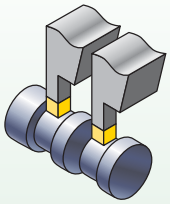
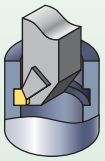
WIDIA
MANCHESTER

Grooving, Cut-Off, and Turning

Grooving





WMT™

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

Pages: D4–D29

TopGroove™

- Insert cutting widths: 0,5mm–6,35mm.
- Insert cutting depths: 0,64mm–12,7mm.
- Integral shank toolholders available.
- ID boring bar minimum bore diameter: 11,2mm.

Pages: D30–D69

ProGroove™

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

Pages: D70–D82

S-LOC™

- Insert cutting widths: 1,04mm–3,81mm.
- Maximum cutting depth: 2,4mm.
- Inserts for boring or threading available.
- Screw-clamping integral shank toolholder for ID applications.
- ID boring bar minimum bore diameter: 14,2mm.

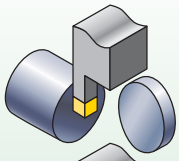
Pages: D110–D115

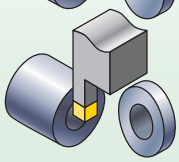
LG

- Insert cutting widths: 8,0mm–16,0mm.
- OD cutting depths: 20,0mm–32,0mm.
- Wedge-clamping integral shanks tooling available.

Page: D74

Cut-Off





WMT

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

Pages: D4–D29

ProGroove

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

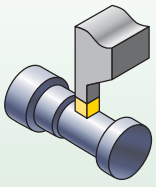
Pages: D70–D82

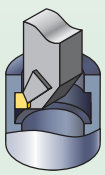
Separator™

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

Pages: D84–D101

Plunge and Turn





WMT

Heavy Stock Removal in Turning Applications

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

Pages: D4–D29

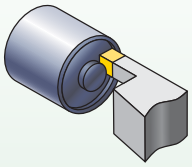
ProGroove

For Light-Cutting Inserts

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

Pages: D70–D82

Face Grooving



WMT

- Minimum face groove diameter: 38,0mm–205,0mm.
- Cutting widths: 3,0mm–6,35mm.
- Cutting depths: 13,0mm–25,4mm.

Pages: D4–D29

Ranger™

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

Pages: D102–D109

S-LOC

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

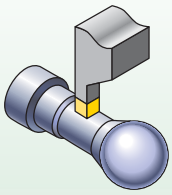
Pages: D110–D115

TopGroove

- Standard insert minimum face groove diameter range: 54,0mm–330,0mm.
- NF/NFD face groove insert range: 24,0mm–57,0mm.
- Cutting width range for standard inserts: 0,8mm–9,5mm.
- Cutting width range for NF/NFD face grooving inserts: 2,0mm–6,35mm.
- Cutting depth range for standard inserts: 1,27mm–12,7mm.
- Cutting depth range for NF/NFD face grooving inserts: 3,8mm–6,35mm.
- Cutting depth range for NF: 0,8mm–9,5mm.
- Cutting depth range for NFD: 6,35mm–12,7mm.

Pages: D30–D69

Profiling



WMT

For Heavy Stock Removal

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

Pages: D4–D29

TopGroove

Moderate/Heavy Stock Removal at Shallow Profile Depths

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

Pages: D30–D69

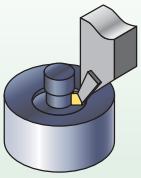
ProGroove

For Light Cutting

- Full-radius insert cutting widths: 3,0mm–6,0mm.
- Screw-clamping integral shank/cartridge toolholders available.
- OD cutting depths: 10,0mm–32,0mm.

Pages: D70–D82

Undercutting



TopGroove

- Undercutting insert widths: 2,4mm–4,0mm.
- Economical double-ended inserts.

Pages: D30–D69

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

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

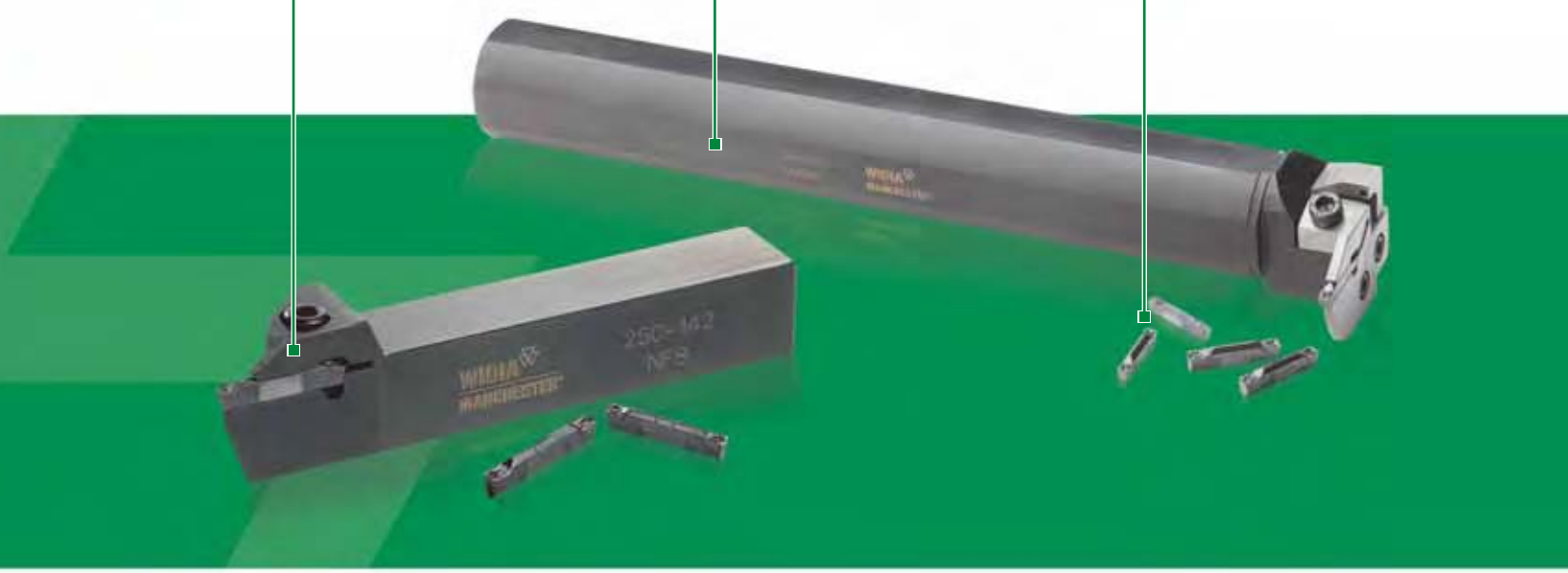
WMT Toolholders

- 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

- Adaptable and easy to use, it reduces setup time and downtime between jobs.
- Replaceable cartridge makes changing applications quick and easy.
- 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.

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!

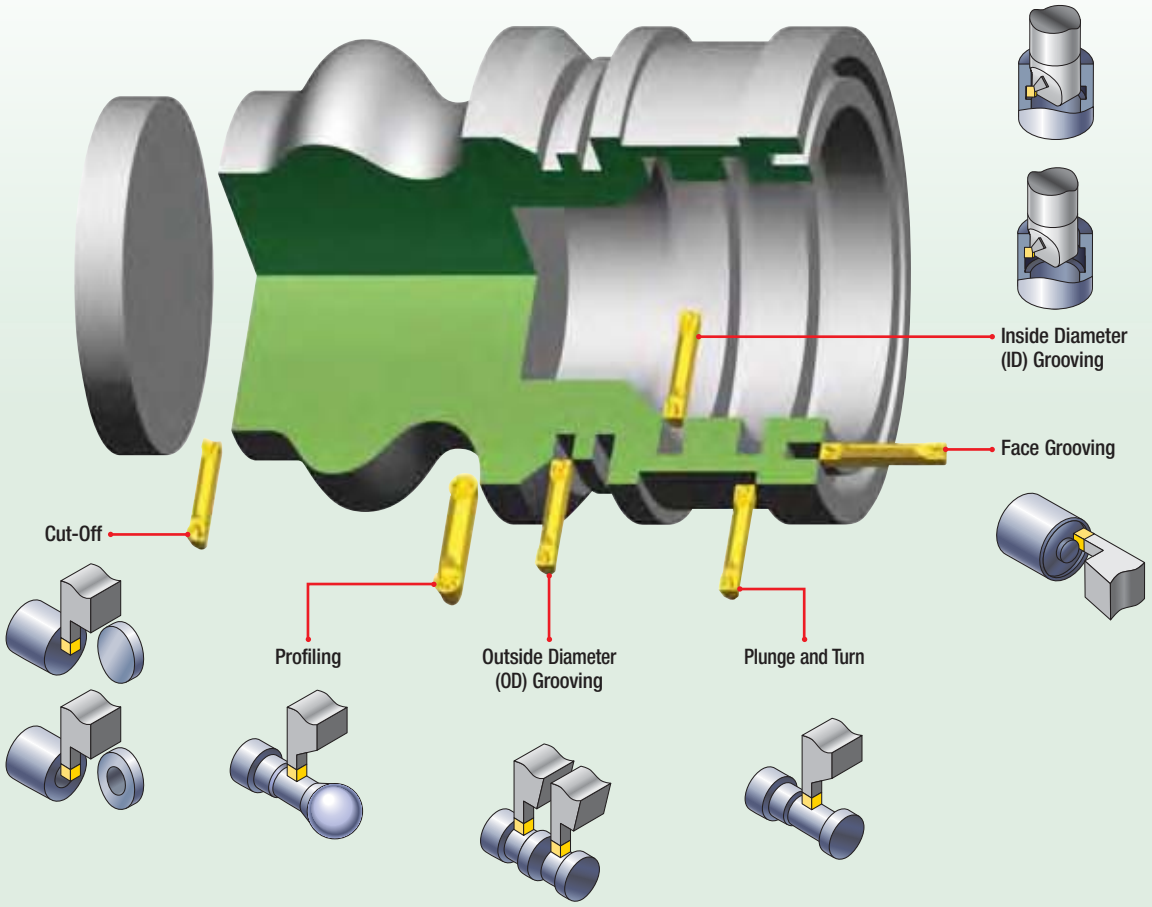
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

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

Utilise 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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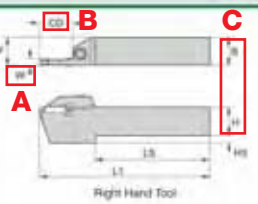
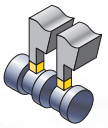
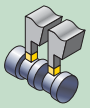
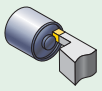
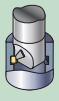




■ OD Grooving

order number	catalogue number	A W	B CD	F	C H	C B	H3	L1	L5	clamp screw
	Right hand									
3650516	250409	1,50	17	25	25	25	–	150	116	606249
3650456	250205	2,00	17	16	16	16	8	125	101	606249
3650458	250207	2,00	17	20	20	20	–	125	92	606249
3650506	250295	2,00	17	25	25	25	–	150	116	606249
3650460	250217	3,00	11	16	16	16	–	125	92	619205
3650462	250219	3,00	22	16	16	16	5	125	83	619205
3650468	250227	3,00	11	20	20	20	–	125	92	619205
3650470	250229	3,00	22	20	20	20	5	125	83	619205
3650478	250241	3,00	11	25	25	25	–	150	117	619205
3650481	250243	3,00	22	25	25	25	–	150	109	619205
3650464	250221	4,00	22	16	16	16	5	125	83	619205
3653751	250231	4,00	20	–	20	–	–	125	83	619205
3650483	250245	4,00	22	25	25	25	–	150	109	619205
3650502	250281	4,00	11	16	16	16	–	125	92	619205
3650504	250283	4,00	11	20	20	20	–	125	92	619205
3653752	250285	4,00	11	25	25	25	–	150	117	619205
3650466	250223	5,00	14	16	16	16	–	125	88	619168
3650473	250233	5,00	14	20	20	19	–	125	88	619168
3650475	250235	5,00	15	20	20	19	5	140	93	619168
3650485	250247	5,00	14	25	25	24	–	150	113	619168
3650487	250249	5,00	25	25	25	24	–	150	104	619168
3650477	250237	6,00	14	20	20	19	–	140	103	619168
3650489	250251	6,00	14	25	25	24	–	150	114	619168
3650491	250253	6,00	25	25	25	24	–	150	104	619168
3650494	250255	6,00	14	25	25	24	–	150	113	619168
3650496	250257	6,00	25	25	25	24	–	150	104	619168
3650498	250275	6,00	14	32	32	31	–	150	113	619168
3650500	250277	6,00	25	32	32	31	–	150	104	619168

(continued)

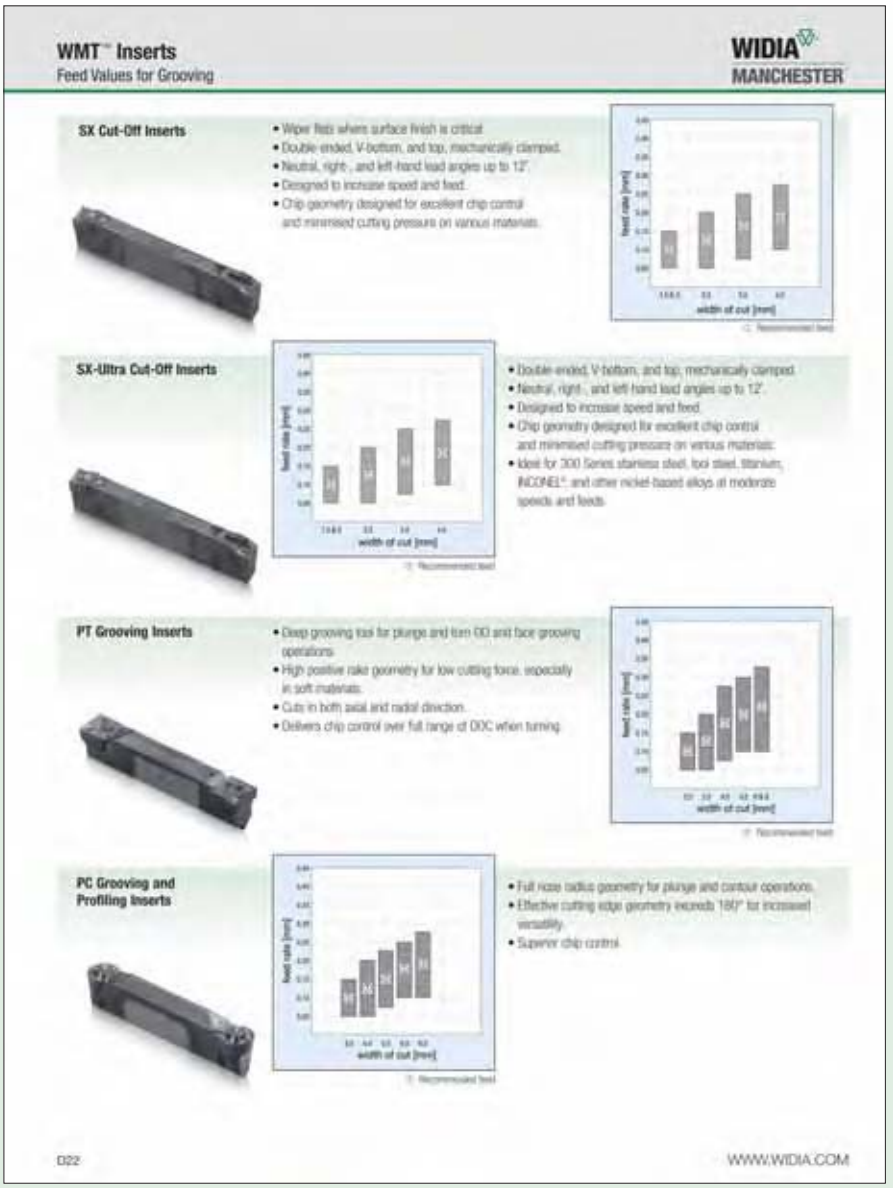
	application	conventional toolholders	modular blades
 	OD Grooving and Cut-Off	pages D10–D12	pages D16–D17
	Face Grooving	pages D13–D14	pages D18–D19
	ID Grooving	—	pages D20–D21
	Plunge and Turn	pages D10–D12	pages D16–D17

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 minimised 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 minimised 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

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

PC Grooving and Profiling Inserts

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

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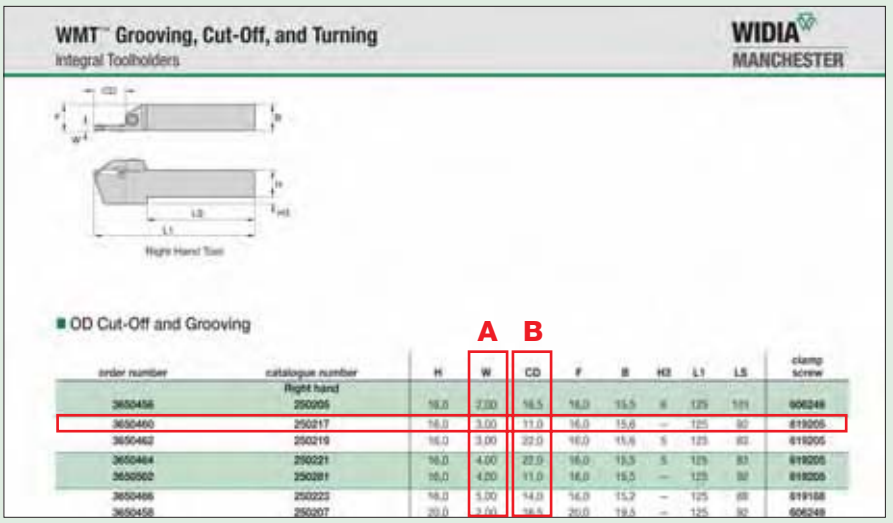
A Choose the appropriate insert width "W" for your specific application.

B Select the required corner radius value "RR".



WMT™ Grooving, Cut-Off, and Turning
Integral Toolholders

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■ OD Cut-Off and Grooving

order number	catalogue number	H	W (A)	CD (B)	F	B	H2	L1	LS	clamp screw
	Right hand									
3650456	250205	16,0	2,00	16,5	16,0	15,5	6	125	101	606249
3650460	250217	16,0	3,00	11,0	16,0	15,6	–	125	92	619205
3650462	250219	16,0	3,00	22,0	16,0	15,6	5	125	83	619205
3650464	250221	16,0	4,00	22,0	16,0	15,5	5	125	83	619205
3650502	250281	16,0	4,00	11,0	16,0	15,5	–	125	92	619205
3650466	250223	16,0	5,00	14,0	16,0	15,2	–	125	88	619168
3650458	250207	20,0	2,00	16,5	20,0	19,5	–	125	92	606249

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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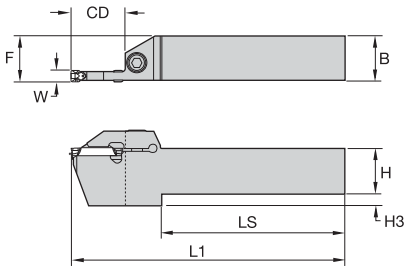
ANSI ISO 513	VDI 3323	Material Group	Cutting Speed • vc m/min								
			min	Start	max	min	Start	max	min	Start	max
			TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
P	1		170	**200**	230	140	**170**	195	130	**150**	175
	2		170	**200**	230	140	**170**	195	130	**150**	175
	3		135	**170**	200	115	**140**	170	105	**130**	150
	4	A	150	**185**	215	130	**155**	180	115	**140**	165
	5		135	**170**	200	115	**140**	170	105	**130**	150
	6		135	**170**	200	115	**140**	170	105	**130**	150
	7		165	**195**	225	140	**165**	190	125	**150**	175
	8		135	**170**	200	115	**140**	170	105	**130**	150
	9		135	**170**	200	115	**140**	170	105	**130**	150
	10		145	**175**	205	125	**150**	175	110	**135**	155
	11		120	**150**	185	105	**130**	155	95	**115**	140
	12		135	**170**	200	115	**140**	170	105	**130**	150
	13.1		135	**170**	200	115	**140**	170	105	**130**	150
	13.2		120	**150**	185	105	**130**	155	95	**115**	140
			TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
M	14.1		100	**135**	170	90	**115**	140	80	**105**	130
	14.2		85	**115**	145	75	**100**	125	65	**90**	110
	14.3		70	**100**	130	60	**85**	110	50	**75**	100
	14.4		55	**85**	115	45	**70**	95	40	**65**	85
			TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
K	15		185	**215**	245	155	**180**	205	140	**165**	185
	16		135	**170**	200	115	**140**	170	105	**130**	150
	17		150	**185**	215	130	**155**	180	115	**140**	165
	18		145	**175**	205	125	**150**	175	110	**135**	155
	19		200	**230**	260	170	**195**	220	150	**175**	200
	20		135	**170**	200	115	**140**	170	105	**130**	150
			TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
N	21		305	**335**	365	260	**285**	310			
	22		245	**275**	305	205	**235**	260			
	23		305	**335**	365	260	**285**	310			
	24		245	**275**	305	205	**235**	260			
	25		215	**245**	275	180	**205**	235			
	26		150	**185**	215	130	**155**	180			
	27		150	**185**	215	130	**155**	180			
	28		150	**185**	215	130	**155**	180			
	29		135	**170**	200	115	**140**	170			
	30		135	**170**	200	115	**140**	170			
			TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
S	31		50	**80**	115	45	**70**	95	35	**60**	80
	32		35	**65**	100	30	**55**	85	25	**50**	70
	33		40	**70**	100	30	**60**	85	30	**50**	70
	34		30	**60**	90	25	**50**	80	20	**45**	65
	35		35	**65**	95	30	**55**	80	25	**45**	70
	36		65	**100**	130	55	**85**	110	50	**70**	90
	37		40	**70**	100	30	**60**	85	30	**50**	70



Right Hand Tool

OD Cut-Off and Grooving

order number	catalogue number	H	W	CD	F	B	H3	L1	LS	clamp screw
	Right hand									
3650456	250205	16,0	2,00	16,5	16,0	15,5	6	125	101	606249
3650460	250217	16,0	3,00	11,0	16,0	15,6	–	125	92	619205
3650462	250219	16,0	3,00	22,0	16,0	15,6	5	125	83	619205
3650464	250221	16,0	4,00	22,0	16,0	15,5	5	125	83	619205
3650502	250281	16,0	4,00	11,0	16,0	15,5	–	125	92	619205
3650466	250223	16,0	5,00	14,0	16,0	15,2	–	125	88	619168
3650458	250207	20,0	2,00	16,5	20,0	19,5	–	125	92	606249
3650468	250227	20,0	3,00	11,0	20,0	19,5	–	125	92	619205
3650470	250229	20,0	3,00	22,0	20,0	19,5	5	125	83	619205
3653751	250231	20,0	4,00	20,0	–	–	–	125	83	619205
3650504	250283	20,0	4,00	11,0	20,0	19,5	–	125	92	619205
3650473	250233	20,0	5,00	14,0	20,0	19,2	–	125	88	619168
3650475	250235	20,0	5,00	15,0	20,0	19,2	5	140	93	619168
3650477	250237	20,0	6,00	14,0	20,0	19,2	–	140	103	619168
3650516	250409	25,0	1,50	16,5	25,0	24,5	–	150	116	606249
3650506	250295	25,0	2,00	16,5	25,0	24,5	–	150	116	606249
3650479	250241	25,0	3,00	11,0	25,0	24,5	–	150	117	619205
3650481	250243	25,0	3,00	22,0	25,0	24,5	–	150	109	619205
3650483	250245	25,0	4,00	22,0	25,0	24,5	–	150	109	619205
3653752	250285	25,0	4,00	11,0	25,0	24,7	–	150	117	619205
3650485	250247	25,0	5,00	14,0	25,0	24,1	–	150	113	619168
3650487	250249	25,0	5,00	25,0	25,0	24,1	–	150	104	619168
3650489	250251	25,0	6,00	14,0	25,0	24,1	–	150	114	619168
3650491	250253	25,0	6,00	25,0	25,0	24,1	–	150	104	619168
3650494	250255	25,0	8,00	14,0	25,0	23,9	–	150	113	619168
3650496	250257	25,0	8,00	25,0	25,0	23,9	–	150	104	619168
3650498	250275	32,0	8,00	14,0	32,0	30,9	–	150	113	619168
3650500	250277	32,0	8,00	25,0	32,0	30,9	–	150	104	619168

(continued)

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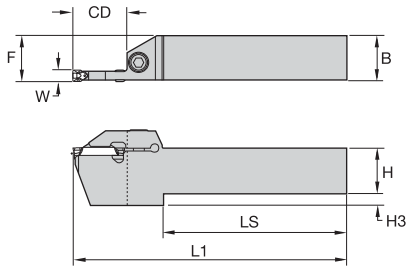
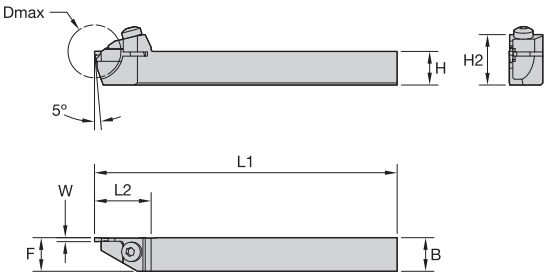


Right Hand Tool

OD Cut-Off and Grooving

order number	catalogue number	H	W	CD	F	B	H3	L1	LS	clamp screw
	Left hand									
3650457	**250206**	16,0	2,00	16,5	16,0	15,5	6	125	101	**606249**
3650461	**250218**	16,0	3,00	11,0	16,0	15,5	—	125	92	**619205**
3650463	**250220**	16,0	3,00	22,0	16,0	15,5	5	125	83	**619205**
3650465	**250222**	16,0	4,00	22,0	16,0	15,5	5	125	83	**619205**
3650503	**250282**	16,0	4,00	11,0	16,0	15,5	—	125	92	**619205**
3650467	**250224**	16,0	5,00	14,0	16,0	15,2	—	125	88	**619168**
3650459	**250208**	20,0	2,00	16,5	20,0	19,5	—	125	92	**606249**
3650469	**250228**	20,0	3,00	11,0	20,0	19,5	—	125	92	**619205**
3650471	**250230**	20,0	3,00	22,0	20,0	19,5	5	125	83	**619205**
3650472	**250232**	20,0	4,00	22,0	20,0	19,7	5	125	83	**619205**
3650505	**250284**	20,0	4,00	11,0	20,0	19,5	—	125	92	**619205**
3650474	**250234**	20,0	5,00	14,0	20,0	19,2	—	125	88	**619168**
3650476	**250236**	20,0	5,00	15,0	20,0	19,2	5	140	93	**619168**
3650478	**250238**	20,0	6,00	14,0	20,0	19,3	—	140	103	**619168**
3650507	**250296**	25,0	2,00	16,5	25,0	24,5	—	150	116	**606249**
3653332	**250410**	25,0	2,00	16,5	25,3	24,5	—	150	116	**606249**
3650480	**250242**	25,0	3,00	11,0	25,0	24,5	—	150	116	**619205**
3650482	**250244**	25,0	3,00	22,0	25,0	24,5	—	150	109	**619205**
3650484	**250246**	25,0	4,00	22,0	25,0	24,5	—	150	109	**619205**
3653763	**250286**	25,0	4,00	11,0	25,0	24,7	—	150	117	**619205**
3650486	**250248**	25,0	5,00	14,0	25,0	24,1	—	150	113	**619168**
3650488	**250250**	25,0	5,00	25,0	25,0	24,1	—	150	104	**619168**
3650490	**250252**	25,0	6,00	14,0	25,0	24,1	—	150	114	**619168**
3650493	**250254**	25,0	6,00	25,0	25,0	24,1	—	150	104	**619168**
3650495	**250256**	25,0	8,00	14,0	25,0	23,9	—	150	113	**619168**
3650497	**250258**	25,0	8,00	25,0	25,0	23,9	—	150	104	**619168**
3650499	**250276**	32,0	8,00	14,0	32,0	30,9	—	150	113	**619168**
3650501	**250278**	32,0	8,00	25,0	32,0	30,9	—	150	104	**619168**

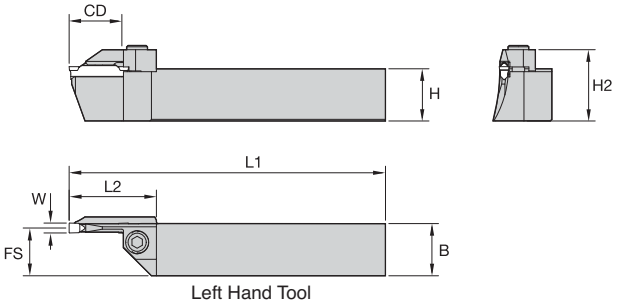


Left Hand Tool

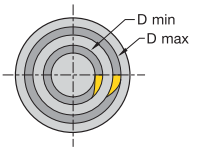
Swiss Grooving and Cut-Off

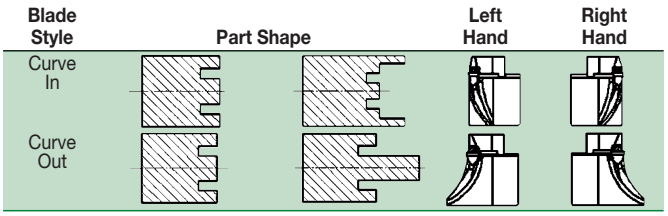
order number	catalogue number	W	D max	B	H	H2	F	L1	L2	clamp screw
	Right hand									
3650508	**250401**	1,50	20	10,0	10,0	16	10,0	100	21	**606249**
3650510	**250403**	1,50	20	12,0	12,0	18	12,0	100	21	**606249**
3650512	**250405**	1,50	26	15,9	16,0	24	16,0	125	24	**606266**
3650514	**250407**	1,50	26	19,9	20,0	28	20,0	125	24	**606266**
3653413	**250411**	2,00	20	10,0	10,0	16	10,0	100	21	**606249**
3653415	**250413**	2,00	20	12,0	12,0	18	12,0	100	21	**606249**
3653417	**250415**	2,00	26	15,8	16,0	24	16,0	125	24	**606266**
3653419	**250417**	2,00	26	19,8	20,0	28	20,0	125	24	**606266**
	Left hand									
3650509	**250402**	1,50	20	10,0	10,0	16	10,0	100	21	**606249**
3650511	**250404**	1,50	20	12,0	12,0	18	12,0	100	21	**606249**
3650513	**250406**	1,50	26	15,9	16,0	24	16,0	125	24	**606266**
3650515	**250408**	1,50	26	19,9	20,0	28	20,0	125	24	**606266**
3653414	**250412**	2,00	20	10,0	10,0	16	10,0	100	21	**606249**
3653416	**250414**	2,00	20	12,0	12,0	18	12,0	100	21	**606249**
3653418	**250416**	2,00	26	15,8	16,0	24	16,0	125	24	**606266**
3653420	**250418**	2,00	26	19,8	20,0	28	20,0	125	24	**606266**

NOTE: Insert exterior edge in line with toolholder edge for 10,0mm and 12,0mm shank toolholders.



