Greenleaf®

metalcutting tools and systems





INTRODUCTION

MILLING

TURNING AND BORING

HEAVY TURNING

GROOVING, PROFILING AND CUT-OFF

API RING-GROOVE MACHINING

INDEXABLE DRILLING

TUBE SCARFING

SPECIAL ENGINEERING

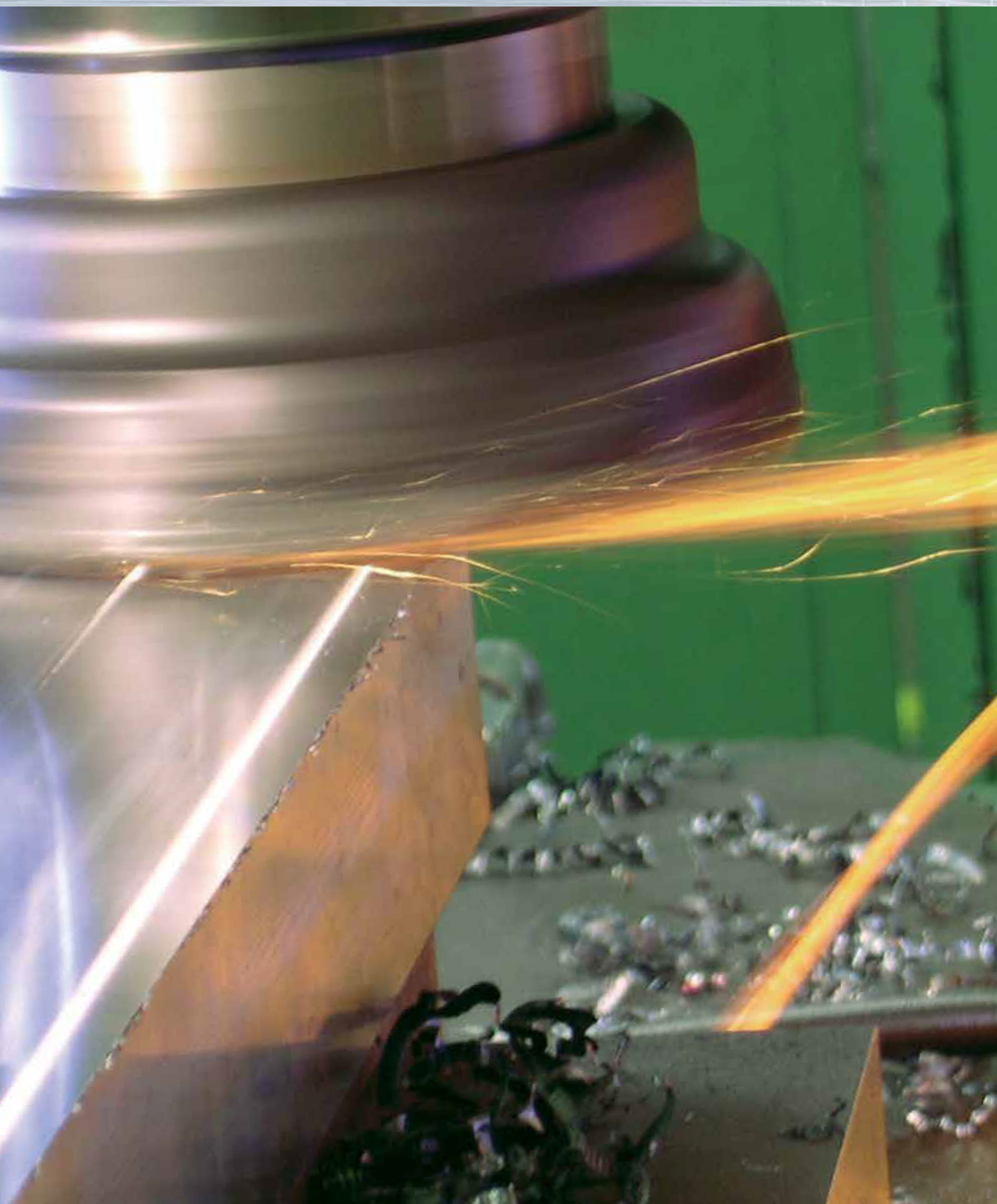
APPLICATION and TECHNICAL INFORMATION





2016 METRIC

www.greenleafglobalsupport.com







James M. Greenleaf
President, Greenleaf Corporation
jgreenleaf@greenleafcorporation.com

At Greenleaf, we use our expertise in advanced materials technology to develop products of superior quality and performance, and we work with our customers to help them use those products in the most efficient manner. It's our technology and our willingness to work closely with our customers that make us a world leader in cutting tools.

Our customers mean a lot to us, and we give them our personal attention. If you have the opportunity to visit us, we'll be glad to show you through our facilities. We're here to serve you, and we never lose sight of that fact.

Our goal is to help our customers become more successful by solving their productivity problems. We do this in several ways – by developing a better tool design, by producing superior tool materials, or just by offering some good shop-floor advice. Whatever it takes, we'll solve your toughest application problems. While other companies are selling commodities, we're offering technical ability, service, and excellent products.



Greenleaf Corporation is a leading developer of cutting tool technology, specializing in the manufacturing of high-performance tungsten carbide and ceramic inserts as well as innovative tool-holding systems. Greenleaf continues to build on 70 years of innovation, which centers on supplying customers with productive solutions to every metalcutting situation.

Greenleaf Corporation is positioned to serve the evolving needs of companies in all major segments of the metalcutting industry including aerospace, gas turbine, energy, oil and gas, steel, medical, roll turning, automotive, machine tool and rail. Greenleaf's products are engineered to provide optimal performance against a wide range of materials under the most rigorous metalcutting conditions. In addition to specially engineered tool-holding systems and a comprehensive line of carbide inserts, Greenleaf offers high-quality ceramic and ceramic composite materials, which can be custom designed for specific machining applications.

From its headquarters in Saegertown, Pennsylvania, a facility in North Carolina, and sales offices in Europe and China, Greenleaf maintains its commitment to pioneering breakthroughs in cutting tool technology and delivering productivity solutions to customers around the world.



MADE IN THE USA

Greenleaf Corporation is continually upgrading its products. For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

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Greenleaf®

MILLING CUTTERS



Powermill® Cutters
Ideal for heavy-duty cutting in severe interruptions and uneven surfaces. Replaceable components maximize cutter life while providing deep depths of cut.

Also available as end mills, face mills and sinusoidal.



Powersine® Inserts
The Greenleaf Powersine® inserts are uniquely designed to have all four edge variations built into one insert, unlike other manufacturers who require sets of inserts. The sinusoidal or wave-type edge fits into the standard Powermill® cutter body and is especially helpful when dealing with long spindle extensions and limited horsepower machinery.



Hushcut® Series II Screw-on-Insert Cutters
Quiet and free-cutting mills with screw-on insert designs to make the most out of the available horsepower. The free cutting action results in longer tool life and improved surface finishes. Available in end mills and face mills in a wide range of small to large diameters.



Multi-Purpose End Mills
High-speed ceramic or standard-speed carbide milling with positive and negative designs for a broad range of materials.

Ball Nose End Mills



C-4 Series Face Mills
High-velocity cutters with ceramic inserts for use in high-temp alloys, hard metals, cast irons at high speeds and accelerated feed rates. Precision nests provide multiple insert configurations and body protection.



Slotting Cutters
Standard screw-on and mechanically held indexable slotting cutters.

Special application cutters designed to produce precise narrow width slots.

INDEXABLE DRILLING



Holemill™ System
Indexable drill utilizing Greenleaf's advanced coated carbide grades for higher speeds, quieter cutting, longer tool life and reduced horsepower consumption. Inserts are positive squares (SPMT) for 4 indexes per insert. 1" to 3" diameter range.

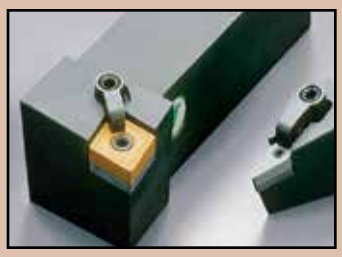
SPECIALLY ENGINEERED PRODUCTS

Greenleaf engineers have designed custom operation-specific metal-cutting tools for thousands of customers. Sometimes starting with a concept as simple as a paper sketch, they are able to implement their experience in materials and processes to devise a practical custom application.

From individual inserts making special cuts to ganged cutters providing special cutting paths, Greenleaf CAD engineering services can provide a prompt solution for your special metalcutting needs.



GROOVING, TURNING AND BORING SYSTEMS



ANSI Toolholders
Greenleaf manufactures a complete line of industry-standard toolholders in conformance with ANSI specifications in 4140 and 4150 alloy steel, hardened up to 42 Rc and oxide coated.



Face Grooving / Support Blades
A selection of 248 width and face grooving diameter combinations to fit our standard advanced ceramic tooling offering. Support blades accept GTS carbide groovers as well as Greenleaf standard ceramic grooving inserts.

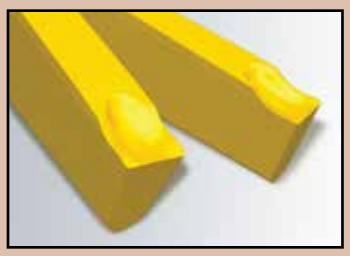


Bar Turning Tools
Complete systems are available – heads, cartridges and inserts for Kieserling*, Medart/BlawKnox*, Daisho* and Hetran* bar turning machines.

* *These trademarks or registered trademarks are the property of the respective companies.*



Advanced Tooling
Greenleaf ceramic insert tool-holders feature a geometry and pocket depth that maximizes ceramic performance.



COS – Cut-Off System
Greenleaf's advanced Cut-Off System features inserts that are qualified to fit into the standard Greenleaf grooving tools while maintaining superior performance.

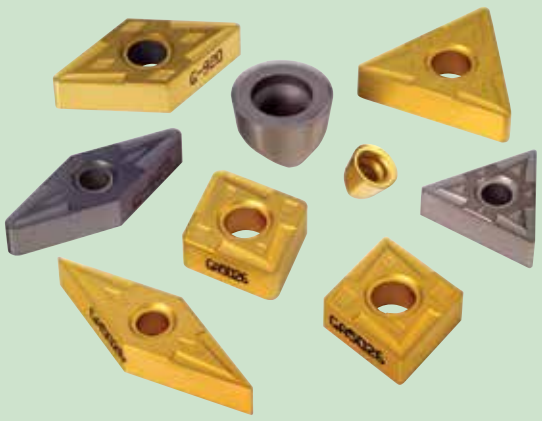


Trigon Inserts
Ceramic and carbide. Flexibility of a triangle with the corner strength of an 80° diamond.

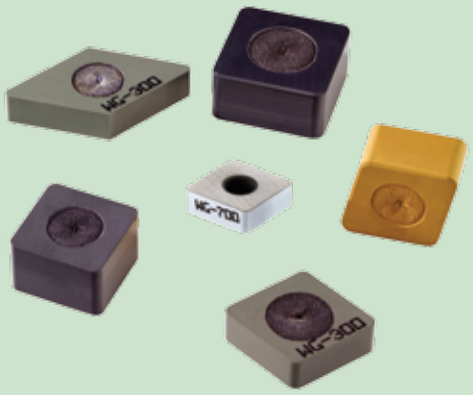


GTS – Groove Turn System
GTS inserts offer high-speed performance in a chipform geometry specifically designed to allow the Greenleaf carbide grooving insert to double as a turning tool when the application dictates. GTS carbide inserts are qualified to fit into the same pocket as its standard ceramic groover counterpart.

GREENLEAF SURFACES/GEOMETRIES



TurboForm® Inserts
Precise finishing with excellent chip control in nickel-based alloys. Very effective for machining wall sections as thin as .050".



Rough Stuff® Surface Treatment
Greatly improved insert-gripping power for greater accuracy, speed and pocket retention. Available on WG-300®, WG-600®, WG-700™ and GSN100™ ceramics.
U.S. Patent No. 6,712,564 B1

CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chipbreakers for heavy roughing through finishing.

COATED

GA5023 A high-speed performance grade for turning and milling cast iron. GA5023 features an advanced MT-CVD coating specifically developed for abrasive wear resistance. Application ranges from roughing to finishing on most cast iron materials including gray iron, ductile, nodular and other alloyed irons. The high wear and shock resistance of GA5023 allows machining at high speeds and a variety of feeds.

GA5025 A high-speed MT-CVD coated grade for turning, light roughing and finishing of carbon and alloy steels, as well as selected stainless steels.

GA5026 A high-speed grade developed for turning nickel- and cobalt-based super-alloys, stainless steels, and refractory metals. The advanced MT-CVD coating over a micro-grain substrate offers high wear resistance. GA5026 has exceptional resistance to the notching and deformation common to machining high strength materials. Apply at high speeds and light feeds in turning and selected milling applications.



GA5035 A high-performance MT-CVD coated grade for turning all types of steels, and selected stainless steels. GA5035 can be used in rough, semi-finish, and finish turning situations requiring resistance to heat deformation, thermal shock, and abrasion. GA5035 should be applied at high speeds and a range of feeds.

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy and light duty milling at high cutting speeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

G-910 PVD-coated grade for milling high-temp alloys, stainless steel, and low carbon steels. G-910 is a medium-speed grade and should be applied at moderate to high feed rates.

G-9120 PVD-coated grade for milling and turning steel castings and steel forgings. G-9120 is engineered to maximize productivity at moderate to heavy feed rates and depths of cut.

G-915 Multi-layer PVD-coated grade, excellent for cut off, milling and turning high-temp alloys, stainless steel, and low carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-920 PVD-coated grade for turning and milling high-strength materials such as high-temp alloys, titanium and stainless steel. G-920 is also an excellent grade for aluminum and refractory metals. This grade has the resistance to deformation and notching required for higher speeds than G-910.

G-9230 PVD-coated grade developed for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons. G-9230 has superior wear resistance and toughness and is excellent for cast and forged scale machining conditions.

G-925 Multi-layer PVD-coated grade specifically designed for machining abrasive and difficult-to-machine materials. Typical applications include high-temp alloys, titanium and other refractory metals, stainless steel, and many cast irons. G-925 exhibits excellent resistance to notching and deformation. Apply at moderate to high speeds and moderate feeds.

G-935 Multi-layer PVD-coated grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

UNCOATED

G-01 Developed for milling high-temp alloys, stainless steel, and low-carbon steels at low speeds and moderate to high feeds. Also can be used for turning in the same application range on severe interruption or old machinery.

G-01M A tough, sub-micron grade used for milling and roughing austenitic stainless steels, and stainless steel castings – even when rolling or casting skin is present. The edge strength of G-01M allows the use of sharp edges, high positive rakes, and intermittent cuts.

G-10 For roughing all cast irons under severe conditions, including broaching. The edge strength of G-10 makes it a good choice for roughing high-temp alloys with positive rakes and machining non-ferrous materials when toughness is of prime importance. Apply at moderate speeds and feeds.

G-02 An excellent general-purpose cast iron grade. G-02 can be applied to milling and turning cast iron at moderately high speeds and medium feeds. G-02 is also a good choice for machining aluminum with positive rakes, and light roughing of some high-temp alloys and stainless steels.

G-20M A sub-micron C-2 carbide grade suited for use in turning and milling titanium and nickel-based super-alloys. G-20M has the strength and edge wear characteristics to resist notching when turning high-strength materials.

G-23 A finishing grade for all cast irons and other short-chipping non-ferrous materials, such as brass and bronze. Apply at moderately high speeds and moderate feed rates.

G-40 Finish turning of cast iron and other hard-wearing materials at high speeds and light feeds in good conditions.

G-50 Heavy roughing grade for steel and steel castings under difficult conditions, and ferritic stainless steels in most applications. G-50 is tough enough to enable the use of positive rakes for turning.

G-53 Excellent general-purpose milling grade for steel and steel alloys at moderate speeds and feeds. Good combination of toughness and wear resistance for milling, or as an all-around grade for mixed production applications. G-53 is not recommended for continuous turning.

G-60 Heavy, rough turning of steel, steel castings, and steel forgings. Apply G-60 at moderate speeds and heavy feed rates and depths of cut. More wear resistant than G-50, but lower in toughness.

G-74 Roughing or finishing grade for steel and steel castings. G-74 has higher shock resistance than G-70, and should be applied at high speeds and moderate to heavy feeds. Well suited for turning of steel rolls.

CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel and cobalt based super-alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

WG-600® Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels. *U.S. Patent No. 6,447,896 B1*

WG-700™ New whisker-reinforced Al_2O_3 ceramic substrate featuring improved toughness and a unique high-speed coating. WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-machines materials. WG-700 exhibits high metal-removal rates with exceptional tool life.
U.S. Patent No. 6,447,896 B1

XSYTIN™-1 New phase-toughened ceramic capable of extreme feed rates. XSYTIN™-1 excels at machining a wide variety of materials including steels, cast ad ductile irons, high-temperature alloys and other challenging metals. XSYTIN™-1 is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

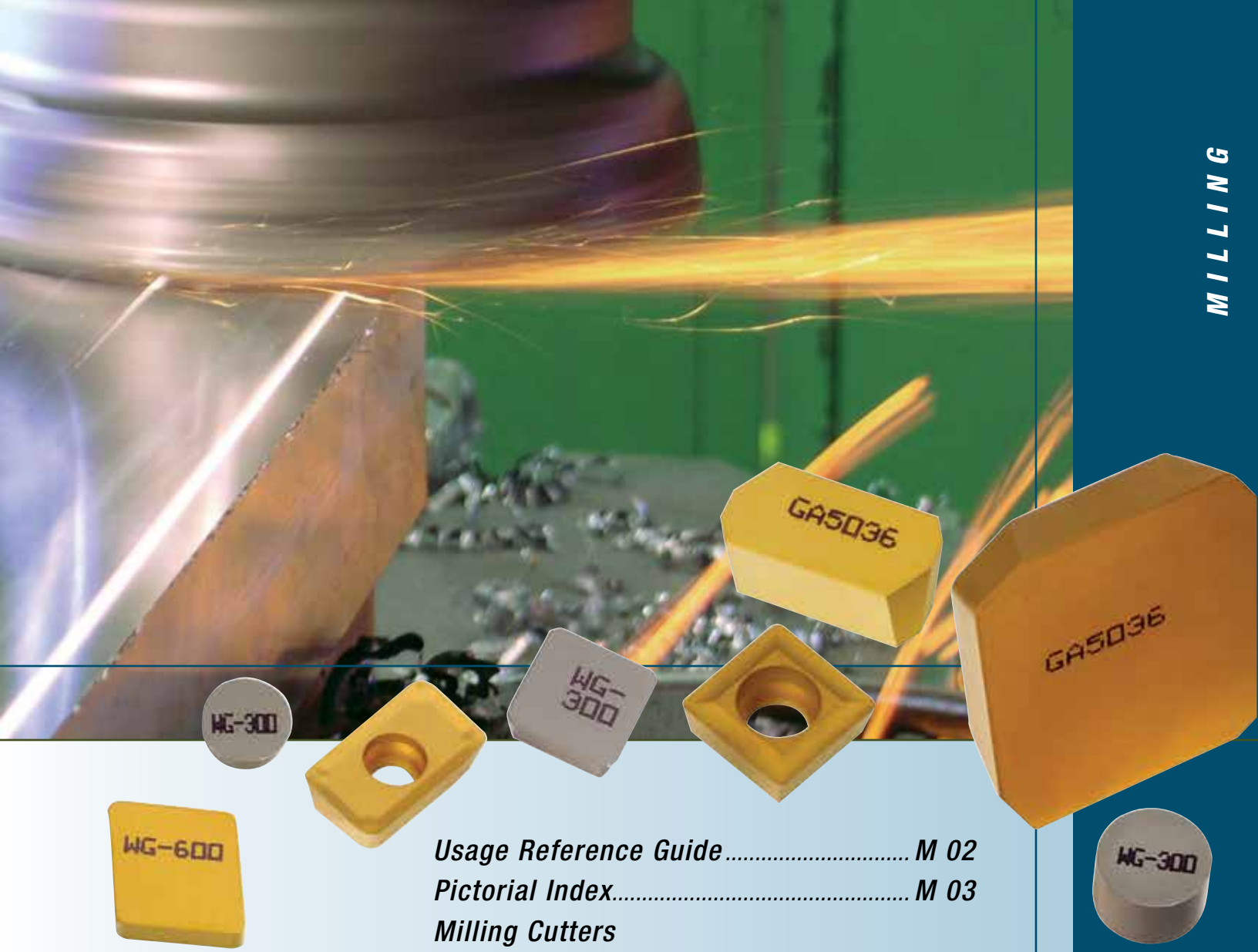
GSN100™ New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

GEM-7™ Al_2O_3 + TiC composite ceramic with a high degree of predictability in roll turning and hard alloy (up to 65 R/c) machining.

GEM-19™ Cold pressed and sintered Al_2O_3 ceramic for economical roughing and finishing of cast iron grades.



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Milling Cutters

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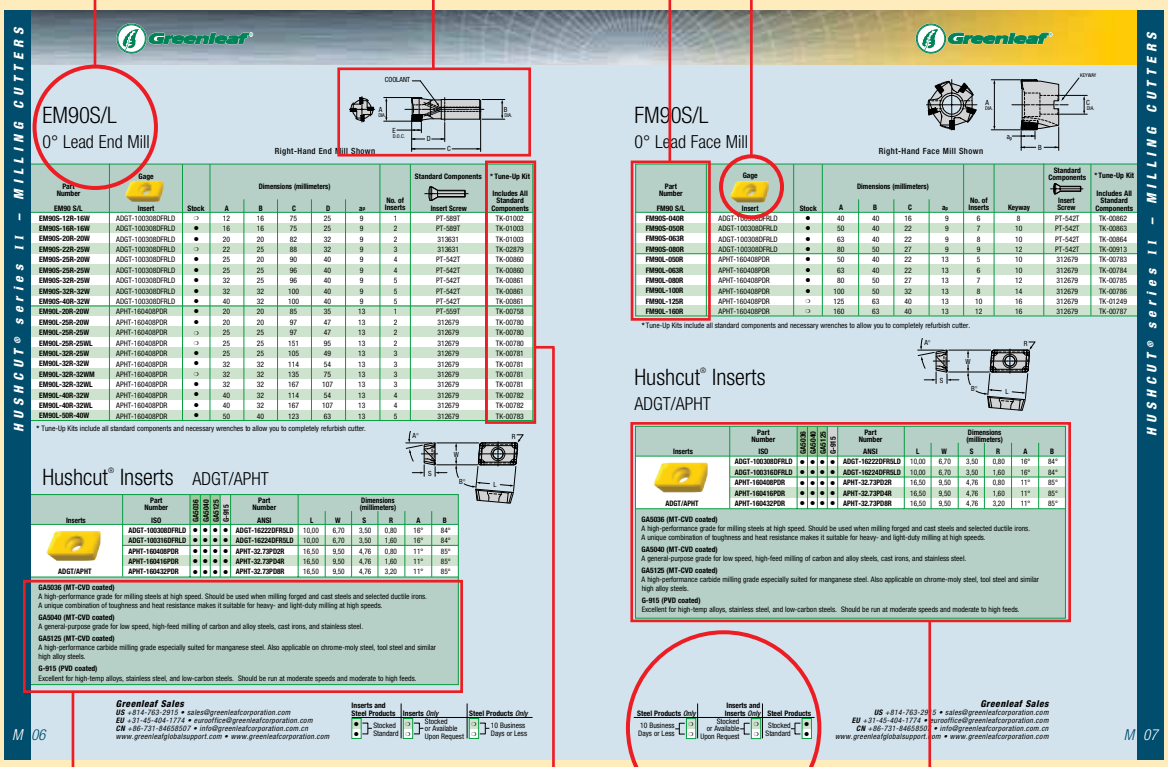
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Insert Grade Descriptions ..... ***M 46***

Insert Grade Reference for Milling ..... ***M 47***

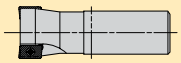
Technical Data for Milling ..... ***M 48-53***

Greenleaf®

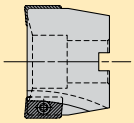


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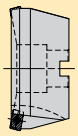
Hushcut® Series II MIlling System



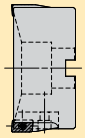
EM90S/L
0° Lead End Mill
12mm – 50mm Diameter
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FM90S/L
0° Lead Face Mill
40mm – 160mm Diameter
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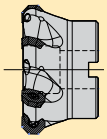


FM75L
75° Lead Face Mill
50mm – 160mm Diameter
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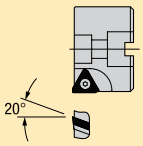
FMC90L
Cartridge Style
0° Lead Face Mill
80mm – 250mm Diameter
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Index-O-Cut™ MIlling System

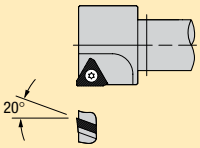


G-MOFHP
High Positive Face Mill
Octagon Inserts
51mm – 203mm Diameter
page: M 12-13

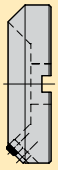
High-Shear Cutting Mills



FTHP
0° Lead Face Mill
20° Positive Axial Rake
63mm – 100mm Diameter
page: M 16

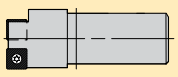


WSTHP
0° Lead End Mill
20° Positive Axial Rake
40mm – 63mm Diameter
page: M 17



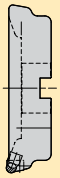
SHPC
45° Lead Face Mill
Negative Radial,
20° Positive Axial Rake
100mm – 160mm Diameter
page: M 18

Screw-On Insert Style Cutters

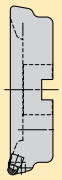


WSSCC
0° Lead End Mill
Center Cutting
20mm – 40mm Diameter
page: M 20

Excelerator® Milling Cutters
Ceramic and Carbide Inserts
80 – 315 mm Diameter Cutters

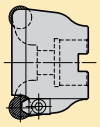


CP4 Series
Face Mill
Positive Rake Inserts
Cutters and Nests
page: M 22-23

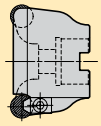


C4 Series
Face Mill
Negative Rake Inserts
Cutters and Nests
page: M 24-25

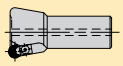
Excelerator® Milling Cutters
Ceramic and Carbide Inserts
Up to 100 mm Diameter Cutters



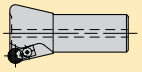
FMRP
Face Mill
Round Positive Inserts
50mm – 100mm Diameter
page: M 26



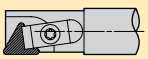
FMRN
Face Mill
Round Negative Inserts
50mm – 100mm Diameter
page: M 26



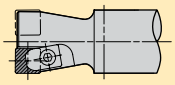
WSRP
End Mill
Round Positive Inserts
16mm – 63mm Diameter
page: M 27



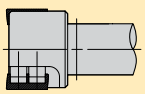
WSRN
End Mill
Round Negative Inserts
25mm – 63mm Diameter
page: M 28



WSTP
End Mill
Triangle Positive Inserts
12mm – 16mm Diameter
page: M 29

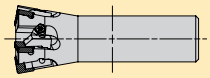


WSSP
End Mill
Square Positive Inserts
10mm – 40mm Diameter
page: M 30

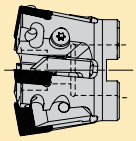


WSAN
End Mill
Parallelogram Inserts
25mm – 63mm Diameter
page: M 31

Excelerator® Milling Cutters
Ceramic and Carbide Inserts *(continued)*
Up to 100 mm Diameter Cutters



XFSP
High-Feed End Mill
Square Positive Inserts
25mm – 40mm Diameter
page: M 32-33

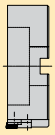


XFSP
High-Feed Face Mill
Square Positive Inserts
55mm Diameter
page: M 32-33

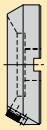


SSBN
Ball Nose End Mill
Ball Nose Inserts
10mm – 25mm Diameter
page: M 34-35

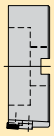
Powermill® Cutters



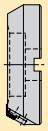
M400LNP-A
0° Lead Face Mill
Negative Radial
Positive Axial
100mm – 315mm Dia.
page: M 38



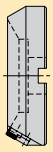
C430LNP-H
30° Lead Face Mill
Negative Radial
Positive Axial
200mm – 315mm Dia.
page: M 42



M402LN-A
2° Lead Face Mill
Negative Radial
Negative Axial
100mm – 315mm Dia.
page: M 39



C430LNP-W
30° Lead Face Mill
Finishing Cutter
Negative Radial,
Positive Axial
200mm – 315mm Dia.
page: M 43



M430LNP-A
30° Lead Face Mill
Negative Radial,
Positive Axial
100mm – 315mm Dia.
page: M 41

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Hushcut® Series II Milling Cutters

Quiet and free-cutting mills with screw-on insert designs to make the most out of the available horsepower. The free-cutting action results in longer tool life and improved surface finishes. Available in end mills and face mills in a wide range of small to large diameters.



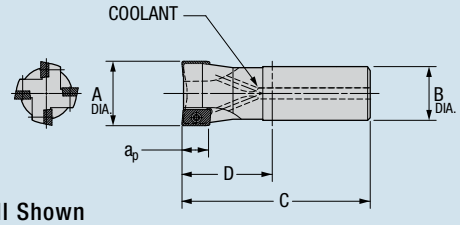
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EM90S/L

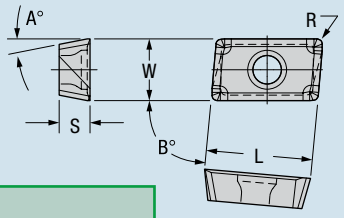
0° Lead End Mill



Right-Hand End Mill Shown

Part Number EM90 S/L	Gage Insert	Stock	Dimensions (millimeters) A	B	C	D	a_p	No. of Inserts	Standard Components Insert Screw	*Tune-Up Kit Includes All Standard Components
EM90S-12R-16W	ADGT-100308DFRLD	❍	12	16	75	25	9	1	PT-589T	TK-01002
EM90S-16R-16W	ADGT-100308DFRLD	●	16	16	75	25	9	2	PT-589T	TK-01003
EM90S-20R-20W	ADGT-100308DFRLD	●	20	20	82	32	9	2	313631	TK-02878
EM90S-22R-25W	ADGT-100308DFRLD	❍	22	25	88	32	9	3	313631	TK-02879
EM90S-25R-20W	ADGT-100308DFRLD	●	25	20	90	40	9	4	PT-542T	TK-00860
EM90S-25R-25W	ADGT-100308DFRLD	●	25	25	96	40	9	4	PT-542T	TK-00860
EM90S-32R-25W	ADGT-100308DFRLD	●	32	25	96	40	9	5	PT-542T	TK-00861
EM90S-32R-32W	ADGT-100308DFRLD	●	32	32	100	40	9	5	PT-542T	TK-00861
EM90S-40R-32W	ADGT-100308DFRLD	●	40	32	100	40	9	5	PT-542T	TK-00861
EM90L-20R-20W	APHT-160408PDR**	●	20	20	85	35	13	1	PT-559T	TK-00758
EM90L-25R-20W	APHT-160408PDR**	●	25	20	97	47	13	2	312679	TK-00780
EM90L-25R-25W	APHT-160408PDR**	❍	25	25	97	47	13	2	312679	TK-00780
EM90L-25R-25WL	APHT-160408PDR**	❍	25	25	151	95	13	2	312679	TK-00780
EM90L-32R-25W	APHT-160408PDR**	●	32	25	105	49	13	3	312679	TK-00781
EM90L-32R-32W	APHT-160408PDR**	●	32	32	114	54	13	3	312679	TK-00781
EM90L-32R-32WM	APHT-160408PDR**	❍	32	32	135	75	13	3	312679	TK-00781
EM90L-32R-32WL	APHT-160408PDR**	●	32	32	167	107	13	3	312679	TK-00781
EM90L-40R-32W	APHT-160408PDR**	●	40	32	114	54	13	4	312679	TK-00782
EM90L-40R-32WL	APHT-160408PDR**	●	40	32	167	107	13	4	312679	TK-00782
EM90L-50R-40W	APHT-160408PDR**	●	50	40	123	63	13	5	312679	TK-00783

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** APET can be used in place of APHT.



