062	—	—	0,79	.0310	2,39	.094	3	●	●		●
NR3M100R	2,00	.079	—	—	1,00	.0394	2,39	.094	3	●	●	●	
NR3047R	2,39	.094	—	—	1,19	.0470	3,81	.150	3	●	●		●
NR3M125R	2,50	.098	—	—	1,25	.0492	3,81	.150	3	●	●	●	
NR3M150R	3,00	.118	—	—	1,50	.0591	3,81	.150	3	●	●	●	
NR3062R	3,18	.125	—	—	1,59	.0625	3,81	.150	3	●	●		●
NR3M175R	3,50	.138	—	—	1,75	.0689	3,81	.150	3	●	●	●	
NR3M200R	4,00	.157	—	—	2,00	.0787	3,81	.150	3	●	●	●	
NR3M225R	4,50	.177	—	—	2,25	.0886	3,81	.150	3	●	●	●	
NR3094R	4,78	.188	—	—	2,39	.0940	3,81	.150	3	●	●		
NR4M200R	4,00	.157	—	—	2,00	.0787	6,35	.250	4	●	●	●	
NR4M225R	4,50	.177	—	—	2,25	.0886	6,35	.250	4	●	●	●	
NR4M250R	5,00	.197	—	—	2,50	.0984	6,35	.250	4	●	●	●	
NR4125R	6,35	.250	—	—	3,18	.1250	6,35	.250	4	●	●		

NOTE: Right-hand insert shown; left-hand insert is mirror image.

(continued)

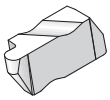
(continued)



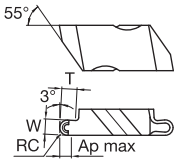
● first choice
○ alternate choice

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

■ NR



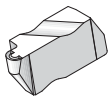
catalog number	W mm	W in	Ap max mm	Ap max in	RC mm	RC in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Left hand													
NR2M050L	1,00	.039	–	–	0,50	.0197	1,27	.050	2	●	●	●	
NR2M075L	1,50	.059	–	–	0,75	.0295	2,79	.110	2	●	●	●	
NR2031L	1,58	.062	–	–	0,79	.0310	2,79	.110	2	●	●		
NR2M100L	2,00	.079	–	–	1,00	.0394	2,79	.110	2	●	●	●	
NR2047L	2,39	.094	–	–	1,19	.0470	2,79	.110	2		●		
NR2M125L	2,50	.098	–	–	1,25	.0492	2,79	.110	2	●	●	●	
NR2M150L	3,00	.118	–	–	1,50	.0591	2,79	.110	2	●	●	●	
NR2M175L	3,50	.138	–	–	1,75	.0689	2,79	.110	2	●	●	●	
NR3031L	1,58	.062	–	–	0,79	.0310	2,39	.094	3	●	●		●
NR3M100L	2,00	.079	–	–	1,00	.0394	2,39	.094	3	●	●	●	
NR3047L	2,39	.094	–	–	1,19	.0470	3,81	.150	3	●	●		●
NR3M125L	2,50	.098	–	–	1,25	.0492	3,81	.150	3	●	●	●	
NR3M150L	3,00	.118	–	–	1,50	.0591	3,81	.150	3	●	●	●	
NR3062L	3,18	.125	–	–	1,59	.0625	3,81	.150	3	●	●		●
NR3M175L	3,50	.138	–	–	1,75	.0689	3,81	.150	3	●	●	●	
NR3M200L	4,00	.157	–	–	2,00	.0787	3,81	.150	3	●	●	●	
NR3M225L	4,50	.177	–	–	2,25	.0886	3,81	.150	3	●	●	●	
NR3094L	4,78	.188	–	–	2,39	.0940	3,81	.150	3	●	●		
NR4M200L	4,00	.157	–	–	2,00	.0787	6,35	.250	4	●	●	●	
NR4M225L	4,50	.177	–	–	2,25	.0886	6,35	.250	4	●	●	●	
NR4M250L	5,00	.197	–	–	2,50	.0984	6,35	.250	4	●	●	●	
NR4125L	6,35	.250	–	–	3,18	.1250	6,35	.250	4	●	●		



● first choice
○ alternate choice

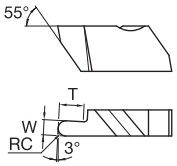
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

NR-K

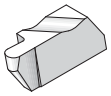


catalog number	W mm	W in	Ap max mm	Ap max in	RC mm	RC in	T mm	T in	insert size	TN6010	TN6025	TN7110	THM
Right hand													
NR3031RK	1,58	.062	1,98	.078	0,79	.0310	2,39	.094	3	●	●		
NR3047RK	2,39	.094	1,91	.075	1,19	.0470	3,81	.150	3	●	●		
NR3062RK	3,18	.125	2,92	.115	1,59	.0625	3,81	.150	3	●	●		
NR3078RK	3,96	.156	2,54	.100	1,98	.0780	3,81	.150	3	●	●		
NR4062RK	3,18	.125	2,92	.115	1,59	.0625	3,81	.150	4	●	●		
NR4094RK	4,78	.188	3,81	.150	2,39	.0940	6,35	.250	4	●	●		
NR4125RK	6,35	.250	3,81	.150	3,18	.1250	6,35	.250	4	●	●		
Left hand													
NR3031LK	1,58	.062	1,98	.078	0,79	.0310	2,39	.094	3	●	●		
NR3047LK	2,39	.094	1,91	.075	1,19	.0470	3,81	.150	3	●	●		
NR3062LK	3,18	.125	2,92	.115	1,59	.0625	3,81	.150	3	●	●		
NR3078LK	3,96	.156	2,54	.100	1,98	.0780	3,81	.150	3	●	●		
NR4062LK	3,18	.125	2,92	.115	1,59	.0625	3,81	.150	4	●	●		
NR4094LK	4,78	.188	3,81	.150	2,39	.0940	6,35	.250	4	●	●		
NR4125LK	6,35	.250	3,81	.150	3,18	.1250	6,35	.250	4	●	●		

NOTE: Right-hand insert shown; left-hand insert is mirror image.

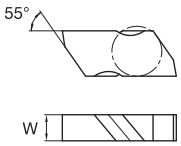


NRD



catalog number	W mm	W in	Ap max mm	Ap max in	RC mm	RC in	T mm	T in	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Right hand														
NRD3031R	1,58	.062	—	—	0,79	.0310	3,18	.125	3	2	●	●		
NRD3062R	3,18	.125	—	—	1,59	.0625	6,35	.250	3	1	●	●		
NRD4062R	3,18	.125	—	—	1,59	.0625	6,35	.250	4	2	●	●		
NRD4125R	6,35	.250	—	—	3,18	.1250	12,70	.500	4	1	●	●		
Left hand														
NRD3031L	1,58	.062	—	—	0,79	.0310	3,18	.125	3	2	●	●		
NRD3062L	3,18	.125	—	—	1,59	.0625	6,35	.250	3	1	●	●		
NRD4062L	3,18	.125	—	—	1,59	.0625	6,35	.250	4	2	●	●		
NRD4125L	6,35	.250	—	—	3,18	.1250	12,70	.500	4	1	●	●		

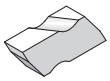
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

	TN6010	TN6025	TN7110	THM
P	●	●	●	
M	●	●	○	
K	●	●	○	○
N	○	○		●
S	●	●		●
H	○			

■ NB



catalog number	W mm	W in	insert size	TN6010	TN6025	TN7110	THM
Right hand							
NB2R	3,81	.150	2				●
NB3R	4,95	.195	3				●
Left hand							
NB2L	3,81	.150	2				●
NB3L	4,95	.195	3				●

NOTE: Right-hand insert shown; left-hand insert is mirror image.
NB blanks are designed to allow modification of the W dimension and end-form.
W dimension is provided to indicate maximum possible width.
Available in uncoated grades only.

TopGroove Inserts: The Best Platform for Customization

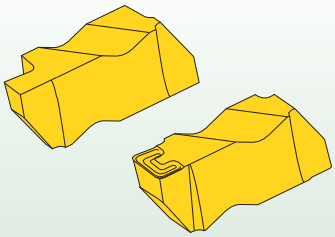
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

Custom orders start with proven WIDIA™ carbide grade technology as the basis for optimizing tool performance. Positive top rake angles are also available in most inserts.

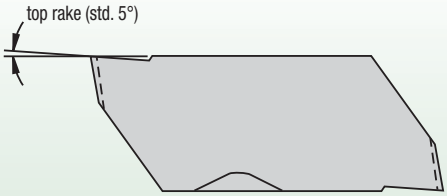
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

There are limitless variations of the flat-top TopGroove design. Additionally, chip control in the most common styles enables true optimization and productivity. WIDIA offers NB- and NBD-style insert blanks as well. These blanks can be end-form ground in your own shop.

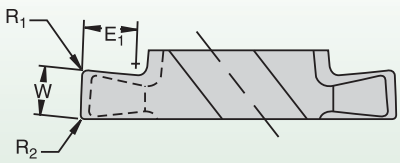
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



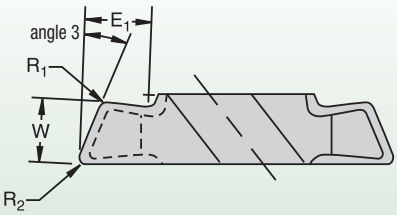
top rake



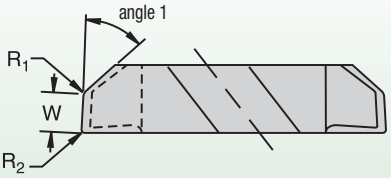
style A



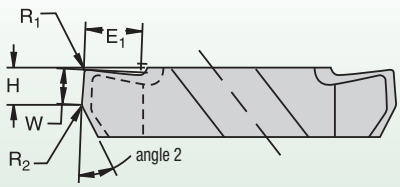
style B1



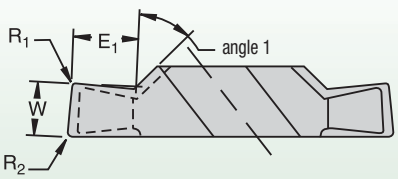
style B2



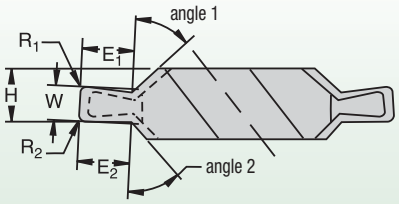
style B3



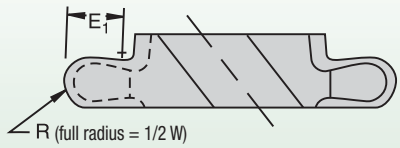
style B4



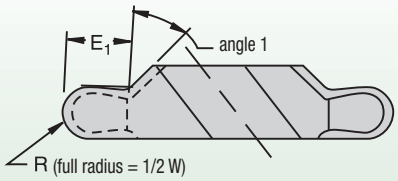
style C1



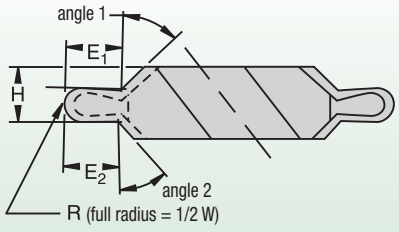
style D



style F



style G



NOTE: Common styles are shown here in right-hand versions. Left-hand versions are also available.

TopGroove™ Grooving Systems

Use this Custom-Order Worksheet to modify an existing product to meet your specifications. If your custom requirements do not fall into these categories, simply contact your WIDIA™ Distributor.

Trust our experienced distributors and WIDIA engineering team to design the best solution for you.

Date / /

Customer-Specified Dimensions

Style (circle one) A B1 B2 B3 B4 C1 D F G

Orientation (circle one) left hand right hand

Top Rake		**Total Width (T)**	
Cutting Width (W)		**Angle 1**	
Corner Radius 1 (R_1)		**Angle 2**	
Corner Radius 2 (R_2)		**Offset (H)**	
Cutting Depth (E_1)		**Other** (please specify)	

Special Instructions
(please make any necessary notes or sketches in the box at right)

Closest Catalog Standard

Customer

Distributor

Shipping Requirements

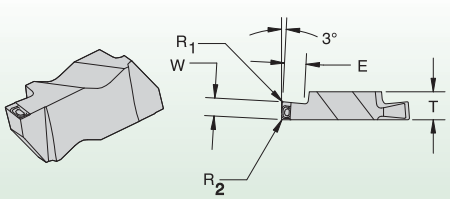
Attention Distributors: Use this worksheet to collect information for your customer.

☐ Ground ☐ Next Day Air ☐ 2nd Day Air ☐ 3rd Day Air

A-SK Specials

10° positive cutting action

- Grooving
- Face grooving



insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NG2-R-SK or NF2-R-SK	**NG2-L-SK or NF2-L-SK**	.026–.056 .057–.135	.000–.007 .003–.013	.050 .110	.150	carbide grades quoted upon request. **See page D46.**
NG3-R-SK or NF3-R-SK	**NG3-L-SK or NF3-L-SK**	.042–.067 .068–.076 .077–.094 .095–.105 .106–.125 .126–.134 .135–.156 .157–.174 .184–.196	.003–.013 .005–.020 .005–.030 .005–.020 .005–.030 .005–.020 .005–.030 .008–.018 .018–.028	.094 .094 .150 .150 .150 .150 .150 .150 .150	.195	
NG4-R-SK or NF4-R-SK	**NG4-L-SK or NF4-L-SK**	.100–.110 .111–.125 .126–.131 .132–.156 .157–.162 .163–.189 .190–.191 .192–.204 .245–.257	.005–.020 .005–.030 .005–.020 .005–.030 .005–.020 .005–.030 .018–.028 .008–.018 .018–.025	.150 .150 .150 .150 .150 .250 .250 .250 .250	.255	

NG-SK, NF-SK, NGD-SK, and NFD-SK inserts may be specially ordered within the specifications listed in the above charts.

Order example: NF3R-SK W=.090, R_1=.010, R_2=.010, grade TN6010.

Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R_1 and R_2) will be applied.

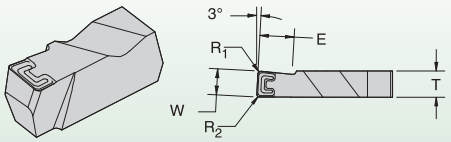
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

In addition to the guidelines above, full radius face groove inserts may be quoted. Under certain conditions, chip control performance may vary from standard insert styles.

A-SK Specials

10° positive cutting action

- Deep grooving
- Deep face grooving



insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NGD3-R-SK or NFD3-R-SK	**NGD3-L-SK or NFD3-L-SK**	.057–.069 .089–.101* .120–.132* .184–.196*	.003–.013 .003–.013 .003–.013 .018–.028	.125 .250 .250 .250	.195	carbide grades quoted upon request. **See page D46.**
NGD4-R-SK or NFD4-R-SK	**NG4-L-SK or NF4-L-SK**	.120–.132* .180–.196* .245–.257*	.003–.013 .018–.028 .018–.028	.250 .375 .500	.255	

**One cutting edge.*

NG-SK, NF-SK, NGD-SK, and NFD-SK inserts may be specially ordered within the specifications listed in the above charts.

Order example: NF3R-SK W=.090, R_1=.010, R_2=.010, grade TN6010.

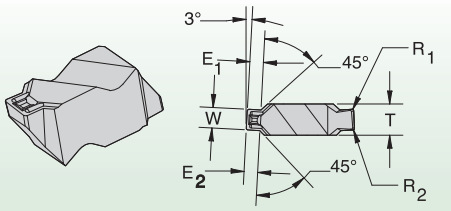
Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R_1 and R_2) will be applied.

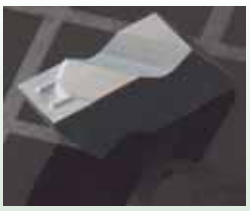
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

In addition to the guidelines above, full radius face groove inserts may be quoted. Under certain conditions, chip control performance may vary from standard insert styles.

C1-SK Specials

- Groove and chamfer

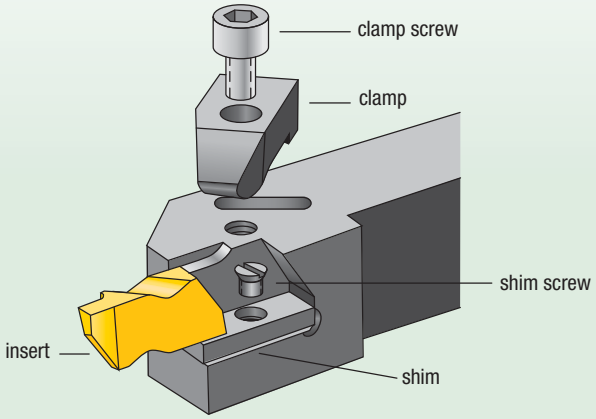




insert catalog number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NB2-R-K	**NB2-L-K**	.047–.125	.005–.015	.100	.150	carbide grades quoted upon request. **See page D46.**
NB3-R-K	**NB3-L-K**	.094–.170	.005–.025	.150	.195	

NOTE: The above insert style is for simultaneous groove and chamfer operations with chip control.

TopGroove Toolholders and Boring Bars



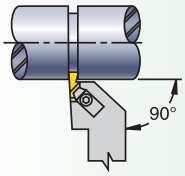
insert size and style	clamp	clamp screw	shim	shim screw
NG-1L	CM-109	S-304	–	–
NG-2R	CM-182	S-310	–	–
NG-2L	CM-183	S-310	–	–
NG-2R	CM-74	S-310	–	–
NG-2L	CM-75	S-310	–	–
NG-3R	CM-184	S-412	–	–
NG-3L	CM-185	S-412	–	–
NG-3R	CM-72	S-412	–	–
NG-3L	CM-73	S-412	–	–
NG-3R*	CM-78	S-412	–	–
NG-3L*	CM-70	S-412	–	–
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	–	–
NG-5L	CM-81	S-352	–	–
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L	CM-121	S-412	SM-416	S-111
TopGroove relief grooving				
NU-3125R	CM-72	S-412	–	–
NU-3125L	CM-73	S-412	–	–
NU-3125R**	CM-72	S-618	–	–
NU-3125L**	CM-73	S-618	–	–
Utility threading				
NTU-4R	CM-72	S-412	–	–
NTU-4L	CM-73	S-412	–	–

**1" diameter boring head.*
***Boring head.*

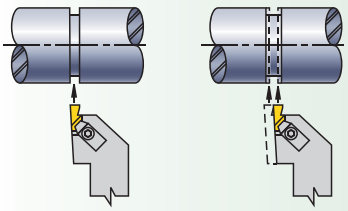
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

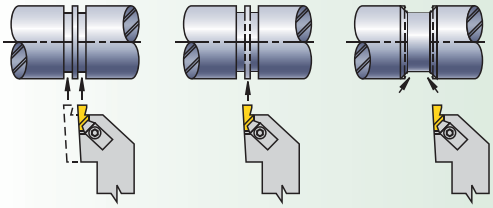


How to Cut a Groove Slightly Wider than the Groove Tool



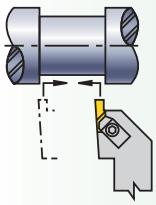
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

How to Cut Wider Grooves



1. Plunge out both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. Plunge both sides of groove at the required angle, using approximately one-half the width of the grooving tool for maximum width of cut.

Finish Turning the Groove



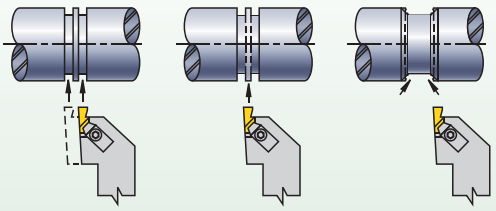
1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still enables good chip surface finishing.

problem	solution
burr	1. Ensure tool center height. 2. Use sharp tool (index more often). 3. Use positive rake PVD-coated insert. 4. Use correct grade for workpiece material. 5. Use correct geometry (e.g., positive rake for work-hardening material). 6. Chamfer before grooving. 7. Change tool path.
poor surface finish	1. Increase speed. 2. Use sharp tool (index more often). 3. Dwell tool in bottom 1–3 revolutions (max). 4. Use proper chip control geometry. 5. Increase coolant flow/concentration. 6. Ensure proper setup (overhang, shank size). 7. Use correct geometry (e.g., positive rake for work-hardening material).
groove bottom that is not flat	1. Use sharp tool (index more often). 2. Dwell tool in bottom 1–3 revolutions (max). 3. Reduce tool overhang (increase rigidity). 4. Ensure correct tool alignment. 5. Reduce feed rate at groove bottom. 6. Use a wider insert. 7. Ensure tool center height.
poor chip control	1. Use “K” chip control geometry insert. 2. Use sharp tool (index more often). 3. Increase coolant concentration. 4. Adjust feed rate (usually increase first).
chatter	1. Reduce tool and workpiece overhang. 2. Adjust speed and feed (usually increase first). 3. Ensure center height.
insert chipping	1. Use correct grade for workpiece material. 2. Increase speed. 3. Reduce feed. 4. Use a stronger grade. 5. Increase tool and setup rigidity.
side walls not straight	1. Check tool alignment for square. 2. Use correct insert hand. 3. Reduce workpiece and tool overhang. 4. Use sharp insert (index more often).

Machining Guidelines for Chip Control • Grooving

When the proper cutter diameter is not available, proper cutter positioning will provide positive results.

- Center height of insert should be positioned at the center of the workpiece or up to .005" (0,13mm) above.
- Dwell time in the bottom of the groove (more than three revolutions) is not recommended.
- Chip control is feed rate related and should be adjusted to fit the particular situation. Recommended feed range is .003"–.012" IPR (0,08–0,3 mm/rev).

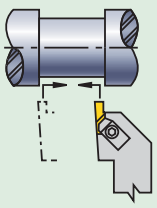


Machining Guidelines for Chip Control • Turning/Profiling

Maximum depth of cut for side cutting (turning/profiling) depends on the material being cut and the width of the tool.

- .031"–.062" (0,79mm–1,6mm) wide insert can cut up to .025" (0,6mm) deep.
- .067"–.128" (1,7mm–3,3mm) wide insert can cut up to .040" (1,0mm) deep.
- .138"–.189" (3,5mm–4,8mm) wide insert can cut up to .080" (2,0mm) deep.
- .197"–.250" (5,0mm–6,35mm) wide insert can cut up to .120" (3,0mm) deep.

