



2017 Master Catalog

WIDIA  TM



WIDIA™ Ranger™ Adjustable Face Grooving System

Ranger is the industry's only fully adjustable face grooving platform. The system can produce face groove diameters from 2.25–16" (57,2–406mm).

Ranger



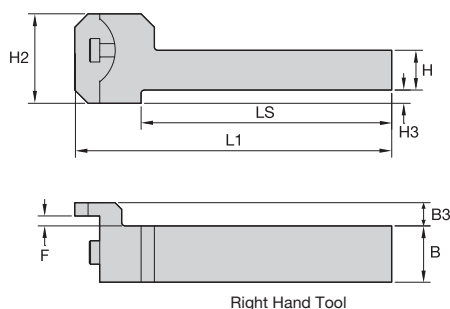
Square Shank Toolholders

- Compact, right angle design with full 1" depth of cut capability when using .188" and .250" wide inserts.
- Versatile selection of curve-out cartridges, featuring .125", .188", and .250" widths.
- Universal insert geometry for steels, stainless steels, non-ferrous materials, and cast iron.

Round Shank Bars

- Available in 1", 1.25", and 1.50" round shanks with added flexibility to use both right-hand and left-hand cartridges in the same shank.
- Versatile selection of both curve-in and curve-out cartridges to produce external and internal (through the bore) face groove styles.
- Insert widths of .125", .188", and .250" with choice of square front inserts for plunge and groove, or full nose radii for plunge, groove, and profile.





Right Hand Tool



Left-hand holder with right-hand cartridge shown



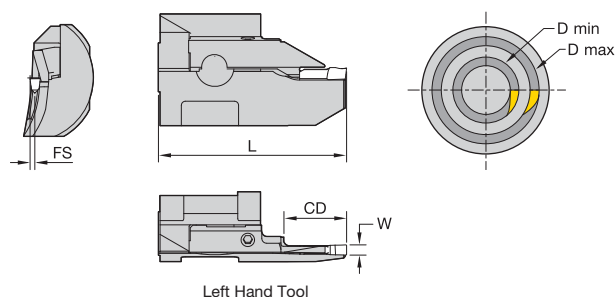
Right-hand holder with left-hand cartridge shown

■ Square Shank • Inch • Use Curve-Out Cartridges Only

order number	catalog number	B	B3	F	H	H2	H3	L1	LS	support blade screw	nut
right hand											
3538796	235103	1.06	.44	-.19	.75	1.69	.25	5.963	4.475	606218	613137
3538797	235104	1.06	.44	-.19	1.00	1.69	—	5.975	4.475	606218	613137
3538798	235105	1.06	.44	-.19	1.25	1.94	—	5.963	4.475	606218	613137
left hand											
3538800	235107	1.06	.44	-.19	1.00	1.69	—	5.963	4.475	606218	613137
3538801	235108	1.06	.44	-.19	1.25	1.94	—	5.963	4.475	606218	613137

NOTE: The toolholder shank is supplied with the support blade mounting screw, 606218, and nut, 61317. Order the insert and cartridge separately. Select left-hand cartridge for right-hand toolholder. Select right-hand cartridge for left-hand toolholder.

Cartridge Assembly



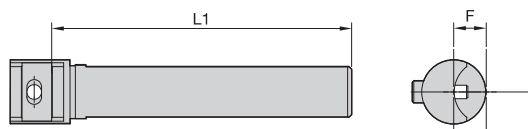
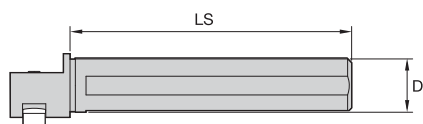
Left Hand Tool

Blade Style	Part Shape	Right Hand CCW	Left Hand CW
Curve Out			

■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
left hand										
3539539	338125	3CCW	.125	.75	2.25	16	-.058	2.30	440205	606219
3539540	338126	5	.188	1.00	2.25	16	-.094	2.30	440206	606219
3539541	338127	6	.250	1.00	2.25	16	-.125	2.30	440207	606219
right hand										
3539542	338128	3CW	.125	.75	2.25	16	-.058	2.30	440208	606219
3539543	338129	5	.188	1.00	2.25	16	-.094	2.30	440209	606219
3539544	338130	6	.250	1.00	2.25	16	-.125	2.30	440210M	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