Left Hand Tool

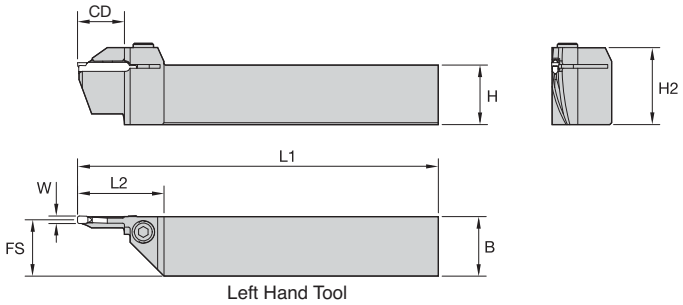




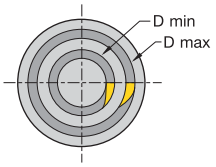
Curve Out

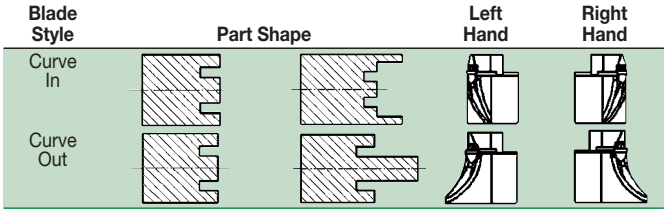
order number	catalogue number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
	Right hand												
3653421	**251217**	3,00	13,0	52	38	23,5	32	24,8	24,8	150	34	–	**619205**
3653425	**251221**	3,00	16,0	100	70	23,5	32	24,8	24,8	150	34	–	**619205**
3653423	**251219**	3,00	16,0	70	52	23,5	32	24,8	24,8	150	34	–	**619205**
3653427	**251223**	3,00	19,0	205	100	23,5	32	25,0	24,8	150	37	–	**619205**
3653764	**251265**	4,00	12,5	52	32	23,0	32	24,8	24,8	150	34	–	**619205**
3653768	**251269**	4,00	15,5	100	70	23,0	32	24,8	24,8	150	34	–	**619205**
3653766	**251267**	4,00	15,5	70	52	23,0	32	24,8	24,8	150	34	–	**619205**
3653770	**251271**	4,00	18,5	205	100	23,0	32	24,8	24,8	150	37	–	**619205**
3653429	**251233**	5,00	16,0	52	38	22,5	34	25,0	24,6	150	38	**446102**	**619168**
3653433	**251237**	5,00	19,0	100	70	22,5	34	24,8	24,8	150	42	**446104**	**619168**
3653431	**251235**	5,00	19,0	70	52	22,5	34	24,8	24,8	150	38	**446102**	**619168**
3653435	**251239**	5,00	25,0	205	100	22,5	34	24,8	24,8	150	42	**446104**	**619168**
3653437	**251249**	6,00	16,0	52	38	22,0	35	24,8	24,8	150	38	**446102**	**619168**
3653441	**251253**	6,00	19,0	100	70	22,0	36	24,8	24,8	150	42	**446104**	**619168**
3653439	**251251**	6,00	19,0	70	52	22,0	34	24,8	24,8	150	38	**446102**	**619168**
3653443	**251255**	6,00	25,0	205	100	22,0	34	24,8	24,8	150	42	**446104**	**619168**
	Left hand												
3653422	**251218**	3,00	13,0	52	38	23,5	32	24,8	24,8	150	34	–	**619205**
3653424	**251220**	3,00	16,0	70	52	23,5	32	24,8	24,8	150	34	–	**619205**
3653426	**251222**	3,00	16,0	100	70	23,5	32	24,8	24,8	150	34	–	**619205**
3653428	**251224**	3,00	19,0	205	100	23,5	32	24,8	24,8	150	37	–	**619205**
3653765	**251266**	4,00	12,5	52	32	23,0	32	24,8	24,8	150	34	–	**619205**
3653769	**251270**	4,00	15,5	100	70	23,0	32	24,8	24,8	150	34	–	**619205**
3653767	**251268**	4,00	15,5	70	52	23,0	32	24,8	24,8	150	34	–	**619205**
3653771	**251272**	4,00	18,5	205	100	23,0	32	24,8	24,8	150	37	–	**619205**
3653430	**251234**	5,00	16,0	52	38	22,5	34	24,8	24,8	150	38	**446101**	**619168**
3653432	**251236**	5,00	19,0	70	52	22,5	34	24,8	24,8	150	38	**446101**	**619168**
3653434	**251238**	5,00	19,0	100	70	22,5	34	24,8	24,8	150	42	**446103**	**619168**
3653436	**251240**	5,00	25,0	205	100	22,5	34	24,8	24,8	150	42	**446103**	**619168**
3653438	**251250**	6,00	16,0	52	38	22,0	35	24,8	24,8	150	38	**446101**	**619168**
3653440	**251252**	6,00	19,0	70	52	22,0	34	24,8	24,8	150	38	**446101**	**619168**
3653442	**251254**	6,00	19,0	100	70	22,0	34	24,8	24,8	150	42	**446103**	**619168**
3653444	**251256**	6,00	25,0	205	100	22,0	34	24,8	24,8	150	42	**446103**	**619168**

NOTE: Insert cutting edge for WMT Face Grooving system is positioned +0,75mm above center.
The WMT Face Grooving system is not designed to cut diameters of less than 12,6mm.
Toolholders that accept 3,0mm width inserts have an integral clamp.
Toolholders that accept 5,0mm and 6,0mm width inserts are supplied with a detachable clamp.



Left Hand Tool





Curve In

order number	catalogue number	W	CD	D max	D min	FS	H2	H	B	L1	L2	clamp	clamp screw
	Right hand												
3634282	**252209M**	3,00	15,9	100	70	23,5	32	24,8	24,8	150	34	**–**	**MS326**
3634284	**252211M**	3,00	19,1	205	100	23,5	32	24,8	24,8	150	37	**–**	**MS326**
3634286	**252217M**	5,00	19,1	100	70	22,5	34	24,8	24,8	150	42	**446104**	**619168**
3634288	**252219M**	5,00	25,4	205	100	22,5	34	24,8	24,8	150	42	**446104**	**619168**
3634290	**252225M**	6,00	19,1	100	70	22,0	34	24,8	24,8	150	42	**446104**	**619168**
3634292	**252227M**	6,00	25,4	205	100	22,0	34	24,8	24,8	150	42	**446104**	**619168**
	Left hand												
3634283	**252210M**	3,00	15,9	100	70	23,5	32	24,8	24,8	150	34	**–**	**MS326**
3634285	**252212M**	3,00	19,1	205	100	23,5	32	24,8	24,8	150	37	**–**	**MS326**
3634287	**252218M**	5,00	19,1	100	70	22,5	34	24,8	24,8	150	42	**446103**	**619168**
3634289	**252220M**	5,00	25,4	205	100	22,5	34	24,8	24,8	150	42	**446103**	**619168**
3634291	**252226M**	6,00	19,1	100	70	22,0	34	24,8	24,8	150	42	**446103**	**619168**
3634293	**252228M**	6,00	25,4	205	100	22,0	34	24,8	24,8	150	42	**446103**	**619168**

NOTE: Insert cutting edge for WMT Face Grooving system is positioned +0,75mm above center.
The WMT Face Grooving system is not designed to cut diameters of less than 12,6mm.
Toolholders that accept 3,0mm width inserts have an integral clamp.
Toolholders that accept 5,0mm and 6,0mm width inserts are supplied with a detachable clamp.

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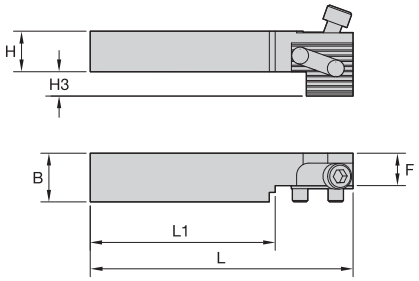
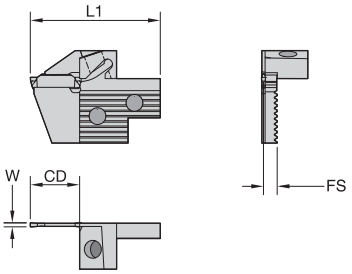


Left Hand Tool


Right Hand Assembly

Grooving, Cut-Off, and Face Grooving

order number	catalogue number	H	B	L	L1	F	H3	cartridge screw	clamp screw
	Right hand								
3653445	**253201**	16,0	20,0	101	70,4	14,8	9	**606255**	**619168**
3653447	**253203**	20,0	20,0	101	70,4	14,8	5	**606255**	**619168**
3653451	**253207**	25,0	25,0	126	95,4	19,8	—	**619419**	**619168**
3653449	**253205**	32,0	32,0	126	95,4	26,8	—	**619419**	**619168**
	Left hand								
3653446	**253202**	16,0	20,0	101	70,4	14,8	9	**606255**	**619168**
3653448	**253204**	20,0	20,0	101	70,4	14,8	5	**606255**	**619168**
3653452	**253208**	25,0	25,0	126	95,4	19,8	—	**619419**	**619168**
3653450	**253206**	32,0	32,0	126	95,4	26,8	—	**619419**	**619168**



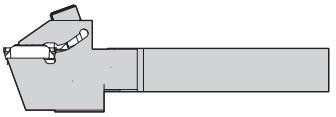
Left Hand Tool

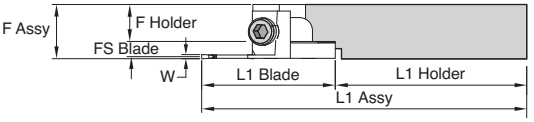

Right Hand Assembly

Grooving and Cut-Off

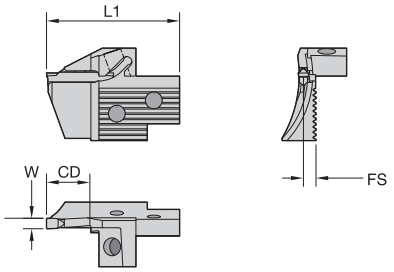
order number	catalogue number	W	CD	L1	FS
	Right hand				
3653461	**348101**	1,50	16,5	49,1	5,2
3653463	**348103**	2,00	16,5	49,1	5,0
3653465	**348105**	2,38	19,1	52,1	4,7
3653467	**348107**	3,00	22,2	54,6	4,4
3653469	**348109**	4,00	22,2	54,6	4,8
3653703	**348111**	4,76	25,4	57,1	4,3
3653705	**348113**	6,36	25,4	57,2	4,0
	Left hand				
3653462	**348102**	1,50	16,5	49,1	5,2
3653464	**348104**	2,00	16,5	49,1	5,0
3653466	**348106**	2,38	19,1	52,1	4,7
3653468	**348108**	3,00	22,2	54,6	4,4
3653470	**348110**	4,00	22,2	54,6	4,8
3653704	**348112**	4,76	25,4	57,1	4,3
3653706	**348114**	6,36	25,4	57,2	4,0

NOTE: Widths of 4,0mm; 5,0mm; and 6,0mm are not recommended for 16,0mm shank toolholders.
Width of 6,0mm is not recommended for 20,0mm shank toolholders.





L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2 - 0,787mm



Left Hand Tool

Right Hand Assembly

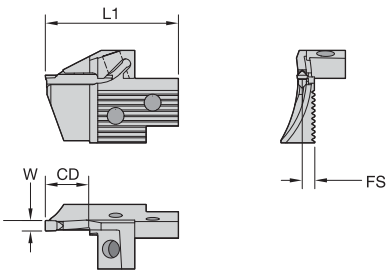
Face Grooving • Curve Out

order number	catalogue number	W	D min	D max	CD	FS	L1
	Right hand						
3653707	**349101**	3,0	38	51	12,7	4,4	50,3
3653708	**349102**	3,0	51	70	15,9	4,4	50,3
3653709	**349103**	3,0	70	102	15,9	4,4	50,3
3653710	**349104**	3,0	102	203	19,1	4,4	52,7
3653715	**349109**	4,0	38	51	12,7	4,8	50,3
3653716	**349110**	4,0	51	70	15,9	4,8	50,3
3653717	**349111**	4,0	70	102	15,9	4,8	50,3
3653718	**349112**	4,0	102	203	19,1	4,8	52,7
3653723	**349117**	5,0	38	51	15,9	4,3	52,7
3653724	**349118**	5,0	51	70	19,1	4,3	52,7
3653725	**349119**	5,0	70	102	19,1	4,3	56,6
3653726	**349120**	5,0	102	203	25,4	4,3	56,6
3653731	**349125**	6,0	30	51	15,9	5,6	52,7
3653732	**349126**	6,0	51	70	19,1	5,6	52,7
3653733	**349127**	6,0	70	102	19,1	5,6	56,6
3653734	**349128**	6,0	102	203	25,4	5,6	56,6

NOTE: Width of 6,0mm is not recommended for 20,0mm shank toolholders.
See page D16 for shank tooling.

(continued)

(continued)

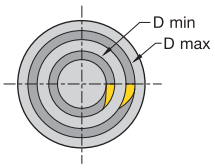


Left Hand Tool

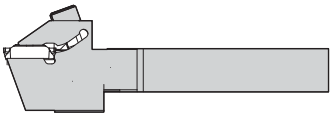
Right Hand Assembly

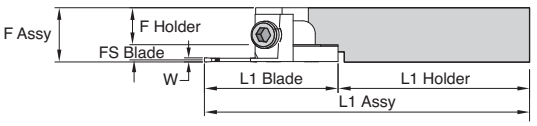
Face Grooving • Curve Out

order number	catalogue number	W	D min	D max	CD	FS	L1
	Left hand						
3653711	**349105**	3,0	38	51	12,7	4,4	50,3
3653712	**349106**	3,0	51	70	15,9	4,4	50,3
3653713	**349107**	3,0	70	102	15,9	4,4	50,3
3653714	**349108**	3,0	102	203	19,1	4,4	52,7
3653719	**349113**	4,0	38	51	12,7	4,8	50,3
3653720	**349114**	4,0	51	70	15,9	4,8	50,3
3653721	**349115**	4,0	70	102	15,9	4,8	50,3
3653722	**349116**	4,0	102	203	19,1	4,8	52,7
3653727	**349121**	5,0	38	51	15,9	4,3	52,7
3653728	**349122**	5,0	51	70	19,1	4,3	52,7
3653729	**349123**	5,0	70	102	19,1	4,3	56,6
3653730	**349124**	5,0	102	203	25,4	4,3	56,6
3653735	**349129**	6,0	30	51	15,9	5,6	52,7
3653736	**349130**	6,0	51	70	19,1	5,6	52,7
3653737	**349131**	6,0	70	102	19,1	5,6	56,6
3653738	**349132**	6,0	102	203	25,4	5,6	56,6

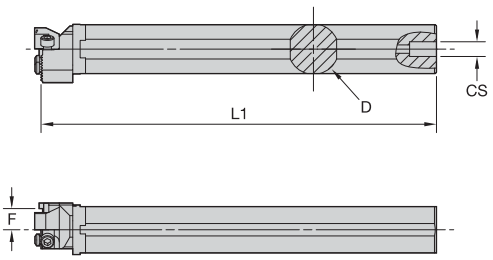


Blade Style	Part Shape	Left Hand	Right Hand
Curve In			
Curve Out			





L1 Assy = L1 (holder) + L1 (blade)
F Assy = F (holder) + FS (blade) + W/2 - 0,787mm



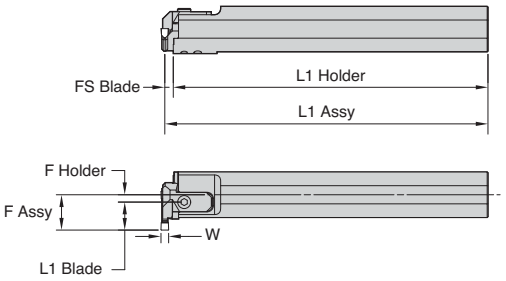
Right Hand Tool

Left Hand Assembly

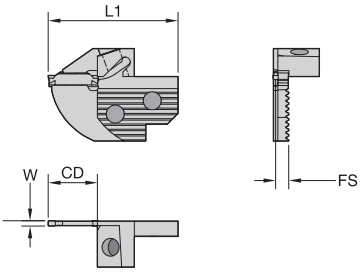
ID Grooving

order number	catalogue number	D	F	L1	CS	cartridge screw	coolant spout	coolant support screw	clamp screw
	Right hand								
3653454	**254202**	25	-16,0	194,0	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3653456	**254204**	32	-16,0	244,0	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3653458	**254206**	40	-16,0	294,0	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
3653459	**254207**	50	-13,0	298,9	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3653460	**254208**	50	-13,0	298,9	1/4-18 NPT	**606256**	**614126**	**619151**	**619168**
	Left hand								
3653453	**254201**	25	-16,0	194,0	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3653455	**254203**	32	-16,0	244,0	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**
3653457	**254205**	40	-16,0	294,0	1/4-18 NPT	**606256**	**614125**	**619151**	**619168**

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



L1 Assy = L1 (holder) + FS (blade) + W/2 - 0,787mm
F Assy = F (holder) + L1 (blade)



Left Hand Tool


Left Hand Assembly

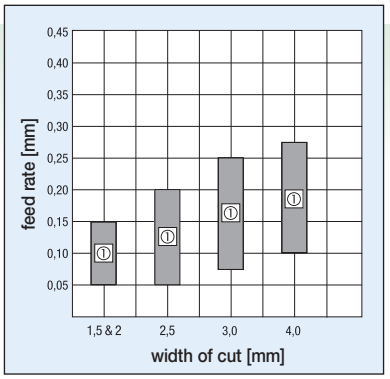
ID Grooving

order number	catalogue number	W	CD	FS	L1
	Right hand				
3653739	**350103**	2,00	12,7	5,0	49,1
3653741	**350105**	2,50	15,9	4,7	52,1
3653743	**350107**	3,00	19,1	4,4	54,6
3653745	**350109**	4,00	19,1	4,8	54,6
3653747	**350111**	5,00	21,6	4,3	57,1
3653749	**350113**	6,00	21,6	4,0	57,2
	Left hand				
3653740	**350104**	2,00	12,7	5,0	49,1
3653742	**350106**	2,50	15,9	4,7	52,1
3653744	**350108**	3,00	19,1	4,4	54,6
3653746	**350110**	4,00	19,1	4,8	54,6
3653748	**350112**	5,00	21,6	4,3	57,1
3653750	**350114**	6,00	21,6	4,0	57,2

NOTE: Widths of 5,0mm and 6,0mm are not recommended for 25,0mm shank toolholders.
Right-hand toolholders use left-hand cartridges.

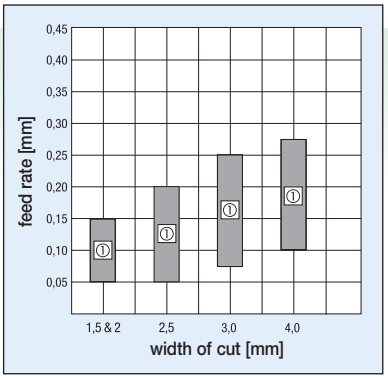
SX Cut-Off Inserts

- 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 minimised cutting pressure on various materials.



① Recommended feed

SX-Ultra Cut-Off Inserts

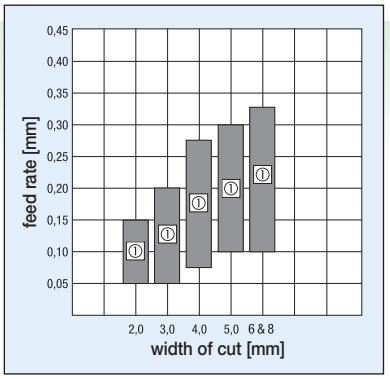


① Recommended feed

- 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 minimised 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.

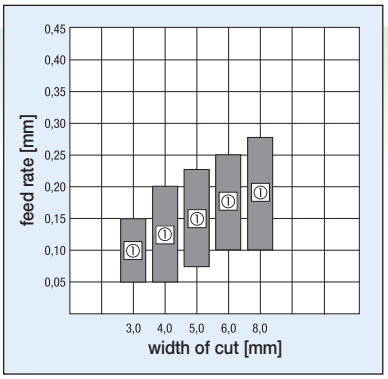
PT Grooving Inserts

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



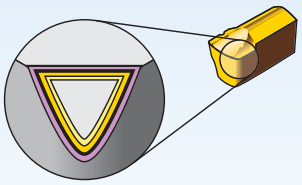
① Recommended feed

PC Grooving and Profiling Inserts



① Recommended feed

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



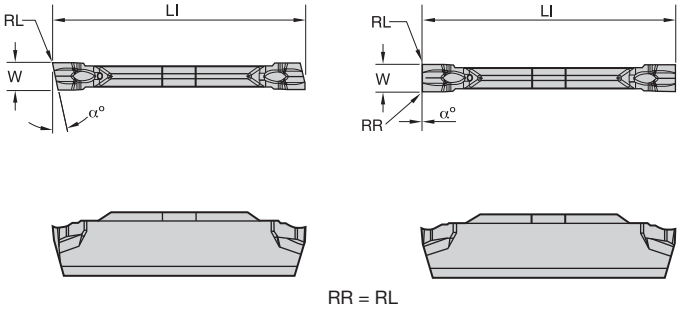
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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.									
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.									
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.									

ANSI ISO 513	VDI 3323									
Material Group		Cutting Speed • vc m/min								
		min	Start	max	min	Start	max	min	Start	max
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
P	1	170	**200**	230	140	**170**	195	130	**150**	175
	2	170	**200**	230	140	**170**	195	130	**150**	175
	3	135	**170**	200	115	**140**	170	105	**130**	150
	4	150	**185**	215	130	**155**	180	115	**140**	165
	5	135	**170**	200	115	**140**	170	105	**130**	150
	6	135	**170**	200	115	**140**	170	105	**130**	150
	7	165	**195**	225	140	**165**	190	125	**150**	175
	8	135	**170**	200	115	**140**	170	105	**130**	150
	9	135	**170**	200	115	**140**	170	105	**130**	150
	10	145	**175**	205	125	**150**	175	110	**135**	155
	11	120	**150**	185	105	**130**	155	95	**115**	140
	12	135	**170**	200	115	**140**	170	105	**130**	150
	13.1	135	**170**	200	115	**140**	170	105	**130**	150
	13.2	120	**150**	185	105	**130**	155	95	**115**	140
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
M	14.1	105	**135**	170	90	**115**	140	80	**105**	130
	14.2	85	**115**	145	75	**100**	125	65	**90**	110
	14.3	70	**100**	130	60	**85**	110	50	**75**	100
	14.4	55	**85**	115	45	**70**	95	40	**65**	85
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
K	15	185	**215**	245	155	**180**	205	140	**165**	185
	16	135	**170**	200	115	**140**	170	105	**130**	150
	17	150	**185**	215	130	**155**	180	115	**140**	165
	18	145	**175**	205	125	**150**	175	110	**135**	155
	19	200	**230**	260	170	**195**	220	150	**175**	200
	20	135	**170**	200	115	**140**	170	105	**130**	150
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
N	21	305	**335**	365	260	**285**	310			
	22	245	**275**	305	205	**235**	260			
	23	305	**335**	365	260	**285**	310			
	24	245	**275**	305	205	**235**	260			
	25	215	**245**	275	180	**205**	235			
	26	150	**185**	215	130	**155**	180			
	27	150	**185**	215	130	**155**	180			
	28	150	**185**	215	130	**155**	180			
	29	135	**170**	200	115	**140**	170			
	30	135	**170**	200	115	**140**	170			
		TN6016 (M93)			TN6031 (M43)			TN6026 (M433B)		
S	31	50	**80**	115	45	**70**	95	35	**60**	80
	32	35	**65**	100	30	**55**	85	25	**50**	70
	33	40	**70**	100	30	**60**	85	30	**50**	70
	34	30	**60**	90	25	**50**	80	20	**45**	65
	35	35	**65**	95	30	**55**	80	25	**45**	70
	36	65	**100**	130	55	**85**	110	50	**70**	90
	37	40	**70**	100	30	**60**	85	30	**50**	70



RR = RL

● first choice
○ alternate choice

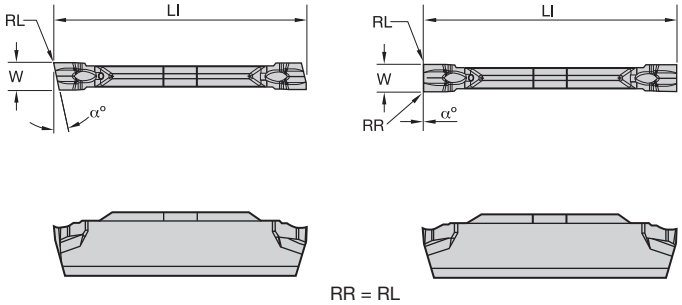
		TN6016	TN6026	TN6031
P		○	●	●
M		○	●	●
K		●	○	●
N		●		○
S			●	○
H				○

WMT-SX

catalogue number	W	LI	RR	α°	hand	TN6016	TN6026	TN6031
583160	1,50	19,31	0,08	—	N - Neutral			●
583125	2,00	19,21	0,08	—	N - Neutral	●		●
583135	3,00	25,38	0,17	—	N - Neutral	●		●
583175	4,00	25,40	0,17	—	N - Neutral	●		●

catalogue number	W	LI	RR	α°	hand	TN6016	TN6026	TN6031
583162	1,50	19,31	0,08	5	L - Left			●
583164	1,50	19,35	0,08	12	L - Left			●
583127	2,00	19,26	0,08	5	L - Left	●		●
583129	2,00	19,28	0,08	12	L - Left			●
583137	3,00	25,35	0,17	5	L - Left	●		●
583139	3,00	25,40	0,17	12	L - Left			●
583177	4,00	25,44	0,17	5	L - Left	●		●
583179	4,00	25,45	0,17	12	L - Left			●

catalogue number	W	LI	RL	α°	hand	TN6016	TN6026	TN6031
583161	1,50	19,31	0,08	5	R - Right			●
583163	1,50	19,35	0,08	12	R - Right			●
583126	2,00	19,26	0,08	5	R - Right	●		●
583128	2,00	19,28	0,08	12	R - Right			●
583136	3,00	25,35	0,17	5	R - Right	●		●
583138	3,00	25,40	0,17	12	R - Right			●
583176	4,00	25,44	0,17	5	R - Right	●		●
583178	4,00	25,45	0,17	12	R - Right			●



● first choice
○ alternate choice

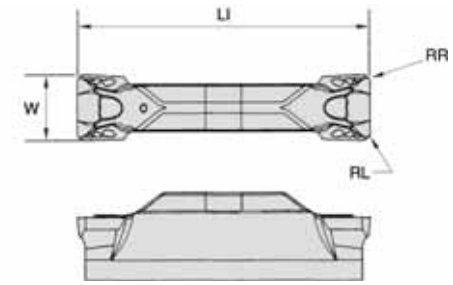
		TN6016	TN6026	TN6031
P		○	●	●
M		○	●	●
K		●	○	●
N		●		○
S			●	○
H				○

WMT-SX Ultra

catalogue number	W	RR	LI	α°	hand	TN6016	TN6026	TN6031
583165	1,50	0,08	19,31	—	N - Neutral		●	
583170	2,00	0,08	19,21	—	N - Neutral		●	
583155	3,00	0,17	25,38	—	N - Neutral		●	
583180	4,00	0,17	25,35	—	N - Neutral		●	

catalogue number	W	RR	LI	α°	hand	TN6016	TN6026	TN6031
583167	1,50	0,08	19,31	5	L - Left		●	
583169	1,50	0,08	19,35	12	L - Left		●	
583172	2,00	0,08	19,26	5	L - Left		●	
583174	2,00	0,08	19,26	12	L - Left		●	
583157	3,00	0,17	25,35	5	L - Left		●	
583159	3,00	0,17	25,40	12	L - Left		●	
583182	4,00	0,17	25,43	5	L - Left		●	
583184	4,00	0,17	25,43	12	L - Left		●	

catalogue number	W	RL	LI	α°	hand	TN6016	TN6026	TN6031
583166	1,50	0,08	19,31	5	R - Right		●	
583168	1,50	0,08	19,35	12	R - Right		●	
583171	2,00	0,08	19,26	5	R - Right		●	
583173	2,00	0,08	19,26	12	R - Right		●	
583156	3,00	0,17	25,35	5	R - Right		●	
583158	3,00	0,17	25,40	12	R - Right		●	
583181	4,00	0,17	25,43	5	R - Right		●	
583183	4,00	0,17	25,43	12	R - Right		●	



RR = RL

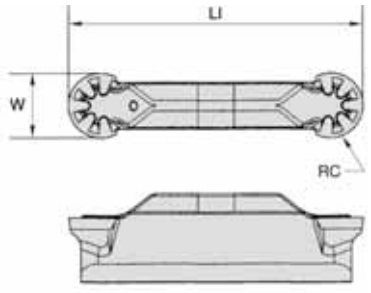
● first choice
○ alternate choice

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

■ WMT-PT

catalogue number	W	RR	LI	hand	TN6016	TN6026	TN6031
582131	2,00	0,15	19,10	N - Neutral	●		●
582129	2,00	0,15	19,10	N - Neutral	●		●
582130	2,00	0,31	19,10	N - Neutral	●		●
582113	3,00	0,31	25,40	N - Neutral	●		●
582114	3,00	0,61	25,40	N - Neutral	●		●
582115	4,00	0,31	25,40	N - Neutral	●		●
582116	4,00	0,61	25,40	N - Neutral	●		●
582117	5,00	0,31	28,63	N - Neutral	●		●
582118	5,00	0,61	28,63	N - Neutral	●		●
582119	6,00	0,31	28,63	N - Neutral	●		●
582120	6,00	0,61	28,63	N - Neutral	●		●
582122	8,00	0,61	28,58	N - Neutral	●		●
582149	8,00	1,50	28,58	N - Neutral	●		●

NOTE: 582131 is exclusively for ID applications.