Finish Turning the Groove



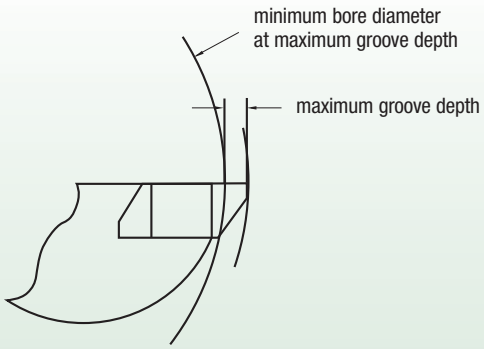
1. Plunge both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined.
4. Use the lightest depth of cut that still allows good chipbreaking, tool life, and surface finish.

Groove Limits				
insert catalog number	maximum internal groove depth		minimum bore diameter	
	inch	mm	inch	mm
NG-1094L	.075	1,91	.800	20,32
—	.040	1,02	.440	11,18
NG-2031R/L	.050	1,27	.730	18,54
NG-2041R/L	—	—	—	—
NG-2047R/L	—	—	—	—
NG-2058R/L	—	—	—	—
—	.110	2,79	2.500	63,50
NG-2062R/L	.102	2,59	1.750	44,45
NG-2094R/L	.098	2,49	1.500	38,10
NG-2125R/L	.080	2,03	1.000	25,40
—	.055	1,40	.730	18,54
NG-3047R/L	—	—	—	—
NG-3062R/L	.094	2,39	1.750	44,45
NG-3072R/L	.090	2,29	1.625	41,28
NG-3078R/L	.075	1,91	1.375	34,93
NG-3088R/L	—	—	—	—
NG-3094R/L	—	—	—	—
NG-3097R/L	.150	3,81	2.375	60,33
NG-3105R/L	—	—	—	—
NG-3110R/L	.145	3,68	2.125	53,98
NG-3122R/L	—	—	—	—
NG-3125R/L	.138	3,51	1.875	47,63
NG-3142R/L	—	—	—	—
NG-3156R/L	.125	3,18	1.625	41,28
NG-3178R/L	—	—	—	—
NG-3185R/L	.110	2,79	1.375	34,93
NG-3189R/L	—	—	—	—
NG-4125R/L	.150	3,81	2.750	69,85
—	.250	6,35	5.750	146,05
NG-4189R/L	.245	6,22	5.000	127,00
NG-4213R/L	.240	6,10	4.500	114,30
NG-4219R/L	.218	5,54	3.250	82,55
NG-4250R/L	.200	5,08	2.500	63,50

NOTE: The same maximum groove depth and minimum bore diameter values also apply to metric, NG-K (chip control), and NR (full radius) inserts of similar size.

The same internal grooving depth limits are a function of bar clearance versus bore diameters.

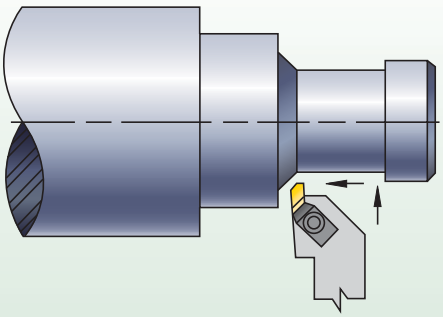
Internal Groove Depth versus Bar Interference



NOTE: Internal grooving depth limits are a function of bar clearance versus bore diameters.

Machining Guidelines for Back Turning/Turning/Profiling

The NP-K-style TopGroove inserts were engineered specifically for back turning on small automatic lathes, but they also find applications for other light turning and profiling operations. For general applications, maximum depth of cut should not exceed .108" (2,74mm) for size 2 inserts or .151" (3,84mm) for size 3 inserts.



Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

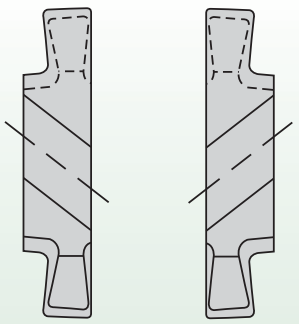
Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

insert catalog number	add to C dimension		add to F dimension	
	inch	mm	inch	mm
NGD-3062	.000	0,00	.000	0,00
NGD-3094	.100	2,54	.100	2,54
NGD-3125	.100	2,54	.100	2,54
NGD-3189	.100	2,54	.100	2,54
NGD-4125	.000	0,00	.000	0,00
NGD-4189	.125	3,18	.125	3,18
NGD-4250	.250	6,35	.250	6,35
NRD-3031	.000	0,00	.000	0,00
NRD-3062	.100	2,54	.100	2,54
NRD-4062	.000	0,00	.000	0,00
NRD-4094	.250	6,35	.250	6,35
NRD-4125	.250	6,35	.250	6,35

TopGroove Insert Selection Guide

- All TopGroove inserts are precision ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopGroove inserts can be used in either toolholders or boring bars.
- Right-hand TopGroove toolholders use right-hand inserts. Left-hand TopGroove toolholders use left-hand inserts.
- Right-hand TopGroove boring bars use left-hand inserts. Left-hand TopGroove boring bars use right-hand inserts.

See page D46 for carbide grade selection and more technical information.

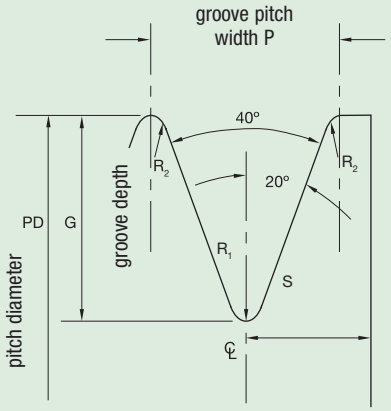


left-hand insert right-hand insert

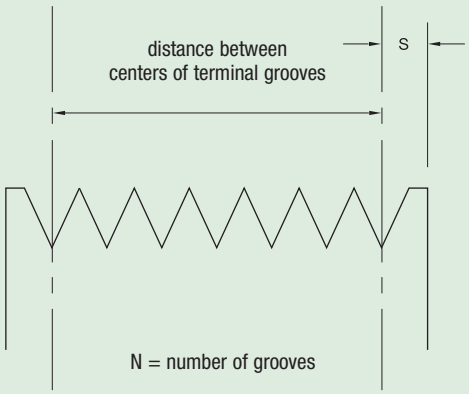
Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)

- To machine cross section "J", use insert NV3-J.
- To machine cross section "L", use insert NV4-L.

Section J



Section L

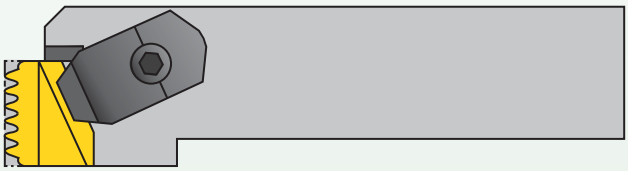


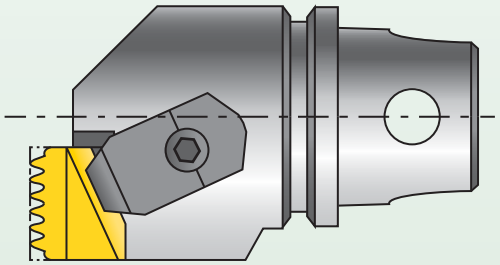
Groove Dimensions and Tolerances for Sheaves

groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	.092 ±.001	.087 ±.005	.008	.0125 ±.0025	1/8	(N-1).092 ±.010
L	.185 ±.002	.201 ±.005	.015	.0125 ±.0025	3/8	(N-1).185 ±.010

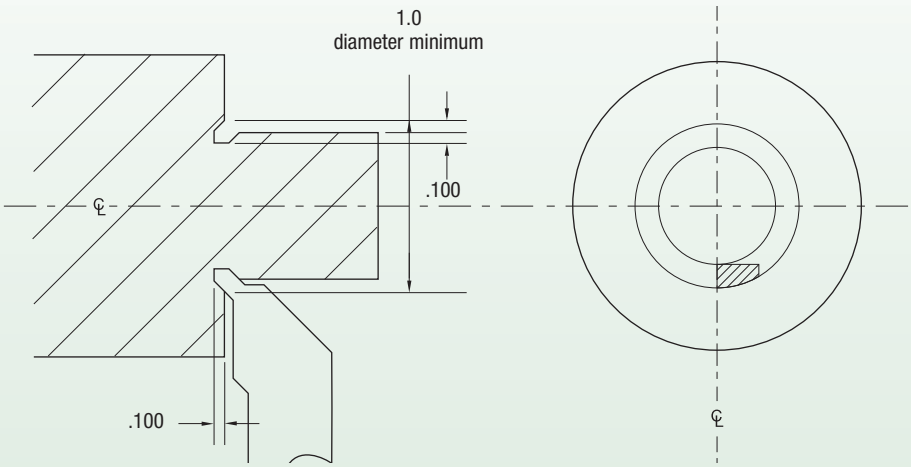
Multiple Tooth Poly–Vee Grooving

Let WIDIA™ quote your multiple tooth poly-vee grooving applications. Semi-standard inserts and holders are available. The strong TopGroove design holds the insert rigid and outperforms any other tooling method for this application.



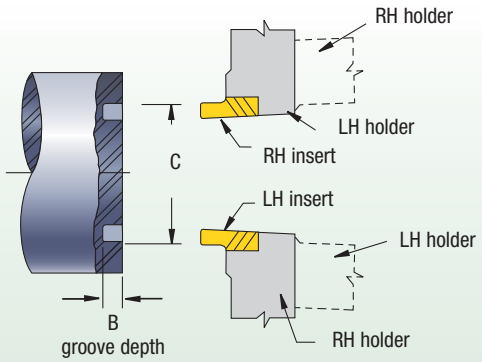


Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



Machining Guidelines for Face Grooving Operations • External

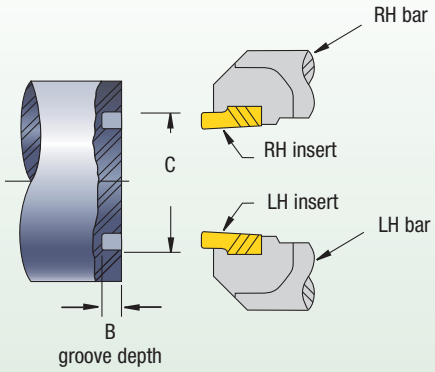
Toolholders



Standard NF/NDF Inserts				
insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NF-3	.060	1,52	.94	23,9
NF-3	.094	2,39	1.20	30,5
NF-3	.125	3,18	1.42	36,1
NF-3	.150	3,81	1.63	41,3
NFD-3	.250	6,35	1.88	47,6
NFD-4	.375	9,53	2.25	57,2
NFD-4	.500	12,70	2.25	57,2

Machining Guidelines for Face Grooving Operations • External

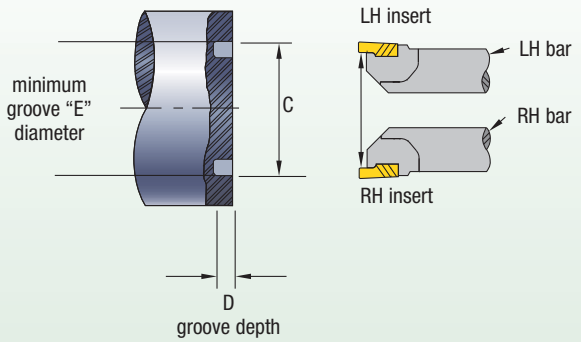
Boring Bars



Standard NG/NGD Inserts				
insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NG-2	.050	1,27	2.13	54,0
NG-2	.110	2,79	3.50	88,9
NG-3	.094	2,39	4.00	101,6
NG-3	.125	3,18	5.00	127,0
NG-3	.150	3,81	5.50	139,7
NGD-3	.250	6,35	6.88	174,6
NG-4	.150	3,81	6.00	152,4
NG-4	.250	6,35	8.25	209,6
NGD-4	.375	9,53	8.75	222,3
NGD-4	.500	12,70	8.75	222,3

Machining Guidelines for Face Grooving Operations • Internal

Boring Bars



Standard NG/NGD Inserts				
insert family	maximum groove depth D		minimum groove diameter E	
	inch	mm	inch	mm
NFD-3-KI	.250	6,35	2.250	63,5

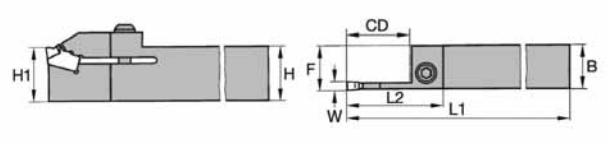
NOTE: Also check minimum bore diameter of boring bar. See page D42.

ProGroove™

ProGroove™ Grooving and Cut-Off

Features and Benefits:

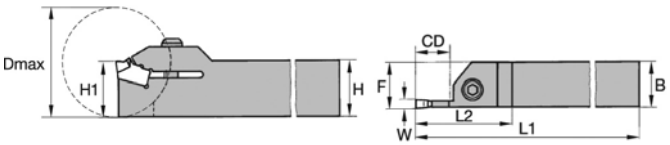
- Single-end grooving and cut-off inserts.
- Offered with integral toolholders and blades.
- Shallow, deep grooving, and cut-off capabilities.
- Available in four different geometries.



Right Hand Tool

Grooving and Cut-Off

order number	catalog number	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
	Right hand										
2962743	**12250023000**	.118	.787	.750	.750	.764	5.000	1.260	.750	**12148596200**	**12148041200**
2962745	**12250023200**	.118	.984	1.000	1.000	1.012	6.000	1.575	1.000	**12148596200**	**12148041200**
2962747	**12250024000**	.158	.984	.750	.750	.768	5.000	1.575	.750	**12148596200**	**12148041200**
2962749	**12250024200**	.158	.984	1.000	1.000	10.160	6.000	1.575	1.000	**12148596200**	**12148041200**
2962751	**12250025200**	.197	1.260	1.000	1.000	1.016	6.000	2.087	1.000	**12148596200**	**12148041200**
	Left hand										
2962744	**12250023100**	.118	.787	.750	.750	.764	5.000	1.260	.750	**12148596200**	**12148041200**
2962746	**12250023300**	.118	.984	1.000	1.000	1.012	6.000	1.575	1.000	**12148596200**	**12148041200**
2962748	**12250024100**	.158	.984	.750	.750	.768	5.000	1.575	.750	**12148596200**	**12148041200**
2962750	**12250024300**	.158	.984	1.000	1.000	1.016	6.000	1.575	1.000	**12148596200**	**12148041200**
2962752	**12250025300**	.197	1.260	1.000	1.000	1.016	6.000	2.087	1.000	**12148596200**	**12148041200**

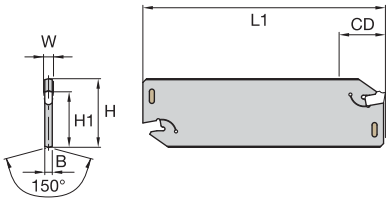


Right Hand Tool

Grooving and Profiling

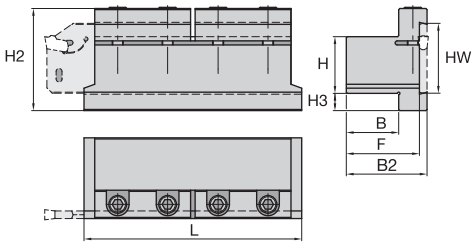
order number	catalog number	W	CD	D max	H	B	F	L1	L2	H1	cap screw	wrench
	Right hand											
2962733	**12250013000**	.118	.394	1.000	.984	.984	.764	5.906	1.221	.750	**12148596200**	**12148041200**
2962735	**12250013200**	.118	.394	1.000	1.000	1.000	1.016	6.000	1.024	1.000	**12148596200**	**12148041200**
2962737	**12250014000**	.158	.492	1.260	.750	.750	.768	5.000	1.221	.750	**12148596200**	**12148041200**
2962739	**12250014200**	.158	.492	1.260	1.000	1.000	1.016	6.000	1.221	1.000	**12148596200**	**12148041200**
2962741	**12250015200**	.197	.492	—	1.000	1.000	1.016	6.000	1.221	1.000	**12148596200**	**12148041200**
	Left hand											
2962734	**12250013100**	.118	.394	1.000	.750	.750	.764	5.000	1.024	.750	**12148596200**	**12148041200**
2962736	**12250013300**	.118	.394	1.000	1.000	1.000	1.016	6.000	1.024	1.000	**12148596200**	**12148041200**
2962738	**12250014100**	.158	.492	1.260	.750	.750	.768	5.000	1.221	.750	**12148596200**	**12148041200**
2962740	**12250014300**	.158	.492	1.260	1.000	1.000	1.016	6.000	1.221	1.000	**12148596200**	**12148041200**
2962742	**12250015300**	.197	.492	—	1.000	1.000	1.016	6.000	1.221	1.000	**12148596200**	**12148041200**

NOTE: Select shorter CD dimension for added stability.



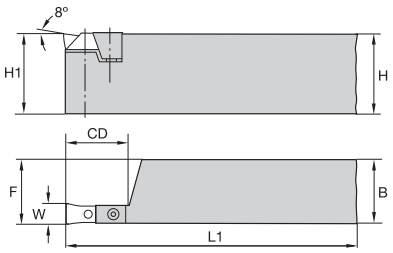
Cut-Off Blades

order number	catalog number	W	H	H1	L1	B	CD	wrench
2021629	**12251332000**	.079	.748	.618	3.543	.067	.787	**12146003800**
2021639	**12251342000**	.079	1.024	.843	4.331	.067	.984	**12146003800**
2008113	**12251352000**	.079	1.260	.984	5.906	.067	.984	**12146003800**
2021640	**12251343000**	.118	1.024	.843	4.331	.095	1.575	**12146003800**
2008116	**12251353000**	.118	1.260	.984	5.906	.095	1.969	**12146003800**
2021641	**12251344000**	.158	1.024	.843	4.331	.126	1.575	**12146003800**
2008119	**12251354000**	.158	1.260	.984	5.906	.126	1.969	**12146003800**
2008122	**12251355000**	.197	1.260	.984	5.906	.165	2.362	**12146003800**
2008135	**12251356000**	.236	1.260	.984	5.906	.197	2.362	**12146009500**
2008138	**12251358000**	.315	1.260	.984	5.906	.268	2.362	**12146009500**
2021743	**12251368000**	.315	2.067	1.772	9.843	.268	3.937	**12146009500**



Cut-Off Blade Holders

order number	catalog number	HW	H	B	F	H2	B2	H3	L	cap screw	wrench
2968845	**32251221200**	1.024	.750	.750	1.161	1.57	1.34	.32	3.39	**125.625**	**12148041300**
2968846	**32251221600**	1.260	1.000	1.000	1.417	1.89	1.63	.30	4.33	**125.630**	**12148041300**
2968847	**32251222000**	1.260	1.250	1.250	1.673	1.97	1.89	.13	4.33	**125.630**	**12148041300**

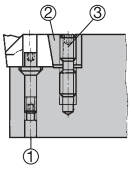


Grooving

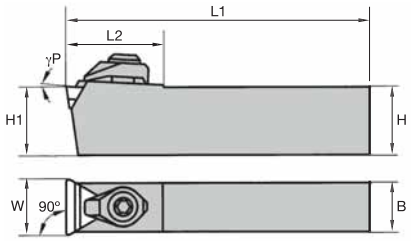
order number	catalog number	W	CD	H	H1	B	L1	F
	Right hand							
2983280	32250110100	.321	.866	1.250	1.250	1.000	6.020	1.021
2983281	32250110300	.400	.906	1.250	1.250	1.000	6.020	1.021
2983282	32250110500	.480	1.181	1.500	1.500	1.250	7.020	1.272
2983973	32250110700	.559	1.181	1.500	1.500	1.250	7.020	1.272
2983974	32250110900	.638	1.339	1.500	1.500	1.250	7.020	1.272
	Left hand							
2983975	32250110200	.321	.866	1.250	1.250	1.000	6.020	1.021
2983976	32250110400	.400	.906	1.250	1.250	1.000	6.020	1.021
2983977	32250110600	.480	1.181	1.500	1.500	1.250	7.020	1.272
2983978	32250110800	.559	1.181	1.500	1.500	1.250	7.020	1.272
2983979	32250111000	.638	1.339	1.500	1.500	1.250	7.020	1.272

Spare Parts

catalog number	clamping bolt	wedge clamp	clamping screw	wrench for clamp screw	wrench for clamping bolt
Right hand					
32250110100	12148060600	12148094300	12148574100	12148041000	12148046000
32250110300	12148060600	12148094400	12148574700	12148041100	12148046000
32250110500	12148060700	12148094500	12148574900	12148041100	12148040900
32250110700	12148060700	12148094600	12148574000	12148041200	12148040900
32250110900	12148060800	12148094700	12148574000	12148041200	12148041000
Left hand					
32250110200	12148060600	12148094300	12148574100	12148041000	12148046000
32250110400	12148060600	12148094400	12148574700	12148041100	12148046000
32250110600	12148060700	12148094500	12148574900	12148041100	12148040900
32250110800	12148060700	12148094600	12148574000	12148041200	12148040900
32250111000	12148060800	12148094700	12148574000	12148041200	12148041000



1. Clamping bolt
2. Wedge clamp
3. Clamping screw



Grooving

order number	catalog number	W	H	H1	B	L1	L2	γP°	insert 1
2022921	12191061900	.409	.787	.787	.374	4.921	.827	3	TP..1103../TP..22..
2007414	12191062086	.602	.787	.787	.512	5.906	1.063	3	TP..1603../TP..32..
2022922	12191062586	.602	.984	.984	.512	5.906	1.063	3	TP..1603../TP..32..
2058066	12191062686	.795	.984	.984	.709	5.906	1.378	3	TP..2204../TP..43..
2022923	12191063286	.795	1.260	1.260	.709	7.087	1.378	3	TP..2204../TP..43..

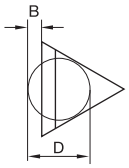
NOTE: Holders 276-STP are supplied without chipbreaker. For chipbreaker order numbers, see below.

