

VG-Cut

Complete Range of Turning Solutions



METRIC

GROOVEX

Innovative Grooving & Turning Solutions

VG-Cut | Complete Range of Turning Solutions

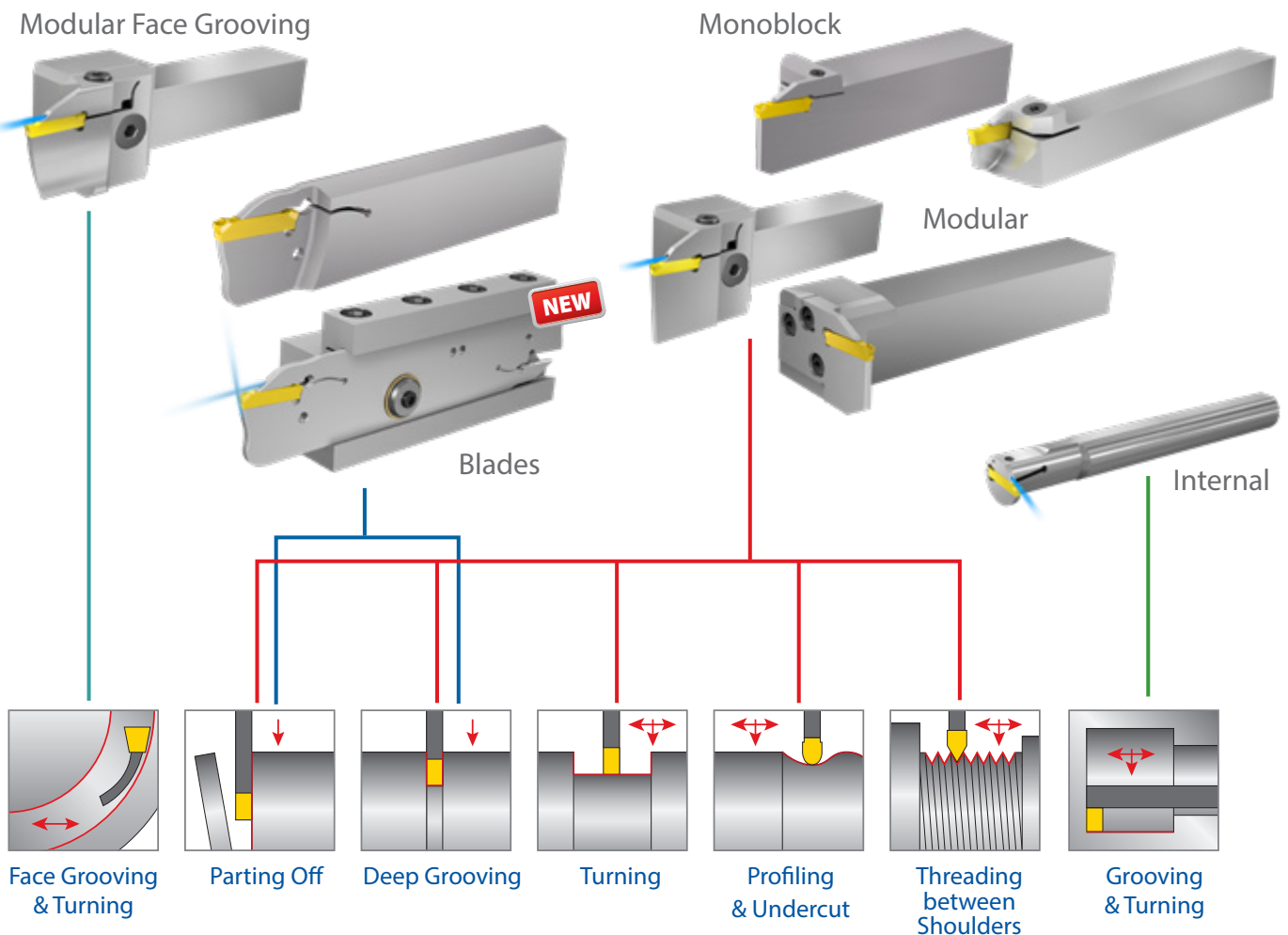
Deep Grooving, Threading, Parting Off, Boring and Face Grooving

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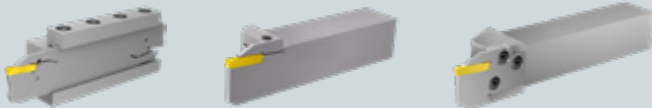
The new family of **VG-Cut** tools by GROOVEX, provides a wider range of applications and options within the same insert pocket of Deep Grooving, Parting Off, Turning, Profiling, Boring, Face Grooving and Threading. The VG-Cut inserts also offer a variety of chip formers and carbide grades, making the **VG-Cut** program a distinctly versatile system.

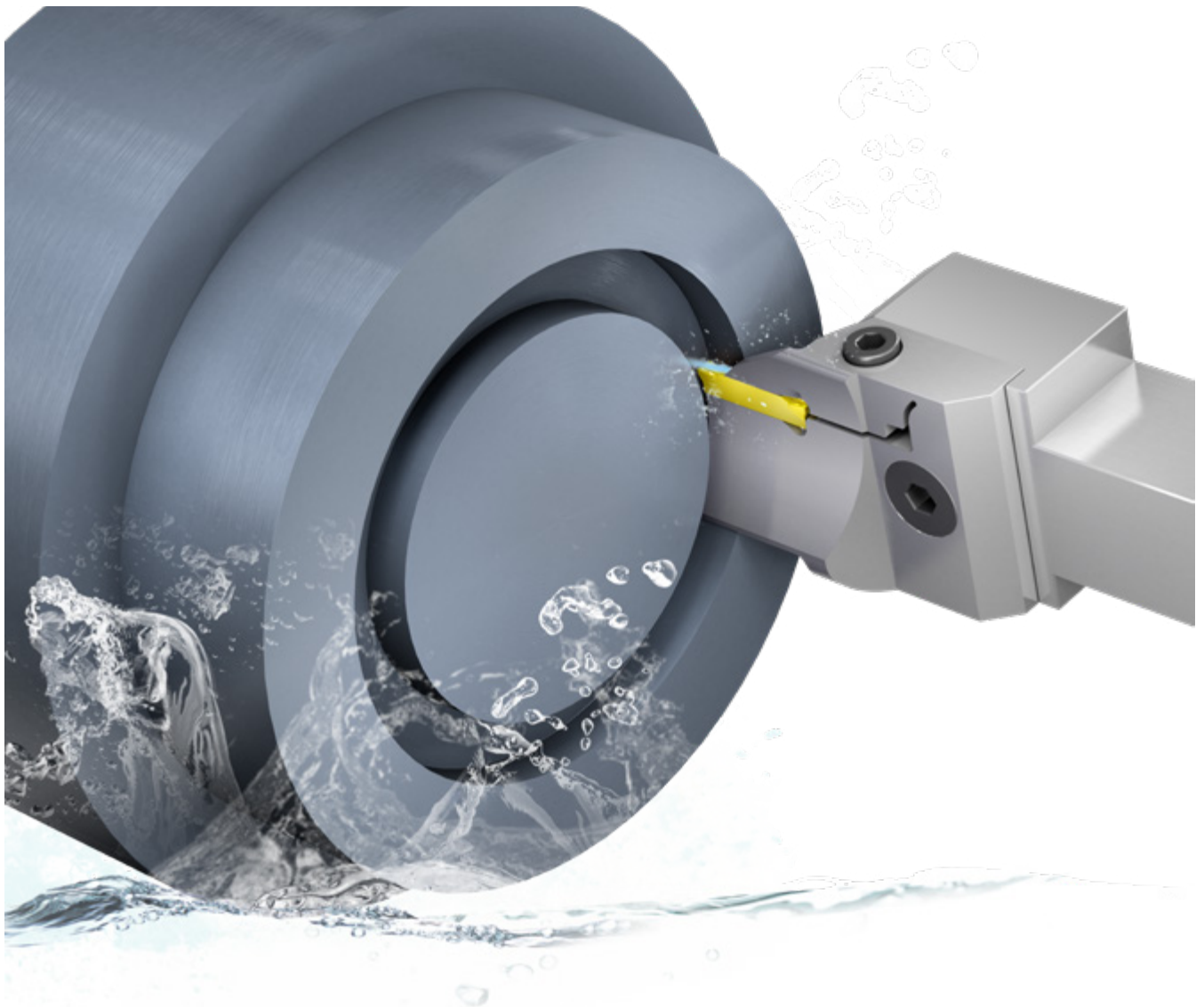
VG-Cut tools cover a wide range of Threading Standards for machining between shoulders and close to the spindle for up to shoulder depth of 10.0 mm.

The **VG-Cut**, with its unique multifunctional geometry, minimizes inventory for the end-user in an extensive selection of applications.

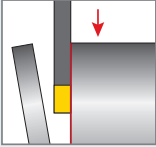


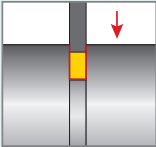




Insert, Tool and Cutting Data Selection Guide

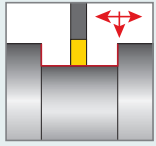

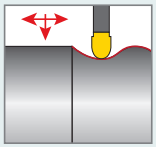

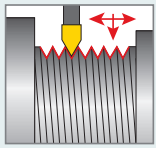

A Identify the Application																																															
B Identify the Designated Work Piece Material	<table border="1"> <tr> <td style="background-color: #00a0e3; color: white; text-align: center;">P Alloy Steel</td> <td style="background-color: #ffcc00; color: black; text-align: center;">M Stainless Steel</td> <td style="background-color: #ff0000; color: white; text-align: center;">K Cast Iron</td> <td style="background-color: #008000; color: white; text-align: center;">N Non-Ferrous</td> <td style="background-color: #ff9900; color: black; text-align: center;">S Heat Resistance</td> <td style="background-color: #cccccc; color: black; text-align: center;">H Hardened Material</td> </tr> </table>	P Alloy Steel	M Stainless Steel	K Cast Iron	N Non-Ferrous	S Heat Resistance	H Hardened Material																																								
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C Designated Chip Former Geometry for Selected Applications		page 4																																													
D Designated Carbide Grade for Desired Application	<table border="1"> <tr> <td style="background-color: #cccccc; text-align: center;">VKG</td> <td style="background-color: #cccccc; text-align: center;">VPG</td> <td style="background-color: #cccccc; text-align: center;">VMG</td> </tr> <tr> <td style="background-color: #ff0000; height: 10px;"></td> <td style="background-color: #00a0e3; height: 10px;"></td> <td style="background-color: #ffcc00; height: 10px;"></td> </tr> </table>	VKG	VPG	VMG				page 5																																							
VKG	VPG	VMG																																													
E Selecting Insert and Tool as Required by Operation		pages 13-30																																													
F Cutting Data According to Selected Items	<table border="1"> <tr> <td rowspan="4" style="background-color: #ffcc00; text-align: center;">Stainless Steel</td> <td>15</td> <td>Stainless Steel</td> <td>Non Hardened</td> <td>200</td> <td>50-120</td> <td>60-160</td> </tr> <tr> <td>16</td> <td>Cast Ferritic</td> <td>Hardened</td> <td>330</td> <td>40-100</td> <td>50-140</td> </tr> <tr> <td>17</td> <td>Stainless Steel</td> <td>Austenitic</td> <td>200</td> <td>50-120</td> <td>60-160</td> </tr> <tr> <td>18</td> <td>Cast Austenitic</td> <td>Hardened</td> <td>330</td> <td>40-100</td> <td>50-140</td> </tr> <tr> <td rowspan="2" style="background-color: #ff0000; text-align: center;">Malleable Cast Iron</td> <td>28</td> <td>Malleable</td> <td>Ferritic (short chips)</td> <td>130</td> <td></td> <td>160-280</td> </tr> <tr> <td>29</td> <td>Cast Iron</td> <td>Ferritic (long chips)</td> <td>230</td> <td></td> <td>140-260</td> </tr> <tr> <td rowspan="2" style="background-color: #ff0000; text-align: center;">K</td> <td>30</td> <td></td> <td>Low Tensile Strength</td> <td>180</td> <td></td> <td>160-240</td> </tr> </table>	Stainless Steel	15	Stainless Steel	Non Hardened	200	50-120	60-160	16	Cast Ferritic	Hardened	330	40-100	50-140	17	Stainless Steel	Austenitic	200	50-120	60-160	18	Cast Austenitic	Hardened	330	40-100	50-140	Malleable Cast Iron	28	Malleable	Ferritic (short chips)	130		160-280	29	Cast Iron	Ferritic (long chips)	230		140-260	K	30		Low Tensile Strength	180		160-240	pages 6-12
Stainless Steel	15		Stainless Steel	Non Hardened	200	50-120	60-160																																								
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Designated Chip Former Geometry for Parting Off and Grooving

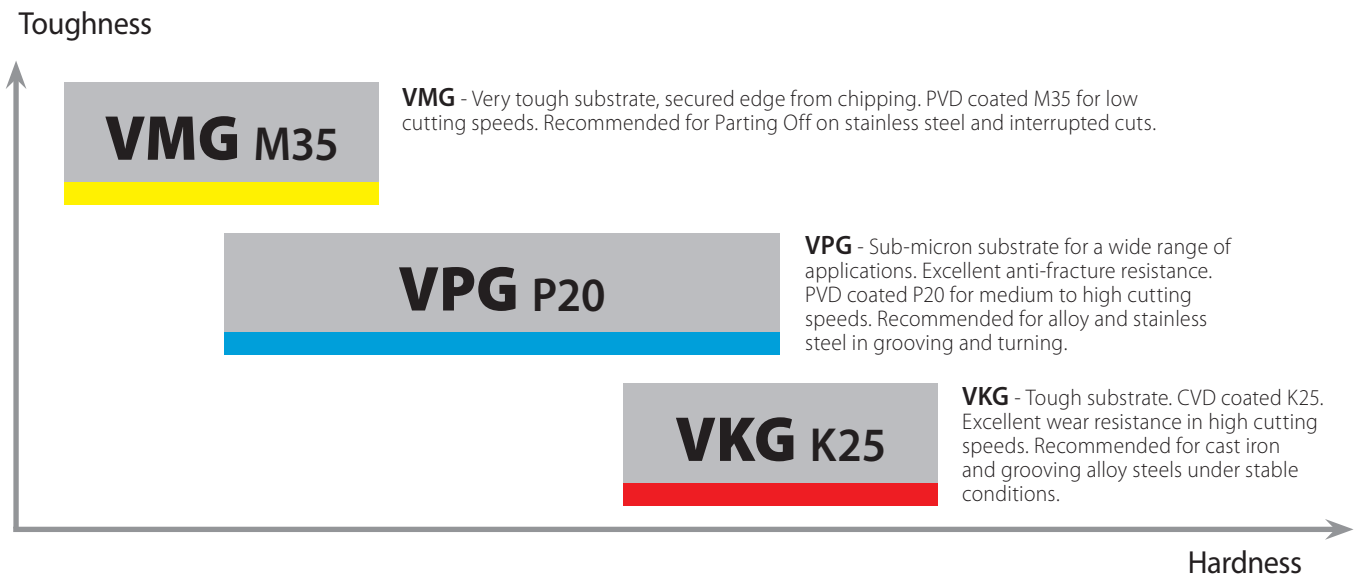
Application	Material Group	Standard Conditions	Extreme Conditions				
 <p>Parting Off</p>	<table border="1"> <tr> <td>P Alloy Steel</td> <td>H Hardened Material</td> </tr> <tr> <td>K Cast Iron</td> <td></td> </tr> </table>	P Alloy Steel	H Hardened Material	K Cast Iron		 <p>GT Recommended choice for machining alloy and stainless steel. Positive rake chip former leads to low cutting forces during cutting. A multifunctional chip former for parting, grooving and turning.</p>	 <p>GP Recommended choice for machining cast iron, for interrupted cuts and for unstable applications where accuracy and overall machining stability are not clear. Reinforced cutting edge for parting off and grooving.</p>
P Alloy Steel	H Hardened Material						
K Cast Iron							
 <p>Grooving</p>	<table border="1"> <tr> <td>M Stainless Steel</td> <td>S Heat Resistance</td> </tr> <tr> <td>N Non-Ferrous</td> <td>P Mild Steel</td> </tr> </table>	M Stainless Steel	S Heat Resistance	N Non-Ferrous	P Mild Steel	 <p>GM/GF Recommended choice for stainless steel. Positive sharp cutting edge decreases build-up on edge for parting off and grooving in low feeds.</p>	 <p>GT Recommended choice for machining alloy and stainless steel. Positive rake chip former leads to low cutting forces during cutting, with multifunctional chip former for parting, grooving and turning.</p>
M Stainless Steel	S Heat Resistance						
N Non-Ferrous	P Mild Steel						