Hushcut® Inserts ADGT/APHT/APET



ADGT/APHT/APET

Inserts	Part Number ISO	GA5036	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) L	W	S	R	A	B
	ADGT-100308DFRLD	●	●	●	**ADGT-16222DFR5LD**	10,00	6,70	3,50	0,80	16°	84°
	ADGT-100316DFRLD	●	●	●	**ADGT-16224DFR5LD**	10,00	6,70	3,50	1,60	16°	84°
	APHT-160408PDR	●	●	●	**APHT-32.73PD2R**	16,50	9,50	4,76	0,80	11°	85°
	APHT-160416PDR	●	●	●	**APHT-32.73PD4R**	16,50	9,50	4,76	1,60	11°	85°
	APHT-160432PDR	●	●	●	**APHT-32.73PD8R**	16,50	9,50	4,76	3,20	11°	85°
	APET-160408PDR	●	●	●	**APET-32.73D2R**	16,76	9,50	4,76	0,80	11°	85°
	APET-160416PDR	●	❍	❍	**APET-32.73D4R**	16,59	9,50	4,76	1,60	11°	85°
	APET-160432PDR	❍	❍	❍	**APET-32.73D6R**	16,59	9,50	4,76	2,38	11°	85°

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

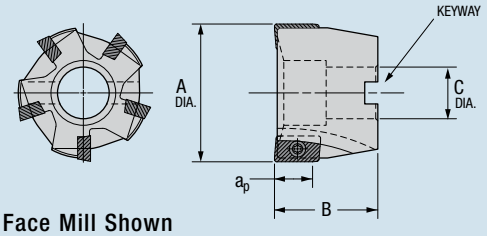
G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked ● Standard	❍ Stocked or Available ❍ Upon Request	❍ 10 Business ❍ Days or Less

FM90S/L

0° Lead Face Mill



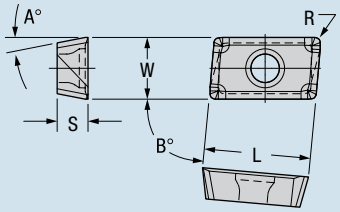
Right-Hand Face Mill Shown

Part Number FM90 S/L	Gage Insert	Stock	Dimensions (millimeters) A	B	C	a_p	No. of Inserts	Keyway	Standard Components Insert Screw	* Tune-Up Kit Includes All Standard Components
FM90S-040R	ADGT-100308DFRLD	●	40	40	16	9	6	8	PT-542T	TK-00862
FM90S-050R	ADGT-100308DFRLD	●	50	40	22	9	7	10	PT-542T	TK-00863
FM90S-063R	ADGT-100308DFRLD	●	63	40	22	9	8	10	PT-542T	TK-00864
FM90S-080R	ADGT-100308DFRLD	●	80	50	27	9	9	12	PT-542T	TK-00913
FM90L-050R	APHT-160408PDR**	●	50	40	22	13	5	10	312679	TK-00783
FM90L-063R	APHT-160408PDR**	●	63	40	22	13	6	10	312679	TK-00784
FM90L-080R	APHT-160408PDR**	●	80	50	27	13	7	12	312679	TK-00785
FM90L-100R	APHT-160408PDR**	●	100	50	32	13	8	14	312679	TK-00786
FM90L-125R	APHT-160408PDR**	❍	125	63	40	13	10	16	312679	TK-01249
FM90L-160R	APHT-160408PDR**	❍	160	63	40	13	12	16	312679	TK-00787

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** APET can be used in place of APHT.

Hushcut® Inserts

ADGT/APHT/APET



Inserts	Part Number ISO	GA5036	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) L	W	S	R	A	B
 ADGT/APHT/APET	**ADGT-100308DFRLD**	●	●	●	**ADGT-16222DFR5LD**	10,00	6,70	3,50	0,80	16°	84°
	ADGT-100316DFRLD	●	●	●	**ADGT-16224DFR5LD**	10,00	6,70	3,50	1,60	16°	84°
	APHT-160408PDR	●	●	●	**APHT-32.73PD2R**	16,50	9,50	4,76	0,80	11°	85°
	APHT-160416PDR	●	●	●	**APHT-32.73PD4R**	16,50	9,50	4,76	1,60	11°	85°
	APHT-160432PDR	●	●	●	**APHT-32.73PD8R**	16,50	9,50	4,76	3,20	11°	85°
	APET-160408PDR	●	●	●	**APET-32.73D2R**	16,76	9,50	4,76	0,80	11°	85°
	APET-160416PDR	●	❍	❍	**APET-32.73D4R**	16,59	9,50	4,76	1,60	11°	85°
	APET-160432PDR	❍	❍	❍	**APET-32.73D6R**	16,59	9,50	4,76	2,38	11°	85°

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

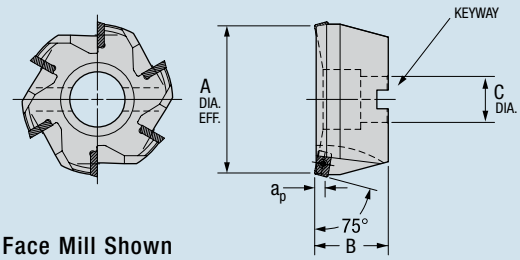
G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

Steel Products *Only*		Inserts and Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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FM75L

75° Lead Face Mill



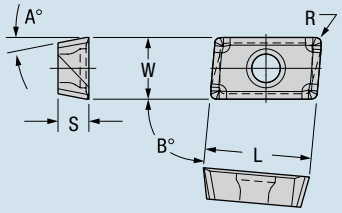
Right-Hand Face Mill Shown

Part Number FM75 S/L	Gage Insert	Stock	Dimensions (millimeters) A	B	C	a_p	Bolt Circle	No. of Inserts	Keyway	Standard Components Insert Screw	* Tune-Up Kit Includes All Standard Components
FM75L-050R	APHT-160408PDR**	❍	50	40	22	7,8	N/A	3	10	312679	TK-00781
FM75L-063R	APHT-160408PDR**	❍	63	40	22	7,8	N/A	4	10	312679	TK-00782
FM75L-080R	APHT-160408PDR**	❍	80	50	27	7,8	N/A	5	12	312679	TK-00783
FM75L-100R	APHT-160408PDR**	●	100	50	32	7,8	N/A	6	14	312679	TK-00784
FM75L-125R	APHT-160408PDR**	❍	125	63	40	7,8	N/A	7	16	312679	TK-00785
FM75L-160R	APHT-160408PDR**	❍	160	63	40	7,8	66,7	8	16	312679	TK-00786

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** APET can be used in place of APHT.

Hushcut® Inserts

APHT/APET



Inserts	Part Number ISO	GA5036	G-9120	G-915	Part Number ANSI	Dimensions (inches) L	W	S	R	A	B
 APHT/APET	**APHT-160408PDR**	●	●	●	**APHT-32.73PD2R**	16,50	9,50	4,76	0,80	11°	85°
	APHT-160416PDR	●	●	●	**APHT-32.73PD4R**	16,50	9,50	4,76	1,60	11°	85°
	APHT-160432PDR	❍	❍	❍	**APHT-32.73PD8R**	16,50	9,50	4,76	3,20	11°	85°
	APET-160408PDR	●	●	●	**APET-32.73D2R**	16,76	9,50	4,76	0,80	11°	85°
	APET-160416PDR	●	❍	❍	**APET-32.73D4R**	16,59	9,50	4,76	1,60	11°	85°
	APET-160432PDR	●	●	●	**APET-32.73D6R**	16,59	9,50	4,76	2,38	11°	85°

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

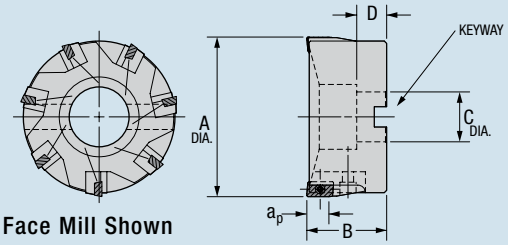
G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked ● Standard	❍ Stocked or Available ❍ Upon Request	❍ 10 Business ❍ Days or Less

FMC90L

0° Lead Face Mill, Cartridge Style



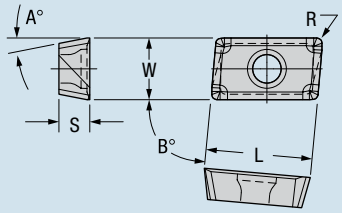
Right-Hand Face Mill Shown

Part Number FMC90L	Gage Insert	Stock	Dimensions (millimeters) A	B	C	D	a_p	No. of Inserts	Keyway	Standard Components: Cartridge Screw	Cartridge	Insert Screw	*Tune-Up Kit Includes All Standard Components
FMC90L-080R	APHT-160408PDR**	❍	80	40	22	20	13	6	10	SHCS M6-1.0 x 16mm	MC90L-R	312679	TK-02199
FMC90L-100R	APHT-160408PDR**	●	100	63	40	28	13	7	16	SHCS M6-1.0 x 16mm	MC90L-R	312679	TK-02200
FMC90L-125R	APHT-160408PDR**	❍	125	63	40	28	13	8	16	SHCS M6-1.0 x 20mm	MC90L-R	312679	TK-02201
FMC90L-160R	APHT-160408PDR**	❍	160	63	40	28	13	10	16	SHCS M6-1.0 x 20mm	MC90L-R	312679	TK-02202
FMC90L-200R	APHT-160408PDR**	❍	200	63	60	32	13	12	25	SHCS M6-1.0 x 20mm	MC90L-R	312679	TK-02203
FMC90L-250R	APHT-160408PDR**	❍	250	63	60	32	13	16	25	SHCS M6-1.0 x 20mm	MC90L-R	312679	TK-02204

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** APET can be used in place of APHT.

Hushcut® Inserts

APHT/APET



Inserts	Part Number ISO	GA5036	G-9120	G-915	Part Number ANSI	Dimensions (inches) L	W	S	R	A	B
 APHT/APET	**APHT-160408PDR**	●	●	●	**APHT-32.73PD2R**	16,50	9,50	4,76	0,80	11°	85°
	APHT-160416PDR	●	❍	❍	**APHT-32.73PD4R**	16,50	9,50	4,76	1,60	11°	85°
	APHT-160432PDR	●	●	●	**APHT-32.73PD8R**	16,50	9,50	4,76	3,20	11°	85°
	APET-160408PDR	●	●	●	**APET-32.73D2R**	16,76	9,50	4,76	0,80	11°	85°
	APET-160416PDR	●	●	●	**APET-32.73D4R**	16,59	9,50	4,76	1,60	11°	85°
	APET-160432PDR	❍	❍	❍	**APET-32.73D6R**	16,59	9,50	4,76	2,38	11°	85°

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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Index-O-Cut™ Milling Cutters

The Index-O-Cut™ is a high-performance milling system for all materials thanks to its high-shear cutting action and the 45° lead angle on the octagon-style insert. These mills are capable of running at higher speeds and feeds than the competitiion with low horsepower consumption.





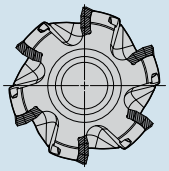
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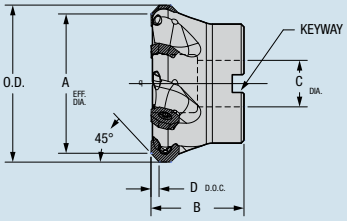
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G-MOFHP

Face Mill: High Positive



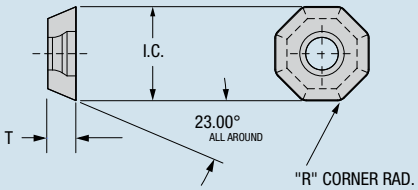


Part Number	Gage Insert	Stock	Dimensions (mm) A	O.D.	B	C	DOC** D	No. of Inserts	Keyway	Standard Components Insert Screw	*Tune-Up Kit Includes All Standard Components
G-MOFHP-0545E050	00EW-060416	●	50	59,4	40	22	4,39	4	10	PT-546-T	TK-03249
G-MOFHP-0545E063	00EW-060416	●	63	72,4	40	22	4,39	5	10	PT-546-T	TK-03165
G-MOFHP-0545E080	00EW-060416	❍	80	89,4	50	27	4,39	6	12	PT-546-T	TK-03250
G-MOFHP-0545E100	00EW-060416	●	100	109,4	50	32	4,39	7	14	PT-546-T	TK-03444
G-MOFHP-0545E125	00EW-060416	●	125	134,4	63	40	4,39	8	16	PT-546-T	TK-03445
G-MOFHP-0545E150	00EW-060416	●	150	159,4	63	40	4,39	9	16	PT-546-T	TK-03651
G-MOFHP-0545E800	00EW-060416	●	200	209,4	63	60	4,39	10	25	PT-546-T	TK-03437

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
**Maximum depth of cut is 7,92mm.

00EW Insert

Octagon



Inserts	Part Number ISO	G-9120	G-915	Part Number ANSI	Dimensions (mm) A	T	R
	00EW-060416	●	●	00EW-534	15,875	4,763	1,588

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

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● ● Stocked Standard	❍ ❍ Stocked or Available Upon Request	❍ ❍ 10 Business Days or Less

Performance Calculations

Starting Speeds and Feeds for Index-O-Cut™ *(M12)*

Work Material	Insert Grades	Hardness (Hrc)	Cutting Speed (m/min)	Maximum Feed per Tooth (mm)
Low-Carbon Steel / Free Machining	G-9120	<25	365-487	0,12-0,25
Alloy Steel (4140, 4130, 6150, 8620)	G-9120	15-30	274-426	0,10-0,17
High-Carbon Steel (1080,1541, Nitralloy, 52100)	G-9120	25-40	182-304	0,07-0,15
Tool Steel (A6, D2, P-20, H-13)	G-9120	<30	243-365	0,10-0,20
High-Temp (Inconel, Hastelloy, Waspaloy)	G-915	<35	121-243	0,07-0,17
Stainless Steel (304, 316, 17-4 PH)	G-915	<32	274-457	0,10-0,22

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High-Shear Milling Cutters

Greenleaf's high-shear face milling cutters are industry's first choice when surface finish and material removal rate are a priority in materials such as aluminum, high-temp alloy, stainless steel or low-carbon steel. The zero-degree lead face mills offer a protected screw-on insert pocket design with an anvil backup or cartridge design in a diameter range from 40-160mm, which gives greater life to the cutter body.

The Greenleaf 45-degree face mill has a through-pocket wedge-behind design, which offers complete face adjustability to dial in the face runout and maximum chip gullets to allow even the most difficult-to-machine materials to exit the cut freely. This feature extends insert life and aids in achieving the desired surface finish.

- 40-100mm diameter, zero-degree lead are offered in a fixed pocket design.
- 100-160mm diameter, zero-degree and 45-degree lead are offered in adjustable pocket designs to pre-set face runout.





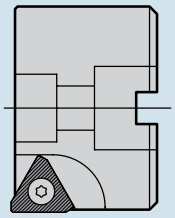
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FTHP

Milling Cutters: High Shear



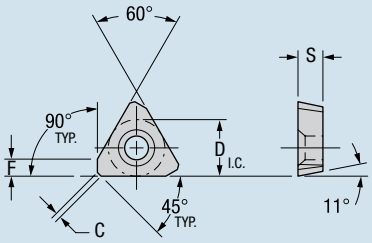
Right-Hand Face Mill Shown

Part Number		Gage		Dimensions (millimeters)					Standard Components		* Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	Keyway	No. Of Inserts	Anvil	Insert Screw	Includes All Standard Components
FTHP-500063R		TPCB-2204PF-R	❍	63	40	22	10	4	308429	SE03-23	TK-00652
	FTHP-500063L	TPCB-2204PF-L	❍	63	40	22	10	4	308429	SE03-23	TK-00652
FTHP-500080R		TPCB-2204PF-R	❍	80	50	27	12	4	308429	SE03-23	TK-00652
	FTHP-500080L	TPCB-2204PF-L	❍	80	50	27	12	4	308429	SE03-23	TK-00652
FTHP-5000100R		TPCB-2204PF-R	❍	100	50	32	14	5	308429	SE03-23	TK-02234
	FTHP-5000100L	TPCB-2204PF-L	❍	100	50	32	14	5	308429	SE03-23	TK-02234

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

TPCB Insert

Inserts	Part Number ISO	GA5036	G-915	G-53	Part Number ANSI	Dimensions (millimeters) D	S	F	C
	TPCB-2204PF-R	❍	●	❍	TPCB-43P8F-R	12,70	4,76	3,18	1,12
	TPCB-2204PF-L	❍	●	❍	TPCB-43P8F-L	12,70	4,76	3,18	1,12



GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

G-53 (uncoated) General purpose grade for steel and steel alloys. Good combination of toughness and wear resistance for milling, or as an all-around grade for mixed production applications.

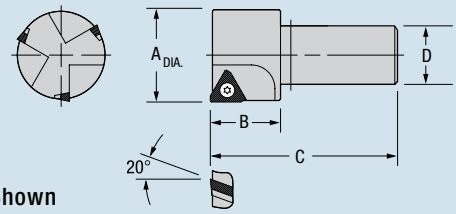
"J" finish available upon request

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● Stocked Standard	❍ Stocked or Available Upon Request	❍ 10 Business Days or Less

WSTHP

End Mill: Screw-On Inserts



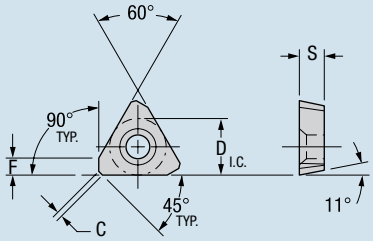
Right-Hand End Mill Shown

Part Number		Gage		Dimensions (millimeters)					Standard Components		* Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D	No. Of Inserts	Anvil	Insert Screw	Includes All Standard Components
WSTHP-4032R		TPCB-2204PF-R	❍	40	42	115	32	2	308429	SE03-23	TK-00650
	WSTHP-4032L	TPCB-2204PF-L	❍	40	42	115	32	2	308429	SE03-23	TK-00650
WSTHP-5032R		TPCB-2204PF-R	●	50	42	115	32	3	308429	SE03-23	TK-00651
	WSTHP-5032L	TPCB-2204PF-L	❍	50	42	115	32	3	308429	SE03-23	TK-00651
WSTHP-6332R		TPCB-2204PF-R	❍	63	42	115	32	4	308429	SE03-23	TK-00652
	WSTHP-6332L	TPCB-2204PF-L	❍	63	42	115	32	4	308429	SE03-23	TK-00652

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

TPCB Insert

Inserts	Part Number ISO	GA5036	G-915	G-53	Part Number ANSI	Dimensions (millimeters) D	S	F	C
	TPCB-2204PF-R	❍	●	❍	TPCB-43P8F-R	12,70	4,76	3,18	1,12
	TPCB-2204PF-L	❍	●	❍	TPCB-43P8F-L	12,70	4,76	3,18	1,12



GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

G-53 (uncoated) General purpose grade for steel and steel alloys. Good combination of toughness and wear resistance for milling, or as an all-around grade for mixed production applications.

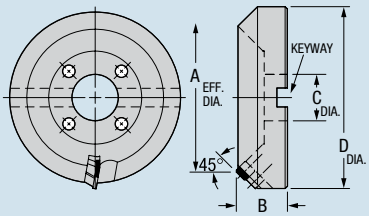
"J" finish available upon request

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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SHPC-345 45° Lead

45° Lead Face Mill, Negative Radial 20° Positive Axial



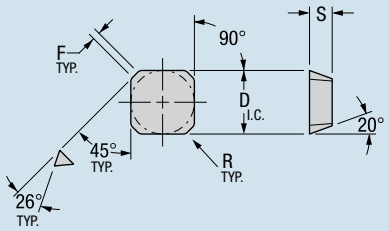
Right-Hand Face Mill Shown

Part Number		Gage		Dimensions (millimeters)						Standard Components			* Tune-Up Kit
Right Hand	Left Hand	† Insert	Stock	A	B	C	D	Keyway	Bolt Circle	No. of Inserts	Wedge	Wedge Screw	Back-Up Plate	Includes All Standard Components
SHPC-12-345-100R	–	SECN-42A6FR4	❍	100	50	32	130	14	–	6	430996	STCM-11	307788	TK-02161
–	SHPC-12-345-100L	SECN-42A6FR4	❍	100	50	32	130	14	–	6	430996	STCM-11	307788	TK-02161
SHPC-12-345-125R	–	SECN-42A6FR4	❍	125	63	40	155	16	–	8	430996	STCM-11	307788	TK-02162
–	SHPC-12-345-125L	SECN-42A6FR4	❍	125	63	40	155	16	–	8	430996	STCM-11	307788	TK-02162
SHPC-12-345-160R	–	SECN-42A6FR4	●	160	63	40	190	16	66,7	10	430996	STCM-11	307788	TK-02165
–	SHPC-12-345-160L	SECN-42A6FR4	❍	160	63	40	190	16	66,7	10	430996	STCM-11	307788	TK-02165

† SECN-42A6F CAN BE USED FOR FINISHING, BUT THERE IS NOT 1,5mm CORNER RADIUS ON THE FLAT.
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

SECN Insert

Inserts	Part Number ANSI	GA5036	GA5125	G-9120	G-915	G-910	Part Number ANSI	Dimensions (millimeters) D	S	F	R
	SECN-42A6FR4	●	❍	●	●	●	SECN-42A6FR4	12,70	3,18	2,38	0,25



GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

G-910 (PVD coated) A grade for high-temp alloys, stainless steel, and low carbon steels. A medium speed grade and should be applied at moderate to high feed rates.

"J" polish available upon request.

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Screw-On Insert Milling Cutters

The special-duty end mills utilize the screw-on insert concept for simplicity and maximum chip clearance without hardware interference. This provides longer tool life and better surface finishes.

Center Cutting

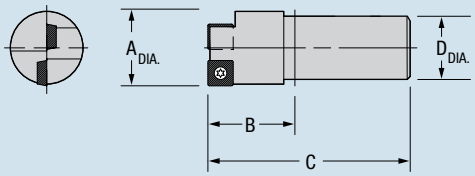


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www.greenleafglobalsupport.com

WSSCC

0° Lead End Mill, Center Cutting



Right-Hand End Mill Shown

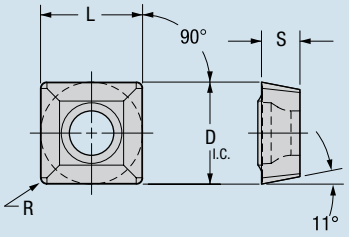
Part Number		Gage		Dimensions (millimeters)					Standard Components	*Tune-Up Kit	
Right Hand	Left Hand**	Insert	Stock	A	B	C	D	No. of Inserts	Insert Screw	Includes All Standard Components	Optional Insert
WSSCC-2020R		SPMT-070308	❍	20	35	115	20	2	PT-543-T	TK-00737	SPMW-070308
	WSSCC-2020L	SPMT-070308	❍	20	35	115	20	2	PT-543-T	TK-00737	SPMW-070308
WSSCC-2525R		SPMT-09T308	●	25	35	115	25	2	PT-559-T	TK-00738	SPMW-09T308
	WSSCC-2525L	SPMT-09T308	❍	25	35	115	25	2	PT-559-T	TK-00738	SPMW-09T308
WSSCC-3232R		SPMT-120408	❍	32	45	125	32	2	PT-588-T	TK-00739	SPMW-120408
	WSSCC-3232L	SPMT-120408	❍	32	45	125	32	2	PT-588-T	TK-00739	SPMW-120408
WSSCC-4032R		SPMT-120408	❍	40	45	125	32	2	PT-588-T	TK-00739	SPMW-120408
	WSSCC-4032L	SPMT-120408	❍	40	45	125	32	2	PT-588-T	TK-00739	SPMW-120408

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** Left-Hand cutters are made to order only.

Screw-On Inserts

SPMT-X2

Inserts	Part Number ISO	GA5036	G-935	Part Number ANSI	Dimensions (millimeters) D	L	S	R
 SPMT-X2	**SPMT-070308-X2**	●	●	**SPMT-2.522-X2**	7,94	7,94	3,18	0,80
	SPMT-09T308-X2	●	●	**SPMT-32.52-X2**	9,53	9,53	3,96	0,80
	SPMT-120408-X2	●	●	**SPMT-432-X2**	12,70	12,70	4,76	0,80



GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-935 (PVD coated)
For steel where additional resistance to mechanical and thermal shock is required. For moderate speeds and feeds.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● ● Stocked Standard	❍ ❍ Stocked or Available Upon Request	❍ ❍ 10 Business Days or Less

Excelerator® Milling Cutters

High-velocity cutters with ceramic inserts for use in high-temp alloys, hard metals, cast irons at high speeds and accelerated feed rates. Precision nests provide multiple insert configurations and body protection.





Greenleaf Excelerator® Mills Set-Up and Operational Procedures

1. Thoroughly clean all insert pockets.
2. Install the inserts, making sure that they are properly seated in the pocket, and torque the insert clamp screws to the correct torque as indicated on the body of the Excelerator Milling Cutter.
3. Use Greenleaf Excelerator Mills only on machines that have adequate shield guards.
4. Run the Greenleaf Excelerator Mills using cutting parameters as recommended by the Greenleaf Tech Team. Contact Greenleaf at:
   +814-763-2915 US
   +31-45-404-1774 EU
   +86-731-89954796 CN
5. For safety purposes, do not exceed the maximum RPM's etched on the Excelerator Mill. Note: There are two max RPM numbers. One (the lower RPM number) is for using the mill with carbide inserts and the other is for usage with ceramic inserts.

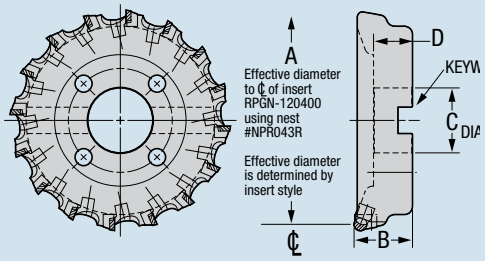
Application Tips

- Air blast is highly recommended for hard milling applications.
- Maximum insert life can be achieved at a radial width of cut based on 40-60 percent of cutter diameter.
- As the width-of-cut ratio decreases, feed should be increased to maintain acceptable average chip thickness.
- Balanced toolholders are critical when operating at 10,000 RPM and higher.
- Keep tool length overhang as short as possible.
- Ramping or helical interpolation are the preferred methods of entry into the cut.
- Maintain cutter engagement as much as possible; frequent entry and exit into cuts can decrease insert life.
- When using round insert cutters, the effective cutting diameter depends on the actual depth of cut.

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CP4 Series

Positive Rake Face Mill



Right-Hand Face Mill Shown

Cutter Part Number			Dimensions (millimeters)							Standard Components			* Tune-Up Kit
Right Hand	Left Hand	Stock	A	B	C	D	Keyway	Bolt Circle	No. of Inserts	Wedge	Wedge Screw	Nest Screw	Includes All Standard Components
CP-4080R	–	●	80	50	27	22	12	–	6	425605	MS-1595	C0-5018	TK-01604
–	CP-4080L	❍	80	50	27	22	12	–	6	425605	MS-1595	C0-5018	TK-01604
CP-4100R	–	●	100	50	32	25	14	–	8	425605	MS-1595	C0-5018	TK-01963
–	CP-4100L	❍	100	50	32	25	14	–	8	425605	MS-1595	C0-5018	TK-01963
CP-4125R	–	●	125	63	40	28	16	–	10	425605	MS-1595	C0-5018	TK-01593
–	CP-4125L	❍	125	63	40	28	16	–	10	425605	MS-1595	C0-5018	TK-01593
CP-4160R	–	❍	160	63	40	28	16	66,7	12	425605	MS-1595	C0-5018	TK-01694
–	CP-4160L	❍	160	63	40	28	16	66,7	12	425605	MS-1595	C0-5018	TK-01694
CP-4200R	–	❍	200	63	60	38	25	101,6	16	425605	MS-1595	C0-5018	TK-01921
–	CP-4200L	❍	200	63	60	38	25	101,6	16	425605	MS-1595	C0-5018	TK-01921
CP-4250R	–	❍	250	63	60	38	25	101,6	20	425605	MS-1595	C0-5018	TK-01962
–	CP-4250L	❍	250	63	60	38	25	101,6	20	425605	MS-1595	C0-5018	TK-01962
CP-4315R	–	❍	315	80	60	38	25	101,6 177,8	24	425605	MS-1595	C0-5018	TK-01976
–	CP-4315L	❍	315	80	60	38	25	101,6 177,8	24	425605	MS-1595	C0-5018	TK-01976

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

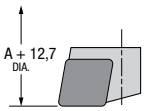
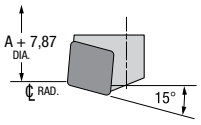
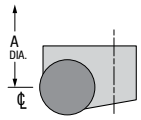
Cutters are supplied less insert and nest. Nest must be purchased separately. See below.

Insert shape, size and quantity must be determined after choosing cutter and nest.

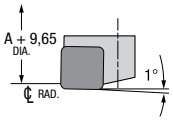
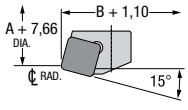
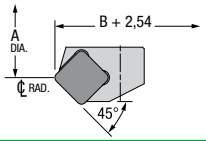
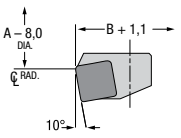
Left-hand cutters can be built to order.

CP4 Series

Nests

Inserts	Nest Part Number		Stock		Gage
	Right Hand	Left Hand	R	L	Insert
	NPC043R	—	●		CPGN-120412
	—	NPC043L		❍	CPGN-120412
	NPC1543R	—	●		CPGN-120412
	—	NPC1543L		❍	CPGN-120412
	NPR043R	—	●		RPGN-120400
	—	NPR043L		❍	RPGN-120400

The filler block nest, NPB, will act as a replacement for the inserts and insert nests. The filler block nest must be locked securely in place with the wedge to insure cutter integrity.