■ WMT-PC

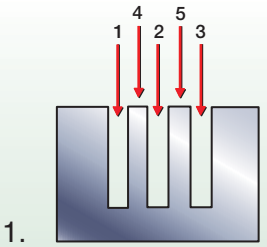
catalogue number	W	RC	LI			
581107	3,00	1,50	25,40	●		●
581108	4,00	2,00	25,45	●		●
581109	5,00	2,50	28,88	●		●
581110	6,00	3,00	28,65	●		●
581111	8,00	4,00	29,08	●		●

Troubleshooting

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

1 Multiple-Pass Grooving

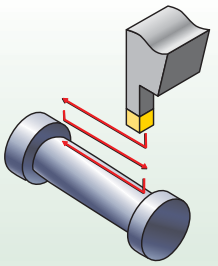
Use the widest possible insert width to achieve optimal chip control and tool life. Make grooves 1, 2, and 3 first, then connect with passes 4 and 5. For passes 4 and 5, the material removed should be no more than 0,8 x the insert width.



1.

2 Grooving and Turning

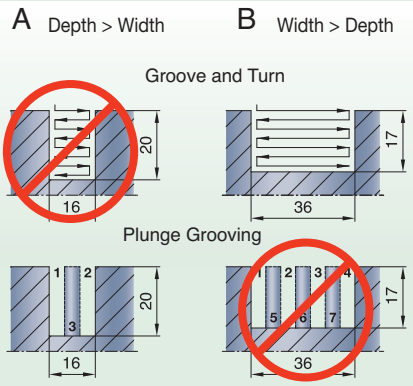
For small and unstable workpieces, this is the preferred method to reduce vibrations experienced when axial grooving. The depth of cut in longitudinal turning should generally be 60–70% of the groove width. Turning in both directions improves tool life.


2.

Choosing the Best Method:

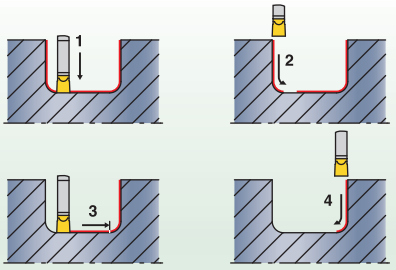
A When the groove depth is greater than the groove width, multiple-pass plunge grooving offers the best results.

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. When possible, they should be your first toolholder choice.
- 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 the 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 needed 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.

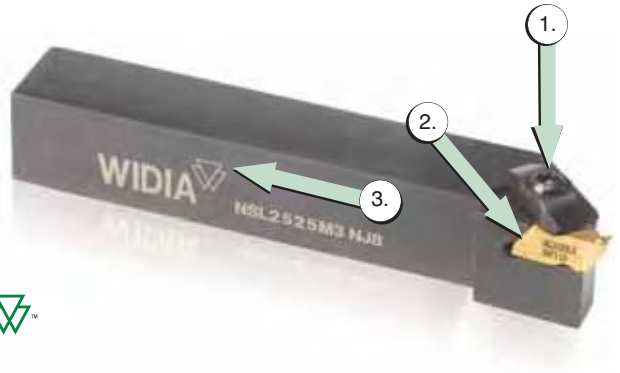
WIDIA™ TopGroove™

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 moulded 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.
- New CVD TN7110 grade.
- Versatile design enables one system to handle OD and ID grooving, face grooving, back turning, undercutting, and even threading operations.

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.

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

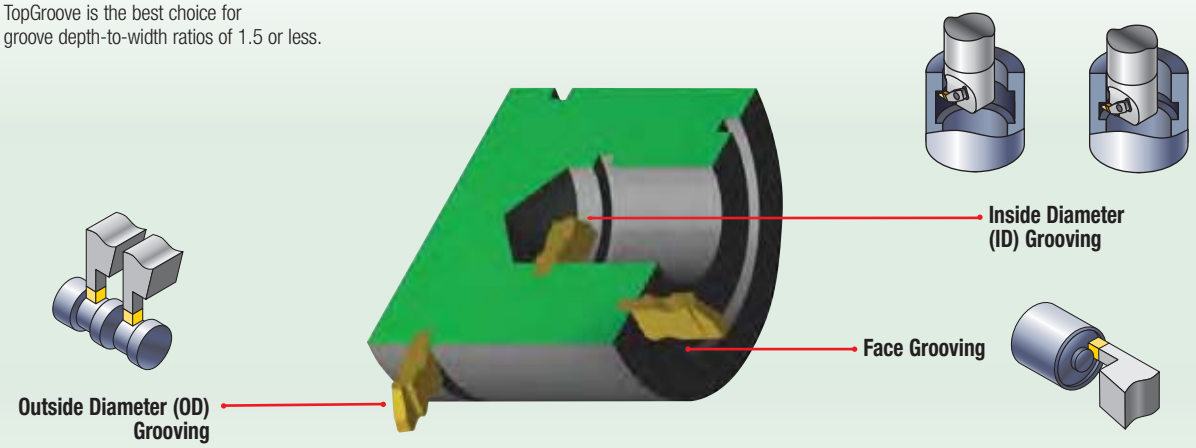
Utilise this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

What you need to know:

- Groove depth, width, and profile.
- Material being machined.
- 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	0,79mm	9,53mm
		depth	—	12,7mm
	Face Grooving	width	2,00mm	6,35mm
		depth	—	12,7mm
	Internal Grooving	diameter	11,2mm	—
	Face Grooving Diameter	standard	23,9mm	—
		deep	—	–
	Deep OD/ID Grooving	width	1,57mm	6,35mm
		depth	—	12,7mm
	Deep Face Grooving	width	3,18mm	6,35mm
		depth	—	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:

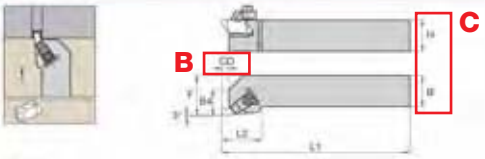
A Choose the appropriate gage insert (width) required for the application.

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.

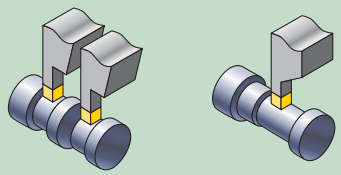
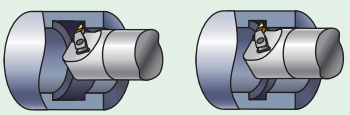
TopGroove™
Toolholders

WIDIA MANCHESTER



■ NS

order number	catalogue number	C H	C B	F	L1	L2	B4	B CD	A gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3641682	NSR1010E2	10,0	10,0	14,0	70	19	9	3,5	N.2R	CM74	MS1200	T10
3641660	NSR1212F2	12,0	12,0	16,0	80	19	9	3,5	N.2R	CM74	MS1200	T10
3636542	NSR1616H2	16,0	16,0	20,0	100	19	9	3,5	N.2R	CM74	MS1200	T10
3638589	NSR2020K2	20,0	20,0	25,0	125	19	9	3,5	N.2R	CM74	MS1200	T10
3638590	NSR2525M2	25,0	25,0	32,0	150	19	9	3,5	N.2R	CM74	MS1200	T10
3638588	NSR2020K3	20,0	20,0	25,0	125	32	13	5,3	N.3R	CM72LP	MS2111	25 IP
3636536	NSR2525M3	25,0	25,0	32,0	150	32	13	5,3	N.3R	CM72LP	MS2111	25 IP
3641664	NSR3225P3	32,0	25,0	32,0	170	32	13	5,3	N.3R	CM72LP	MS2111	25 IP
3641668	NSR3232P3	32,0	32,0	40,0	170	32	13	5,3	N.3R	CM72LP	MS2111	25 IP
3636540	NSR2525M4	25,0	25,0	32,0	150	35	14	7,5	N.4R	CM72LP	MS2111	25 IP
3641675	NSR3225P4	32,0	25,0	32,0	170	35	14	7,5	N.4R	CM72LP	MS2111	25 IP
3641669	NSR3232P4	32,0	32,0	40,0	170	35	14	7,5	N.4R	CM72LP	MS2111	25 IP
3641673	NSR3232P5	32,0	32,0	40,0	170	51	19	10,5	N.5R	CM80	MS352	6mm
	Left hand											
3641683	NSL1010E2	10,0	10,0	14,0	70	19	9	3,5	N.2L	CM75	MS1200	T10
3641661	NSL1212F2	12,0	12,0	16,0	80	19	9	3,5	N.2L	CM75	MS1200	T10
3636545	NSL1616H2	16,0	16,0	20,0	100	19	9	3,5	N.2L	CM75	MS1200	T10
3639045	NSL2020K2	20,0	20,0	25,0	125	19	9	3,5	N.2L	CM75	MS1200	T10
3639047	NSL2525M2	25,0	25,0	32,0	150	19	9	3,5	N.2L	CM75	MS1200	T10
3639046	NSL2020K3	20,0	20,0	32,0	125	32	13	5,3	N.3L	CM73LP	MS2111	25 IP
3636539	NSL2525M3	25,0	25,0	32,0	150	32	13	5,3	N.3L	CM73LP	MS2111	25 IP
3641670	NSL3225P3	32,0	25,0	32,0	170	32	13	5,3	N.3L	CM73LP	MS2111	25 IP
3641671	NSL3232P3	32,0	32,0	40,0	170	32	13	5,3	N.3L	CM73LP	MS2111	25 IP
3636544	NSL2525M4	25,0	25,0	32,0	150	35	14	7,5	N.4L	CM73LP	MS2111	25 IP
3641678	NSL3225P4	32,0	25,0	32,0	170	35	14	7,5	N.4L	CM73LP	MS2111	25 IP

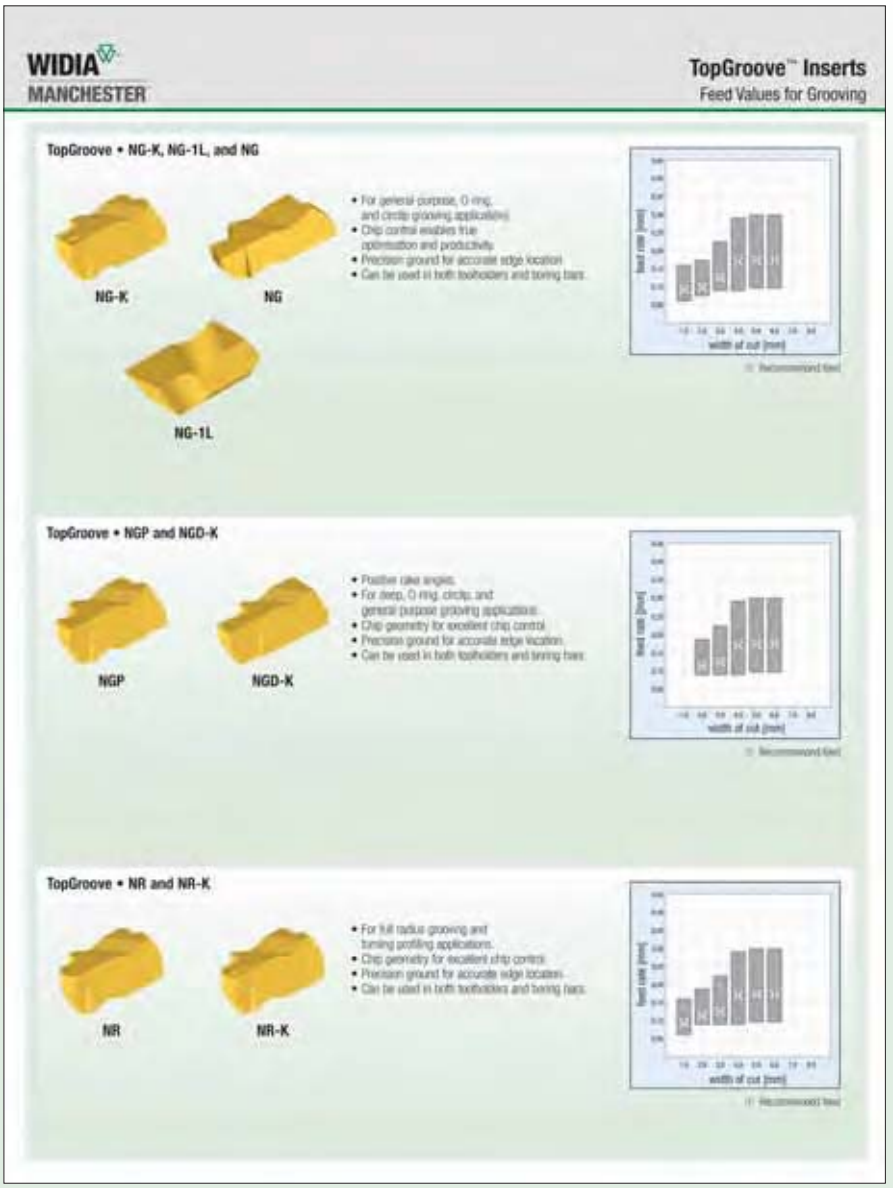
	application	conventional toolholders	modular blades
	OD Grooving and Plunge and Turn	page D38	—
	ID Grooving	page D41	—

4 Select chipbreaker style for the application:

See application guide on page D42 for a complete list of insert styles.

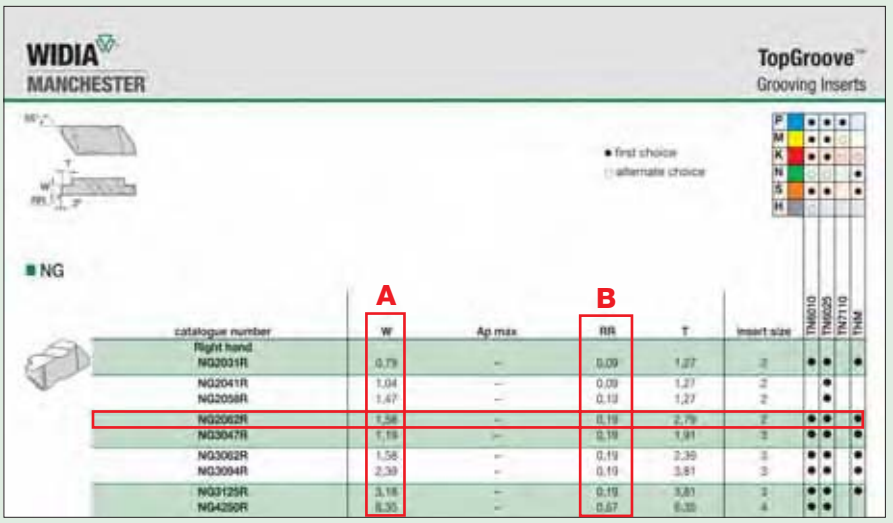
NOTE: Chart shows recommended starting feed rates.

See page D43.



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

B Select the required corner radius value "RR".



5 Select grade:

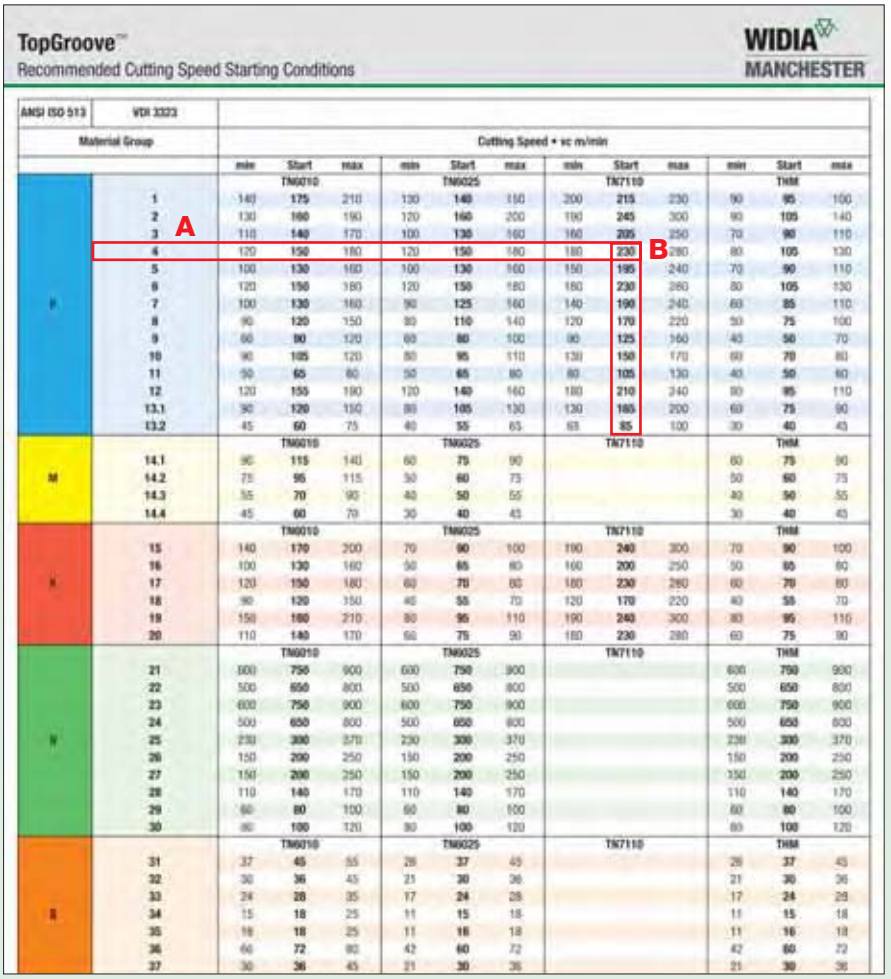
cutting condition		Recommended Grades					
		steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		TN7110	TN6010	TN7110	TN6010	TN6010	TN6010
varying depth of cut, casting, or forging skin		TN6010	TN6010	TN6010	TN6010	TN6010	TN6010
lightly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

See page D44 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 D46 for cutting data.



TopGroove™
Recommended Cutting Speed Starting Conditions

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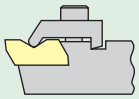
ANSI ISO 513	VDI 3323	Material Group	Cutting Speed • vc m/min											
			min	Start	max	min	Start	max	min	Start	max	min	Start	max
			TN6010			TN6025			TN7110			THM		
P	1		140	175	210	130	140	150	200	215	230	90	95	100
	2		130	160	190	120	160	200	190	245	300	90	105	140
	3	A	110	140	170	100	130	160	160	205	250	70	90	110
	4		120	150	180	120	150	180	180	230	280	80	105	130
	5		100	130	160	100	130	160	150	195	240	70	90	110
	6		120	150	180	120	150	180	180	230	280	80	105	130
	7		100	130	160	90	125	160	140	190	240	60	85	110
	8		90	120	150	80	110	140	120	170	220	50	75	100
	9		60	90	120	60	80	100	90	125	160	40	50	70
	10		90	105	120	80	95	110	130	150	170	60	70	80
	11		50	65	80	50	65	80	80	105	130	40	50	60
	12		120	155	190	120	140	160	180	210	240	80	95	110
	13.1		90	120	150	80	105	130	130	165	200	60	75	90
	13.2		45	60	75	40	55	65	65	85	100	30	40	45
			TN6010			TN6025			TN7110			THM		
M	14.1		95	115	140	60	75	90				60	75	90
	14.2		75	95	115	50	60	75				50	60	75
	14.3		55	70	90	40	50	55				40	50	55
	14.4		45	60	70	30	40	45				30	40	45
			TN6010			TN6025			TN7110			THM		
K	15		140	170	200	70	90	100	190	240	300	70	90	100
	16		100	130	160	50	65	80	160	200	250	50	65	80
	17		120	150	180	60	75	80	180	230	280	60	70	80
	18		90	120	150	40	55	70	120	170	220	40	55	70
	19		150	180	210	80	95	110	190	240	300	80	95	110
	20		110	140	170	60	75	90	180	230	280	60	75	90
			TN6010			TN6025			TN7110			THM		
N	21		600	750	900	600	750	900				600	750	900
	22		500	650	800	500	650	800				500	650	800
	23		600	750	900	600	750	900				600	750	900
	24		500	650	800	500	650	800				500	650	800
	25		230	300	370	230	300	370				230	300	370
	26		150	200	250	150	200	250				150	200	250
	27		150	200	250	150	200	250				150	200	250
	28		110	140	170	110	140	170				110	140	170
	29		60	80	100	60	80	100				60	80	100
	30		80	100	120	80	100	120				80	100	120
			TN6010			TN6025			TN7110			THM		
S	31		37	45	55	28	37	45				28	37	45
	32		30	36	45	21	30	36				21	30	36
	33		24	28	35	17	24	28				17	24	28
	34		15	18	25	11	15	18				11	15	18
	35		18	18	25	11	18	18				11	18	18
	36		60	72	80	42	60	72				42	60	72
	37		30	36	45	21	30	36				21	30	36

TopGroove
Holder Identification System

N — Insert Holding Method

N —
TopGroove*

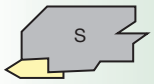


*Proprietary standard only.

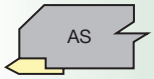
S — Insert Mounting Location

End mount

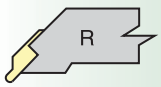
Side mount
Offset



Side mount
No offset

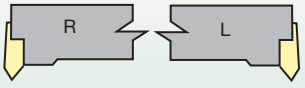


NRR Undercut

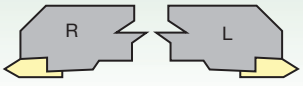


R — Hand of Tool

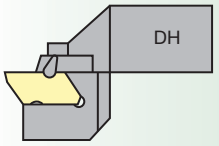
End mount



Side mount



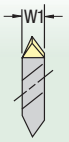
Drop Head



16 — Shank Size

Shank height and width in mm and holder length according to ISO standard.

4 — Insert Size



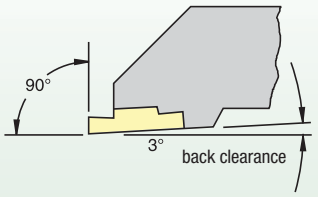
insert size	W1
2	3,81mm
3	4,95mm
4	6,98mm
5	9,65mm
6	9,73mm
8	11,13mm

M — Tool Length

L1	ISO
32	A
40	B
50	C
60	D
70	E
80	F
90	G
100	H
110	J
125	K
140	L
150	M
160	N
170	P
180	Q
200	R
250	S
300	T
350	U
400	V
450	W
500	Y
Special Length	X

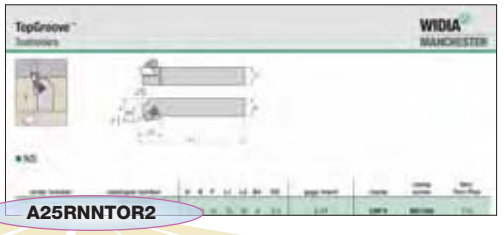
Q — Qualified Surface and Length

Q –
qualified metric holder



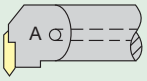
NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

TopGroove
Boring Bar Identification System

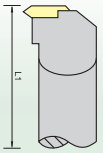


A	25	R	N	N	T	O	R	2
Bar Type	Bar Diameter	Bar Length	Insert Holding Method	Insert Shape	Insert Location	Rake Angle	Hand of Tool	Insert Size

Steel with coolant



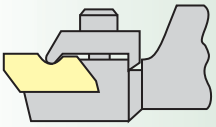
Bar diameter in millimetres



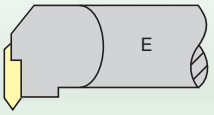
Metric bars:

M	150,0mm
Q	180,0mm
R	200,0mm
S	250,0mm
T	300,0mm
U	350,0mm

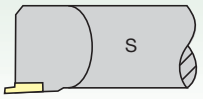
N — TopGroove



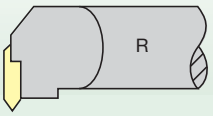
End mount



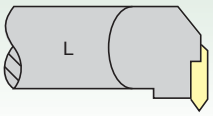
Side mount

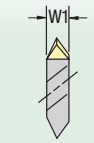


Right hand

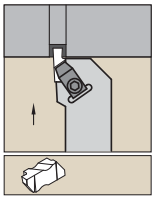


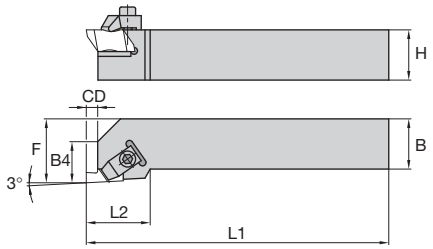
Left hand





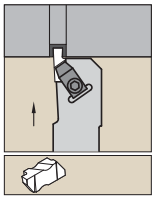
insert size	T
1	3,54mm
2	3,81mm
3	5,35mm
4	6,40mm
5	9,65mm
6	9,73mm
8	11,13mm

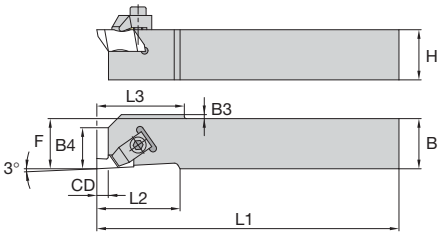




NS

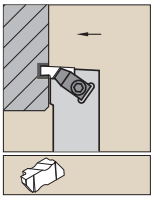
order number	catalogue number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand											
3641682	**NSR1010E2**	10,0	10,0	14,0	70	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3641660	**NSR1212F2**	12,0	12,0	16,0	80	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3636542	**NSR1616H2**	16,0	16,0	20,0	100	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3638589	**NSR2020K2**	20,0	20,0	25,0	125	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3638590	**NSR2525M2**	25,0	25,0	32,0	150	19	9	3,5	N.2R	**CM74**	**MS1200**	T10
3638588	**NSR2020K3**	20,0	20,0	25,0	125	32	13	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3636536	**NSR2525M3**	25,0	25,0	32,0	150	32	13	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3641664	**NSR3225P3**	32,0	25,0	32,0	170	32	13	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3641666	**NSR3232P3**	32,0	32,0	40,0	170	32	13	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3636540	**NSR2525M4**	25,0	25,0	32,0	150	35	14	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641675	**NSR3225P4**	32,0	25,0	32,0	170	35	14	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641669	**NSR3232P4**	32,0	32,0	40,0	170	35	14	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641673	**NSR3232P5**	32,0	32,0	40,0	170	51	16	10,5	N.5R	**CM80**	**MS352**	6mm
	Left hand											
3641683	**NSL1010E2**	10,0	10,0	14,0	70	19	9	3,5	N.2L	**CM75**	**MS1200**	T10
3641681	**NSL1212F2**	12,0	12,0	16,0	80	19	9	3,5	N.2L	**CM75**	**MS1200**	T10
3636545	**NSL1616H2**	16,0	16,0	20,0	100	19	9	3,5	N.2L	**CM75**	**MS1200**	T10
3639045	**NSL2020K2**	20,0	20,0	25,0	125	19	9	3,5	N.2L	**CM75**	**MS1200**	T10
3639047	**NSL2525M2**	25,0	25,0	32,0	150	19	9	3,5	N.2L	**CM75**	**MS1200**	T10
3639046	**NSL2020K3**	20,0	20,0	32,0	125	32	13	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3636539	**NSL2525M3**	25,0	25,0	32,0	150	32	13	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3641670	**NSL3225P3**	32,0	25,0	32,0	170	32	13	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3641671	**NSL3232P3**	32,0	32,0	40,0	170	32	13	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3636544	**NSL2525M4**	25,0	25,0	32,0	150	35	14	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641678	**NSL3225P4**	32,0	25,0	32,0	170	35	14	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641679	**NSL3232P4**	32,0	32,0	40,0	170	35	14	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641688	**NSL3232P5**	32,0	32,0	40,0	170	51	16	10,5	N.5L	**CM81**	**MS352**	6mm