Designated Chip Former Geometry for Turning, Profiling and Threading

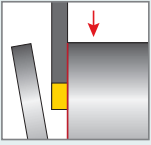




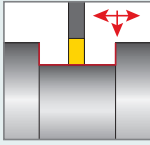




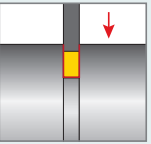




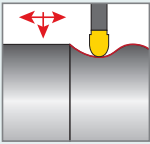




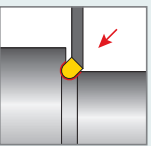




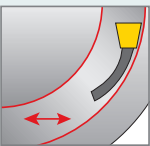




Application	Standard Conditions
 <p>Turning</p>	 <p>GT Recommended choice for machining alloy and stainless steel. Positive rake chip former leads to low cutting forces during cutting, with multifunctional chip former for parting off, grooving and turning.</p>
 <p>Profiling</p>	 <p>GR Recommended choice for grooving, undercut and profiling. Round shape geometric for profiling, and positive rake chip former with multifunctional chip control.</p>
 <p>Threading</p>	 <p>RS/LS Varied range of threading standards for machining between shoulders and close to the spindle.</p>

Designated Carbide Grade for Desired Application

Toughness vs. Hardness

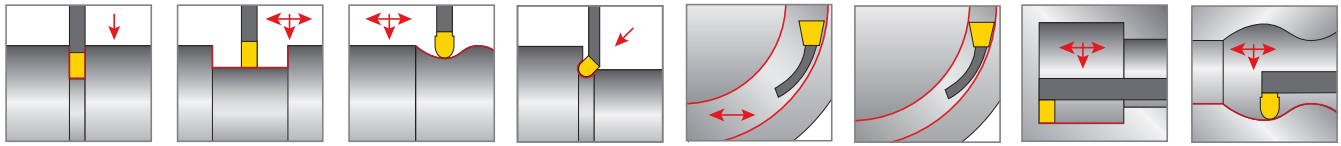


Recommended Carbide Grade for Designated Application

Application	Improved Chipping Resistance	Improved Wear Resistance	Application	Improved Chipping Resistance	Improved Wear Resistance
 Parting Off	 	 	 Turning	 	 
 Grooving	 	 	 Profiling	 	 
 Undercut	 	 	 Face Turning	 	 

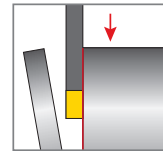
Technical Data

Recommended Cutting Speeds Vc [m/min]



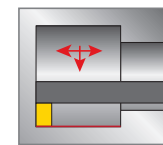
Material Group	Vargus No.	Material	Hardness Brinell HB	Carbide Grade			
				VMG PVD M35	VPG PVD P20	VKG CVD K25	
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	100-160	120-260	120-280
	2		Medium Carbon (C=0.25-0.55%)	150	80-140	90-220	90-250
	3		High Carbon (C=0.55-0.85%)	170	80-140	90-220	90-250
	4	Low Alloy Steel (alloying elements ≤5%)	Non Hardened	180	80-140	90-220	90-250
	5		Hardened	275	50-120	60-150	60-180
	6	High Alloy Steel (alloying elements >5%)	Annealed	200	50-100	90-150	90-250
	7		Hardened	325	40-70	50-100	60-160
	8	Cast Steel	Low Alloy (alloying elements <5%)	200	50-100	90-150	90-250
	9		High Alloy (alloying elements >5%)	225	50-100	60-150	60-180
	M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	50-80	60-160
12		Hardened		330	40-80	50-140	
13		Stainless Steel Austenitic	Austenitic	180	50-80	60-160	
14			Super Austenitic	200	50-80	60-160	
15		Stainless Steel Cast Ferritic	Non Hardened	200	50-80	60-160	
16			Hardened	330	40-80	50-140	
17		Stainless Steel Cast Austenitic	Austenitic	200	50-80	60-160	
18			Hardened	330	40-80	50-140	
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130		160-200	160-280
	29		Pearlitic (long chips)	230		140-220	140-260
	30	Grey Cast Iron	Low Tensile Strength	180		160-200	160-280
	31		High Tensile Strength	260		100-200	100-240
	32	Nodular Sg Iron	Ferritic	160		100-200	100-240
	33		Pearlitic	260		100-200	100-240
N(K) Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	150-300		
	35		Aged	100	150-250		
	36	Aluminium Alloys Cast	Cast	75	150-300		
	37		Cast & Aged	90	150-300		
	38	Aluminium Alloys Cast Si 13-22%	130	150-250			
	39	Copper and Copper Alloys	Brass	90	150-300		
40	Bronze And Non Leaded Copper		100	150-300			
S(M) Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	25-40	30-50	
	20		Aged (iron based)	280	25-35	20-50	
	21		Annealed (nickel or cobalt based)	250	25-35	20-50	
	22		Aged (nickel or cobalt based)	350	25-35	20-50	
23	Titanium Alloys	Pure 99.5 Ti	400Rm	25-40	30-50		
24		α+β Alloys	1050Rm	25-60	30-70		
H(K) Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc		20-40	30-50
	26		51-55HRc		15-30	25-45	

Vc [m/min] for Parting Off



For Parting Off, improved chip forming and chip evacuation; **reduce speed by ≈ 30%**.

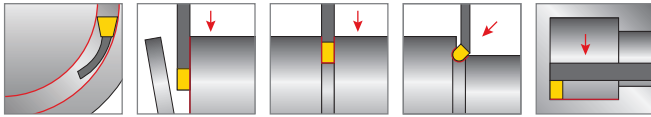
Vc [m/min] for Boring



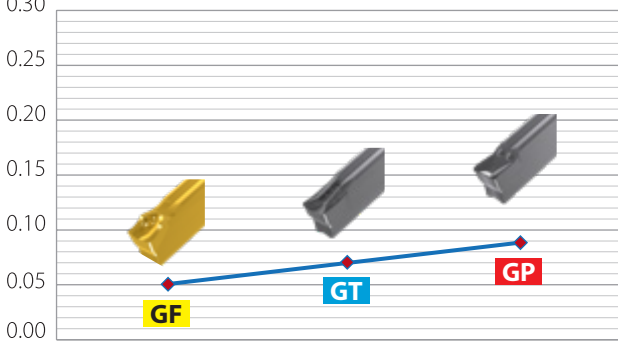
Reduce speed by ≈ 30% for improved chip forming and evacuation.

For gummy materials, such as stainless steel and heat resistant metals or in case of build up on edge (cold welding), **increase speed by ≈ 20%**.

Feed Rate (f) Starting Point for Deep Grooving, Face Grooving & Parting Off

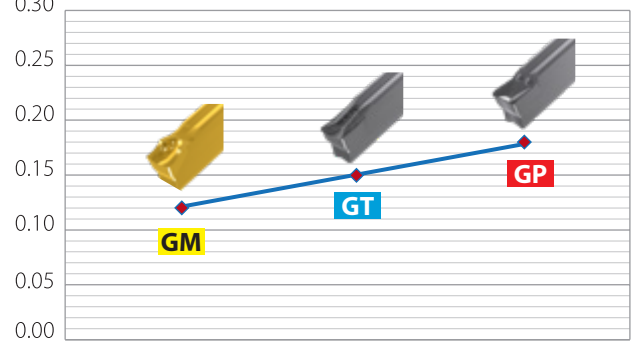


2.0 mm Insert Width



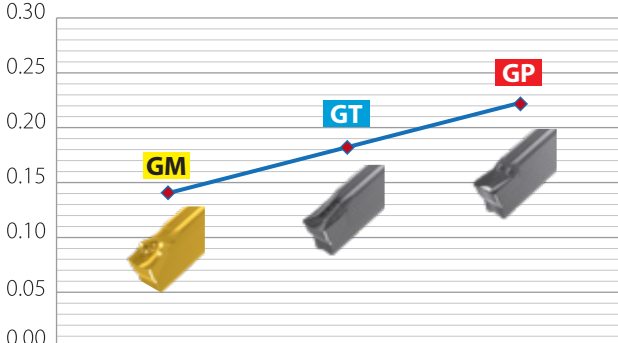
Chip Former	GF	GT	GP
f [mm/rev]	0.06	0.08	0.10

3.0 mm Insert Width



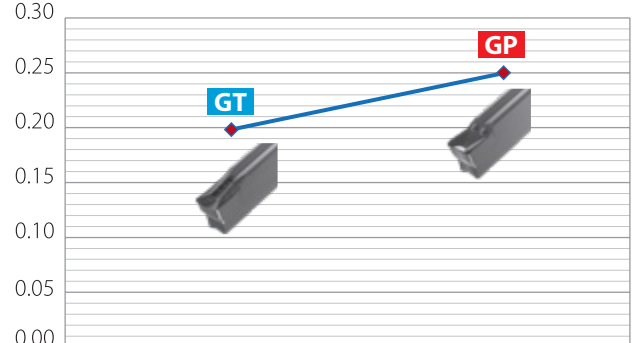
Chip Former	GM	GT	GP
f [mm/rev]	0.12	0.15	0.18

4.0 mm Insert Width



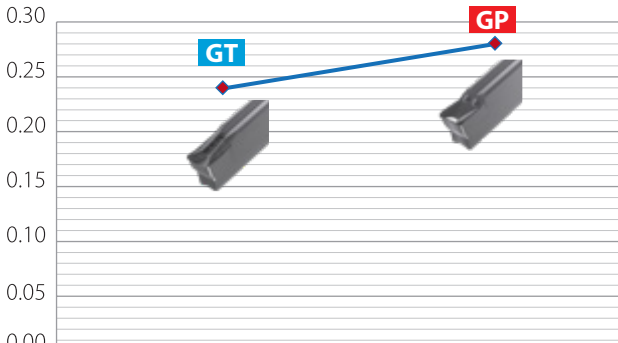
Chip Former	GM	GT	GP
f [mm/rev]	0.14	0.18	0.22

5.0 mm Insert Width



Chip Former	GT	GP
f [mm/rev]	0.20	0.25

6.0 mm Insert Width



Chip Former	GT	GP
f [mm/rev]	0.24	0.28

Correct chip forming is essential for chip evacuation. Low feed rates with sufficient chip evacuation improve process stability and tool life. Feed rate should be increased only when improved evacuation is needed to prevent wall scratching or chip entanglement.

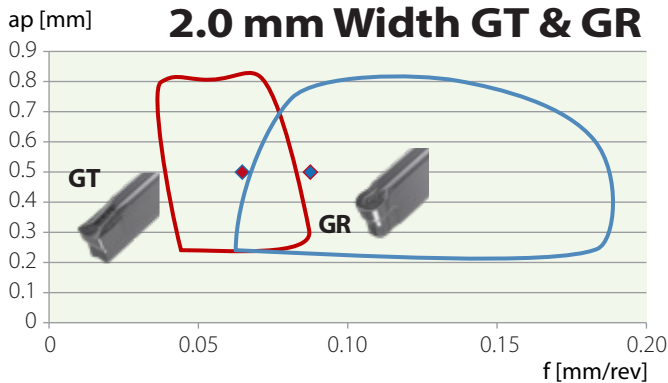
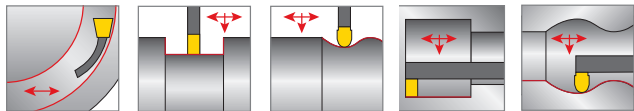
For Parting Off, it is recommended to reduce feed rate by 30% while using R / L inserts.

For Parting Off, it is recommended to reduce feed rate by 50% as the insert approaches rotation center. Reduce feed when the insert approaches approx. 6.0 mm diameter.

For better chip evacuation in Face Grooving, creating short chips is preferable. It is therefore recommended to work in short intervals (pecking), at a maximum grooving depth of twice the insert width. Taking into consideration the workpiece material and groove diameter, it is recommended to begin the first cut at no longer than the insert's width.

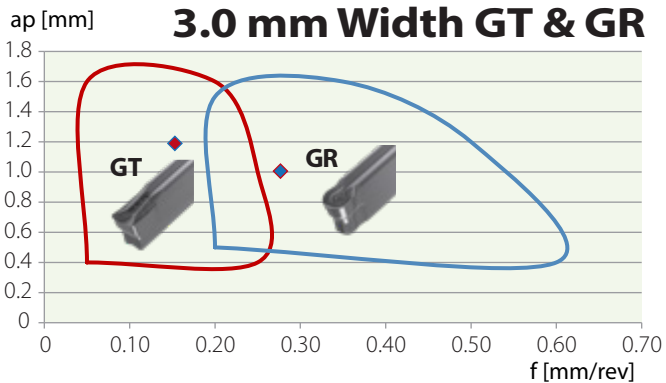
For **internal turning**, reduce feed by 25% when machining depth exceeds 3xD shank diameter.

Feed Rate (f) and Depth of Cuts for Axial Turning , Profiling and Face Grooving



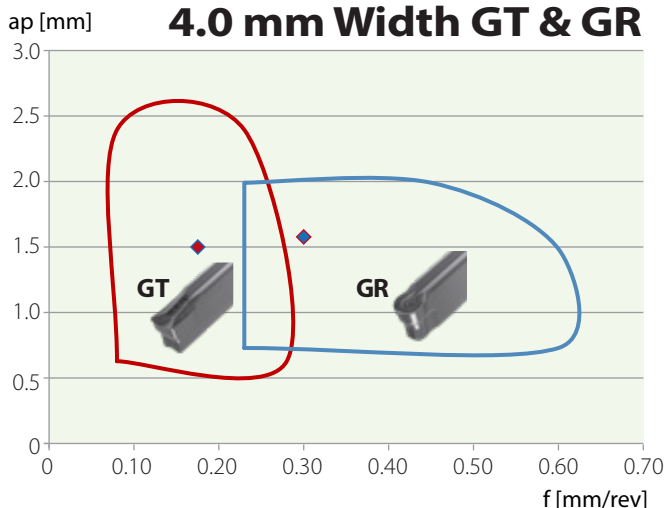
Recommended Starting Point:

	◆ GT 2.0 mm	◆ GR 2.0 mm
ap [mm]	0.5	0.5
f [mm/rev]	0.06	0.08



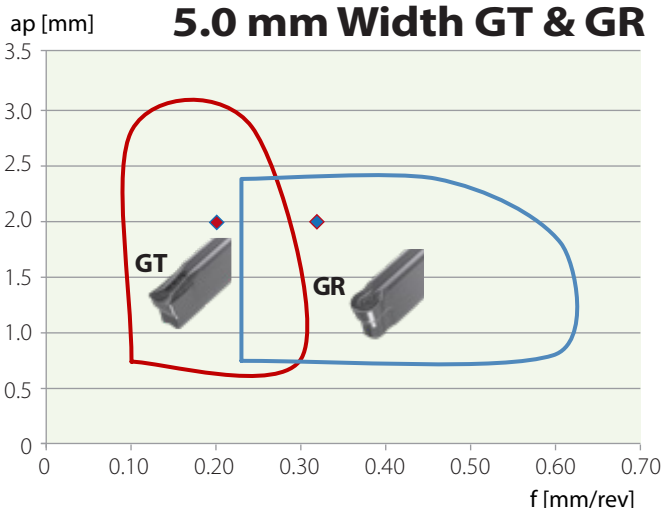
Recommended Starting Point:

	◆ GT 3.0 mm	◆ GR 3.0 mm
ap [mm]	1.20	1.00
f [mm/rev]	0.14	0.25



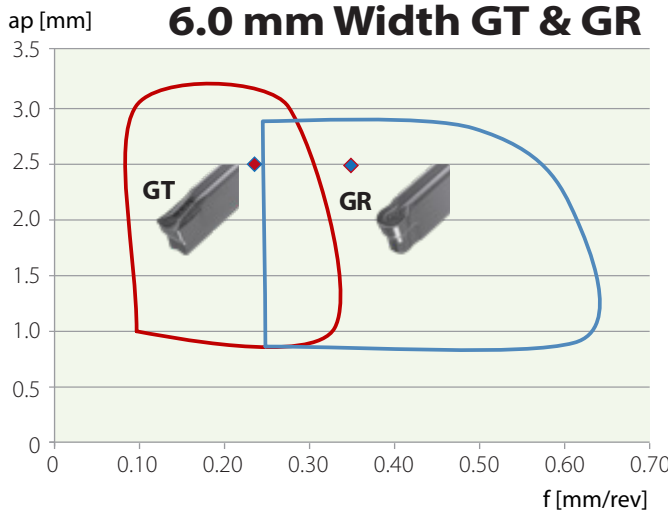
Recommended Starting Point:

	◆ GT 4.0 mm	◆ GR 4.0 mm
ap [mm]	1.50	1.60
f [mm/rev]	0.18	0.30



Recommended Starting Point:

	◆ GT 5.0 mm	◆ GR 5.0 mm
ap [mm]	2.0	2.0
f [mm/rev]	0.20	0.32



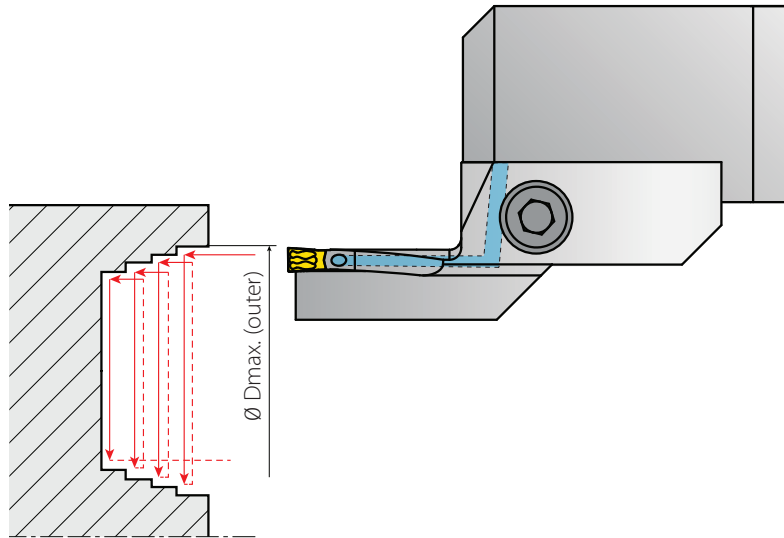
Recommended Starting Point:

	◆ GT 6.0 mm	◆ GR 6.0 mm
ap [mm]	2.50	2.50
f [mm/rev]	0.24	0.35

Face Groove and Turn Machining Recommendations

Roughing:

Method 1:



1. Start by face grooving close to outer diameter, followed by face turning toward the center.
2. Axial retract away from the workpiece for about 0.3 mm.
3. Repeat the above cycle (points 1 & 2), each time deeper into the workpiece, with a maximum grooving depth of twice the insert width.
4. Keep about 0.4 mm of additional material on workpiece, which will be removed in the finishing operation as recommended below.

Method 2:

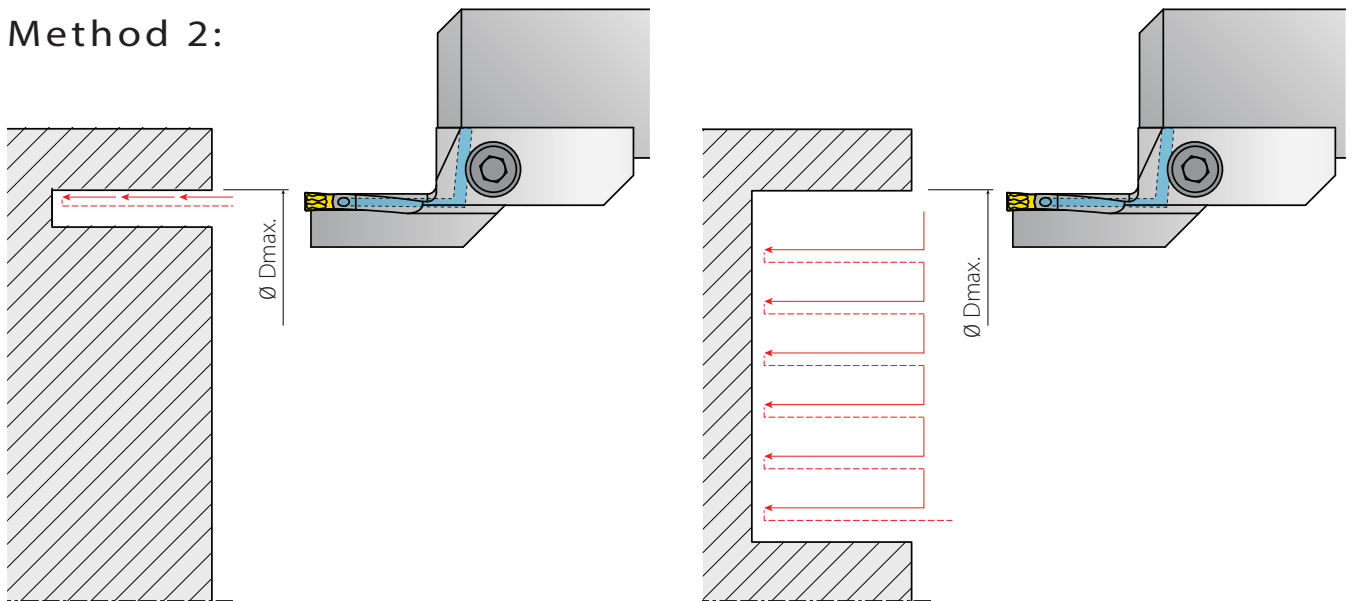


Figure A

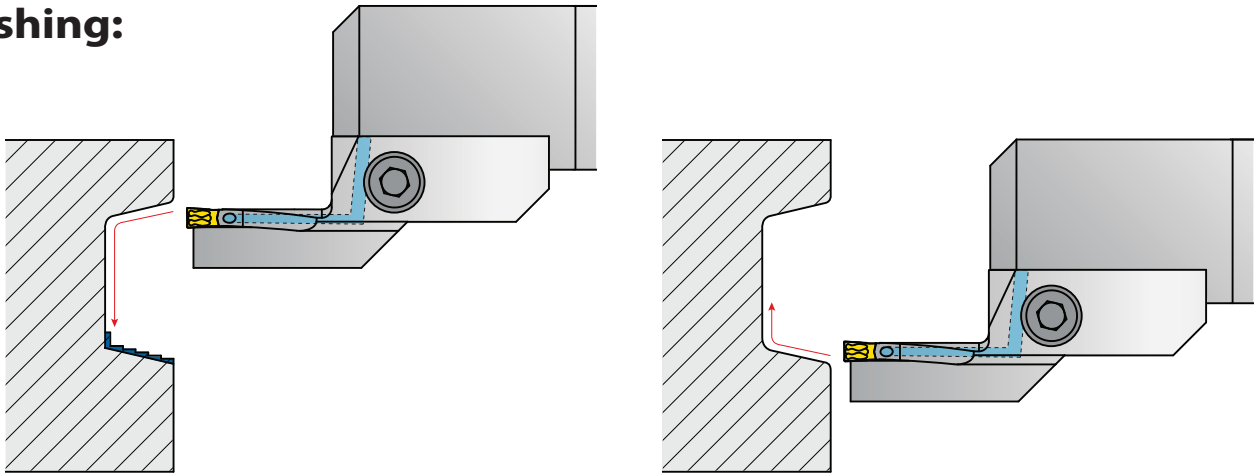
Figure B

1. Start by face grooving close to outer diameter (Figure A). Work in short intervals (pecking) at maximum grooving depth of twice the insert width.
2. Follow this by face grooving towards the center of the workpiece as required for covering the entire pocket shape (Figure B). Each additional groove width should be smaller than the insert width by approx. 0.3 mm.
3. Only the first groove (Figure A) is done in short intervals (pecking) for better chip evacuation. Other grooves can be done continuously based on recommended feeds for the application.
4. Recommended chip forming for Alloy Steel is GP. For Stainless Steel please use GT.

See the following page for Finishing Recommendations.

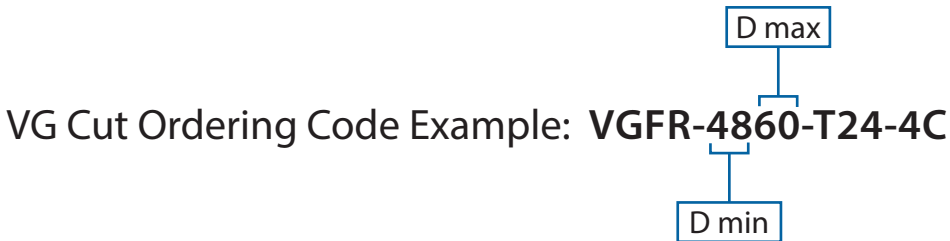
Face Groove and Turn Machining Recommendations

Finishing:



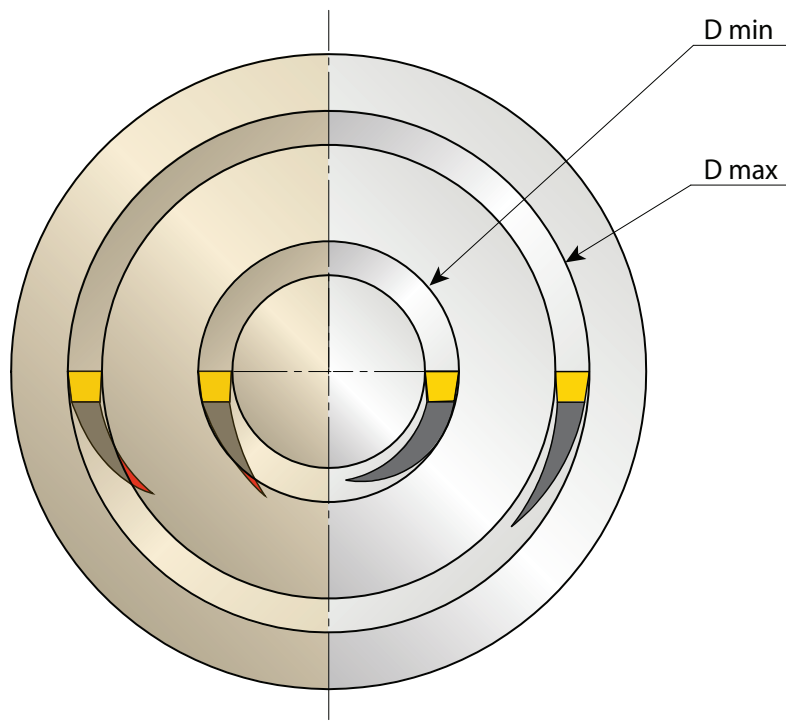
1. Start the Profiling operation from the outer diameter of the workpiece and work in. Generate the desired radius followed by the face turning operation close to the tangential point of the inner radius.
2. Start the Profiling operation from the inner diameter towards the bottom of the workpiece, generate the desired radius as needed.

Selecting the Correct Face Grooving Module



Wrong Support

Correct Support

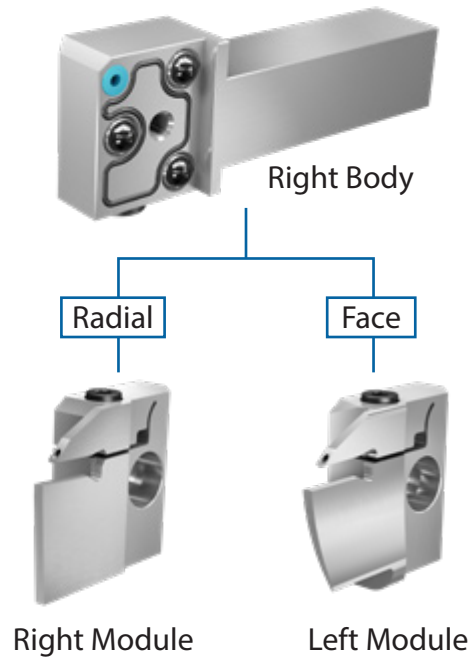


User Guide for Modular System

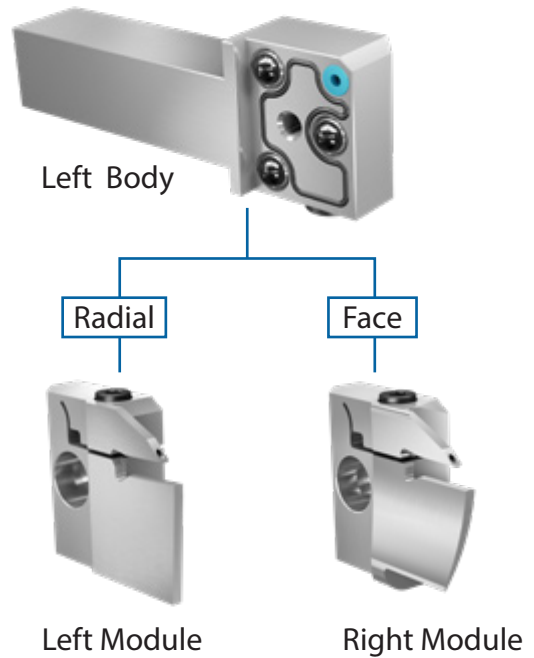
Choosing the correct Holder for the application (Body + Module):

* High pressure coolant system shown.