For Grooving without Chipbreaker

catalog number	clamp	clamp screw	shim	shim screw	washer	wrench
12191061900	12148589300	12148589800	12148032586	12148021900		12148041100
12191062086	12148583800	12148586000	12148031686	12148024100	12148024200	12148041200
12191062686	12148586900	12148021100	12148032086	12148024500	12148024800	12148041200
12191062586	12148583800	12148586000	12148031686	12148024100	12148024200	12148041200
12191063286	12148586900	12148021100	12148032086	12148024500	12148024800	12148041200

For Grooving with Chipbreaker (order additional clamp and chipbreaker)

			chipbreakers					
			B — edge width					
insert	clamp with chipbreaker	D	.016	.047	.071	.098	.126	.158
TP...22...	12148589200	.250	12148591011	12148588211	12148588311	12148588411	—	—
TP...32...	12148589300	.375	12148591111	12148586611	12148587011	12148587111	12148580011	—
TP...43...	12148586900	.500	—	—	12148580411	12148580511	12148580611	12148582511



WIN WITH WIDIA™

WIDIA™

ProGroove™

With easy-to-change inserts available in multiple high-performance carbide grades, the ProGroove system ensures accurate, reliable, and reproducible cutting edge performance.

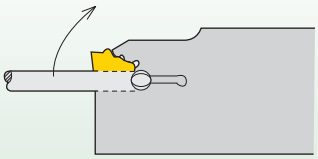
ProGroove Grooving and Cut-Off

- Single-end inserts for grooving and cut-off.
- Offered with integral shanks and blades.
- Shallow, deep grooving, and cut-off capabilities.
- Available in four different geometries.

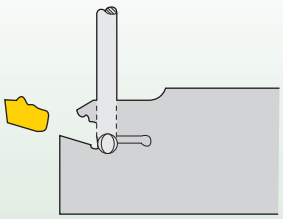
To learn more, contact your local Authorized Distributor or visit **www.widia.com**.

WIDIA™
Win with WIDIA™

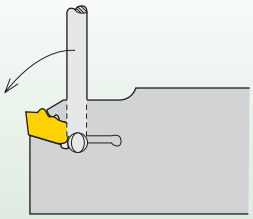
ProGroove System



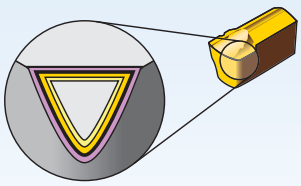
To change the cutting insert, place the wrench into the blade recess.
The blade mouth is opened by turning through 90°.



In this position, the wrench is self-locking, leaving both hands free
for changing the cutting insert.



The cutting insert is pressed against the rear seat in the blade mouth,
releasing the wrench. The insert is accurately positioned and securely clamped.



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

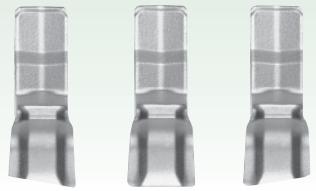
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multi-layer coating provides better wear resistance.

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

Grade

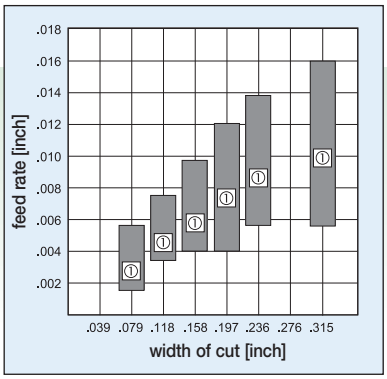
Coating		Grade Description	05	10	15	20	25	30	35	40	45
TN6030	HC-P30	PVD-TiAlN Nano-layer coated carbide. Medium and heavy machining for steels and nodular cast irons. Recommended at medium cutting speeds when good toughness properties are required.	P									
			M									
			K									
TN7525	HC-P25	MT-CVD/CVD — TiN-TiCN-Al_2O_3-TiN coated carbide. Light and medium machining for steels and nodular cast irons.	P									
			K									
TN7535	HC-P35	MT-CVD/CVD — TiN-TiCN-Al_2O_3 coated carbide. Medium and heavy machining for steels and nodular cast iron.	P									
			K									
TN8025	HC-M25	MT-CVD/CVD-TiN-TiCN-Al_2O_3-ZrCN coated carbide. Light and medium machining for all stainless steels. Can be used both with or without coolant.	M									
THM	HW-K15	Uncoated carbide for light and medium machining. For cast iron and all non-ferrous metals and non-metals. Also capable of machining hardened materials at low cutting speeds.	K									
			N									
			S									
			H									
TTM	HW-P25	Uncoated carbide with good toughness and wear properties. Medium machining for steels.	P									
			M									

ProGroove • U



left-hand neutral right-hand

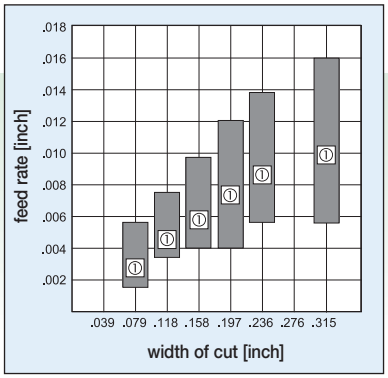
For grooving and parting operations, universal use.
Positive chipbreaker groove for light cutting action.
Right-hand and left-hand styles with 6° front angle.



① Recommended feed

ProGroove • M

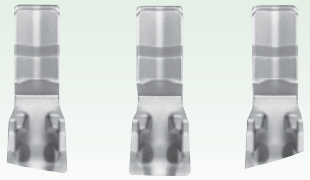
neutral



① Recommended feed

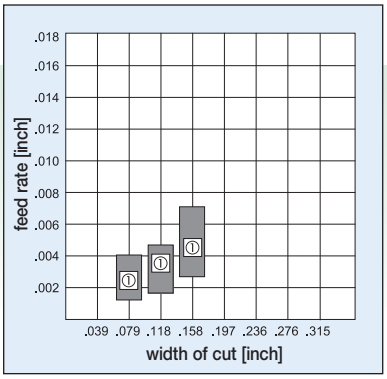
For grooving and parting, also capable of copy and straight turning as well as chamfering. With additional chip forming element for good chip control with varying depths of cut.

ProGroove • S



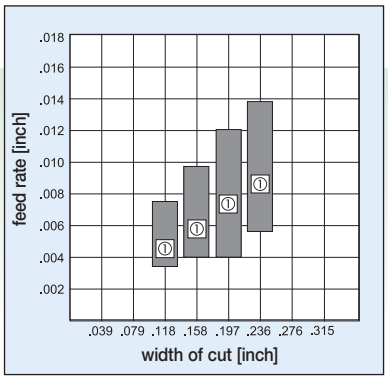
left-hand neutral right-hand

For low-burr parting with straight flanks and smooth surface finishes. All inserts are recommended for parting and grooving slender workpieces, part diameter <1.25", and thin-wall tubes.



① Recommended feed

ProGroove • R



① Recommended feed

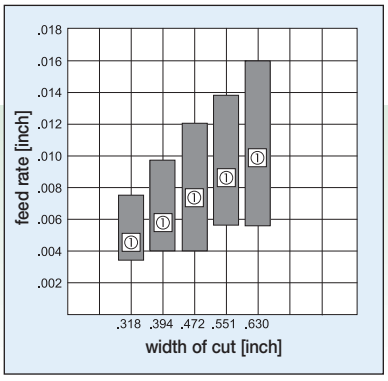
Full round inserts for profiling, grooving, and copy turning.
Very good chip control for broad general use. Accurate, reproducible cutting edge positioning.

LG System • 0 and 1

0 1

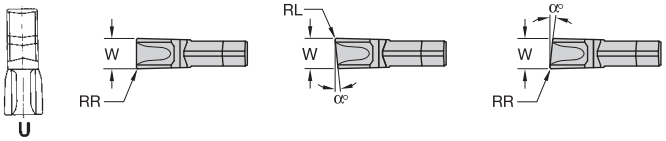
…0
Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.

…1
Inserts with wide range of uses in grooving and deep grooving of short chipping materials.



① Recommended feed

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM																	
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
P	1	425	**455**	490	655	**705**	750	455	**570**	685							295	**310**	325
	2	390	**520**	655	620	**800**	980	425	**520**	620							295	**340**	455
	3	325	**425**	520	520	**670**	820	360	**455**	555							225	**295**	360
	4	390	**490**	590	590	**750**	915	390	**490**	590							260	**340**	425
	5	325	**425**	520	490	**635**	785	325	**425**	520							225	**295**	360
	6	390	**490**	590	590	**750**	915	390	**490**	590							260	**340**	425
	7	295	**410**	520	455	**620**	785	325	**425**	520							195	**275**	360
	8	260	**360**	455	390	**555**	720	295	**390**	490							160	**245**	325
	9	195	**260**	325	295	**410**	520	195	**295**	390							130	**160**	225
	10	260	**310**	360	425	**490**	555	295	**340**	390							195	**225**	260
	11	160	**210**	260	260	**340**	425	160	**210**	260							130	**160**	195
	12	390	**455**	520	590	**685**	785	390	**505**	620							260	**310**	360
	13.1	260	**340**	425	425	**540**	655	295	**390**	490							195	**245**	295
	13.2	130	**180**	210	210	**275**	325	145	**195**	245							95	**130**	145
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
M	14.1	295	**390**	490							295	**390**	490				195	**245**	295
	14.2	245	**325**	390							245	**325**	390				160	**195**	245
	14.3	180	**245**	310							180	**245**	310				130	**160**	180
	14.4	145	**195**	245							145	**195**	245				95	**130**	145
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
K	15	225	**295**	325	455	**555**	655							225	**295**	325			
	16	160	**210**	260	325	**425**	520							160	**210**	260			
	17	195	**225**	260	390	**490**	590							195	**225**	260			
	18	130	**180**	225	295	**390**	490							130	**180**	225			
	19	260	**310**	360	490	**590**	685							260	**310**	360			
	20	195	**245**	295	360	**455**	555							195	**245**	295			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
N	21													1965	**2460**	2950			
	22													1640	**2130**	2620			
	23													1965	**2460**	2950			
	24													1640	**2130**	2620			
	25													750	**980**	1210			
	26													490	**655**	820			
	27													490	**655**	820			
	28													360	**455**	555			
	29													195	**260**	325			
	30													260	**325**	390			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
S	31													85	**120**	145			
	32													65	**95**	115			
	33													55	**75**	90			
	34													35	**45**	55			
	35													35	**50**	55			
	36													135	**195**	235			
	37													65	**95**	115			



● first choice
○ alternate choice

		TN6030	TN7525	TN7535	TN8025	THM	TTM
P		●	●	●			●
M		●	●	●	●		●
K		●	●	●		●	
N						●	
S						●	
H						●	

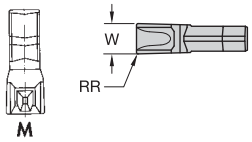
■ PGU

	W		RR									
catalog number	mm	in	mm	in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567320	2,10	.083	0,20	.008	–	N - Neutral	●	●	●	●	●	
123567330	3,10	.122	0,30	.012	–	N - Neutral	●	●	●	●	●	
123567340	4,10	.161	0,30	.012	–	N - Neutral	●	●	●		●	
123567350	5,10	.201	0,30	.012	–	N - Neutral	●	●	●	●	●	
123567360	6,10	.240	0,40	.016	–	N - Neutral	●	●	●	●	●	
123567380	8,15	.321	0,60	.024	–	N - Neutral	●	●	●	●	●	

	W		RR									
catalog number	mm	in	mm	in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567231	3,10	.122	0,25	.010	6	L - Left	●	●	●			
123567241	4,10	.161	0,25	.010	6	L - Left	●	●	●			

	W		RL									
catalog number	mm	in	mm	in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567230	3,10	.122	0,25	.010	6	R - Right	●	●	●			
123567240	4,10	.161	0,25	.010	6	R - Right	●	●	●			

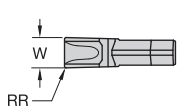
NOTE: W tolerance on all = ±.002" (±0,05mm).

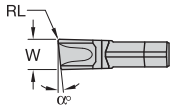


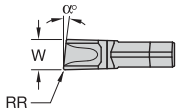
■ PGM

	W		RR									
catalog number	mm	in	mm	in	α°		TN6030	TN7525	TN7535	TN8025	THM	TTM
123567420	2,10	.083	0,20	.008	–		●	●	●			
123567430	3,10	.122	0,30	.012	–		●	●	●			
123567440	4,10	.161	0,30	.012	–		●	●	●			
123567450	5,10	.201	0,30	.012	–		●	●	●			
123567460	6,10	.240	0,40	.016	–		●	●	●			
123567480	8,15	.321	0,60	.024	–		●	●	●			

NOTE: W tolerance on all = ±.002" (±0,05mm).







● first choice
○ alternate choice

		TN6030	TN7525	TN7535	TN8025	THM	TTM
P		●	●	●			●
M		●	●	●	●		●
K		●	●	●		●	
N						●	
S						●	
H						●	

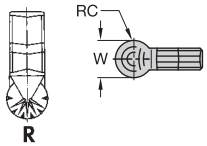
■ PGS

catalog number	W mm	W in	RR mm	RR in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567702	2,25	.089	0,20	.008	—	N - Neutral			●	●		
123567703	3,25	.128	0,20	.008	—	N - Neutral			●	●		
123567704	4,25	.167	0,20	.008	—	N - Neutral			●	●		

catalog number	W mm	W in	RR mm	RR in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567721	2,25	.089	0,20	.008	6	L - Left			●	●		
123567731	3,25	.128	0,20	.008	6	L - Left			●	●		
123567741	4,25	.167	0,20	.008	6	L - Left			●	●		

catalog number	W mm	W in	RL mm	RL in	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567720	2,25	.089	0,20	.008	6	R - Right			●	●		
123567730	3,25	.128	0,20	.008	6	R - Right			●	●		
123567740	4,25	.167	0,20	.008	6	R - Right			●	●		

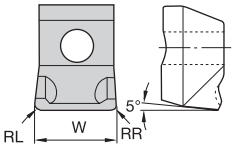
NOTE: W tolerance on all = ±.002" (±0,05mm).



■ PGR

catalog number	W mm	W in	RC mm	RC in	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567803	3,00	.118	1,50	.059		●				
123567804	4,00	.158	2,00	.079		●				
123567805	5,00	.197	2,50	.098		●				
123567806	6,00	.236	3,00	.118		●				

NOTE: W tolerance on all = ±.003" (±0,07mm).



RR = RL

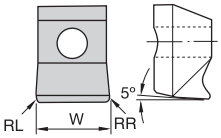
● first choice
○ alternate choice

		TN6030	TN7525	TN7535	TN8025	THM	TTM
P		●	●	●			●
M		●	●	●	●		●
K		●	●	●		●	
N						●	
S						●	
H						●	

LGN0

catalog number	W mm	W in	RR mm	RR in	TN6030	TN7525	TN7535	TN8025	THM	TTM
123568080	8,15	.321	0,80	.032		●	●		●	●
123568100	10,15	.400	0,80	.032		●	●		●	●
123568120	12,20	.480	0,80	.032		●	●		●	●
123568140	14,20	.559	0,80	.032		●	●		●	●
123568160	16,20	.638	0,80	.032		●	●		●	●

NOTE: W tolerance on all = ±.002" (±0,05mm).



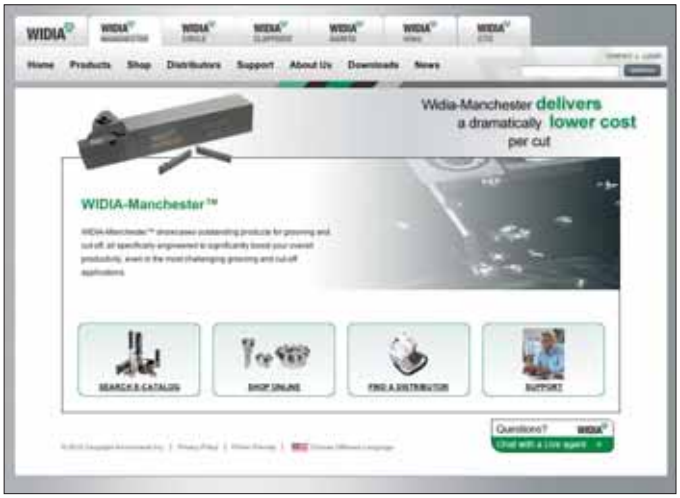
RR = RL

LGN1

catalog number	W mm	W in	RR mm	RR in	TN6030	TN7525	TN7535	TN8025	THM	TTM
123568081	8,15	.321	0,80	.032					●	
123568101	10,15	.400	0,80	.032					●	
123568121	12,20	.480	0,80	.032					●	
123568141	14,20	.559	0,80	.032					●	
123568161	16,20	.638	0,80	.032					●	

NOTE: W tolerance on all = ±.002" (±0,05mm).

On the Web



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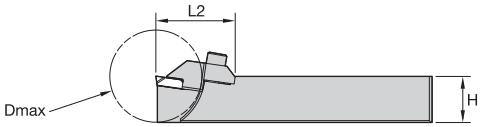
Specifically engineered to deliver toolholder flexibility with integral, component, universal, and blade-style designs.

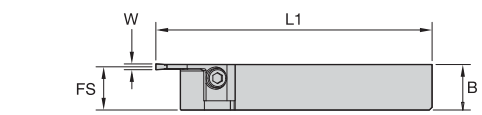
Features:

- Insert widths .063"–.157" (2,0mm–4,0mm).
- Toolholder shank sizes .375"–1.250" (10,0mm–31,75mm).
- Cut-off up 3.0" (76,0mm) bar capacity.

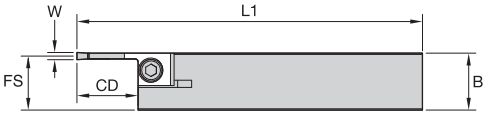
Benefits:

- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.





Left Hand Tool



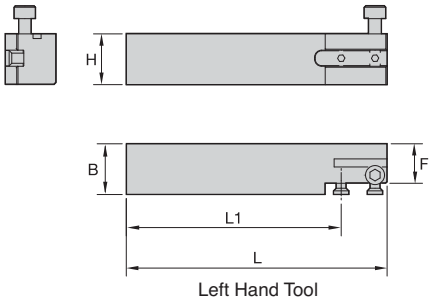
Left Hand Tool

Right Hand Tool

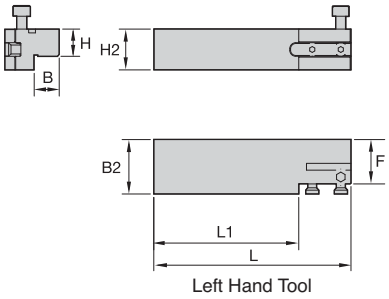
Square Shank

order number	catalog number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	Right hand										
3538685	**206173**	.094	1.063	—	.365	.328	.375	.987	2.630	**435152**	**619122**
3538687	**206175**	.094	1.063	—	.490	.453	.500	.978	6.000	**435152**	**619122**
3538679	**206167**	.094	1.500	—	.615	.578	.625	1.293	4.500	**435140**	**619123**
3538683	**206171**	.094	1.500	—	.740	.703	.750	1.293	4.500	**435140**	**619120**
3538672	**206145**	.125	1.000	—	.488	.437	.500	.928	6.000	**435130**	**619122**
3538681	**206169**	.125	1.500	—	.613	.562	.625	1.293	4.500	**435126**	**619123**
3563787	**206139**	.125	1.500	—	.738	.687	.750	1.293	4.500	**435126**	**619120**
3538744	**206420**	.125	—	1.000	.988	.937	1.000	1.687	6.000	**435180**	**619164**
3538745	**206421**	.188	—	1.000	.978	.906	1.000	1.691	6.000	**435180**	**619164**
	Left hand										
3538686	**206174**	.094	1.063	—	.365	.328	.375	.987	2.630	**435153**	**619122**
3538688	**206176**	.094	1.063	—	.490	.453	.500	.978	6.000	**435153**	**619122**
3538680	**206168**	.094	1.500	—	.615	.578	.625	1.293	4.500	**435141**	**619123**
3538684	**206172**	.094	1.500	—	.740	.703	.750	1.293	4.500	**435141**	**619120**
3538673	**206146**	.125	1.000	—	.488	.437	.500	.928	6.000	**435131**	**619122**
3538682	**206170**	.125	1.500	—	.613	.562	.625	1.293	4.500	**435127**	**619123**
3563800	**206140**	.125	1.500	—	.738	.687	.750	1.293	4.500	**435127**	**619120**
3538746	**206422**	.125	—	1.000	.988	.937	1.000	1.687	6.000	**435181**	**619164**
3538747	**206423**	.188	—	1.000	.978	.906	1.000	1.687	6.000	**435181**	**619164**

NOTE: Above toolholders are supplied with clamp.



Left Hand Tool



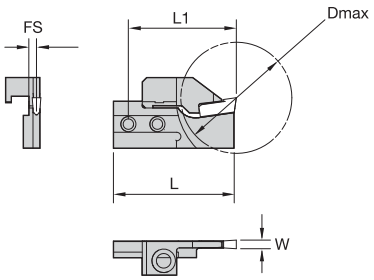
Left Hand Tool

Right Hand Tool

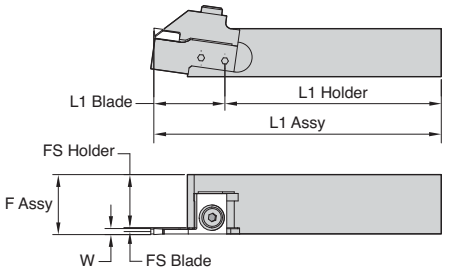
1/2" and 3/4" Shank Toolholders

order number	catalog number	H	B	B2	L	L1	H2	F	hand	support blade screw	clamp screw
3538689	**206178**	.745	.750	—	3.625	2.913	—	.575	N - Neutral	**606167**	**619124**
3563801	**206179**	.500	.460	1.000	3.625	2.913	.750	.815	R - Right	**606167**	**619124**

NOTE: 206178 can use right- or left-hand blade and clamp.