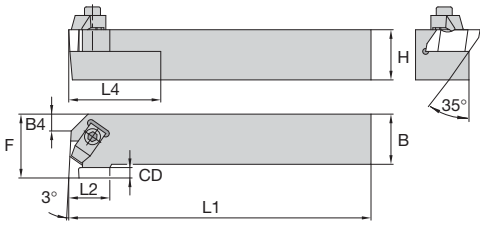




NAS

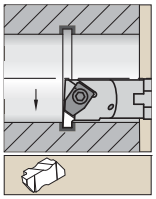
order number	catalogue number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand													
3641667	**NASR1010M2Q**	10,0	10,0	10,0	150	19	9	3,5	2,03	19	N.2R	**CM182**	**MS1200**	T10
3641662	**NASR1212M2Q**	12,0	12,0	12,0	150	19	9	3,5	—	—	N.2R	**CM182**	**MS1200**	T10
3639048	**NASR1616K3Q**	16,0	16,0	16,0	125	32	12	5,3	—	—	N.3R	**CM184LP**	**MS2111**	25 IP
	Left hand													
3641691	**NASL1010M2Q**	10,0	10,0	10,0	150	19	9	3,5	2,03	19	N.2L	**CM183**	**MS1200**	T10
3641686	**NASL1212M2Q**	12,0	12,0	12,0	150	19	9	3,5	—	—	N.2L	**CM183**	**MS1200**	T10
3641687	**NASL1616K3Q**	16,0	16,0	16,0	125	32	12	5,3	—	—	N.3L	**CM185LP**	**MS2111**	25 IP



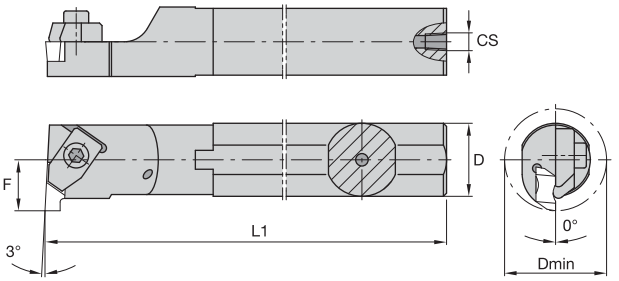


NE

order number	catalogue number	H	B	F	L1	L2	L4	B4	CD	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand												
3641674	**NER1616H2**	16	16	20	100	15	25	—	3,5	N.2L	**CM75**	**MS1200**	T10
3641658	**NER2020K2**	20	20	25	125	15	25	6	3,5	N.2L	**CM75**	**MS1200**	T10
3641665	**NER2525M2**	25	25	32	150	15	25	12	3,5	N.2L	**CM75**	**MS1200**	T10
3636541	**NER2525M3**	25	25	32	150	22	51	—	5,3	N.3L	**CM73LP**	**MS2111**	25 IP
3641680	**NER3225P3**	32	25	32	170	22	51	—	3,8	N.3L	**CM73LP**	**MS2111**	25 IP
3641672	**NER2525M4**	25	25	35	150	24	51	—	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641689	**NER3225P4**	32	25	35	170	24	51	—	7,5	N.4L	**CM73LP**	**MS2111**	25 IP
3641693	**NER3232P4**	32	32	40	170	24	51	—	6,4	N.4L	**CM73LP**	**MS2111**	25 IP
3641692	**NER3232P5**	32	32	50	170	35	51	—	10,5	N.5L	**CM81**	**MS352**	6mm
	Left hand												
3641684	**NEL1616H2**	16	16	20	100	15	25	—	3,5	N.2R	**CM74**	**MS1200**	T10
3641677	**NEL2020K2**	20	20	25	125	15	25	6	3,5	N.2R	**CM74**	**MS1200**	T10
3641676	**NEL2525M2**	25	25	32	150	15	25	12	3,5	N.2R	**CM74**	**MS1200**	T10
3636543	**NEL2525M3**	25	25	32	150	22	51	—	5,3	N.3R	**CM72LP**	**MS2111**	25 IP
3641685	**NEL3225P3**	32	25	32	170	22	51	—	3,8	N.3R	**CM72LP**	**MS2111**	25 IP
3641668	**NEL2525M4**	25	25	35	150	24	51	—	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641694	**NEL3225P4**	32	25	35	170	24	51	—	7,5	N.4R	**CM72LP**	**MS2111**	25 IP
3641696	**NEL3232P4**	32	32	40	170	24	51	—	6,4	N.4R	**CM72LP**	**MS2111**	25 IP
3641695	**NEL3232P5**	32	32	50	170	35	51	—	10,5	N.5R	**CM80**	**MS352**	6mm



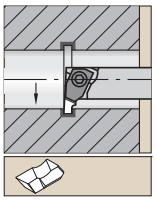
Steel shank with through coolant.



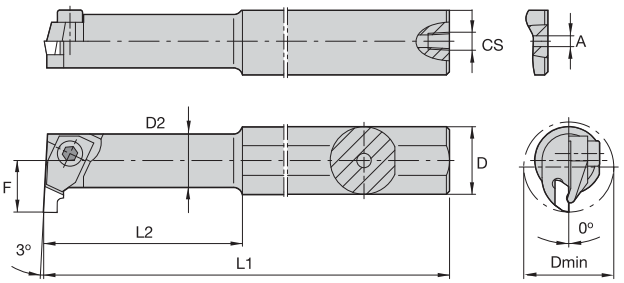
A-NNT

order number	catalogue number	D	D min	L1	F	CS	gage insert	clamp	clamp screw	hex/ Torx plus
	Right hand									
3641644	**A12MNNTOR2**	12	18,5	150	11	1/16-27 NPT	N.2L	**CM147**	**MS1200**	2.5mm
3641643	**A16MNNTOR2**	16	22,0	150	11	1/8-27 NPT	N.2L	**CM75**	**MS1200**	2.5mm
3641645	**A20QNNTOR2**	20	26,0	180	13	1/8-27 NPT	N.2L	**CM75**	**MS1200**	2.5mm
3641651	**A25RNNTOR2**	25	34,0	200	17	1/4-18 NPT	N.2L	**CM75**	**MS1200**	2.5mm
3641622	**A25RNNTOR3**	25	34,0	200	17	1/4-18 NPT	N.3L	**CM73LP**	**MS2111**	25 IP
3641646	**A32SNNTOR3**	32	44,0	250	22	1/4-18 NPT	N.3L	**CM73LP**	**MS2111**	25 IP
3641653	**A40TNNTOR3**	40	54,0	300	27	1/4-18 NPT	N.3L	**CM73LP**	**MS2111**	25 IP
3641654	**A40TNNTOR4**	40	54,0	300	27	1/4-18 NPT	N.4L	**CM73LP**	**MS2111**	25 IP
3641661	**A50UNNTOR4**	50	70,0	350	35	1/4-18 NPT	N.4L	**CM73LP**	**MS2111**	25 IP
	Left hand									
3641655	**A12MNNTOL2**	12	18,5	150	11	1/16-27 NPT	N.2R	**CM146**	**MS1200**	2.5mm
3641649	**A16MNNTOL2**	16	22,0	150	11	1/8-27 NPT	N.2R	**CM74**	**MS1200**	2.5mm
3641652	**A20QNNTOL2**	20	26,0	180	13	1/8-27 NPT	N.2R	**CM74**	**MS1200**	2.5mm
3641657	**A25RNNTOL2**	25	34,0	200	17	1/4-18 NPT	N.2R	**CM74**	**MS1200**	2.5mm
3641650	**A25RNNTOL3**	25	34,0	200	17	1/4-18 NPT	N.3R	**CM72LP**	**MS2111**	25 IP
3641656	**A32SNNTOL3**	32	44,0	250	22	1/4-18 NPT	N.3R	**CM72LP**	**MS2111**	25 IP
3641659	**A40TNNTOL3**	40	54,0	300	27	1/4-18 NPT	N.3R	**CM72LP**	**MS2111**	25 IP
3641663	**A40TNNTOL4**	40	54,0	300	27	1/4-18 NPT	N.4R	**CM72LP**	**MS2111**	25 IP
3641690	**A50UNNTOL4**	50	70,0	350	35	1/4-18 NPT	N.4R	**CM72LP**	**MS2111**	25 IP

NOTE: Minimum bore capability varies with depth of groove. See pages D64–D65 for details.



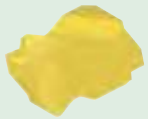
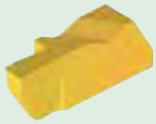
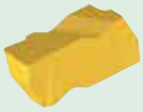
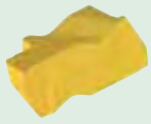
Necked steel shank with through coolant.

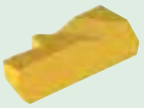
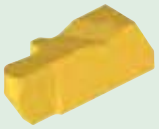


A-NNT-1

order number	catalogue number	D	D min	D2	L1	L2	F	A	CS	gage insert	clamp	clamp screw	hex/ Torx Plus
	Right hand												
3641648	**A10KNNTOR1**	10	11,5	8,7	125	31,75	7	3,2	—	N.1L	**CM109**	**MS1034**	1.5mm
3641647	**A12MNNTOR1**	12	11,5	8,7	150	31,30	7	4,0	1/16-27 NPT	N.1L	**CM109**	**MS1034**	1.5mm

NOTE: Minimum bore capability varies with depth of groove. See pages D64–D65 for details.

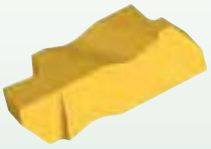
insert style	application	rake angle	page(s)
NG 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	neutral	**D47**
NG-K 	• Chip control geometry. • General-purpose grooving. • O-ring grooving. • Circlip grooving. • Light turning.	10° positive	**D48**
NGC-K* 	• Combined groove and chamfered 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	**D51**
NGP 	• General-purpose grooving. • O-ring grooving. • Circlip grooving.	5° positive	**D52**
NF* 	• Face grooving. • Additional side clearance.	neutral	—
NF-K 	• Face grooving with chip control. • Additional side clearance.	10° positive	**D53**
NFD-K 	• Deep face grooving with chip control. • Additional side clearance.	10° positive	**D53**

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 **NPK-K** 	• Turning. • Back turning positive. • Profiling with chip control.	10° positive	**D54**
NR 	• Full radius grooving. • Turning and profiling.	neutral	**D55**
NR-K 	• Chip control geometry. • Full radius grooving, turning, and profiling.	10° positive	**D56**
NRD 	• Deep grooving. • Full radius end-form.	neutral	**D56**
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.	—	**D57**

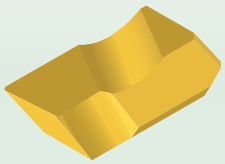
*Inserts are available as custom solutions.

TopGroove • NG-K, NG-1L, and NG

NG-K

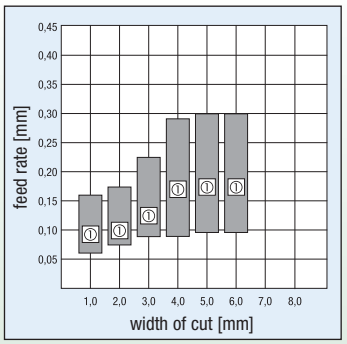


NG



NG-1L

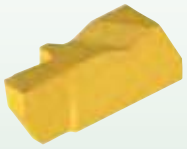
- For general-purpose, O-ring, and circlip grooving applications.
- Chip control enables true optimisation and productivity.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.



① Recommended feed

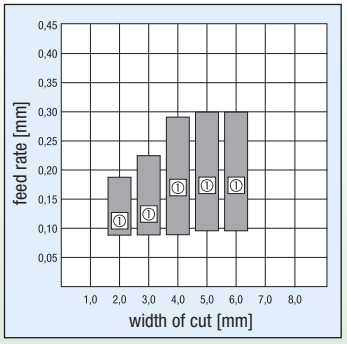
TopGroove • NGP and NGD-K

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.



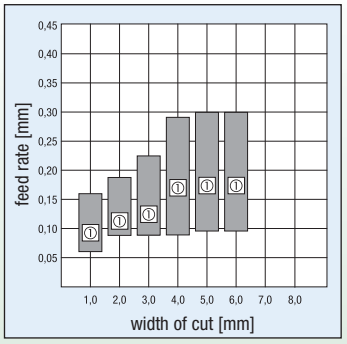
① Recommended feed

TopGroove • NR and NR-K

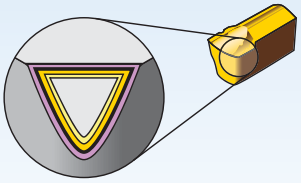
NR

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



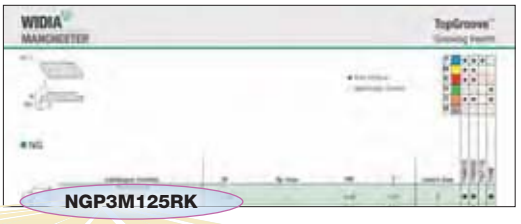
Coatings provide high-speed capability and are engineered for finishing to light roughing.

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 unfavourable 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					

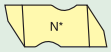
TopGroove
Insert Identification System



N	G	P	3	M	125	R		K	
Type of Insert	Insert Style	Additional Information	Insert Size	Size Identification	Groove Size**	Hand of Insert	Cutting Depth	Chipbreaker Design	Definition of Inserts

Type of Insert

N — TopGroove



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

Additional Information

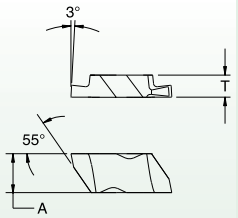
D — Deep grooving

P — Positive

C — Groove and chamfer

Insert Size

insert size	S	W1
1	2,54	2,54mm
2	5,56	3,81mm
3	8,74	4,95mm
4	11,51	6,98mm
5	17,48	9,65mm
6	11,51	9,73mm



Size Identification

M — Metric insert groove width

C — Circlip groove insert width is nominal circlip size

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 0,01mm.

125 = 1,25mm

Width Tolerance: ±0,025mm unless otherwise specified

**Omit position for TopGroove NB-style blanks.

Hand of Insert

L — Left hand

R — Right hand

Cutting Depth

Shown for groove and chamfer inserts in 0,01mm increments.

Chipbreaker Design

K — Standard chip control

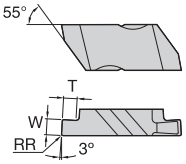
E — Hone only

Definition of Inserts

Groove size

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

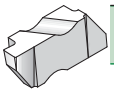
ANSI ISO 513	VDI 3323												
Material Group		Cutting Speed • vc m/min											
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			TN6010			TN6025			TN7110			THM	
P	1	140	**175**	210	130	**140**	150	200	**215**	230	90	**95**	100
	2	130	**160**	190	120	**160**	200	190	**245**	300	90	**105**	140
	3	110	**140**	170	100	**130**	160	160	**205**	250	70	**90**	110
	4	120	**150**	180	120	**150**	180	180	**230**	280	80	**105**	130
	5	100	**130**	160	100	**130**	160	150	**195**	240	70	**90**	110
	6	120	**150**	180	120	**150**	180	180	**230**	280	80	**105**	130
	7	100	**130**	160	90	**125**	160	140	**190**	240	60	**85**	110
	8	90	**120**	150	80	**110**	140	120	**170**	220	50	**75**	100
	9	60	**90**	120	60	**80**	100	90	**125**	160	40	**50**	70
	10	90	**105**	120	80	**95**	110	130	**150**	170	60	**70**	80
	11	50	**65**	80	50	**65**	80	80	**105**	130	40	**50**	60
	12	120	**155**	190	120	**140**	160	180	**210**	240	80	**95**	110
	13.1	90	**120**	150	80	**105**	130	130	**165**	200	60	**75**	90
	13.2	45	**60**	75	40	**55**	65	65	**85**	100	30	**40**	45
			TN6010			TN6025			TN7110			THM	
M	14.1	90	**115**	140	60	**75**	90				60	**75**	90
	14.2	75	**95**	115	50	**60**	75				50	**60**	75
	14.3	55	**70**	90	40	**50**	55				40	**50**	55
	14.4	45	**60**	70	30	**40**	45				30	**40**	45
			TN6010			TN6025			TN7110			THM	
K	15	140	**170**	200	70	**90**	100	190	**240**	300	70	**90**	100
	16	100	**130**	160	50	**65**	80	160	**200**	250	50	**65**	80
	17	120	**150**	180	60	**70**	80	180	**230**	280	60	**70**	80
	18	90	**120**	150	40	**55**	70	120	**170**	220	40	**55**	70
	19	150	**180**	210	80	**95**	110	190	**240**	300	80	**95**	110
	20	110	**140**	170	60	**75**	90	180	**230**	280	60	**75**	90
			TN6010			TN6025			TN7110			THM	
N	21	600	**750**	900	600	**750**	900				600	**750**	900
	22	500	**650**	800	500	**650**	800				500	**650**	800
	23	600	**750**	900	600	**750**	900				600	**750**	900
	24	500	**650**	800	500	**650**	800				500	**650**	800
	25	230	**300**	370	230	**300**	370				230	**300**	370
	26	150	**200**	250	150	**200**	250				150	**200**	250
	27	150	**200**	250	150	**200**	250				150	**200**	250
	28	110	**140**	170	110	**140**	170				110	**140**	170
	29	60	**80**	100	60	**80**	100				60	**80**	100
	30	80	**100**	120	80	**100**	120				80	**100**	120
			TN6010			TN6025			TN7110			THM	
S	31	37	**45**	55	26	**37**	45				26	**37**	45
	32	30	**36**	45	21	**30**	36				21	**30**	36
	33	24	**28**	35	17	**24**	28				17	**24**	28
	34	15	**18**	25	11	**15**	18				11	**15**	18
	35	16	**18**	25	11	**16**	18				11	**16**	18
	36	60	**72**	80	42	**60**	72				42	**60**	72
	37	30	**36**	45	21	**30**	36				21	**30**	36



● first choice
○ alternate choice

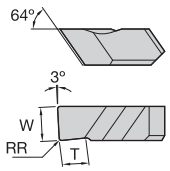
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NG

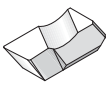


catalogue number	W	Ap max	RR	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NG2031R	0,79	–	0,09	1,27	2	●	●		●
NG2041R	1,04	–	0,09	1,27	2		●		
NG2058R	1,47	–	0,19	1,27	2		●		
NG2062R	1,58	–	0,19	2,79	2	●	●		●
NG3047R	1,19	–	0,19	1,91	3	●	●		●
NG3062R	1,58	–	0,19	2,39	3	●	●		●
NG3094R	2,39	–	0,19	3,81	3	●	●		●
NG3125R	3,18	–	0,19	3,81	3	●	●		●
NG4250R	6,35	–	0,57	6,35	4	●	●		
Left hand									
NG2031L	0,79	–	0,09	1,27	2		●		
NG2058L	1,47	–	0,19	1,27	2		●		
NG2062L	1,58	–	0,19	2,79	2		●		
NG3047L	1,19	–	0,19	1,91	3	●	●		●
NG3062L	1,58	–	0,19	2,39	3	●	●		●
NG3094L	2,39	–	0,19	3,81	3	●	●		●
NG3125L	3,18	–	0,19	3,81	3	●	●		●
NG4250L	6,35	–	0,57	6,35	4	●	●		
NG5M500L	5,00	–	0,32	9,52	5		●		

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

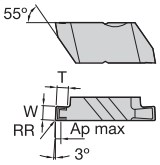


■ NG-1L



catalogue number	W	Ap max	RR	T	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Left hand										
NG1047L	1,19	–	0,19	1,91	1	1		●		
NG1062L	1,58	–	0,19	1,91	1	1		●		
NG1094L	2,39	–	0,19	1,91	1	1		●		

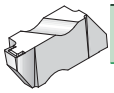
NOTE: Width tolerance is +/- 0,076mm on NG-1L inserts.



● first choice
○ alternate choice

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

■ NG-K

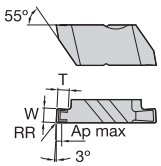


catalogue number	W	Ap max	RR	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NG2M050RK	0,50	0,64	0,09	0,64	2	●	●		
NG2031RK	0,79	0,76	0,09	1,27	2	●	●		
NG2M080RK	0,80	0,76	0,09	1,27	2	●	●		
NG2M100RK	1,00	0,76	0,09	1,27	2	●	●		
NG2047RK	1,19	0,76	0,09	1,27	2	●	●		
NG2M120RK	1,20	0,76	0,09	1,27	2	●	●		
NG2M140RK	1,40	0,76	0,09	1,27	2	●	●		
NG2M150RK	1,50	1,09	0,19	2,79	2		●		
NG2062RK	1,58	1,09	0,19	2,79	2	●	●		
NG2M170RK	1,70	1,09	0,19	2,79	2	●	●		
NG2M175RK	1,75	1,09	0,19	2,79	2		●		
NG2M195RK	1,95	1,09	0,19	2,79	2	●	●		
NG2M200RK	2,00	1,09	0,19	2,79	2	●	●		
NG2M220RK	2,20	1,09	0,19	2,79	2		●		
NG2M225RK	2,25	1,09	0,19	2,79	2	●	●		
NG2094RK	2,39	1,09	0,19	2,79	2	●	●		
NG2M250RK	2,50	1,09	0,19	2,79	2		●		
NG2M275RK	2,75	1,09	0,19	2,79	2	●	●		
NG2M300RK	3,00	1,09	0,19	2,79	2	●	●		
NG2125RK	3,18	1,09	0,19	2,79	2	●	●		
NG2M325RK	3,25	1,09	0,19	2,79	2		●		
NG3M100RK	1,00	0,76	0,19	1,91	3		●		
NG3047RK	1,19	0,76	0,19	1,91	3	●	●		
NG3M120RK	1,20	0,76	0,19	1,91	3	●	●		
NG3M150RK	1,50	1,02	0,19	2,39	3		●	●	
NG3062RK	1,58	1,02	0,19	2,39	3	●	●	●	
NG3M175RK	1,75	1,02	0,19	2,39	3		●		
NG3072RK	1,83	1,02	0,19	2,39	3	●	●		
NG3078RK	1,98	1,02	0,19	2,39	3	●	●		
NG3M200RK	2,00	1,02	0,19	2,39	3		●	●	
NG3M220RK	2,20	1,02	0,19	2,39	3		●		
NG3M225RK	2,25	1,02	0,19	2,39	3	●	●	●	
NG3094RK	2,39	1,02	0,19	3,81	3	●	●		
NG3M250RK	2,50	1,02	0,19	3,81	3		●	●	
NG3M275RK	2,75	1,02	0,19	3,81	3	●	●		
NG3M300RK	3,00	1,02	0,19	3,81	3	●	●	●	
NG3125RK	3,18	1,02	0,19	3,81	3	●	●		
NG3M320RK	3,20	1,02	0,19	3,81	3		●		
NG3M325RK	3,25	1,02	0,19	3,81	3		●		

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

(continued)

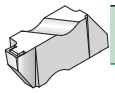
(continued)



● first choice
○ alternate choice

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

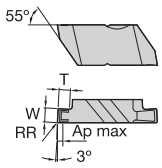
■ NG-K



catalogue number	W	Ap max	RR	T	insert size	TN6010	TN6025	TN7110	THM
NG3M350RK	3,50	2,92	0,32	3,81	3		●		
NG3156RK	3,96	2,92	0,19	3,81	3	●	●		
NG3M400RK	4,00	2,92	0,32	3,81	3	●	●	●	
NG3M425RK	4,25	2,92	0,32	3,81	3	●	●		
NG3M450RK	4,50	2,92	0,32	3,81	3		●		
NG3189RK	4,80	2,92	0,57	3,81	3	●	●	●	
NG4M300RK	3,00	1,02	0,19	3,81	4		●		
NG4125RK	3,18	1,02	0,19	3,81	4	●	●		
NG4M350RK	3,50	2,92	0,57	6,35	4		●	●	
NG4M400RK	4,00	2,92	0,57	6,35	4	●	●	●	
NG4M450RK	4,50	2,92	0,57	6,35	4		●		
NG4189RK	4,80	2,92	0,57	6,35	4	●	●		
NG4M500RK	5,00	2,92	0,32	6,35	4	●	●	●	
NG4M550RK	5,50	3,81	0,57	6,35	4		●		
NG4M600RK	6,00	3,81	0,57	6,35	4		●	●	
NG4250RK	6,35	3,81	0,57	6,35	4	●	●		
Left hand									
NG2M050LK	0,50	0,64	0,09	0,64	2	●	●		
NG2031LK	0,79	0,76	0,09	1,27	2	●	●		
NG2M080LK	0,80	0,76	0,09	1,27	2	●	●		
NG2M100LK	1,00	0,76	0,09	1,27	2	●	●		
NG2047LK	1,19	0,76	0,09	1,27	2		●		
NG2M120LK	1,20	0,76	0,09	1,27	2	●	●		
NG2M140LK	1,40	0,76	0,09	1,27	2	●	●		
NG2M150LK	1,50	1,09	0,19	2,79	2		●		
NG2062LK	1,58	1,09	0,19	2,79	2	●	●		
NG2M170LK	1,70	1,09	0,19	2,79	2	●	●		
NG2M175LK	1,75	1,09	0,19	2,79	2		●		
NG2M195LK	1,95	1,09	0,19	2,79	2	●	●		
NG2M200LK	2,00	1,09	0,19	2,79	2	●	●		
NG2M220LK	2,20	1,09	0,19	2,79	2		●		
NG2M225LK	2,25	1,09	0,19	2,79	2	●	●		
NG2094LK	2,39	1,09	0,19	2,79	2	●	●		
NG2M250LK	2,50	1,09	0,19	2,79	2		●		
NG2M275LK	2,75	1,09	0,19	2,79	2	●	●		
NG2M300LK	3,00	1,09	0,19	2,79	2	●	●		
NG2125LK	3,18	1,09	0,19	2,79	2	●	●		
NG2M325LK	3,25	1,09	0,19	2,79	2		●		
NG3M100LK	1,00	0,76	0,19	1,91	3		●		
NG3047LK	1,19	0,76	0,19	1,91	3	●	●		

(continued)

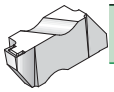
(continued)



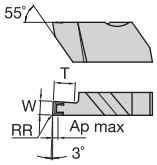
● first choice
○ alternate choice

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

■ NG-K



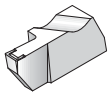
catalogue number	W	Ap max	RR	T	insert size	TN6010	TN6025	TN7110	THM
NG3M120LK	1,20	0,76	0,19	1,91	3	●	●		
NG3M150LK	1,50	1,02	0,19	2,39	3		●	●	
NG3062LK	1,58	1,02	0,19	2,39	3	●	●	●	
NG3M175LK	1,75	1,02	0,19	2,39	3		●		
NG3072LK	1,83	1,02	0,19	2,39	3	●	●		
NG3078LK	1,98	1,02	0,19	2,39	3	●	●		
NG3M200LK	2,00	1,02	0,19	2,39	3		●	●	
NG3M220LK	2,20	1,02	0,19	2,39	3		●		
NG3M225LK	2,25	1,02	0,19	2,39	3	●	●	●	
NG3094LK	2,39	1,02	0,19	3,81	3	●	●		
NG3M250LK	2,50	1,02	0,19	3,81	3		●	●	
NG3M275LK	2,75	1,02	0,19	3,81	3	●	●		
NG3M300LK	3,00	1,02	0,19	3,81	3	●	●	●	
NG3125LK	3,18	1,02	0,19	3,81	3	●	●		
NG3M320LK	3,20	1,02	0,19	3,81	3		●		
NG3M325LK	3,25	1,02	0,19	3,81	3		●		
NG3M350LK	3,50	2,92	0,32	3,81	3		●		
NG3156LK	3,96	2,92	0,19	3,81	3	●	●		
NG3M400LK	4,00	2,92	0,32	3,81	3	●	●	●	
NG3M425LK	4,25	2,92	0,32	3,81	3	●	●		
NG3M450LK	4,50	2,92	0,32	3,81	3		●		
NG3189LK	4,80	2,92	0,57	3,81	3	●	●	●	
NG4M300LK	3,00	1,02	0,19	3,81	4		●		
NG4125LK	3,18	1,02	0,19	3,81	4	●	●		
NG4M350LK	3,50	2,92	0,57	6,35	4		●	●	
NG4M400LK	4,00	2,92	0,57	6,35	4	●	●	●	
NG4M450LK	4,50	2,92	0,57	6,35	4		●		
NG4189LK	4,80	2,92	0,57	6,35	4	●	●		
NG4M500LK	5,00	2,92	0,32	6,35	4	●	●	●	
NG4M550LK	5,50	3,81	0,57	6,35	4		●		
NG4M600LK	6,00	3,81	0,57	6,35	4		●	●	
NG4250LK	6,35	3,81	0,57	6,35	4	●	●		