Inserts	Nest Part Number		Stock		Gage
	Right Hand	Left Hand	R	L	Insert
	NPS143R	—	●		SPGN-120416
	—	NPS143L		❍	SPGN-120416
	NPS1543R	—	●		SPGN-120416
	—	NPS1543L		❍	SPGN-120416
	NPS4543R	—	●		SPGN-120416
	—	NPS4543L		❍	SPGN-120416
	XFNPS8043R	—	●		SPGN-120412
	—	XFNPS8043L		❍	SPGN-120412

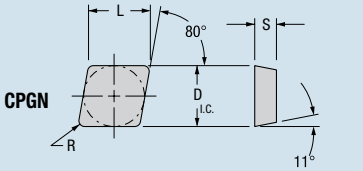
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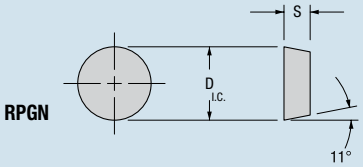
Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked ● Standard	❍ Stocked or Available Upon Request	❍ 10 Business Days or Less

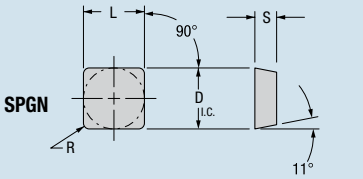
CP4 Series

Positive Inserts

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	G-9230	GA5036	GA5125	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	L	S	R
	CPGN-120412	●	●	●	●	❍	●	❍	❍	●	CPGN-433	12,70	12,90	4,76	1,20
	CPGN-120416	●	●	❍	❍	❍	●	❍	❍	●	CPGN-434	12,70	12,90	4,76	1,60
	RPGN-120400	●	●	●	●	❍	●	●	●	●	RPGN-43	12,70	–	4,76	–
	SPGN-120412	●	●	●	❍	❍	●	●	●	●	SPGN-433	12,70	12,70	4,76	1,20
	SPGN-120416	●	●	❍	●	❍	●	❍	❍	●	SPGN-434	12,70	12,70	4,76	1,60







WG-300® and WG-600® (Whiskered Ceramic)
Used for milling high-temp alloys and hardened material above 45 Rc.

XSYTIN™-1 (Phase-Toughened)
Ideal for use in interrupted cuts, scale and milling. Capable of extreme feed rates. Excels at machining steels, cast and ductile irons, high-temp alloys and other challenging materials.

GSN100™ (Silicon Nitride Ceramic)
For high-speed turning, grooving and milling of gray and ductile cast irons.

G-9230 (PVD coated)
Carbide grade for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons.

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated)
A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

Cutter Part Number	Screw Torque Setting
CP-4080R/L	9,6 Nm
CP-4100R/L	9,6 Nm
CP-4125R/L	9,6 Nm
CP-4160R/L	9,6 Nm
CP-4200R/L	9,6 Nm
CP-4250R/L	9,6 Nm
CP-4315R/L	9,6 Nm

For additional nose radii, call Greenleaf Technical Service.

For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

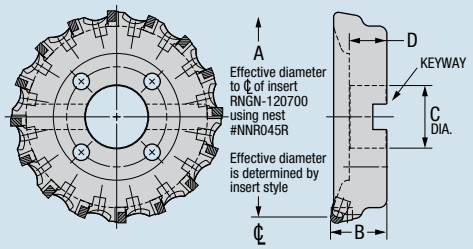
Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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C4 Series

Negative Rake Face Mill

Right-Hand
Face Mill Shown

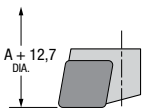
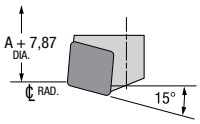
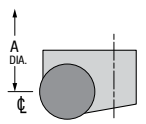


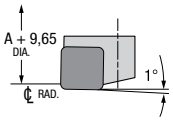
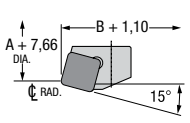
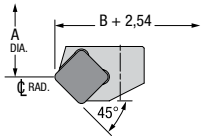
Cutter Part Number			Dimensions (millimeters)							Standard Components			* Tune-Up Kit
Right Hand	Left Hand	Stock	A	B	C	D	Keyway	Bolt Circle	No. of Inserts	Wedge	Wedge Screw	Nest Screw	Includes All Standard Components
C-4080R	–	●	80	50	27	22	12	–	6	425605	MS-1595	C0-5018	TK-01604
–	C-4080L	❍	80	50	27	22	12	–	6	425605	MS-1595	C0-5018	TK-01604
C-4100R	–	●	100	50	32	25	14	–	8	425605	MS-1595	C0-5018	TK-01963
–	C-4100L	❍	100	50	32	25	14	–	8	425605	MS-1595	C0-5018	TK-01963
C-4125R	–	●	125	63	40	28	16	–	10	425605	MS-1595	C0-5018	TK-01593
–	C-4125L	❍	125	63	40	28	16	–	10	425605	MS-1595	C0-5018	TK-01593
C-4160R	–	●	160	63	40	28	16	66,7	12	425605	MS-1595	C0-5018	TK-01694
–	C-4160L	❍	160	63	40	28	16	66,7	12	425605	MS-1595	C0-5018	TK-01694
C-4200R	–	●	200	63	60	32	25	101,6	16	425605	MS-1595	C0-5018	TK-01921
–	C-4200L	❍	200	63	60	32	25	101,6	16	425605	MS-1595	C0-5018	TK-01921
C-4250R	–	❍	250	63	60	32	25	101,6	20	425605	MS-1595	C0-5018	TK-01962
–	C-4250L	❍	250	63	60	32	25	101,6	20	425605	MS-1595	C0-5018	TK-01962
C-4315R	–	❍	315	80	60	32	25	101,6 177,8	24	425605	MS-1595	C0-5018	TK-01976
–	C-4315L	❍	315	80	60	32	25	101,6 177,8	24	425605	MS-1595	C0-5018	TK-01976

* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
Cutters are supplied less insert and nest. Nest must be purchased separately. See below.
Insert shape, size and quantity must be determined after choosing cutter and nest.
Left-hand cutters can be built to order.

C4 Series

Nests

Inserts	Nest Part Number		Stock		Gage
	Right Hand	Left Hand	R	L	Insert
	NNC043R	—	●		CNGN-120412
	—	NNC043L		●	CNGN-120412
	NNC045R	—	●		CNGN-120712
	—	NNC045L		●	CNGN-120712
	NNC1543R	—	●		CNGN-120412
	—	NNC1543L		●	CNGN-120412
	NNC1545R	—	●		CNGN-120712
	—	NNC1545L		●	CNGN-120712
	NNR043R	—	●		RNGN-120400
	—	NNR043L		●	RNGN-120400
	NNR045R	—	●		RNGN-120700
	—	NNR045L			RNGN-120700
			●		

Inserts	Nest Part Number		Stock		Gage
	Right Hand	Left Hand	R	L	Insert
	NNS143R	—	●		SNGN-120416
	—	NNS143L		●	SNGN-120416
	NNS145R	—	●		SNGN-120716
	—	NNS145L		●	SNGN-120716
	NNS1543R	—	●		SNGN-120416
	—	NNS1543L		❍	SNGN-120416
	NNS1545R	—	❍		SNGN-120716
	—	NNS1545L		❍	SNGN-120716
	NNS4543R	—	●		SNGN-120416
	—	NNS4543L		❍	SNGN-120416
	NNS4545R	—	❍		SNGN-120716
	—	NNS4545L		❍	SNGN-120716

For applications which will not require the maximum number of inserts, the filler block nest, NNB, will act as a replacement for the inserts and insert nests.

The filler block nest must be locked securely in place with the wedge to insure cutter integrity.

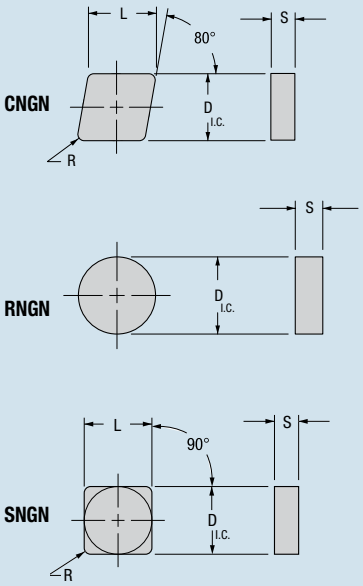
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Inserts and Steel Products		Inserts *Only*		Steel Products *Only*	
●	Stocked Standard	❍	Stocked or Available Upon Request	❍	10 Business Days or Less
●		❍		❍	

C4 Series

Negative Inserts

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	G-9230	GA5036	GA5125	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	L	S	R
	CNGN-120412	●	●	●	●	❍	●	❍	❍	●	CNGN-433	12,70	12,90	4,76	1,20
	CNGN-120416	●	●	●	●	❍	●	❍	❍	●	CNGN-434	12,70	12,90	4,76	1,60
	CNGN-120712	●	●	●	●	❍	●	❍	❍	●	CNGN-453	12,70	12,90	7,94	1,20
	CNGN-120716	●	●	●	●	❍	●	❍	❍	●	CNGN-454	12,70	12,90	7,94	1,60
	RNGN-120400	●	●	●	●	❍	●	❍	❍	●	RNGN-43	12,70	–	4,76	–
	RNGN-120700	●	●	●	●	❍	●	❍	❍	●	RNGN-45	12,70	–	7,94	–
	SNGN-120412	●	●	●	●	❍	●	●	❍	●	SNGN-433	12,70	12,70	4,76	1,20
	SNGN-120416	●	●	●	●	❍	●	❍	❍	●	SNGN-434	12,70	12,70	4,76	1,60
	SNGN-120712	●	●	●	●	❍	●	❍	❍	●	SNGN-453	12,70	12,70	7,94	1,20
	SNGN-120716	●	●	●	●	❍	●	❍	❍	●	SNGN-454	12,70	12,70	7,94	1,60



WG-300® and WG-600® (Whiskered Ceramic)
Used for milling high-temp alloys and hardened material above 45 Rc.

XSYTIN™-1 (Phase-Toughened)
Ideal for use in interrupted cuts, scale and milling. Capable of extreme feed rates. Excels at machining steels, cast and ductile irons, high-temp alloys and other challenging materials.

GSN100™ (Silicon Nitride Ceramic)
For high-speed turning, grooving and milling of gray and ductile cast irons.

G-9230 (PVD coated)
Carbide grade for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons.

GA5036 (MT-CVD coated)
A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated)
A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated)
Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated)
Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

Cutter Part Number	Screw Torque Setting
C-4080R/L	9,6 Nm
C-4100R/L	9,6 Nm
C-4125R/L	9,6 Nm
C-4160R/L	9,6 Nm
C-4200R/L	9,6 Nm
C-4250R/L	9,6 Nm
C-4315R/L	9,6 Nm

For additional nose radii, call Greenleaf Technical Service.

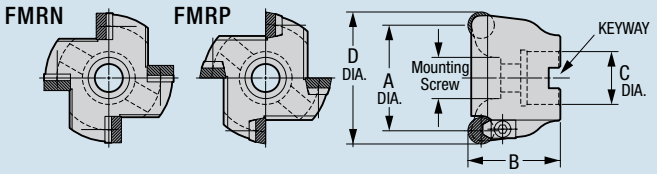
For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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FMRP–FMRN

Round Insert Face Mill



Right-Hand Cutter Shown

Part Number		Gage		Dimensions (millimeters)							Standard Components				*Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D	† Mounting Screw	No. of Inserts	Keyway	**Anvil	Anvil Screw	Clamp	Clamp Screw	Includes All Std. Components
FMRP-050R		RPGN-120400	●	50	40	22	62,7	M10	4	10	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01446
	FMRP-050L	RPGN-120400	○	50	40	22	62,7	M10	4	10	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01446
FMRP-063R		RPGN-120400	●	63	40	22	75,7	M10	4	10	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01446
	FMRP-063L	RPGN-120400	●	63	40	22	75,7	M10	4	10	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01446
FMRP-080R		RPGN-120400	●	80	50	27	92,7	M12	5	12	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01445
	FMRP-080L	RPGN-120400	○	80	50	27	92,7	M12	5	12	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01445
FMRP-100R		RPGN-120400	○	100	50	32	112,7	M16	6	14	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01447
	FMRP-100L	RPGN-120400	○	100	50	32	112,7	M16	6	14	308341	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-01447

** For Insert RPGN-120300, use anvil 312780. For insert RPGN-120700, use no anvil.

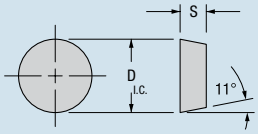
Part Number		Gage		Dimensions (millimeters)							Standard Components				*Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D	† Mounting Screw	No. of Inserts	Keyway	**Anvil	Anvil Screw	Clamp	Clamp Screw	Includes All Std. Components
FMRN-050R		RNGN-120400	●	50	40	22	62,7	M10	4	10	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699
	FMRN-050L	RNGN-120400	○	50	40	22	62,7	M10	4	10	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699
FMRN-063R		RNGN-120400	●	63	40	22	75,7	M10	4	10	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699
	FMRN-063L	RNGN-120400	○	63	40	22	75,7	M10	4	10	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699
FMRN-080R		RNGN-120400	●	80	50	27	92,7	M12	5	12	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02700
	FMRN-080L	RNGN-120400	○	80	50	27	92,7	M12	5	12	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02700
FMRN-100R		RNGN-120400	●	100	50	32	112,7	M16	6	14	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02701
	FMRN-100L	RNGN-120400	○	100	50	32	112,7	M16	6	14	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02701

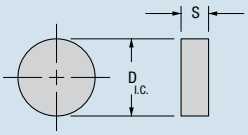
** For Insert RNGN-120300, use anvil 313596. For insert RNGN-120700, use no anvil.
*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

Left-Hand cutters are made to order only.
† Hole to suit.

RPGN, RNGN Insert

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	GA5036	GA5125	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	S
	RPGN-120300	○	○	○	○	●	○	○	●	RPGN-42	12,70	3,18
	RPGN-120400	●	●	●	●	●	●	●	●	RPGN-43	12,70	4,76
	RNGN-120300	○	○	●	○	●	○	○	●	RNGN-42	12,70	3,18
	RNGN-120400	●	●	●	●	●	○	○	●	RNGN-43	12,70	4,76
	RNGN-120700	●	●	●	●	●	○	○	●	RNGN-45	12,70	7,94





For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

WG-300® and WG-600® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

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GSN100™ (Silicon Nitride Ceramic) For high-speed turning, grooving and milling of gray and ductile cast irons.

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

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G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

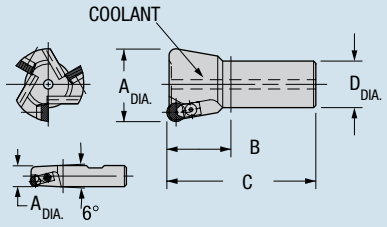
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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked ● Standard	○ Stocked or Available ○ Upon Request	○ 10 Business ○ Days or Less

WSRP *Excelerator® Mill*

End Mill: Round Positive Inserts



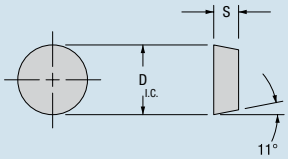
Right-Hand Cutter Shown

Part Number		Gage		Dimensions (millimeters)				No. Of Inserts	Standard Components				*Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D		Anvil	Anvil Screw	Clamp	Clamp Screw	Includes All Std. Components
† WSRP-1616R		RPGN-060200	●	16	32	80	16	2	–	–	430879	SHCS M2.5-.45x6mm	TK-01335
	† WSRP-1616L	RPGN-060200	❍	16	32	80	16	2	–	–	430879	SHCS M2.5-.45x6mm	TK-01335
† WSRP-2020R		RPGN-070300	●	20	32	82	20	2	–	–	429323	MS-1156	TK-01339
	† WSRP-2020L	RPGN-070300	❍	20	32	82	20	2	–	–	429323	MS-1156	TK-01339
WSRP-2520RA		RPGN-070300	●	25	32	82	20	3	–	–	429323	MS-1156	TK-01840
	WSRP-2520LA	RPGN-070300	❍	25	32	82	20	3	–	–	429323	MS-1156	TK-01840
WSRP-2520R		RPGN-090300	●	25	32	82	20	3	–	–	425716	MS-1156	TK-01325
	WSRP-2520L	RPGN-090300	❍	25	32	82	20	3	–	–	425716	MS-1156	TK-01325
WSRP-3225R		RPGN-090300	●	32	32	88	25	3	–	–	425716	MS-1156	TK-01325
	WSRP-3225L	RPGN-090300	❍	32	32	88	25	3	–	–	425716	MS-1156	TK-01325
WSRP-4032R		RPGN-120400	●	40	45	105	32	3	–	–	3025-1	438920	TK-01340
	WSRP-4032L	RPGN-120400	❍	40	45	105	32	3	–	–	3025-1	438920	TK-01340
WSRP-5040R		RPGN-120400	●	50	45	115	40	3	308341	FHCS M3-0.5x6mm	3025-1	438920	TK-01360
	WSRP-5040L	RPGN-120400	❍	50	45	115	40	3	308341	FHCS M3-0.5x6mm	3025-1	438920	TK-01360
WSRP-6340R		RPGN-120400	●	63	45	115	40	4	308341	FHCS M3-0.5x6mm	3025-1	438920	TK-01357
	WSRP-6340L	RPGN-120400	❍	63	45	115	40	4	308341	FHCS M3-0.5x6mm	3025-1	438920	TK-01357

† No thru-tool coolant is available on WSRP-1616 and WSRP-2020 cutters
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** Left-Hand cutters are made to order only.

RPGN Insert

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	GA5036	GA5125	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	S
	RPGN-060200	●	●	●	❍	●	❍	●	●	RPGN-21.5	6,35	2,38
	RPGN-070300	●	●	●	●	●	❍	●	●	RPGN-2.52	7,94	3,18
	RPGN-090300	●	●	●	●	●	❍	●	●	RPGN-32	9,53	3,18
	RPGN-120400	●	●	●	●	●	●	●	●	RPGN-43	12,70	4,76



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G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

Cutter Part Number	Screw Torque Setting	Max RPM Carbide	Max RPM Ceramic
WSRP-1616R/L	1,7 Nm	15,000	40,000
WSRP-2020R/L	3,4 Nm	12,500	35,000
WSRP-2520R/L	3,4 Nm	9,500	26,000
WSRP-2520RA/LA	3,4 Nm	9,500	26,000
WSRP-3225R/L	3,4 Nm	7,500	21,000
WSRP-4032R/L	3,4 Nm	6,200	19,500
WSRP-5040R/L	3,4 Nm	4,600	13,000
WSRP-6340R/L	13,6 Nm	3,800	10,000

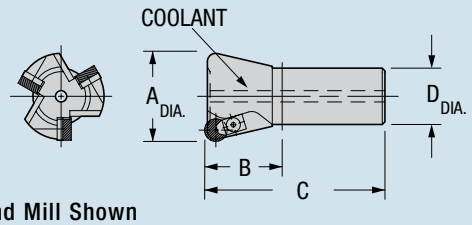
For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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WSRN *Excelerator® Mill*

End Mill: Round Negative Inserts

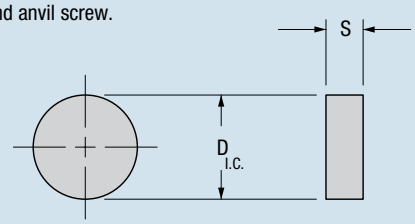


Right-Hand End Mill Shown

Part Number		Gage		Dimensions (millimeters)				No. Of Inserts	Standard Components				*Tune-Up Kit	Optional Components	
Right Hand	Left Hand	Insert	Stock	A	B	C	D		**Anvil	Anvil Screw	Clamp	Clamp Screw	Includes All Std. Components	Insert	Shim
† WSRN-2520R		RNGN-090300	●	25	30	80	20	2	–	–	425716	MS-1156	TK-01321	–	–
	† WSRN-2520L	RNGN-090300	❍	25	30	80	20	2	–	–	425716	MS-1156	TK-01321	–	–
WSRN-3225R		RNGN-090300	●	32	30	86	25	3	–	–	425716	MS-1156	TK-01325	–	–
	WSRN-3225L	RNGN-090300	❍	32	30	86	25	3	–	–	425716	MS-1156	TK-01325	–	–
WSRN-4032R		RNGN-120400	●	40	45	105	32	3	–	–	3025-1	438920	TK-01340	–	–
	WSRN-4032L	RNGN-120400	❍	40	45	105	32	3	–	–	3025-1	438920	TK-01340	–	–
†† WSRN-5040R		RNGN-120400	●	50	45	115	40	3	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02702	RNGN-120300	313596
	†† WSRN-5040L	RNGN-120400	❍	50	45	115	40	3	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02702	RNGN-120300	313596
†† WSRN-6340R		RNGN-120400	❍	63	45	115	40	4	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699	RNGN-120300	313596
	†† WSRN-6340L	RNGN-120400	❍	63	45	115	40	4	313572	FHCS M3-0.5x6mm	3025-1	SHCS M5-0.8x12mm	TK-02699	RNGN-120300	313596

***** Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
† This shank does not have any flats.
†† To use insert RNGN-120700, remove the anvil and anvil screw.

RNGN Insert



Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	S
	RNGN-090300	●	●	●	❍	❍	❍	RNGN-32	9,53	3,18
	RNGN-120300	●	❍	●	❍	❍	❍	RNGN-42	12,70	3,18
	RNGN-120400	●	●	●	●	❍	❍	RNGN-43	12,70	4,76

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Cutter Part Number	Screw Torque Setting	Max RPM Carbide	Max RPM Ceramic
WSRN-2520R/L	3,4 Nm	9,500	26,000
WSRN-3225R/L	3,4 Nm	7,500	21,000
WSRN-4032R/L	13,6 Nm	6,200	16,500
WSRN-5040R/L	13,6 Nm	4,600	13,000
WSRN-6340R/L	13,6 Nm	3,800	10,000

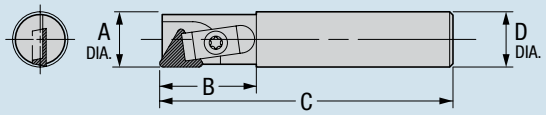
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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked Standard	❍ Stocked or Available Upon Request	❍ 10 Business Days or Less

WSTP *Excelerator® Mill*

End Mill: Triangle Positive Inserts

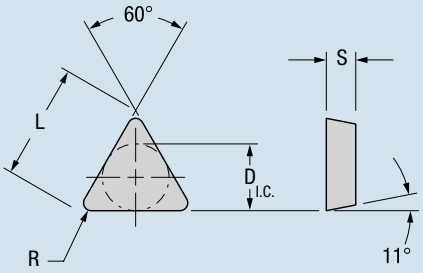


Right-Hand End Mill Shown

Part Number		Gage		Dimensions (millimeters)					Standard Components		* Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D	No. Of Inserts	Clamp	Clamp Screw	Includes All Standard Components
WSTP-1212R		TPGN-110308	●	12	22	67	12	1	429871	PT-317T	TK-00897
	WSTP-1212L	TPGN-110308	❍	12	22	67	12	1	429871	PT-317T	TK-00897
WSTP-1412R		TPGN-110308	●	14	25	70	12	1	429871	PT-317T	TK-00897
	WSTP-1412L	TPGN-110308	❍	14	25	70	12	1	429871	PT-317T	TK-00897
WSTP-1616R		TPGN-110308	●	16	25	85	16	1	429871	PT-317T	TK-00897
	WSTP-1616L	TPGN-110308	❍	16	25	85	16	1	429871	PT-317T	TK-00897

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

TPGN Insert



Inserts	Part Number ISO	WG-300	GSN100	GA5036	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) L	D	S	R
	TPGN-110308	●	❍	●	●	❍	TPGN-222	11,0	6,35	3,18	0,80

WG-300® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

GSN100™ (Silicone Nitride Ceramic) For high-speed turning, grooving and milling of gray and ducile cast irons.

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

Cutter Part Number	Screw Torque Setting	Max RPM Carbide	Max RPM Ceramic
WSTP-1212R/L	2,3 Nm	19,000	35,000
WSTP-1412R/L	2,3 Nm	17,000	35,000
WSTP-1616R/L	2,3 Nm	15,000	35,000

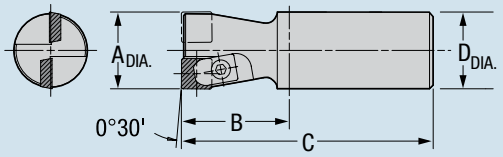
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Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
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WSSP *Excelerator® Mill*

End Mill: Square Positive Inserts



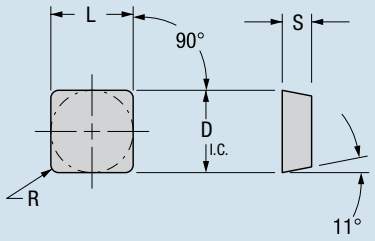
Right-Hand End Mill Shown

Part Number		Gage		Dimensions (millimeters)					Standard Components		* Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	D	No. Of Inserts	Clamp	Clamp Screw	Includes All Standard Components
WSSP-1010R		SPGN-060208	●	10	12	52	10	1	429871	PT-317T	TK-00897
	WSSP-1010L	SPGN-060208	❍	10	12	52	10	1	429871	PT-317T	TK-00897
WSSP-1212R		SPGN-060208	●	12	22	67	12	1	429871	PT-317T	TK-00897
	WSSP-1212L	SPGN-060208	❍	12	22	67	12	1	429871	PT-317T	TK-00897
WSSP-1616R		SPGN-060308	●	16	25	73	16	2	430879	SHCS M2.5-0.45x6mm	TK-01335
	WSSP-1616L	SPGN-060308	❍	16	25	73	16	2	430879	SHCS M2.5-0.45x6mm	TK-01335
WSSP-2020R		SPGN-060308	●	20	25	75	20	2	430879	SHCS M2.5-0.45x6mm	TK-01335
	WSSP-2020L	SPGN-060308	❍	20	25	75	20	2	430879	SHCS M2.5-0.45x6mm	TK-01335
WSSP-2520R		SPGN-090308	●	25	32	82	20	2	429706	MS-1156	TK-01336
	WSSP-2520L	SPGN-090308	❍	25	32	82	20	2	429706	MS-1156	TK-01336
WSSP-3225R		SPGN-090308	●	32	45	101	25	3	429706	MS-1156	TK-01337
	WSSP-3225L	SPGN-090308	❍	32	45	101	25	3	429706	MS-1156	TK-01337
WSSP-4032R		SPGN-120408	●	40	45	105	32	3	3127-C	SHCS M5-0.8x12mm	TK-01338
	WSSP-4032L	SPGN-120408	❍	40	45	105	32	3	3127-C	SHCS M5-0.8x12mm	TK-01338

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

SPGN Insert

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	G-9230	GA5036	GA5125	G-9120	G-915	Part Number ANSI	D	L	S	R
	SPGN-060208	●	❍	●	❍	●	●	❍	❍	●	SPGN-21.52	6,35	6,35	2,38	0,80
	SPGN-060308	●	●	●	❍	❍	●	❍	●	●	SPGN-222	6,35	6,35	3,18	0,80
	SPGN-090308	●	●	●	●	❍	●	❍	●	●	SPGN-322	9,53	9,53	3,18	0,80
	SPGN-120408	●	●	●	❍	❍	●	❍	●	●	SPGN-432	12,70	12,70	4,76	0,80
	SPGN-120412	●	❍	●	❍	❍	●	●	●	❍	SPGN-433	12,70	12,70	4,76	1,20



WG-300® and WG-600® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

XSYTIN™ -1 (Phase-Toughened) Ideal for use in interrupted cuts, scale and milling. Capable of extreme feed rates. Excels at machining steels, cast and ductile irons, high-temp alloys and other challenging materials.

GSN100™ (Silicon Nitride Ceramic) For high-speed turning, grooving and milling of gray and ductile cast irons.

G-9230 (PVD coated) Carbide grade for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons.

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low carbon steels. Should be run at moderate speeds and moderate to high feeds.

Cutter Part Number	Screw Torque Setting	Max RPM Carbide	Max RPM Ceramic
WSSP-1010R/L	2,3 Nm	25,000	40,000
WSSP-1212R/L	2,3 Nm	19,000	40,000
WSSP-1616R/L	1,7 Nm	15,000	40,000
WSSP-2020R/L	1,7 Nm	12,500	35,000
WSSP-2520R/L	3,4 Nm	9,500	26,000
WSSP-3225R/L	3,4 Nm	7,500	21,000
WSSP-4032R/L	13,6 Nm	6,200	16,500

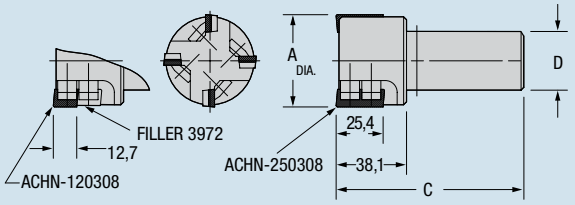
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● ● Stocked Standard	❍ ❍ Stocked or Available Upon Request	❍ ❍ 10 Business Days or Less

WSAN

End Mill: Parallelogram Inserts



Right-Hand End Mill Shown

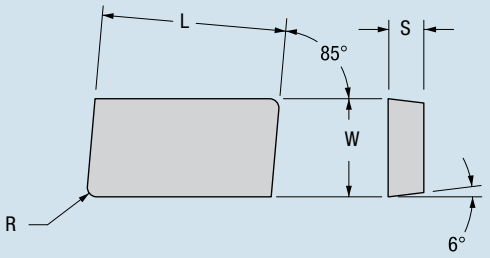
Part Number		Gage Insert		Dimensions (millimeters)				Standard Components				* Tune-Up Kit	Optional Components	
Right Hand	Left Hand	Max 25mm DOC	Stock	A	C	D	No. Of Inserts	Anvil	Anvil Screw	Clamp	Clamp Screw	Includes All Standard Components	Max 12,7 DOC Insert	Filler
WSAN-2520R		ACHN-250308	●	25	95	20	2	–	–	410756		TK-01351	ACHN-120308	3972
	WSAN-2520L	ACHN-250308-LH	❍	25	95	20	2	–	–	410756		TK-01351	ACHN-120308-LH	3972
WSAN-2525R		ACHN-250308	❍	25	101	25	2	–	–	410756		TK-01351	ACHN-120308	3972
	WSAN-2525L	ACHN-250308-LH	❍	25	101	25	2	–	–	410756		TK-01351	ACHN-120308-LH	3972
WSAN-3225R		ACHN-250308	●	32	101	25	2	–	–	410756		TK-01351	ACHN-120308	3972
	WSAN-3225L	ACHN-250308-LH	❍	32	101	25	2	–	–	410756		TK-01351	ACHN-120308-LH	3972
WSAN-4032R		ACHN-250308	●	40	105	32	3	AAP-3224	FHCS M3-0.5x6mm	410756		TK-01617	ACHN-120308	3972
	WSAN-4032L	ACHN-250308-LH	❍	40	105	32	3	AAP-3224-LH	FHCS M3-0.5x6mm	410756		TK-02229	ACHN-120308-LH	3972
WSAN-5040R		ACHN-250308	●	50	115	40	4	AAP-3224	FHCS M3-0.5x6mm	410756		TK-01616	ACHN-120308	3972
	WSAN-5040L	ACHN-250308-LH	❍	50	115	40	4	AAP-3224-LH	FHCS M3-0.5x6mm	410756		TK-02230	ACHN-120308-LH	3972
WSAN-6340R		ACHN-250308	●	63	115	40	4	AAP-3224	FHCS M3-0.5x6mm	410756		TK-01616	ACHN-120308	3972
	WSAN-6340L	ACHN-250308-LH	❍	63	115	40	4	AAP-3224-LH	FHCS M3-0.5x6mm	410756		TK-02230	ACHN-120308-LH	3972

All clamps use Clamp Screw BHCS M4-0.7x10mm

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

ACHN Insert

Inserts	Part Number ISO	WG-300	XSYTIN-1	GSN100	G-9230	GA5036	G-9120	Part Number ANSI	Dimensions (millimeters) S	W	L	R
	ACHN-250308	●	●	●	●	❍	❍	ACHN-3422	3,18	9,50	25,40	0,80
	ACHN-120308	●	❍	●	❍	●	❍	ACHN-3222	3,18	9,50	12,70	0,80
	ACHN-250308LH	❍	❍	❍	❍	❍	❍	ACHN-3422LH	3,18	9,50	25,40	0,80
	ACHN-120308LH	❍	❍	❍	❍	❍	❍	ACHN-3222LH	3,18	9,50	12,70	0,80



WG-300® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

XSYTIN™ -1 (Phase-Toughened) Ideal for use in interrupted cuts, scale and milling. Capable of extreme feed rates. Excels at machining steels, cast and ductile irons, high-temp alloys and other challenging materials.