Round shank bar shown with left-hand curve-out cartridge (left-hand assembly)



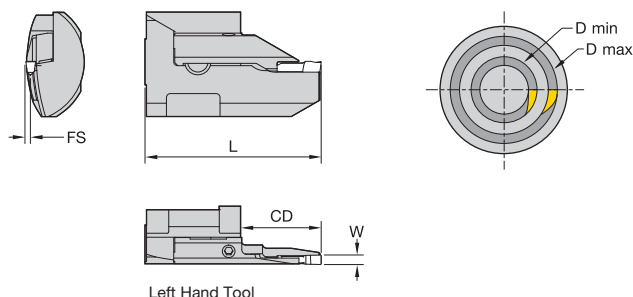
Round shank bar shown with right-hand curve-in cartridge (right-hand assembly)

Round Shank • Inch • Universal Shank for RH and LH Assemblies

order number	catalog number	D	L1	LS	F	support blade screw	washer
3538803	235110	1.000	6.750	6.600	.763	619155	613135
3538802	235109	1.250	6.750	6.600	.763	619155	613135
3538794	235101	1.500	6.750	6.500	.763	619155	613135

NOTE: Select right-hand cartridge for right-hand assembly. Select left-hand cartridge for left-hand assembly. Round shank bars are supplied with the support blade mounting screw, 619155, and washer, 613135. Order the insert and cartridge separately.

Cartridge Assembly



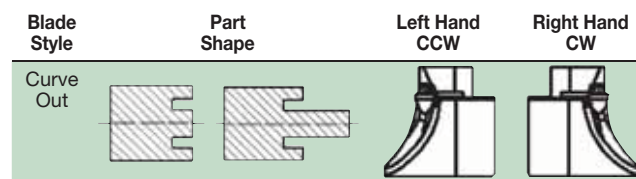
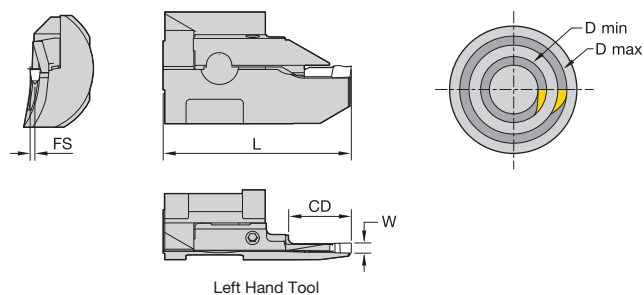
Left Hand Tool

Blade Style	Part Shape	Left Hand CW	Right Hand CCW
Curve In			

Curve-In Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
left hand										
3539537	338123	3CW	.125	.75	2.25	16	-.071	2.30	440203	606219
3539538	338124	5	.188	1.00	2.25	16	-.094	2.30	440204	606219
3539546	338132	6	.250	1.00	2.25	16	-.125	2.30	440212	606219
right hand										
3539535	338121	3CCW	.125	.75	2.25	16	-.071	2.30	440201M	606219
3539536	338122	5	.188	1.00	2.25	16	-.094	2.30	440202	606219
3539545	338131	6	.250	1.00	2.25	16	-.125	2.30	440211	606219

NOTE: Curve-in cartridges used with round shank bars only. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
left hand										
3539539	338125	3CCW	.125	.75	2.25	16	-.058	2.30	440205	606219
3539540	338126	5	.188	1.00	2.25	16	-.094	2.30	440206	606219
3539541	338127	6	.250	1.00	2.25	16	-.125	2.30	440207	606219
right hand										
3539542	338128	3CW	.125	.75	2.25	16	-.058	2.30	440208	606219
3539543	338129	5	.188	1.00	2.25	16	-.094	2.30	440209	606219
3539544	338130	6	.250	1.00	2.25	16	-.125	2.30	440210M	606219