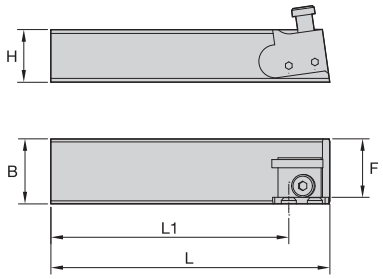
Right Hand Tool



L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2

1/2" and 3/4" Shank Blades

order number	catalog number	W	D max	FS	L	L1	clamp
	Right hand						
3539515	**333101**	.094	1.625	.128	1.767	1.580	**435154**
3539516	**333102**	.125	1.625	.112	1.767	1.580	**435155**
	Left hand						
3539517	**333103**	.094	1.625	.128	1.767	1.580	**435156**
3539518	**333104**	.125	1.625	.112	1.767	1.580	**435157**

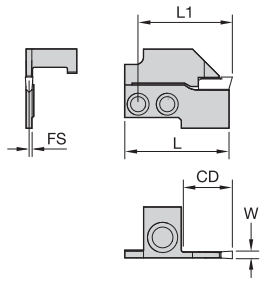


Left Hand Tool

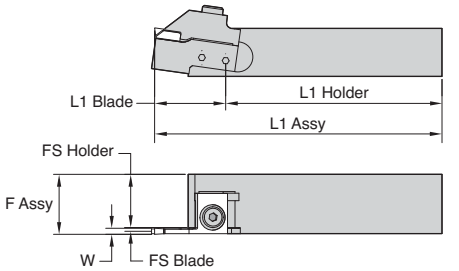

Right Hand Tool

1" and 1-1/4" Shank Toolholders

order number	catalog number	H	B	L	L1	F	support blade screw	clamp screw
	Right hand							
3538669	**206141**	1.000	1.234	5.291	4.510	1.109	**606164**	**619121**
3538670	**206143**	1.250	1.484	5.291	4.510	1.359	**606164**	**619121**
	Left hand							
3563786	**206142**	1.000	1.234	5.291	4.510	1.109	**606164**	**619121**



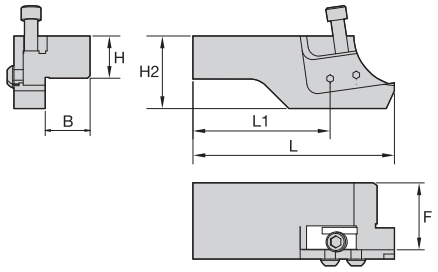
Left Hand Tool



L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2

1" and 1-1/4" Shank Blades

order number	catalog number	W	CD	FS	L	L1	clamp
	Right hand						
3563591	**331117**	.094	.500	.094	1.419	1.165	**435142**
3539504	**331101**	.125	.813	.078	1.724	1.482	**435128**
3539506	**331103**	.188	.813	.078	1.724	1.482	**435128**
	Left hand						
3539510	**331118**	.094	.500	.094	1.419	1.165	**435143**
3539505	**331102**	.125	.813	.078	1.724	1.482	**435129**
3539507	**331104**	.188	.813	.078	1.724	1.482	**435129**



Left Hand Tool

Right Hand Tool

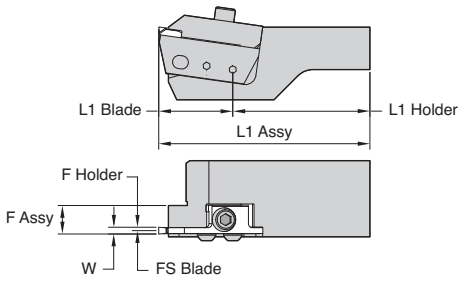
Universal Style 2-1/4" Bar Capacity

order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
	Right hand								
3538667	**206128**	.812	.750	1.719	1.334	2.747	4.270	**606171**	**619112**
3538659	**206114**	.912	1.000	1.719	1.434	3.867	5.390	**606171**	**619112**
3538665	**206123**	1.062	1.000	1.719	1.584	3.247	4.770	**606171**	**S352**
3538658	**206113**	1.062	1.000	1.719	1.584	4.247	5.770	**606171**	**S352**
	Left hand								
3538662	**206118**	.812	.750	1.719	1.334	2.747	4.270	**606171**	**619112**
3563798	**206108**	1.062	1.000	1.719	1.434	3.867	5.390	**606171**	**619112**
3538668	**206136**	1.062	1.000	1.719	1.584	3.247	4.770	**606171**	**619112**

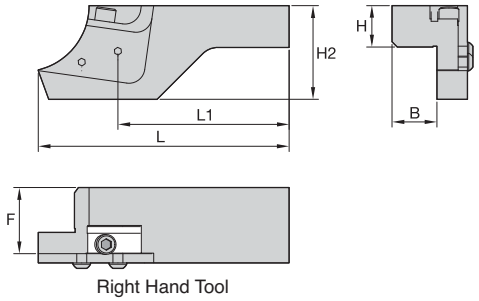
NOTE: .750" shank holders 206118 and 206128 use different clamps.

Components

W	L1	FS	left hand clamp	clamp for toolholder 206118 only	support blade	clamp for toolholder 206128 only	right hand clamp
.094	1.752	.036	**435149**	**435151**	**310109**	**435150**	**435148**
.125	1.752	.050	**435104**	**435110**	**310102**	**435116**	**435101**
.188	1.752	.072	**435105**	**435109**	**310108**	**435117**	**435102**



L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2



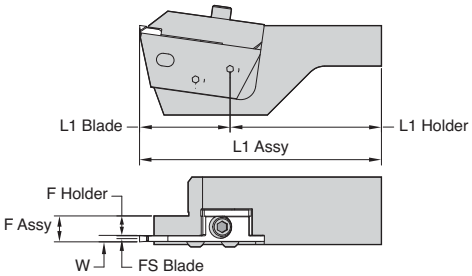
Right Hand Tool

Universal Style 3" Bar Capacity

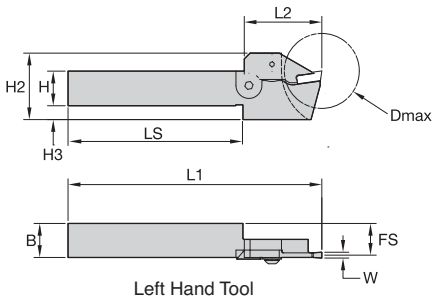
order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
	Right hand								
3538660	**206115**	.964	1.000	2.219	1.454	3.754	5.640	**606171**	**S352**
3538661	**206116**	1.064	1.000	2.219	1.554	3.754	5.640	**606171**	**619112**
3587587	**206121**	1.194	1.250	2.219	1.684	4.004	5.890	**606171**	**619112**
	Left hand								
3563799	**206110**	1.074	1.000	2.219	1.554	3.304	5.190	**606171**	**619112**
3538663	**206119**	1.104	1.000	2.219	1.554	3.754	5.640	**606171**	**619112**

Components

W	L1	FS	left hand clamp	support blade	right hand clamp
.125	2.246	.050	**435137**	**309111**	**435136**
.188	2.246	.072	**435106**	**309105**	**435103**
.250	2.246	.094	**435107**	**309106**	**435108**



L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2



Left Hand Tool

Sub-Spindle

order number	catalog number	W	D max	B	FS	H	H2	H3	L1	LS	L2	button-head cap screw	clamp	flat-head cap screw	washer
	Right hand														
3538762	**206502**	.094	1.630	.740	.703	.750	1.444	.300	5.500	3.790	1.680	**619174**	**409184**	**619177**	**613139**
3538760	**206500**	.126	2.630	.987	.937	1.000	1.754	.375	6.000	3.600	2.375	**619174**	**409182**	**619175**	**613139**
3538761	**206501**	.126	2.630	.987	.937	1.000	1.754	.375	6.000	3.600	2.375	**619174**	**409183**	**619175**	**613139**
	Left hand														
3538765	**206505**	.126	1.630	.737	.687	.750	1.439	.300	5.500	3.790	1.681	**619174**	**409187**	**619176**	**613139**
3538764	**206504**	.126	1.630	.737	.687	.750	1.439	.300	5.500	3.790	1.681	**619174**	**409186**	**619176**	**613139**

WIN WITH WIDIA™

WIDIA™

Separator™

Specifically engineered to deliver toolholder flexibility with integral, component, universal, and blade-style designs.

Separator Toolholders and Inserts

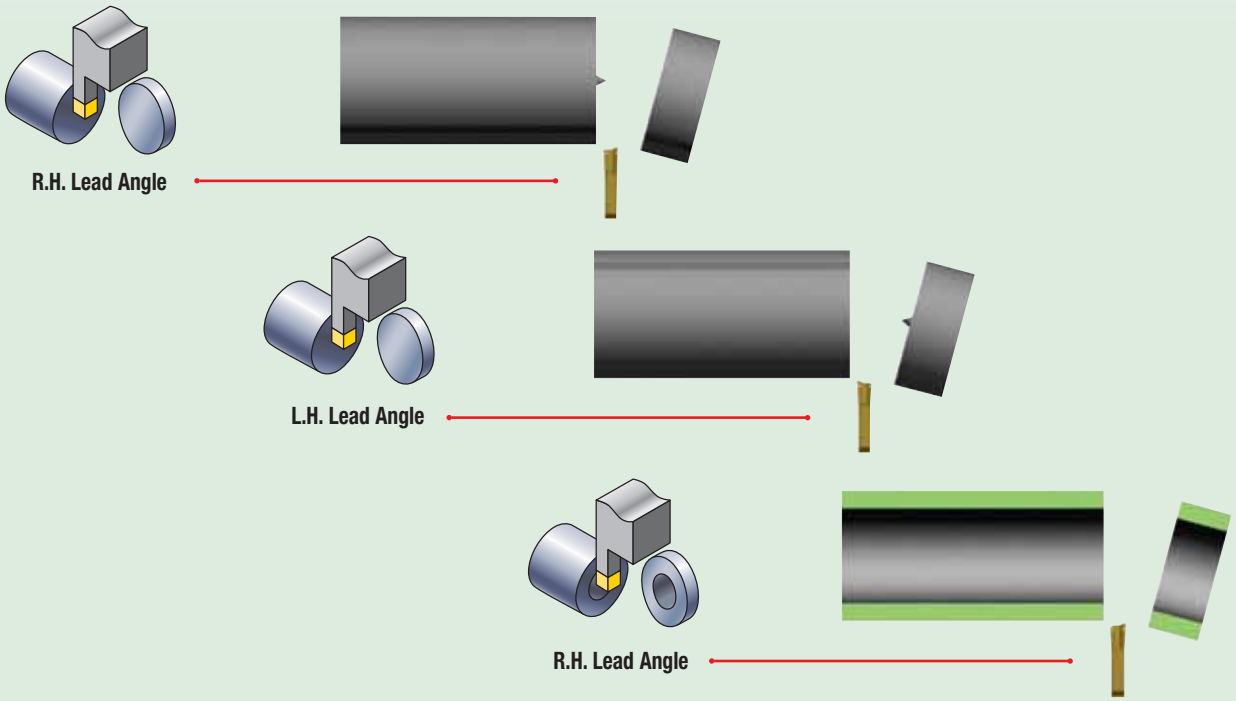
- Insert widths .079"–.157" (2,0mm–4,0mm).
- Toolholder shank sizes .394"–1.25" (10,0mm–31,75mm).
- Cut-off up to 2.99" (76,0mm) bar capacity.
- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.

To learn more, contact your local Authorized Distributor or visit **www.widia.com**.

WIDIA™
Win with WIDIA™

1 Choose the application to be performed:

Choose lead angle of insert for application.



2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

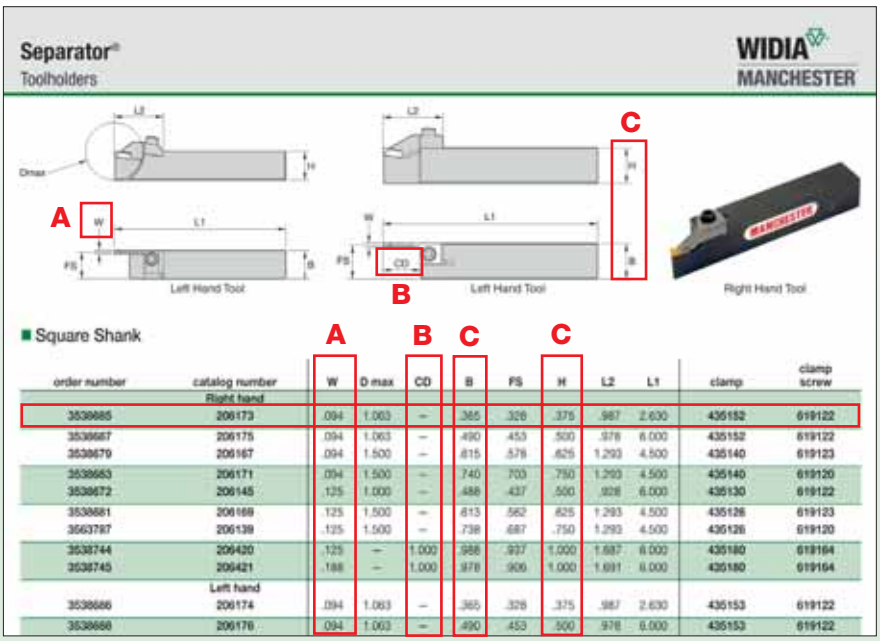
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

3 Select your toolholder based on the application:

A Choose the appropriate width of insert required for the application.

B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.

C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.



■ Square Shank

order number	catalog number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	Right hand										
3538685	206173	.094	1.063	–	.365	.328	.375	.987	2.630	435152	619122
3538687	206175	.094	1.063	–	.490	.453	.500	.978	6.000	435152	619122
3538679	206167	.094	1.500	–	.615	.578	.625	1.293	4.500	435140	619123
3538683	206171	.094	1.500	–	.740	.703	.750	1.293	4.500	435140	619120
3538672	206145	.125	1.000	–	.488	.437	.500	.928	6.000	435130	619122
3538681	206169	.125	1.500	–	.613	.562	.625	1.293	4.500	435126	619123
3563787	206139	.125	1.500	–	.738	.687	.750	1.293	4.500	435126	619120
3538744	206420	.125	–	1.000	.988	.937	1.000	1.687	6.000	435180	619164
3538745	206421	.188	–	1.000	.978	.906	1.000	1.691	6.000	435180	619164
	Left hand										
3538686	206174	.094	1.063	–	.365	.328	.375	.987	2.630	435153	619122
3538688	206176	.094	1.063	–	.490	.453	.500	.978	6.000	435153	619122

4 Select chipbreaker style for the application:

See the application guide on page D97 for a complete list of insert styles.

insert type	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
first choice	X²-Ultra (X² has wipers)	X²-Ultra	X²-Ultra	X²-Ultra	X²-Ultra	—
second choice	S²-Ultra	S²-Ultra	Classic	S²-Ultra	S²-Ultra	—

5 Select grade:

	Recommended Grades				
machining condition	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
high performance for optimal conditions (clean cuts, good machine condition, higher speed capability)	M-93	M433B	M-93	M-93	M-433B
	—	M-93	—	—	M-93
general purpose (1st choice for general machining)	M-43	M-43	M-43	M-43	M-43
unfavorable conditions (interrupted cuts, low speeds, etc.)	M-45	M-45	M-45	M-45	M-45
	M-40	M-40	M-40	M-40	M-40

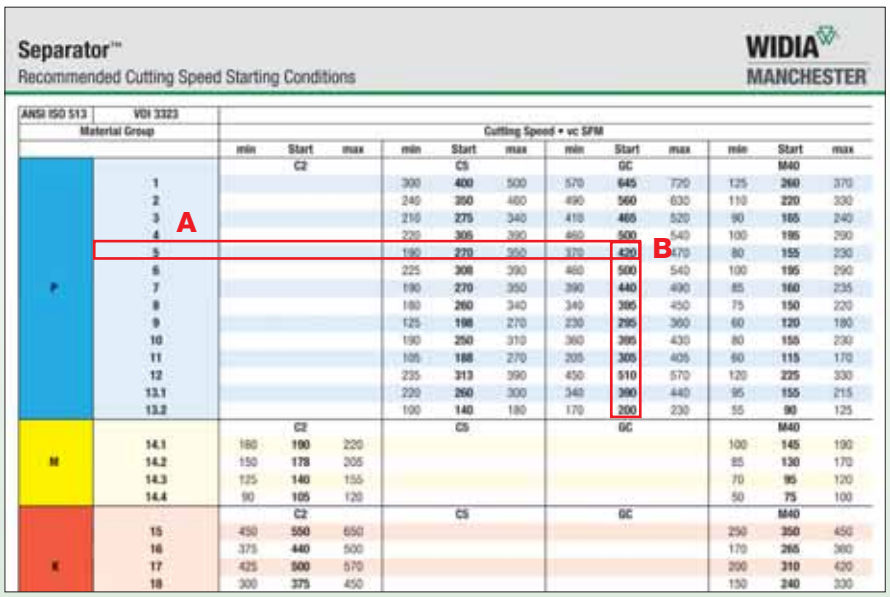
See page D96 for Grades and Grade Descriptions.

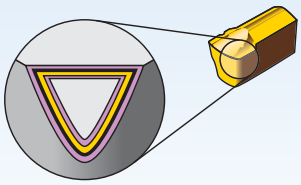
6 Determine cutting data:

A Based on material group and grade, identify starting speed (vc).

B First choice starting speed is in **bold**.

See page D98 for cutting data.





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

- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multi-layer coating provides better wear resistance.

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

Grade

Coating		Grade Description	05	10	15	20	25	30	35	40	45
C2	HW-K15	A general-purpose tungsten carbide for use on cast irons, non-ferrous alloys, and many high-temperature alloys.									
C5	HW-P35	A general-purpose, alloyed tungsten carbide for steel cutting.									
GC	HC-P20	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.									
M40	HC-P35	A premium, single-phase PVD-TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.									
M43	HC-P25	PVD-TiAlN multi-layer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.									
M433B	HC-M30	PVD-TiAlN single-layer coating over a superiorly tough, fine-grained carbide substrate. Outstanding temperature properties with excellent resistance to avoid built-up edges. Medium to high speeds and feeds. For stainless steels and high-temperature alloys.									
M45	HC-P30	A premium PVD-TiCN coated, shock-resistant carbide designed for low to moderate speeds. Excellent resistance to welding and BUE, along with improved abrasion resistance make this an ideal grade for austenitic stainless steel, low carbon steel, and high-temperature alloys.									
M93	HC-P20	PVD-TiAlN multi-layer coating over a tough, fine-grained carbide substrate with increased resistance to heat. Recommended for medium to higher cutting speeds under moderate conditions.									

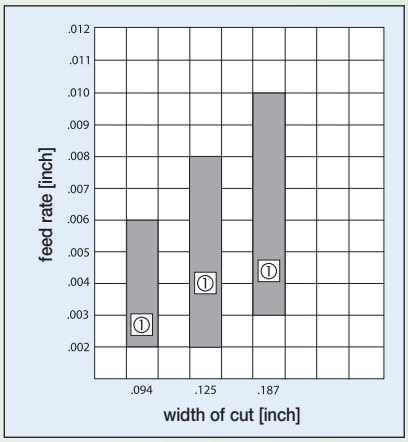
Separator • X² and X²-Ultra

X²

This insert has the same geometry as the WMT-SX™. Chip control geometry offers the widest range of speed and feed capabilities and provides excellent flatness and finish. This chipbreaker cuts with the least amount of tool pressure, extending tool life. The geometry also includes wipers and a corner radius. This geometry works well on a variety of materials.

X²-Ultra

This insert has the same geometry as the WMT-SX-Ultra. The X²-Ultra is an enhanced version of the X² and is ideal for stainless steels, nickel-based alloys, tool steel, INCONEL®, and titanium.



① Recommended feed

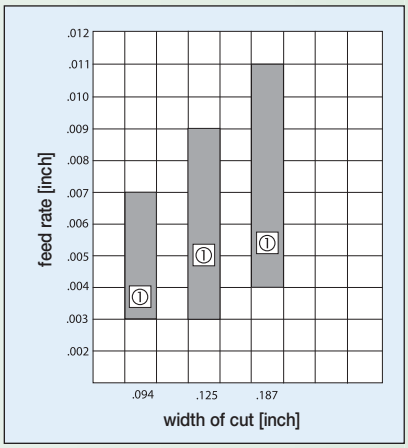
Separator • S² and S²-Ultra

S²

High positive rake with a more open chipbreaker enables increased speeds and feeds for moderate- to high-speed applications. The geometry includes wipers and a corner radius that provides superior flatness and finish. This insert is also available with sharp corners. Its greatest strengths can be seen on stainless steels and soft gummy steels.

S²-Ultra

The S²-Ultra is an enhanced version of the S² and is ideal for 300 series stainless steels, nickel-based alloys, tool steel, INCONEL, and titanium at moderate to high speeds and feeds.



① Recommended feed

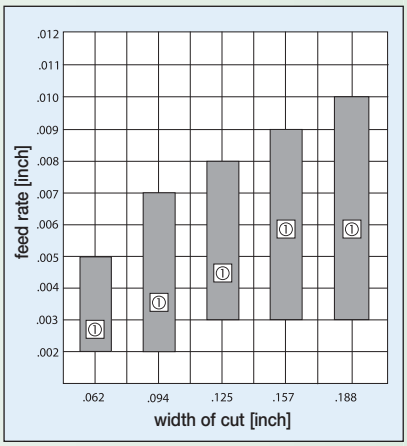
Separator • Classic and F²

Classic

A good general-purpose insert for carbon steels, alloy steels, and most stainless steels. The Separator Classic chipbreaker is designed to perform well at moderate to slow speeds and feeds. The Classic provides standard high lead angles and sharp corners, making it the first choice when choosing an insert for nib-free cut-off.

F²

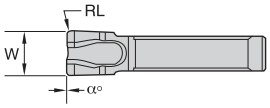
This insert provides superior flatness and finish on a wide variety of materials. Ideal for thick wall parts or cutting off larger diameter parts to center. The Separator F² performs well at slow to moderate speeds and feeds.