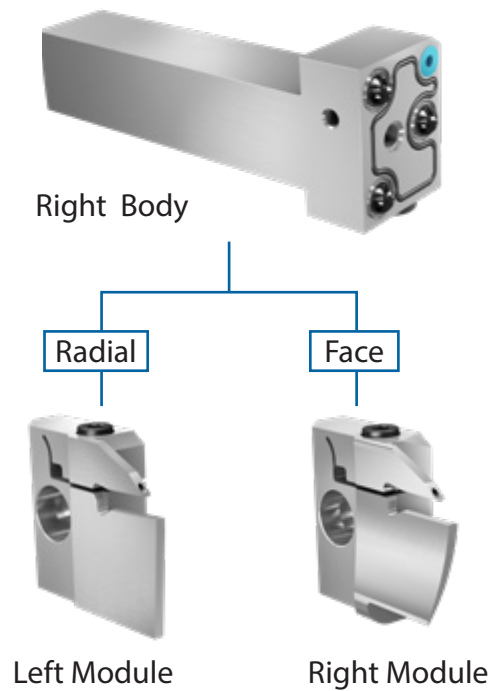
Parallel Right Tools



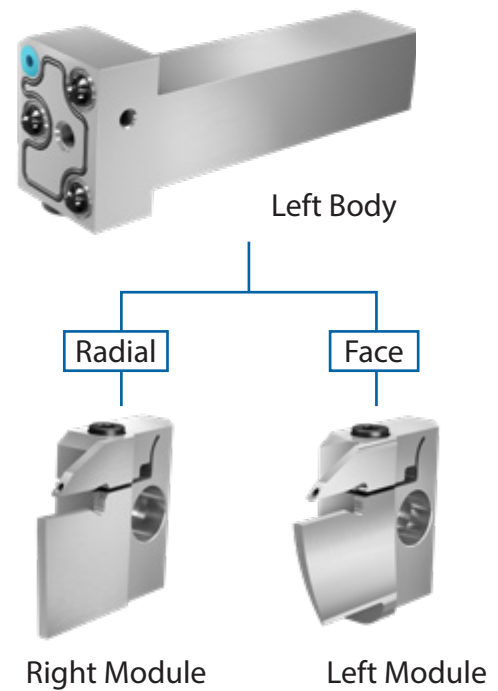
Parallel Left Tools



90° Right Tools

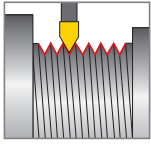


90° Left Tools



Technical Data

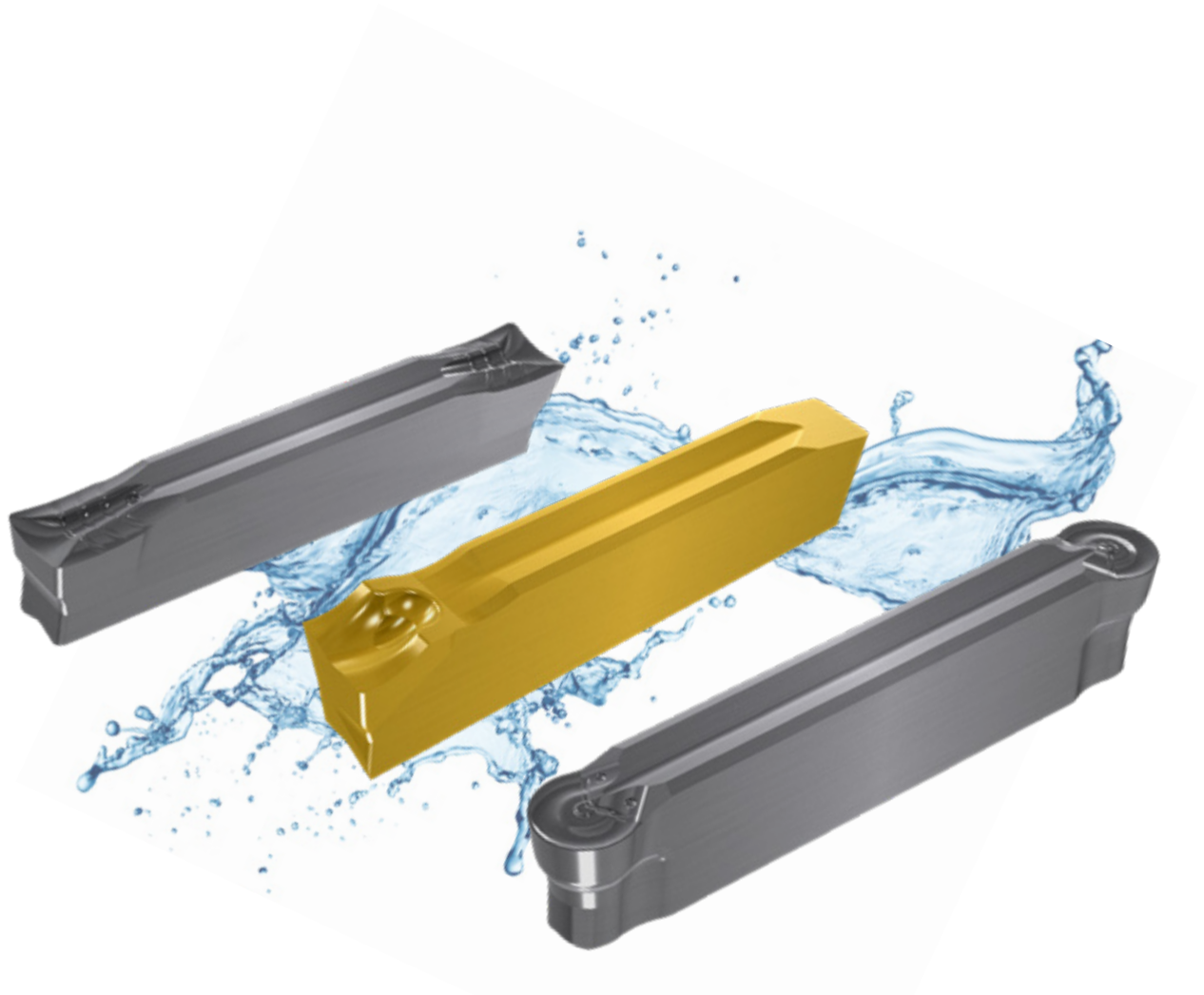
Recommended Cutting Speeds Vc [m/min] for Threading



Material Group	Vargus No.	Material		Hardness Brinell HB	Carbide Grade
					VPG PVD P20
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	120-260
	2		Medium Carbon (C=0.25-0.55%)	150	90-220
	3		High Carbon (C=0.55-0.85%)	170	90-220
	4	Low Alloy Steel (alloying elements ≤5%)	Non Hardened	180	90-220
	5		Hardened	275	60-160
	6		Hardened	350	50-100
	7	High Alloy Steel (alloying elements >5%)	Annealed	200	90-220
	8		Hardened	325	50-100
	9	Cast Steel	Low Alloy (alloying elements <5%)	200	90-220
	10		High Alloy (alloying elements >5%)	225	60-160
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	60-160
	12		Hardened	330	50-140
	13	Stainless Steel Austenitic	Austenitic	180	60-160
	14		Super Austenitic	200	60-160
	15	Stainless Steel Cast Ferritic	Non Hardened	200	60-160
	16		Hardened	330	50-140
	17	Stainless Steel Cast Austenitic	Austenitic	200	60-160
	18		Hardened	330	50-140
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	160-240
	29		Pearlitic (long chips)	230	140-220
	30	Grey Cast Iron	Low Tensile Strength	180	160-240
	31		High Tensile Strength	260	100-200
	32	Nodular Sg Iron	Ferritic	160	100-200
	33		Pearlitic	260	100-200
N(K) Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	200-450
	35		Aged	100	200-350
	36	Aluminium Alloys	Cast	75	200-450
	37		Cast & Aged	90	200-450
	38	Aluminium Alloys	Cast Si 13-22%	130	200-350
	39	Copper and Copper Alloys	Brass	90	200-450
	40		Bronze And Non Leaded Copper	100	200-450
S(M) Heat Resistant Material	19	High Temperature Alloys	Annealed (iron based)	200	30-50
	20		Aged (iron based)	280	20-50
	21		Annealed (nickel or cobalt based)	250	20-50
	22		Aged (nickel or cobalt based)	350	20-50
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	30-50
	24		α+β Alloys	1050Rm	30-70
H(K) Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	20-40
	26			51-55HRc	15-30

VG-Cut Inserts

Parting Off & Deep Grooving - Double Sided Inserts (2.0 - 6.0 mm).....	14
Parting Off & Deep Grooving - Single Sided Inserts (2.0 - 4.0 mm).....	15
Turning & Profiling (2.0 - 6.0 mm).....	16
Threading (3.0 mm).....	17



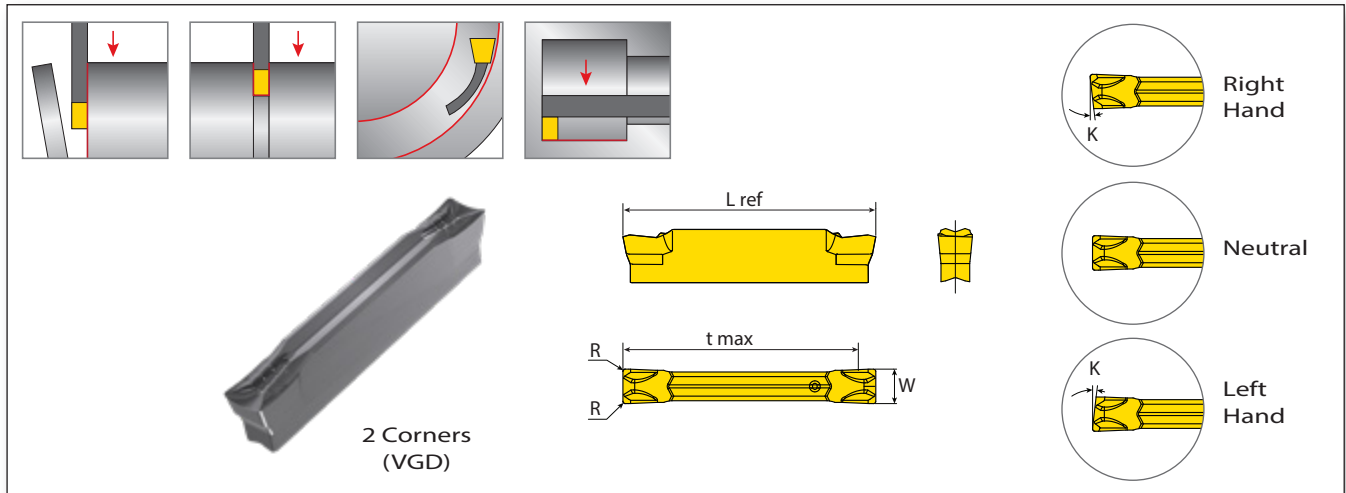
VG-Cut Inserts Ordering Code

VG	D	3.00	020	6R	GP	VPG
1	2	3	4	5	6	7

1 – Line Name Deep Grooving & Parting Off	2 – Number of Cutting Corners D - Double S - Single	3 – Insert Width 2.0, 3.0, 4.0, 5.0, 6.0 mm	4 – Corner Radius 0.20 mm Threading Standard
5 – RH or LH (for Grooving) 4, 6, 15 Deg. RH or LH None - Neutral	5 – RH or LH (for Threading) RH Helix LH Helix	6 – Top Rake Geometry GP, GM, GT, GR RS - Close to right shoulder LS - Close to left shoulder	7 – Carbide Grade VPG, VMG, VKG

Parting Off & Deep Grooving - Double Sided Inserts

2.0 - 6.0 mm Width

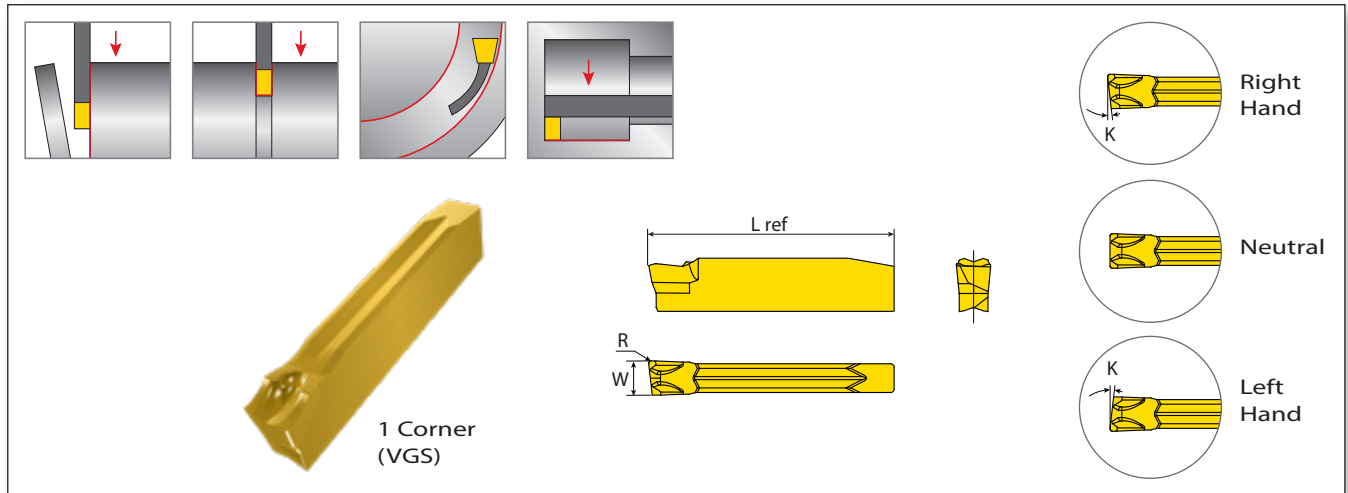


	Pocket Size	Ordering Code	Dimensions mm					Feed Range (mm/rev)	Grade			
			$W^{\pm 0.04}$	R	t_{max}	K°	L_{ref}		VPG	VMG	VKG	
Positive cutting edge, for small parts, thin wall pipes & soft materials	GF	2	VGD2.00-020-GF	2.00	0.20	20.0	0.0	22.0	0.03 - 0.10	•	•	◦
		2	VGD2.00-015-6R-GF	2.00	0.15	20.0	6.0	22.0	0.03 - 0.10	•	◦	◦
		2	VGD2.00-015-6L-GF	2.00	0.15	20.0	6.0	22.0	0.03 - 0.10	•	◦	◦
		2	VGD2.00-020-15R-GF	2.00	0.20	20.0	15.0	22.0	0.03 - 0.08	•	◦	◦
		2	VGD2.00-020-15L-GF	2.00	0.20	20.0	15.0	22.0	0.03 - 0.08	•	◦	◦
Positive sharp cutting edge, for low feed & speed	GM	3	VGD3.00-015-GM	3.00	0.15	20.0	0.0	22.0	0.06 - 0.16	•	◦	•
		3	VGD3.00-030-GM	3.00	0.30	20.0	0.0	22.0	0.08 - 0.22	•	•	•
		3	VGD3.00-020-6R-GM	3.00	0.20	20.0	6.0	22.0	0.05 - 0.16	•	•	◦
		3	VGD3.00-020-6L-GM	3.00	0.20	20.0	6.0	22.0	0.05 - 0.16	◦	•	◦
		4	VGD4.00-040-GM	4.00	0.40	23.0	0.0	25.0	0.08 - 0.25	•	•	◦
Multipurpose geometry, for general use	GT	2	VGD2.00-020-GT	2.00	0.20	20.0	0.0	22.0	0.03 - 0.12	•	◦	•
		3	VGD3.00-030-GT	3.00	0.30	20.0	0.0	22.0	0.05 - 0.15	•	◦	•
		4	VGD4.00-020-GT	4.00	0.20	23.0	0.0	25.0	0.05 - 0.15	•	◦	◦
		4	VGD4.00-040-GT	4.00	0.40	23.0	0.0	25.0	0.05 - 0.18	•	◦	•
		5	VGD5.00-040-GT	5.00	0.40	23.0	0.0	25.0	0.08 - 0.25	•	◦	•
Round multipurpose geometry for profiling & undercut	GR	2	VGD2.00-100-GR	2.00	1.00	18.0	0.0	22.0	0.03 - 0.12	•	◦	◦
		3	VGD3.00-150-GR	3.00	1.50	18.0	0.0	22.0	0.05 - 0.15	•	◦	◦
		4	VGD4.00-200-GR	4.00	2.00	20.0	0.0	25.0	0.05 - 0.18	•	◦	•
		6	VGD6.00-300-GR	6.00	3.00	20.0	-	25.0	0.06 - 0.20	•	◦	◦
Blunt reinforced cutting edge for high feed & speed	GP	2	VGD2.00-020-GP	2.00	0.20	20.0	0.0	22.0	0.03 - 0.14	•	•	•
		3	VGD3.00-020-GP	3.00	0.20	20.0	0.0	22.0	0.06 - 0.20	•	•	•
		3	VGD3.00-015-6R-GP	3.00	0.15	20.0	6.0	22.0	0.06 - 0.16	•	•	◦
		3	VGD3.00-015-6L-GP	3.00	0.15	20.0	6.0	22.0	0.06 - 0.16	◦	•	◦
		4	VGD4.00-030-GP	4.00	0.30	23.0	0.0	25.0	0.08 - 0.24	•	•	•
		4	VGD4.00-020-4R-GP	4.00	0.20	23.0	4.0	25.0	0.06 - 0.22	◦	•	◦
		4	VGD4.00-020-4L-GP	4.00	0.20	23.0	4.0	25.0	0.06 - 0.22	◦	•	◦
		5	VGD5.00-040-GP	5.00	0.40	23.0	0.0	25.0	0.08 - 0.28	•	◦	•
6	VGD6.00-040-GP	6.00	0.40	23.0	0.0	25.0	0.10 - 0.30	•	◦	•		