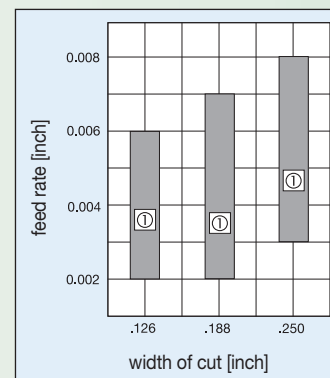


Grooving and Cut-Off

Ranger Insert Selection

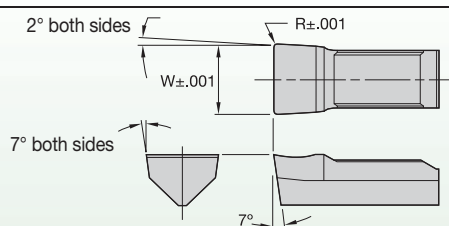


- Inserts available for plunge and groove and full-nose radii.
- Geometry designed to provide clearance while deep grooving.
- Superior chip control.



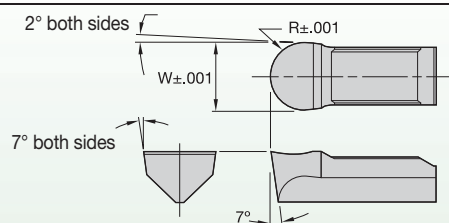
① Recommended Starting Feed

Square Bottom Inserts



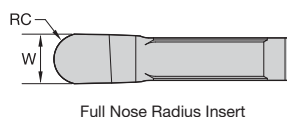
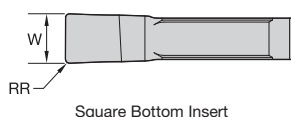
catalog number	seat size	W mm	W inch	RR mm	RR inch	max doc when side cutting	spindle rotation	
							CW	CCW
506101	3CCW	3,18	.125	0,25	.010	.050		●
506102	3CW	3,18	.125	0,25	.010	.050	●	
506103	5	4,78	.188	0,25	.010	.080	●	●
506107	6	6,35	.250	0,25	.010	.080	●	●

Full Nose Radius



catalog number	seat size	W mm	W inch	RC mm	RC inch	max doc when side cutting	spindle rotation	
							CW	CCW
506104	3CCW	3,18	.125	1,59	.063	.050		●
506105	3CW	3,18	.125	1,59	.063	.050	●	
506106	5	4,78	.188	2,39	.094	.080	●	●
506108	6	6,35	.250	3,18	.125	.080	●	●

- The .125" (3,18mm) wide inserts and support blade assemblies will cut grooves up to .750" (19mm) deep. These inserts are spindle rotation specific because the V on the bottom of the insert is slightly offset to provide additional support in the cartridge.
- The .188" (4,78mm) and .250" (6,35mm) wide inserts and support blade assemblies will cut grooves up to 1" (25,4mm) deep. These inserts can be used for either clockwise or counterclockwise spindle rotation.



● first choice
○ alternate choice

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

■ Face Grooving • Use with .125" (3,18mm) Cartridges • Clockwise Spindle Rotation

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506102	3CW	3,18	.125	0,25	.010	—	—	3540407	3540408	3540409	—
506105	3CW	3,18	.125	—	—	1,59	.063	3540429	—	3540430	—

NOTE: Inserts showing RC values are full nose radius inserts.

■ Face Grooving • Use with .125" (3,18mm) Cartridges • Counterclockwise Spindle Rotation

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506101	3CCW	3,18	.125	0,25	.010	—	—	3540398	3540399	3540400	—
506104	3CCW	3,18	.125	—	—	1,59	.063	—	—	3540423	—

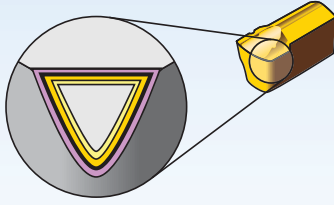
NOTE: Inserts showing RC values are full nose radius inserts.