● first choice
○ alternate choice

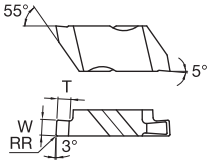
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NGD-K



catalog number	W	Ap max	RR	T	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Right hand										
NGD2M150RK	1,50	1,09	0,19	4,06	2	1	●	●		
NGD2M200RK	2,00	1,09	0,19	5,08	2	1	●	●		
NGD2M250RK	2,50	1,09	0,19	5,08	2	1	●	●		
NGD3062RK	1,58	1,02	0,19	3,18	3	2	●	●		
NGD3M200RK	2,00	1,02	0,19	4,06	3	1	●	●		
NGD3094RK	2,39	1,02	0,19	6,35	3	1	●	●		●
NGD3M250RK	2,50	1,02	0,19	6,35	3	1	●	●		
NGD3M300RK	3,00	1,02	0,19	6,35	3	1	●	●		
NGD3125RK	3,18	1,02	0,19	6,35	3	1	●	●		
NGD3M350RK	3,50	2,92	0,32	6,35	3	1	●	●		
NGD3M400RK	4,00	2,92	0,32	6,35	3	1	●	●		
NGD3189RK	4,80	2,92	0,57	6,35	3	1	●	●		
NGD4125RK	3,18	1,02	0,19	6,35	4	2	●	●		
NGD4M400RK	4,00	2,92	0,57	9,53	4	1	●	●		
NGD4M450RK	4,50	2,92	0,57	12,70	4	1	●	●		
NGD4189RK	4,80	2,92	0,57	9,53	4	1	●	●		
NGD4M500RK	5,00	2,92	0,57	12,70	4	1	●	●		
NGD4M550RK	5,50	3,81	0,57	12,70	4	1	●	●		
NGD4250RK	6,35	3,81	0,57	12,70	4	1	●	●		
Left hand										
NGD2M150LK	1,50	1,09	0,19	4,06	2	1	●	●		
NGD2M200LK	2,00	1,09	0,19	5,08	2	1	●	●		
NGD2M250LK	2,50	1,09	0,19	5,08	2	1	●	●		
NGD3062LK	1,58	1,02	0,19	3,18	3	2	●	●		
NGD3M200LK	2,00	1,02	0,19	4,06	3	1	●	●		
NGD3094LK	2,39	1,02	0,19	6,35	3	1	●	●		●
NGD3M250LK	2,50	1,02	0,19	6,35	3	1	●	●		
NGD3M300LK	3,00	1,02	0,19	6,35	3	1	●	●		
NGD3125LK	3,18	1,02	0,19	6,35	3	1	●	●		
NGD3M350LK	3,50	2,92	0,32	6,35	3	1	●	●		
NGD3M400LK	4,00	2,92	0,32	6,35	3	1	●	●		
NGD3189LK	4,80	2,92	0,57	6,35	3	1	●	●		
NGD4125LK	3,18	1,02	0,19	6,35	4	2	●	●		
NGD4M400LK	4,00	2,92	0,57	9,53	4	1	●	●		
NGD4M450LK	4,50	2,92	0,57	12,70	4	1	●	●		
NGD4189LK	4,80	2,92	0,57	9,53	4	1	●	●		
NGD4M500LK	5,00	2,92	0,57	12,70	4	1	●	●		
NGD4M550LK	5,50	3,81	0,57	12,70	4	1	●	●		
NGD4250LK	6,35	3,81	0,57	12,70	4	1	●	●		

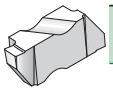
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

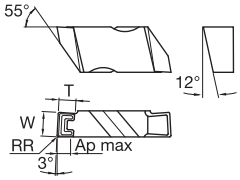
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NGP



catalogue number	W	Ap max	T	RR	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NGP2M150R	1,50	–	2,79	0,19	2	●			●
NGP2062R	1,58	–	2,79	0,19	2	●			
NGP2M200R	2,00	–	2,79	0,19	2	●			●
NGP2M250R	2,50	–	2,79	0,19	2	●			●
NGP2M300R	3,00	–	2,79	0,19	2	●			●
NGP3M150R	1,50	–	1,90	0,19	3	●			●
NGP3M200R	2,00	–	2,79	0,19	3	●			●
NGP3M250R	2,50	–	3,81	0,19	3	●			●
NGP3M300R	3,00	–	3,81	0,19	3	●			●
Left hand									
NGP2M150L	1,50	–	2,79	0,19	2	●			●
NGP2062L	1,58	–	2,79	0,19	2	●			
NGP2M200L	2,00	–	2,79	0,19	2	●			●
NGP2M250L	2,50	–	2,79	0,19	2	●			●
NGP2M300L	3,00	–	2,79	0,19	2	●			●
NGP3M150L	1,50	–	1,90	0,19	3	●			●
NGP3M200L	2,00	–	2,79	0,19	3	●			●
NGP3M250L	2,50	–	3,81	0,19	3	●			●
NGP3M300L	3,00	–	3,81	0,19	3	●			●

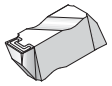
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

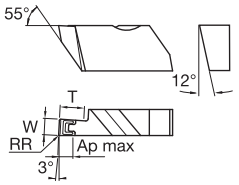
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NF-K

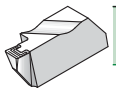


catalogue number	W	Ap max	RR	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NF3M200RK	2,00	1,02	0,19	1,78	3		●		
NF3M300RK	3,00	1,02	0,19	3,81	3		●		
NF3125RK	3,18	1,02	0,19	3,81	3		●		
Left hand									
NF3M200LK	2,00	1,02	0,19	1,78	3		●		
NF3M300LK	3,00	1,02	0,19	3,81	3		●		
NF3125LK	3,18	1,02	0,19	3,81	3		●		
NF3156LK	3,96	2,92	0,19	3,81	3		●		

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

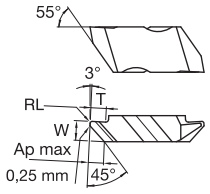


■ NFD-K



catalogue number	W	Ap max	RR	T	insert size	cutting edges	TN6010	TN6025	TN7110	THM
Right hand										
NFD3M300RK	3,00	1,02	0,19	6,35	3	1		●		
NFD3125RK	3,18	1,02	0,19	6,35	3	1		●		
NFD4189RK	4,80	2,92	0,57	9,53	4	1		●		
NFD4250RK	6,35	3,81	0,57	12,70	4	1		●		
Left hand										
NFD3M300LK	3,00	1,02	0,19	6,35	3	1		●		
NFD3125LK	3,18	1,02	0,19	6,35	3	1		●		
NFD4189LK	4,80	2,92	0,57	9,53	4	1		●		

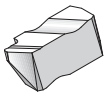
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

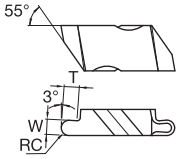
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NP-K



catalogue number	W	Ap max	RL	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NP2002RK	3,68	—	0,25	2,79	2	●	●		
NP3002RK	4,83	—	0,25	5,08	3	●	●		
NP3012RK	4,83	—	0,25	5,08	3		●		

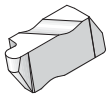
NOTE: Right-hand insert shown; left-hand insert is mirror image.
Width tolerance is +/- 0,13mm.



● first choice
○ alternate choice

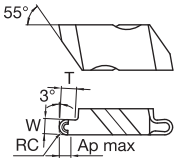
		TN6010	TN6025	TN7110	THM
P		●	●	●	
M		●	●	○	
K		●	●	○	○
N		○	○		●
S		●	●		●
H		○			

■ NR



catalogue number	W	Ap max	RC	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NR2M050R	1,00	–	0,50	1,27	2	●	●	●	
NR2M075R	1,50	–	0,75	2,79	2	●	●	●	
NR2031R	1,58	–	0,79	2,79	2	●	●		
NR2M100R	2,00	–	1,00	2,79	2	●	●	●	
NR2047R	2,39	–	1,19	2,79	2		●		
NR2M125R	2,50	–	1,25	2,79	2	●	●	●	
NR2M150R	3,00	–	1,50	2,79	2	●	●	●	
NR2M175R	3,50	–	1,75	2,79	2	●	●	●	
NR3031R	1,58	–	0,79	2,39	3	●	●		●
NR3M100R	2,00	–	1,00	2,39	3	●	●	●	
NR3047R	2,39	–	1,19	3,81	3	●	●		●
NR3M125R	2,50	–	1,25	3,81	3	●	●	●	
NR3M150R	3,00	–	1,50	3,81	3	●	●	●	
NR3062R	3,18	–	1,59	3,81	3	●	●		●
NR3M175R	3,50	–	1,75	3,81	3	●	●	●	
NR3M200R	4,00	–	2,00	3,81	3	●	●	●	
NR3M225R	4,50	–	2,25	3,81	3	●	●	●	
NR3094R	4,78	–	2,39	3,81	3	●	●		
NR4M200R	4,00	–	2,00	6,35	4	●	●	●	
NR4M225R	4,50	–	2,25	6,35	4	●	●	●	
NR4M250R	5,00	–	2,50	6,35	4	●	●	●	
NR4125R	6,35	–	3,18	6,35	4	●	●		
Left hand									
NR2M050L	1,00	–	0,50	1,27	2	●	●	●	
NR2M075L	1,50	–	0,75	2,79	2	●	●	●	
NR2031L	1,58	–	0,79	2,79	2	●	●		
NR2M100L	2,00	–	1,00	2,79	2	●	●	●	
NR2047L	2,39	–	1,19	2,79	2		●		
NR2M125L	2,50	–	1,25	2,79	2	●	●	●	
NR2M150L	3,00	–	1,50	2,79	2	●	●	●	
NR2M175L	3,50	–	1,75	2,79	2	●	●	●	
NR3031L	1,58	–	0,79	2,39	3	●	●		●
NR3M100L	2,00	–	1,00	2,39	3	●	●	●	
NR3047L	2,39	–	1,19	3,81	3	●	●		●
NR3M125L	2,50	–	1,25	3,81	3	●	●	●	
NR3M150L	3,00	–	1,50	3,81	3	●	●	●	
NR3062L	3,18	–	1,59	3,81	3	●	●		●
NR3M175L	3,50	–	1,75	3,81	3	●	●	●	
NR3M200L	4,00	–	2,00	3,81	3	●	●	●	
NR3M225L	4,50	–	2,25	3,81	3	●	●	●	
NR3094L	4,78	–	2,39	3,81	3	●	●		
NR4M200L	4,00	–	2,00	6,35	4	●	●	●	
NR4M225L	4,50	–	2,25	6,35	4	●	●	●	
NR4M250L	5,00	–	2,50	6,35	4	●	●	●	
NR4125L	6,35	–	3,18	6,35	4	●	●		

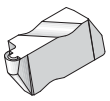
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

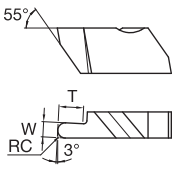
P	●	●	●		
M	●	●	○		
K	●	●	○	○	
N	○	○		●	
S	●	●		●	
H	○				

NR-K

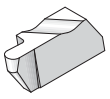


catalogue number	W	Ap max	RC	T	insert size	TN6010	TN6025	TN7110	THM
Right hand									
NR3031RK	1,58	1,98	0,79	2,39	3	●	●		
NR3047RK	2,39	1,91	1,19	3,81	3	●	●		
NR3062RK	3,18	2,92	1,59	3,81	3	●	●		
NR3078RK	3,96	2,54	1,98	3,81	3	●	●		
NR4062RK	3,18	2,92	1,59	3,81	4	●	●		
NR4094RK	4,78	3,81	2,39	6,35	4	●	●		
NR4125RK	6,35	3,81	3,18	6,35	4	●	●		
Left hand									
NR3031LK	1,58	1,98	0,79	2,39	3	●	●		
NR3047LK	2,39	1,91	1,19	3,81	3	●	●		
NR3062LK	3,18	2,92	1,59	3,81	3	●	●		
NR3078LK	3,96	2,54	1,98	3,81	3	●	●		
NR4062LK	3,18	2,92	1,59	3,81	4	●	●		
NR4094LK	4,78	3,81	2,39	6,35	4	●	●		
NR4125LK	6,35	3,81	3,18	6,35	4	●	●		

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

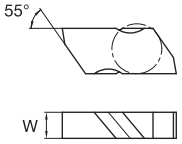


NRD



catalogue number	W	Ap max	RC	T	insert size	cutting edges				
Right hand										
NRD3031R	1,58	–	0,79	3,18	3	2	●	●		
NRD3062R	3,18	–	1,59	6,35	3	1	●	●		
NRD4062R	3,18	–	1,59	6,35	4	2	●	●		
NRD4125R	6,35	–	3,18	12,70	4	1	●	●		
Left hand										
NRD3031L	1,58	–	0,79	3,18	3	2	●	●		
NRD3062L	3,18	–	1,59	6,35	3	1	●	●		
NRD4062L	3,18	–	1,59	6,35	4	2	●	●		
NRD4125L	6,35	–	3,18	12,70	4	1	●	●		

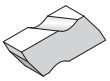
NOTE: Right-hand insert shown; left-hand insert is mirror image.



● first choice
○ alternate choice

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

NB



catalogue number	W	insert size	TN6010	TN6025	TN7110	THM
Right hand						
NB2R	3,81	2				●
NB3R	4,95	3				●
Left hand						
NB2L	3,81	2				●
NB3L	4,95	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 Customisation

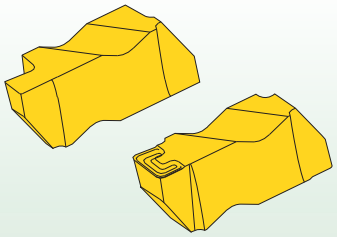
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

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

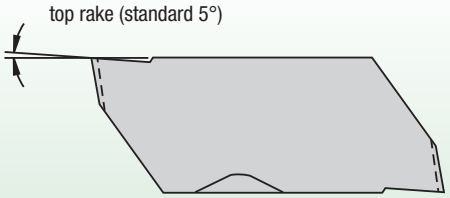
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

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

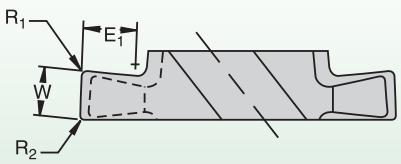
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



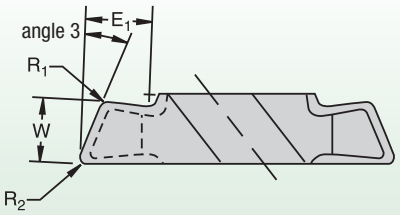
top rake



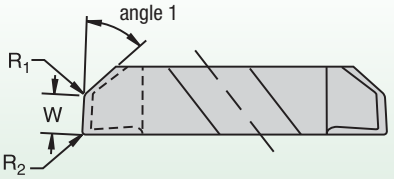
style A



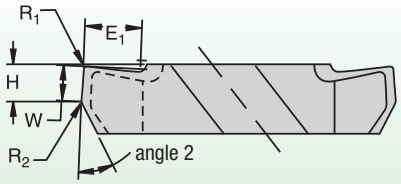
style B1



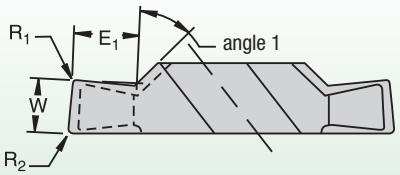
style B2



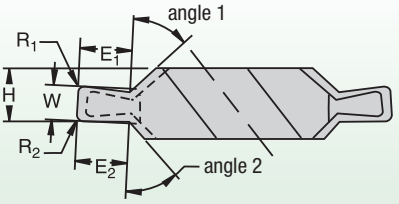
style B3



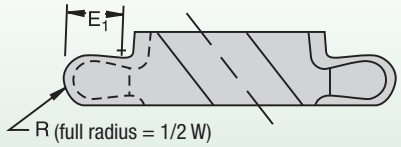
style B4



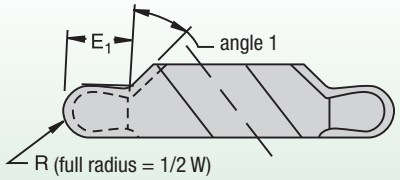
style C1



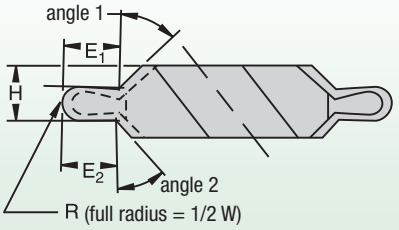
style D



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 Catalogue Standard

Customer

Distributor

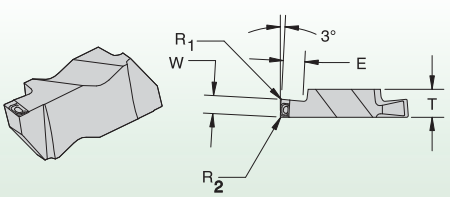
Shipping Requirements

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 catalogue 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**	0,66–1,42 1,45–3,43	0,00–0,18 0,08–0,33	1,27 2,79	3,810	carbide grades quoted upon request. **See page D44.**
NG3-R-SK or NF3-R-SK	**NG3-L-SK or NF3-L-SK**	1,07–1,70 1,73–1,93 1,96–2,39 2,41–2,67 2,69–3,18 3,20–3,40 3,43–3,96 3,99–4,42 4,67–4,98	0,08–0,33 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,20–0,46 0,46–0,71	2,39 2,39 3,81 3,81 3,81 3,81 3,81 3,81 3,81	4,950	
NG4-R-SK or NF4-R-SK	**NG4-L-SK or NF4-L-SK**	2,54–2,79 2,82–3,18 3,20–3,33 3,35–3,96 3,99–4,11 3,89–4,80 4,83–4,85 4,88–5,18 6,22–6,53	0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,13–0,51 0,13–0,76 0,46–0,71 0,20–0,46 0,46–0,64	3,81 3,81 3,81 3,81 3,81 6,35 6,35 6,35 6,35	6,480	

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=2,29; R_1=0,25; R_2=0,25; grade TN6010.

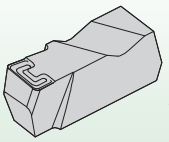
Standard tolerance of ±0,03mm on width (W) will be applied unless specified otherwise. Standard tolerance of ±0,06mm on radii (R_1 and R_2) will be applied unless specified otherwise.

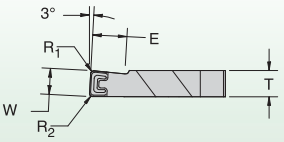
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

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

Specials

- 10° positive cutting action
- Deep grooving
- Deep face grooving





insert catalogue 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**	1,45–1,75 2,26–2,57* 3,05–3,35* 4,67–4,98*	.008–.033 .008–.033 .008–.033 .046–.071	3,18 6,35 6,35 6,35	4,95	carbide grades quoted upon request. **See page D44.**
NGD4-R-SK or NFD4-R-SK	**NGD4-L-SK or NFD4-L-SK**	3,05–3,35* 4,57–4,98* 6,22–6,53*	.008–.033 .046–.071 .046–.071	6,35 9,53 12,70	6,48	

**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=2,0; R_1=0,09; R_2=0,09; grade TN6010.

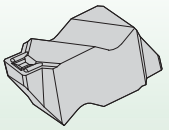
Unless otherwise specified, a standard tolerance of ±0,025mm on width (W) will be applied, and a standard tolerance of ±0,063mm on radii (R_1 and R_2) will be applied.

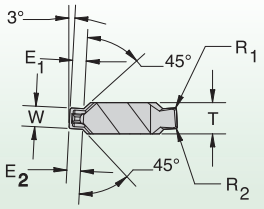
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

In addition to the guidelines written 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

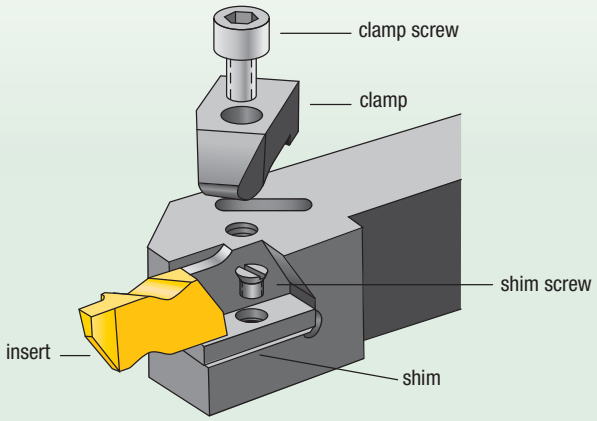




insert catalogue number		width range W	corner radii range R_1 and R_2	E	T	grades
right hand	left hand					
NB2-R-K	**NB2-L-K**	1,19–3,18	0,13–0,38	2,54	3,81	carbide grades quoted upon request. **See page D44.**
NB3-R-K	**NB3-L-K**	2,39–4,32	0,13–0,64	3,81	4,95	

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	–	–

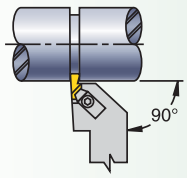
**25,0mm diameter boring head.*

***Boring head.*

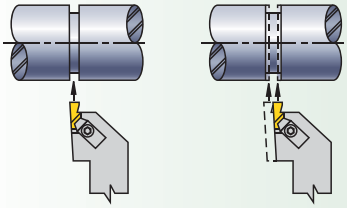
Grooving Tool Failure and Solution Guide

Practical Solutions to Common Grooving Problems

Holder Position for Grooving Operation

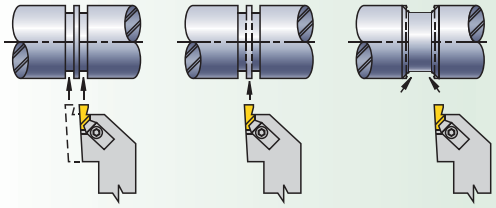


How to Cut a Groove Slightly Wider than the Groove Tool



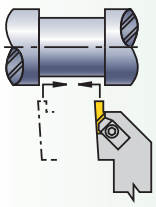
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

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.

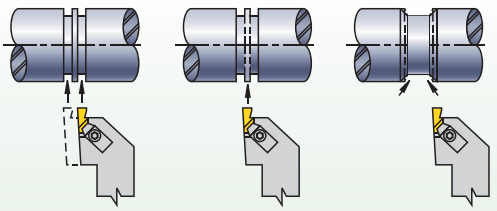
Finish Turning the Groove



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 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 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.

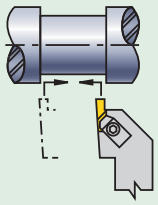
- 0,79mm–1,6mm wide insert can cut up to 0,6mm deep.
- 1,7mm–3,3mm wide insert can cut up to 1,0mm deep.
- 3,5mm–4,8mm wide insert can cut up to 2,0mm deep.
- 5,0mm–6,35mm wide insert can cut up to 3,0mm deep.

Groove Limits		
insert catalogue number	maximum internal groove depth mm	minimum bore diameter mm
NG-1094L	1,91	20,32
	1,02	11,18
NG-2031R/L	1,27	18,54
NG-2041R/L		
NG-2047R/L		
NG-2058R/L		
	2,79	63,50
NG-2062R/L	2,59	44,45
NG-2094R/L	2,49	38,10
NG-2125R/L	2,03	25,40
	1,40	18,54
NG-3047R/L		
NG-3062R/L	2,39	44,45
NG-3072R/L	2,29	41,28
NG-3078R/L	1,91	34,93
NG-3088R/L		
NG-3094R/L		
NG-3097R/L	3,81	60,33
NG-3105R/L		
NG-3110R/L	3,68	53,98
NG-3122R/L		
NG-3125R/L	3,51	47,63
NG-3142R/L		
NG-3156R/L	3,18	41,28
NG-3178R/L		
NG-3185R/L	2,79	34,93
NG-3189R/L		
NG-4125R/L	3,81	69,85
	6,35	146,05
NG-4189R/L	6,22	127,00
NG-4213R/L	6,10	114,30
NG-4219R/L	5,54	82,55
NG-4250R/L	5,08	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.

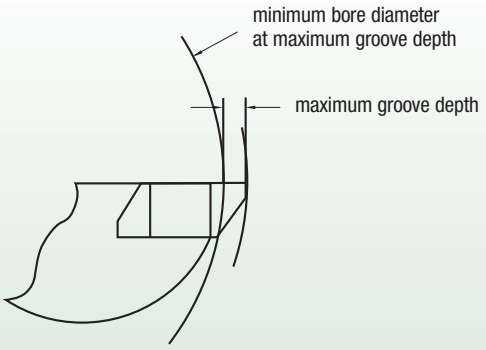
The same internal grooving depth limits are a function of bar clearance versus bore diameters.

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.

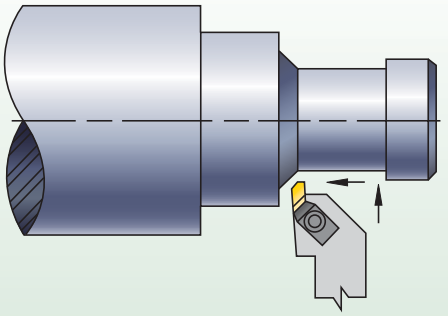
Internal Groove Depth versus Bar Interference



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 2,74mm for size 2 inserts or 3,84mm for size 3 inserts.



Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

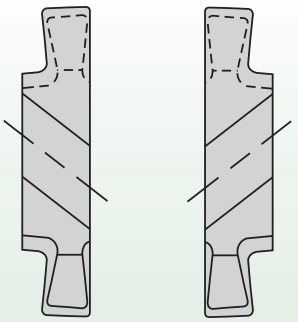
Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

insert catalogue number	add to C dimension	add to F dimension
NGD-3062	0,00	0,00
NGD-3094	2,54	2,54
NGD-3125	2,54	2,54
NGD-3189	2,54	2,54
NGD-4125	0,00	0,00
NGD-4189	3,18	3,18
NGD-4250	6,35	6,35
NRD-3031	0,00	0,00
NRD-3062	2,54	2,54
NRD-4062	0,00	0,00
NRD-4094	6,35	6,35
NRD-4125	6,35	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 D44 for carbide grade selection and more technical information.

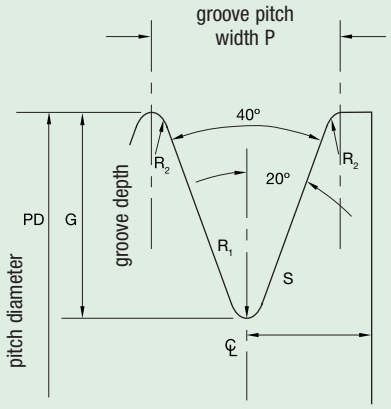


left-hand insert right-hand insert

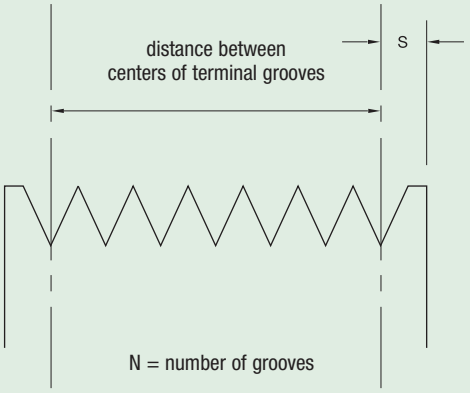
Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)

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

Section J



Section L

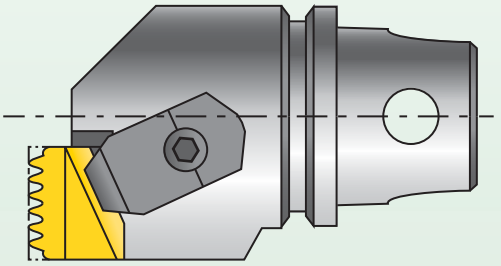


Groove Dimensions and Tolerances for Sheaves

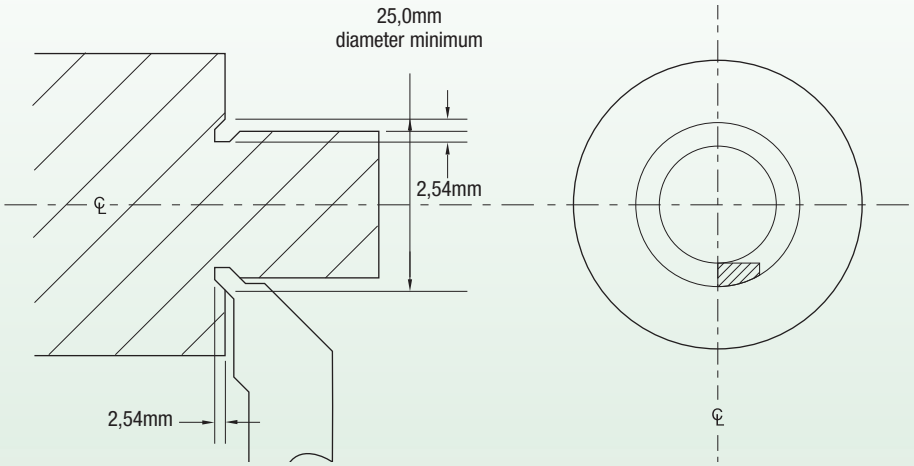
groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	2,34 ±0,03	2,21 ±0,13	0,20	0,32 ±0,06	3,18	(N-1)4,88 ±0,25
L	4,70 ±0,05	5,11 ±0,13	0,38	0,32 ±0,06	9,53	(N-1)4,70 ±0,25

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.