GSN100™ (Silicon Nitride Ceramic) For high-speed turning, grooving and milling of gray and ductile cast irons.

G-9230 (PVD coated) Carbide grade for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons.

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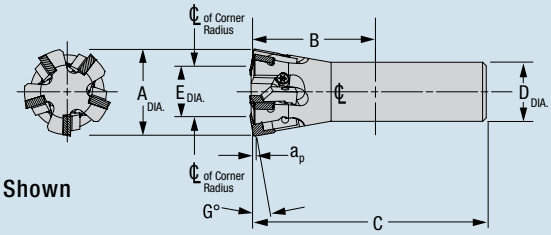
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Excelerator® XF

Positive High-Feed Mills

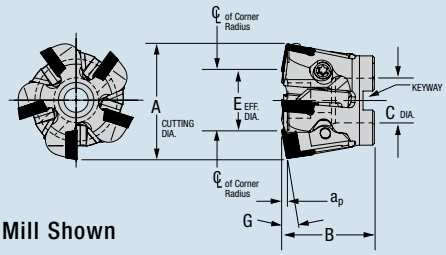


Right-Hand End Mill Shown

25mm and 40mm High-Feed End Mill: *Square Positive Inserts*

Cutter Order Number	Insert	Stock	Dimensions (millimeters) A	B	C	D	E	a_p	G	No. of Inserts	Standard Components Clamp	Clamp Screw	* Tune-Up Kit Includes All Standard Components	Screw Torque Setting	Max RPM Ceramic	Max RPM Carbide
XFSP-2520-EM	SPGN-060308	●	25	32	82	20	14,0	0,79	10°	4	431402	PT-542-T	TK-01868	1,7 Nm	26,000	9,500
XFSP-4032-EM	SPGN-090308	●	40	45	105	32	22,8	1,32	10°	5	313256	SE02-01	TK-01905	4,0 Nm	16,500	6,200

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
Add L to part number for left-hand cutter.



Right-Hand Face Mill Shown

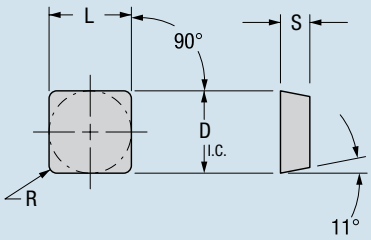
55mm High-Feed Face Mill: *Square Positive Inserts*

Cutter Order Number	Insert	Stock	Dimensions (millimeters) A	B	C	E	a_p	G	Keyway	No. of Inserts	Standard Components Clamp	Clamp Screw	Mount Screw	* Tune-Up Kit Includes All Standard Components	Screw Torque Setting	Max RPM Ceramic	Max RPM Carbide
XFSP-055-FM	SPGN-120408	●	55	40	22	31,52	1,93	10°	10,4	5	431628	SE03-72	SHCS M10-1.5	TK-02228	7,9 Nm	13,300	4,600

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
Add L to part number for left-hand cutter.

SPGN Insert

Inserts	Part Number ISO	WG-300	WG-600	XSYTIN-1	GSN100	G-9230	GA5036	GA5125	G-9120	G-915	Part Number ANSI	Dimensions (millimeters) D	L	S	R
	SPGN-060308	●	●	●	○	○	●	○	●	●	SPGN-222	6,35	6,35	3,18	0,80
	SPGN-090308	●	●	●	●	○	●	○	●	●	SPGN-322	9,53	9,53	3,18	0,80
	SPGN-120408	●	●	●	○	○	●	○	●	●	SPGN-432	12,70	12,70	4,76	0,80



WG-300® and WG-600® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

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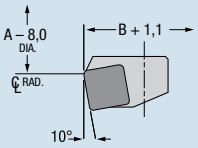
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XFNPS Nest

Nest Part Number Right Hand	Nest Part Number Left Hand	Gage Insert
XFNPS8043R	—	SPGN-120412
—	XFNPS8043L	SPGN-120412

Nest used with CP4 Series mills shown on M14.

For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

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●	○	○

Performance Calculations

Starting Speeds and Feeds for Excelerator® XF *(M32)*

Work Material	Insert Grades	Vc (m/min)	25mm Diameter			40mm Diameter			55mm Diameter			CP4 80-315mm
			RPM	v_f	f_z	RPM	v_f	f_z	RPM	v_f	f_z	h_m
Hardened Steel (60-65rc)	WG-600	213	2713	2604	0,24	1696	1950	0,23	1233	1541	0,25	0,050
Hardened Steel (50-59rc)	WG-600	244	3108	4103	0,33	1942	3592	0,37	1412	2612	0,37	0,076
Hardened Steel (40-49rc)	WG-600	427	5439	6744	0,31	3400	6460	0,38	2472	4697	0,38	0,076
Steel (30-39rc)	WG-600	427	5439	7079	0,33	3400	6800	0,40	2472	5438	0,44	0,076
Steel	GA5036 WG-600	183 244	2331 3108	3916 5221	0,42 0,42	1457 1943	3351 4372	0,46 0,45	1060 1413	2332 3250	0,44 0,46	0,127 0,127
High-Strength Alloys	G-915	30	387	584	0,38	243	610	0,50	177	505	0,57	0,10
Cast Iron	GSN100 GA5023	763 365	11850 5688	16865 9245	0,36 0,41	8140 3907	16535 8940	0,41 0,46	6200 2977	14173 7010	0,46 0,47	0,13 0,13
	Maximum Stepover (mm)		14,2			21,8			28,7			
	a_p Max (mm)		0,8			1,4			1,9			1,9
	a_e Max (mm)		25mm			40mm			55mm			

AVERAGE CHIP THICKNESS

D.O.C. vs Effective Diameter for Excelerator® XF *(M32)*

Metric	25	40	55	80	100	125	160	200	250	315
0,25	14,3	23,0	31,8	72,2	92,2	117,2	152,2	192,2	242,2	307,2
0,5	17,2	25,9	34,7	75,1	95,1	120,1	155,1	195,1	245,1	310,1
0,75	20,5	28,8	37,5	78,0	98,0	123,0	158,0	198,0	248,0	313,0
1,0		31,7	40,4	80,9	100,9	125,9	160,9	200,9	250,9	315,9
1,27		34,6	43,3	83,8	103,8	128,8	163,8	203,8	253,8	318,8
1,5		37,5	46,2	86,6	106,6	131,6	166,6	206,6	256,6	321,6
1,77			49,1	89,5	109,5	134,5	169,5	209,5	259,5	324,5
2,0			51,9	92,4	112,4	139,9	174,9	214,9	264,9	329,9

a_p (mm)

Hard-Milling Speeds and Feeds for Excelerator® End Mills *(M27-M31)*

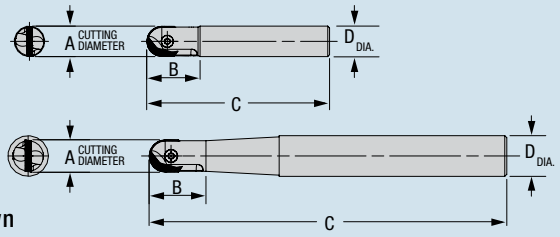
Insert	Recommended Axial Depth (ap=mm)	45-55 R/c 210-365 m/min Starting Speed (v)	45-55 R/c 0,08-0,15 mm Starting Feed (fz = mm)	55-60 R/c 150-275 m/min Starting Speed (v)	55-60 R/c 0,06-0,1 mm Starting Feed (fz = mm)	60-62 R/c 120-210 m/min Starting Speed (v)	60-62 R/c 0,05-0,9 mm Starting Feed (fz = mm)
ACHN 250308	0,9	260	0,09	210	0,064	170	0,064
RPGN 060200	0,8	260	0,10	210	0,076	170	0,064
RPGN 070300	1,0	260	0,10	210	0,076	170	0,064
RPGN 090300	1,1	260	0,11	210	0,076	170	0,064
RPGN 120400	1,2	260	0,11	210	0,089	170	0,076
RNGN 090300	1,1	260	0,13	210	0,076	170	0,064
RNGN 120400	1,2	260	0,13	210	0,089	170	0,076
SPGN 060208	0,8	260	0,08	210	0,064	170	0,056
SPGN 060308	0,9	260	0,09	210	0,064	170	0,064
SPGN 090308	0,9	260	0,09	210	0,064	170	0,064
SPGN 120408	1,0	260	0,09	210	0,076	170	0,064
TPGN 110308	0,8	260	0,08	210	0,064	170	0,056

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Excelerator® Ball Nose

End Mills

U. S. Patent No. 8,177,459 B2



Right-Hand End Mill Shown

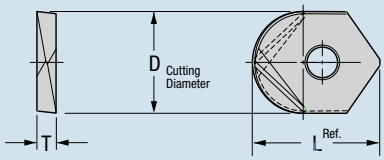
Part Number		Gage		Dimensions (inches)				Standard Component	* Tune-Up Kit Includes All Standard Components	Screw Torque Setting	Max RPM Ceramic	Max RPM Carbide
Short Series	Extended Series	Insert	Stock	A	B	C	D	Insert Screw				
SSBN-M010	—	GBN-M010	●	10	17	100	16	SM30-082	TK-02291	2,0 Nm	40,000	40,000
—	**SSBN-M010E**	GBN-M010	●	10	17	180	16	SM30-082	TK-02291	2,0 Nm	40,000	40,000
SSBN-M012	—	GBN-M012	●	12	19	110	16	SM40-106	TK-02292	2,9 Nm	40,000	40,000
—	**SSBN-M012E**	GBN-M012	●	12	19	200	16	SM40-106	TK-02292	2,9 Nm	40,000	40,000
SSBN-M016	—	GBN-M016	●	16	25.4	130	20	SM50-138	TK-02293	4,4 Nm	40,000	40,000
—	**SSBN-M016E**	GBN-M016	●	16	25.4	220	20	SM50-138	TK-02293	4,4 Nm	40,000	40,000
SSBN-M020	—	GBN-M020	●	20	32	140	25	SM60-165	TK-02294	5,8 Nm	40,000	40,000
—	**SSBN-M020E**	GBN-M020	●	20	32	250	25	SM60-165	TK-02294	5,8 Nm	40,000	40,000
SSBN-M025	—	GBN-M025	●	25	36	150	32	SM70-210	TK-02295	9,2 Nm	40,000	40,000
—	**SSBN-M025E**	GBN-M025	●	25	36	250	32	SM70-210	TK-02295	9,2 Nm	40,000	40,000

*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
Add L to part number for left-hand cutter.

GBN Inserts

U. S. Patent No. 8,177,459 B2

Inserts	Part Number ISO	WG-600	G-925	Part Number ANSI	Dimensions (inches) L	T	D
	**GBN-M010**	●	●	**GBN-0375**	12,7	3,18	10
	GBN-M012	●	●	**GBN-0500**	17,0	4,78	12
	GBN-M016	●	●	**GBN-0625**	20,3	4,78	16
	GBN-M020	●	●	**GBN-0750**	22,9	4,78	20
	GBN-M025	●	●	**GBN-1000**	31,2	4,78	25



WG-600® (Whiskered Ceramic) Used for milling high-temp alloys and hardened material above 45 Rc.

G-925 (Multi-layer CVD coated) Specifically designed for machining abrasive and difficult-to-machine materials. Should be used when milling high-temp alloys, titanium and other refractory metals, stainless steel and many cast irons. Excellent resistance to notching and deformation makes it suitable for moderate feeds at moderate to high speeds.

For available edge preps, please reference page ATI19 or contact Greenleaf Technical Service.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● Stocked Standard	○ Stocked or Available Upon Request	○ 10 Business Days or Less

Performance Calculations

Starting Speeds and Feeds for Excelerator® Ball Nose *(M34)*

DIN Designation	Work Material Imperial U.S.	Insert Grades	Cutting Speed Vc m/min	Maximum Feed per Tooth fz Insert Diameter 10mm	12-16mm	20-25mm
X40CrMoV5-1	**H-13** (40Hrc)	G-925	200-400	0,20	0,25	0,30
X40CrMoV5-1	**H-13** (41-55Hrc)	G-925 WG-600	175-300 300-650	0,20	0,25	0,30
X40CrMoV5-1	**H-13** (56+Hrc)	G-925 WG-600	150-225 250-450	0,15	0,27	0,27
X100CrMoV5-1	**A2** (<40Hrc)	G-925	200-400	0,22	0,25	0,30
X100CrMoV5-1	**A2** (41-54Hrc)	G-925 WG-600	200-300 300-650	0,20	0,25	0,30
X100CrMoV5-1	**A2** (55+Hrc)	G-925 WG-600	150-275 200-425	0,17	0,22	0,27
40CrMnNiMo8-6-4	**P-20** (<40Hrc)	G-925	200-400	0,20	0,30	0,35
40CrMnNiMo8-6-4	**P-20** (41-54Hrc)	G-925 WG-600	150-300 300-750	0,20	0,25	0,01
X155CrVMo12-1	**D-2** (<40Hrc)	G-925	150-300	0,20	0,25	0,30
X155CrVMo12-1	**D-2** (41-54Hrc)	G-925 WG-600	120-250 275-550	0,15	0,20	0,25
X155CrVMo12-1	**D-2** (55+Hrc)	G-925 WG-600	110-175 300-500	0,15	0,20	0,25
25CrMo4 - 50CrMo4	**4130-4150** (<45Hrc)	G-925	200-425	0,20	0,25	0,30
Ferritic & Martensitic Alloys	**400 Series SS** (<40Hrc)	G-925	200-400	0,01	0,30	0,35
Ferritic & Martensitic Alloys	**400 Series SS** (41-55Hrc)	G-925 WG-600	175-300 300-900	0,20	0,25	0,30
Austenitic Alloys	**300 Series SS** (<41Hrc)	G-925	120-300	0,20	0,30	0,35
ISO-S Material	**High-Temp** (<42Hrc)	G-925	100-200	0,20	0,25	0,30
ISO-S Material	**High-Temp** (35-45Hrc)	WG-600	300-1200	0,05 – 0,08 actual chip thickness recommended		
Cast Iron	**1691-85** (<40Hrc)	G-925 WG-600	200-450 1000-4000	0,01	0,3	0,35

For roughing operations, maximum recommended Width of Cut (WOC) and Depth of Cut (DOC) are 30 percent of ball diameter.

DOC vs Effective Diameter for Excelerator® Ball Nose *(M34)*

Insert Diameter	Metric Depth of Cut (DOC) 0,13	0,25	0,38	0,64	0,89	1,27	2,54	3,18	3,81	5,08	6,35
10	2,18	3,07	3,73	4,75	5,54	6,48	8,43	8,99	9,32	9,50	
12	2,51	3,56	4,34	5,54	6,45	7,62	10,1	11,0	11,6	12,4	12,7
16	2,85	3,99	4,85	6,22	7,29	8,61	11,63	12,7	13,6	14,8	15,5
20	3,1	4,37	5,33	6,83	8,03	9,50	13,0	14,2	15,2	16,8	18,0
25	3,58	5,05	6,17	7,92	9,35	11,1	15,2	16,8	18,1	20,3	22,0

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Powermill® Milling Cutters

Ideal for heavy-duty cutting in severe interruptions and uneven surfaces. Replaceable components maximize cutter life while providing deep depths of cut. Also available as end mills, face mills and sinusoidal.



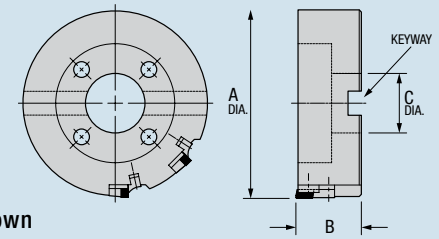
Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

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Powermill® M400LNP-A

0° Lead, Neg-Pos



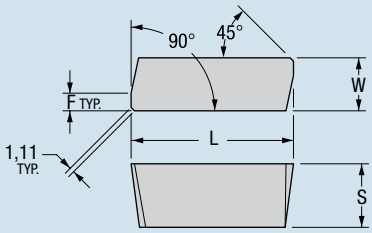
Right-Hand Face Mill Shown

Part Number		Gage		Dimensions (millimeters)					No. of Inserts	Standard Components				* Tune-Up Kit Includes All Std. Compo-nents	Optional Components	
Right Hand	Left Hand	Insert	Stock	A	B	C	Keyway	Bolt Circle		Wedge	Wedge Screw	† Anvil	Back-Up Plate††		Long Insert	Anvil
M400LNP100AR	–	LNP-335-90R	❍	100	63	32	14	–	6	430992	STCM-8	S-90R	–	TK-02206	LNP-34.57-90R	S-91R
–	M400LNP100AL	LNP-335-90L	❍	100	63	32	14	–	6	430992	STCM-8	S-90L	–	TK-02205	LNP-34.57-90L	S-91L
M400LNP125AR	–	LNP-335-90R	❍	125	63	40	16	–	6	430992	STCM-8	S-90R	303414	TK-02208	LNP-34.57-90R	S-91R
–	M400LNP125AL	LNP-335-90L	❍	125	63	40	16	–	6	430992	STCM-8	S-90L	303414	TK-02207	LNP-34.57-90L	S-91L
M400LNP160AR	–	LNP-335-90R	●	160	63	40	16	66,7	8	430992	STCM-8	S-90R	303414	TK-02210	LNP-34.57-90R	S-91R
–	M400LNP160AL	LNP-335-90L	❍	160	63	40	16	66,7	8	430992	STCM-8	S-90L	303414	TK-02209	LNP-34.57-90L	S-91L
M400LNP200AR	–	LNP-335-90R	❍	200	63	60	25	101,6	10	430992	STCM-8	S-90R	303414	TK-02613	LNP-34.57-90R	S-91R
–	M400LNP200AL	LNP-335-90L	❍	200	63	60	25	101,6	10	430992	STCM-8	S-90L	303414	TK-02616	LNP-34.57-90L	S-91L
M400LNP250AR	–	LNP-335-90R	●	250	63	60	25	101,6	12	430992	STCM-8	S-90R	303414	TK-02214	LNP-34.57-90R	S-91R
–	M400LNP250AL	LNP-335-90L	❍	250	63	60	25	101,6	12	430992	STCM-8	S-90L	303414	TK-02213	LNP-34.57-90L	S-91L
M400LNP315AR	–	LNP-335-90R	❍	315	80	60	25	101,6 177,8	16	430992	STCM-8	S-90R	303414	TK-02061	LNP-34.57-90R	S-91R
–	M400LNP315AL	LNP-335-90L	❍	315	80	60	25	101,6 177,8	16	430992	STCM-8	S-90L	303414	TK-02215	LNP-34.57-90L	S-91L

Maximum depth of cut with furnished parts is 17,3mm. When using the optional insert and anvil, the depth of cut is 26,9mm.
† Uses Anvil Screw FHCS M5-0.8x20mm. †† Uses Back-Up Plate Screw FHCS M3-0.5x10mm.
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.

LNP Insert

Inserts	Part Number ANSI	GA5036	GA5125	G-9120	Part Number ANSI	Dimensions (millimeters) S	W	L	F
	LNP-335-90R	●	●	❍	LNP-335-90R	7,94	9,53	19,05	3,18
	LNP-335-90L	●	●	❍	LNP-335-90L	7,94	9,53	19,05	3,18
	LNP-34.57-90R	●	❍	❍	LNP-34.57-90R	11,10	9,53	28,58	3,18
	LNP-34.57-90L	●	❍	❍	LNP-34.57-90L	11,10	9,53	28,58	3,18



GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

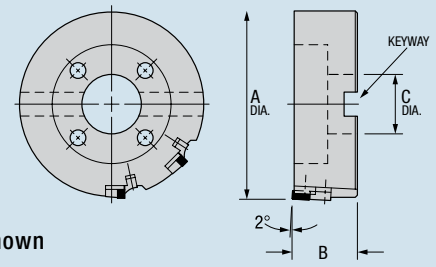
G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● ● Stocked Standard	❍ ❍ Stocked or Available Upon Request	❍ ❍ 10 Business Days or Less

Powermill® M402LN-A

2° Lead, Neg-Neg



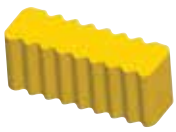
Right-Hand Face Mill Shown

Part Number		Gage		Dimensions (millimeters)					No. of Inserts	Standard Components				* Tune-Up Kit Includes All Standard Compo-nents	Optional Components	
Right Hand	Left Hand	** Insert	Stock	A	B	C	Keyway	Bolt Circle		Wedge	Wedge Screw	† Anvil	Back-Up Plate††		Long Insert	†††Anvil
M402LN100AR			❍	100	63	32	14	–	6	430992	STCM-8	S-21M	–	TK-02216		S-2M
	M402LN100AL		❍	100	63	32	14	–	6	430992	STCM-8	S-21M	–	TK-02216		S-2M
M402LN125AR		General	❍	125	63	40	16	–	6	430992	STCM-8	S-21M	303414	TK-02217	General	S-2M
	M402LN125AL	Purpose	❍	125	63	40	16	–	6	430992	STCM-8	S-21M	303414	TK-02217	Purpose	S-2M
M402LN160AR		LNE-335	●	160	63	40	16	66.7	8	430992	STCM-8	S-21M	303414	TK-02062	LNE-34.57	S-2M
	M402LN160AL		❍	160	63	40	16	66.7	8	430992	STCM-8	S-21M	303414	TK-02062		S-2M
M402LN200AR		Finisher	❍	200	63	60	25	101,6	10	430992	STCM-8	S-21M	303414	TK-02218	Finisher	S-2M
	M402LN200AL	LNE-335F	❍	200	63	60	25	101,6	10	430992	STCM-8	S-21M	303414	TK-02218	LNE-34.57F	S-2M
M402LN250AR			●	250	63	60	25	101,6	12	430992	STCM-8	S-21M	303414	TK-02219		S-2M
	M402LN250AL	Powersine®	❍	250	63	60	25	101,6	12	430992	STCM-8	S-21M	303414	TK-02219	Powersine®	S-2M
M402LN315AR		LNES-335	❍	315	80	60	25	101,6 177,8	16	430992	STCM-8	S-21M	303414	TK-02063	LNES-34.57	S-2M
	M402LN315AL		❍	315	80	60	25	101,6 177,8	16	430992	STCM-8	S-21M	303414	TK-02063		S-2M

Maximum depth of cut with furnished parts is 17,3mm. When using the optional insert and anvil, the depth of cut is 26,9mm.
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
** Specify: General Purpose – LNE, Powersine® – LNES, or Finisher – LNEF.

† Uses Anvil Screw FHCS M5-0.8x20mm. †† Uses Back-Up Plate Screw FHCS M3-0.5x10mm. ††† Used with insert LNE-34.57.

LNE, LNES Insert

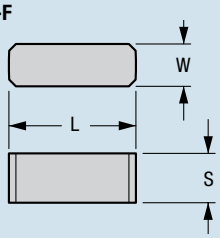
Inserts	Part Number ANSI	GA5036	GA5125	G-9120	Part Number ANSI	Dimensions (millimeters) S	W	L
	LNE-335	●	❍	●	LNE-335	7,94	9,53	19,05
	LNE-34.57	●	●	●	LNE-34.57	11,10	9,53	28,58
	LNE-335F	●	❍	❍	LNE-335F	7,94	9,53	19,05
	LNE-34.57F	●	❍	❍	LNE-34.57F	11,10	9,53	28,58
	LNES-335	●	●	❍	LNES-335	7,94	9,53	19,05
	LNES-34.57	●	❍	❍	LNES-34.57	11,10	9,53	28,58

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

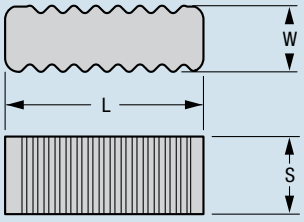
GA5125 (MT-CVD coated) A high-performance milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

LNE/LNE-F



LNES



Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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Finishing Inserts (LNE-F)

Finishing inserts incorporating a 2° approach angle ground on the surface-generating edge of the insert are available to suit certain cutters in this range. When these inserts are an available option, they are listed at the bottom of the page with the standard insert. Finishing inserts should be used in complete sets for optimum results.

This is unlike "wiper" inserts which are designed to be higher on the cutter face and can be used in one or in a limited number of positions.

Finishing inserts will generally insure a better surface finish by their increased progressive wiping action on the surface being generated.

We do not recommend the use of finishing inserts under all conditions. Standard inserts will produce better life between indexes, and in the majority of cases the finish produced will be satisfactory for all but the most demanding situations.

Sinusoidal Inserts (LNES)

Sinusoidal inserts having a "wavy" or sine wave type edge have been designed to suit the Powermill® cutter line. This concept allows the chip to be produced as a series of small segments rather than as a continuous band of chip.

The effect is a lowering of cutting forces which is especially helpful when dealing with long spindle extensions to reduce deflective forces. This style of insert does not increase productivity under normal rigid conditions versus a standard insert.

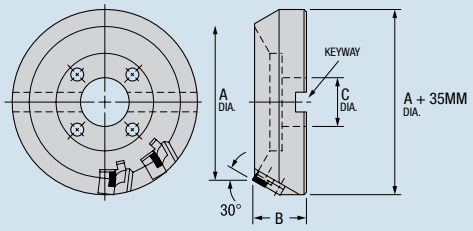
Unique to the Greenleaf Powermill® sinusoidal insert design is the fact that all four edge variations are built into a single insert. There is, therefore, only one insert and not a set of inserts as is common with other manufacturers. The inserts are simply placed into the body with the clearly visible indicator dots in sequence: •, ••, •••, ••••.

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Inserts and Steel Products	**Inserts *Only***	**Steel Products *Only***
● Stocked Standard	○ Stocked or Available Upon Request	○ 10 Business Days or Less
●	○	○

Powermill® M430LNP-A

30° Lead, Neg-Pos

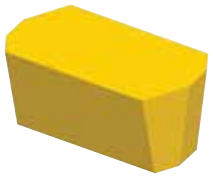


Right-Hand Face Mill Shown

Part Number		Gage	No. of Inserts	Wiper	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit Includes All Std. Compo-nents	Optional Components	
Right Hand	Left Hand	Insert		** Insert		A	B	C	Keyway	Bolt Circle	Wedge	Wedge Screw	†Anvil	Back-Up Plate††		Long Insert	†††Anvil
M430LNP100AR		LNP-335R	6	LNP-335RW	❍	100	63	32	14	–	430992	STCM-8	S-21M	303414	TK-02217		S-2M
	M430LNP100AL	LNP-335L	6	LNP-335LW	❍	100	63	32	14	–	430992	STCM-8	S-21M	303414	TK-02217		S-2M
M430LNP125AR		LNP-335R	6	LNP-335RW	❍	125	63	40	16	–	430992	STCM-8	S-21M	303414	TK-02217	General	S-2M
	M430LNP125AL	LNP-335L	6	LNP-335LW	❍	125	63	40	16	–	430992	STCM-8	S-21M	303414	TK-02217	Purpose	S-2M
M430LNP160AR		LNP-335R	8	LNP-335RW	●	160	63	40	16	66,7	430992	STCM-8	S-21M	303414	TK-02062	LNP-34.57	S-2M
	M430LNP160AL	LNP-335L	8	LNP-335LW	❍	160	63	40	16	66,7	430992	STCM-8	S-21M	303414	TK-02062	R or L	S-2M
M430LNP200AR		LNP-335R	10	LNP-335RW	❍	200	63	60	25	101,6	430992	STCM-8	S-21M	303414	TK-02218		S-2M
	M430LNP200AL	LNP-335L	10	LNP-335LW	❍	200	63	60	25	101,6	430992	STCM-8	S-21M	303414	TK-02218	Wiper	S-2M
M430LNP250AR		LNP-335R	12	LNP-335RW	●	250	63	60	25	101,6	430992	STCM-8	S-21M	303414	TK-02219	LNP-34.57F	S-2M
	M430LNP250AL	LNP-335L	12	LNP-335LW	❍	250	63	60	25	101,6	430992	STCM-8	S-21M	303414	TK-02219	RW or LW	S-2M
M430LNP315AR		LNP-335R	16	LNP-335RW	❍	315	80	60	25	101,6 177,8	430992	STCM-8	S-21M	303414	TK-02063		S-2M
	M430LNP315AL	LNP-335L	16	LNP-335LW	❍	315	80	60	25	101,6 177,8	430992	STCM-8	S-21M	303414	TK-02063		S-2M

Maximum depth of cut with standard parts is 12,7 mm. When using the optional insert and anvil, the depth of cut is 22,3 mm.
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter. ** See below for explanation of wiper insert.
† Uses Anvil Screw FHCS M5-0.8x20mm. †† Uses Back-Up Plate Screw FHCS M3-0.5x10mm. ††† Used with insert LNP34.57R/L.

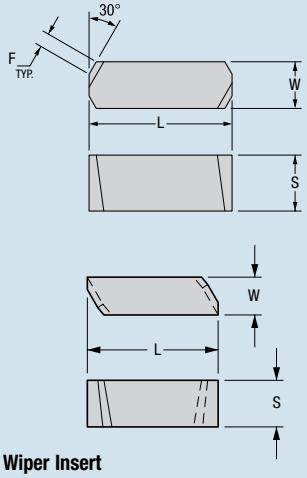
LNP Insert

Inserts	Part Number ANSI	GA5036	GA5125	G-9120	Part Number ANSI	Dimensions (millimeters) S	W	L	F
	**LNP-335R**	●	❍	●	**LNP-335R**	7,94	9,53	19,05	2,54
	LNP-335L	●	❍	●	**LNP-335L**	7,94	9,53	19,05	2,54
	LNP-335RW	●	❍	●	**LNP-335RW**	7,94	9,02	21,54	N/A
	LNP-335LW	●	❍	●	**LNP-335LW**	7,94	9,02	21,54	N/A
	LNP-34.57R	●	❍	●	**LNP-34.57R**	11,10	9,53	28,58	2,54
	LNP-34.57L	●	●	●	**LNP-34.57L**	11,10	9,53	28,58	2,54
	LNP-34.57RW	●	❍	❍	**LNP-34.57RW**	11,10	9,02	31,19	N/A
	LNP-34.57LW	●	❍	❍	**LNP-34.57LW**	11,10	9,02	31,19	N/A

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.



Wiper Insert

Wiper Inserts (LNP-RW/LW)

A wiper insert is designed to be higher above the face of the cutter compared to standard inserts and has a broader wiping flat or radius to effectively wipe out any tool marks produced by the tolerance differences in the standard inserts.

Wiper inserts can be used effectively in a single pocket in smaller diameter cutters and in multiples of two or three in larger cutters to produce a superior finish.