• In stock ◦ Available upon request

Parting Off & Deep Grooving - Single Sided Inserts

2.0 - 4.0 mm Width

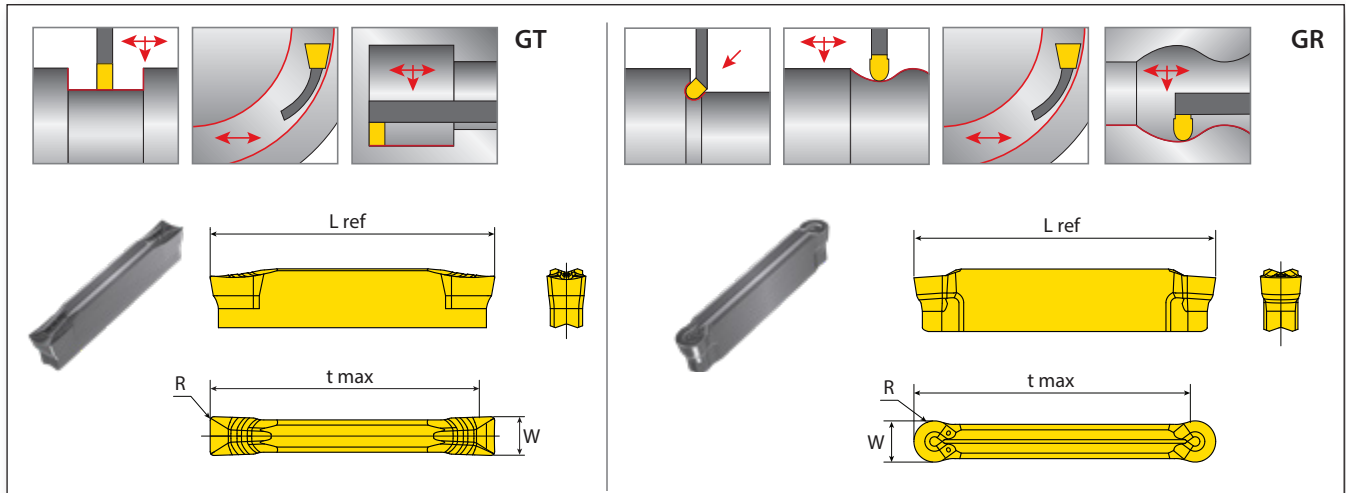


	Pocket Size	Ordering Code	Dimensions mm					Feed Range (mm/rev)	Grade		
			$W_{\pm 0.04}$	R	t max	K°	L ref		VPG	VMG	VKG
Positive cutting edge, for small parts, thin wall pipes & soft materials	2	VGS2.00-015-6R-GF	2.00	0.15	∞	6.0	21.3	0.03 - 0.10	○	●	○
		VGS2.00-015-6L-GF	2.00	0.15	∞	6.0	21.3	0.03 - 0.10	○	●	○
Positive sharp cutting edge, for low feed & speed	3	VGS3.00-020-GM	3.00	0.20	∞	0.0	22.0	0.08 - 0.22	●	●	○
	3	VGS3.00-020-6R-GM	3.00	0.20	∞	6.0	21.3	0.05 - 0.16	○	●	○
	3	VGS3.00-020-6L-GM	3.00	0.20	∞	6.0	21.3	0.05 - 0.16	○	●	○
	4	VGS4.00-040-GM	4.00	0.40	∞	0.0	25.0	0.08 - 0.25	●	●	○
	4	VGS4.00-040-4R-GM	4.00	0.40	∞	4.0	24.3	0.06 - 0.18	○	●	○
	4	VGS4.00-040-4L-GM	4.00	0.40	∞	4.0	24.3	0.06 - 0.18	○	●	○
Blunt reinforced cutting edge for high feed & speed	3	VGS3.00-020-GP	3.00	0.20	∞	0.0	22.0	0.06 - 0.20	●	●	○
	3	VGS3.00-020-6R-GP	3.00	0.20	∞	6.5	21.3	0.06 - 0.16	○	●	○
	3	VGS3.00-020-6L-GP	3.00	0.20	∞	6.5	21.3	0.06 - 0.16	○	●	○
	4	VGS4.00-030-GP	4.00	0.30	∞	0.0	25.0	0.08 - 0.24	●	●	○
	4	VGS4.00-030-4R-GP	4.00	0.30	∞	4.0	24.3	0.06 - 0.22	○	●	○
	4	VGS4.00-030-4L-GP	4.00	0.30	∞	4.0	24.3	0.06 - 0.22	○	●	○

● In stock ○ Available upon request

Turning & Profiling

2.0 - 6.0 mm Width

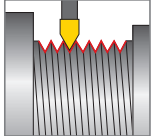


	Pocket Size	Ordering Code	Dimensions mm				Feed Range (mm/rev)	Grade			
			W ^{±0.05}	R	t max	K°		L ref	VPG	VMG	VKG
Positive rake chip former with multifunctional chip control. Low cutting forces during cutting.	2	VG2.00-020-GT	2.00	0.20	20.0	-	22.0	0.05 - 0.10	●	○	●
	3	VG3.00-030-GT	3.00	0.30	20.0	-	22.0	0.05 - 0.25	●	○	●
	4	VG4.00-020-GT	4.00	0.20	23.0	-	25.0	0.05 - 0.18	●	○	○
	4	VG4.00-040-GT	4.00	0.40	23.0	-	25.0	0.08 - 0.28	●	○	●
	5	VG5.00-040-GT	5.00	0.40	23.0	-	25.0	0.08 - 0.25	●	○	●
	6	VG6.00-040-GT	6.00	0.40	23.0	-	25.0	0.10 - 0.28	●	○	●
Round shape geometric design for profiling. Positive rake chip former and multifunctional chip control for undercut and profiling.	2	VG2.00-100-GR	2.00	1.00	18.0	-	22.0	0.06 - 0.12	●	○	●
	3	VG3.00-150-GR	3.00	1.50	18.0	-	22.0	0.06 - 0.18	●	○	●
	4	VG4.00-200-GR	4.00	2.00	20.0	-	25.0	0.06 - 0.20	●	○	●
	6	VG6.00-300-GR	6.00	3.00	20.0	-	25.0	0.06 - 0.20	●	○	○


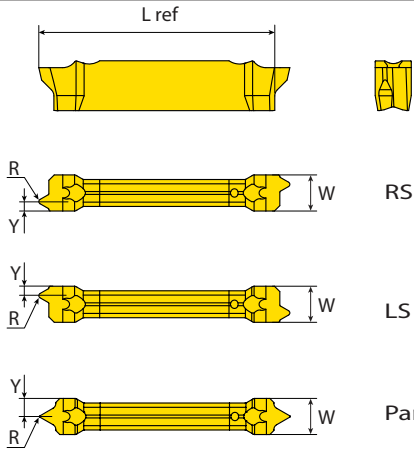
● In stock ○ Available upon request

Threading

3.0 mm Width

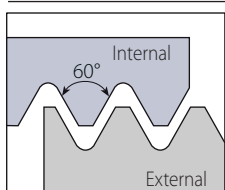


RS/LS Varied range of threading standards for machining between shoulders and close to spindle.

To be used with Monoblock tools (VGE..T08 or T12) or reinforced monoblock tools (PH) only.

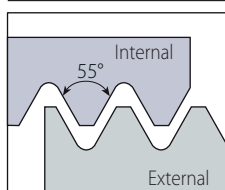
Partial Profile 60°



Pocket Size	Ordering Code	Dimensions mm					No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch mm	R	Y	L ref				
3	VGD3.0A60RH	3.00	0.5-1.5	0.05	1.68	21.9	5 - 8	1.5°	●	Partial Profile A60

● In stock ○ Available upon request

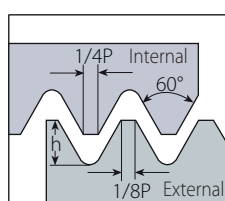
Partial Profile 55°



Pocket Size	Ordering Code	Dimensions mm					No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch TPI	R	Y	L ref				
3	VGD3.0A55RH	3.00	48-16	0.05	1.68	21.9	5 - 8	1.5°	●	Partial Profile A55

● In stock ○ Available upon request

ISO Metric



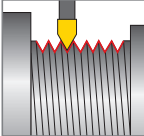
Defined by: R262 (DIN 13)
Tolerance class: 6H

Pocket Size	Ordering Code	Dimensions mm					No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch mm	h min	Y	L ref				
3	VGD3.0ISO0.50RH-RS/LS	3.00	0.50	0.31	0.53	21.9	5 - 7	2.5°	●	M3x0.5
3	VGD3.0ISO0.75RH-RS/LS		0.75	0.46	0.64		5 - 8		●	M5x0.75
3	VGD3.0ISO1.00RH-RS/LS		1.00	0.61	0.74		5 - 9		●	M6x1
3	VGD3.0ISO1.25RH-RS/LS		1.25	0.77	0.85		6 - 10		●	M8x1.25
3	VGD3.0ISO1.50RH-RS/LS		1.50	0.92	1.10		7 - 12		●	M10x1.5 Coarse
3	VGD3.0ISO1.75RH-RS/LS		1.75	1.07	1.20		8 - 14		●	M12x1.75 Coarse
3	VGD3.0ISO2.00RH-RS/LS		2.00	1.23	1.30		9 - 14		●	M16x2.0 Coarse
3	VGD3.0ISO2.50RH-RS/LS		2.50	1.53	1.55		8 - 14		●	M18x2.5 Coarse


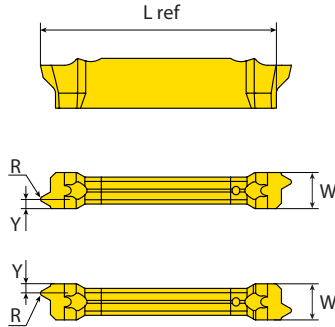
● In stock ○ Available upon request

Threading

3.0 mm Width (con't)



RS/LS Varied range of threading standards for machining between shoulders and close to spindle.

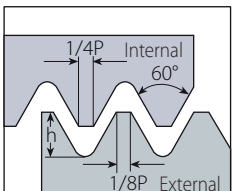



RS Full Profile

LS Full Profile

To be used with Monoblock tools (VGE..T08 or T12) or reinforced monoblock tools (PH) only.

American UN

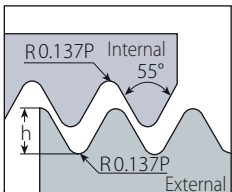


Defined by: ANSI B1.1:74
Tolerance class: 2B

Pocket Size	Ordering Code	Dimensions mm				No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch TPI	h min	Y				
3	VGD3.0UN32RH-RS/LS	3.00	32	0.49	0.66	5 - 8	2.5°	•	5/32"-32 UNC
3	VGD3.0UN28RH-RS/LS		28	0.56	0.71	5 - 9		•	3/16"-28 UNC
3	VGD3.0UN24RH-RS/LS		24	0.65	0.77	5 - 9		•	7/32"-24 UNC
3	VGD3.0UN20RH-RS/LS		20	0.78	0.86	6 - 10		•	1/4"-20 UNC
3	VGD3.0UN18RH-RS/LS		18	0.87	0.93	7 - 12		•	5/16"-18 UNC
3	VGD3.0UN16RH-RS/LS		16	0.97	1.10	7 - 12		◦	3/8"-16 UNC
3	VGD3.0UN14RH-RS		14	1.11	1.09	8 - 14		•	7/16"-14 UNC
3	VGD3.0UN14RH-LS		14	1.11	1.09	8 - 14		◦	7/16"-14 UNC
3	VGD3.0UN12RH-RS		12	1.30	1.30	8 - 14		•	9/16"-14 UNC
3	VGD3.0UN12RH-LS		12	1.30	1.30	8 - 14		◦	9/16"-14 UNC

• In stock ◦ Available upon request | LH Helix threads available upon request

Whitworth

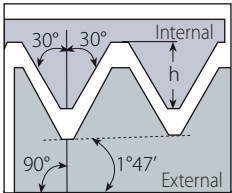


Defined by: B.S.84:1956, DIN 259, ISO228/1:1982
Tolerance class: Medium class A

Pocket Size	Ordering Code	Dimensions mm				No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch TPI	h min	Y				
3	VGD3.0W19RH-RS/LS	3.00	19	0.86	0.95	7 - 12	2.5°	•	1/2"-19BSW
3	VGD3.0W14RH-RS/LS		14	1.16	1.15	8 - 14		•	1/2"-14BSW
3	VGD3.0W11RH/LH		11	1.48	1.68	8-14		•	5/8"-11BSW

• In stock ◦ Available upon request | LH Helix threads available upon request

NPT



Defined by: USAS B2.1:1968
Tolerance class: Standard NPT

Pocket Size	Ordering Code	Dimensions mm				No. of Passes	Helix Deg	Grade	Min. Thread Diameter
		W ref	Pitch TPI	h min	Y				
3	VGD3.0NPT18RH-RS/LS	3.00	18	1.01	1.20	7 - 12	1.5°	•	1/4"-18NPT
3	VGD3.0NPT14RH-RS/LS		14	1.33	1.40	8 - 14		•	1/2"-14NPT
3	VGD3.0NPT11.5RH-RS/LS		11.5	1.64	1.60	9 - 15		◦	1"-11.5NPT

• In stock ◦ Available upon request | LH Helix threads available upon request

VG-Cut Tools

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VG-Cut Tools Ordering Code

Monoblock Toolholders

VG	E	R	2525	3	T12	PH	C
1	2	9	3	4	5	10	11

Blades

VG	P	32	4	D	C
1	2	7	4	8	11

Modules

VG	A	R	20	T25	4	S	C
1	2	9	7	5	4	8	11

Holdings/Bodies

VB	A	R	2525	32	C
1	6	9	3	7	11

1 – Tools/holders VG - Deep Grooving & Parting Off VB - Holders	2 – Type E - External tool P - Universal blade W - Reinforced blade A - Radial module F - Face module	3 – For External Holders Shank Size	4 – Pocket Size 2, 3, 4, 5, 6
5 – Depth of Cut T12 - Limit Depth of Cut 12 mm	6 – Holders A - Universal	7 – Blade Height 20, 25, 26, 32 00, 45, 90 Approach angle	8 – Number of Pockets D - Double S - Single
9 – RH or LH R - RH L - LH None - Neutral	10 – PH PH - Reinforced blade structure	11 – Coolant C - Coolant	

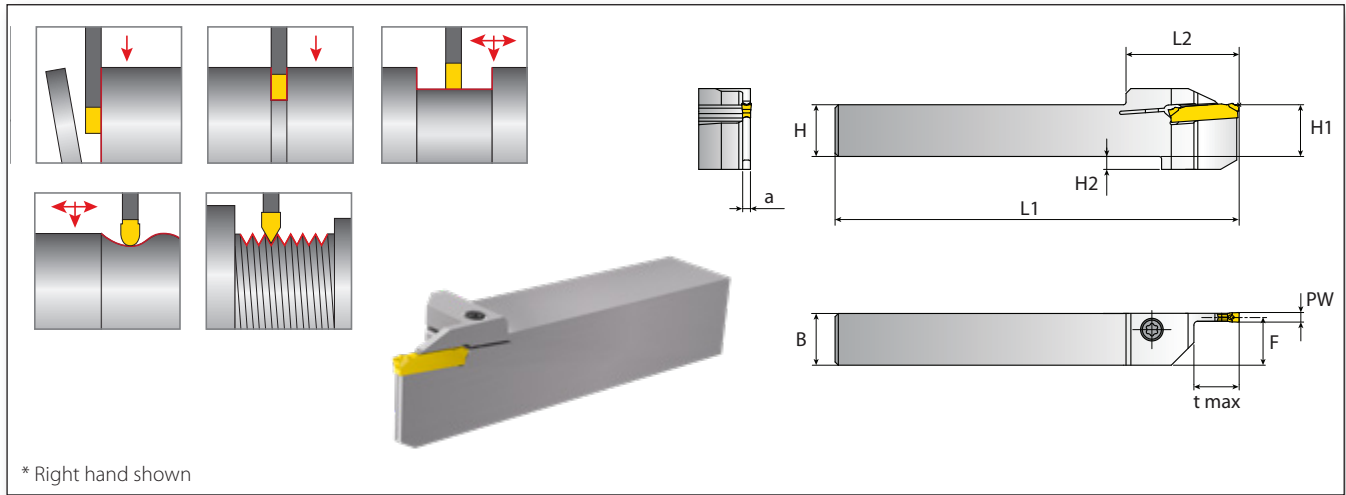
Internal Holders

VG	I	R	20-25	3	C
1	2	3	4	5	6

1 – Tools/holders VG - Grooving & Turning	2 – Type I - Internal	3 – RH or LH R - RH L - LH	4 – Shank Diameter Shank Dia. - D min. - Ex. 20-25	5 – Pocket Size 2, 3, 4, 5, 6	6 – Coolant C - Coolant
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External Monoblock Tools

Grooving, Parting Off, Turning & Threading



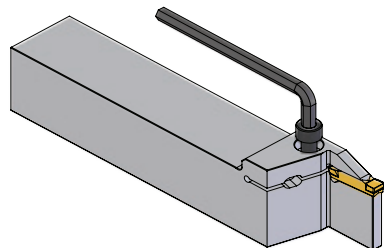
* Right hand shown

Ordering Code		Dimensions mm								Spare Parts	
RH/LH	PW	t max	HXB	H1	F	L1	L2	a	H2		
VGER/L1616-2T12	2	12	16x16	16	15.3	125	35	1.4	4.0	SM4.0x16-T20	Key
VGER/L2020-2T12			20x20	20	19.3	125	35	1.4	---		
VGER/L2525-2T08			25x25	25	24.3	125	35	1.4	---		
VGER/L1212-3T12	3	12	12x12	12	10.8	125	35	2.4	4.0	SM4.0x18-T20	K6T
VGER/L1616-3T12			16x16	16	14.8	125	35	2.4	4.0		
VGER/L1616-3T21			16x16	16	14.8	125	35	2.4	4.0		
VGER/L2020-3T08			20x20	20	18.8	125	35	2.4	---		
VGER/L2020-3T12			20x20	20	18.8	125	35	2.4	---		
VGER/L2020-3T21			20x20	20	18.8	125	35	2.4	---		
VGER/L2525-3T08			25x25	25	23.8	125	35	2.4	---		
VGER/L2525-3T12			25x25	25	23.8	125	35	2.4	---		
VGER/L2525-3T21			25x25	25	23.8	125	35	2.4	---		
VGER/L1616-4T21			4	21	16x16	16	14.5	125	35		
VGER/L2020-4T21	20x20	20			18.5	125	35	3.0	---		
VGER/L2525-4T08	25x25	25			23.52	125	35	2.95	---		
VGER/L2525-4T12	25x25	25			23.5	125	35	3.0	---		
VGER/L2525-4T21	25x25	25			23.5	125	35	3.0	---		
VGER/L3232-4T21	5	22	32x32	32	32.52	125	35	2.95	---	SM6.0x20	K5H
VGER/L2525-5T22**			25x25	25	23.0	150	43	4.0	---		
VGER/L3232-5T22**			32x32	32	30.0	170	43	4.0	---		
VGER/L2525-6T24**			25x25	25	22.5	150	45	5.0	---		
VGER/L3232-6T24**	6	24	32x32	32	29.5	170	45	5.0	---	SM6.0x20	K5H

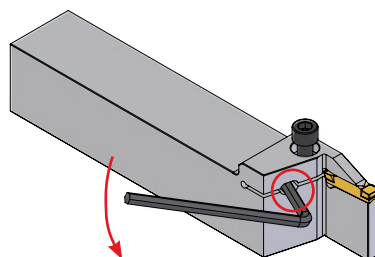
* Tightening Torque: T15 screws - 5 Nm max , T20 screws - 7 Nm max

** Mounting and Replacing Inserts for 5mm & 6mm Monoblock Toolholders:

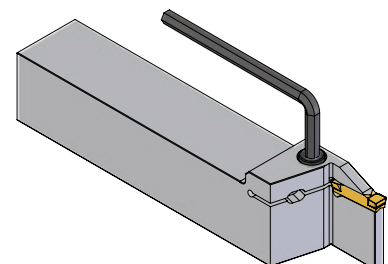
1 Unlock the top screw using the key provided.