■ Face Grooving • Not Spindle Rotation Specific

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506103	5	4,78	.188	0,25	.010	—	—	3540414	3540415	3614667	—
506106	5	4,78	.188	—	—	2,39	.094	—	—	3540435	—
506107	6	6,35	.250	0,25	.010	—	—	—	—	3540440	—
506108	6	6,35	.250	—	—	3,18	.125	—	—	3540444	—

NOTE: Inserts showing RC values are full nose radius inserts.

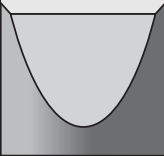
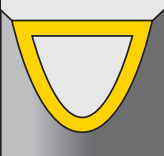
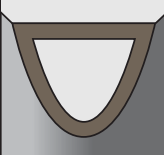
Grooving and Cut-Off



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

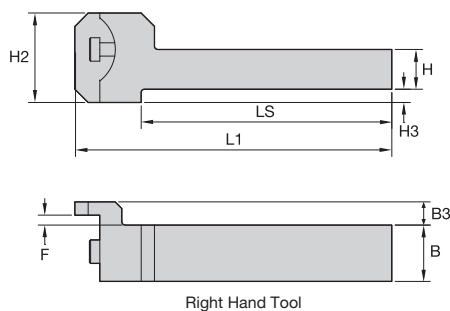
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

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

Material Group		Cutting Speed – vc SFM											
		C2			GC			M40			M43		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	–	–	–	570	645	720	125	260	370	350	525	700
	2	–	–	–	440	495	545	95	185	275	250	395	540
	3	–	–	–	440	495	545	95	185	275	250	395	540
	4	–	–	–	290	355	415	70	135	205	170	285	405
	5	–	–	–	395	450	505	110	190	275	270	365	455
	6	–	–	–	170	200	230	55	90	125	110	160	210
M	1	160	190	220	–	–	–	100	145	190	170	250	330
	2	125	140	155	–	–	–	70	95	120	110	160	210
	3	120	140	165	–	–	–	70	105	135	115	165	220
K	1	415	495	575	–	–	–	210	310	405	300	440	575
	2	410	490	575	–	–	–	210	310	410	300	435	575
	3	400	475	550	–	–	–	180	290	400	270	410	550
N	1	1000	1350	1700	–	–	–	700	1200	1700	900	1450	2000
	2	865	1215	1565	–	–	–	565	1065	1565	765	1315	1865
	3	700	800	900	–	–	–	450	675	900	600	850	1100
	4	435	485	535	–	–	–	265	400	535	350	485	615
	5	225	275	325	–	–	–	150	240	325	190	285	375
	6	835	1100	1365	–	–	–	550	960	1365	735	1185	1635
	7	900	1250	1600	–	–	–	600	1100	1600	800	1350	1900
S	1	105	125	140	–	–	–	80	105	130	90	120	150
	2	65	70	75	–	–	–	40	55	65	45	60	75
	3	180	195	210	–	–	–	110	155	200	120	170	220
	4	90	100	110	–	–	–	60	80	100	75	95	115
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		Cutting Speed – vc SFM											
		C2			GC			M40			M43		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	–	–	–	175	200	220	40	80	115	110	160	210
	2	–	–	–	135	150	165	30	60	85	75	120	165
	3	–	–	–	135	150	165	30	60	85	75	120	165
	4	–	–	–	90	110	130	25	45	60	55	90	125
	5	–	–	–	120	140	155	35	60	85	85	110	140
	6	–	–	–	50	60	70	15	30	40	35	50	65
M	1	50	60	70	–	–	–	30	45	60	50	75	100
	2	40	45	50	–	–	–	20	30	40	35	50	65
	3	35	45	55	–	–	–	20	35	40	35	50	65
K	1	125	155	175	–	–	–	65	95	125	90	135	175
	2	125	150	175	–	–	–	65	95	125	90	135	175
	3	120	145	170	–	–	–	55	90	120	80	125	170
N	1	305	410	520	–	–	–	210	370	520	275	440	610
	2	265	370	480	–	–	–	170	325	480	230	400	570
	3	210	245	275	–	–	–	135	205	275	180	260	335
	4	130	150	165	–	–	–	80	120	165	105	150	190
	5	70	85	100	–	–	–	45	75	100	60	85	115
	6	255	335	420	–	–	–	165	290	420	220	360	500
	7	275	380	490	–	–	–	180	340	490	245	410	580
S	1	30	40	45	–	–	–	25	35	40	25	40	50
	2	15	20	25	–	–	–	10	15	20	15	20	25
	3	55	60	65	–	–	–	35	45	60	35	50	65
	4	25	30	35	–	–	–	15	25	30	25	30	35
H	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–