The grades selected for wiper inserts will generally be harder (higher 'C' classification) to combat the trend toward more rapid wear caused by the increased surface contact. Wiper inserts should only be a used when the required RMS value is very low.

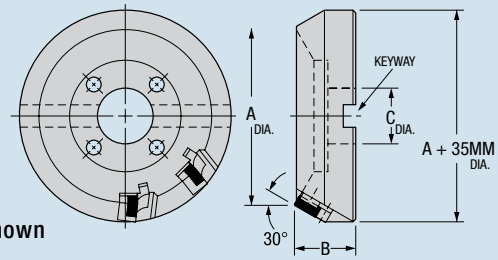
Always bear in mind that the majority of finish problems in milling come from lack of rigidity of the set-up, deflection of the part piece or machine spindle, excessive overhangs, and poor cleanliness and assembly practices in the cutter body. Wiper inserts cannot be expected to resolve these problems.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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Powermill® C430LNP-H

30° Lead, Neg-Pos, Heavy Duty



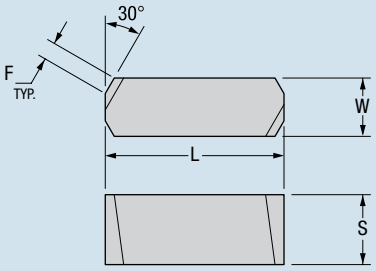
Right-Hand Face Mill Shown

Part Number		Gage		Dimensions (millimeters)						Standard Components				* Tune-Up Kit
Right Hand	Left Hand	Insert	Stock	A	B	C	Keyway	Bolt Circle	No. of Inserts	Wedge	Wedge Screw	† Anvil	Back-Up Plate ††	Includes All Standard Components
C430LNP200HR	–	LNP-44.57R	❍	200	63	60	25	101,6	8	430992	STCM-8	S-24M	303414	TK-02220
–	C430LNP200HL	LNP-44.57L	❍	200	63	60	25	101,6	8	430992	STCM-8	S-24M	303414	TK-02220
C430LNP250HR	–	LNP-44.57R	❍	250	63	60	25	101,6	10	430992	STCM-8	S-24M	303414	TK-02221
–	C430LNP250HL	LNP-44.57L	❍	250	63	60	25	101,6	10	430992	STCM-8	S-24M	303414	TK-02221
C430LNP315HR	–	LNP-44.57R	❍	315	80	60	25	101,6 177,8	12	430992	STCM-8	S-24M	303414	TK-02222
–	C430LNP315HL	LNP-44.57L	❍	315	80	60	25	101,6 177,8	12	430992	STCM-8	S-24M	303414	TK-02222

Maximum depth is 22,4mm.
*Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter.
† Uses Anvil Screw FHCS M5-0.8x25mm. †† Uses Back-Up Plate Screw FHCS M3-0.5x10mm.

LNP Insert

Inserts	Part Number ANSI	GA5036	GA5125	G-9120	Part Number ANSI	Dimensions (millimeters) S	W	L	F
	LNP-44.57R	●	❍	●	LNP-44.57R	11,10	12,70	28,58	2,54
	LNP-44.57L	●	❍	●	LNP-44.57L	11,10	12,70	28,58	2,54



GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

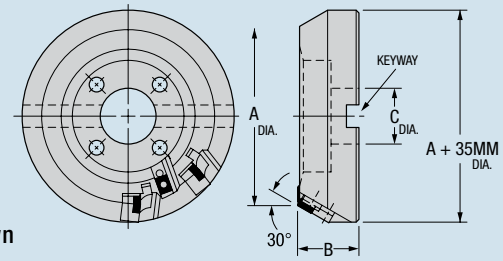
G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

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Inserts and Steel Products	Inserts *Only*	Steel Products *Only*
● ● Stocked Standard	❍ ❍ Stocked or Available Upon Request	❍ ❍ 10 Business Days or Less

Powermill® C430LNP-W

30° Lead, Neg-Pos, Finishing



Right-Hand Face Mill Shown

Part Number		Gage	No. of Inserts	** Wiper	No. of Inserts	Stock	Dimensions (millimeters)					Standard Components						*Tune-Up Kit Includes All Std. Compo-nents	Optional Components
Right Hand	Left Hand	Insert		Insert			A	B	C	Keyway	Bolt Circle	Wedge	Wedge Screw	† Anvil	Back-Up Plate ††	Wiper Insert Screw			††† Anvil
C430LNP200WR		LNP-335R	8	YCE-434-01	2	❍	200	63	60	25	101,6	430992	STCM-8	S-21M	303414	SE03-70	TK-02223	S-2M	
	C430LNP200WL	LNP-335L	8	YCE-434-01	2	❍	200	63	60	25	101,6	430992	STCM-8	S-21M	303414	SE03-70	TK-02223	S-2M	
C430LNP250WR		LNP-335R	10	YCE-434-01	2	❍	250	63	60	25	101,6	430992	STCM-8	S-21M	303414	SE03-70	TK-02224	S-2M	
	C430LNP250WL	LNP-335L	10	YCE-434-01	2	❍	250	63	60	25	101,6	430992	STCM-8	S-21M	303414	SE03-70	TK-02224	S-2M	
C430LNP315WR		LNP-335R	12	YCE-434-01	4	❍	315	80	60	25	101,6 177,8	430992	STCM-8	S-21M	303414	SE03-70	TK-02225	S-2M	
	C430LNP315WL	LNP-335L	12	YCE-434-01	4	❍	315	80	60	25	101,6 177,8	430992	STCM-8	S-21M	303414	SE03-70	TK-02225	S-2M	

The effective finish diameter is 25,4 mm less than the "A" diameter.
Maximum depth is 22,4 mm.
* Tune-Up Kits include all standard components and necessary wrenches to allow you to completely refurbish cutter. ** See below for explanation of wiper insert.
† Uses Anvil Screw FHCS M5-0.8x20mm. †† Uses Back-Up Plate Screw FHCS M3-0.5x10mm. ††† Used with insert LNP34.57R/L.

LNP, YCE Insert

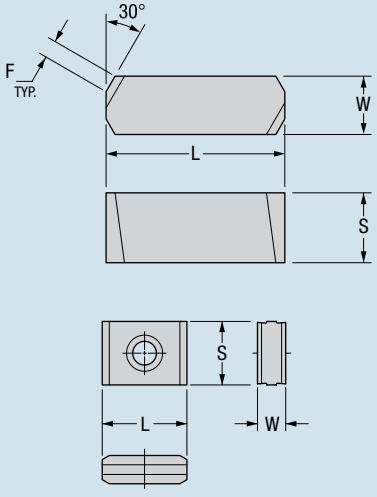
Inserts	Order Number ANSI	GA5036	GA5125	G-9120	G-60	Order Number ANSI	Dimensions (millimeters) S	W	L	F
	LNP-335R	●	●	●		LNP-335R	7,94	9,53	19,05	2,54
	LNP-335L	●	❍	●		LNP-335L	7,94	9,53	19,05	2,54
	LNP-34.57R	●	●	●		LNP-34.57R	11,10	9,53	28,58	2,54
	LNP-34.57L	●	●	●		LNP-34.57L	11,10	9,53	28,58	2,54
	YCE-434-01				●	YCE-434-01	14,28	6,35	19,05	N/A

GA5036 (MT-CVD coated) A high-performance grade for milling steels at high speed. Should be used when milling forged and cast steels and selected ductile irons. A unique combination of toughness and heat resistance makes it suitable for heavy- and light-duty milling at high speeds.

GA5125 (MT-CVD coated) A high-performance carbide milling grade especially suited for manganese steel. Also applicable on chrome-moly steel, tool steel and similar high alloy steels.

G-9120 (PVD coated) Carbide grade engineered for milling steel castings and steel forgings. Should be run at moderate to heavy feed rates and depths of cut.

G-60 (uncoated) Finishing of steel and steel castings under favorable conditions in the wiper configuration.



Wiper Insert

Wiper Inserts (YCE)

A wiper insert is designed to be higher above the face of the cutter compared to standard inserts and has a broader wiping flat or radius to effectively wipe out any tool marks produced by the tolerance differences in the standard inserts.

The grades selected for wiper inserts will generally be harder (higher 'C' classification) to combat the trend toward more rapid wear caused by the increased surface contact.

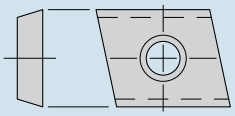
Wiper inserts should only be a used when the required RMS value is very low.

Always bear in mind that the majority of finish problems in milling come from lack of rigidity of the set-up, deflection of the part piece or machine spindle, excessive overhangs, and poor cleanliness and assembly practices in the cutter body. Wiper inserts cannot be expected to resolve these problems.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
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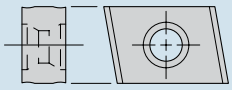
Additional Greenleaf Milling Inserts



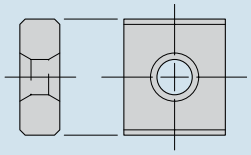
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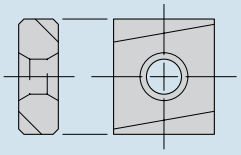
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DXE 314-03 *(427721)*
DXE 324-007 *(427719)*

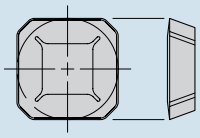


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LNE 424-20 *(306518)*
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LNE 446-01 *(38548)*

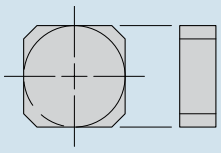


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LSE 446R01 *(418958)*

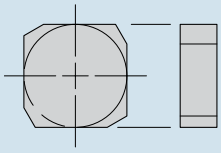
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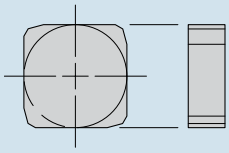
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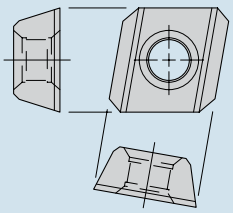
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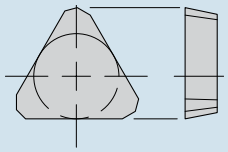
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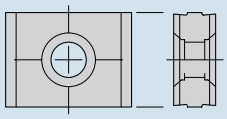
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SPE 33R01
(418993)
SPE 55L04
(421410)



TPK-43P2R
(426296)



YCE 434-01
(417787)
YCE 446-01
(423783)

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CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chip-breakers for heavy roughing through finishing.

COATED

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy- and light-duty milling at high cutting speeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

G-910 PVD-coated grade for milling high-temp alloys, stainless steel, and low carbon steels. G-910 is a medium-speed grade and should be applied at moderate to high feed rates.

G-9120 PVD-coated grade for milling and turning steel castings and steel forgings. G-9120 is engineered to maximize productivity at moderate to heavy feed rates and depths of cut.

G-915 Multi-layer PVD-coated grade, excellent for milling and turning high-temp alloys, stainless steel, and low-carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-9230 PVD-coated grade developed for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons. G-9230 has superior wear resistance and toughness and is excellent for cast and forged scale machining conditions.

G-935 Multi-layer PVD-coated grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

UNCOATED

G-53 Excellent general-purpose milling grade for steel and steel alloys at moderate speeds and feeds. Good combination of toughness and wear resistance for milling, or as an all-around grade for mixed production applications. G-53 is not recommended for continuous turning.

G-60 Heavy, rough turning of steel, steel castings, and steel forgings. Apply G-60 at moderate speeds and heavy feed rates and depths of cut. More wear resistant than G-50, but lower in toughness.

CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300®
Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel- and cobalt-based super alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

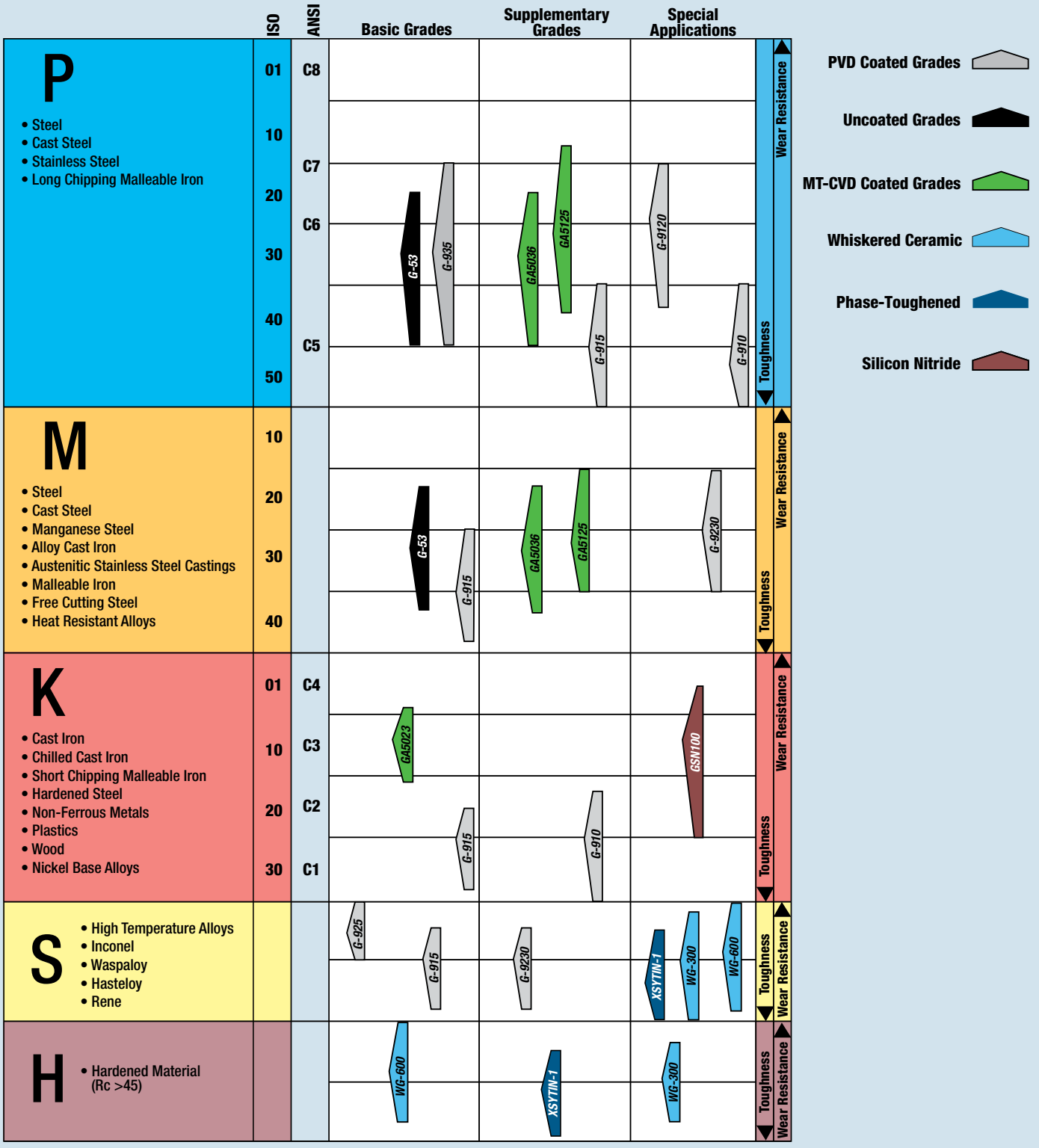
WG-600®
Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels. *U.S. Patent No. 6,447,896 B1.*

XSYTIN™-1 New phase-toughened ceramic capable of extreme feed rates. XSYTIN™-1 excels at machining a wide variety of materials including steels, cast and ductile irons, high-temperature alloys and other challenging metals. XSYTIN™-1 is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

GSN100™
New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

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Insert Grade Reference for Milling

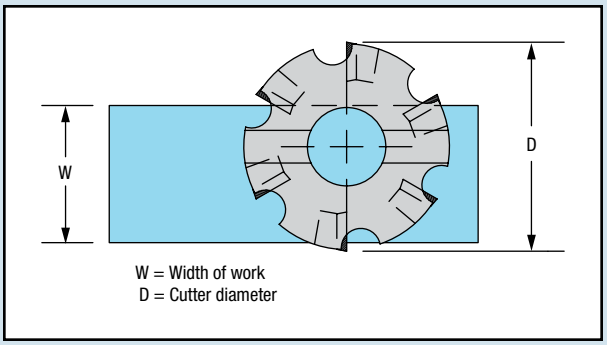


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Selection of Correct Cutter Diameter

Select a cutter diameter greater than the workpiece width by a ratio of approximately 1.5 to 1. This will ensure that each insert enters the cut without the frictional, no-chip phase which occurs when attempting to cut the full cutter dia-meter. Also, the insert leaves the part without reducing the chip down to zero. These benefits can greatly extend the insert life.

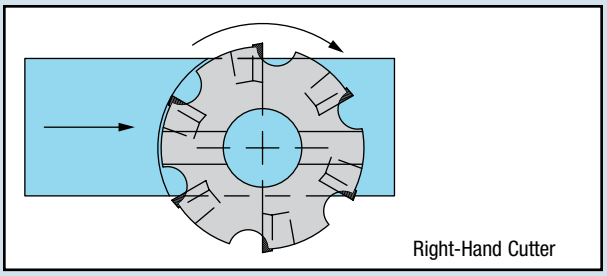
With smaller, low-power machines it will be better to select a smaller cutter and take two passes rather than a large diameter cutter forced to operate at low tooth loads (feed rates) to avoid stalling of the spindle.



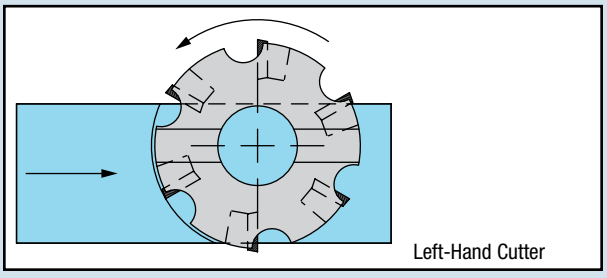
Choose a cutter diameter approximately 1.5 times the workpiece width.

Hand of Cutters

A *right-hand cutter* is one which, when viewed from above, rotates clockwise relative to the workpiece.



A *left-hand cutter* is one which, when viewed from above, rotates counterclockwise relative to the workpiece.



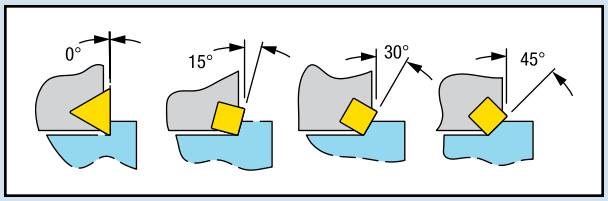
Lead Angle

The lead angle of a milling cutter is not intended for producing a specific angle on the work. In fact, because of compound angles, a given lead angle will not produce that angle exactly.

The purpose of lead angle is to thin the chip while absorbing a given depth of cut over a greater portion of the insert edge. This results in improved tool life and, for a given horsepower, a greater depth potential.

For example, 30° lead angle is a good choice for face milling in general purpose applications.

The exception to the previous statement is the 0° lead cutter, sometimes called a 90° cutter, which is designed for milling to square shoulders and producing a 90° corner.

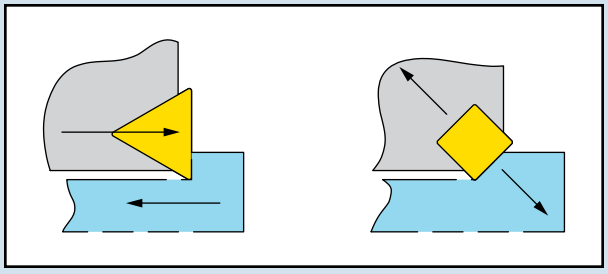


Lead Angles and Cutting Forces

The lead angle of a milling cutter has a direct effect upon the cutting forces being presented to the workpiece, cutting tool, and machine.

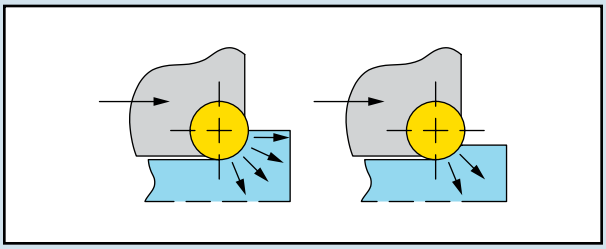
The resultant force is always directly perpendicular to the cutting edge. A lead angle may, therefore, be a major consideration in how we want to direct the forces.

For example, in a thin section workpiece, a high lead angle may cause deflection since there is more tendency to “push” the part away from the cutter. On the other hand, a 0° lead cutter has more deflective force on the machine spindle.

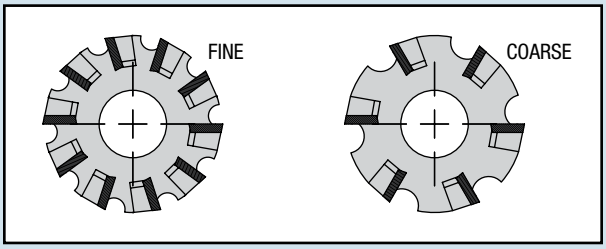


The Round Insert Cutter

The exception to the rule in lead angle cutting forces is the round insert. With a round insert, the lead angle is entirely dependent upon the depth of cut. As the depth increases, the lead angle decreases. If cutting half the diameter deep, there is effectively 0° lead angle.



In the milling of work hardening materials such as Inconel, and using a round insert cutter, there will be a direct relationship between depth of cut and speed of development of notch wear. The shallower the cut, the slower the notch wear.



Pitch

The pitch of a milling cutter refers to the numbers of inserts placed into a given diameter.

Cutters for cast iron are often closer pitch to allow the maximum number of teeth to be engaged at one time for smoother cutting, and because cast iron does not need large gullet for the discontinuous chips produced.

For general use, choose a fairly coarse pitch.

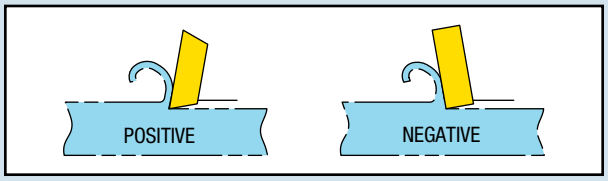
Negative Versus Positive Geometry

In an indexable cutter, the negative insert is the only one which permits the insert to be turned over and used on both sides. It is the most economical style. Also, it is the strongest insert because all edges are 90° to the faces.

On the minus side, the negative rake tool produces higher cutting forces when compared to the positive rake.

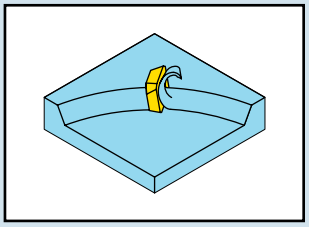
In general, use negative rakes for cast iron, interrupted cuts, and on rigid high-power machining for steels.

Use positive rakes for aluminum, titanium, copper, most stainless steels, thin or easily deflected parts, steels, and nickel alloys.



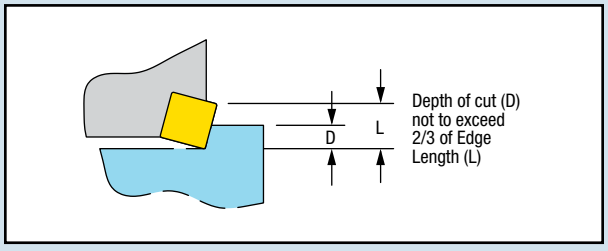
There are many milling cutters with a combination of positive and negative rakes often called shear-angle design. These cutters offer some of both worlds, although inserts are essentially like positive inserts and cannot be turned over. Shear angle cutters do provide continuous chip ejection since the axial rake behaves much like a helix in a flute and takes the chip up and away from the finished surface.

These cutters work well in heavy duty operations with wide widths of cut—especially if combined with a 30° lead angle.



Depth of Cut

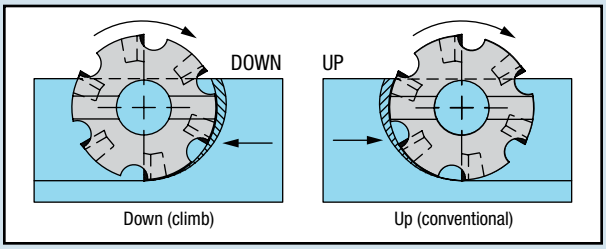
It is a good general rule not to allow depth of cut to exceed 2/3 of the cutting edge length. Remember that in lead angle cutters the cutting edge length in use is not the same as the depth of cut.



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Up Milling and Down Milling

This refers to direction of rotation relative to the feed.

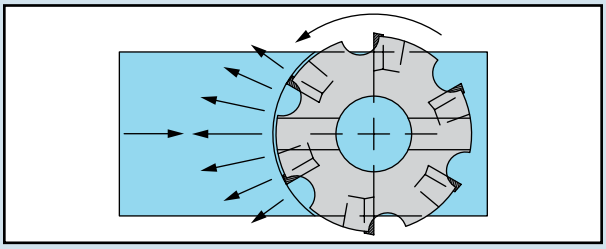


With a modern machine in good condition, down milling will give the best results. This is because the thickest section of the chip is against the insert to avoid welding, and pressure is progressively relieved towards the finished surface.

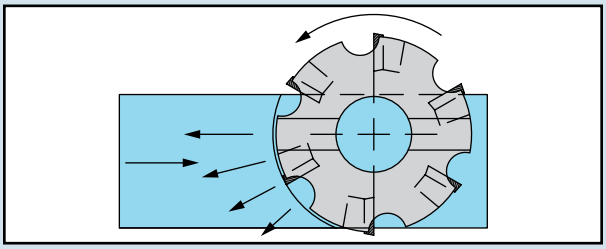
In up milling, friction and pressure build up before the chip starts to form, causing premature edge wear. It should be in rare cases that up milling is needed. This could be, for example, on an older machine with backlash in the table feed.

Cutter Positioning

Central positioning of the cutter can give rise to vibration if any spindle play is present. This is because of an alternating radial force pushing against the spindle.



Placing the cutter off center will always be a better situation to avoid chatter and vibration and also to improve tool life.

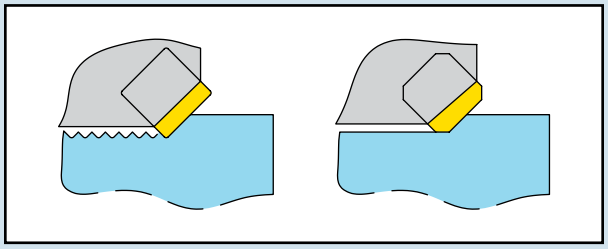


When moving off center, the path of cut is longer since each insert now sweeps a longer arc with each revolution. This may have a measureable impact on tool life, and cutting temperature will tend to increase.

Seek a happy medium by moving off center in small increments until vibration is controlled.

Surface Finish

In a milling cutter the finish is produced by the highest insert. Since variations exist in the body and the inserts, it is inevitable that some inserts will be higher than others. If the inserts have small corner radii, for example, the highest insert will cut the track and this will determine the finish.



For this reason, most inserts designed especially for milling, use flats on the insert rather than a radius. In this way, the highest insert produces a wiping effect removing the variances of the other inserts and leaving a much improved finish. “Wiper” inserts installed in a few stations can be used for this purpose as well as “finishing” inserts which are available for certain cutters in the Greenleaf line.

Speed Calculations

Recommended cutting speeds are usually given in surface meters per minute (m/min). Sometimes it is necessary to convert m/min to the correct RPM (rev/min) for a given cutter diameter. The following formulas can be used to make this conversion:

Vc	=	Cutting speed	m/min
D	=	Cutting diameter	mm
n	=	Spindle speed	rev/min

Cutting speed $Vc = \frac{\pi * D * n}{1000}$

Spindle speed $n = \frac{Vc * 1000}{\pi * D}$

Cutting speed recommendations are based upon the material to be machined and the cutting tool material which will be used – such as carbide, coated carbide, ceramic, silicon nitride, etc.

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Feed Rate Calculation

One problem encountered in milling cutter feed rate considerations is that while most milling cutter manufacturers make recommendations in load per tooth or feed per tooth, the machine is calibrated in *millimeters per minute*. It is, therefore, necessary to do a little simple math to get the answers required.

In turning, these problems do not exist since only one insert is involved, and the machine is calibrated in feed per revolution. Feed per revolution is the same as feed per tooth when there is only one insert, so we simply plug in the recommended feed.

With a milling cutter, the feed per tooth is controlled by three factors. These are:

1. The feed rate or table advance in mm per minute.
2. The spindle speed in revolutions per minute.
3. The number of inserts in the milling cutter.

We must make a calculation in order to find out the really critical information needed, such as the feed per tooth or how much work we are asking each insert to perform. Too little work is more often a problem than too much.

If the feed per tooth is very small, let us say less than 0,08mm, then abrasive wear is accelerated. No real chip is produced to take away the heat.

On the other hand, if high feed rates are used and the cutter has many teeth, then power available may be insufficient. This is an important consideration in selecting a cutter, especially larger diameter cutters with fine pitch. Here are the equations you will need to make your calculations:

D = Cutting diameter	**mm**
L = Machined length	**mm**
De = Effective diameter	**mm**
a_p = Depth of cut	**mm**
ae = Working engagement	**mm**
Vc = Cutting speed	**m/min**
Q = Metal removal rate	**cm^3/min**
T = Period of engagement	**min**
z = Number of teeth	**Piece**
fz = Feed per tooth	**mm**
fn = Feed per revolution	**mm/rev**
Vf = Table feed	**mm/min**
hex = Maximum chip thickness	**mm**
hm = Average chip thickness	**mm**
Kc = Specific cutting force	**N/mm^2**
n = Spindle speed	**rev/min**
Pc = Cutting power net	**Kw**
η = Efficiency	
Kr = Major cutting edge angle	**Degrees**

Table feed: $Vf = fz * n * z$

Feed per revolution: $Fn = \frac{Vf}{n}$

Removal rate: $Q = \frac{a_p * ae * Vf}{1000}$

Average chip thickness: $hm = \frac{\sqrt{ae}}{D}$

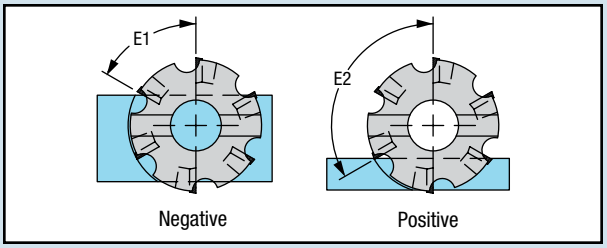
Machining time: $T = \frac{L}{Vf}$

Net power: $Pc = \frac{a_p * ae * Vf * Kc}{60000000 * \eta}$

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Angle of Entry

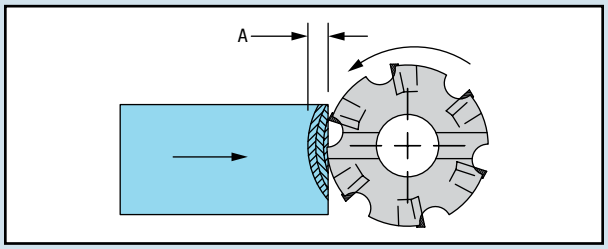
In face milling operations, the angle of entry can have a significant impact upon insert performance. A positive angle of entry can cause breakage or chipping, especially when using positive inserts. Positive angle of entry will occur when the path of cut is narrow relative to cutter diameter.