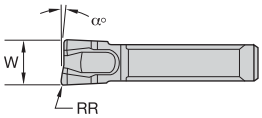


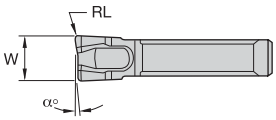
① Recommended feed

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			C5			GC			M40	
P	1				300	**400**	500	570	**645**	720	125	**260**	370
	2				240	**350**	460	490	**560**	630	110	**220**	330
	3				210	**275**	340	410	**465**	520	90	**165**	240
	4				220	**305**	390	460	**500**	540	100	**195**	290
	5				190	**270**	350	370	**420**	470	80	**155**	230
	6				225	**308**	390	460	**500**	540	100	**195**	290
	7				190	**270**	350	390	**440**	490	85	**160**	235
	8				180	**260**	340	340	**395**	450	75	**150**	220
	9				125	**198**	270	230	**295**	360	60	**120**	180
	10				190	**250**	310	360	**395**	430	80	**155**	230
	11				105	**188**	270	205	**305**	405	60	**115**	170
	12				235	**313**	390	450	**510**	570	120	**225**	330
	13.1				220	**260**	300	340	**390**	440	95	**155**	215
	13.2				100	**140**	180	170	**200**	230	55	**90**	125
			C2			C5			GC			M40	
M	14.1	160	**190**	220							100	**145**	190
	14.2	150	**178**	205							85	**130**	170
	14.3	125	**140**	155							70	**95**	120
	14.4	90	**105**	120							50	**75**	100
			C2			C5			GC			M40	
K	15	450	**550**	650							250	**350**	450
	16	375	**440**	500							170	**265**	360
	17	425	**500**	570							200	**310**	420
	18	300	**375**	450							150	**240**	330
	19	500	**600**	700							275	**375**	475
	20	400	**475**	550							180	**290**	400
			C2			C5			GC			M40	
N	21	1000	**1350**	1700							700	**1200**	1700
	22	800	**1150**	1500							500	**1000**	1500
	23	1000	**1350**	1700							700	**1200**	1700
	24	800	**1150**	1500							500	**1000**	1500
	25	700	**800**	900							450	**675**	900
	26	500	**550**	600							300	**450**	600
	27	500	**550**	600							300	**450**	600
	28	300	**350**	400							200	**300**	400
	29	200	**250**	300							150	**225**	300
	30	250	**300**	350							150	**250**	350
			C2			C5			GC			M40	
S	31	120	**145**	170							90	**125**	160
	32	90	**100**	110							70	**85**	100
	33	70	**75**	80							45	**60**	75
	34	60	**65**	70							40	**50**	60
	35	60	**65**	70							40	**50**	60
	36	180	**195**	210							110	**155**	200
	37	90	**100**	110							60	**80**	100

Cutting Speed • vc SFM												VDI 3323	ANSI ISO 513
												Material Group	
min	Start	max	min	Start	max	min	Start	max	min	Start	max		
	M43			M433B			M45			M93			
350	**525**	700	—	—	—	150	**275**	400	500	**650**	800	**1**	
280	**455**	630	—	—	—	140	**250**	360	425	**550**	700	**2**	
240	**365**	490	—	—	—	115	**190**	265	360	**475**	570	**3**	
260	**405**	550	—	—	—	130	**225**	320	400	**490**	600	**4**	
210	**340**	470	—	—	—	100	**175**	250	325	**425**	520	**5**	
260	**405**	550	—	—	—	130	**225**	320	400	**500**	600	**6**	
215	**345**	475	—	—	—	110	**175**	245	340	**440**	540	**7**	**P**
200	**330**	455	—	—	—	90	**160**	230	300	**400**	500	**8**	
140	**255**	370	—	—	—	70	**135**	200	200	**300**	400	**9**	
210	**305**	400	—	—	—	100	**170**	240	320	**400**	475	**10**	
115	**245**	375	100	**235**	370	70	**130**	190	180	**320**	450	**11**	
280	**395**	510	280	**405**	530	130	**245**	360	390	**505**	620	**12**	
260	**330**	400	260	**340**	420	110	**180**	250	295	**390**	490	**13.1**	
110	**160**	210	110	**170**	230	65	**100**	140	150	**200**	250	**13.2**	
	M43			M433B			M45			M93			
170	**250**	330	180	**300**	420	110	**165**	220	295	**390**	490	**14.1**	
140	**205**	270	150	**245**	340	105	**155**	205	245	**325**	390	**14.2**	**M**
110	**160**	210	120	**195**	270	85	**120**	155	180	**245**	310	**14.3**	
85	**125**	165	90	**150**	210	60	**90**	120	145	**195**	245	**14.4**	
	M43			M433B			M45			M93			
350	**500**	650	750	**950**	1150	300	**400**	500	500	**650**	800	**15**	
250	**375**	500	550	**750**	950	200	**325**	450	350	**500**	650	**16**	
300	**435**	570	650	**850**	1050	230	**360**	490	400	**550**	700	**17**	**K**
200	**325**	450	600	**800**	1000	175	**275**	375	375	**525**	675	**18**	
400	**550**	700	800	**1000**	1200	320	**420**	520	550	**590**	850	**19**	
270	**410**	550	700	**900**	1100	210	**340**	470	360	**460**	700	**20**	
	M43			M433B			M45			M93			
900	**1450**	2000				800	**1300**	1800	1000	**1600**	2200	**21**	
700	**1250**	1800				600	**1100**	1600	800	**1400**	2000	**22**	
900	**1450**	2000				800	**1300**	1800	1000	**1600**	2200	**23**	
700	**1250**	1800				600	**1100**	1600	800	**1400**	2000	**24**	
600	**850**	1100				500	**750**	1000	700	**1000**	1300	**25**	**N**
400	**550**	700				350	**500**	650	500	**650**	800	**26**	
400	**550**	700				350	**500**	650	500	**650**	800	**27**	
250	**350**	450				225	**325**	425	300	**450**	600	**28**	
180	**265**	350				150	**240**	325	200	**300**	400	**29**	
200	**300**	400				175	**275**	375	250	**400**	500	**30**	
	M43			M433B			M45			M93			
100	**140**	180	110	**155**	200	100	**135**	170	120	**170**	220	**31**	
75	**95**	120	80	**105**	130	75	**90**	110	95	**115**	150	**32**	
50	**70**	90	60	**80**	100	50	**65**	80	75	**90**	115	**33**	**S**
45	**55**	70	50	**65**	80	45	**55**	70	60	**75**	90	**34**	
45	**55**	70	50	**65**	80	45	**55**	70	60	**75**	90	**35**	
120	**170**	220	130	**180**	230	120	**165**	210	180	**220**	260	**36**	
75	**95**	115	80	**105**	130	75	**90**	110	95	**115**	145	**37**	







● first choice
○ alternate choice

		C2	C5	GC	M40	M43	M433B	M45	M93
P			○	○	●	●	●	●	●
M		○			●	●	●	●	●
K		○			○				
N		○				●	●		
S					○	●	●	●	○
H		●							

X²

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507305	2,39	.094	0,14	.006	—	N - Neutral					●		●	●
507308	3,20	.126	0,17	.007	—	N - Neutral					●		●	●

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507307	2,39	.094	0,14	.006	5	L - Left					●		●	●
507310	3,20	.126	0,17	.007	5	L - Left					●		●	●

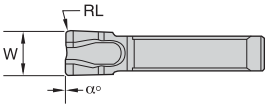
catalog number	W mm	W in	RL mm	RL in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507306	2,39	.094	0,14	.006	5	R - Right					●		●	●
507309	3,20	.126	0,17	.007	5	R - Right					●		●	●

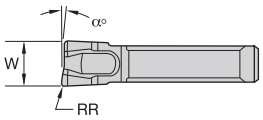
X² Ultra

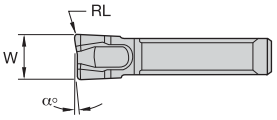
catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507354	2,39	.094	0,15	.006	—	N - Neutral						●		
507357	3,20	.126	0,15	.006	—	N - Neutral						●		

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507356	2,39	.094	0,13	.005	5	L - Left						●		
507359	3,20	.126	0,15	.006	5	L - Left						●		

catalog number	W mm	W in	RL mm	RL in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507355	2,39	.094	0,13	.005	5	R - Right						●		
507358	3,20	.126	0,15	.006	5	R - Right						●		







● first choice
○ alternate choice

		C2	C5	GC	M40	M43	M433B	M45	M93
P			○	○	●	●	●	●	●
M		○			●	●	●	●	●
K		○			○				
N		○				●	●		
S					○	●	●	●	○
H		●							

S²

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507275	2,39	.094	0,20	.008	—	N - Neutral				●	●		●	●
507278	3,20	.126	0,25	.010	—	N - Neutral				●	●		●	●
507281	4,78	.188	0,25	.010	—	N - Neutral					●		●	●

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507277	2,39	.094	0,20	.008	5	L - Left					●		●	●
507280	3,20	.126	0,20	.008	5	L - Left				●			●	
507283	4,78	.188	0,20	.008	5	L - Left							●	●

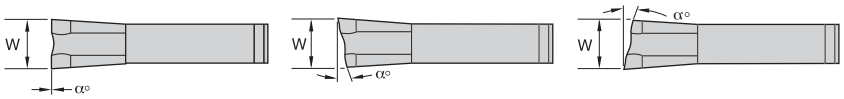
catalog number	W mm	W in	RL mm	RL in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507276	2,39	.094	0,20	.008	5	R - Right				●	●		●	●
507301	2,39	.094	—	—	5	R - Right							●	
507298	3,20	.126	—	—	5	R - Right					●		●	●
507279	3,20	.126	0,20	.008	5	R - Right				●	●		●	●
507282	4,78	.188	0,20	.008	5	R - Right					●		●	●

S² Ultra

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507329	2,39	.094	0,15	.006	—	N - Neutral						●		
507332	3,18	.125	0,15	.006	—	N - Neutral						●		

catalog number	W mm	W in	RR mm	RR in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507331	2,39	.094	0,15	.006	5	L - Left						●		
507334	3,18	.125	0,15	.006	5	L - Left						●		

catalog number	W mm	W in	RL mm	RL in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507330	2,39	.094	0,15	.006	5	R - Right						●		
507333	3,18	.125	0,15	.006	5	R - Right						●		



● first choice
○ alternate choice

		C2	C5	GC	M40	M43	M433B	M45	M93
P			○	○	●	●	●	●	●
M		○			●	●	●	●	●
K		○			○				
N		○				●	●		
S					○	●	●	●	○
H		●							

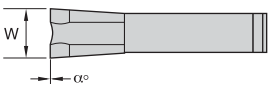
Classic

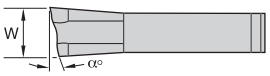
catalog number	W mm	W in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507196	1,60	.063	—	N - Neutral				●			●	
507140	2,39	.094	—	N - Neutral				●			●	●
507117	3,20	.126	—	N - Neutral	●		●	●			●	●
507116	4,78	.188	—	N - Neutral		●	●	●			●	
507118	6,35	.250	—	N - Neutral			●					

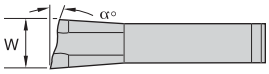
catalog number	W mm	W in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507213	1,60	.063	4	L - Left				●				
507152	2,36	.093	12	L - Left				●				
507144	2,39	.094	4	L - Left				●			●	
507154	3,15	.124	12	L - Left				●			●	
507129	3,20	.126	4	L - Left				●			●	
507125	4,78	.188	4	L - Left				●				

catalog number	W mm	W in	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507197	1,60	.063	4	R - Right				●			●	
507214	1,60	.063	12	R - Right				●			●	
507207	2,31	.091	4	R - Right				●			●	
507151	2,36	.093	12	R - Right				●	●		●	
507143	2,39	.094	4	R - Right	●			●			●	●
507161	2,39	.094	18	R - Right				●			●	
507146	3,15	.124	12	R - Right				●			●	
507155	3,15	.124	18	R - Right				●			●	
507128	3,20	.126	4	R - Right	●		●	●			●	●
507224	3,20	.126	4	R - Right				●			●	
507176	4,72	.186	12	R - Right				●			●	
507124	4,78	.188	4	R - Right	●		●	●			●	●

NOTE: No RR on Classic Inserts. Inserts are sharp.
507207, 507224, and 507226 have a modified aggressive chip control design.







● first choice
○ alternate choice

		C2	C5	GC	M40	M43	M433B	M45	M93
P		○	○		●	●	●	●	●
M		○			●	●	●	●	●
K		○			○				
N		○				●	●		
S					○	●	●	●	○
H		●							

■ F²

catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507240	2,39	.094	—	N - Neutral				●			●	
507244	3,20	.126	—	N - Neutral				●			●	

catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507255	2,39	.094	12	L - Left				●				
507257	3,18	.125	4	L - Left							●	
507258	3,18	.125	12	L - Left							●	
507259	3,18	.125	18	L - Left							●	

catalog number	W mm	W in	W α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507241	2,39	.094	4	R - Right				●			●	
507242	2,39	.094	12	R - Right				●			●	
507243	2,39	.094	18	R - Right				●			●	
507245	3,18	.125	4	R - Right				●			●	
507246	3,18	.125	12	R - Right				●			●	
507247	3,18	.125	18	R - Right				●			●	
507252	4,75	.187	4	R - Right				●			●	
507253	4,78	.188	12	R - Right				●	●		●	

Definitions and Guidelines

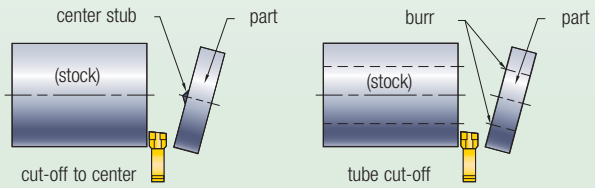
1. Width of cut (W) = width of the insert.

2. Lead angle = 0° (neutral); 4°, 5°, 12°, 18° (RH or LH).

Reduce burr of cut-off faces:

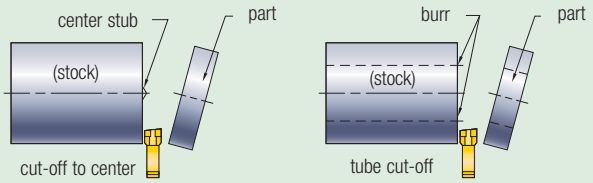
- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the burr that remains on the part but decreases tool life and increases tool side deflection and possibly cycle time.

Figure 1
Insert selection **left-hand lead**



Left-hand lead insert leaves center stub or burr on part and produces clean stock surface.

Figure 2
Insert selection **right-hand lead**

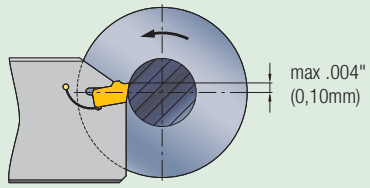


Right-hand lead insert leaves center stub or burr on stock and produces clean part surface.

- Check total height and maintain on center with part diameter.

- The cutting edge height should be within ±.004" (0,1mm) to the center; recommended cutting position is .002" (0,05mm) above center.

Figure 3
Above center



- If 0° lead angle is mandatory, use the narrowest possible cut-off insert and blade. This will minimize the center stub or cut-off burr length. Decrease the feed rate to maximum .002" (0,05mm) or less at the point where diameter equals insert width.

- On tubing-type parts that require a chamfer on the ID, align ID chamfer tool with cut-off surface. This will enable the chamfering operation to actually separate the part from the bar (see Figure 4). Note the part may drop onto the chamfering bar, which, in this case, will act like a catcher for the part.

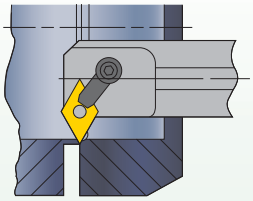


Figure 4
Internal chamfer line up

Improve surface finish of cut-off faces:

- Use insert with 0° lead angle.

- Increase coolant flow or improve application technique, as shown in Figure 5.

- Decrease the feed rate near the break-through point of the cut.

- Check that the grooving tool is set at the correct angle.

- Use blades with the greatest possible face height and smallest possible cutting width.

- Increase the speed.

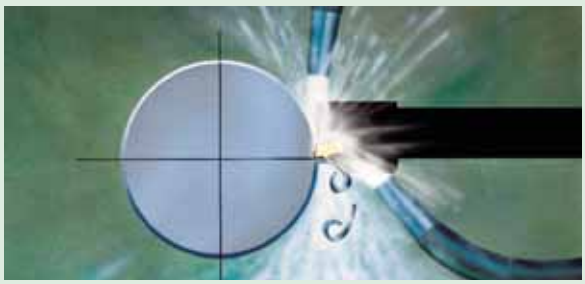


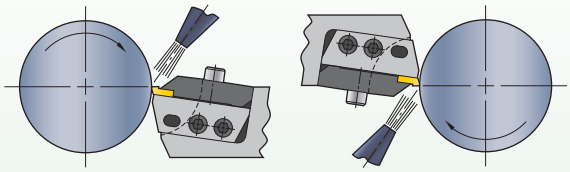
Figure 5
Preferred method for applying coolant

- Mount cut-off tool upside down. This enables gravity to remove chips and avoid cutting the chips twice. Another benefit of mounting the tool upside down is preventing chips from wedging between the tool insert and the groove side walls, which galls the side wall surfaces.

Improve chip control:

- Adjust feed rate up or down to accommodate chip formation.
- Use a 0° or smallest lead available.
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain sharp cutting edge and corners.

Figure A

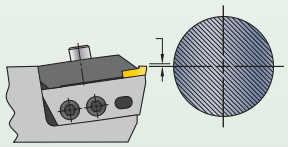


Coolant on cut-off tool | Preferred method of applying coolant

Improve flatness of cut-off surfaces:

- Maintain 90° position (perpendicular alignment) between cut-off tool and workpiece.
- For low to moderate speed (sfpm), use Separator F2.
- For moderate to high speed (sfpm), use Separator S^2 or X^2.
- Use strongest toolholder system possible.
- Use 0° lead angle inserts when possible. If lead angle inserts are needed, reduce the feed rate.
- Check for minimum overhang of holder and blade.
- Set up for minimum workpiece overhang (distance out of chuck).
- Reduce feed rate.
- Maintain sharp edge and corners on cut-off insert.
- Increase speed (RPM).
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain proper tool center height .000"–.005" (0,0mm–0,0001mm) above center (see Figure B).

Figure B



Improve surface finish:

- For low to moderate speed (sfpm), use Separator F2.
- For moderate to high speed (sfpm), use Separator S^2 or X^2.
- Avoid overly aggressive chip control.
- Increase speed.
- Reduce lead angle and feed rate.
- Determine if corner radius is too large or small.
- Use a coated grade.
- Use coolant (see Figure A).

Minimize edge chipping:

- Check to see if tool is significantly above or below center.
- Reduce feed prior to part drop off.
- Use Separator S^2 or X^2.
- Choose the proper speed associated with the insert grade used.
- Call Technical Support to see if a larger hone size is needed.
- Eliminate chatter.
- Avoid chip re-cutting.
- Check for these part and machine problems:
  - Slide is loose.
  - Slide travel is irregular.
  - Bar/tube ID and/or OD is out of round.
  - Bar/tube is bent.
  - Thin wall collapses (deforms) in the cut.
  - Part is unstable.
  - Cut-off through unturned stock.
  - Excessive tool overhang.
  - Bent or partly attached flash ring.

(continued)

(continued)

Eliminate chatter:

- Minimize tool blade and holder overhang.
- Minimize part overhang.
- Use strongest toolholder system.
- Use a more narrow width of insert.
- Chipbreaker might be too aggressive. (Call Technical Support.)
- Adjust speed and feed rate up or down.
- Hold workpiece rigidly.
- With a longer part, support with steady rest or live center.
- Avoid machine dwell.
- Use S^2 or X^2 to reduce cutting forces.

Reduce cut-off nib on solid bar or ID burr on tubing:

- Check tool height. Insert cutting edge should be on center to .002" (0,05mm) above centerline of workpiece.
- To reduce nib on part, use a high lead angle-type insert. Lead angle on a cut-off insert reduces the nib, which remains on the workpiece. CAUTION: the higher the lead, the more tool-side deflection.
- Use the narrowest possible cut-off insert to minimize the cut-off burr length.
- Reduce feed rate at the end of a cut.
- On most tubing-type parts, a 4° or 5° lead angle will be sufficient.
- Add support to a long slender-type part.
- Maintain proper sub-spindle alignment.
- If nib or burr persists, call Technical Support about reducing hone size.
- Use small- or no-corner radius.

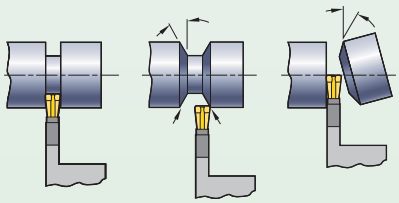
Eliminate built-up edge:

- Select proper grade for insert.
- Increase speed (RPM).
- Increase the feed rate.
- Use ample amounts of well-directed coolant (see Figure A on page D105).

Chamfer and cut-off operations:

- Use Separator S^2 or X^2.
- Groove or breakdown workpiece surface being machined.
- Machine the chamfer.
- For jobs requiring a chamfer on both ends of the part, begin by plunging to a depth just beyond the depth of the chamfers. Then, return to the part OD and profile each chamfer individually. Finish the cut-off after completion of the second chamfer.
- Cut off the workpiece (see Figure C).

Figure C



Modifications for Increased Depth of Cut

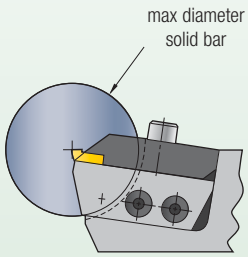


Figure 1
Standard bar capacity shown

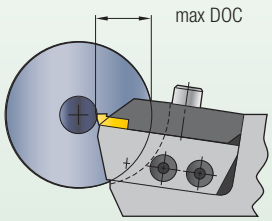


Figure 2
Larger bar diameter shown

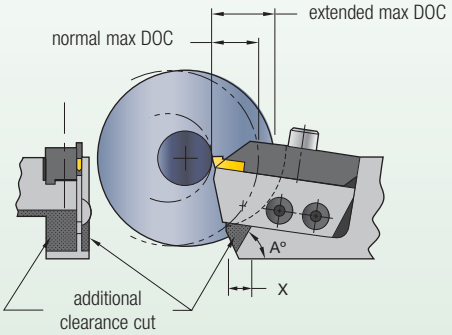


Figure 3
Modified toolholder with larger bar diameter shown

Capacity Chart for 2-1/4" Diameter Bar Capacity Tooling								
bar diameter	2.5"	3.0"	3.5"	4.0"	4.5"	5.0"	6.0"	**NOTE**
max DOC	0.94"	0.75"	0.62"	0.56"	0.50"	0.47"	0.44"	**with no modification on toolholder**
	1.12"	1.03"	0.97"	0.91"	0.87"	0.84"	0.78"	**with no modification on toolholder X = .40" A = 50"**

Capacity Chart for 3" Diameter Bar Capacity Tooling						
bar diameter	3.5"	4.0"	4.5"	5.0"	6.0"	**NOTE**
max DOC	1.12"	1.00"	0.88"	0.78"	0.69"	**with no modification on toolholder**
	1.44"	1.37"	1.31"	1.25"	1.12"	**with no modification on toolholder X = .40" A = 50"**

Ranger™

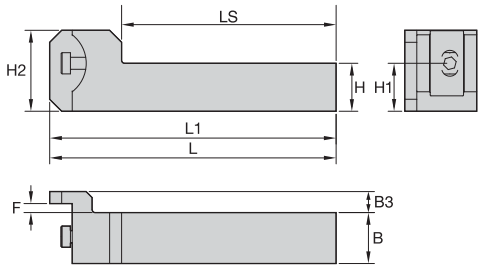
Ranger™ Adjustable Face Grooving System

Features:

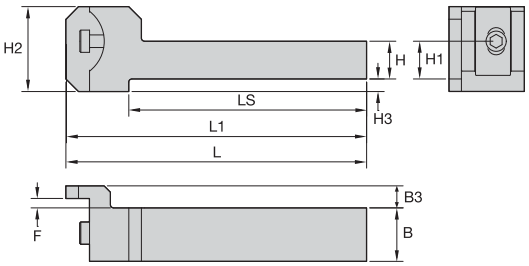
- Enables the adjustment of the support blade from 2.25" (57,0mm) to 16" (406,0mm) diameter for initial plunge.
- Insert widths .126" (3,2mm); .188" (4,9mm); and .250" (6,4mm).