Left-hand holder with right-hand cartridge shown



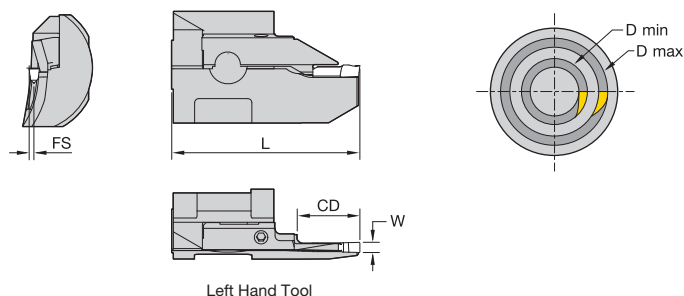
Right-hand holder with left-hand cartridge shown

■ Square Shank • Metric • Use Curve-Out Cartridges Only

order number	catalog number	B	B3	H	H2	H3	F	L1	LS	support blade screw	nut
right hand											
3538809	235206	27	11	32	49	—	-5	151,460	113,665	606218	613137
3538807	235204	27	11	20	43	5	-5	151,460	113,665	606218	613137
3538808	235205	27	11	25	43	—	-5	151,460	113,665	606218	613137
left hand											
3538810	235207	27	11	20	43	5	-5	151,460	113,665	606218	613137
3538811	235208	27	11	25	43	—	-5	151,460	113,665	606218	613137

NOTE: The toolholder shank is supplied with the support blade mounting screw, 606218, and nut, 61317. Order the insert and cartridge separately. Select left-hand cartridge for right-hand toolholder. Select right-hand cartridge for left-hand toolholder.

Cartridge Assembly

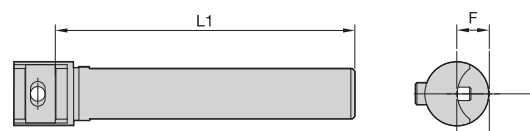
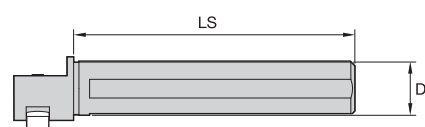


Blade Style	Part Shape	Right Hand CCW	Left Hand CW
Curve Out			

■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
right hand										
3539566	338228	3CW	3,18	19	57	400	-1,47	58	440208	606219
3539568	338230	6	6,35	25	57	400	-3,18	58	440210M	606219
left hand										
3539563	338225	3CCW	3,18	19	57	400	-1,47	58	440205	606219
3539564	338226	5	4,76	25	57	400	-2,39	58	440206	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



Round shank bar shown with left-hand curve-out cartridge (left-hand assembly)



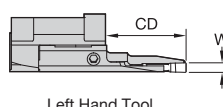
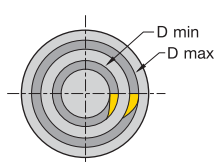
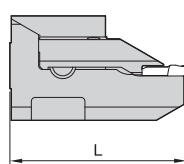
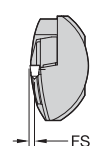
Round shank bar shown with right-hand curve-in cartridge (right-hand assembly)

■ Round Shank • Metric • Universal Shank for RH and LH Assemblies

order number	catalog 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: Select right-hand cartridge for right-hand assembly. Select left-hand cartridge for left-hand assembly. Round shank bars are supplied with the support blade mounting screw, 619155, and washer, 613135. Order the insert and cartridge separately.