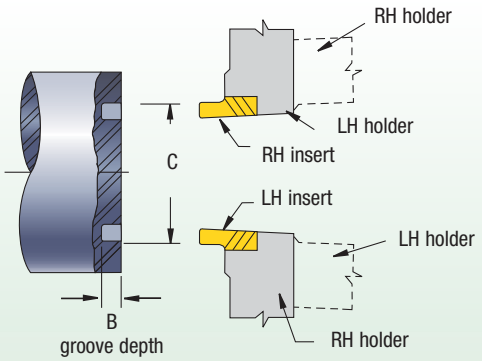


Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



Machining Guidelines for Face Grooving Operations • External

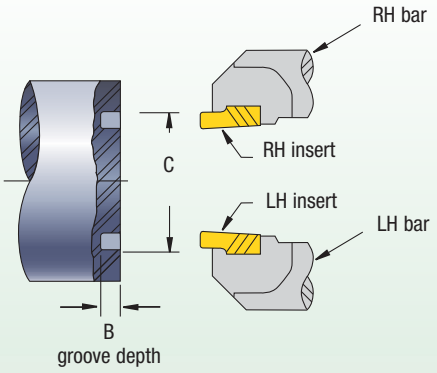
Toolholders



Standard NF/NDF Inserts		
insert family	maximum groove depth B mm	minimum groove diameter C mm
NF-3	1,52	23,9
NF-3	2,39	30,5
NF-3	3,18	36,1
NF-3	3,81	41,3
NFD-3	6,35	47,6
NFD-4	9,53	57,2
NFD-4	12,70	57,2

Machining Guidelines for Face Grooving Operations • External

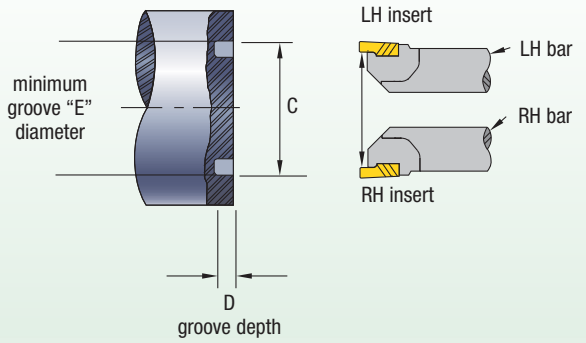
Boring Bars



Standard NG/NGD Inserts		
insert family	maximum groove depth B mm	minimum groove diameter C mm
NG-2	1,27	54,0
NG-2	2,79	88,9
NG-3	2,39	101,6
NG-3	3,18	127,0
NG-3	3,81	139,7
NGD-3	6,35	174,6
NG-4	3,81	152,4
NG-4	6,35	209,6
NGD-4	9,53	222,3
NGD-4	12,70	222,3

Machining Guidelines for Face Grooving Operations • Internal

Boring Bars



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

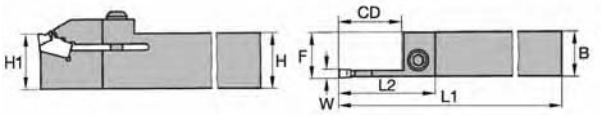
NOTE: Also check minimum bore diameter of boring bar. See page D41.

ProGroove™

ProGroove™ Grooving and Cut-Off

Features and Benefits:

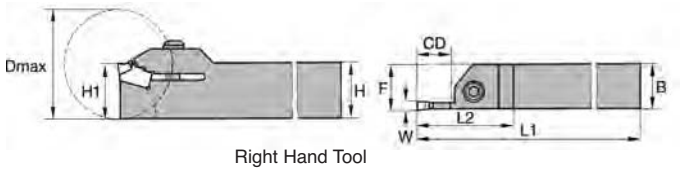
- Single-end grooving and cut-off inserts.
- Offered with integral toolholders and blades.
- Shallow, deep grooving, and cut-off capabilities.
- Available in four different geometries.



Right Hand Tool

Grooving and Cut-Off

order number	catalogue number	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
	Right hand										
2007136	**12251782000**	2,00	16,0	16	16	16,2	100	27	16	**12146012600**	**12148041100**
2022560	**12251783000**	3,00	20,0	20	20	20,3	125	32	20	**12148596200**	**12148041200**
2007142	**12251783200**	3,00	25,0	25	25	25,3	150	40	25	**12148596200**	**12148041200**
2008153	**12251783600**	3,00	25,0	32	25	25,3	170	40	32	**12148596200**	**12148041200**
2022562	**12251784000**	4,00	25,0	20	20	20,4	125	40	20	**12148596200**	**12148041200**
2007148	**12251784200**	4,00	25,0	25	25	25,4	150	40	25	**12148596200**	**12148041200**
2015814	**12251784400**	4,00	32,0	32	25	25,4	170	53	32	**12148596200**	**12148041200**
2022564	**12251785200**	5,00	32,0	25	25	25,4	150	53	25	**12148596200**	**12148041200**
2022566	**12251785400**	5,00	32,0	32	25	25,4	170	53	32	**12148596200**	**12148041200**
2022568	**12251786400**	6,00	32,0	32	25	25,5	170	53	32	**12146012700**	**12148041300**
2022569	**12251788400**	8,00	40,0	32	25	25,6	170	66	32	**12146012700**	**12148041300**
	Left hand										
2007139	**12251782100**	2,00	16,0	16	16	16,2	100	27	16	**12146012600**	**12148041100**
2022561	**12251783100**	3,00	20,0	20	20	20,3	125	32	20	**12148596200**	**12148041200**
2007145	**12251783300**	3,00	25,0	25	25	25,3	150	40	25	**12148596200**	**12148041200**
2008150	**12251783700**	3,00	25,0	32	25	25,3	170	40	32	**12148596200**	**12148041200**
2022563	**12251784100**	4,00	25,0	20	20	20,4	125	40	20	**12148596200**	**12148041200**
2007151	**12251784300**	4,00	25,0	25	25	25,4	150	40	25	**12148596200**	**12148041200**
2015816	**12251784500**	4,00	32,0	32	25	25,4	170	53	32	**12148596200**	**12148041200**
2022565	**12251785300**	5,00	32,0	25	25	25,4	150	53	25	**12148596200**	**12148041200**
2022567	**12251785500**	5,00	32,0	32	25	25,4	170	53	32	**12148596200**	**12148041200**
2015839	**12251786500**	6,00	32,0	32	25	25,5	170	53	32	**12146012700**	**12148041300**
2015842	**12251788500**	8,00	40,0	32	25	25,6	170	66	32	**12146012700**	**12148041300**

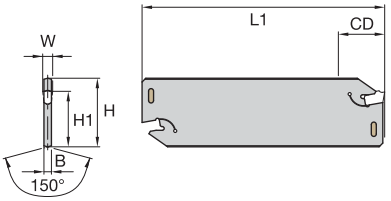


Right Hand Tool

Grooving and Profiling

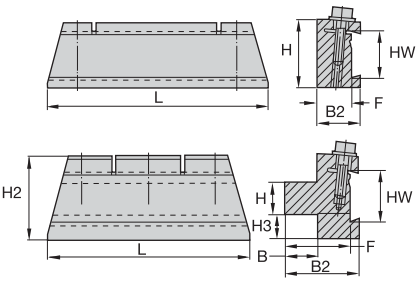
order number	catalogue number	W	CD	D max	H	B	F	L1	L2	H1	cap screw	wrench
	Right hand											
2007105	**12251762000**	2,00	10,0	25,4	16	16	16,2	100	26	16	**12146012600**	**12148041100**
2007832	**12251762200**	2,00	10,0	25,4	20	20	20,2	125	26	25	**12146012600**	**12148041100**
2021637	**12251762400**	2,00	10,0	25,4	25	25	25,2	150	26	25	**12146012600**	**12148041100**
2007127	**12251763400**	3,00	10,0	25,4	16	16	16,3	100	26	25	**12148596200**	**12148041200**
2015754	**12251763000**	3,00	10,0	25,4	20	20	20,3	125	26	25	**12148596200**	**12148041200**
2007111	**12251763200**	3,00	10,0	25,4	25	25	25,3	150	26	20	**12148596200**	**12148041200**
2022548	**12251764000**	4,00	12,5	32,0	20	20	20,4	125	31	20	**12148596200**	**12148041200**
2007130	**12251764200**	4,00	12,5	32,0	25	25	25,4	150	31	25	**12148596200**	**12148041200**
2022550	**12251764400**	4,00	12,5	32,0	32	25	25,4	170	31	32	**12148596200**	**12148041200**
2022552	**12251765200**	5,00	12,5	–	25	25	25,5	150	31	25	**12148596200**	**12148041200**
2022554	**12251765400**	5,00	12,5	–	32	25	25,5	170	31	32	**12148596200**	**12148041200**
2022555	**12251766200**	6,00	16,0	–	25	25	25,6	150	35	25	**12146012700**	**12148041300**
2022557	**12251766400**	6,00	16,0	–	32	25	25,6	170	35	32	**12146012700**	**12148041300**
2021638	**12251768200**	8,00	16,0	–	25	25	25,7	150	36	25	**12146012700**	**12148041300**
2015792	**12251768400**	8,00	16,0	–	32	25	25,7	170	36	32	**12146012700**	**12148041300**
	Left hand											
2007108	**12251762100**	2,00	10,0	25,4	16	16	16,2	100	26	16	**12146012600**	**12148041100**
2021631	**12251762300**	2,00	10,0	25,4	20	20	20,2	125	26	16	**12146012600**	**12148041100**
2021636	**12251762500**	2,00	10,0	25,4	25	25	25,2	150	26	25	**12146012600**	**12148041100**
2021627	**12251763500**	3,00	10,0	25,4	16	16	16,3	100	26	32	**12148596200**	**12148041200**
2022547	**12251763100**	3,00	10,0	25,4	20	20	20,3	125	26	20	**12148596200**	**12148041200**
2007124	**12251763300**	3,00	10,0	25,4	25	25	25,3	150	26	20	**12148596200**	**12148041200**
2022549	**12251764100**	4,00	12,5	32,0	20	20	20,4	125	31	20	**12148596200**	**12148041200**
2007133	**12251764300**	4,00	12,5	32,0	25	25	25,4	150	31	25	**12148596200**	**12148041200**
2022551	**12251764500**	4,00	12,5	32,0	32	25	25,4	170	31	32	**12148596200**	**12148041200**
2022553	**12251765300**	5,00	12,5	–	25	25	25,5	150	31	25	**12148596200**	**12148041200**
2015782	**12251765500**	5,00	12,5	–	32	25	25,5	170	31	20	**12148596200**	**12148041200**
2022556	**12251766300**	6,00	16,0	–	25	25	25,6	150	35	25	**12146012700**	**12148041300**
2022558	**12251766500**	6,00	16,0	–	32	25	25,6	170	35	32	**12146012700**	**12148041300**
2007863	**12251768300**	8,00	16,0	–	25	25	25,7	150	36	25	**12146012700**	**12148041300**
2022559	**12251768500**	8,00	16,0	–	32	25	25,7	170	36	32	**12146012700**	**12148041300**

NOTE: Select shorter CD dimension for added stability.



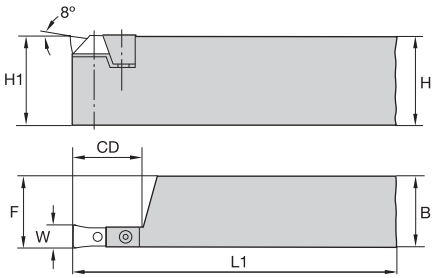
Cut-Off Blades

order number	catalogue number	W	H	H1	L1	B	CD	wrench
2021629	12251332000	2,0	19	15,7	90	1,7	20	12146003800
2021639	12251342000	2,0	26	21,4	110	1,7	25	12146003800
2008113	12251352000	2,0	32	25,0	150	1,7	25	12146003800
2021640	12251343000	3,0	26	21,4	110	2,4	40	12146003800
2008116	12251353000	3,0	32	25,0	150	2,4	50	12146003800
2021641	12251344000	4,0	26	21,4	110	3,2	40	12146003800
2008119	12251354000	4,0	32	25,0	150	3,2	50	12146003800
2008122	12251355000	5,0	32	25,0	150	4,2	60	12146003800
2008135	12251356000	6,0	32	25,0	150	5,0	60	12146009500
2008138	12251358000	8,0	32	25,0	150	6,8	60	12146009500
2021743	12251368000	8,0	53	45,0	250	6,8	100	12146009500



Cut-Off Blade Holders

order number	catalogue number	HW	H	B	F	H2	B2	H3	L	cap screw	wrench
2021625	12251221900	19	16	16	28,3	30	30	4	100	12148036000	12148041300
2021634	12251212500	19	25	19	17,3	25	19	—	100	12148036000	12148041300
2021626	12251221600	26	16	16	31,0	40	36	12	100	12148036000	12148041300
2007826	12251222000	26	20	18	33,0	40	38	8	100	12148036000	12148041300
2008141	12251213200	26	32	20	15,0	32	20	—	125	12148036000	12148041300
2021635	12251222500	32	25	20	35,0	50	40	10	125	12148036000	12148041300
2008156	12251223200	32	32	25	40,0	50	45	3	125	12146013400	12148041400
2008159	12251233200	53	32	25	50,0	82	57	30	160	12146013400	12148041400
2021723	12251234000	53	40	40	58,0	82	65	22	160	12146013400	12148041400



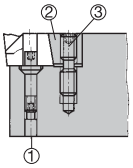
Right Hand Tool

Grooving

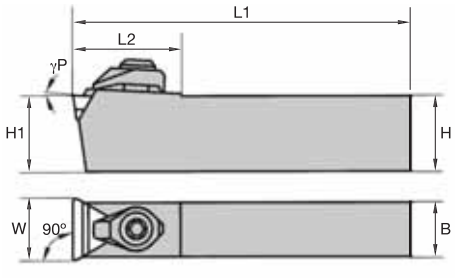
order number	catalogue number	W	CD	H	H1	B	L1	F
	Right hand							
2022446	**12250110100**	8	20	32	32	25	170	25,5
2008147	**12250110300**	10	20	32	32	25	170	25,5
2021719	**12250110500**	12	25	40	40	32	200	33,0
2021721	**12250110700**	14	28	40	40	32	200	33,0
2008521	**12250110900**	16	32	40	40	32	200	33,0
	Left hand							
2022447	**12250110200**	8	20	32	32	25	170	25,5
2008144	**12250110400**	10	20	32	32	25	170	25,5
2021718	**12250110600**	12	25	40	40	32	200	33,0
2021720	**12250110800**	14	28	40	40	32	200	33,0
2021722	**12250111000**	16	32	40	40	32	200	33,0

Spare Parts

catalogue number	clamping bolt	wedge clamp	clamping screw	wrench for clamping screw	wrench for clamping bolt
Right hand					
12250110100	**12148060600**	**12148094300**	**12148574100**	**12148041000**	**12148046000**
12250110300	**12148060600**	**12148094400**	**12148574900**	**12148041100**	**12148046000**
12250110500	**12148060700**	**12148094500**	**12148574900**	**12148041100**	**12148040900**
12250110700	**12148060700**	**12148094600**	**12148574000**	**12148041200**	**12148040900**
12250110900	**12148060800**	**12148094700**	**12148574000**	**12148041200**	**12148041000**
Left hand					
12250110200	**12148060600**	**12148094300**	**12148574100**	**12148041000**	**12148046000**
12250110400	**12148060600**	**12148094400**	**12148574900**	**12148041100**	**12148046000**
12250110600	**12148060700**	**12148094500**	**12148574900**	**12148041100**	**12148040900**
12250110800	**12148060700**	**12148094600**	**12148574000**	**12148041200**	**12148040900**
12250111000	**12148060800**	**12148094700**	**12148574000**	**12148041200**	**12148041000**



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



Grooving

order number	catalogue number	W	H1	H	B	L1	L2	γP°	insert 1
2022921	**12191061900**	10,4	20	20	9,5	125	21	3	TP..1103../TP..22..
2007414	**12191062086**	15,3	20	20	13,0	150	27	3	TP..1603../TP..32..
2022922	**12191062586**	15,3	25	25	13,0	150	27	3	TP..1603../TP..32..
2058066	**12191062686**	20,2	25	25	18,0	150	35	3	TP..2204../TP..43..
2022923	**12191063286**	20,2	32	32	18,0	180	35	3	TP..2204../TP..43..

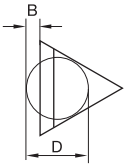
NOTE: Holders 276-STP are supplied without chipbreaker. For chipbreaker order numbers, see below.

For Grooving without Chipbreaker

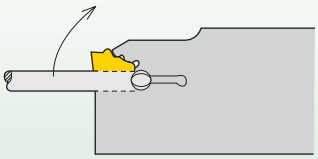
catalogue number	clamp	clamp screw	shim	shim screw	washer	wrench
12191061900	**12148589300**	**12148589800**	**12148032586**	**12148021900**	**–**	**12148041100**
12191062086	**12148583800**	**12148586000**	**12148031686**	**12148024100**	**12148024200**	**12148041200**
12191062586	**12148583800**	**12148586000**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

For Grooving with Chipbreaker (order additional clamp and chipbreaker)

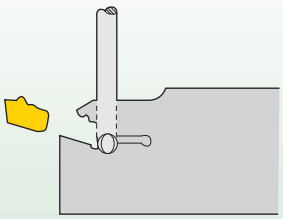
			chipbreakers					
			B – edge width					
insert	clamp with chipbreaker	D	0,4mm	1,2mm	1,8mm	2,5mm	3,2mm	4,0mm
TP...1103...	**12148589200**	6,35	**12148591011**	**12148588211**	**12148588311**	**12148588411**	**–**	**–**
TP...1603...	**12148589300**	9,52	**12148591111**	**12148586611**	**12148587011**	**12148587111**	**12148580011**	**–**
TP...2204...	**12148586900**	12,70	**–**	**–**	**12148580411**	**12148580511**	**12148580611**	**12148582511**



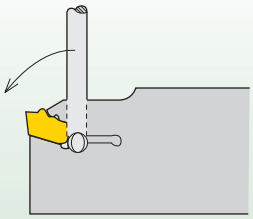
ProGroove System



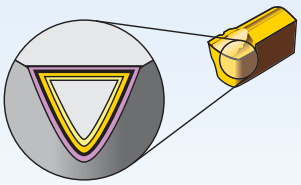
To change the cutting insert, place the wrench into the blade recess. The blade mouth is opened by turning through 90°.



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

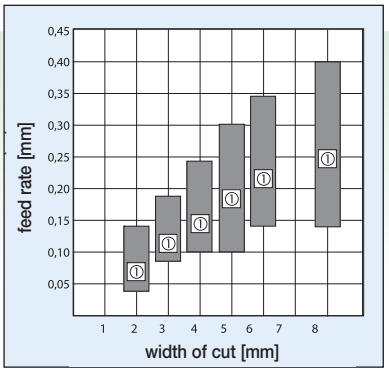
Grade

Coating	Grade Description	05	10	15	20	25	30	35	40	45
TN6030 / HC-P30	PVD-TiAlN Nano-multi-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				P M K	P M K	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		P K	P K	P K	P K	P		
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			P K	P K	P K	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			M	M	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		K N S H	K N S H					
TTM / HW-P25	Uncoated carbide with good toughness and wear properties. Medium machining for steels.	P M			P M	P M	P M			

ProGroove • U

left hand neutral right hand

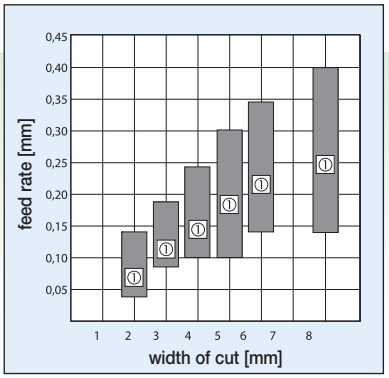
For grooving and parting operations, universal use.
Positive chipbreaker groove for light cutting action.
Right-hand and left-hand styles with 6° front angle.



① Recommended feed

ProGroove • M

neutral



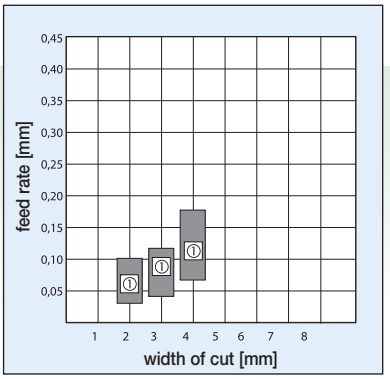
① Recommended feed

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

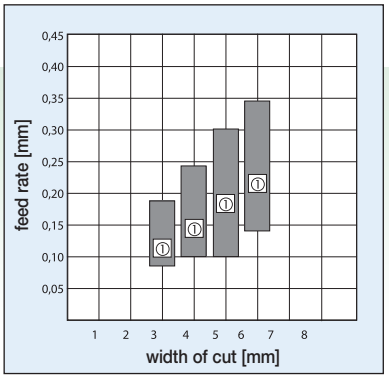
left hand neutral right hand

For low-burr parting with straight flanks and smooth surface finishes. All inserts are recommended for parting and grooving slender workpieces, part diameter <32,0mm, and thin-wall tubes.



① Recommended feed

ProGroove • R



① Recommended feed

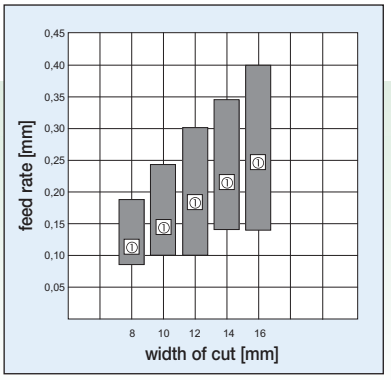
Full round inserts for profiling, grooving, and copy turning.
Very good chip control for broad general use. Accurate, reproducible cutting edge positioning.

LG System • 0 and 1

0 1

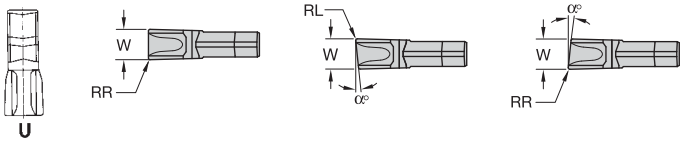
…0
Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.

…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 m/min																	
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	130	**140**	150	200	**215**	230	140	**175**	210							90	**95**	100
	2	120	**160**	200	190	**245**	300	130	**160**	190							90	**105**	140
	3	100	**130**	160	160	**205**	250	110	**140**	170							70	**90**	110
	4	120	**150**	180	180	**230**	280	120	**150**	180							80	**105**	130
	5	100	**130**	160	150	**195**	240	100	**130**	160							70	**90**	110
	6	120	**150**	180	180	**230**	280	120	**150**	180							80	**105**	130
	7	90	**125**	160	140	**190**	240	100	**130**	160							60	**85**	110
	8	80	**110**	140	120	**170**	220	90	**120**	150							50	**75**	100
	9	60	**80**	100	90	**125**	160	60	**90**	120							40	**50**	70
	10	80	**95**	110	130	**150**	170	90	**105**	120							60	**70**	80
	11	50	**65**	80	80	**105**	130	50	**65**	80							40	**50**	60
	12	120	**140**	160	180	**210**	240	120	**155**	190							80	**95**	110
	13.1	80	**105**	130	130	**165**	200	90	**120**	150							60	**75**	90
	13.2	40	**55**	65	65	**85**	100	45	**60**	75							30	**40**	45
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
M	14.1	90	**110**	140							90	**120**	150				60	**75**	90
	14.2	75	**90**	115							75	**100**	120				50	**60**	75
	14.3	55	**70**	90							55	**75**	95				40	**50**	55
	14.4	45	**60**	70							45	**60**	75				30	**40**	45
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
K	15	70	**90**	100	140	**170**	200							70	**90**	100			
	16	50	**65**	80	100	**130**	160							50	**65**	80			
	17	60	**70**	80	120	**150**	180							60	**70**	80			
	18	40	**55**	70	90	**120**	150							40	**55**	70			
	19	80	**95**	110	150	**180**	210							80	**95**	110			
	20	60	**75**	90	110	**140**	170							60	**75**	90			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
N	21													600	**750**	900			
	22													500	**650**	800			
	23													600	**750**	900			
	24													500	**650**	800			
	25													230	**300**	370			
	26													150	**200**	250			
	27													150	**200**	250			
	28													110	**140**	170			
	29													60	**80**	100			
	30													80	**100**	120			
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
S	31													26	**37**	45			
	32													21	**30**	36			
	33													17	**24**	28			
	34													11	**15**	18			
	35													11	**16**	18			
	36													42	**60**	72			
	37													21	**30**	36			



● first choice
○ alternate choice

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

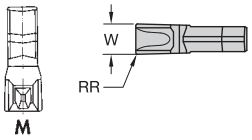
■ PGU

catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567320	2,10	0,20	–	N - Neutral	●	●	●	●	●	
123567330	3,10	0,30	–	N - Neutral	●	●	●	●	●	
123567340	4,10	0,30	–	N - Neutral	●	●	●		●	
123567350	5,10	0,30	–	N - Neutral	●	●	●	●	●	
123567360	6,10	0,40	–	N - Neutral	●	●	●	●	●	
123567380	8,15	0,60	–	N - Neutral	●	●	●	●	●	

catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567231	3,10	0,25	6	L - Left	●	●	●			
123567241	4,10	0,25	6	L - Left	●	●	●			

catalogue number	W	RL	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567230	3,10	0,25	6	R - Right	●	●	●			
123567240	4,10	0,25	6	R - Right	●	●	●			

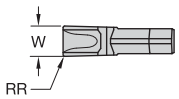
NOTE: W tolerance on all = ±0,05mm.

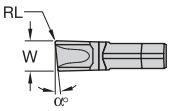


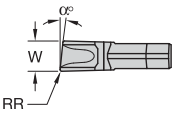
■ PGM

catalogue number	W	RR	α°	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567420	2,10	0,20	–	●	●	●			
123567430	3,10	0,30	–	●	●	●			
123567440	4,10	0,30	–	●	●	●			
123567450	5,10	0,30	–	●	●	●			
123567460	6,10	0,40	–	●	●	●			
123567480	8,15	0,60	–	●	●	●			

NOTE: W tolerance on all = ±0,05mm.







● first choice
○ alternate choice

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

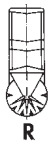
PGS

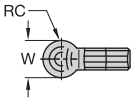
catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567702	2,25	0,20	—	N - Neutral			●	●		
123567703	3,25	0,20	—	N - Neutral			●	●		
123567704	4,25	0,20	—	N - Neutral			●	●		

catalogue number	W	RR	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567721	2,25	0,20	6	L - Left			●	●		
123567731	3,25	0,20	6	L - Left			●	●		
123567741	4,25	0,20	6	L - Left			●	●		

catalogue number	W	RL	α°	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567720	2,25	0,20	6	R - Right			●	●		
123567730	3,25	0,20	6	R - Right			●	●		
123567740	4,25	0,20	6	R - Right			●	●		

NOTE: W tolerance on all = ±0,05mm.

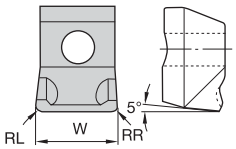




PGR

catalogue number	W	RC	TN6030	TN7525	TN7535	TN8025	THM	TTM
123567803	3,00	1,50		●				
123567804	4,00	2,00		●				
123567805	5,00	2,50		●				
123567806	6,00	3,00		●				

NOTE: W tolerance on all = ±0,07mm.