Benefits:

- Available in both CW and CCW rotation and in both sweep-in or sweep-out styles.
- 2.25" (57,0mm) to 16" (406,0mm) OD face grooving with one adjustable assembly.



Right Hand Tool



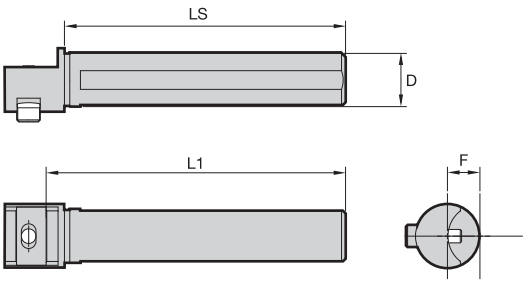
Right Hand Tool

Left Hand Assembly

Square Shank

order number	catalog number	B	B3	F	H	H1	H2	H3	L	L1	LS	support blade screw	nut
	Right hand												
3538796	**235103**	1.06	.44	-0.19	.75	.75	1.69	.25	5.98	5.963	4.475	**606218**	**613137**
3538797	**235104**	1.06	.44	-0.19	1.00	1.00	1.69	—	5.98	5.963	5.090	**606218**	**613137**
3538798	**235105**	1.06	.47	-0.19	1.25	1.25	1.94	—	5.98	5.963	5.090	**606218**	**613137**
	Left hand												
3538799	**235106**	1.06	.44	-0.19	.75	.75	1.69	.25	5.98	5.963	4.475	**606218**	**613137**
3538800	**235107**	1.06	.44	-0.19	1.00	1.00	1.69	—	5.98	5.963	5.090	**606218**	**613137**
3538801	**235108**	1.06	.44	-0.19	1.25	1.25	1.94	—	5.98	5.963	5.090	**606218**	**613137**

NOTE: These holders can only use curve-out cartridge assembly.
Right-hand holder uses left-hand cartridge assembly.

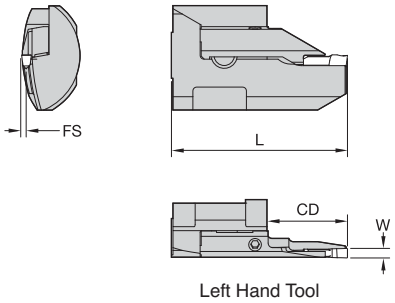


Left Hand Assembly

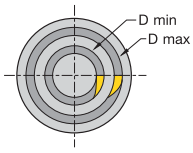
Round Shank

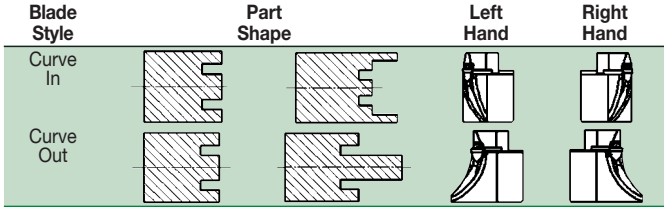
order number	catalog number	D	L1	LS	F	support blade screw	washer
3538803	**235110**	1.000	6.750	6.750	.763	**619155**	**613135**
3538802	**235109**	1.250	6.750	6.750	.763	**619155**	**613135**
3538794	**235101**	1.500	6.750	6.750	.763	**619155**	**613135**

NOTE: Toolholders can be used as left hand or right hand.
These holders can use curve-in and curve-out cartridge assembly.



Left Hand Tool

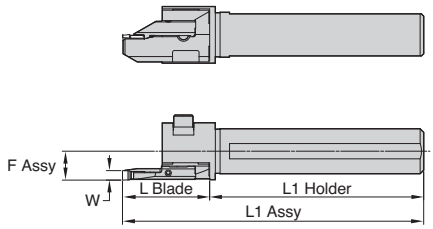




Curve In

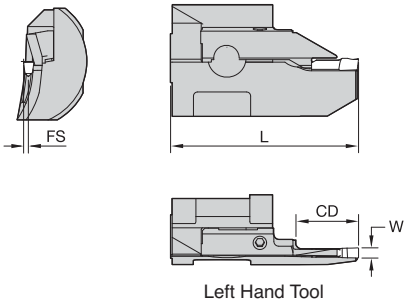
order number	catalog number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539537	**338123**	.125	.75	2.25	15.75	-0.071	2.30	L - Left	**440203**	**606219**
3539538	**338124**	.188	1.00	2.25	15.75	-0.094	2.30	L - Left	**440204**	**606219**
3539546	**338132**	.250	1.00	2.25	15.75	-0.125	2.30	L - Left	**4402122**	**606219**
3539535	**338121**	.125	.75	2.25	15.75	-0.071	2.30	R - Right	**440201M**	**606219**
3539536	**338122**	.188	1.00	2.25	15.75	-0.094	2.30	R - Right	**440202**	**606219**
3539545	**338131**	.250	1.00	2.25	15.75	-0.125	2.30	R - Right	**440211**	**606219**

NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.

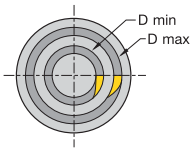


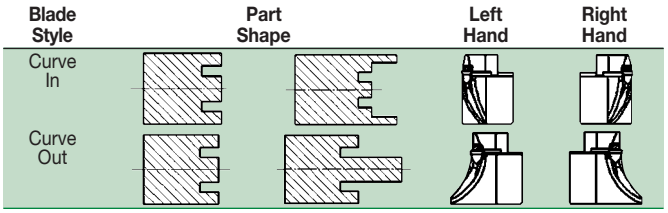
For Round Shank

F Assy = W/2 + F (holder) + FS (blade)
L1 Assy = L1 (holder) + L (blade)



Left Hand Tool

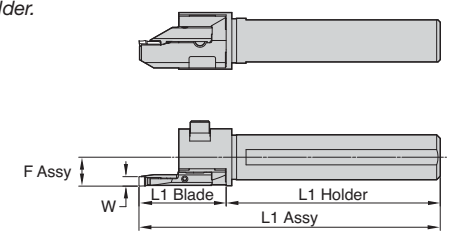




Curve Out

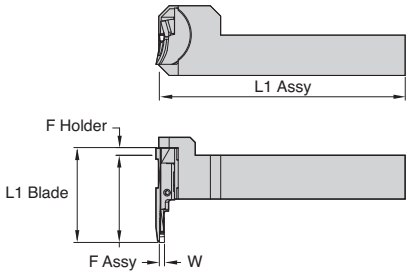
order number	catalog number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539539	**338125**	.125	.75	2.25	15.75	-0.058	2.30	L - Left	**440205**	**606219**
3539540	**338126**	.188	1.00	2.25	15.75	-0.094	2.30	L - Left	**440206**	**606219**
3539541	**338127**	.250	1.00	2.25	15.75	-0.125	2.30	L - Left	**440207**	**606219**
3539542	**338128**	.125	.75	2.25	15.75	-0.058	2.30	R - Right	**440208**	**606219**
3539543	**338129**	.188	1.00	2.25	15.75	-0.094	2.30	R - Right	**440209**	**606219**
3539544	**338130**	.250	1.00	2.25	15.75	-0.125	2.30	R - Right	**440210M**	**606219**

NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.



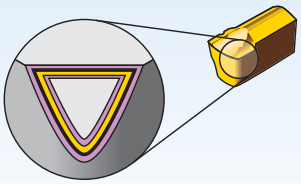
For Round Shank

F Assy = W/2 + F (holder) + FS (blade)
L1 Assy = L1 (holder) + L1 (blade)



For Square Shank

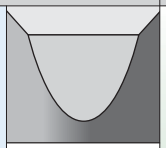
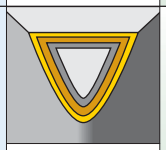
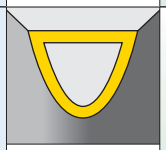
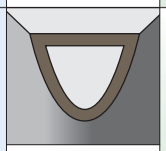
F Assy = F (holder) + L1 (blade)
L1 Assy = W/2 + L1 (holder) + FS (blade)



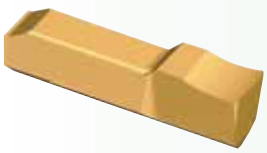
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

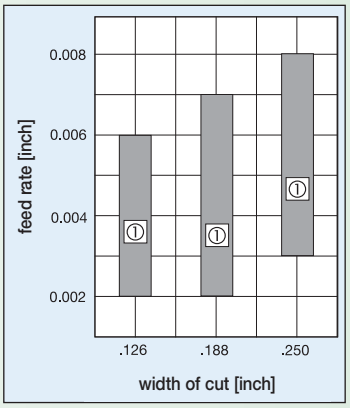
Grade

Coating		Grade Description	05	10	15	20	25	30	35	40	45
C2	 HW-K15	A general-purpose tungsten carbide for use on cast irons, non-ferrous alloys, and many high-temperature alloys.	M								
			K								
			N								
			S								
GC	 HC-P15	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P								
M40	 HC-P35	A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P								
			M								
			K								
			N								
			S								
M43	 HC-P30	PVD-TiAlN multi-layer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P								
			M								
			K								
			S								

Ranger • Face Grooving

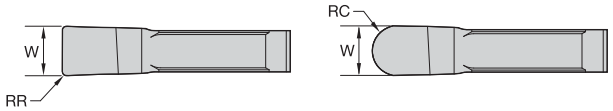


- Inserts available for plunge-groove and full-nose radii.
- Geometry design to provide clearance deep grooving.
- Superior chip control.



① Recommended feed

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			GC			M40			M43	
P	1				570	**645**	720	125	**260**	370	350	**525**	700
	2				490	**560**	630	110	**220**	330	280	**455**	630
	3				410	**465**	520	90	**165**	240	240	**365**	490
	4				460	**500**	540	100	**195**	290	260	**405**	550
	5				370	**420**	470	80	**155**	230	210	**340**	470
	6				460	**500**	540	100	**195**	290	260	**405**	550
	7				390	**440**	490	85	**160**	235	215	**345**	475
	8				340	**395**	450	75	**150**	220	200	**330**	455
	9				230	**295**	360	60	**120**	180	140	**255**	370
	10				360	**395**	430	80	**155**	230	210	**305**	400
	11				205	**305**	405	60	**115**	170	115	**245**	375
	12				450	**510**	570	120	**225**	330	280	**395**	510
	13.1				340	**390**	440	95	**155**	215	260	**330**	400
	13.2				170	**200**	230	55	**90**	125	110	**160**	210
			C2			GC			M40			M43	
M	14.1	160	**190**	220				100	**145**	190	170	**250**	330
	14.2	150	**178**	205				85	**130**	170	140	**205**	270
	14.3	125	**140**	155				70	**95**	120	110	**160**	210
	14.4	90	**105**	120				50	**75**	100	85	**125**	165
			C2			GC			M40			M43	
K	15	450	**550**	650				250	**350**	450	350	**500**	650
	16	375	**440**	500				170	**265**	360	250	**375**	500
	17	425	**500**	570				200	**310**	420	300	**435**	570
	18	300	**375**	450				150	**240**	330	200	**325**	450
	19	500	**600**	700				275	**375**	475	400	**550**	700
	20	400	**475**	550				180	**290**	400	270	**410**	550
			C2			GC			M40			M43	
N	21	1000	**1350**	1700				700	**1200**	1700	900	**1450**	2000
	22	800	**1150**	1500				500	**1000**	1500	700	**1250**	1800
	23	1000	**1350**	1700				700	**1200**	1700	900	**1450**	2000
	24	800	**1150**	1500				500	**1000**	1500	700	**1250**	1800
	25	700	**800**	900				450	**675**	900	600	**850**	1100
	26	500	**550**	600				300	**450**	600	400	**550**	700
	27	500	**550**	600				300	**450**	600	400	**550**	700
	28	300	**350**	400				200	**300**	400	250	**350**	450
	29	200	**250**	300				150	**225**	300	180	**265**	350
	30	250	**300**	350				150	**250**	350	200	**300**	400
			C2			GC			M40			M43	
S	31	120	**145**	170				90	**125**	160	100	**140**	180
	32	90	**100**	110				70	**85**	100	75	**95**	120
	33	70	**75**	80				45	**60**	75	50	**70**	90
	34	60	**65**	70				40	**50**	60	45	**55**	70
	35	60	**65**	70				40	**50**	60	45	**55**	70
	36	180	**195**	210				110	**155**	200	120	**170**	220
	37	90	**100**	110				60	**80**	100	75	**95**	115



● first choice
○ alternate choice

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

Face Grooving

catalog number	W mm	W in	RR mm	RR in	RC mm	RC in	C2	GC	M40	M43
506101	3,18	.125	0,25	.010	–	–	●	●	●	●
506102	3,18	.125	0,25	.010	–	–	●	●	●	
506104	3,18	.125	–	–	1,59	.063	●		●	
506105	3,18	.125	–	–	1,59	.063	●		●	
506103	4,78	.188	0,25	.010	–	–	●	●		●
506106	4,78	.188	–	–	2,39	.094			●	
506107	6,35	.250	0,25	.010	–	–			●	
506108	6,35	.250	–	–	3,18	.125			●	

NOTE: Inserts 506101 and 506104 are to be used for counterclockwise rotation only.
Inserts 506102 and 506105 are to be used for clockwise rotation only.

Technical Recommendations • Ranger Tool Systems

Application Information:

- When changing inserts, be sure the new insert locates against the positive stop on the clamp.
- Never tighten the insert clamping screw without an insert in the pocket. Permanent damage to the clamp could occur.
- Toolholder projection length out of the tool block should be as short as possible to maintain rigidity.
- Slower speeds and feeds are recommended compared to OD grooving.

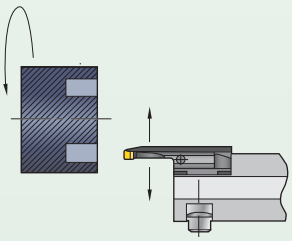
Face Grooving Ranges per Setting

given diameter setting	plunge range at diameter setting	
	smallest OD	largest OD
2-1/4	2-1/4	2-3/8
2-1/2	2-3/8	2-5/8
2-3/4	2-9/16	2-15/16
3.0	2-5/8	3-3/8
3-1/2	3-1/16	3-15/16
4.0	3-1/2	4-1/2
5.0	4-1/4	5-3/4
6.0	5	7
8.0	6-1/2	9-1/2
10.0	8	11
11-16	9	16

NOTE: This chart is a general guide for face groove entry at outside diameters both smaller and larger than each given OD setting on the tool.
Example: If the tool is adjusted for 4" OD, plunge cuts from 3-1/2" OD to 4-1/2" OD can be made without changing the 4" OD setting.

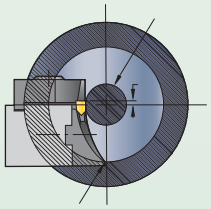
Widening a Face Groove

Additional clearance is generated on the workpiece after the first groove cut. Without further adjustment, the tool may then be used to widen the groove toward the center or the OD of the workpiece.



WMT™ Face Grooving Clearances

The cutting edge of the WMT face grooving system is +.030" above center to improve cutting clearances. This tool should not be repositioned on center. When facing toward center, this system does not have sufficient clearance to cut at <.850" diameters.



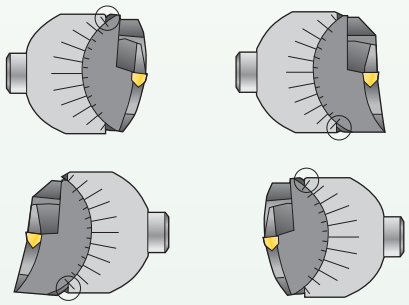
Adjusting Information for Ranger Tooling

The following instructions are for style 1 Ranger tools.
Instructions for style 2 tools are in [brackets].

- Appropriate diameter range setting can be accomplished as follows:

Step 1 Loosen the support blade locking screw and rotate the support blade so that the 2.25 mark is above the top line on the toolholder. [Below the line on toolholder for style 2.]

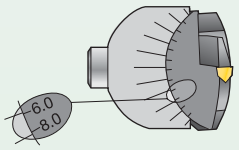
2.25 diameter settings



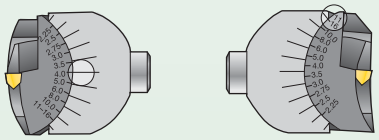
style 1 style 2

Step 2 Slowly rotate the support blade down until the 2.25 mark is aligned with the top line of the toolholder. [Rotate the support blade up until the 2.25 mark is aligned with the bottom line on the toolholder for style 2.] At this point, the support blade assembly is properly aligned to cut face grooves at 2.25" OD.

For diameters larger than 2.25" OD, continue to rotate the support blade in the same direction until the desired diameter range has been aligned.



7.0 diameter setting



4.0 diameter setting 11–16 diameter setting

Example: The 7.0 diameter setting falls between the 6.0 and 8.0 diameter settings.

Step 3 Tighten the support blade screw. Inspect the scale to ensure that the desired diameter range is aligned.

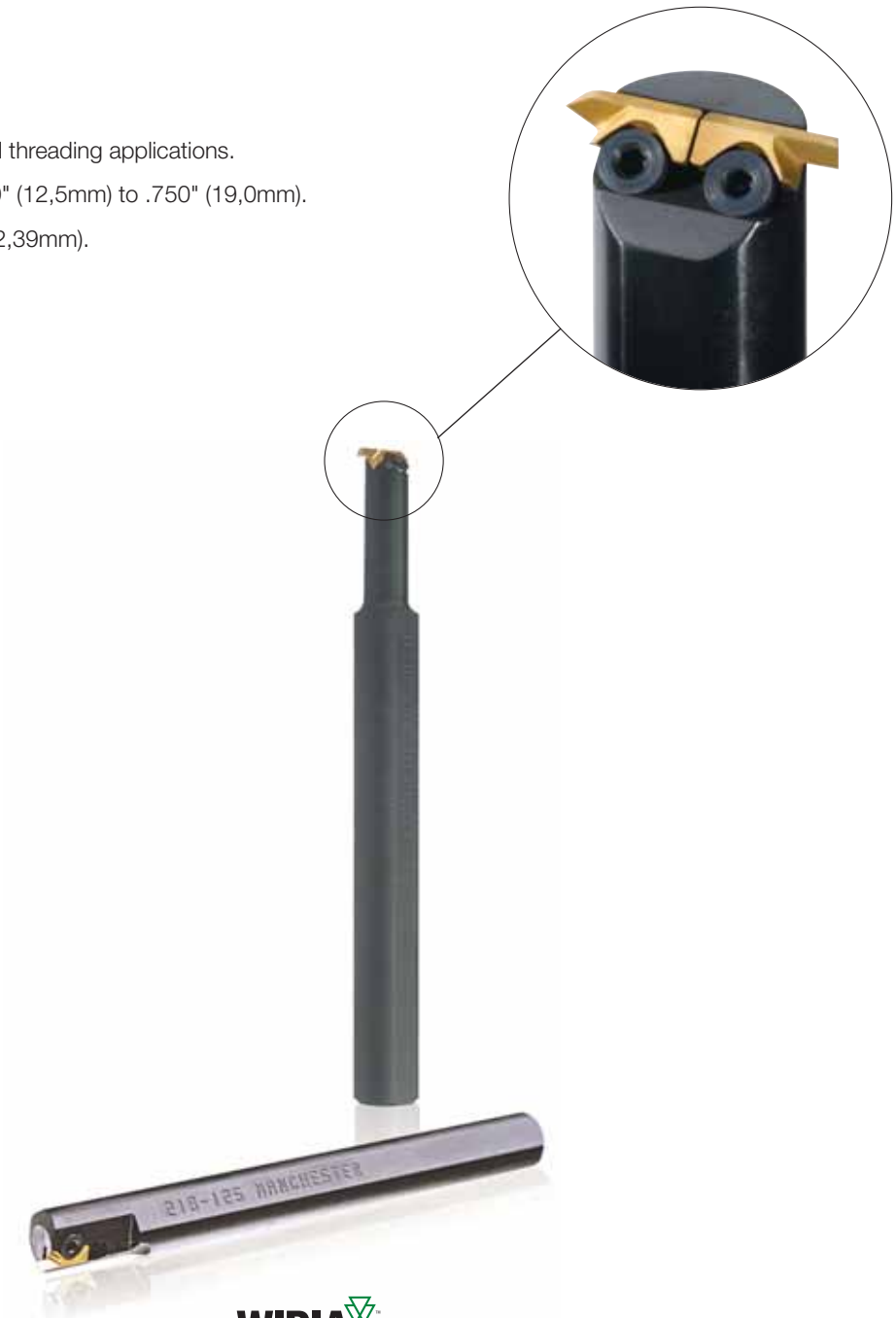
NOTE: It is important that these instructions are followed. Failure to do so may result in damage to the tool and the workpiece.