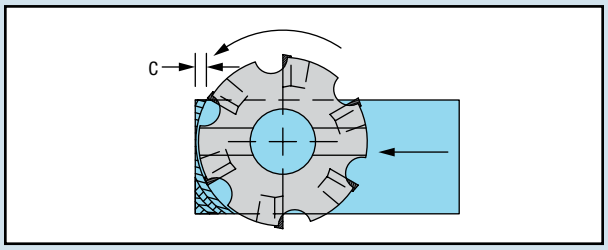
1. When the angle of entry (E1) is less than 90°, the initial impact occurs at a position behind the point of the tool. The insert has a greater section and is stronger here and better able to withstand the impacts.

2. When the angle of entry (E2) is greater than 90°, the initial impact between the insert and the part piece occurs at the point of the tool, which, especially in a positive rake milling cutter, is the weakest section of the insert. This can lead to insert failure.

Entering and Exiting the Cut



The angle of entry is always adverse as the cut commences. In the illustration, we can see that as the cutter travels through zone A, the angle of entry is changing. It starts out positive as the inserts first start to cut. As the cut progresses, it becomes less and less positive and eventually negative.



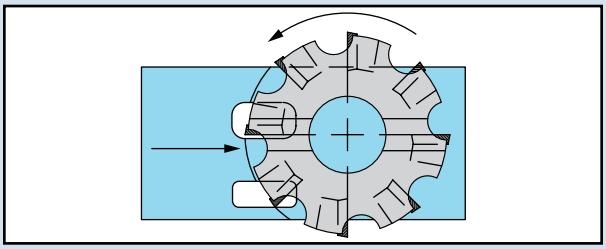
With a CNC machine, it is a worthwhile exercise to slow down the feed rate in zone A, especially with positive rake tools and hard to cut materials. As the cutter starts to break through at the end of the cut, another problem area is created in zone C. At this point, the cutter breaks through in the center, leaving two islands of material. Changes of entry angle occur which can result in insert problems. As in entry into the part, a reduction of feed rate can help alleviate chipping or breakage problems if they arise.

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Interruptions

Milling is by definition an interrupted operation. In addition, as the cutter crosses voids in the part, changes of entry angle occur. This situation is usually too complex to define in absolute terms relative to a targeted solution. Recognizing this in interrupted parts, try to include some of the following features in the set-up to reduce impact:

1. Negative or negative/positive geometry
2. Use a lead-angle cutter (30° or 45°) if possible
3. Use an impact-resistant carbide grade
4. Use a cutter with medium or fine pitch
5. Keep the load per tooth on the low end



A Milling Cutter is a Series of Single-Point Tools

It is easy to lose sight of the fact that a milling cutter is nothing more than a series of single-point tools clamped into a rotating holder. If you always keep this in mind, you will be constantly reminded that what is most important to know is what is happening to each tool or insert.

The feed rate in millimeters per minute of machine table travel does not tell you anything important unless or until you calculate the feed per tooth. You cannot calculate the feed per tooth until you know the speed in revolutions per minute and how many teeth are in the cutter. Therefore, it should become second nature to ask, know, and consider the three "golden" variables:

1. How many inserts?
2. How many RPM?
3. What feed in millimeters per minute?

Use this formula to find feed per tooth:

$$\textbf{Feed per tooth: } fz = \frac{Vf}{n * z}$$

fz	**= Feed per tooth**	**mm**
Vf	**= Table feed**	**mm/min**
n	**= Spindle speed**	**rev/min**
z	**= Number of teeth**	**Piece**

Once you know the feed per tooth, as a very broad general guide, try to keep the feed above 0,08mm per tooth and remember that power limitations usually come into play long before most cutters reach the upper limit. Efficient metal removal will usually dictate working in the 0,1mm to 0,25mm per tooth range.

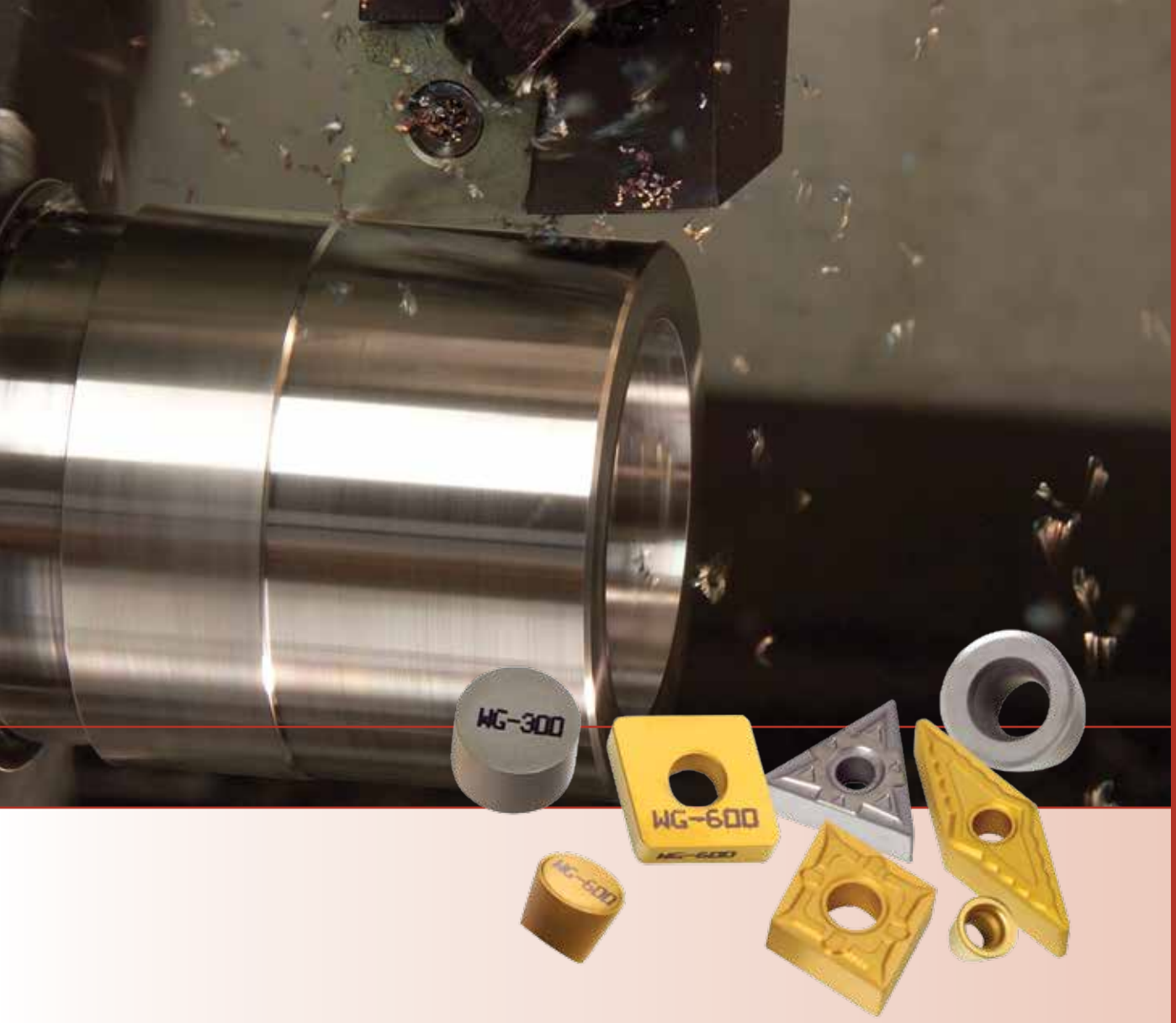
Some heavy-duty cutters can be used as high as 0,75mm or more per tooth, but this will need a machine in the 40+ Kw class – and a larger cutter could well use over 75Kw.

Greenleaf Excelerator® Mills Setup and Operational Procedures

1. Thoroughly clean all insert pockets.
2. Install the inserts, making sure that they are properly seated in the pocket, and torque the insert clamp screws to the correct torque as indicated on the body of the Excelerator Milling Cutter.
3. Use Greenleaf Excelerator Mills only on machines that have adequate shield guards.
4. Run the Greenleaf Excelerator Mills using cutting parameters as recommended by the Greenleaf Tech Team. Contact Greenleaf at:
   +814-763-2915 US
   +31-45-404-1774 EU
   +86-731-84658507 CN
5. For safety purposes, do not exceed the maximum RPM's etched on the Excelerator Mill. Note: There are two max RPM numbers. One (the lower RPM number) is for using the mill with carbide inserts and the other is for usage with ceramic inserts.

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Carbide Inserts ..... *T 02-39*
Ceramic Inserts ..... *T 40-70*
Industry-Standard Toolholders ..... *T 71-96*
Ceramic Toolholders ..... *T 97-119*
Industry-Standard Boring Bars for Carbide Inserts ..... *T 120-133*
Ceramic-Insert Boring Bars ..... *T 134-146*
Additional Greenleaf Turning Inserts ..... *T 147*

Greenleaf®

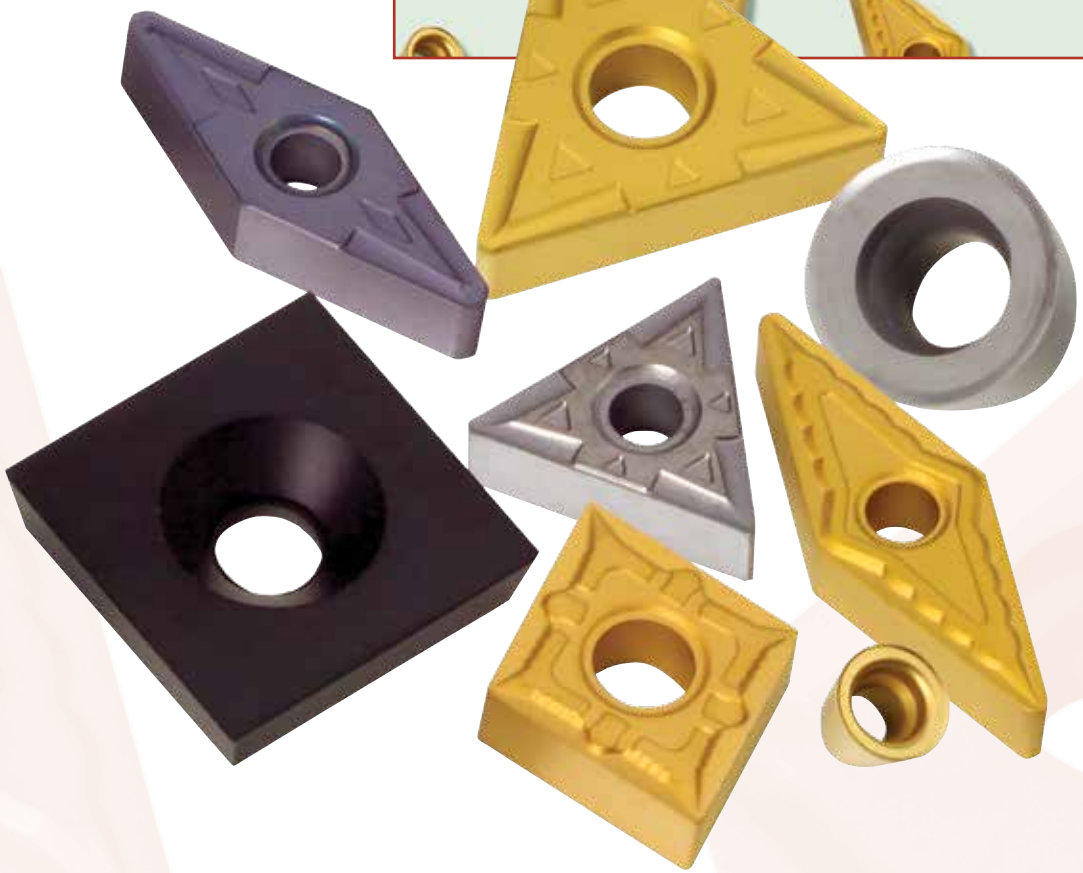


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Advanced Carbide Inserts

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chipbreakers for heavy roughing through finishing.





Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

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Carbide Insert Grade Description

CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chipbreakers for heavy roughing through finishing.

COATED – MT-CVD

GA5023 A high-speed performance grade for turning and milling cast iron. GA5023 features an advanced MT-CVD coating specifically developed for abrasive wear resistance. Application ranges from roughing to finishing on most cast iron materials including gray iron, ductile, nodular and other alloyed irons. The high wear and shock resistance of GA5023 allows machining at high speeds and a variety of feeds.

GA5025 A high-speed MT-CVD coated grade for turning, light roughing and finishing of carbon and alloy steels, as well as selected stainless steels.

GA5026 A high-speed grade developed for turning nickel- and cobalt-based super-alloys, stainless steels, and refractory metals. The advanced MT-CVD coating over a micro-grain substrate offers high wear resistance. GA5026 has exceptional resistance to the notching and deformation common to machining high strength materials. Apply at high speeds and light feeds in turning and selected milling applications.

GA5035 A high-performance MT-CVD coated grade for turning all types of steels, and selected stainless steels. GA5035 can be used in rough, semi-finish, and finish turning situations requiring resistance to heat deformation, thermal shock, and abrasion. GA5035 should be applied at high speeds and a range of feeds.

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy- and light-duty milling at high cutting speeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

COATED – PVD

G-915 Multi-layer PVD-coated grade, excellent for cut off, milling and turning high-temp alloys, stainless steel, and low carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-920 PVD-coated grade for turning and milling high-strength materials such as high-temp alloys, titanium and stainless steel. G-920 is also an excellent grade for aluminum and refractory metals. This grade has the resistance to deformation and notching required for higher speeds than G-910.

G-9230 PVD-coated grade developed for medium to heavy machining of nickel alloys, cobalt alloys, titanium alloys, stainless steels and alloyed irons. G-9230 has superior wear resistance and toughness and is excellent for cast and forged scale machining conditions.

G-925 Multi-layer PVD-coated grade specifically designed for machining abrasive and difficult-to-machine materials. Typical applications include high-temp alloys, titanium and other refractory metals, stainless steel, and many cast irons. G-925 exhibits excellent resistance to notching and deformation. Apply at moderate to high speeds and moderate feeds.

UNCOATED

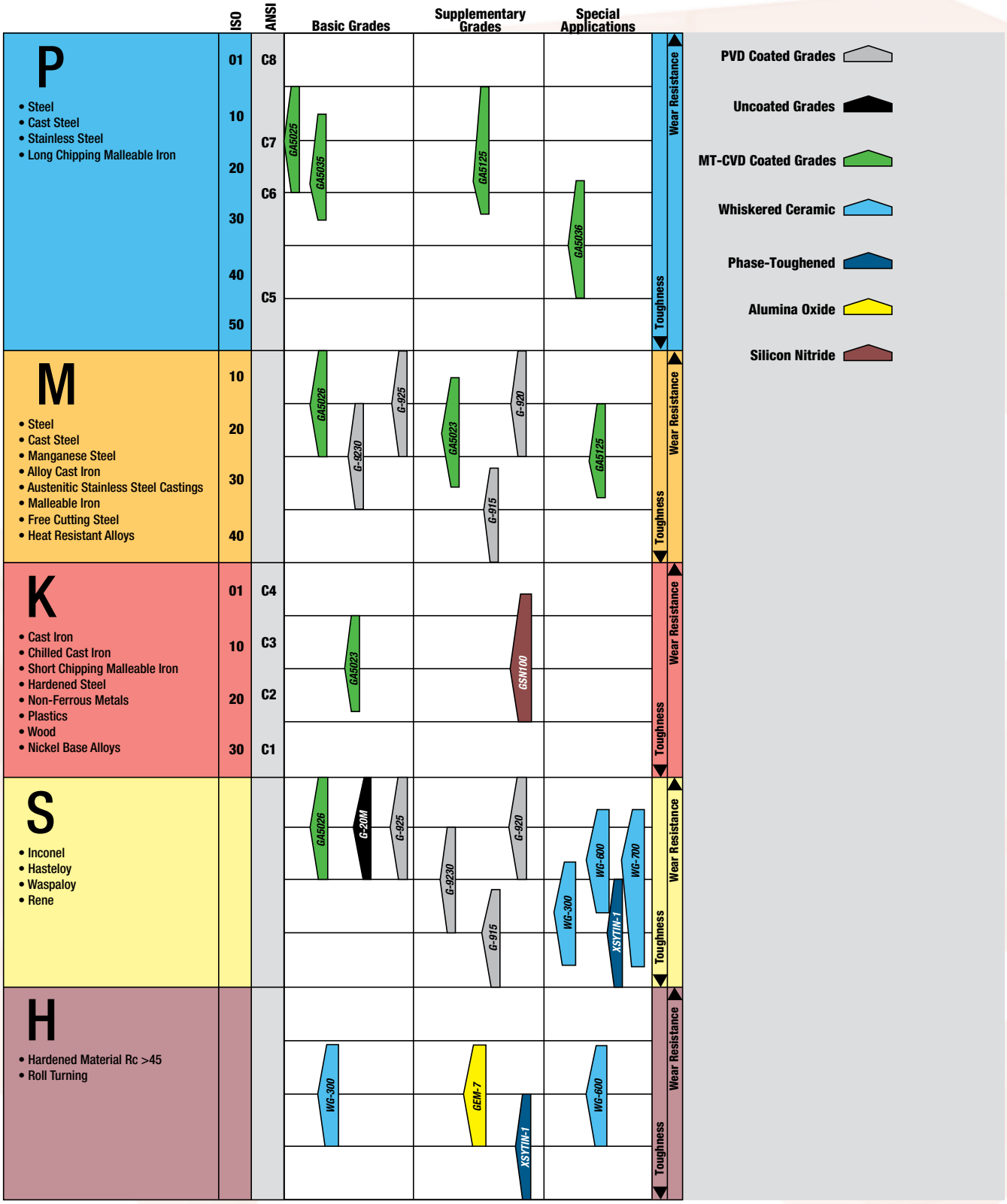
G-02 An excellent general-purpose grade for all types of machining of cast irons. G-02 should be used at moderate speeds and feeds. Also good for light roughing and finishing of high-temperature alloys, stainless steels, and aluminums.

G-60 Used for heavy, rough turning of steel, steel castings, and steel forgings. G-60 should be used at moderate speeds and feeds.

G-20M A sub-micron C-2 carbide grade suited for use in turning and milling titanium and nickel-based super-alloys. G-20M has the strength and edge wear characteristics to resist notching when turning high-strength materials.

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Insert Grade Reference for Turning

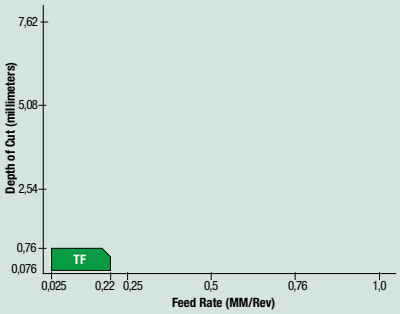


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Chipform Application Range

PRECISION FINISHING

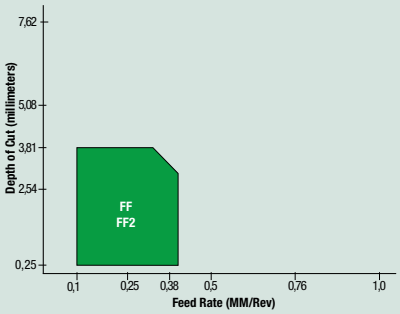


TF

Precision ground chipbreaker for nickel alloys. Good for feeds up to 0,22/rev and depths to 0,76.



FINISHING

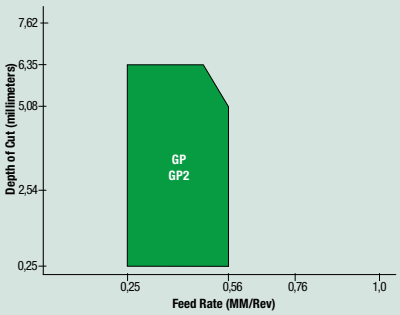


FF and FF2

For finishing all types of material. Designed for feeds up to 0,47/rev and 3,81 depth of cut.



GENERAL PURPOSE

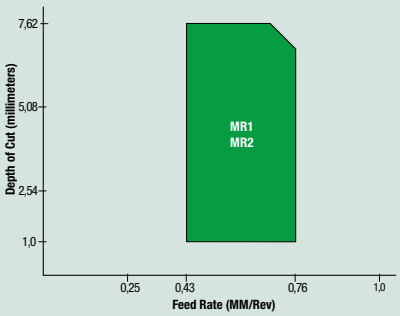


GP and GP2

General purpose chipbreaker. Feed rates up to 0,56/rev and 6,35 depth of cut.

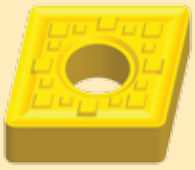


MEDIUM ROUGHING

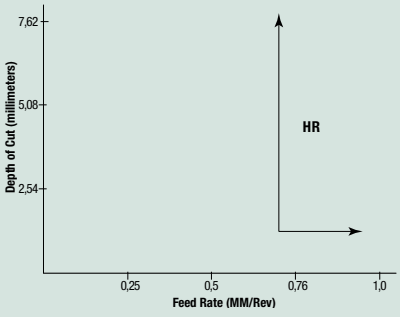


MR and MR2

Used for medium roughing of all material. Feeds up to 0,71/rev and depths up to 7,62.



HEAVY ROUGHING



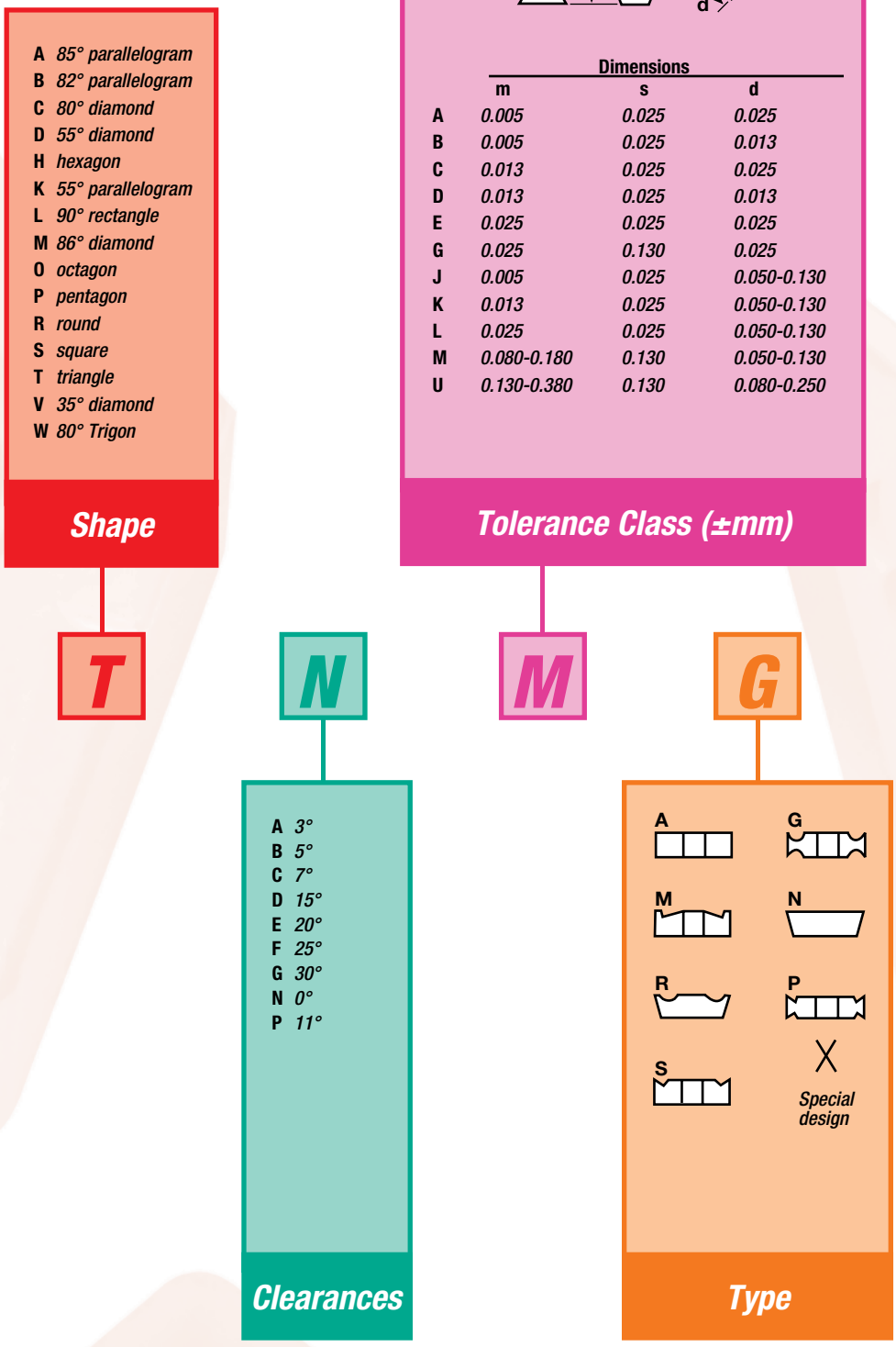
HR

Heavy roughing for all materials. Feeds above 0,58/rev. One-sided chipbreaker for heaviest feeds (MM).

Example: CNMM-190612 HR



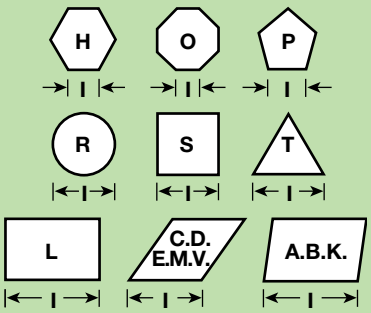
I.S.O. Identification for Turning and Boring Inserts



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Comparison cutting edge length in mm – IC in inches

△	06	09	11	16	22	27	33	44
□ ○				09	12	15	19	25
55°					15	19		
80°					12	16	19	25
35°				16	22			
IC = d	5/32"	7/32"	1/4"	3/8"	1/2"	5/8"	3/4"	
1"								



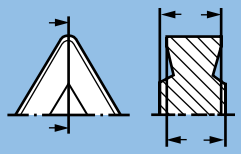
Integers to be preceded by a 0.
Example: 9,52 mm indicated by 09.

Cutting Edge Length

Unhoned	F
Honed	E
Chamfered	T
Chamfered and Honed	S

Cutting Edge

22 **04** **08** **E**



01	s= 1,59
T1	s= 1,98
02	s= 2,38
03	s= 3,18
T3	s= 3,97
04	s= 4,76
05	s= 5,56
06	s= 6,35
07	s= 7,94
09	s= 9,52
10	s= 10,00
12	s= 12,00

Thickness

Radius in terms of 0.1 mm	
00	Round insert
00	sharp point
02	0.2
04	0.4
05	0.5
08	0.8
10	1.0
12	1.2
15	1.5
16	1.6
24	2.4
32	3.2
40	4.0

Cutting Point Configuration

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A.N.S.I. Identification for Turning and Boring Inserts

Tolerance Class [1]

	Roll Dim. B	I.C. A	Thickness T
A	0.0002 [2]	0.001	0.001
B	0.0002	0.001	0.005
C	0.0005	0.001	0.001
D	0.0005	0.001	0.005
E	0.001	0.001	0.001
F	0.0002 [2]	0.0005	0.001
G	0.001	0.001	0.005
H	0.0005	0.0005	0.001
J	0.0002 [2]	0.002-0.005	0.001
K	0.0005	0.002-0.005	0.001
L	0.001	0.002-0.005	0.001
M	0.002-0.010 [3]	0.002-0.004 [3]	0.005
U	0.005-0.012 [3]	0.005-0.010 [3]	0.005
N	0.002-0.010 [3]	0.002-0.004 [3]	0.001

Size (I.C.)

Regular polygons and diamonds
Number of 1/8ths of an inch in the inscribed circle as per table below:

Example:

5/32" I.C.	1.2
3/16" I.C.	1.5
7/32" I.C.	1.8
1/4" I.C.	2
5/16" I.C.	2.5
3/8" I.C.	3
1/2" I.C.	4
5/8" I.C.	5
3/4" I.C.	6
7/8" I.C.	7
1" I.C.	8
1-1/4" I.C.	10

Rectangles and parallelograms
Use two digits to size
1st digit: Number of 1/8ths of an inch in width
2nd digit: Number of 1/4ths of an inch in length

S P G A 6

Shape

- **V** 35° diamond
- **D** 55° diamond
- **K** 55° parallelogram
- **T** 60° triangle
- **E** 75° diamond
- **C** 80° diamond
- **W** 80° Trigon
- **B** 82° parallelogram
- **A** 85° parallelogram
- **M** 86° diamond
- **S** 90° square
- **L** 90° rectangle
- **P** 108° pentagon
- **H** 120° hexagon
- **O** 135° octagon
- **R** round

Clearances

- **N** 0°
- **A** 3°
- **B** 5°
- **C** 7°
- **P** 11°
- **D** 15°
- **E** 20°
- **F** 25°
- **G** 30°
- **H** 0°-11° [4]
- **J** 0°-14° [4]
- **K** 0°-17° [4]
- **L** 0°-20° [4]
- **M** 11°-14° [4]
- **R** 11°-17° [4]
- **S** 11°-20° [4]

Type

- **N** Without hole
- **R** Without hole with chip groove on one rake face
- **F** Without hole with chip grooves on two rake faces
- **A** With hole
- **B** With hole and one countersink (80°-90°)
- **C** With hole and two countersinks (80°-90°)
- **W** With hole and one countersink (40°-60°)
- **Q** With hole and two countersinks (40°-60°)
- **M** With hole and chip groove on one rake face
- **G** With hole and chip grooves on two rake faces
- **H** With hole, one countersink (80°-90°) and chip groove on one rake face
- **J** With hole, two countersinks (80°-90°) and chip grooves on two rake faces
- **T** With hole, one countersink (40°-60°) and chip groove on one rake face
- **U** With hole, two countersinks (40°-60°) and chip grooves on two rake faces

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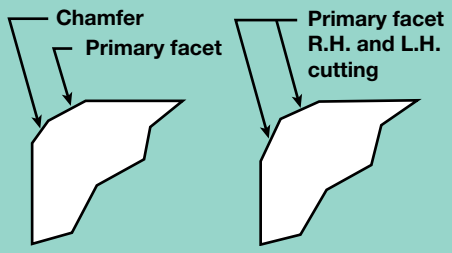
Regular polygons, diamonds, rectangles and parallelograms:
Number of 1/16ths of an inch in thickness as per table below:

Example:

3/32"	1.5
1/8"	2
5/32"	2.5
3/16"	3
7/32"	3.5
1/4"	4
5/16"	5
3/8"	6
7/16"	7
1/2"	8

Thickness

Only used following a letter in the seventh position.
Number of 1/64ths of an inch in the primary facet length.