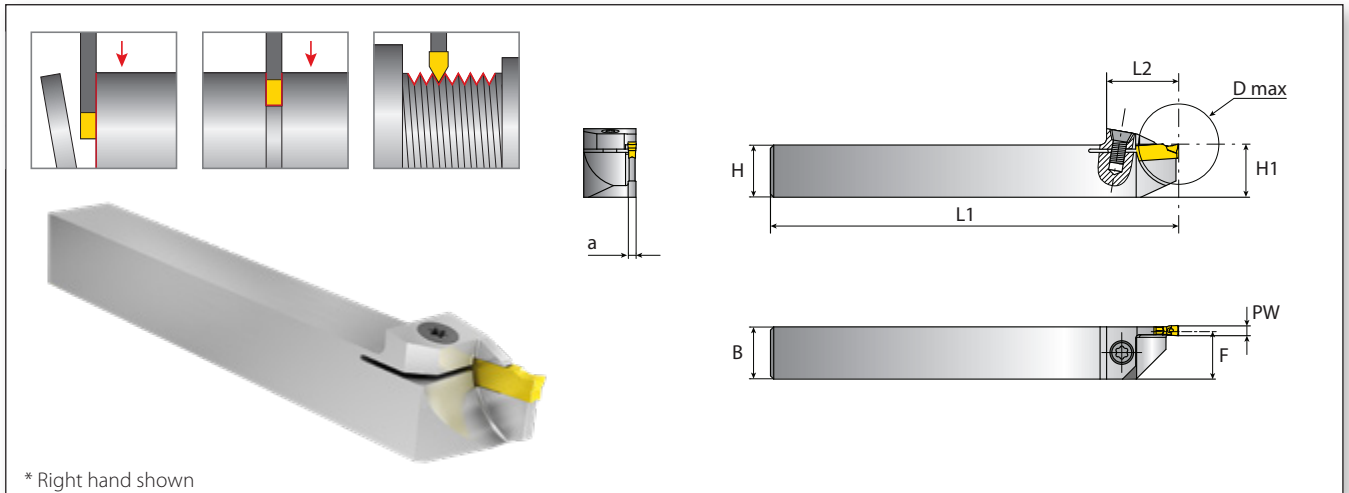
2 Place the same key in the "pocket." Turn and hold the key to loosen the pocket and remove the insert. Place the new insert in the pocket.





3 Now remove the key from the pocket and secure the insert by firmly locking the top screw.



Reinforced Monoblock Tools Parting, Grooving & Threading

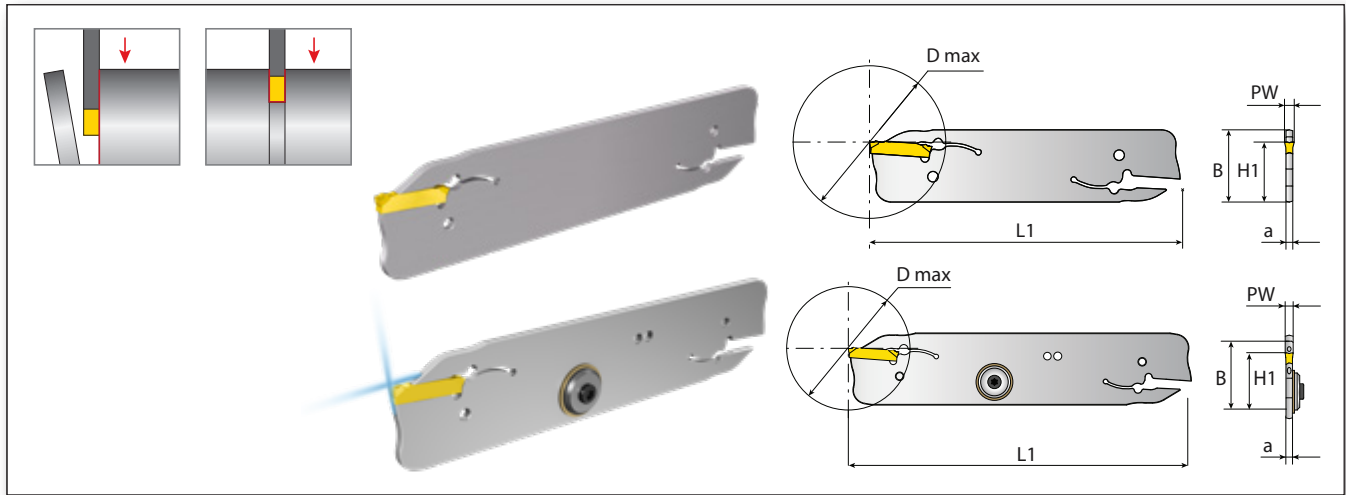


* Right hand shown

Ordering Code		Dimensions mm							Spare Parts	
RH/LH	PW	D max	HXB	H1	F	L1	L2	a		
									Cylindrical Screw*	Key
VGER/L1212-2T12PH	2	26	12x12	12	11.3	125	22	1.4	SCM4x14-T15	KT-15
VGER/L1616-2T12PH		26	16x16	16	15.3	125	22	1.4		
VGER/L1616-2T21PH		42	16x16	16	15.3	125	30	1.4		
VGER/L2020-2T12PH		26	20x20	20	19.3	125	22	1.4		
VGER/L2020-2T21PH		42	20x20	20	19.3	125	30	1.4		
VGER/L2525-2T21PH		42	25x25	25	24.3	125	30	1.4		
VGER/L1616-3T12PH	3	26	16x16	16	14.8	125	22	2.4	SCM4x14-T15	KT-15
VGER/L2020-3T12PH		26	20x20	20	18.8	125	22	2.4		
VGER/L2020-3T21PH		42	20x20	20	18.8	125	30	2.4		
VGER/L2525-3T12PH		26	25x25	25	18.8	125	22	2.4		
VGER/L2525-3T21PH		42	25x25	25	23.8	125	30	2.4		

* Tightening Torque 5 Nm max.

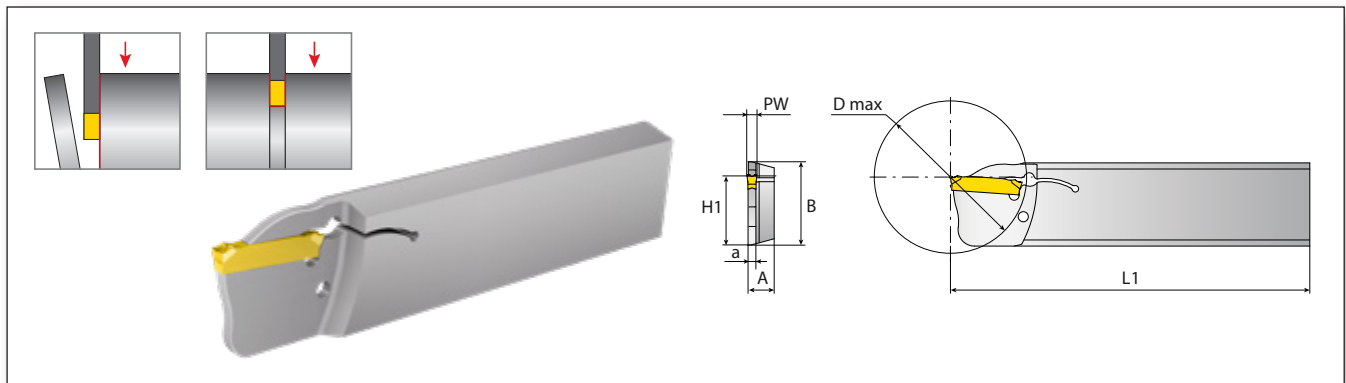
Blades for Grooving & Parting Off NEW



Ordering Code	Dimensions mm						Spare Parts		
	B	PW	D max*	H1	L1	a	Key	Key	Sealing Cap
VGP26-2D	26	2	50	21.4	110	1.4	VP-3**	-	-
VGP32-2D	32	2	50	24.8	150	1.8		-	-
VGP26-3D	26	3	70	21.4	110	2.4		-	-
VGP26-3DC NEW	26	3	70	21.4	110	2.4		M4x3-15IP	WS-15IP
VGP32-3D	32	3	100	24.8	150	2.4		-	-
VGP32-3DC NEW	32	3	100	24.8	150	2.4		M4x3-15IP	WS-15IP
VGP35-3S	35	3	100	33.5	150	2.4	-	-	
VGP32-4D	32	4	100	24.8	150	3.0	VP-4**	-	-
VGP32-4DC NEW	32	4	100	24.8	150	2.95		M4x3-15IP	WS-15IP
VGP32-5D	32	5	100	24.8	150	4.0	VP-G**	-	-
VGP32-6D	32	6	100	24.8	150	5.0		-	-

I Blades marked with **C** are offered with High Pressure Coolant.
 * D max figures presented are for single sided insert (VGS).
 ** Not included. Please order separately.

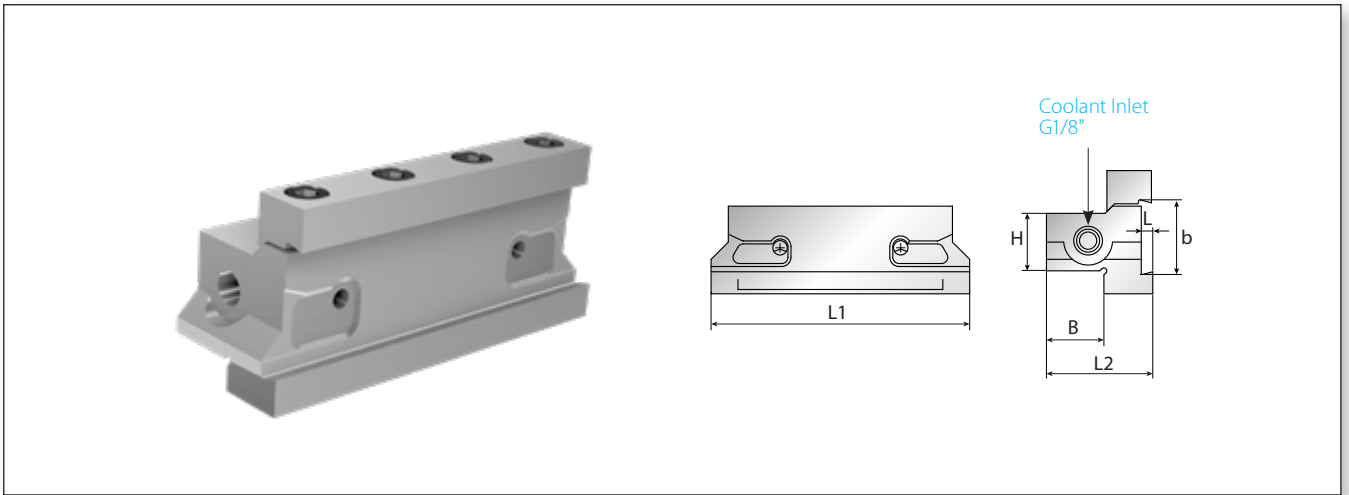
Reinforced Blades for Grooving & Parting Off







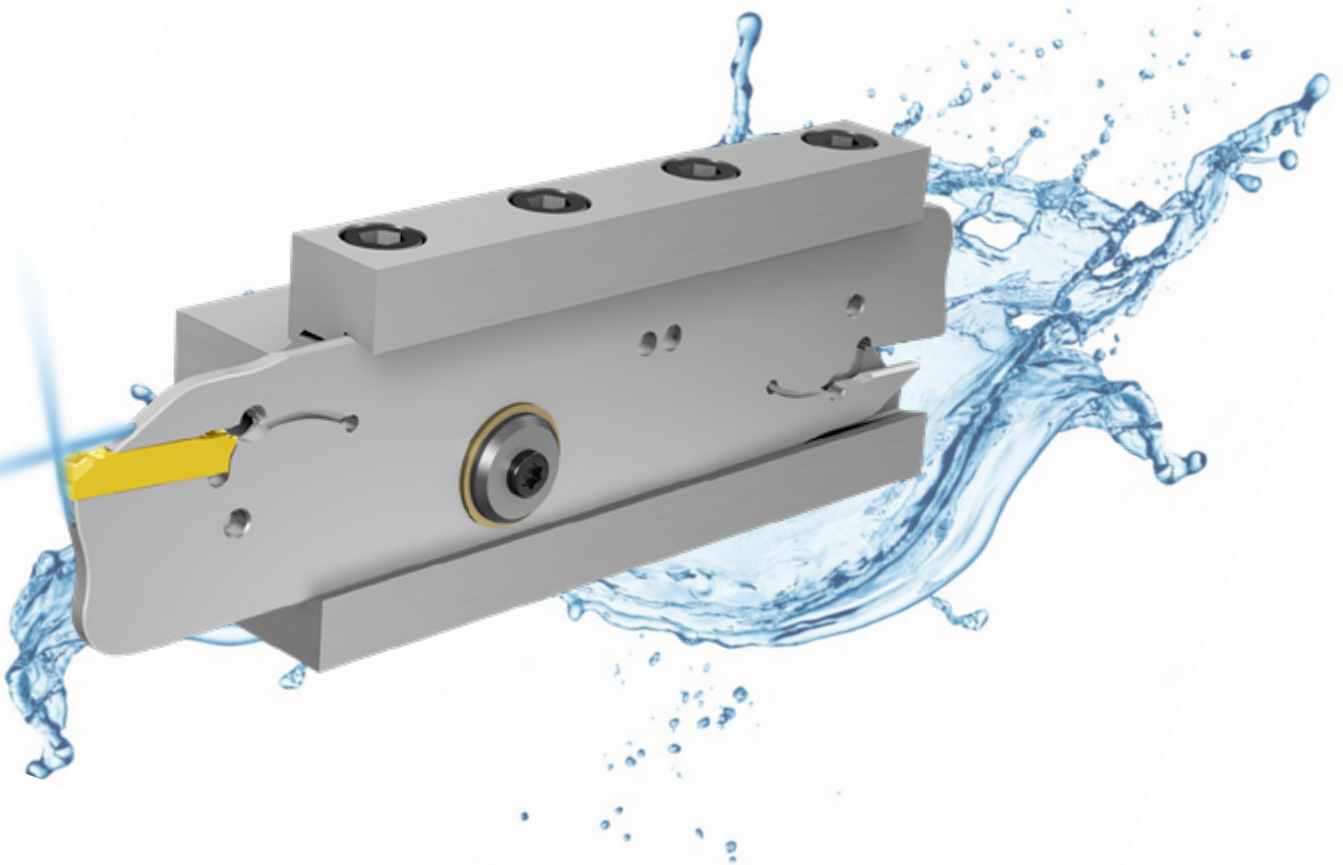
Ordering Code	Dimensions mm								Spare Parts
	RH/LH	B	PW	D max*	H1	L1	A	a	Key
VGWR/L26-2S		26	2	50	21.4	110	8.0	1.4	VP-3**
VGWR/L26-3S		26	3	50	21.4	110	8.0	2.4	

* D max figures presented are for single sided insert (VGS).
 ** Not included. Please order separately.