RR = RL

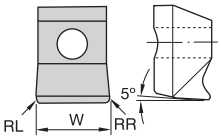
● first choice
○ alternate choice

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

LGN0

catalogue number	W	RR	TN6030	TN7525	TN7535	TN8025	THM	TTM
123568080	8,15	0,80		●	●		●	●
123568100	10,15	0,80		●	●		●	●
123568120	12,20	0,80		●	●		●	●
123568140	14,20	0,80		●	●		●	●
123568160	16,20	0,80		●	●		●	●

NOTE: W tolerance on all = ±0,05mm.



RR = RL

LGN1

catalogue number	W	RR	TN6030	TN7525	TN7535	TN8025	THM	TTM
123568081	8,15	0,80					●	
123568101	10,15	0,80					●	
123568121	12,20	0,80					●	
123568141	14,20	0,80					●	
123568161	16,20	0,80					●	

NOTE: W tolerance on all = ±0,05mm.

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 Authorised Distributor or visit **www.widia.com**.

WIDIA™
Win with WIDIA™

Separator™

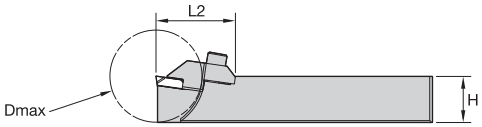
Specifically engineered to deliver toolholder flexibility with integral, component, universal, and blade-style designs.

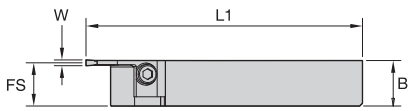
Features:

- Insert widths 2,0mm–4,0mm.
- Toolholder shank sizes 10,0mm–31,75mm.
- Cut-off up 76,0mm bar capacity.

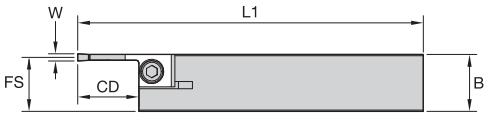
Benefits:

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





Left Hand Tool

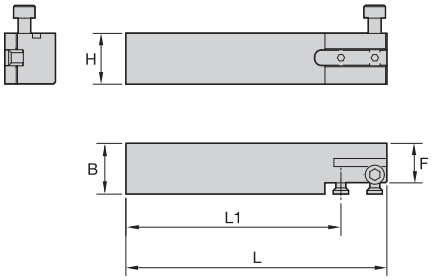


Left Hand Tool

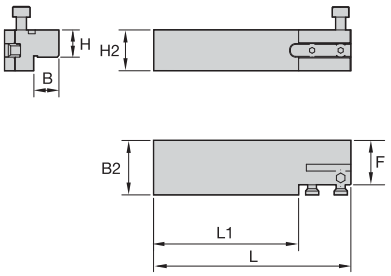
Right Hand Tool

Square Shank

order number	catalogue number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	Right hand										
3614290	**206445**	2,00	20,00	–	9,86	9,00	10,00	21,55	75,00	**435200**	**MS318**
3538751	**206446**	2,00	20,00	–	11,86	11,00	12,00	21,55	90,00	**435200**	**MS318**
3538752	**206447**	2,00	26,00	–	9,86	9,00	10,00	24,83	150,00	**435201**	**MS318**
3587590	**206448**	2,00	26,00	–	11,86	11,00	12,00	24,83	150,00	**435201**	**MS318**
3615308	**206449**	2,00	38,00	–	15,86	15,00	16,00	32,83	100,00	**435202**	**MS412**
3538753	**206450**	2,00	38,00	–	19,86	19,00	20,00	32,84	125,00	**435202**	**MS412**
3538704	**206263**	2,50	20,00	–	9,75	8,80	10,00	21,51	74,96	**435170**	**MS318**
3538706	**206265**	2,50	20,00	–	11,74	10,81	12,00	21,51	89,95	**435170**	**MS318**
3538718	**206279**	2,50	26,00	–	9,75	8,81	10,00	24,80	150,00	**435152**	**MS318**
3538719	**206280**	2,50	26,00	–	11,73	10,80	12,00	24,80	150,00	**435152**	**MS318**
3538721	**206282**	2,50	38,00	–	15,75	14,81	16,00	32,80	100,00	**435140**	**MS412**
3538723	**206284**	2,50	38,00	–	19,74	18,80	20,00	32,80	125,00	**435140**	**MS412**
3538720	**206281**	3,00	26,00	–	11,68	10,39	12,00	23,62	150,00	**435130**	**MS318**
3538722	**206283**	3,00	38,00	–	15,70	14,40	16,00	32,85	100,00	**435126**	**MS412**
3565364	**206285**	3,00	38,00	–	19,68	18,39	20,00	32,85	125,00	**435126**	**MS412**
3538741	**206417**	3,00	–	25,00	24,74	23,50	25,00	42,92	150,00	**435180**	**619168**
3538742	**206418**	4,00	–	25,00	24,69	23,00	25,00	42,97	150,00	**435180**	**619168**
	Left hand										
3614291	**206451**	2,00	20,00	–	9,86	9,00	10,00	21,55	75,00	**435203**	**MS318**
3538754	**206452**	2,00	20,00	–	11,86	11,00	12,00	21,55	90,00	**435203**	**MS318**
3614292	**206453**	2,00	26,00	–	9,86	9,00	10,00	24,83	150,00	**435204**	**MS318**
3538755	**206454**	2,00	26,00	–	11,00	11,00	12,00	24,83	150,00	**435204**	**MS318**
3538756	**206455**	2,00	38,00	–	15,86	15,00	16,00	32,83	100,00	**435205**	**MS412**
3615309	**206456**	2,01	38,00	–	19,86	19,00	20,00	32,84	125,00	**435205**	**MS412**
3538705	**206264**	2,50	20,00	–	9,75	8,80	10,00	21,51	74,96	**435171**	**MS318**
3538707	**206266**	2,50	20,00	–	11,74	10,81	12,00	21,51	89,95	**435171**	**MS318**
3538711	**206272**	2,50	26,00	–	9,75	8,81	10,00	24,80	150,00	**435153**	**MS318**
3538712	**206273**	2,50	26,00	–	11,73	10,80	12,00	24,80	150,00	**435153**	**MS318**
3538714	**206275**	2,50	38,00	–	15,75	14,81	16,00	32,80	100,00	**435141**	**MS412**
3538716	**206277**	2,50	38,00	–	19,74	18,80	20,00	32,80	125,00	**435141**	**MS412**
3538713	**206274**	3,00	26,00	–	11,68	10,39	12,00	23,62	150,00	**435131**	**MS318**
3538715	**206276**	3,00	38,00	–	15,70	14,40	16,00	32,85	100,00	**435127**	**MS412**
3538717	**206278**	3,00	38,00	–	19,68	18,39	20,00	32,85	125,00	**435127**	**MS412**
3538743	**206419**	3,00	–	25,00	24,74	23,50	25,00	42,92	150,00	**435181**	**619168**
3615303	**206424**	4,00	–	25,00	24,69	23,00	25,00	42,96	150,00	**435181**	**619168**



Left Hand Tool

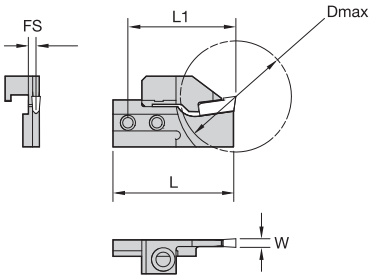


Left Hand Tool

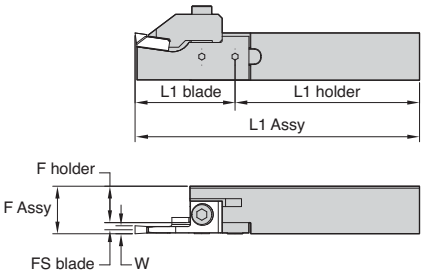
Right Hand Tool

12,0mm and 20,0mm Shank Toolholders

order number	catalogue number	H	B	B2	L	L1	H2	F	support blade screw	clamp screw
	Right hand									
3538772	**206518**	11,91	11,54	24,99	102,77	84,68	19,05	20,56	**606247**	**MS1495**
3614344	**206522**	20,00	20,00	—	102,77	84,68	—	15,55	**606247**	**MS1495**
	Left hand									
3538773	**206519**	11,91	11,54	25,00	102,77	84,68	19,05	20,55	**606247**	**MS1495**
3538774	**206523**	20,00	20,00	—	102,77	84,68	—	15,55	**606247**	**MS1495**



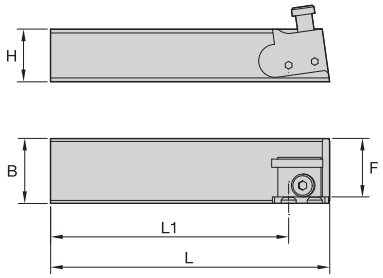
Right Hand Tool



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

12,0mm and 20,0mm Shank Blades

order number	catalogue number	W	D max	FS	L	L1	clamp
	Right hand						
3539522	**333111**	2,00	41,28	3,40	44,88	40,13	**435194**
3539515	**333101**	2,50	41,28	3,25	44,88	40,13	**435154**
3539516	**333102**	3,00	41,28	2,84	44,88	40,13	**435155**
	Left hand						
3539517	**333103**	2,50	41,28	3,25	44,88	40,13	**435156**
3539518	**333104**	3,00	41,28	2,84	44,88	40,13	**435157**

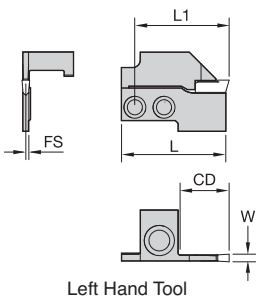


Left Hand Tool

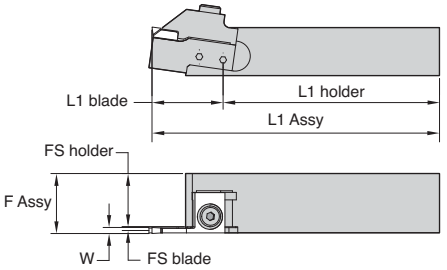

Right Hand Tool

25,0mm and 32,0mm Shank Toolholders

order number	catalogue number	H	B	L	L1	F	support blade screw	clamp screw
	Right hand							
3538710	**206271**	25,00	24,61	131,90	112,16	21,41	**MS1073**	**MS1071**
3538749	**206439**	32,00	31,60	132,03	112,18	28,42	**MS1073**	**MS1071**
	Left hand							
3538703	**206262**	25,00	24,61	131,91	112,17	21,41	**MS1073**	**MS1071**
3615305	**206440**	32,00	31,60	132,03	112,18	28,42	**MS1073**	**MS1071**



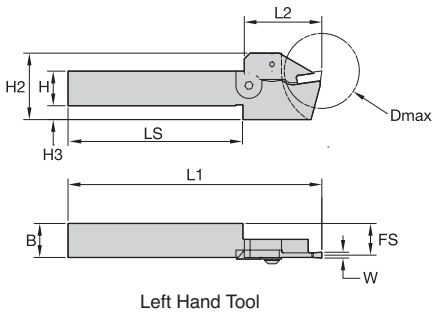
Left Hand Tool



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

25,0mm and 32,0mm Shank Blades

order number	catalogue number	W	CD	FS	L1	L	clamp
	Right hand						
3563591	**331117**	2,50	12,70	2,39	29,60	36,03	**435142**
3539504	**331101**	3,00	20,64	1,98	37,63	43,80	**435128**
3539508	**331109**	4,00	20,64	1,98	37,63	43,80	**435128**
	Left hand						
3539510	**331118**	2,50	12,70	2,39	29,60	36,03	**435143**
3539505	**331102**	3,00	20,64	1,98	37,63	43,80	**435129**
3539509	**331110**	4,00	20,64	1,98	37,63	43,80	**435129**



Left Hand Tool

Sub-Spindle

order number	catalogue number	W	D max	B	FS	H	H2	H3	L1	LS	L2	button-head cap screw	clamp	flat-head cap screw	washer
	Right hand														
3538768	**206508**	2,50	42,00	19,75	18,81	20,00	37,71	7,62	140,00	96,57	42,66	**MS518**	**409184**	**606244**	**613139**
3538770	**206510**	3,00	42,00	19,76	18,50	20,00	37,50	7,62	140,00	96,57	42,68	**MS518**	**409186**	**606244**	**613139**
3538766	**206506**	3,00	66,70	24,76	23,50	25,00	44,45	9,52	150,00	89,05	60,31	**MS518**	**409182**	**606243**	**613139**
	Left hand														
3538769	**206509**	2,50	42,00	19,75	18,80	20,00	37,65	7,62	140,00	96,57	42,66	**MS518**	**409185**	**606244**	**613139**
3538771	**206511**	3,00	42,00	19,77	18,50	20,00	37,52	7,62	140,00	96,57	42,68	**MS518**	**409187**	**606244**	**613139**
3538767	**206507**	3,00	66,70	24,76	23,50	25,00	44,45	9,52	150,00	89,05	60,32	**MS518**	**409183**	**606243**	**613139**

WIN WITH WIDIA™

WIDIA™

Separator™

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

Separator Toolholders and Inserts

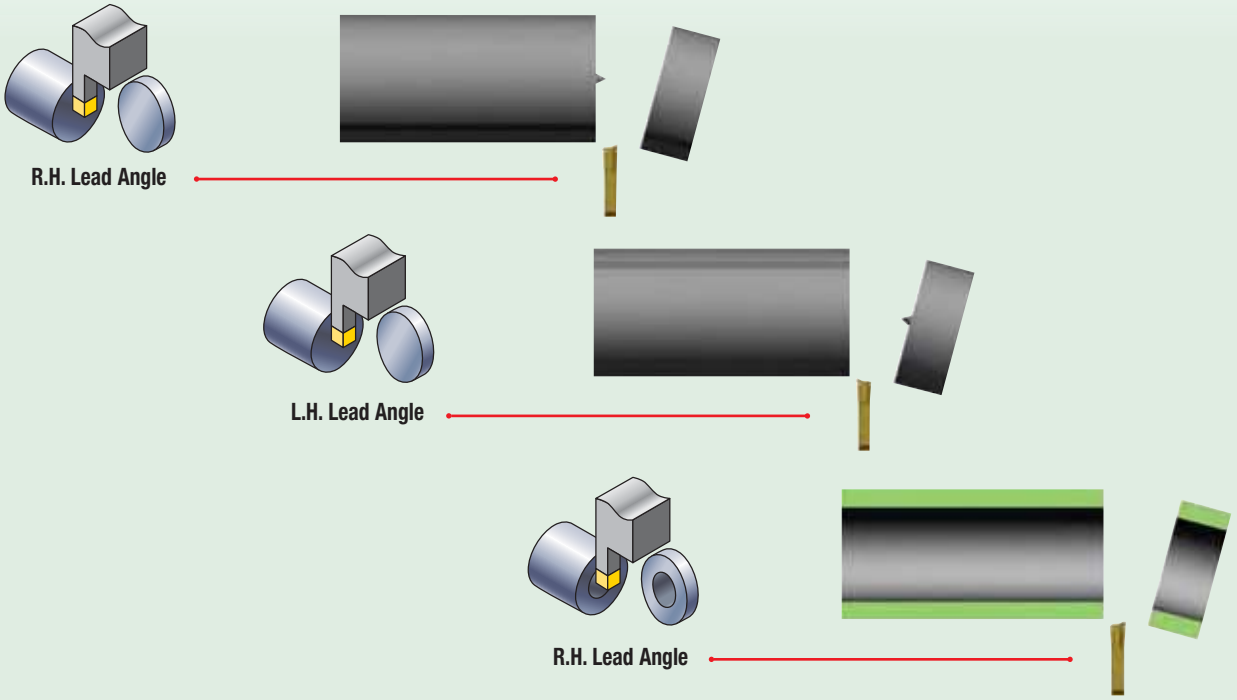
- Insert widths 2,0mm–4,0mm.
- Toolholder shank sizes 10,0mm–31,75mm.
- Cut-off up to 76,0mm bar capacity.
- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.

To learn more, contact your local Authorised 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.

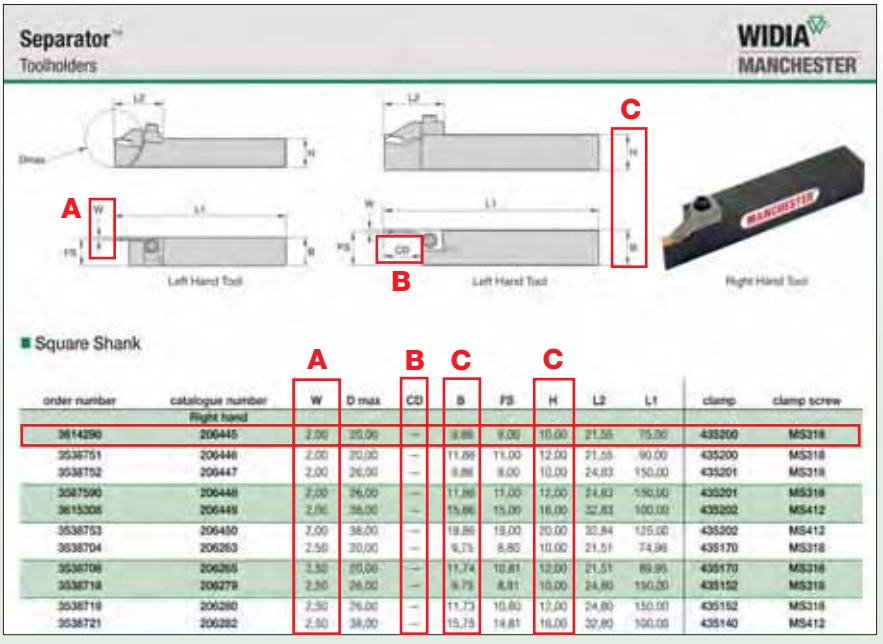
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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.



order number	catalogue number	W	D max	CD	B	FS	H	L2	L1	clamp	clamp screw
	Right hand										
3614290	206445	2,00	20,00	–	8,86	9,00	10,00	21,55	75,00	435200	MS318
3538751	206446	2,00	20,00	–	11,86	11,00	12,00	21,55	90,00	435200	MS318
3538752	206447	2,00	26,00	–	8,86	9,00	10,00	24,83	150,00	435201	MS318
3587590	206448	2,00	26,00	–	11,86	11,00	12,00	24,83	150,00	435201	MS318
3615308	206449	2,00	38,00	–	15,86	15,00	16,00	32,83	100,00	435202	MS412
3538753	206450	2,00	38,00	–	19,86	19,00	20,00	32,84	125,00	435202	MS412
3538704	206263	2,50	20,00	–	9,75	8,80	10,00	21,51	74,96	435170	MS318
3538706	206265	2,50	20,00	–	11,74	10,81	12,00	21,51	89,95	435170	MS318
3538718	206279	2,50	26,00	–	9,75	8,81	10,00	24,80	150,00	435152	MS318
3538719	206280	2,50	26,00	–	11,73	10,80	12,00	24,80	150,00	435152	MS318
3538721	206282	2,50	38,00	–	15,75	14,81	16,00	32,80	100,00	435140	MS412

4 Select chipbreaker style for the application:

See the application guide on page D93 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**
unfavourable 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**

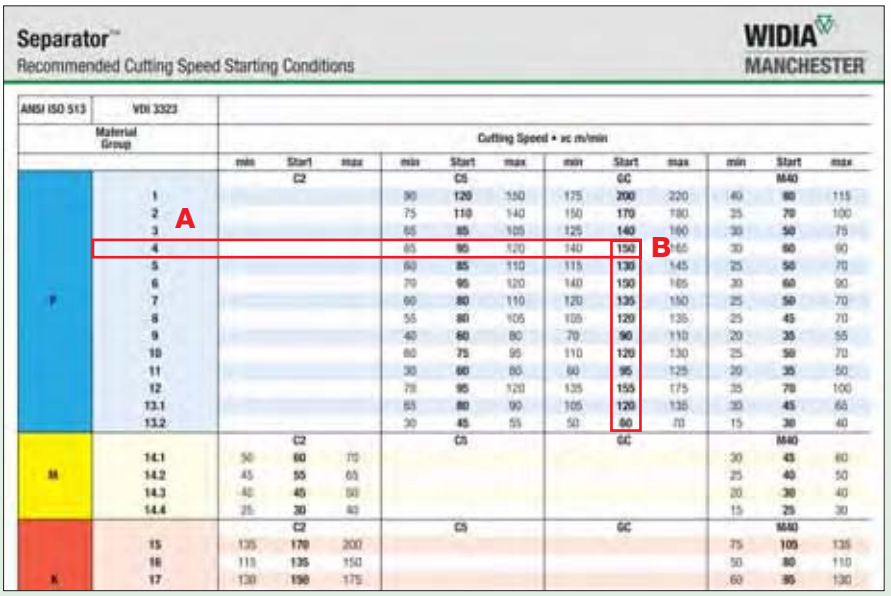
See page D92 for Grades and Grade Descriptions.

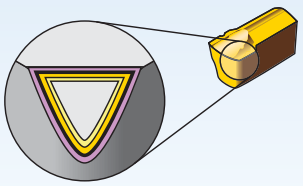
6 Determine cutting data:

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

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

See page D94 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 colour.									
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.									

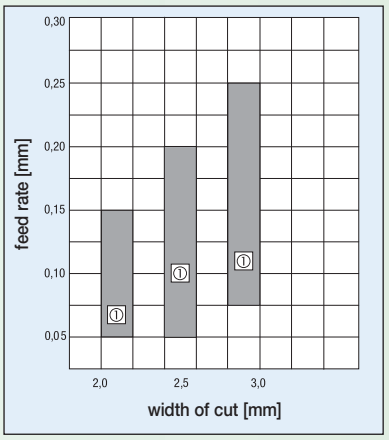
Separator • X² and X²-Ultra

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

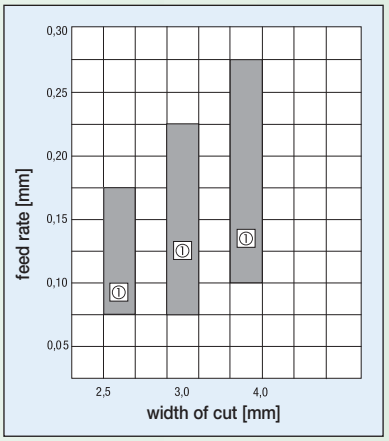
Separator • S² and S²-Ultra

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

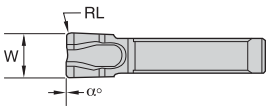
The S²-Ultra is an enhanced version of the S² and is ideal for 300 series stainless steel, nickel-based alloys, tool steel, INCONEL, and titanium at moderate to high speeds and feeds.

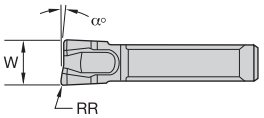


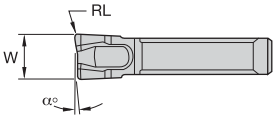
① Recommended feed

ANSI ISO 513	VDI 3323											
Material Group		Cutting Speed • vc m/min										
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			C5			GC			M40	
P	1				90	**120**	150	175	**200**	220	40	**80**	115
	2				75	**110**	140	150	**170**	190	35	**70**	100
	3				65	**85**	105	125	**140**	160	30	**50**	75
	4				65	**95**	120	140	**150**	165	30	**60**	90
	5				60	**85**	110	115	**130**	145	25	**50**	70
	6				70	**95**	120	140	**150**	165	30	**60**	90
	7				60	**80**	110	120	**135**	150	25	**50**	70
	8				55	**80**	105	105	**120**	135	25	**45**	70
	9				40	**60**	80	70	**90**	110	20	**35**	55
	10				60	**75**	95	110	**120**	130	25	**50**	70
	11				30	**60**	80	60	**95**	125	20	**35**	50
	12				70	**95**	120	135	**155**	175	35	**70**	100
	13.1				65	**80**	90	105	**120**	135	30	**45**	65
	13.2				30	**45**	55	50	**60**	70	15	**30**	40
			C2			C5			GC			M40	
M	14.1	50	**60**	70							30	**45**	60
	14.2	45	**55**	65							25	**40**	50
	14.3	40	**45**	50							20	**30**	40
	14.4	25	**30**	40							15	**25**	30
			C2			C5			GC			M40	
K	15	135	**170**	200							75	**105**	135
	16	115	**135**	150							50	**80**	110
	17	130	**150**	175							60	**95**	130
	18	90	**115**	140							45	**75**	100
	19	150	**185**	215							85	**115**	145
	20	120	**145**	170							55	**90**	120
			C2			C5			GC			M40	
N	21	305	**410**	520							210	**370**	520
	22	245	**350**	460							150	**305**	460
	23	305	**410**	520							210	**365**	520
	24	245	**350**	460							150	**305**	460
	25	210	**245**	275							135	**205**	275
	26	150	**170**	185							90	**135**	185
	27	150	**170**	185							90	**135**	185
	28	90	**105**	120							60	**90**	120
	29	60	**75**	90							45	**70**	90
	30	75	**90**	105							45	**75**	110
			C2			C5			GC			M40	
S	31	35	**45**	50							25	**40**	50
	32	25	**30**	35							20	**25**	30
	33	20	**25**	30							15	**20**	25
	34	15	**20**	25							10	**15**	20
	35	15	**20**	25							10	**15**	20
	36	55	**60**	65							35	**45**	60
	37	25	**30**	35							15	**25**	30

Cutting Speed • vc m/min												VDI 3323 Material Group	ANSI ISO 513
min	Start	max	min	Start	max	min	Start	max	min	Start	max		
	M43			**M433B**			**M45**			**M93**			
110	**160**	210	—	—	—	45	**85**	125	150	**200**	245	**1**	
85	**140**	190	—	—	—	40	**75**	110	130	**170**	215	**2**	
75	**110**	150	—	—	—	35	**60**	80	110	**145**	175	**3**	
80	**125**	170	—	—	—	40	**70**	100	120	**150**	185	**4**	
65	**105**	145	—	—	—	30	**55**	75	100	**130**	160	**5**	
80	**125**	170	—	—	—	40	**70**	100	120	**150**	185	**6**	
65	**105**	145	—	—	—	35	**55**	75	105	**135**	165	**7**	**P**
60	**100**	140	—	—	—	25	**50**	70	90	**120**	150	**8**	
45	**80**	115	—	—	—	20	**40**	60	60	**90**	120	**9**	
65	**95**	120	—	—	—	30	**50**	75	100	**120**	145	**10**	
35	**75**	115	30	**70**	115	20	**40**	60	55	**100**	135	**11**	
85	**120**	155	85	**125**	160	40	**75**	110	120	**155**	190	**12**	
80	**100**	120	80	**105**	130	35	**55**	75	90	**120**	150	**13.1**	
35	**50**	65	35	**50**	70	20	**30**	45	45	**60**	75	**13.2**	
	M43			**M433B**			**M45**			**M93**			
50	**75**	100	55	**90**	130	35	**50**	65	90	**120**	150	**14.1**	
45	**60**	80	45	**75**	105	30	**50**	60	75	**100**	120	**14.2**	**M**
35	**50**	65	35	**60**	80	25	**35**	50	55	**75**	95	**14.3**	
25	**40**	50	25	**45**	65	20	**30**	40	45	**60**	75	**14.4**	
	M43			**M433B**			**M45**			**M93**			
105	**150**	200	230	**290**	350	90	**120**	150	150	**200**	245	**15**	
75	**115**	150	170	**230**	290	60	**100**	135	105	**150**	200	**16**	
90	**135**	175	200	**260**	320	70	**110**	150	120	**170**	215	**17**	**K**
60	**100**	135	180	**245**	305	50	**85**	115	115	**160**	205	**18**	
120	**170**	215	245	**305**	365	100	**130**	160	165	**180**	260	**19**	
80	**125**	170	215	**275**	335	65	**105**	145	110	**140**	215	**20**	
	M43			**M433B**			**M45**			**M93**			
275	**440**	610				245	**400**	550	305	**490**	670	**21**	
210	**380**	550				180	**335**	490	245	**430**	610	**22**	
275	**440**	610				245	**395**	550	305	**490**	670	**23**	
210	**380**	550				180	**335**	490	245	**430**	610	**24**	
180	**260**	335				150	**230**	305	210	**305**	400	**25**	**N**
120	**170**	215				105	**150**	200	150	**200**	245	**26**	
120	**170**	215				105	**150**	200	150	**200**	245	**27**	
75	**105**	135				70	**100**	130	90	**135**	185	**28**	
55	**80**	110				45	**75**	100	60	**90**	120	**29**	
60	**90**	120				50	**85**	115	75	**120**	150	**30**	
	M43			**M433B**			**M45**			**M93**			
30	**45**	55	35	**50**	60	30	**40**	55	35	**50**	70	**31**	
20	**30**	40	25	**35**	40	25	**30**	35	30	**35**	45	**32**	
15	**20**	30	20	**25**	30	15	**20**	25	25	**30**	35	**33**	
15	**20**	25	15	**20**	25	10	**15**	20	20	**25**	30	**34**	**S**
15	**20**	25	15	**20**	25	10	**15**	20	20	**25**	30	**35**	
35	**50**	65	40	**55**	70	35	**50**	65	55	**65**	80	**36**	
25	**30**	35	25	**30**	40	20	**25**	35	30	**35**	45	**37**	







● first choice
○ alternate choice

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

X²

catalogue number	W	RR	α°	hand								
507363	2,50	0,13	—	N - Neutral					●		●	●
507372	3,00	0,15	—	N - Neutral					●		●	●

catalogue number	W	RR	α°	hand								
507365	2,50	0,13	5	L - Left					●		●	●
507374	3,00	0,15	5	L - Left					●		●	●

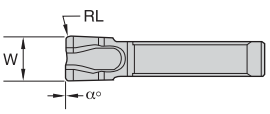
catalogue number	W	RL	α°	hand								
507364	2,50	0,13	5	R - Right					●		●	●
507373	3,00	0,15	5	R - Right					●		●	●

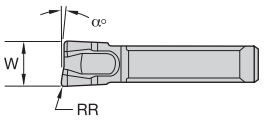
X² Ultra

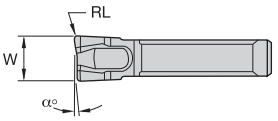
catalogue number	W	RR	α°	hand								
507366	2,50	0,15	—	N - Neutral						●		
507369	3,00	0,15	—	N - Neutral						●		

catalogue number	W	RR	α°	hand								
507368	2,50	0,13	5	L - Left						●		
507371	3,00	0,15	5	L - Left						●		

catalogue number	W	RL	α°	hand								
507383	2,00	—	5	R - Right						●		
507367	2,50	0,13	5	R - Right						●		
507370	3,00	0,15	5	R - Right						●		







● first choice
○ alternate choice

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

S²

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507295	3,00	0,25	—	N - Neutral					●		●	●
507378	4,00	0,25	—	N - Neutral					●		●	●

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507297	3,00	0,20	5	L - Left					●		●	●
507380	4,00	0,25	5	L - Left					●		●	●

catalogue number	W	RL	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507296	3,00	0,20	5	R - Right					●		●	●
507379	4,00	0,25	5	R - Right					●		●	●

S² Ultra

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507348	2,50	0,15	—	N - Neutral						●		
507351	3,00	0,15	—	N - Neutral						●		

catalogue number	W	RR	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507350	2,50	0,15	5	L - Left						●		
507353	3,00	0,15	5	L - Left						●		

catalogue number	W	RL	α°	hand	C2	C5	GC	M40	M43	M433B	M45	M93
507349	2,50	0,15	5	R - Right						●		
507352	3,00	0,15	5	R - Right						●		

Definitions and Guidelines

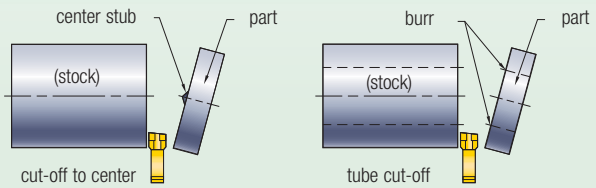
1. Width of cut (W) = width of the insert.