Special Cutting (5) Point Definition

R	Right
L	Left

Hand (5)

3 3 [ ] [ ] A

0 Sharp Corner
1 1/64" radius
2 1/32" radius
3 3/64" radius
4 1/16" radius
5 5/64" radius
6 3/32" radius
7 7/64" radius
8 1/8" radius

A Square insert with 45° chamfer
D Square insert with 30° chamfer
E Square insert with 15° chamfer
F Square insert with 3° chamfer
K Square insert with 30° double chamfer
L Square insert with 15° double chamfer
M Square insert with 3° double chamfer
N Truncated triangular insert
P Flatted corner triangle – 90°

Cutting Point Configuration

A	Honed (0.0005 to 0.001")
B	Honed (0.001 to 0.002")
C	Honed (0.005 to less than 0.007")
D	Honed (0.007" and over)
J	Polished to 4 microinch AA (rake face only)
T	Chamfered – manufacturer's standard (negative land – rake face only)

Other Conditions (5)

(1) Tolerances given are plus and minus from nominal.

(2) These tolerances normally apply to indexable inserts with facets (secondary cutting edges).

(3) The tolerance depends on the size and shape of the insert and should be shown in the standards for the corresponding shapes and sizes (see ANSI B94.25).

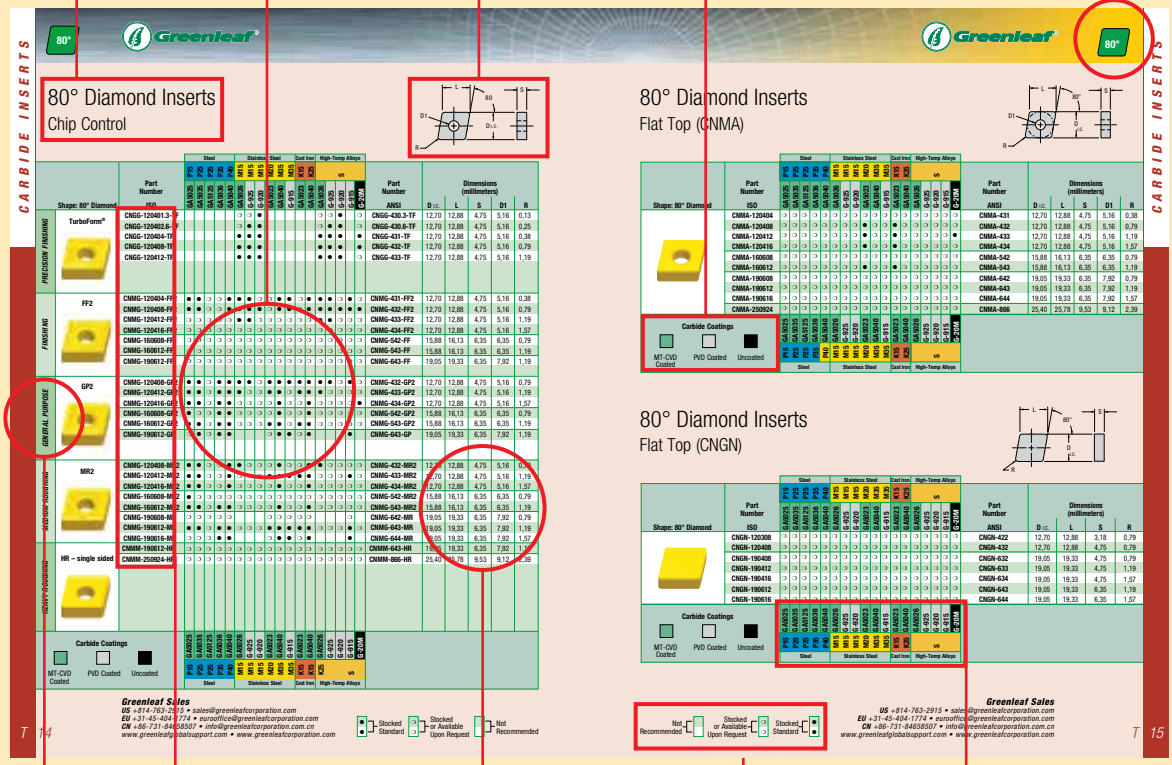
(4) Secondary facet angle may vary by +1°.

(5) Shall only be used when required.

(6) Dimensions are established prior to supplemental edge or coating modification.

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Carbide Insert Usage Reference Guide



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Negative Inserts



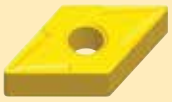
80° Diamond
Chip Control
page: T 14



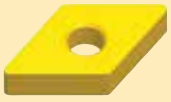
80° Diamond
Flat Top
page: T 15



80° Diamond
Flat Top
page: T 15



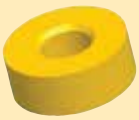
55° Diamond
Chip Control
page: T 16



55° Diamond
Flat Top
page: T 17



Round
Chip Control
page: T 18



Round
Flat Top
page: T 19



Round
Flat Top
page: T 19

Negative Inserts *continued*



Square
Chip Control
page: T 20



Square
Flat Top
page: T 21



Square
Flat Top
page: T 22-23



Triangle
Chip Control
page: T 24-25



Triangle
Flat Top
page: T 26



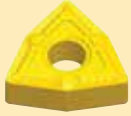
Triangle
Flat Top
page: T 27-28



35° Diamond
Chip Control
page: T 29



35° Diamond
Flat Top
page: T 30



80° Trigon
Chip Control
page: T 31



80° Trigon
Flat Top
page: T 32

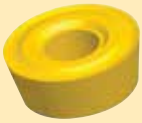
Positive Inserts



80° Diamond
Positive Flat Top
page: T 33



Round
Positive Flat Top
page: T 33



Round
Positive Chip Control
page: T 34



Round
Positive Chip Control
page: T 34



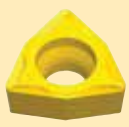
Square
Positive Flat Top
page: T 35



Triangle
Positive Flat Top
page: T 36-37



Triangle
Positive Flat Top
page: T 38

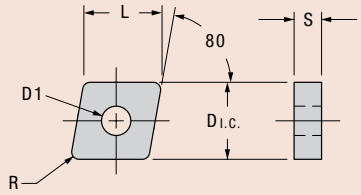


80° Trigon
Chip Control: Screw On
page: T 39

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80° Diamond Inserts

Chip Control



	Shape: 80° Diamond	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
PRECISION FINISHING	TurboForm®	CNGG-120401.3-TF					❍	❍	●	❍				❍	❍	●	❍		❍	CNGG-430.3-TF	12,70	12,88	4,75	5,16	0,13
		CNGG-120402.6-TF					❍	●	●	❍				❍	●	●	❍		❍	CNGG-430.6-TF	12,70	12,88	4,75	5,16	0,25
		CNGG-120404-TF					●	●	●	●				●	●	●	●		●	CNGG-431-TF	12,70	12,88	4,75	5,16	0,38
		CNGG-120408-TF					●	●	●	●				●	●	●	●		●	CNGG-432-TF	12,70	12,88	4,75	5,16	0,79
		CNGG-120412-TF					●	●	●	●				●	●	●	●		❍	CNGG-433-TF	12,70	12,88	4,75	5,16	1,19
FINISHING	FF2	CNMG-120404-FF2	●	●	❍	❍	●	●	❍	●	❍	●	❍	●	●	❍	●	●	❍	CNMG-431-FF2	12,70	12,88	4,75	5,16	0,38
		CNMG-120408-FF2					●	●	❍	❍				●	●	❍	●		●	CNMG-432-FF2	12,70	12,88	4,75	5,16	0,79
		CNMG-120412-FF2	❍	❍	❍		●	●	❍	●	❍	❍	❍	●	●	❍	●	❍	❍	CNMG-433-FF2	12,70	12,88	4,75	5,16	1,19
		CNMG-120416-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-434-FF2	12,70	12,88	4,75	5,16	1,57
		CNMG-160608-FF	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-542-FF	15,88	16,13	6,35	6,35	0,79
		CNMG-160612-FF	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-543-FF	15,88	16,13	6,35	6,35	1,19
		CNMG-190612-FF	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-643-FF	19,05	19,33	6,35	7,92	1,19
GENERAL PURPOSE	GP2	CNMG-120408-GP2	●	●	❍	●	●	●	❍	●	●	●	●	●	●	❍	●	●	❍	CNMG-432-GP2	12,70	12,88	4,75	5,16	0,79
		CNMG-120412-GP2	●	●	❍	●	●	●	❍	●	●	❍	●	●	●	❍	●	❍	❍	CNMG-433-GP2	12,70	12,88	4,75	5,16	1,19
		CNMG-120416-GP2	●	●	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	CNMG-434-GP2	12,70	12,88	4,75	5,16	1,57
		CNMG-160608-GP2	●	❍	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-542-GP2	15,88	16,13	6,35	6,35	0,79
		CNMG-160612-GP2	●	●	❍	●	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	CNMG-543-GP2	15,88	16,13	6,35	6,35	1,19
		CNMG-190612-GP	❍	●	❍	❍				❍	❍	●	❍				❍	●		CNMG-643-GP	19,05	19,33	6,35	7,92	1,19
MEDIUM ROUGHING	MR2	CNMG-120408-MR2	●	●	❍	❍	●	●	❍	●	❍	❍	❍	●	●	❍	●	❍	❍	CNMG-432-MR2	12,70	12,88	4,75	5,16	0,79
		CNMG-120412-MR2	●	●	❍	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	●	❍	CNMG-433-MR2	12,70	12,88	4,75	5,16	1,19
		CNMG-120416-MR2	●	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-434-MR2	12,70	12,88	4,75	5,16	1,57
		CNMG-160608-MR2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-542-MR2	15,88	16,13	6,35	6,35	0,79
		CNMG-160612-MR2	●	●	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMG-543-MR2	15,88	16,13	6,35	6,35	1,19
		CNMG-190608-MR	❍	❍	❍	❍				❍	❍	❍	❍				❍	❍		CNMG-642-MR	19,05	19,33	6,35	7,92	0,79
		CNMG-190612-MR	●	●	❍	●	❍	❍	❍	❍	●	●	●	❍	❍	❍	❍	●	❍	CNMG-643-MR	19,05	19,33	6,35	7,92	1,19
		CNMG-190616-MR	❍	❍	❍	●				❍	❍	●	❍				❍	●		CNMG-644-MR	19,05	19,33	6,35	7,92	1,57
HEAVY ROUGHING	HR – single sided	CNMM-190612-HR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMM-643-HR	19,05	19,33	6,35	7,92	1,19
		CNMM-250924-HR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	CNMM-866-HR	25,40	25,78	9,53	9,12	2,39
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M						
			Steel				Stainless Steel						Cast Iron	High-Temp Alloys											

Carbide Coatings

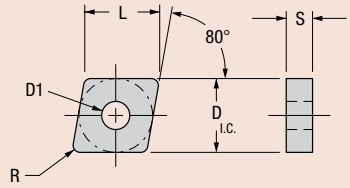
MT-CVD Coated | PVD Coated | Uncoated

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

80° Diamond Inserts

Flat Top (CNMA)



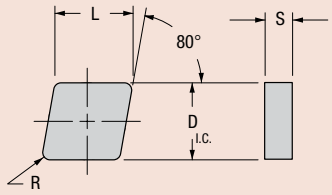
Shape: 80° Diamond	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
	CNMA-120404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-431	12,70	12,88	4,75	5,16	0,38
	CNMA-120408	○	○	○	○	○	○	○	○	●	○	●	○	○	○	○	○	○	CNMA-432	12,70	12,88	4,75	5,16	0,79
	CNMA-120412	○	○	○	○	○	○	○	○	●	○	●	○	○	○	○	○	●	CNMA-433	12,70	12,88	4,75	5,16	1,19
	CNMA-120416	○	○	○	○	○	○	○	○	●	○	●	○	○	○	○	○	○	CNMA-434	12,70	12,88	4,75	5,16	1,57
	CNMA-160608	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-542	15,88	16,13	6,35	6,35	0,79
	CNMA-160612	○	○	○	○	○	○	○	○	●	○	●	○	○	○	○	○	○	CNMA-543	15,88	16,13	6,35	6,35	1,19
	CNMA-190608	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-642	19,05	19,33	6,35	7,92	0,79
	CNMA-190612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-643	19,05	19,33	6,35	7,92	1,19
	CNMA-190616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-644	19,05	19,33	6,35	7,92	1,57
	CNMA-250924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNMA-866	25,40	25,78	9,53	9,12	2,39

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

80° Diamond Inserts

Flat Top (CNGN)



Shape: 80° Diamond	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	CNGN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-422	12,70	12,88	3,18	0,79
	CNGN-120408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-432	12,70	12,88	4,75	0,79
	CNGN-190408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-632	19,05	19,33	4,75	0,79
	CNGN-190412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-633	19,05	19,33	4,75	1,19
	CNGN-190416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-634	19,05	19,33	4,75	1,57
	CNGN-190612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-643	19,05	19,33	6,35	1,19
	CNGN-190616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CNGN-644	19,05	19,33	6,35	1,57

Carbide Coatings

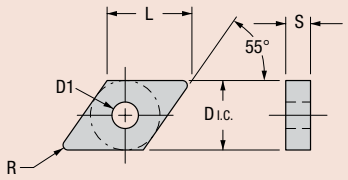
MT-CVD Coated | PVD Coated | Uncoated

Not Recommended | Stocked or Available Upon Request | Stocked Standard

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55° Diamond Inserts

Chip Control



	Shape: 55° Diamond	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
PRECISION FINISHING	TurboForm®	DNGG-150401.3-TF					❍	❍	❍	❍				❍	❍	❍	❍		●	DNGG-430.3-TF	12,70	15,49	4,75	5,16	0,13
		DNGG-150402.6-TF					❍	❍	❍	❍				❍	❍	❍	❍		●	DNGG-430.6-TF	12,70	15,49	4,75	5,16	0,25
		DNGG-150404-TF					●	●	●	❍				●	●	●	❍		❍	DNGG-431-TF	12,70	15,49	4,75	5,16	0,38
		DNGG-150408-TF					●	●	●	❍				●	●	●	❍		❍	DNGG-432-TF	12,70	15,49	4,75	5,16	0,79
		DNGG-150412-TF					●	●	●	❍				●	●	●	❍		❍	DNGG-433-TF	12,70	15,49	4,75	5,16	1,19
		DNGG-190608-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	DNGG-542-TF	15,88	19,38	6,35	6,35	0,79
		DNGG-190612-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	DNGG-543-TF	15,88	19,38	6,35	6,35	1,19
FINISHING	FF2	DNMG-150404-FF2	●	●	❍	❍	●	●	❍	●	●	❍	●	●	●	❍	●	❍	❍	DNMG-431-FF2	12,70	15,49	4,75	5,16	0,38
		DNMG-150408-FF2	●	●	❍	❍	●	●	❍	●	❍	●	❍	●	●	❍	●	●	❍	DNMG-432-FF2	12,70	15,49	4,75	5,16	0,79
		DNMG-150412-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-433-FF2	12,70	15,49	4,75	5,16	1,19
		DNMG-150604-FF2	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	DNMG-441-FF2	12,70	15,49	6,35	5,16	0,38
		DNMG-150608-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-442-FF2	12,70	15,49	6,35	5,16	0,79
		DNMG-150612-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-443-FF2	12,70	15,49	6,35	5,16	1,19
		DNMG-190608-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-542-FF2	15,88	19,38	6,35	6,35	0,79
		DNMG-190612-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-543-FF2	15,88	19,38	6,35	6,35	1,19
GENERAL PURPOSE	GP2	DNMG-150408-GP2	●	●	❍	❍	●	●	❍	❍	●	❍	●	●	●	❍	❍	❍	❍	DNMG-432-GP2	12,70	15,49	4,75	5,16	0,79
		DNMG-150412-GP2	❍	❍	❍	❍	●	❍	❍	❍	●	❍	●	●	❍	❍	❍	❍	❍	DNMG-433-GP2	12,70	15,49	4,75	5,16	1,19
		DNMG-150608-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	●	❍	DNMG-442-GP2	12,70	15,49	6,35	5,16	0,79
		DNMG-150612-GP2	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	DNMG-443-GP2	12,70	15,49	6,35	5,16	1,19
		DNMG-190608-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-542-GP2	15,88	19,38	6,35	6,35	0,79
		DNMG-190612-GP2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-543-GP2	15,88	19,38	6,35	6,35	1,19
MEDIUM ROUGHING	MR2	DNMG-150408-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-432-MR	12,70	15,49	4,75	5,16	0,79
		DNMG-150608-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-442-MR	12,70	15,49	6,35	5,16	0,79
		DNMG-190608-MR2	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-542-MR	15,88	19,38	6,35	6,35	0,79
		DNMG-190612-MR2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMG-543-MR2	15,88	19,38	6,35	6,35	1,19
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M						
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			Steel				Stainless Steel						Cast Iron	High-Temp Alloys											

Carbide Coatings

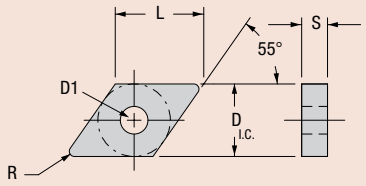
MT-CVD Coated — PVD Coated — Uncoated

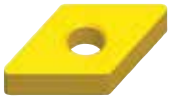
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● ● Stocked Standard — ❍ ❍ Stocked or Available Upon Request — Not Recommended

55° Diamond Inserts

Flat Top



Shape: 55° Diamond	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
	DNMA-150404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-431	12,70	15,49	4,75	5,16	0,13
	DNMA-150408	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	DNMA-432	12,70	15,49	4,75	5,16	0,79
	DNMA-150412	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	DNMA-433	12,70	15,49	4,75	5,16	1,19
	DNMA-150416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-434	12,70	15,49	4,75	5,16	1,57
	DNMA-190412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-533	15,88	19,38	4,75	6,35	1,19
	DNMA-190608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-542	15,88	19,38	6,35	6,35	0,79
	DNMA-190612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-543	15,88	19,38	6,35	6,35	1,19
	DNMA-190616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	DNMA-544	15,88	19,38	6,35	6,35	1,57
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M						
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		Steel				Stainless Steel						Cast Iron	High-Temp Alloys											

Carbide Coatings

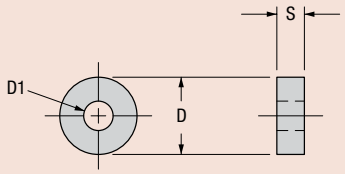
MT-CVD Coated — PVD Coated — Uncoated

Not Recommended — Stocked or Available Upon Request (❍) — Stocked Standard (●)

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Round Inserts

Chip Control



	Shape: Round	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)		
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S									
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M				
PRECISION FINISHING	TurboForm®	RNGG-120400-TF			❍		●	❍	❍	❍				●	❍	❍	❍		●	RNGG-43-TF	12,70	4,75	5,16
GENERAL PURPOSE	GP	RNMG-090300-GP	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-32-GP	9,53	3,18	3,81
		RNMG-090400-GP	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-33-GP	9,53	4,75	3,81
		RNMG-120400-GP	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-43-GP	12,70	4,75	5,16
MEDIUM ROUGHING	MR	RNMG-190600-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-64-MR	19,05	6,35	7,92
		RNMG-250900-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-86-MR	25,40	9,53	9,12
HEAVY ROUGHING	MR – single sided	RNMM-250600-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	RNMM-84 MR	25,40	6,35	9,12

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

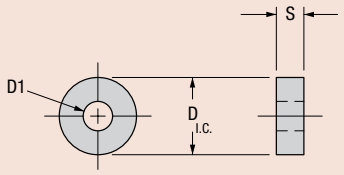
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● Stocked Standard
❍ Stocked or Available Upon Request
Not Recommended

Round Inserts

Flat Top (RNMA)



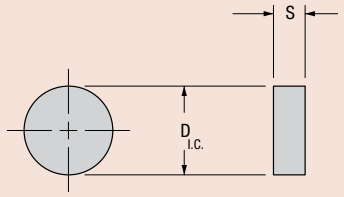
Shape: Round	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	S	D1
	RNMA-090300	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-32	9,53	3,18	3,81
	RNMA-090400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-33	9,53	4,75	3,81
	RNMA-120400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-43	12,70	4,75	5,16
	RNMA-150600	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-54	15,88	6,35	6,35
	RNMA-190600	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-64	19,05	6,35	7,92
	RNMA-250900	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-86	25,40	9,53	9,12
	RNMA-310900	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNMA-106	31,75	9,53	12,70

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

Round Inserts

Flat Top (RNGN)



Shape: Round	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	S
	RNGN-090300	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	●	○	RNGN-32	9,53	3,81
	RNGN-120300	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	RNGN-42	12,70	3,81
	RNGN-120400	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	RNGN-43	12,70	4,75
	RNGN-120700	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	●	RNGN-45	12,70	7,92
	RNGN-150400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNGN-53	15,88	4,75
	RNGN-190400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNGN-63	19,05	4,75
	RNGN-250600	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RNGN-84	25,40	6,35

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

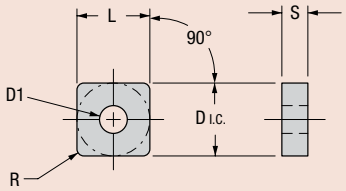
Not Recommended | Stocked or Available Upon Request ○ ○ | Stocked Standard ● ●

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Square Inserts

Chip Control



Shape: Square		Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
FINISHING	FF2 	SNMG-090308-FF2	●	❍	❍	❍				❍	❍	❍	❍				❍	❍		SNMG-322-FF2	9,53	9,53	3,18	3,81	0,79
		SNMG-120408-FF2	●	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	SNMG-432-FF2	12,70	12,70	4,75	5,16	0,79
		SNMG-120412-FF	❍	❍	❍	❍				❍	❍	❍	❍				❍	❍		SNMG-433-FF	12,70	12,70	4,75	5,16	1,19
		SNMG-150612-FF	❍	❍	❍	❍				❍	❍	❍	❍				❍	❍		SNMG-543-FF	15,88	15,88	6,35	6,35	1,19
GENERAL PURPOSE	GP2 	SNMG-090308-GP	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-322-GP	9,53	9,53	3,18	3,81	0,79
		SNMG-120408-GP2	●	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	●	❍	SNMG-432-GP2	12,70	12,70	4,75	5,16	0,79
		SNMG-120412-GP2	●	●	❍	❍	●	●	❍	❍	❍	●	❍	●	●	❍	❍	●	❍	SNMG-433-GP2	12,70	12,70	4,75	5,16	1,19
		SNMG-120416-GP	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-434-GP	12,70	12,70	4,75	5,16	1,57
		SNMG-150612-GP2	●	●	❍	●	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-543-GP2	15,88	15,88	6,35	6,35	1,19
		SNMG-190612-GP2	❍	●	❍	●	●	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	●	❍	SNMG-643-GP2	19,05	19,05	6,35	7,92	1,19
		SNMG-190616-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-644-GP2	19,05	19,05	6,35	7,92	1,57
MEDIUM ROUGHING	MR2 	SNMG-120408-MR2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-432-MR2	12,70	12,70	4,75	5,16	0,79
		SNMG-120608-MR	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-442-MR	12,70	12,70	6,35	5,16	0,79
		SNMG-150612-MR2	●	●	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-543-MR2	15,88	15,88	6,35	6,35	1,19
		SNMG-190612-MR	❍	●	❍	●	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	●	❍	SNMG-643-MR	19,05	19,05	6,35	7,92	1,19
		SNMG-190616-MR	❍	❍	❍	●	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	●	SNMG-644-MR	19,05	19,05	6,35	7,92	1,57
		SNMG-250924-MR	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-866-MR	25,40	25,40	9,53	9,12	2,39
HEAVY ROUGHING	HR – single sided 	SNMM-190612-HR	❍	❍	❍	❍				❍	❍	❍	❍				❍	❍		SNMM-643-HR	19,05	19,05	6,35	7,92	1,19
		SNMM-190616-HR	❍	❍	❍	❍				❍	❍	❍	❍				❍	❍		SNMM-644-HR	19,05	19,05	6,35	7,92	1,57

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

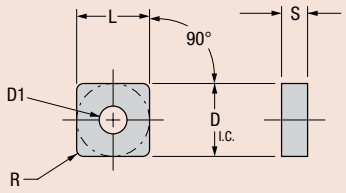
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Square Inserts

Flat Top (SNMA)



		Steel				Stainless Steel						Cast Iron	High-Temp Alloys						
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S						
Shape: Square	Part Number ISO	GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M	Part Number ANSI
	SNMA-090304	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-321
	SNMA-090308	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-322
	SNMA-090312	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-323
	SNMA-120404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-431
	SNMA-120408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-432
	SNMA-120412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-433
	SNMA-120416	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	❍	●	❍	❍	❍	❍	SNMA-434
	SNMA-150608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-542
	SNMA-150612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-543
	SNMA-150616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-544
	SNMA-190612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-643
	SNMA-190616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-644
	SNMA-250916	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-864
	SNMA-250924	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	SNMA-866

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

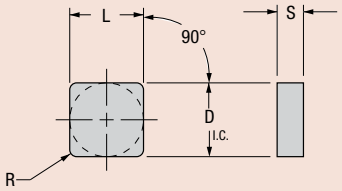
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Not Recommended | Stocked or Available Upon Request ❍ ❍ | Stocked Standard ● ●

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Square Inserts

Flat Top (SNGN)



Shape: Square	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M					
	SNGN-090304	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-321	9,53	9,53	3,18	0,38
	SNGN-090308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-322	9,53	9,53	3,18	0,79
	SNGN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-422	12,70	12,70	3,18	0,79
	SNGN-120312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-423	12,70	12,70	3,18	1,19
	SNGN-120400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-430	12,70	12,70	4,75	0,13
	SNGN-120404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-431	12,70	12,70	4,75	0,38
	SNGN-120408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-432	12,70	12,70	4,75	0,79
	SNGN-120412	○	○	●	●	○	○	○	○	○	●	○	○	○	○	○	●	○	SNGN-433	12,70	12,70	4,75	1,19
	SNGN-120416	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	SNGN-434	12,70	12,70	4,75	1,57
	SNGN-150412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-533	15,88	15,88	4,75	1,19
	SNGN-150416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-534	15,88	15,88	4,75	1,57
	SNGN-150612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-543	15,88	15,88	6,35	1,19
	SNGN-190404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-631	19,05	19,05	4,75	0,38
	SNGN-190408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-632	19,05	19,05	4,75	0,79
	SNGN-190412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-633	19,05	19,05	4,75	1,19
	SNGN-190416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-634	19,05	19,05	4,75	1,57
	SNGN-190432	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-638	19,05	19,05	4,75	3,18
	SNGN-190612	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-643	19,05	19,05	6,35	1,19
	SNGN-190616	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-644	19,05	19,05	6,35	1,57
	SNGN-190624	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-646	19,05	19,05	6,35	2,39
	SNGN-250616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-844	25,40	25,40	6,35	1,57
	SNGN-250716	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-854	25,40	25,40	7,92	1,57
	SNGN-310648	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-10412	31,75	31,75	6,35	4,75
	SNGN-310924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-1066	31,75	31,75	9,53	2,39
	SNGN-310932	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-1068	31,75	31,75	9,53	3,18
	SNGN-381232	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNGN-1288	38,10	38,10	12,70	3,18
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M					
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		Steel				Stainless Steel						Cast Iron	High-Temp Alloys										

Carbide Coatings

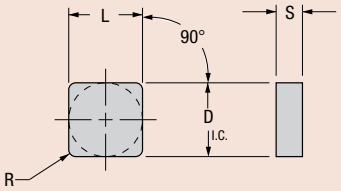
MT-CVD Coated | PVD Coated | Uncoated

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● Stocked Standard
○ Stocked or Available Upon Request
Not Recommended

Square Inserts

Flat Top (SNUN)



Shape: Square	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	SNUN-090308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-322	9,53	9,53	3,18	0,79
	SNUN-090312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-323	9,53	9,53	3,18	1,19
	SNUN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-422	12,70	12,70	3,18	0,79
	SNUN-120312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-423	12,70	12,70	3,18	1,19
	SNUN-120316	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-424	12,70	12,70	3,18	1,57
	SNUN-120408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-432	12,70	12,70	4,75	0,79
	SNUN-120412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-433	12,70	12,70	4,75	1,19
	SNUN-120416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-434	12,70	12,70	4,75	1,57
	SNUN-150412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-533	15,88	15,88	4,75	1,19
	SNUN-190408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-632	19,05	19,05	4,75	0,79
	SNUN-190412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-633	19,05	19,05	4,75	1,19
	SNUN-190416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-634	19,05	19,05	4,75	1,57
	SNUN-250616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-844	25,40	25,40	6,35	1,57
	SNUN-250632	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-848	25,40	25,40	6,35	3,18
	SNUN-250716	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-854	25,40	25,40	7,92	1,57
	SNUN-310924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-1066	31,75	31,75	9,53	2,39
	SNUN-310932	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-1068	31,75	31,75	9,53	3,18
	SNUN-381232	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SNUN-1288	38,10	38,10	12,70	3,18

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Not Recommended | Stocked or Available Upon Request ○ ○ | Stocked Standard ● ●

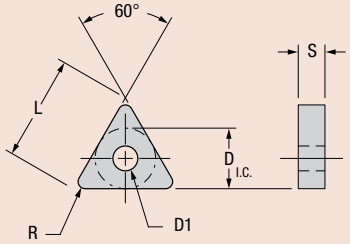
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60°

Greenleaf®

Triangle Inserts

Chip Control



	Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
PRECISION FINISHING	TurboForm® 	TNGG-160401.3-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-330.3-TF	9,53	16,51	4,75	3,81	0,13
		TNGG-160402.6-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-330.6-TF	9,53	16,51	4,75	3,81	0,25
		TNGG-160404-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-331-TF	9,53	16,51	4,75	3,81	0,38
		TNGG-160408-TF					●	❍	❍	❍				●	❍	❍	❍		❍	TNGG-332-TF	9,53	16,51	4,75	3,81	0,79
		TNGG-220401.3-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-430.3-TF	12,70	22,00	4,75	5,16	0,13
		TNGG-220402.6-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-430.6-TF	12,70	22,00	4,75	5,16	0,25
		TNGG-220404-TF					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNGG-431-TF	12,70	22,00	4,75	5,16	0,38
		TNGG-220408-TF					●	●	❍	❍				●	●	❍	❍		❍	TNGG-432-TF	12,70	22,00	4,75	5,16	0,79
FINISHING	FF2 	TNMG-160304-FF2					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNMG-321-FF2	9,53	16,51	3,18	3,81	0,38
		TNMG-160308-FF2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-322-FF2	9,53	16,51	3,18	3,81	0,79
		TNMG-160312-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-323-FF2	9,53	16,51	3,18	3,81	1,19
		TNMG-160316-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-324-FF2	9,53	16,51	3,18	3,81	1,57
		TNMG-160404-FF2					❍	❍	❍	❍				❍	❍	❍	❍		❍	TNMG-331-FF2	9,53	16,51	4,75	3,81	0,38
		TNMG-160408-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-332-FF2	9,53	16,51	4,75	3,81	0,79
		TNMG-160416-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-334-FF2	9,53	16,51	4,75	3,81	1,19
		TNMG- 220404-FF2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-431-FF2	9,53	16,51	4,75	3,81	1,57
		TNMG-220408-FF2	●	●	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-432-FF2	12,70	22,00	4,75	5,16	0,38
		TNMG-220412-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-433-FF2	12,70	22,00	4,75	5,16	0,79
		TNMG-220416-FF2	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	TNMG-434-FF2	12,70	22,00	4,75	5,16	1,19
		TNMG-270608-FF2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-542-FF2	12,70	22,00	4,75	5,16	1,57
		TNMG-270612-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-543-FF2	15,88	27,51	6,35	6,35	0,79
GENERAL PURPOSE	GP2 	TNMG-160304-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-321-GP2	15,88	27,51	6,35	6,35	1,19
		TNMG-160308-GP2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-322-GP2	9,53	16,51	3,18	3,81	0,38
		TNMG-160312-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-323-GP2	9,53	16,51	3,18	3,81	0,79
		TNMG-160316-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-324-GP2	9,53	16,51	3,18	3,81	1,19
		TNMG-160412-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-333-GP2	9,53	16,51	3,18	3,81	1,57
		TNMG-220408-GP2	●	●	❍	●	❍	❍	❍	❍	●	●	●	❍	❍	❍	❍	●	❍	TNMG-432-GP2	9,53	16,51	4,75	3,81	1,19
		TNMG-220412-GP2	●	❍	❍	❍	●	●	❍	❍	❍	●	❍	●	●	❍	❍	●	❍	TNMG-433-GP2	12,70	22,00	4,75	5,16	0,79
		TNMG-220416-GP2	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	TNMG-434-GP2	12,70	22,00	4,75	5,16	1,19
		TNMG-270608-GP2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMG-542-GP2	12,70	22,00	4,75	5,16	1,57
																					15,88	27,51	6,35	6,35	0,79
																					15,88	27,51	6,35	6,35	1,19
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M						
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			Steel				Stainless Steel						Cast Iron	High-Temp Alloys											