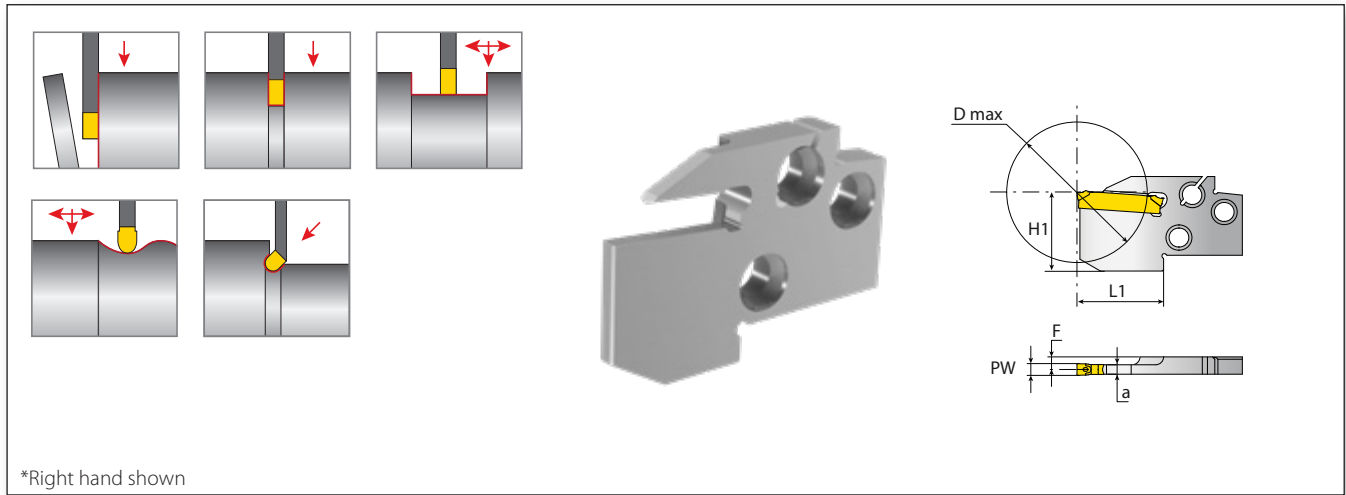
Blade Holders



Ordering Code	Dimensions mm						Spare Parts			
	b	H	B	L	L1	L2				
VBA 2020-26	26	20	20	4	90	37.0	M6x1.0x25	K5	Plug G1/8"	Plug M6x8
VBA 2520-32	32	25	20	5.2	110	37.7				



Modules for Grooving, Parting Off & Turning



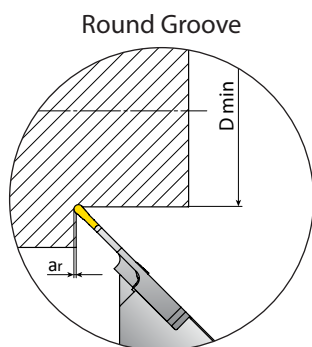
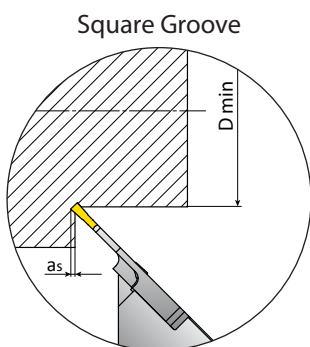
Ordering Code		Dimensions mm					
RH/LH	PW	D max	H1	F	L1	a	
VGAR/L20T25-2S	2	40	20	3.7	22	1.4	
VGAR/L20T25-3S	3	40	20	3.2	24	2.4	
VGAR/L20T25-4S	4	44	20	2.9	24	3.0	
VGAR/L25T25-2S	2	40	25	5.2	22	1.4	
VGAR/L25T25-3S	3	40	25	4.7	24	2.4	
VGAR/L25T25-4S	4	44	25	4.4	24	3.0	

Radial (0°-90°) Module Limitations

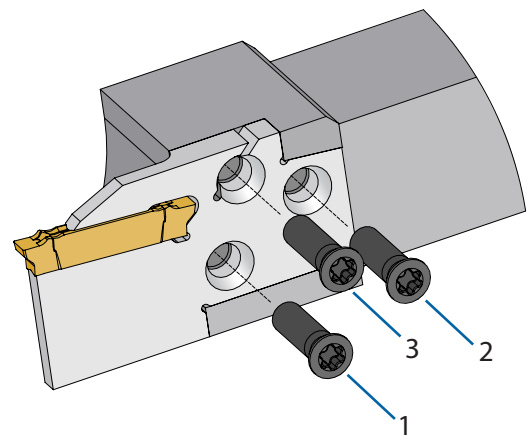
Dimensions mm	
D max	t max
50	20.0
100	17.0
150	16.0
200	15.2

45° (Undercut) Module Limitations

Dimensions mm			
Pocket Width PW	Square Groove as max	Round Groove ar max	D min
2	0.91	0.5	48
3	1.12		
4	1.32		

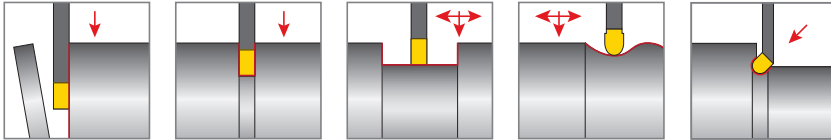


Mounting and Replacing Modules:



1. Clamp the module using screws 1, 2 and 3.
2. First clamp the module to the body with screw no. 1, followed by screw no. 2.
3. Finally, clamp the insert to the holder with screw no. 3.

Modular Bodies for Grooving, Parting Off & Turning



* Right hand shown

Ordering Code		Dimensions mm						Spare Parts	
RH/LH	H/H1	B	B1	H2	F	L1	L2	Conical Screw*	Key
VBMR/L2020-00	20	20.0	24.3	24	20.15	110	20	SM4x14 T15	TK-T15
VBMR/L2525-00	25	25.0	31.0	30	25.50	140	25	SM5x18 T20	TK-T20

* Right hand shown

Ordering Code		Dimensions mm					Spare Parts	
RH/LH	H/H1	B	H2	L1	L2	Conical Screw*	Key	
VBMR/L2020-90	20	20.0	24	110	20	SM4x14 T15	TK-T15	
VBMR/L2525-90	25	25.0	30	140	28	SM5x18 T20	TK-T20	

I For 90° Right-hand Tool: Use right-hand body with left-hand module.

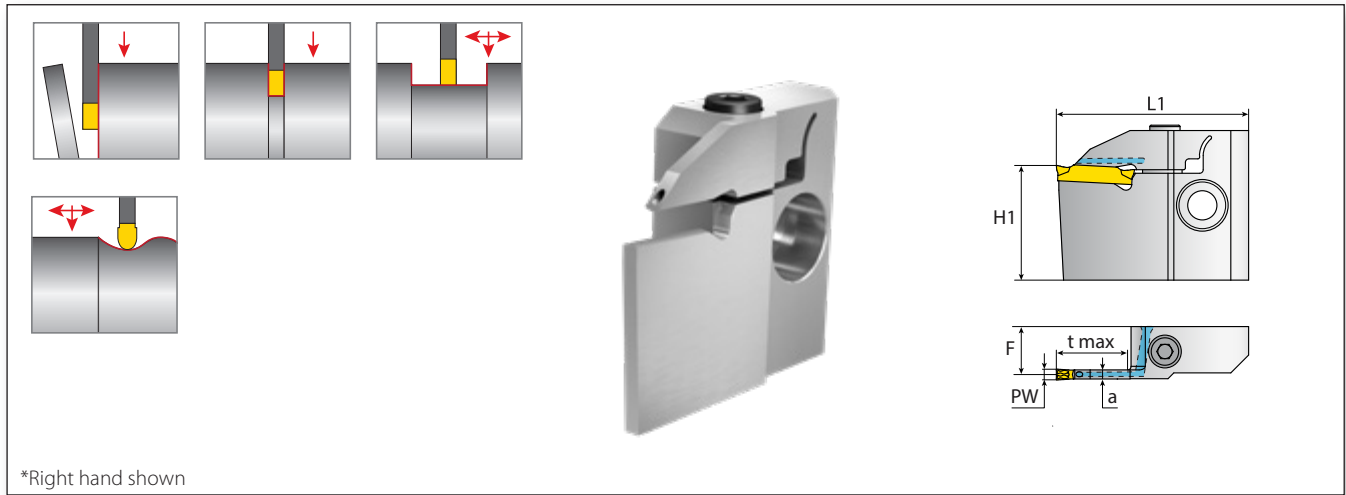
* Left hand shown

Ordering Code		Dimensions mm							Spare Parts	
RH/LH	H/H1	B	B1	H2	L1	L2	F	Conical Screw*	Key	
VBMR/L2020-45	20	20.0	21.5	24	110	20	14.5	SM4x10.5 T15 SM4x14 T15	TK-T15	
VBMR/L2525-45	25	25.0	26.0	30	140	25	18	SM5x13.5 T20 SM5x18 T20	TK-T20	



I For 45° Right-hand Tool: Use right-hand body with left-hand module.

* Tightening Torque: T15 screw - 5 Nm max, T20 screws - 7 Nm max.

Radial Grooving Modules with High Pressure Coolant Thru



*Right hand shown

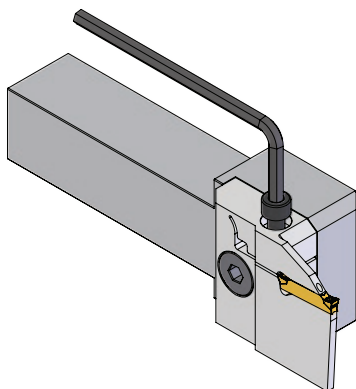
Ordering Code		Dimensions mm					Spare Parts	
RH/LH	PW	t max	H1	F	L1	a	 Screw*	 Key
VGAR/L-T09-2C	2	9	32	13.9	43	1.58	SM5x16	K4H
VGAR/L-T18-2C	2	18	32	13.9	52	1.58		
VGAR/L-T10-3C	3	10	32	13.3	44	2.48		
VGAR/L-T20-3C	3	20	32	13.3	54	2.48		
VGAR/L-T12-4C	4	12	32	13.0	46	3.10		
VGAR/L-T24-4C	4	24	32	13.0	58	3.10		
VGAR/L-T15-5C	5	15	32	13.5	49	4.00		
VGAR/L-T30-5C	5	30**	32	12.5	64	4.00		
VGAR/L-T20-6C	6	20	32	13.0	54	5.00		
VGAR/L-T40-6C	6	40**	32	13.0	74	5.00		

* Tightening Torque 7 Nm max.

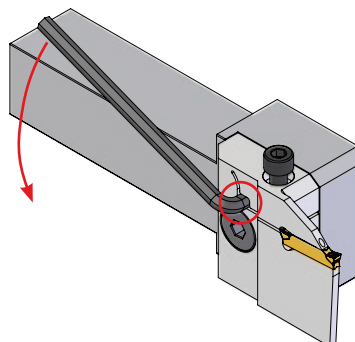
** T max figures presented for single sided inserts (VGS).

Mounting and Replacing Inserts for Radial and Face Grooving Modules with High Pressure Coolant Thru:

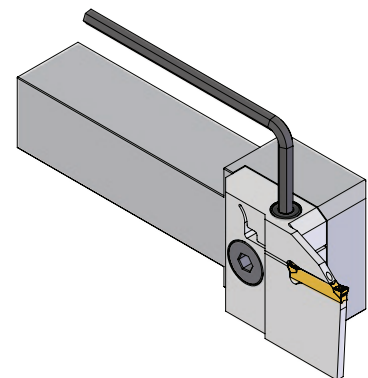
- 1 Unlock the top screw using the key provided.



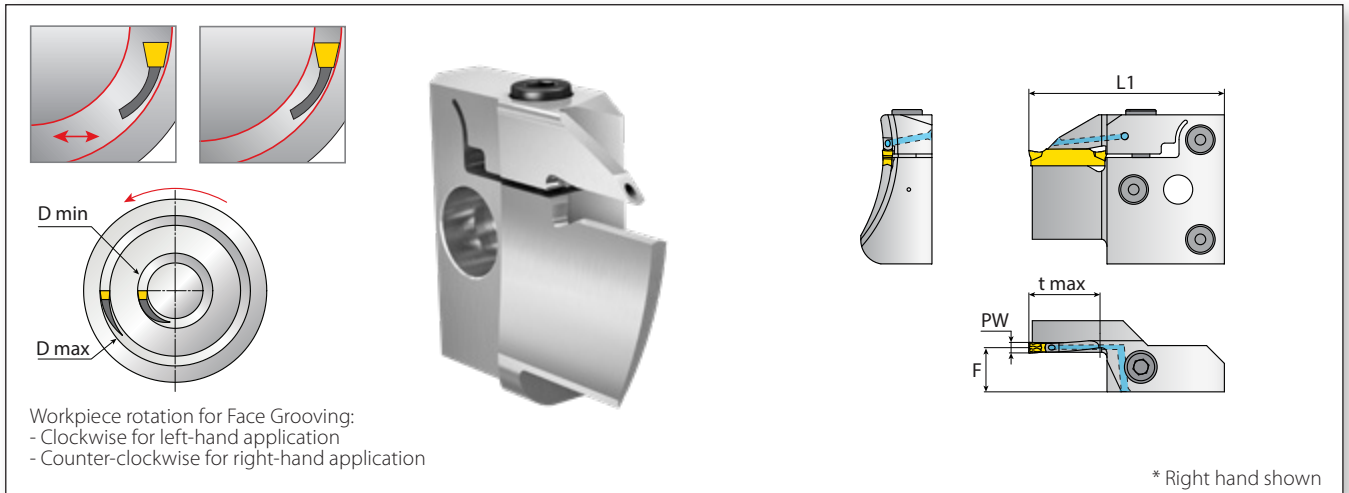
- 2 Place the same key in the "pocket." Turn and hold the key to loosen the pocket and remove the insert. Place the new insert in the pocket.



- 3 Now remove the key from the pocket and secure the insert by firmly locking the top screw.