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

Reduce burr of cut-off faces:

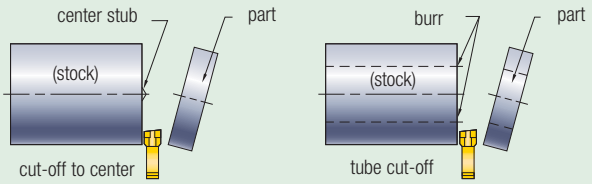
- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the burr that remains on the part but decreases tool life and increases tool-side deflection and possibly cycle time.

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



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

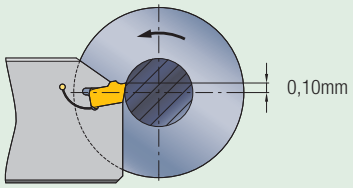
Figure 2
Insert selection **right-hand lead**



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 ±0,1mm to the center; recommended cutting position is 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 minimise the center stub or cut-off burr length. Decrease the feed rate to maximum 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.

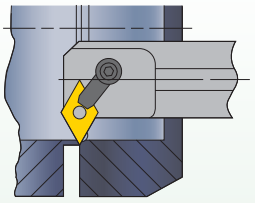


Figure 4
Internal chamfer line up

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.

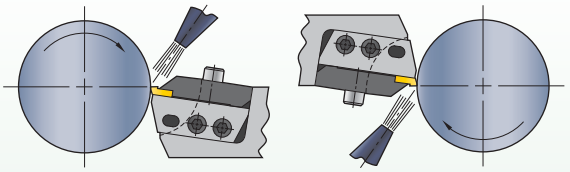
Figure 5
Preferred method for applying coolant

- 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



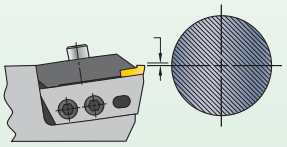
Coolant on cut-off tool

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 0,0mm to 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).

Minimise 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:

- Minimise tool blade and holder overhang.
- Minimise part overhang.
- Use strongest toolholder system.
- Use a narrower 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 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 minimise 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.

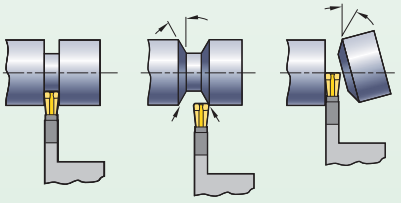
Eliminate built-up edge:

- Select proper grade for insert.
- Increase speed (RPM).
- Increase the feed rate.
- Use ample amounts of well-directed coolant (see Figure A on page D99).

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

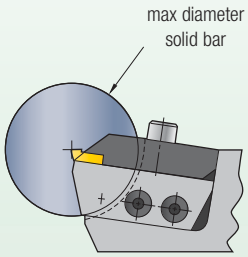


Figure 1
Standard bar capacity shown

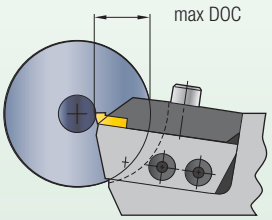


Figure 2
Larger bar diameter shown

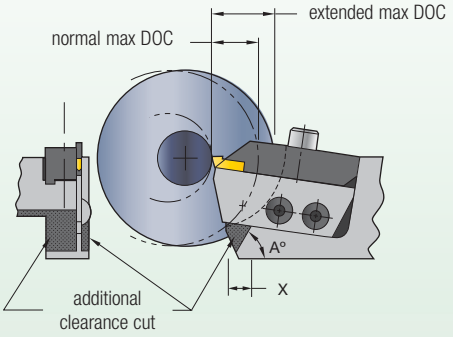


Figure 3
Modified toolholder with larger bar diameter shown

Capacity Chart for 57,15mm Diameter Bar Capacity Tooling								
bar diameter	63,50	76,20	88,90	101,60	114,30	127,00	152,40	**NOTE**
max DOC	23,88	19,05	15,75	14,22	12,70	11,94	11,18	**with no modification on toolholder**
	28,45	26,16	24,64	24,64	22,10	21,34	19,81	**with no modification on toolholder X = 10,16mm A = 1270mm**

Capacity Chart for 76,2mm Diameter Bar Capacity Tooling						
bar diameter	88,90	101,60	114,30	127,00	152,40	**NOTE**
max DOC	28,45	25,40	22,35	19,81	17,53	**with no modification on toolholder**
	36,58	34,80	33,27	31,75	28,45	**with no modification on toolholder X = 10,16mm A = 1270mm**

Ranger™

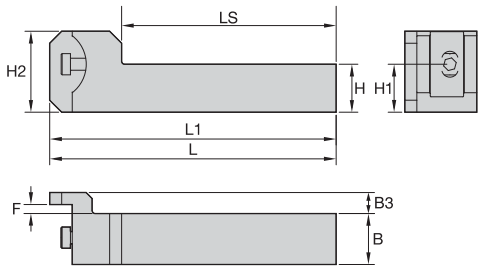
Ranger™ Adjustable Face Grooving System

Features:

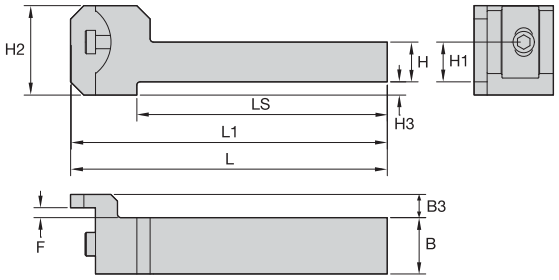
- Enables the adjustment of the support blade from 57,0mm to 406,0mm diameter for initial plunge.
- Insert widths 3,2mm; 4,9mm; and 6,4mm.

Benefits:

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



Right Hand Tool



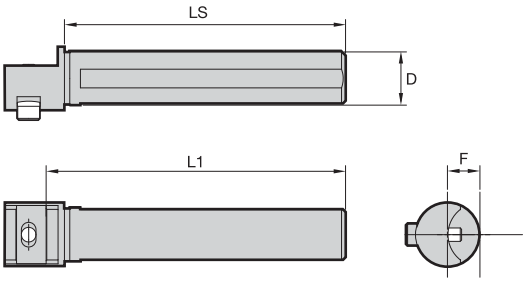
Right Hand Tool

Left Hand Assembly

Square Shank

order number	catalogue number	B	B3	H	H1	H2	H3	F	L	L1	LS	support bladescrew	nut
	Right hand												
3538807	**235204**	27	11	20	20	43	5	-5	152	151,46	113,665	**606218**	**613137**
3538808	**235205**	27	11	25	25	43	—	-5	152	151,46	113,665	**606218**	**613137**
3538809	**235206**	27	11	32	32	49	—	-5	152	151,46	113,665	**606218**	**613137**
	Left hand												
3538810	**235207**	27	11	20	20	43	5	-5	152	151,46	113,665	**606218**	**613137**
3538811	**235208**	27	11	25	25	43	—	-5	152	151,46	113,665	**606218**	**613137**
3538812	**235209**	27	11	32	32	49	—	-5	152	151,46	113,665	**606218**	**613137**

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

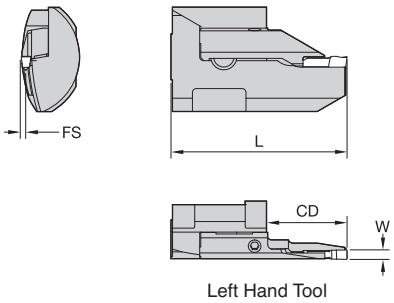



Left Hand Assembly

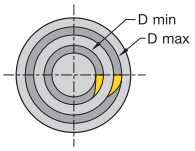
Round Shank

order number	catalogue number	D	L1	LS	F	support blade screw	washer
3538804	**235201**	25	143,51	139,70	19	**619155**	**613135**
3538805	**235202**	30	143,51	139,70	19	**619155**	**613135**
3538806	**235203**	32	143,51	139,70	19	**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

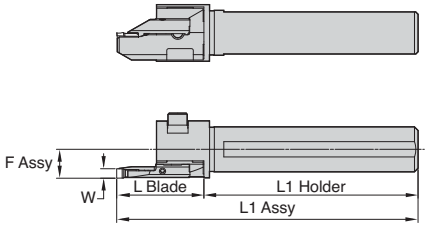


Blade Style	Part Shape	Left Hand	Right Hand
Curve In			
Curve Out			

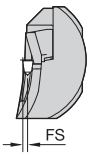
Curve In

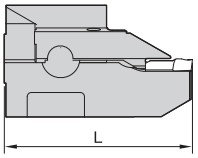
order number	catalogue number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539561	**338223**	3,18	19	57	400	-1,80	58	L - Left	**440203**	**606219**
3539562	**338224**	4,76	25	57	400	-2,39	58	L - Left	**440204**	**606219**
3539570	**338232**	6,35	25	57	400	-3,18	58	L - Left	**4402122**	**606219**
3539559	**338221**	3,17	19	57	400	-1,80	58	R - Right	**440201M**	**606219**
3539560	**338222**	4,76	25	57	400	-2,39	58	R - Right	**440202**	**606219**
3539569	**338231**	6,35	25	57	400	-3,18	58	R - Right	**440211**	**606219**

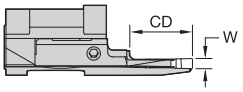
NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.



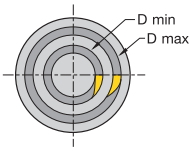
For Round Shank
F Assy = W/2 + F (holder) + FS (blade)
L1 Assy = L1 (holder) + L (blade)







Left Hand Tool

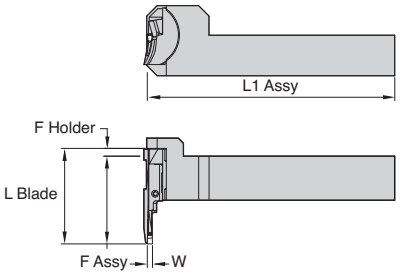


Blade Style	Part Shape	Left Hand	Right Hand
Curve In			
Curve Out			

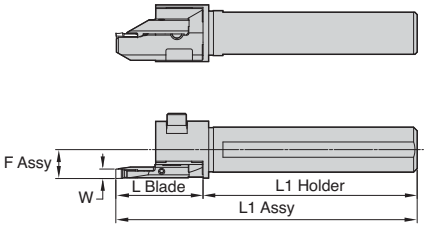
Curve Out

order number	catalogue number	W	CD	D min	D max	FS	L	hand	clamp	clamp screw
3539563	**338225**	3,18	19	57	400	-1,47	58	L - Left	**440205**	**606219**
3539564	**338226**	4,76	25	57	400	-2,39	58	L - Left	**440206**	**606219**
3539565	**338227**	6,35	25	57	400	-3,18	58	L - Left	**440207**	**606219**
3539566	**338228**	3,18	19	57	400	-1,47	58	R - Right	**440208**	**606219**
3539567	**338229**	4,76	25	57	400	-2,39	58	R - Right	**440209**	**606219**
3539568	**338230**	6,35	25	57	400	-3,18	58	R - Right	**440210M**	**606219**

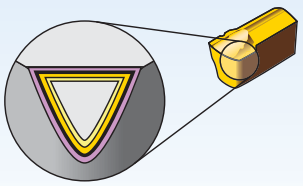
NOTE: RH cartridge goes with LH toolholder.
LH cartridge goes with RH toolholder.



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



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



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

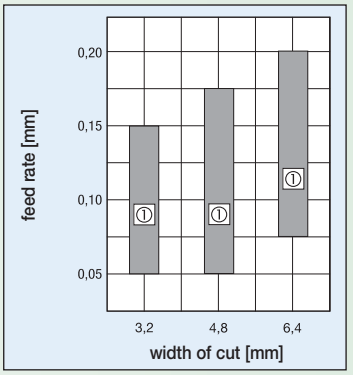
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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.									
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 colour.									
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-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.									

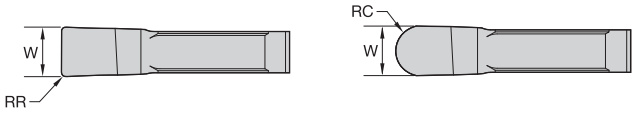
Ranger • Face Grooving

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



① Recommended feed

ANSI ISO 513	VDI 3323											
Material Group		Cutting Speed • vc m/min										
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			GC			M40			M43	
P	1				175	**200**	220	40	**80**	115	110	**160**	210
	2				150	**170**	190	35	**70**	100	85	**140**	190
	3				125	**140**	160	30	**50**	75	75	**110**	150
	4				140	**150**	165	30	**60**	90	80	**125**	170
	5				115	**130**	145	25	**50**	70	65	**105**	145
	6				140	**150**	165	30	**60**	90	80	**125**	170
	7				120	**135**	150	25	**50**	70	65	**105**	145
	8				105	**120**	135	25	**45**	70	60	**100**	140
	9				70	**90**	110	20	**35**	55	45	**80**	115
	10				110	**120**	130	25	**50**	70	65	**95**	120
	11				60	**95**	125	20	**35**	50	35	**75**	115
	12				135	**155**	175	35	**70**	100	85	**120**	155
	13.1				105	**120**	135	30	**45**	65	80	**100**	120
	13.2				50	**60**	70	15	**30**	40	35	**50**	65
			C2			GC			M40			M43	
M	14.1	50	**60**	70				30	**45**	60	50	**75**	100
	14.2	45	**55**	65				25	**40**	50	45	**60**	80
	14.3	40	**45**	50				20	**30**	40	35	**50**	65
	14.4	25	**30**	40				15	**25**	30	25	**40**	50
			C2			GC			M40			M43	
K	15	135	**170**	200				75	**105**	135	105	**150**	200
	16	115	**135**	150				50	**80**	110	75	**115**	150
	17	130	**150**	175				60	**95**	130	90	**135**	175
	18	90	**115**	140				45	**75**	100	60	**100**	135
	19	150	**185**	215				85	**115**	145	120	**170**	215
	20	120	**145**	170				55	**90**	120	80	**125**	170
			C2			GC			M40			M43	
N	21	305	**410**	520				210	**370**	520	275	**440**	610
	22	245	**350**	460				150	**305**	460	210	**380**	550
	23	305	**410**	520				210	**365**	520	275	**440**	610
	24	245	**350**	460				150	**305**	460	210	**380**	550
	25	210	**245**	275				135	**205**	275	180	**260**	335
	26	150	**170**	185				90	**135**	185	120	**170**	215
	27	150	**170**	185				90	**135**	185	120	**170**	215
	28	90	**105**	120				60	**90**	120	75	**105**	135
	29	60	**75**	90				45	**70**	90	55	**80**	110
	30	75	**90**	105				45	**75**	110	60	**90**	120
			C2			GC			M40			M43	
S	31	35	**45**	50				25	**40**	50	30	**45**	55
	32	25	**30**	35				20	**25**	30	20	**30**	40
	33	20	**25**	30				15	**20**	25	15	**20**	30
	34	15	**20**	25				10	**15**	20	15	**20**	25
	35	15	**20**	25				10	**15**	20	15	**20**	25
	36	55	**60**	65				35	**45**	60	35	**50**	65
	37	25	**30**	35				15	**25**	30	25	**30**	35



● first choice
○ alternate choice

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

Face Grooving

catalogue number	W	RR	RC	C2	GC	M40	M43
506104	3,18	—	1,59	●		●	
506101	3,18	0,25	—	●	●	●	●
506102	3,18	0,25	—	●	●	●	
506105	3,18	—	1,59	●		●	
506106	4,78	—	2,39			●	
506103	4,78	0,25	—	●	●		●
506108	6,35	—	3,18			●	
506107	6,35	0,25	—			●	

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.

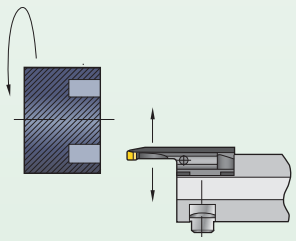
Face Grooving Ranges per Setting

given diameter setting	plunge range at diameter setting	
	smallest OD	largest OD
57,15	57,91	60,33
63,50	60,33	66,68
69,85	65,09	74,61
76,20	66,68	85,73
88,90	77,79	100,01
101,60	88,90	114,30
127,00	107,95	146,05
152,40	127,00	177,80
203,20	165,10	241,30
254,00	203,20	279,40
279,40–406,40	228,60	406,40

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 101,6mm OD, plunge cuts from 88,9mm OD to 114,3mm OD can be made without changing the 101,6mm OD setting.

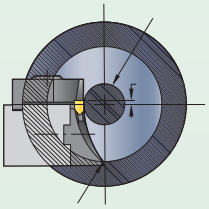
Widening a Face Groove

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 +0,762mm 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 <21,59mm diameters.



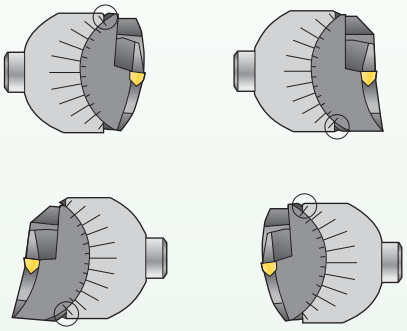
Adjusting Information for Ranger Tooling

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.]

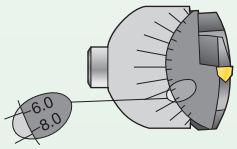
2.25 Diameter Settings



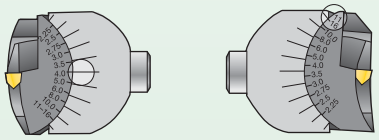
style 1 style 2

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.

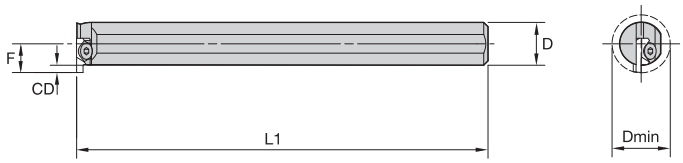
NOTE: It is important that these instructions are followed. Failure to do so may result in damage to the tool and the workpiece.

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 12,5mm to 19,0mm.
- Maximum depth of cut 2,39mm.

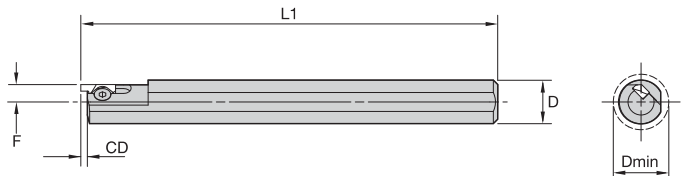


Right Hand Assembly

ID Grooving

order number	catalogue number	CD	L1	D	F	D min	clamp screw
3538783	**218134**	2,40	152,50	12,00	8,00	14,20	**606193**
3538784	**218142**	2,40	150,00	16,00	8,00	14,20	**606193**
3538785	**218143**	2,40	200,00	20,00	13,00	24,00	**606193**

NOTE: Can be used with right- or left-hand inserts.
Right-hand assemblies use left-hand inserts.

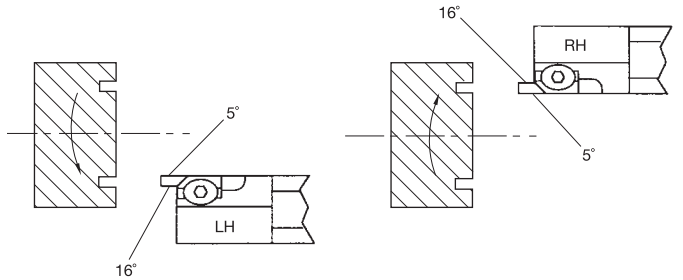


Left Hand Tool

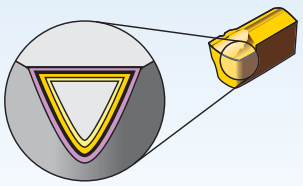
Face Grooving

order number	catalogue number	CD	L1	D	F	D min	clamp screw
	Right hand						
3538779	**218125**	2,39	152,40	15,88	6,35	16,26	**606190**
	Left hand						
3538780	**218126**	2,39	152,40	15,88	6,35	16,26	**606190**

NOTE: 12,0mm 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.

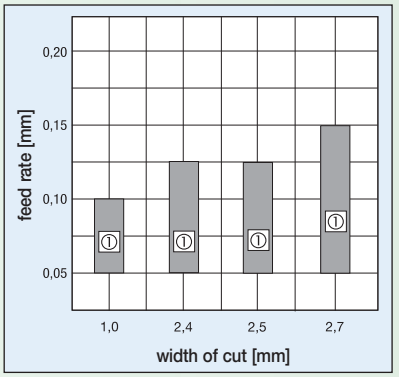
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous Materials
S	High-Temp Alloys
H	Hardened Materials

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 colour.	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								

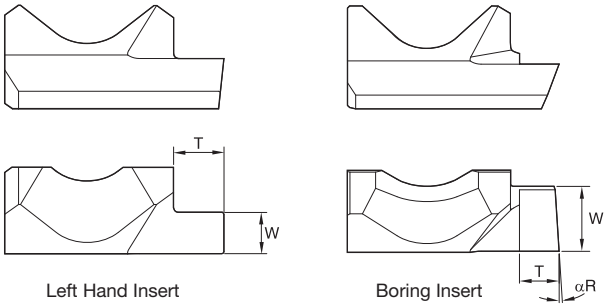
S-LOC

- 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 m/min											
Material Group		min	Start	max	min	Start	max	min	Start	max	min	Start	max
			C2			C5			GC			M40	
P	1				90	**120**	150	175	**200**	220	40	**80**	115
	2				75	**110**	140	150	**170**	190	35	**70**	100
	3				65	**85**	105	125	**140**	160	30	**50**	75
	4				65	**95**	120	140	**150**	165	30	**60**	90
	5				60	**85**	110	115	**130**	145	25	**50**	70
	6				70	**95**	120	140	**150**	165	30	**60**	90
	7				60	**80**	110	120	**135**	150	25	**50**	70
	8				55	**80**	105	105	**120**	135	25	**45**	70
	9				40	**60**	80	70	**90**	110	20	**35**	55
	10				60	**75**	95	110	**120**	130	25	**50**	70
	11				30	**60**	80	60	**95**	125	20	**35**	50
	12				70	**95**	120	135	**155**	175	35	**70**	100
	13.1				65	**80**	90	105	**120**	135	30	**45**	65
	13.2				30	**45**	55	50	**60**	70	15	**30**	40
			C2			C5			GC			M40	
M	14.1	50	**60**	70							30	**45**	60
	14.2	45	**55**	65							25	**40**	50
	14.3	40	**45**	50							20	**30**	40
	14.4	25	**30**	40							15	**25**	30
			C2			C5			GC			M40	
K	15	135	**170**	200							75	**105**	135
	16	115	**135**	150							50	**80**	110
	17	130	**150**	175							60	**95**	130
	18	90	**115**	140							45	**75**	100
	19	150	**185**	215							85	**115**	145
	20	120	**145**	170							55	**90**	120
			C2			C5			GC			M40	
N	21	305	**410**	520							210	**370**	520
	22	245	**350**	460							150	**305**	460
	23	305	**410**	520							210	**365**	520
	24	245	**350**	460							150	**305**	460
	25	210	**245**	275							135	**205**	275
	26	150	**170**	185							90	**135**	185
	27	150	**170**	185							90	**135**	185
	28	90	**105**	120							60	**90**	120
	29	60	**75**	90							45	**70**	90
	30	75	**90**	105							45	**75**	110
			C2			C5			GC			M40	
S	31	35	**45**	50							25	**40**	50
	32	25	**30**	35							20	**25**	30
	33	20	**25**	30							15	**20**	25
	34	15	**20**	25							10	**15**	20
	35	15	**20**	25							10	**15**	20
	36	55	**60**	65							35	**45**	60
	37	25	**30**	35							15	**25**	30



Left Hand Insert

Boring Insert

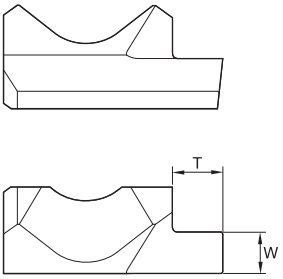
● first choice
○ alternate choice

P	●
M	●
K	○
N	●
S	○
H	

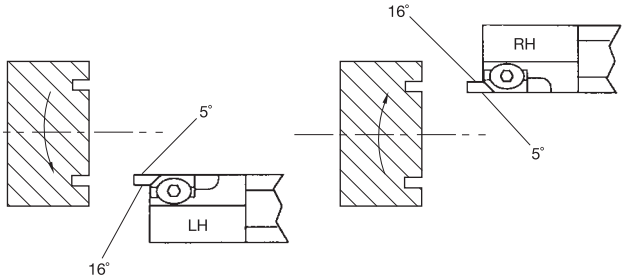
ID Grooving

catalogue number	W	T	αR	M40
Right hand				
510124	1,04	2,08	–	●
510128	1,63	2,92	–	●
510104	2,39	2,92	–	●
510132	2,50	2,92	–	●
510134	2,71	2,92	–	●
Left hand				
510113	1,04	2,08	–	●
510114	1,21	2,08	–	●
510115	1,36	2,08	–	●
510116	1,37	2,08	–	●
510117	1,63	2,92	–	●
510118	1,80	2,92	–	●
510119	1,94	2,39	–	●
510120	2,22	2,92	–	●
510101	2,39	2,92	–	●
510121	2,50	2,92	–	●
510122	2,64	2,92	–	●
510123	2,71	2,92	–	●
510102	3,81	2,39	4.00	●

NOTE: Insert 510102 is used for boring.



Left Hand Insert



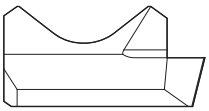
- Side clearance angles as noted.
- Use left-hand tooling for counterclockwise rotation only.
- Use right-hand tooling for clockwise rotation only.

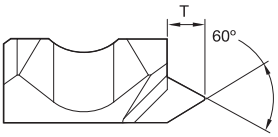
● first choice
○ alternate choice

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

Face Grooving

catalogue number	W	T	C2	C5	GC	M40
Right hand						
510136	1,98	2,39	●	●	●	●
510108	2,39	2,39	●			●
510138	2,59	2,39				●
Left hand						
510135	1,98	2,39		●		●
510107	2,39	2,39				●
510137	2,59	2,39				●





Left Hand Insert

Threading

catalogue number	T	C2	C5	GC	M40
Right hand					
510106	2,38	●			●
Left hand					
510103	2,38	●	●	●	●

NOTE: Minimum 10 threads per inch.