Cartridge Assembly



Left Hand Tool

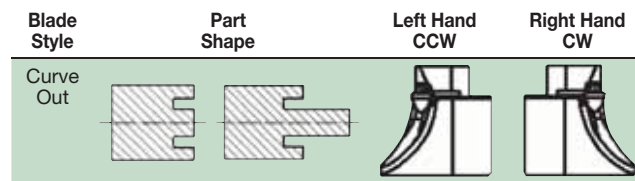
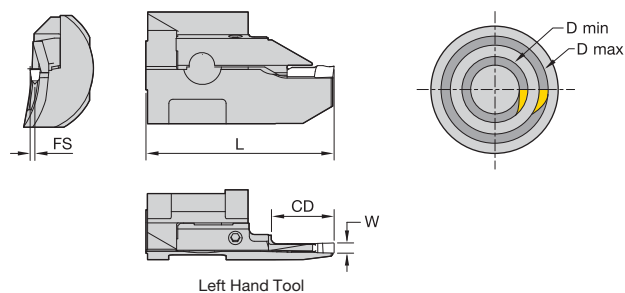


Blade Style	Part Shape	Left Hand CW	Right Hand CCW
Curve In			

■ Curve-In Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
right hand										
3539559	338221	3CCW	3,17	19	57	400	-1,80	58	440201M	606219
3539560	338222	5	4,76	25	57	400	-2,39	58	440202	606219
3539569	338231	6	6,35	25	57	400	-3,18	58	440211	606219
left hand										
3539561	338223	3CW	3,18	19	57	400	-1,80	58	440203	606219
3539562	338224	5	4,76	25	57	400	-2,39	58	440204	606219
3539570	338232	6	6,35	25	57	400	-3,18	58	440212	606219

NOTE: Curve-in cartridges used with round shank bars only. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
right hand										
3539566	338228	3CW	3,18	19	57	400	-1,47	58	440208	606219
3539568	338230	6	6,35	25	57	400	-3,18	58	440210M	606219
left hand										
3539563	338225	3CCW	3,18	19	57	400	-1,47	58	440205	606219
3539564	338226	5	4,76	25	57	400	-2,39	58	440206	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge.
Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.

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 O.D. grooving.

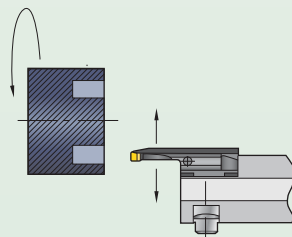
Face Grooving Ranges per Setting		
given diameter setting	plunge range at diameter setting	
	smallest O.D.	largest O.D.
2-1/4	2-1/4	2-3/8
2-1/2	2-3/8	2-5/8
2-3/4	2-9/16	2-15/16
3.0	2-5/8	3-3/8
3-1/2	3-1/16	3-15/16
4.0	3-1/2	4-1/2
5.0	4-1/4	5-3/4
6.0	5	7
8.0	6-1/2	9-1/2
10.0	8	11
11-16	9	16

NOTE: This chart is a general guide for face groove entry at outside diameters both smaller and larger than each given O.D. setting on the tool.

Example: If the tool is adjusted for 4" O.D., plunge cuts from 3-1/2" O.D. to 4-1/2" O.D. can be made without changing the 4" O.D. 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 O.D. of the workpiece.

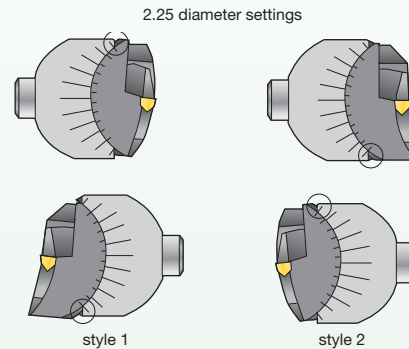


Adjusting Information for Ranger Tooling

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

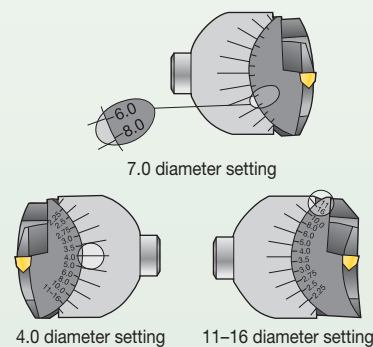
- Appropriate diameter range setting can be accomplished as follows:

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.]



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" O.D.

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



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.