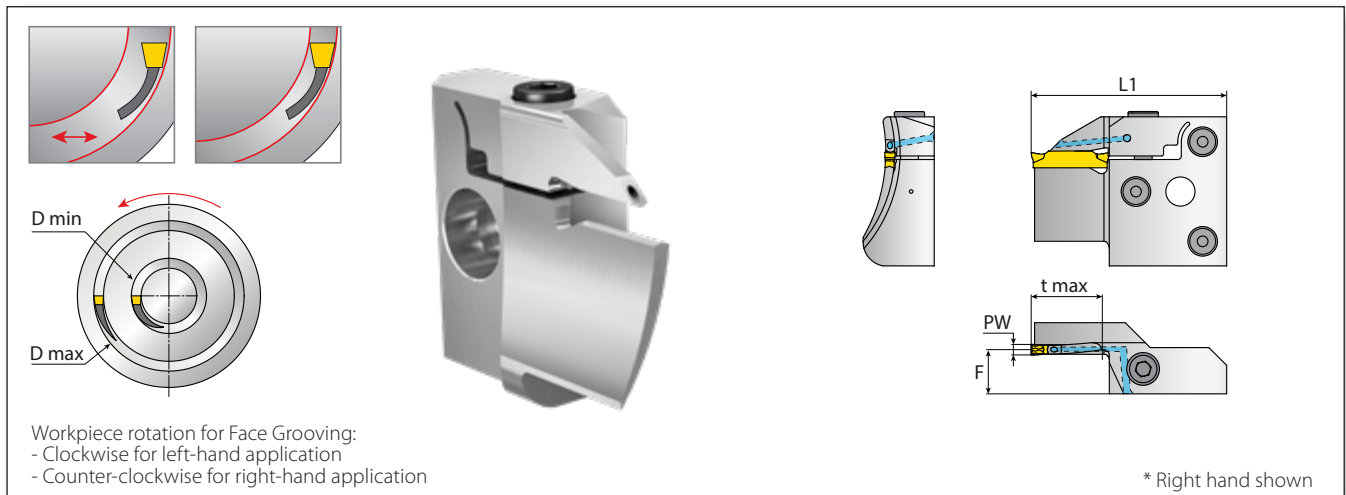
Face Grooving Modules with High Pressure Coolant Thru





Ordering Code							Dimensions mm		Spare Parts	
RH/LH	PW	t max	D min	D max	F	L1	Screw*	Key		
VGFR/L-2530-T10-3C	3	10	25	30	12.5	45	SM5x16	K4H		
VGFR/L-3038-T10-3C			30	38						
VGFR/L-3848-T10-3C			38	48						
VGFR/L-4860-T10-3C			48	60						
VGFR/L-6075-T10-3C		60	75							
VGFR/L-75100-T10-3C		75	100							
VGFR/L-100200-T10-3C		100	200							
VGFR/L-6075-T20-3C		20	60	75		55				
VGFR/L-75100-T20-3C	75		100							
VGFR/L-100200-T20-3C	100		200							
VGFR/L-3048-T12-4C	4	12	30	48	12	47				
VGFR/L-4860-T12-4C			48	60						
VGFR/L-6075-T12-4C			60	75						
VGFR/L-75100-T12-4C			75	100						
VGFR/L-100150-T12-4C		100	150							
VGFR/L-150->-T12-4C		150	>150							
VGFR/L-3048-T24-4C		24	30	48		59				
VGR/LF-4860-T24-4C			48	60						
VGFR/L-6075-T24-4C	60		75							
VGFR/L-75100-T24-4C	75		100							
VGFR/L-100150-T24-4C	100	150								
VGFR/L-150->-T24-4C	150	>150								
VGFR/L-4255-T22-5C	5	22	42	55	13.5	60				
VGFR/L-5575-T22-5C			55	75						
VGFR/L-75130-T22-5C			75	130						
VGFR/L-130200-T22-5C			130	200						
VGFR/L-200->-T22-5C		200	>200							
VGFR/L-130200-T45-5C		45	130	200		92				
VGFR/L-200400-T45-5C			200	400						
VGFR/L-450->-T45-5C			450	>450						

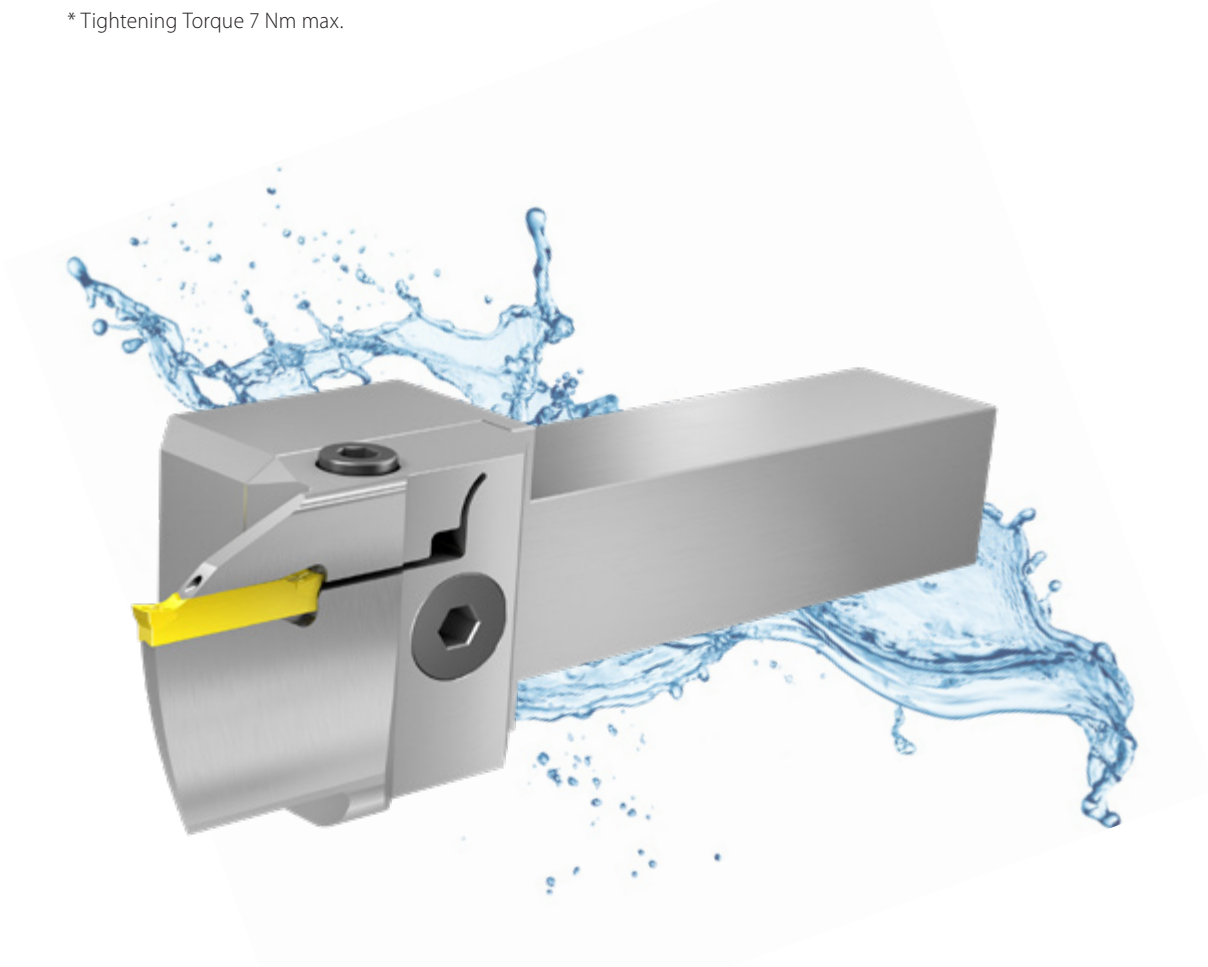
* Tightening Torque 7 Nm max.

Face Grooving Modules with High Pressure Coolant Thru (con't)

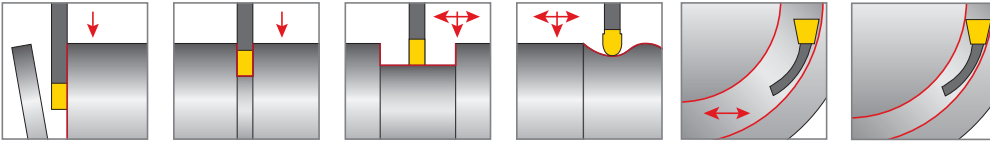



Ordering Code							Dimensions mm		Spare Parts	
RH/LH	PW	t max	D min	D max	F	L1				
							Screw*	Key		
VGFR/L-4255-T22-6C	6	22	42	55	13	60	SM5x16	K4H		
VGFR/L-5575-T22-6C			55	75						
VGFR/L-75130-T22-6C			75	130						
VGFR/L-130200-T22-6C			130	200						
VGFR/L-200->-T22-6C		200	>200							
VGFR/L-130200-T45-6C		45	92	130		200				
VGFR/L-200400-T45-6C				200		400				
VGFR-450->-T45-6C				450		>450				

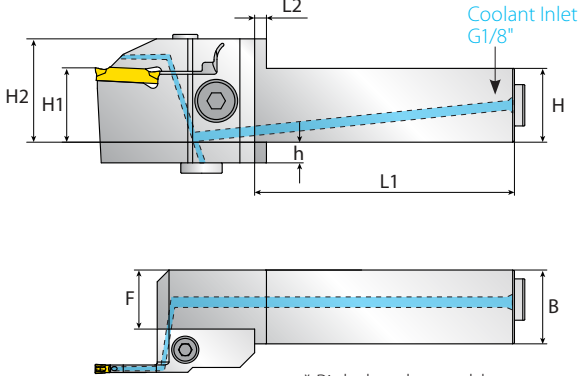
* Tightening Torque 7 Nm max.






Modular Bodies with High Pressure Coolant Thru for Grooving, Face Grooving, Parting Off and Turning

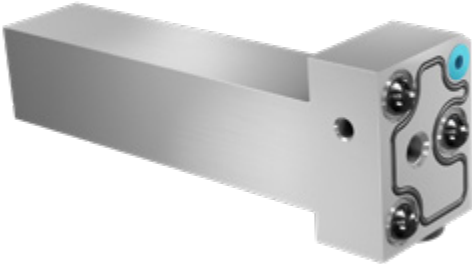


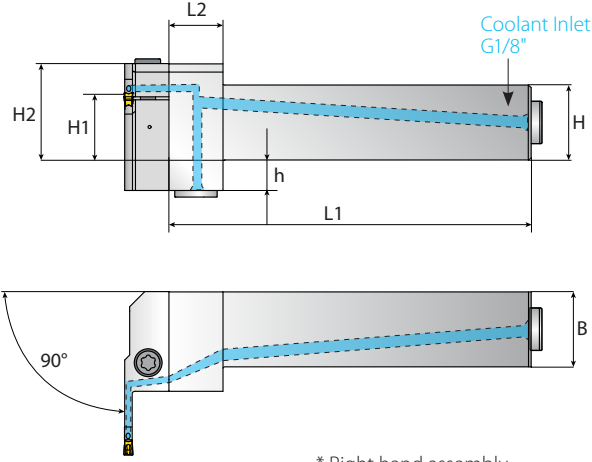







* Right hand shown * Right hand assembly

Ordering Code		Dimensions mm							Spare Parts		
	H/H1	B	H2	h	F	L1	L2				
VBMR/L2020-00-C	20	20	30	12	15	106	4	Clamping Screw	Key	Plug Screw	
VBMR/L2525-00-C	25	25	35	7	20	121	4	SM8x25	K6H	G1/8"	
VBMR/L3225-00-C	32	25	42	0	20	136	4				

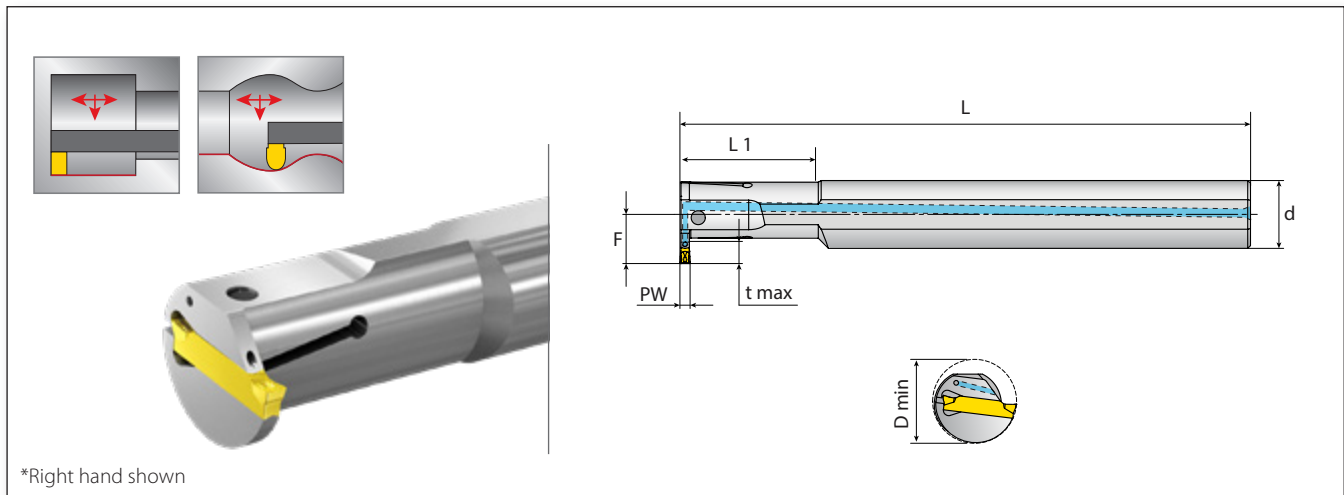






* Right hand shown * Right hand assembly

Ordering Code		Dimensions mm							Spare Parts		
	RH/LH	H/H1	B	H2	h	L1	L2				
VBMR/L2020-90-C		20	20	30	12	111	18	Clamping Screw	Key	Plug Screw	
VBMR/L2525-90-C		25	25	35	7	120	18	SM8x25	K6H	G1/8"	
VBMR/L3225-90-C		32	25	42	0	130	18				

Internal Grooving & Turning



Ordering Code								Dimensions mm		Spare Parts	
RH/LH	PW	t max	L1	D min	d	F	L				
VGIR/L-20-25-2C	2	7	40.5	25	20	14.5	180	SM5x12	K4H		
VGIR/L-25-32-2C		9	50.5	32	25	18.0	200				
VGIR/L-20-25-3C	3	7	40.5	25	20	14.4	180	SM5x16			
VGIR/L-25-32-3C		9	50.5	32	25	18.0	200	SM5x20			
VGIR/L-32-40-3C	4	11	64.0	40	32	22.0	250	SM5x12			
VGIR/L-20-28-4C		9	41.0	28	20	16.5	180	SM5x16			
VGIR/L-25-32-4C	5	9	51.0	32	25	18.0	200	SM5x20			
VGIR/L-32-40-4C		11	64.0	40	32	22.0	250	SM5x25			
VGIR-32-40-5C	6	11	64.0	40	32	22.0	250	SM5x25			
VGIR-40-50-6C		10	80.0	51	40	30.0	295				

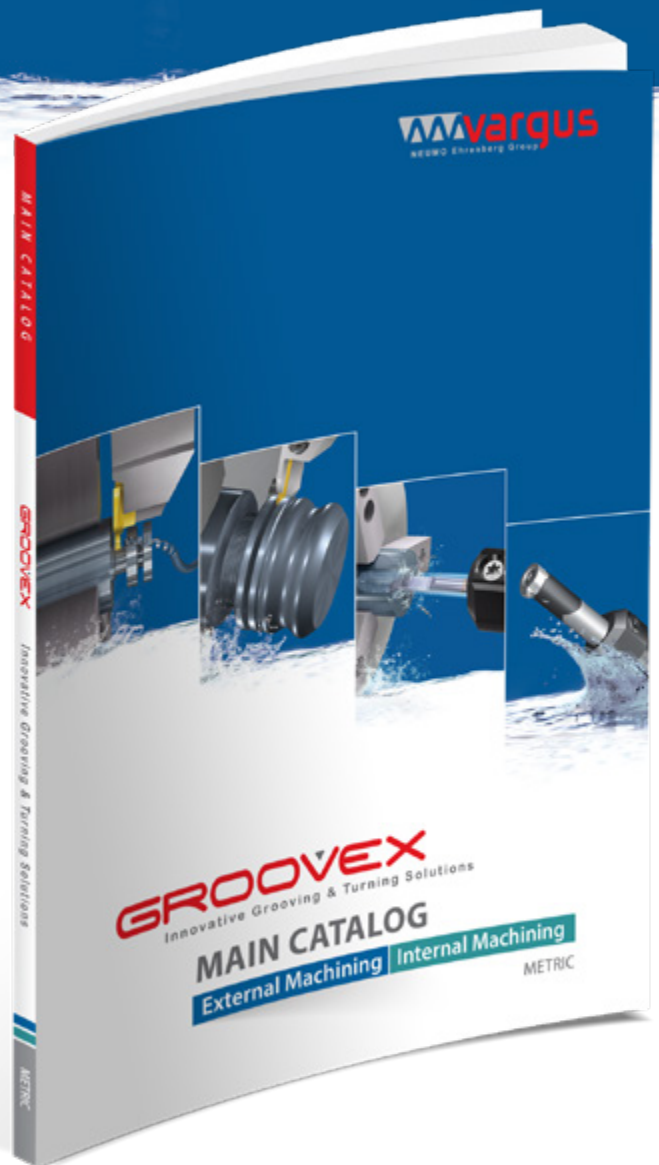
* Tightening Torque 7 Nm max.



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