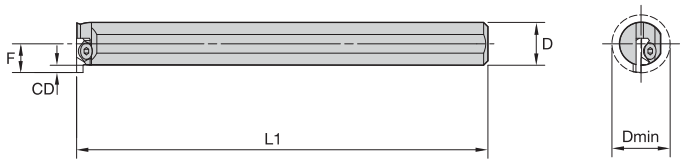
S-LOC™

S-LOC • ID Boring, Grooving, Face Grooving, and Threading

Features and Benefits:

- Specifically for ID grooving and threading applications.
- Bar diameters range from .500" (12,5mm) to .750" (19,0mm).
- Maximum depth of cut .094" (2,39mm).



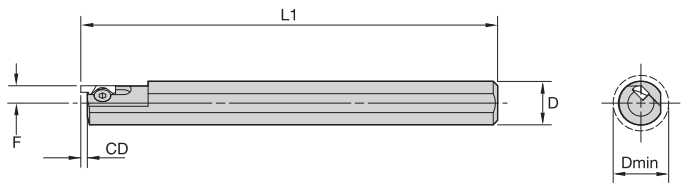


Right Hand Assembly

ID Grooving

order number	catalog number	CD	L1	D	F	D min	hand	clamp screw
3538777	**218123**	.094	6.004	.625	.419	.780	L - Left	**606190**
3636872	**218119**	.094	6.004	.500	.312	.560	N - Neutral	**606190**
3538775	**218121**	.094	6.004	.625	.312	.560	N - Neutral	**606190**
3538778	**218124**	.094	8.004	.750	.510	.940	N - Neutral	**606190**
3538776	**218122**	.094	6.004	.625	.419	.780	R - Right	**606190**

NOTE: Can be used with right- or left-hand inserts.
Right-hand assemblies use left-hand inserts.
218119, 218121, and 218124 may be used as either right- or left-hand holders.

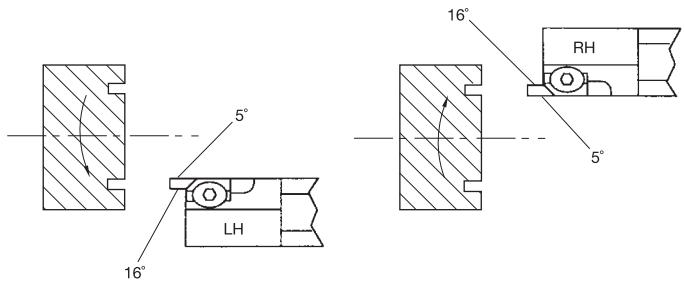


Left Hand Assembly

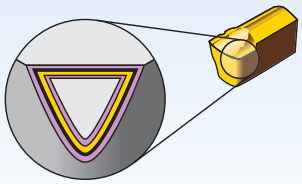
Face Grooving

order number	catalog number	CD	L1	D	F	D min	clamp screw
	Right hand						
3538779	**218125**	.094	6.000	.625	.250	.640	**606190**
	Left hand						
3538780	**218126**	.094	6.000	.625	.250	.640	**606190**

NOTE: 1/2" and larger outside diameter.



- Side clearance angles as noted.
- Use left-hand tooling for counterclockwise rotation only.
- Use right-hand tooling for clockwise rotation only.



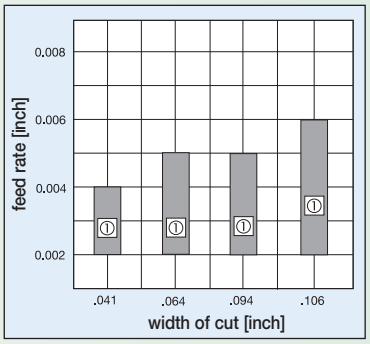
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade	Coating		Grade Description	05	10	15	20	25	30	35	40	45
C2		HW-K15	A general-purpose tungsten carbide for use on cast irons, non-ferrous alloys, and many high-temperature alloys.									
				M								
				K								
				N								
				S								
C5		HW-P30	A general-purpose alloyed tungsten carbide for steel cutting.	P								
				M								
GC		HC-P15	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P								
M40		HC-P35	A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P								
				M								
				K								
				N								
				S								

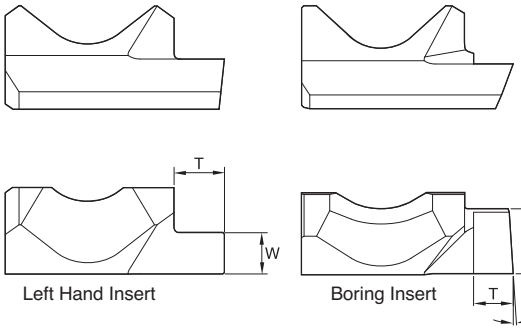
S-LOC

- Unique clamping surface on inserts.
- Used in ID boring and grooving applications.
- Superior chip control.



① Recommended feed

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM											
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			C5			GC			M40	
P	1				300	**400**	500	570	**645**	720	125	**260**	370
	2				240	**350**	460	490	**560**	630	110	**220**	330
	3				210	**275**	340	410	**465**	520	90	**165**	240
	4				220	**305**	390	460	**500**	540	100	**195**	290
	5				190	**270**	350	370	**420**	470	80	**155**	230
	6				225	**308**	390	460	**500**	540	100	**195**	290
	7				190	**270**	350	390	**440**	490	85	**160**	235
	8				180	**260**	340	340	**395**	450	75	**150**	220
	9				125	**198**	270	230	**295**	360	60	**120**	180
	10				190	**250**	310	360	**395**	430	80	**155**	230
	11				105	**188**	270	205	**305**	405	60	**115**	170
	12				235	**313**	390	450	**510**	570	120	**225**	330
	13.1				220	**260**	300	340	**390**	440	95	**155**	215
	13.2				100	**140**	180	170	**200**	230	55	**90**	125
			C2			C5			GC			M40	
M	14.1	160	**190**	220							100	**145**	190
	14.2	150	**178**	205							85	**130**	170
	14.3	125	**140**	155							70	**95**	120
	14.4	90	**105**	120							50	**75**	100
			C2			C5			GC			M40	
K	15	450	**550**	650							250	**350**	450
	16	375	**440**	500							170	**265**	360
	17	425	**500**	570							200	**310**	420
	18	300	**375**	450							150	**240**	330
	19	500	**600**	700							275	**375**	475
	20	400	**475**	550							180	**290**	400
			C2			C5			GC			M40	
N	21	1000	**1350**	1700							700	**1200**	1700
	22	800	**1150**	1500							500	**1000**	1500
	23	1000	**1350**	1700							700	**1200**	1700
	24	800	**1150**	1500							500	**1000**	1500
	25	700	**800**	900							450	**675**	900
	26	500	**550**	600							300	**450**	600
	27	500	**550**	600							300	**450**	600
	28	300	**350**	400							200	**300**	400
	29	200	**250**	300							150	**225**	300
	30	250	**300**	350							150	**250**	350
			C2			C5			GC			M40	
S	31	120	**145**	170							90	**125**	160
	32	90	**100**	110							70	**85**	100
	33	70	**75**	80							45	**60**	75
	34	60	**65**	70							40	**50**	60
	35	60	**65**	70							40	**50**	60
	36	180	**195**	210							110	**155**	200
	37	90	**100**	110							60	**80**	100



Left Hand Insert

Boring Insert

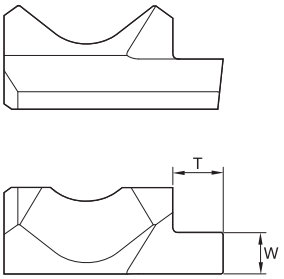
● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	○
H	

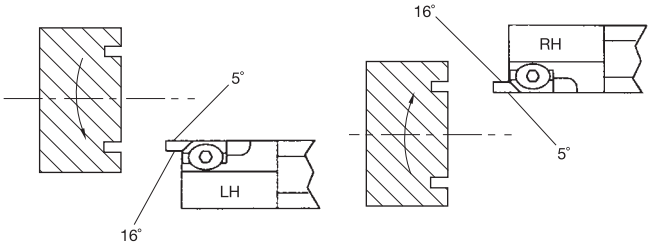
ID Grooving

catalog number	W mm	W in	T mm	T in	αR	M40
Right hand						
510124	1,04	.041	2,08	.082	–	●
510128	1,63	.064	2,92	.115	–	●
510104	2,39	.094	2,92	.115	–	●
510132	2,50	.099	2,92	.115	–	●
510134	2,71	.107	2,92	.115	–	●
Left hand						
510113	1,04	.041	2,08	.082	–	●
510114	1,21	.048	2,08	.082	–	●
510115	1,36	.054	2,08	.082	–	●
510116	1,37	.057	2,08	.082	–	●
510117	1,63	.064	2,92	.115	–	●
510118	1,80	.071	2,92	.115	–	●
510119	1,94	.077	2,39	.094	–	●
510120	2,22	.088	2,92	.115	–	●
510101	2,39	.094	2,92	.115	–	●
510121	2,50	.099	2,92	.115	–	●
510122	2,64	.104	2,92	.115	–	●
510123	2,71	.107	2,92	.115	–	●
510102	3,81	.150	2,39	.094	4.00	●

NOTE: Insert 510102 is used for boring.



Left Hand Insert



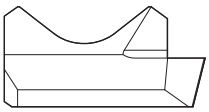
- Side clearance angles as noted.
- Use left-hand tooling for counterclockwise rotation only.
- Use right-hand tooling for clockwise rotation only.

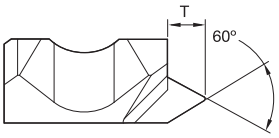
● first choice
○ alternate choice

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

Face Grooving

catalog number	W mm	W in	T mm	T in	C2	C5	GC	M40
Right hand								
510136	1,98	.078	2,39	.094	●	●	●	●
510108	2,39	.094	2,39	.094	●			●
510138	2,59	.102	2,39	.094				●
Left hand								
510135	1,98	.078	2,39	.094		●		●
510107	2,39	.094	2,39	.094				●
510137	2,59	.102	2,39	.094				●





Left Hand Insert

Threading

catalog number	T mm	T in	C2	C5	GC	M40
Right hand						
510106	2,38	.094	●			●
Left hand						
510103	2,38	.094	●	●	●	●

NOTE: Minimum 10 threads per inch.

Chipmaker™

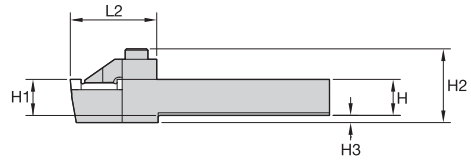
Chipmaker • OD and ID Boring, Grooving, and Face Grooving

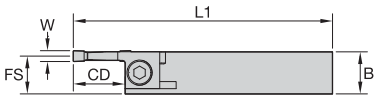
OD and ID Grooving Toolholders are specifically engineered with integral- and component-style toolholders, and single- and multi-edge Chipmaker grooving inserts, to provide a complete grooving portfolio.

- OD and ID grooving toolholders.
- Utilize double-ended “dog bone-style” inserts.
- Component toolholder systems.
- Contouring, and turning capabilities.
- Toolholder shank sizes 5/8"–1.50" (16,0mm–38,0mm).
- Grooving depths 5/16"–13/16" (7,94mm–19,0mm).
- Positive mechanical clamping system.
- Toolholders for straight OD and end mount applications.

OD and ID Grooving Inserts

- Double end, vee-bottom, mechanically clamped.
- .010"–.030" (0,3mm–0,6mm) corner radii and full nose radius.
- Multiple chip management geometries:
  - Flat-top with no chip geometry.
  - Flat-top with positive rake.
  - Molded bump and vee-chip control geometry.
  - Plow breaker-style chipbreaker.
- Various substrates — PVD and CVD coating.

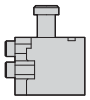


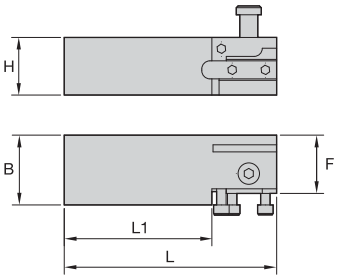


Left Hand Tool

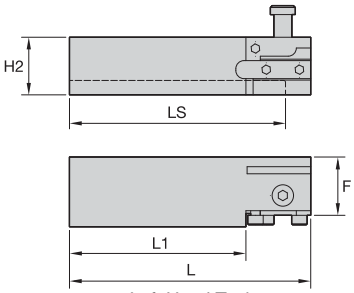
Square Shank

order number	catalog number	W	CD	H	B	H1	H2	H3	L1	L2	FS	clamp	clamp screw
	Right hand												
3538825	**236125**	.126	.750	.625	.737	.625	1.274	.125	4.500	1.375	.687	**441101**	**619168**
3538819	**236107**	.126	.750	.750	.737	.750	1.274	—	5.000	1.375	.687	**441101**	**619168**
3538813	**236101**	.126	.750	1.000	.987	1.000	1.524	—	5.000	1.375	.937	**441101**	**619168**
3538826	**236126**	.188	.875	.625	.730	.625	1.280	.125	4.500	1.500	.656	**441102**	**619168**
3538820	**236108**	.188	.875	.750	.730	.750	1.280	—	5.000	1.500	.656	**441102**	**619168**
3538814	**236102**	.188	.875	1.000	.980	1.000	1.530	—	5.000	1.500	.906	**441102**	**619168**
3538821	**236109**	.250	.875	.750	.730	.750	1.280	—	5.000	1.500	.625	**441102**	**619168**
3538815	**236103**	.250	.875	1.000	.980	1.000	1.530	—	5.000	1.500	.875	**441102**	**619168**
	Left hand												
3538827	**236127**	.126	.750	.625	.737	.625	1.274	.125	4.500	1.375	.687	**441103**	**619168**
3538822	**236110**	.126	.750	.750	.737	.750	1.274	—	5.000	1.375	.687	**441103**	**619168**
3538816	**236104**	.126	.750	1.000	.987	1.000	1.524	—	5.000	1.375	.937	**441103**	**619168**
3538828	**236128**	.188	.875	.625	.730	.625	1.280	.125	4.500	1.500	.656	**441104**	**619168**
3538823	**236111**	.188	.875	.750	.730	.750	1.280	—	5.000	1.500	.656	**441104**	**619168**
3538817	**236105**	.188	.875	1.000	.980	1.000	1.530	—	5.000	1.500	.906	**441104**	**619168**
3538824	**236112**	.250	.875	.750	.730	.750	1.280	—	5.000	1.500	.625	**441104**	**619168**
3538818	**236106**	.250	.875	1.000	.980	1.000	1.530	—	5.000	1.500	.875	**441104**	**619168**

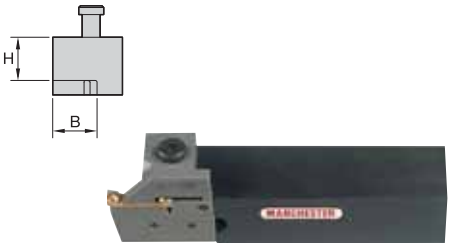




Left Hand Tool



Left Hand Tool



Right Hand Assembly

5/16" and 1/2" Depth of Cut

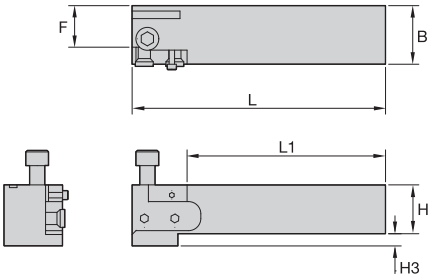
order number	catalog number	B	H	H2	L1	LS	L	F	clamp screw	support blade screw
	Right hand									
3538632	**203344**	.770	.750	1.000	3.063	3.750	4.188	1.012	**619111**	**619102**
3538631	**203343**	.770	.750	1.000	2.563	3.250	3.688	1.012	**619111**	**619102**
3563789	**203235**	1.212	1.250	—	4.563	4.563	5.688	1.012	**619111**	**619102**
3538624	**203281**	1.212	1.000	—	4.563	4.563	5.688	1.012	**619111**	**619102**
3634221	**203223**	1.212	1.000	—	3.563	3.563	4.688	1.012	**619111**	**619102**
3634219	**203219**	1.212	1.000	—	2.563	2.563	3.688	1.012	**619111**	**619102**
	Left hand									
3538634	**203346**	.770	.750	1.000	3.063	3.750	4.188	1.012	**619111**	**619102**
3565414	**203308**	1.212	1.250	—	4.563	4.563	5.688	1.012	**619111**	**619102**
3634246	**203234**	1.212	1.000	—	2.563	2.563	3.688	1.012	**619121**	**619102**
3538622	**203275**	1.212	1.000	—	3.563	3.563	4.688	1.012	**619111**	**619102**
3538625	**203285**	1.212	1.000	—	4.563	4.563	5.688	1.012	**619111**	**619102**

Components for 5/16" Depth of Cut

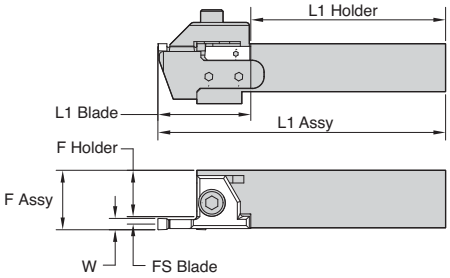
W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.437	.172	**308123**	**407118**	**601101**	**407101**	**308106**
.156	1.437	.157	**308124**	**407119**	**601101**	**407102**	**308107M**
.188	1.437	.141	**308125**	**407120**	**601102**	**407103**	**308108**
.250	1.437	.110	**308126**	**407121**	**601102**	**407104**	**308109**
.312	1.437	.192	**308127**	**407122**	**601103**	**407105**	**308110**

Components for 1/2" Depth of Cut

W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.625	.172	**308130**	**407124**	**601104**	**407107**	**308113**
.156	1.625	.192	**308143**	**407129**	**601104**	**407108**	**308114**
.188	1.625	.157	**308131**	**407125**	**601105**	**407109**	**308115**
.250	1.625	.110	**308137**	**407127**	**601105**	**407110**	**308116**
.312	1.625	.192	**308145**	**407130**	**601106**	**407111**	**308117**



Right Hand Tool



Right Hand Assembly
L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2

Right Hand Assembly

5/8" or 13/16" Depth of Cut

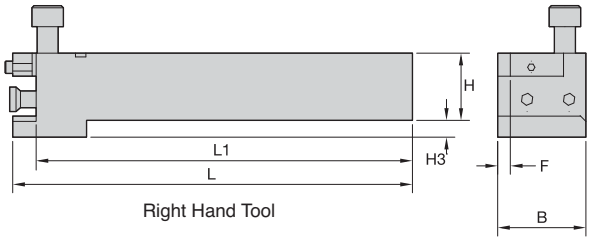
order number	catalog number	B	H	H3	L1	L	F	support blade screw	clamp screw
	Right hand								
3634247	**203287**	1.199	1.000	.250	4.063	5.188	.850	**606160**	**619110**
3538619	**203245**	1.199	1.250	—	4.563	5.688	.850	**606160**	**619110**
3634244	**203231**	1.449	1.250	—	4.063	5.188	1.100	**606160**	**619110**
3538617	**203112**	1.949	1.500	—	4.563	5.688	1.600	**606160**	**619110**
	Left hand								
3538640	**203352**	1.199	1.000	.250	4.063	5.188	.850	**606160**	**619110**
3538621	**203271**	1.449	1.250	—	3.813	4.938	1.100	**606160**	**619110**
3538618	**203232**	1.449	1.250	—	4.063	5.188	1.100	**606160**	**619110**
3634245	**203233**	1.949	1.500	—	4.563	5.688	1.600	**606160**	**619110**

Components for 5/8" Depth of Cut

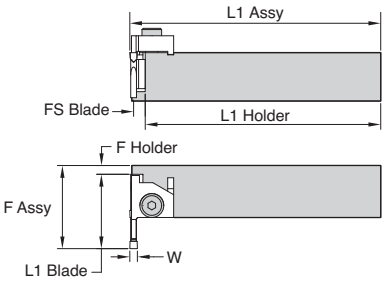
W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.750	.334	**308148**	**407133**	**601112**	**407131**	**308146**
.156	1.750	.319	**308149**	**407134**	**601112**	**407132**	**308147**

Components for 13/16" Depth of Cut

W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.937	.303	**308150**	**407135**	**601107**	**407113**	**308119**
.250	1.937	.272	**308151**	**407144**	**601107**	**407143**	**308120**
.312	1.937	.241	**308152**	**407137**	**601108**	**407115**	**308121**
.376	1.937	.209	**308153**	**407138**	**601108**	**407116**	**308122**



Right Hand Tool



Right Hand Assembly

Left Hand Assembly

L1 Assy = L1 (holder) + FS (blade) + W/2
F Assy = F (holder) + L1 (blade)

Right Angle • 5/8" and 13/16" Depth of Cut

order number	catalog number	B	F	H	H3	L	L1	support blade screw	clamp screw	stop screw
	Right hand									
3538653	**204270**	1.313	.188	1.000	.250	5.949	5.600	**606160**	**619110**	**619101**
3538644	**204215**	1.313	.188	1.250	—	5.949	5.600	**606160**	**619110**	**619101**
3538647	**204259**	1.500	.376	1.500	—	5.949	5.600	**606160**	**619110**	**619101**
	Left hand									
3538652	**204269**	1.313	.188	1.000	.250	5.949	5.600	**606160**	**619110**	**619101**
3615158	**204214**	1.313	.188	1.250	—	5.949	5.600	**606160**	**619110**	**619101**
3538646	**204258**	1.500	.375	1.500	—	5.949	5.600	**606160**	**619110**	**619101**

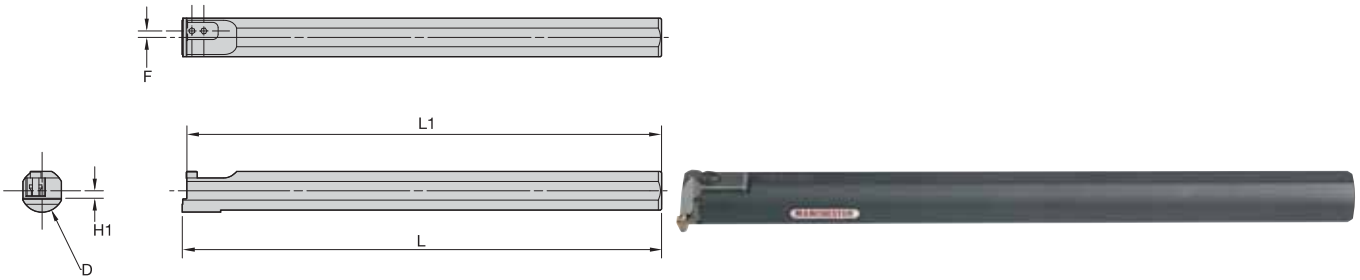
Components for 5/8" Depth of Cut

W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.750	.334	**308148**	**407133**	**601112**	**407131**	**308146**
.156	1.750	.319	**308149**	**407134**	**601112**	**407132**	**308147**

Components for 13/16" Depth of Cut

W	L1	FS	left hand support blade	clamp	stop	clamp	right hand support blade
.126	1.937	.303	**308150**	**407135**	**601107**	**407113**	**308119**
.250	1.937	.272	**308151**	**407144**	**601107**	**407143**	**308120**
.312	1.937	.241	**308152**	**407137**	**601108**	**407115**	**308121**
.376	1.937	.209	**308153**	**407138**	**601108**	**407116**	**308122**

NOTE: Use left-hand components in right-hand toolholders. Use right-hand components in left-hand toolholders.

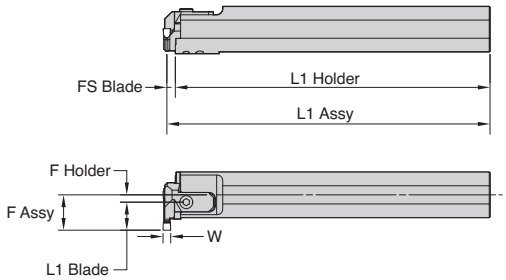


Right Hand Tool

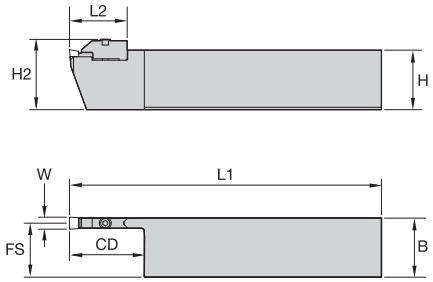
ID Grooving 1-1/4" Diameter

order number	catalog number	D	F	H1	L1	L	support blade screw	clamp screw
	Right hand							
3538648	**204263**	1.250	.188	-0.238	13.865	14.000	**606192**	**619120**
3538792	**226262**	1.260	.188	-0.238	13.865	14.000	**606225**	**619152**
	Left hand							
3538791	**226261**	.984	.000	-0.238	11.865	12.000	**606225**	**619152**
3563796	**204262**	1.000	.000	-0.238	11.865	12.000	**606192**	**619120**
3538649	**204264**	1.250	.188	-0.238	13.865	14.000	**606192**	**619120**
3538789	**226252**	1.260	.188	-0.238	13.865	14.000	**606225**	**619152**

NOTE: Toolholders 204261 and 204262 can be used as a right or left hand.
Left-hand toolholders use right-hand components.
Right-hand toolholders use left-hand components.
Use inserts that have additional clearance for ID boring.



L1 Assy = L1 (holder) + FS (blade) + W/2
F Assy = F (holder) + L1 (blade)

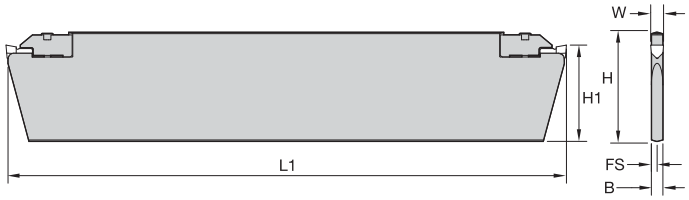


Left Hand Tool

Right Hand Assembly

DAG Extended DOC

order number	catalog number	W	CD	B	H	L1	L2	FS	H2	clamp	clamp screw
	Right hand										
3538848	**237101**	.250	1.500	.980	.990	6.500	1.203	.875	1.214	**442101**	**619170**
3538852	**237105**	.250	1.500	1.230	1.240	6.500	1.203	1.125	1.464	**442101**	**619170**
3538849	**237102**	.313	1.500	.980	.990	6.500	1.229	.845	1.229	**442102**	**619170**
3538853	**237106**	.313	1.500	1.230	1.240	6.500	1.229	1.095	1.479	**442102**	**619170**
	Left hand										
3538850	**237103**	.250	1.500	.980	.990	6.500	1.203	.875	1.214	**442101**	**619170**
3538854	**237107**	.250	1.500	1.230	1.240	6.500	1.203	1.125	1.464	**442101**	**619170**
3538851	**237104**	.313	1.500	.980	.990	6.500	1.229	.845	1.229	**442102**	**619170**
3538855	**237108**	.313	1.500	1.230	1.240	6.500	1.229	1.095	1.479	**442102**	**619170**



DAG Blades

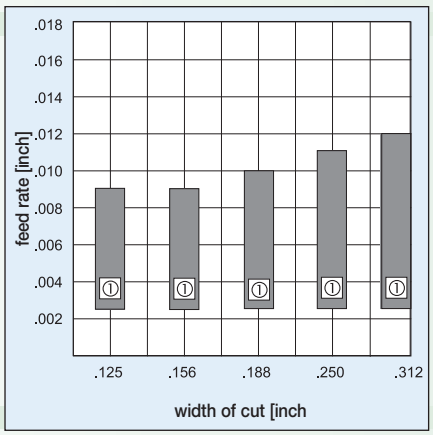
order number	catalog number	W	L1	H	H1	FS	B	clamp	clamp screw
3539595	**341101**	.236	10.300	2.068	1.770	.106	.212	**442101**	**619170**
3539596	**341102**	.315	10.300	2.067	1.770	.135	.270	**442102**	**619170**

Chipmaker

First choice for chip control and reduced cutting forces for most materials.
Precision width for deep grooving. Plunge and turn capable.

Positive Rake Inserts

Reduced cutting pressures versus neutral rake-style for deep grooving.
Plunge and turn capable.



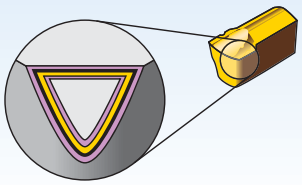
① Recommended feed

Neutral Rake Inserts

First choice for cast iron or other short chipping materials. Widest selection of corner radii.
Precision width for deep grooving. Plunge and turn capable.

Chipmaker 95

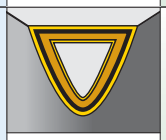
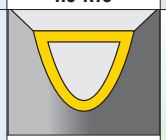
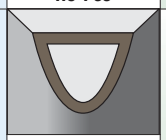
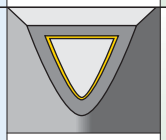
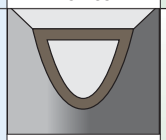
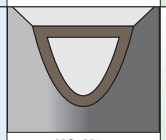
Chip control for applications using aggressive feed rates to deliver productivity.
Plunge mode only. Precision width for deep grooving.



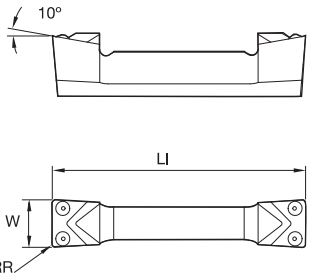
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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

Grade

Coating		Grade Description	05	10	15	20	25	30	35	40	45
GC	 HC-P15	Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P			■	■					
M24	 HC-K15	A multi-phase MT-CVD/CVD coating with TiN-TiCN-AL_2O_3-TiN as its primary constituent, over a hard, wear-resistant tungsten carbide substrate. Its capabilities extend over the entire range of cast irons at moderate to high speeds.	P		■	■					
			K		■	■	■				
M40	 HC-P35	A premium, single-phase PVD-TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P					■	■	■	
			M						■	■	
			K						■	■	
			N					■	■	■	
			S						■	■	
M43	 HC-P35	PVD-TiAlN multi-layer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P				■	■	■	■	
			M					■	■	■	
			K					■	■	■	
			S					■	■	■	
M45	 HC-P35	A premium PVD-TiCN coated, shock-resistant carbide designed for low to moderate speeds. Excellent resistance to welding and BUE and improved abrasion resistance make this an ideal grade for austenitic stainless steel, low carbon steel, and high-temperature alloys.	P					■	■	■	■
			M						■	■	■
			K					■	■	■	
			N					■	■	■	
			S					■	■	■	
M53	 HC-P20	A premium, second generation PVD-TiAlN coating over a tough, general-purpose, steel cutting substrate. An ideal general-purpose grade for use in carbon steels, alloy steels, stainless steels, and high-temperature alloys.	P				■	■			
			M				■				
			K				■				
			S				■				
M93	 HC-K25	PVD-TiAlN multi-layer coating over a tough, fine-grained carbide substrate with increased resistance to heat. Recommended for medium to high cutting speeds under moderate conditions.	P			■	■	■			
			M			■	■				
			K			■	■				
			S			■	■				

ANSI ISO 513	VDI 3323	Cutting Speed • vc SFM														
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
			GC			M40			M43			M45			M93	
P	1	570	**645**	720	125	**260**	370	350	**525**	700	150	**275**	400	500	**650**	800
	2	490	**560**	630	110	**220**	330	280	**455**	630	140	**250**	360	425	**550**	700
	3	410	**465**	520	90	**165**	240	240	**365**	490	115	**190**	265	360	**475**	570
	4	460	**500**	540	100	**195**	290	260	**405**	550	130	**225**	320	400	**490**	600
	5	370	**420**	470	80	**155**	230	210	**340**	470	100	**175**	250	325	**425**	520
	6	460	**500**	540	100	**195**	290	260	**405**	550	130	**225**	320	400	**500**	600
	7	390	**440**	490	85	**160**	235	215	**345**	475	110	**175**	245	340	**440**	540
	8	340	**395**	450	75	**150**	220	200	**330**	455	90	**160**	230	300	**400**	500
	9	230	**295**	360	60	**120**	180	140	**255**	370	70	**135**	200	200	**300**	400
	10	360	**395**	430	80	**155**	230	210	**305**	400	100	**170**	240	320	**400**	475
	11	205	**305**	405	60	**115**	170	115	**245**	375	70	**130**	190	180	**320**	450
	12	450	**510**	570	120	**225**	330	280	**395**	510	130	**245**	360	390	**505**	620
	13.1	340	**390**	440	95	**155**	215	260	**330**	400	110	**180**	250	295	**390**	490
	13.2	170	**200**	230	55	**90**	125	110	**160**	210	65	**100**	140	150	**200**	250
						M40			M43			M45			M93	
M	14.1				100	**145**	190	170	**250**	330	110	**165**	220	295	**390**	490
	14.2				85	**130**	170	140	**205**	270	105	**155**	205	245	**325**	390
	14.3				70	**95**	120	110	**160**	210	85	**120**	155	180	**245**	310
	14.4				50	**75**	100	85	**125**	165	60	**90**	120	145	**195**	245
			M24			M40			M43			M45			M93	
K	15	750	**950**	1150	250	**350**	450	350	**500**	650	300	**400**	500	500	**650**	800
	16	550	**750**	950	170	**265**	360	250	**375**	500	200	**325**	450	350	**500**	650
	17	650	**850**	1050	200	**310**	420	300	**435**	570	230	**360**	490	400	**550**	700
	18	600	**800**	1000	150	**240**	330	200	**325**	450	175	**275**	375	375	**525**	675
	19	800	**1000**	1200	275	**375**	475	400	**550**	700	320	**420**	520	550	**590**	850
	20	700	**900**	1100	180	**290**	400	270	**410**	550	210	**340**	470	360	**460**	700
						M40			M43			M45			M93	
N	21				700	**1200**	1700	900	**1450**	2000	800	**1300**	1800	1000	**1600**	2200
	22				500	**1000**	1500	700	**1250**	1800	600	**1100**	1600	800	**1400**	2000
	23				700	**1200**	1700	900	**1450**	2000	800	**1300**	1800	1000	**1600**	2200
	24				500	**1000**	1500	700	**1250**	1800	600	**1100**	1600	800	**1400**	2000
	25				450	**675**	900	600	**850**	1100	500	**750**	1000	700	**1000**	1300
	26				300	**450**	600	400	**550**	700	350	**500**	650	500	**650**	800
	27				300	**450**	600	400	**550**	700	350	**500**	650	500	**650**	800
	28				200	**300**	400	250	**350**	450	225	**325**	425	300	**450**	600
	29				150	**225**	300	180	**265**	350	150	**240**	325	200	**300**	400
	30				150	**250**	350	200	**300**	400	175	**275**	375	250	**400**	500
						M40			M43			M45			M93	
S	31				90	**125**	160	100	**140**	180	100	**135**	170	120	**170**	220
	32				70	**85**	100	75	**95**	120	75	**90**	110	95	**115**	150
	33				45	**60**	75	50	**70**	90	50	**65**	80	75	**90**	115
	34				40	**50**	60	45	**55**	70	45	**55**	70	60	**75**	90
	35				40	**50**	60	45	**55**	70	45	**55**	70	60	**75**	90
	36				110	**155**	200	120	**170**	220	120	**165**	210	180	**220**	260
	37				60	**80**	100	75	**95**	115	75	**90**	110	95	**115**	145



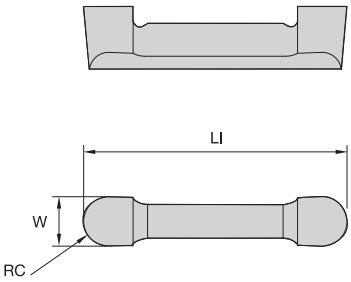
● first choice
○ alternate choice

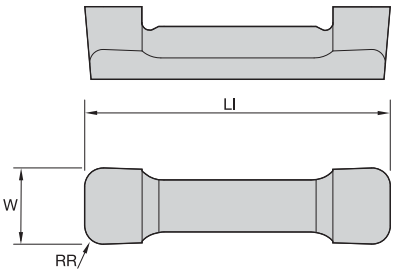
		GC	M24	M40	M43	M45	M53	M93
P		○		●	●	●	●	●
M				●	●	●	●	●
K			●					●
N				●		●		●
S				○	●	●	●	○
H								

Chipmaker

	W		RR		LI								
catalog number	mm	in	mm	in	mm	in	GC	M24	M40	M43	M45	M53	M93
508238	3,20	.126	0,25	.010	22,23	.875	●		●	●	●		●
508250	3,20	.126	0,25	.010	22,23	.875	●		●	●	●		●
508244	3,20	.126	0,76	.030	22,23	.875	●		●	●	●		●
508245	3,96	.156	0,76	.030	22,23	.875			●		●		●
508251	4,78	.188	0,25	.010	25,40	1.000	●		●	●	●		●
508239	4,78	.188	0,25	.010	25,40	1.000	●		●	●	●		●
508246	4,78	.188	0,76	.030	25,40	1.000	●		●	●	●		●
508240	6,35	.250	0,25	.010	25,40	1.000	●		●	●	●		●
508252	6,35	.250	0,25	.010	25,40	1.000			●	●	●		●
508247	6,35	.250	0,76	.030	25,40	1.000	●		●	●	●		●
508242	7,93	.312	0,25	.010	28,58	1.125			●		●		●
508248	7,93	.312	0,76	.030	28,58	1.125			●		●		●
508243	9,55	.376	0,25	.010	28,58	1.125			●		●		●
508249	9,55	.376	0,76	.030	28,58	1.125			●		●		●

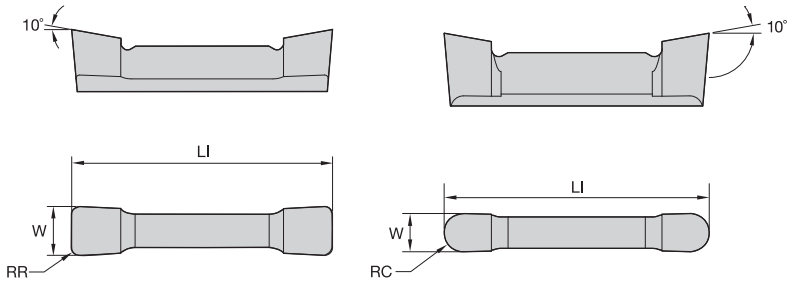
NOTE: 508250, 508251, and 508252 have additional clearance for ID Boring.





OD Neutral

	W		RR		RC		LI							
catalog number	mm	in	mm	in	mm	in	mm	in						
508301	3,20	.126	0,25	.010	—	—	22,23	.875	●	●				
508307	3,20	.126	0,76	.030	—	—	22,23	.875	●	●				
508313	3,20	.126	—	—	1,60	.063	22,23	.875	●	●				
508302	3,96	.156	0,25	.010	—	—	22,23	.875	●					
508314	3,96	.156	—	—	1,98	.078	22,23	.875	●	●				
508303	4,78	.188	0,25	.010	—	—	25,40	1.000	●	●				
508309	4,78	.188	0,76	.030	—	—	25,40	1.000	●	●				
508315	4,78	.188	—	—	2,39	.094	25,40	1.000	●	●				
508304	6,35	.250	0,25	.010	—	—	25,40	1.000	●	●				
508340	6,35	.250	1,52	.060	—	—	25,40	1.000	●	●				
508316	6,35	.250	—	—	3,18	.125	25,40	1.000	●		●			



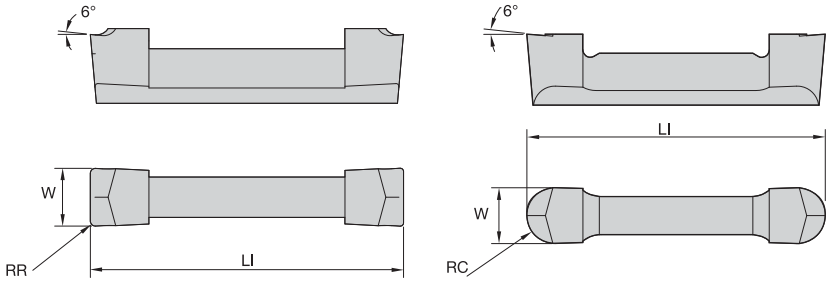
● first choice
○ alternate choice

		C2	C5	GC	M40	M50
P				●	●	●
M					●	●
K				●		
N		○	○		●	
S		●	●		○	●
H						

■ OD Positive

	W		RR		RC		LI						
catalog number	mm	in	mm	in	mm	in	mm	in	C2	C5	GC	M40	M50
508319	3,20	.126	0,25	.010	—	—	22,23	.875	●	●	●		
508337	3,20	.126	0,25	.010	—	—	22,23	.875			●		
508325	3,20	.126	0,76	.030	—	—	22,23	.875	●		●		
508331	3,20	.126	—	—	1,60	.063	22,23	.875	●		●		
508320	3,96	.156	0,25	.010	—	—	22,23	.875			●		
508326	3,96	.156	0,76	.030	—	—	22,23	.875	●		●		
508332	3,96	.156	—	—	1,98	.078	22,23	.875			●		
508321	4,78	.188	0,25	.010	—	—	25,40	1.000	●		●		
508338	4,78	.188	0,25	.010	—	—	25,40	1.000			●		
508327	4,78	.188	0,76	.030	—	—	25,40	1.000			●		
508333	4,78	.188	—	—	2,39	.094	25,40	1.000	●	●	●	●	●
508322	6,35	.250	0,25	.010	—	—	25,40	1.000	●		●		
508339	6,35	.250	0,25	.010	—	—	25,40	1.000			●		
508328	6,35	.250	0,76	.030	—	—	25,40	1.000	●		●		
508334	6,35	.250	—	—	3,18	.125	25,40	1.000	●		●	●	●
508323	7,93	.312	0,25	.010	—	—	28,58	1.125	●		●		
508329	7,93	.312	0,76	.030	—	—	28,58	1.125			●		
508324	9,55	.376	0,25	.010	—	—	28,58	1.125	●		●		
508330	9,55	.376	0,76	.030	—	—	28,58	1.125		●	●		

NOTE: 508337, 508327, and 508339 have additional clearance for ID Boring.

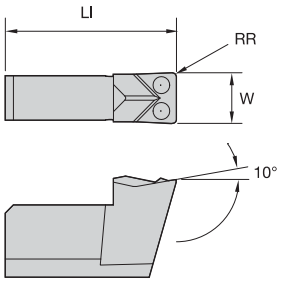


● first choice
○ alternate choice

	GC	M24	M40	M43	M45	M53	M93
P	○		●	●	●	●	●
M			●	●	●	●	●
K		●					●
N			●		●		●
S			○	●	●	●	○
H							

Chipmaker 95

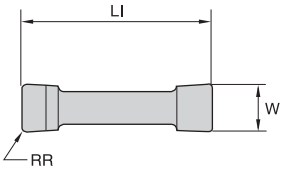
catalog number	W mm	W in	RR mm	RR in	RC mm	RC in	LI mm	LI in	GC	M24	M40	M43	M45	M53	M93
508403	3,20	.126	0,25	.010	—	—	22,23	.875			●			●	
508404	3,20	.126	0,76	.030	—	—	22,23	.875			●			●	
508405	3,20	.126	—	—	1,60	.063	22,23	.875			●			●	
508412	4,78	.188	0,25	.010	—	—	25,40	1.000			●			●	
508413	4,78	.188	0,76	.030	—	—	25,40	1.000			●			●	
508422	6,35	.250	0,25	.010	—	—	25,40	1.000			●			●	
508423	6,35	.250	0,76	.030	—	—	25,40	1.000			●			●	
508424	6,35	.250	1,52	.060	—	—	25,40	1.000			●			●	



DAG • Grooving and Cut-Off

catalog number	W mm	W in	RR mm	RR in	LI mm	LI in	GC	M24	M40	M43	M45	M53	M93
507172	3,20	.126	0,25	.010	10,77	.424			●				
507182	6,35	.250	0,25	.010	12,34	.486			●				●
507183	6,35	.250	0,76	.030	12,34	.486			●				●
507185	7,93	.312	0,25	.010	13,95	.549			●				●
507186	7,93	.312	0,76	.030	13,95	.549			●				●

NOTE: 507172 has additional clearance for ID Boring.



● first choice
○ alternate choice

P	
M	
K	●
N	
S	
H	●

CBN

	W		RR		LI			
catalog number	mm	in	mm	in	mm	in	CBNCI	CBNHT
528301	3,18	.125	0,25	.010	22,23	.875	●	●
528325	4,78	.188	0,76	.030	25,40	1.000	●	
528303	4,78	.188	0,25	.010	25,40	1.000	●	●