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

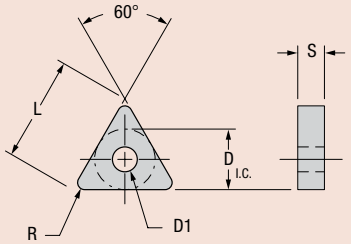
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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Triangle Inserts

Chip Control *Continued*



Shape: Triangle		Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
MEDIUM ROUGHING	MR2	TNMG-110308-MR2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-222-MR2	6,35	11,00	3,18	2,36	0,79
		TNMG-220412-MR2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-433-MR2	12,70	22,00	4,75	5,16	1,19
		TNMG-220416-MR2	○	○	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	TNMG-434-MR2	12,70	22,00	4,75	5,16	1,57
		TNMG-220432-MR2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-438-MR2	12,70	22,00	4,75	5,16	3,18
		TNMG-270608-MR2	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-542-MR2	15,88	27,51	6,35	6,35	0,79
		TNMG-270612-MR2	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-543-MR2	15,88	27,51	6,35	6,35	1,19
		TNMG-270616-MR2	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-544-MR2	15,88	27,51	6,35	6,35	1,57
		TNMG-270624-MR2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-546-MR2	15,88	27,51	6,35	6,35	2,39
		TNMG-330924-MR	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMG-666-MR	19,05	32,99	9,53	7,92	2,39
HEAVY ROUGHING	HR – single sided	TNMM-220412-HR	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMM-433-HR	12,70	22,00	4,75	5,16	1,19
		TNMM-270616-HR	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNMM-544-HR	15,88	27,51	6,35	6,35	1,57

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M
	P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S					
	Steel				Stainless Steel						Cast Iron	High-Temp Alloys					

Not Recommended | Stocked or Available Upon Request ○ ○ | Stocked Standard ● ●

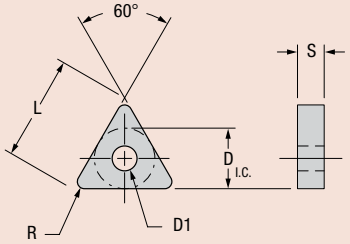
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60°

Greenleaf®

Triangle Inserts

Flat Top (TNMA)



Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
	TNMA-110308	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-222	6,35	11,00	3,18	2,36	0,79
	TNMA-160304	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-321	9,53	16,51	3,18	3,81	0,38
	TNMA-160308	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-322	9,53	16,51	3,18	3,81	0,79
	TNMA-160312	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-323	9,53	16,51	3,18	3,81	1,19
	TNMA-160316	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-324	9,53	16,51	3,18	3,81	1,57
	TNMA-160408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-332	9,53	16,51	4,75	3,81	0,79
	TNMA-160412	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	TNMA-333	9,53	16,51	4,75	3,81	1,19
	TNMA-220404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-431	12,70	22,00	4,75	5,16	0,38
	TNMA-220408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-432	12,70	22,00	4,75	5,16	0,79
	TNMA-220412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-433	12,70	22,00	4,75	5,16	1,19
	TNMA-220416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-434	12,70	22,00	4,75	5,16	1,57
	TNMA-270608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-542	15,88	27,51	6,35	6,35	0,79
	TNMA-270612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-543	15,88	27,51	6,35	6,35	1,19
	TNMA-270616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-544	15,88	27,51	6,35	6,35	1,57
	TNMA-270632	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-548	15,88	27,51	6,35	6,35	3,18
	TNMA-270724	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-556	15,88	27,51	7,92	6,35	2,39
	TNMA-270924	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-566	15,88	27,51	9,53	6,35	2,39
	TNMA-330608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-642	19,05	32,99	6,35	7,92	0,79
	TNMA-330612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-643	19,05	32,99	6,35	7,92	1,19
	TNMA-330616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-644	19,05	32,99	6,35	7,92	1,57
	TNMA-330916	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-664	19,05	32,99	9,53	7,92	1,57
	TNMA-330924	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-666	19,05	32,99	9,53	7,92	2,39
	TNMA-330932	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-668	19,05	32,99	9,53	7,92	3,18

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

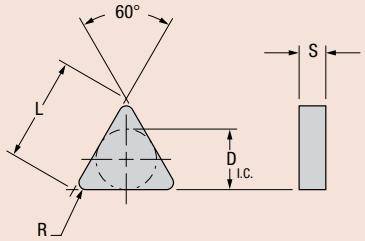
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Triangle Inserts

Flat Top (TNGN)



Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)			
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	R
	TNGN-110308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-222	6,35	11,00	3,18	0,79
	TNGN-110312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-223	6,35	11,00	3,18	1,19
	TNGN-160300	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-320	9,53	16,51	3,18	0,13
	TNGN-160304	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-321	9,53	16,51	3,18	0,38
	TNGN-160308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-322	9,53	16,51	3,18	0,79
	TNGN-160312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-323	9,53	16,51	3,18	1,19
	TNGN-160316	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-324	9,53	16,51	3,18	1,57
	TNGN-160404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-331	9,53	16,51	4,75	0,38
	TNGN-160408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-332	9,53	16,51	4,75	0,79
	TNGN-160412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-333	9,53	16,51	4,75	1,19
	TNGN-160416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-334	9,53	16,51	4,75	1,57
	TNGN-220404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-431	12,70	22,00	4,75	0,38
	TNGN-220408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-432	12,70	22,00	4,75	0,79
	TNGN-220412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-433	12,70	22,00	4,75	1,19
	TNGN-220416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-434	12,70	22,00	4,75	1,57
	TNGN-220432	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-438	12,70	22,00	4,75	3,18
	TNGN-220608	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-442	12,70	22,00	6,35	0,79
	TNGN-220612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-443	12,70	22,00	6,35	1,19
	TNGN-220616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-444	12,70	22,00	6,35	1,57
	TNGN-270408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-532	15,88	27,51	4,75	0,79
	TNGN-270432	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-538	15,88	27,51	4,75	3,18
	TNGN-270604	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-541	15,88	27,51	6,35	0,38
	TNGN-270608	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-542	15,88	27,51	6,35	0,79
	TNGN-270612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-543	15,88	27,51	6,35	1,19
	TNGN-270616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-544	15,88	27,51	6,35	1,57
	TNGN-270716	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-554	15,88	27,51	7,92	1,57
	TNGN-270724	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-556	15,88	27,51	7,92	2,39
	TNGN-330716	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-654	19,05	32,99	7,92	1,57
	TNGN-330724	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-656	19,05	32,99	7,92	2,39
	TNGN-330916	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-664	19,05	32,99	9,53	1,57
	TNGN-330924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-666	19,05	32,99	9,53	2,39
	TNGN-330932	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-668	19,05	32,99	9,53	3,18
	TNGN-381124	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-776	22,23	38,51	11,10	2,39
	TNGN-381132	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-778	22,23	38,51	11,10	3,18
	TNGN-381140	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-7710	22,23	38,51	11,10	3,96
	TNGN-441132	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TNGN-878	25,40	43,99	11,10	3,18

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel — Stainless Steel — Cast Iron — High-Temp Alloys

Not Recommended — Stocked or Available Upon Request (○) — Stocked Standard (●)

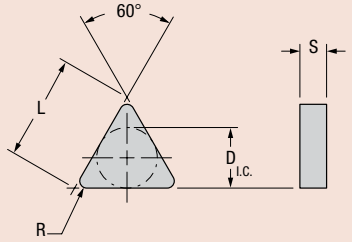
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60°

Greenleaf®

Triangle Inserts

Flat Top (TNUN)



Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)			
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	R
	TNUN-160304	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-321	9,53	16,51	3,18	0,38
	TNUN-160308	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-322	9,53	16,51	3,18	0,79
	TNUN-160312	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-323	9,53	16,51	3,18	1,19
	TNUN-160408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-332	9,53	16,51	4,75	0,79
	TNUN-160412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-333	9,53	16,51	4,75	1,19
	TNUN-160416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-334	9,53	16,51	4,75	1,57
	TNUN-220408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-432	12,70	22,00	4,75	0,79
	TNUN-220412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-433	12,70	22,00	4,75	1,19
	TNUN-220416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-434	12,70	22,00	4,75	1,57
	TNUN-220432	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-438	12,70	22,00	4,75	3,18
	TNUN-220604	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-441	12,70	22,00	6,35	0,38
	TNUN-220608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-442	12,70	22,00	6,35	0,79
	TNUN-220612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-443	12,70	22,00	6,35	1,19
	TNUN-220616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-444	12,70	22,00	6,35	1,57
	TNUN-220632	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-448	12,70	22,00	6,35	3,18
	TNUN-270608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-542	15,88	27,51	6,35	0,79
	TNUN-270612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-543	15,88	27,51	6,35	1,19
	TNUN-270616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-544	15,88	27,51	6,35	1,57
	TNUN-270624	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-546	15,88	27,51	6,35	2,39
	TNUN-270708	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-552	15,88	27,51	7,92	0,79
	TNUN-270712	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-553	15,88	27,51	7,92	1,19
	TNUN-270716	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-554	15,88	27,51	7,92	1,57
	TNUN-270724	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-556	15,88	27,51	7,92	2,39
	TNUN-330716	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-654	19,05	32,99	7,92	1,57
	TNUN-330724	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-656	19,05	32,99	7,92	2,39
	TNUN-330916	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-664	19,05	32,99	9,53	1,57
	TNUN-330924	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-666	19,05	32,99	9,53	2,39
	TNUN-330932	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-668	19,05	32,99	9,53	3,18
	TNUN-381124	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-776	22,23	38,51	11,10	2,39
	TNUN-381132	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-778	22,23	38,51	11,10	3,18
	TNUN-381140	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TNUN-7710	22,23	38,51	11,10	3,96

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

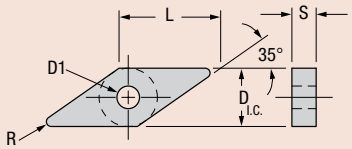
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● ● Stocked Standard | ❍ ❍ Stocked or Available Upon Request | Not Recommended

35° Diamond Inserts

Chip Control



	Shape: 35° Diamond	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
PRECISION FINISHING	TurboForm® 	VNGG-160401.3-TF			❍		❍	●	●	❍				❍	●	●	❍		❍	VNGG-330.3-TF	9,53	16,61	4,75	3,81	0,13
		VNGG-160402.6-TF			❍		❍	❍	●	❍				❍	❍	●	❍		❍	VNGG-330.6-TF	9,53	16,61	4,75	3,81	0,25
		VNGG-160404-TF			❍		●	●	●	●				●	●	●	●		●	VNGG-331-TF	9,53	16,61	4,75	3,81	0,38
		VNGG-160408-TF			❍		●	●	●	❍				●	●	●	❍		●	VNGG-332-TF	9,53	16,61	4,75	3,81	0,79
		VNGG-160412-TF			❍		●	●	❍	❍				●	●	❍	❍		❍	VNGG-333-TF	9,53	16,61	4,75	3,81	1,19
FINISHING	FF2 	VNMG-160404-FF2	●	●	❍	❍	❍	●	❍	●	❍	●	❍	❍	●	❍	●	●	●	VNMG-331-FF2	9,53	16,61	4,75	3,81	0,38
		VNMG-160408-FF2	●	●	❍	❍	●	❍	❍	❍	❍	●	❍	●	❍	❍	❍	●	●	VNMG-332-FF2	9,53	16,61	4,75	3,81	0,79
		VNMG-160412-FF2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMG-333-FF2	9,53	16,61	4,75	3,81	1,19
		VNMG-220408-FF2	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMG-432-FF2	12,70	22,15	4,75	5,16	0,79
GENERAL PURPOSE	GP2 	VNMG-160408-GP2	●	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	VNMG-332-GP2	9,53	16,61	4,75	3,81	0,79
		VNMG-160412-GP2	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMG-333-GP2	9,53	16,61	4,75	3,81	1,19
		VNMG-220408-GP2	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMG-432-GP2	12,70	22,15	4,75	5,16	0,79

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

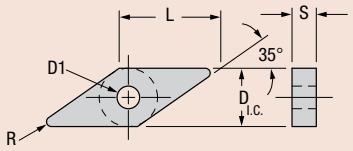
GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M									
P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S														
Steel				Stainless Steel						Cast Iron	High-Temp Alloys														

Not Recommended | Stocked or Available Upon Request | Stocked Standard

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35° Diamond Inserts

Flat Top



Shape: 35° Diamond	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
	VNMA-160404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMA-331	9,53	16,61	4,75	3,81	0,38
	VNMA-160408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMA-332	9,53	16,61	4,75	3,81	0,79
	VNMA-220404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMA-431	12,70	22,15	4,75	5,16	0,38
	VNMA-220408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	VNMA-432	12,70	22,15	4,75	5,16	0,79

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

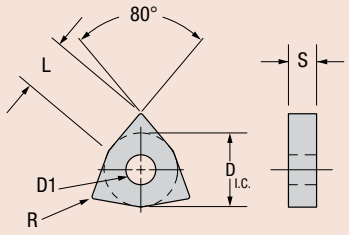
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● ● Stocked Standard | ❍ ❍ Stocked or Available Upon Request | Not Recommended

80° Trigon Inserts

Chip Control



	Shape: 80° Trigon	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
FINISHING	FF2 	WNMG-060404-FF2	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	WNMG-331-FF2	9,53	6,53	4,75	3,81	0,38
		WNMG-060408-FF2	●	●	○	○	●	○	○	○	○	○	○	●	○	○	○	○	○	WNMG-332-FF2	9,53	6,53	4,75	3,81	0,79
		WNMG-080404-FF2	●	○	○	○	●	○	○	○	○	○	○	●	○	○	○	○	○	WNMG-431-FF2	12,70	8,69	4,75	5,16	0,38
		WNMG-080408-FF2	●	●	○	○	●	○	○	○	○	○	○	●	○	○	○	○	○	WNMG-432-FF2	12,70	8,69	4,75	5,16	0,79
GENERAL PURPOSE	GP2 	WNMG-060404-GP2	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	WNMG-331-GP2	9,53	6,53	4,75	3,81	0,38
		WNMG-060408-GP2	●	○	○	○	○	○	○	○	●	○	●	○	○	○	○	●	○	WNMG-332-GP2	9,53	6,53	4,75	3,81	0,79
		WNMG-080404-GP2	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	WNMG-431-GP2	12,70	8,69	4,75	5,16	0,38
		WNMG-080408-GP2	●	●	○	●	●	●	○	○	●	○	●	●	●	○	○	●	○	WNMG-432-GP2	12,70	8,69	4,75	5,16	0,79
		WNMG-080412-GP2	●	●	○	●	●	●	○	○	●	○	●	●	●	○	○	○	○	WNMG-433-GP2	12,70	8,69	4,75	5,16	1,19
		WNMG-080416-GP2	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	WNMG-434-GP2	12,70	8,69	4,75	5,16	1,57
MEDIUM ROUGHING	MR2 	WNMG-080408-MR2	●	○	○	○	○	○	○	●	○	○	○	○	○	○	●	○	○	WNMG-432-MR2	12,70	8,69	4,75	5,16	0,79
		WNMG-080412-MR2	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	WNMG-433-MR2	12,70	8,69	4,75	5,16	1,19
			GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M						
			P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
			Steel				Stainless Steel						Cast Iron	High-Temp Alloys											

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

Not Recommended | Stocked or Available Upon Request | Stocked Standard

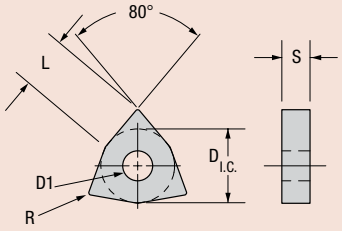
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80°

Greenleaf®

80° Trigon Inserts

Flat Top



Shape: 80° Trigon	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
	WNMA-060404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WNMA-331	9,53	6,53	4,75	3,81	0,38
	WNMA-060408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WNMA-332	9,53	6,53	4,75	3,81	0,79
	WNMA-060412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WNMA-333	9,53	6,53	4,75	3,81	1,19
	WNMA-080404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WNMA-431	12,70	8,69	4,75	5,16	0,38
	WNMA-080408	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	WNMA-432	12,70	8,69	4,75	5,16	0,79
	WNMA-080412	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	WNMA-433	12,70	8,69	4,75	5,16	1,19
	WNMA-080416	❍	❍	❍	❍	❍	❍	❍	❍	●	❍	●	❍	❍	❍	❍	❍	❍	WNMA-434	12,70	8,69	4,75	5,16	1,57

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

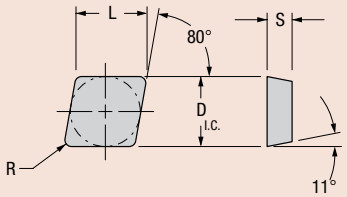
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● ● Stocked Standard | ❍ ❍ Stocked or Available Upon Request | Not Recommended

80° Diamond Inserts

Positive Flat Top



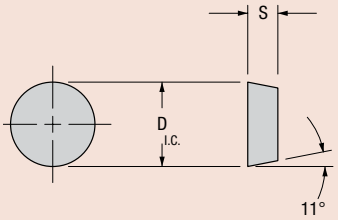
Shape: 80° Diamond	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	CPGN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CPGN-422	12,70	12,88	3,18	0,79
	CPGN-120316	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CPGN-424	12,70	12,88	3,18	1,57
	CPGN-120324	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CPGN-426	12,70	12,88	3,18	2,39
	CPGN-120412	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	CPGN-433	12,70	12,88	4,75	1,19
	CPGN-120416	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	CPGN-434	12,70	12,88	4,75	1,57
	CPGN-190408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CPGN-632	19,05	19,33	4,75	0,79
	CPGN-190412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	CPGN-633	19,05	19,33	4,75	1,19

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

Round Inserts

Positive Flat Top



Shape: Round	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	S
	RPGN-120400	○	○	●	●	○	●	○	○	○	●	○	○	●	○	○	●	●	RPGN-43	12,70	4,75

Carbide Coatings

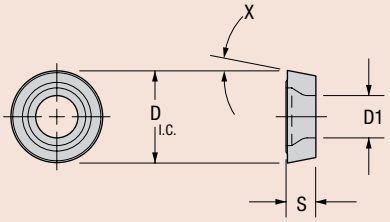
MT-CVD Coated | PVD Coated | Uncoated

Not Recommended | Stocked or Available Upon Request | Stocked Standard

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Round Inserts

Positive Chip Control (RCGT/RPGT)



Shape: Round	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)			
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	S	D1	X
TurboForm®	RCGT-060300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RCGT-22-TF	6,35	3,18	3,40	7°
	RCGT-09T300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RCGT-32.5-TF	9,53	3,96	4,39	7°
	RCGT-120400-TF			❍		❍	●	❍	❍				❍	●	❍	❍		❍	RCGT-43-TF	12,70	4,75	5,51	7°
	RPGT-060300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RPGT-22-TF	6,35	3,18	3,40	11°
	RPGT-09T300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RPGT-32.5-TF	9,53	3,96	4,39	11°
	RPGT-120400-TF			❍		●	●	❍	❍				●	●	❍	❍		❍	RPGT-43-TF	12,70	4,75	5,51	11°



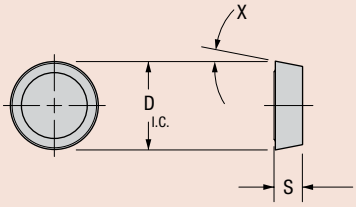
Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Round Inserts

Positive Chip Control (RCGR/RPGR)



Shape: Round	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)		
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S									
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	S	X
TurboForm®	RCGR-060300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RCGR-22-TF	6,35	3,18	7°
	RCGR-09T300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RCGR-32.5-TF	9,53	3,96	7°
	RCGR-120400-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RCGR-43-TF	12,70	4,75	7°
	RPGR-060300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RPGR-22-TF	6,35	3,18	11°
	RPGR-09T300-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RPGR-32.5-TF	9,53	3,96	11°
	RPGR-120400-TF			❍		❍	❍	❍	❍				❍	❍	❍	❍		❍	RPGR-43-TF	12,70	4,75	11°



Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

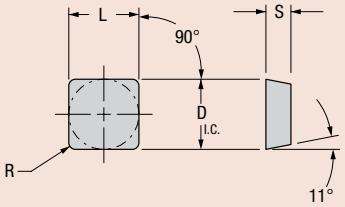
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
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Square Inserts

Positive Flat Top



Shape: Square	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M15 G-9230	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-9230	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	SPGN-090308	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	SPGN-322	9,53	9,53	3,18	0,79
	SPGN-090312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-323	9,53	9,53	3,18	1,19
	SPGN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-422	12,70	12,70	3,18	0,79
	SPGN-120312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-423	12,70	12,70	3,18	1,19
	SPGN-120316	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-424	12,70	12,70	3,18	1,57
	SPGN-120408	○	○	○	●	○	○	○	○	○	●	○	○	○	○	○	●	○	SPGN-432	12,70	12,70	4,75	0,79
	SPGN-120412	○	○	●	●	○	○	○	○	○	●	○	○	○	○	○	●	○	SPGN-433	12,70	12,70	4,75	1,19
	SPGN-120416	○	○	○	●	○	○	○	○	●	●	●	○	○	○	○	●	○	SPGN-434	12,70	12,70	4,75	1,57
	SPGN-150408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-532	15,88	15,88	4,75	0,79
	SPGN-150416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-534	15,88	15,88	4,75	1,57
	SPGN-190404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-631	19,05	19,05	4,75	0,38
	SPGN-190408	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-632	19,05	19,05	4,75	0,79
	SPGN-190412	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-633	19,05	19,05	4,75	1,19
	SPGN-190416	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-634	19,05	19,05	4,75	1,57
	SPGN-190424	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-636	19,05	19,05	4,75	2,39
	SPGN-190432	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPGN-638	19,05	19,05	4,75	3,18
	SPUN-120308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	SPUN-422	12,70	12,70	3,18	0,79
	SPUN-120312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-423	12,70	12,70	3,18	1,19
	SPUN-120316	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-424	12,70	12,70	3,18	1,57
	SPUN-120408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-432	12,70	12,70	4,75	0,79
	SPUN-120412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-433	12,70	12,70	4,75	1,19
	SPUN-190412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-633	19,05	19,05	4,75	1,19
	SPUN-190416	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-634	19,05	19,05	4,75	1,57
	SPUN-190612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-643	19,05	19,05	6,35	1,19
	SPUN-190616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-644	19,05	19,05	6,35	1,57
	SPUN-250916	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-864	25,40	25,40	9,53	1,57
	SPUN-250924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-866	25,40	25,40	9,53	2,39
	SPUN-250932	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-868	25,40	25,40	9,53	3,18
	SPUN-310932	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-1068	31,75	31,75	9,53	3,18
	SPUN-381232	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	SPUN-1288	38,10	38,10	12,70	3,18

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 | GA5026 G-925 G-920 G-9230 GA5023 G-915 | GA5023 | GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 | M15 M15 M15 M15 M20 M35 | K15 | S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Not Recommended | Stocked or Available Upon Request | Stocked Standard

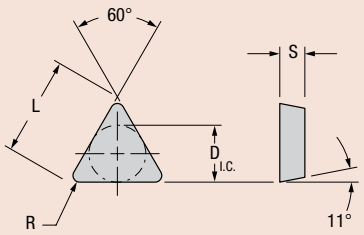
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60°

Greenleaf®

Triangle Inserts

Positive Flat Top (TPGN)



		Steel				Stainless Steel						Cast Iron	High-Temp Alloys						
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S						
Shape: Triangle	Part Number ISO	GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M	Part Number ANSI
	TPGN-110304	❍	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	TPGN-221
	TPGN-110308	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-222
	TPGN-110312	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-223
	TPGN-110316	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-224
	TPGN-160300	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-320
	TPGN-160304	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	●	TPGN-321
	TPGN-160308	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	●	TPGN-322
	TPGN-160312	❍	❍	❍	❍	●	❍	❍	❍	❍	❍	❍	●	❍	❍	❍	❍	●	TPGN-323
	TPGN-160316	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	TPGN-324
	TPGN-160416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-334
	TPGN-160424	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-336
	TPGN-220404	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	TPGN-431
	TPGN-220408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	●	TPGN-432
	TPGN-220412	❍	❍	❍	❍	●	●	❍	❍	❍	❍	❍	●	●	❍	❍	❍	❍	TPGN-433
	TPGN-220416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-434
	TPGN-220424	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-436
	TPGN-270408	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-532
	TPGN-270412	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-533
	TPGN-270416	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-534
	TPGN-270604	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-541
	TPGN-270608	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-542
	TPGN-270612	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-543
	TPGN-270616	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-544
	TPGN-270632	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-548
	TPGN-270716	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-554
	TPGN-270724	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-556
	TPGN-330924	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-666

Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
TPGN-221	6,35	11,00	3,18	0,38
TPGN-222	6,35	11,00	3,18	0,79
TPGN-223	6,35	11,00	3,18	1,19
TPGN-224	6,35	11,00	3,18	1,57
TPGN-320	9,53	16,51	3,18	0,13
TPGN-321	9,53	16,51	3,18	0,38
TPGN-322	9,53	16,51	3,18	0,79
TPGN-323	9,53	16,51	3,18	1,19
TPGN-324	9,53	16,51	3,18	1,57
TPGN-334	9,53	16,51	4,75	1,57
TPGN-336	9,53	16,51	4,75	2,39
TPGN-431	12,70	22,00	4,75	0,38
TPGN-432	12,70	22,00	4,75	0,79
TPGN-433	12,70	22,00	4,75	1,19
TPGN-434	12,70	22,00	4,75	1,57
TPGN-436	12,70	22,00	4,75	2,39
TPGN-532	15,88	27,51	4,75	0,79
TPGN-533	15,88	27,51	4,75	1,19
TPGN-534	15,88	27,51	4,75	1,57
TPGN-541	15,88	27,51	6,35	0,38
TPGN-542	15,88	27,51	6,35	0,79
TPGN-543	15,88	27,51	6,35	1,19
TPGN-544	15,88	27,51	6,35	1,57
TPGN-548	15,88	27,51	6,35	3,18
TPGN-554	15,88	27,51	7,92	1,57
TPGN-556	15,88	27,51	7,92	2,39
TPGN-666	19,05	32,99	9,53	2,39

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

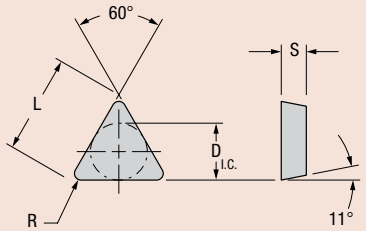
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Triangle Inserts

Positive Flat Top (TPUN)



Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)			
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	R
	TPUN-160304	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-321	9,53	16,51	3,18	0,38
	TPUN-160308	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-322	9,53	16,51	3,18	0,79
	TPUN-160312	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-323	9,53	16,51	3,18	1,19
	TPUN-220404	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-431	12,70	22,00	4,75	0,38
	TPUN-220408	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-432	12,70	22,00	4,75	0,79
	TPUN-220412	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	TPUN-433	12,70	22,00	4,75	1,19
	TPUN-220416	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-434	12,70	22,00	4,75	1,57
	TPUN-270608	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-542	15,88	27,51	6,35	0,79
	TPUN-270612	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-543	15,88	27,51	6,35	1,19
	TPUN-270616	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-544	15,88	27,51	6,35	1,57
	TPUN-270708	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-552	15,88	27,51	7,92	0,79
	TPUN-270712	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-553	15,88	27,51	7,92	1,19
	TPUN-270716	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-554	15,88	27,51	7,92	1,57
	TPUN-270724	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-556	15,88	27,51	7,92	2,39
	TPUN-330916	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-664	19,05	32,99	9,53	1,57
	TPUN-330924	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	TPUN-666	19,05	32,99	9,53	2,39

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Not Recommended | Stocked or Available Upon Request ○ ○ | Stocked Standard ● ●

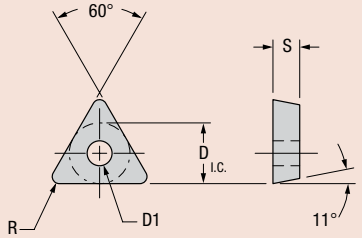
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60°

Greenleaf®

Triangle Inserts

Positive Flat Top (TP/TPGA)



Shape: Triangle	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)			
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S										
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	S	D1	R
	TP-41	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TP-41	6,35	2,36	3,48	0,38
	TP-42	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TP-42	6,35	2,36	3,48	0,79
	TP-62	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TP-62	9,53	3,18	4,14	0,79
	TP-64	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TP-64	9,53	3,18	4,14	1,57
	TP-82	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TP-82	12,70	4,75	5,16	0,79
	TPGA-160304	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGA-321	9,53	3,18	3,8	0,38
	TPGA-160308	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGA-322	9,53	3,18	3,8	0,79
	TPGA-160312	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	TPGA-323	9,53	3,18	3,8	1,19

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

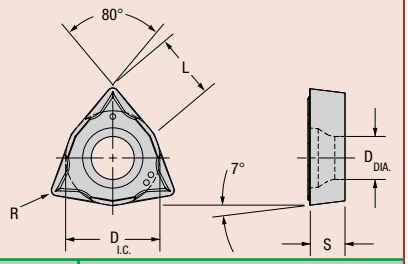
GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 G-9230 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-9230 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

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● ● Stocked Standard | ❍ ❍ Stocked or Available Upon Request | Not Recommended

80° Trigon Inserts

Chip Control: Screw On



Shape: 80° Trigon	Part Number ISO	Steel				Stainless Steel						Cast Iron	High-Temp Alloys						Part Number ANSI	Dimensions (millimeters)				
		P15	P25	P25	P35	M15	M15	M15	M15	M20	M35	K15	S											
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	G-9230	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-9230	G-915	G-20M		D I.C.	L	S	D1	R
	WCMT-060202-X3	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WCMT-21.5.5-X3	6,35	4,34	2,36	2,79	0,20
	WCMT-060204-X3	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WCMT-21.51-X3	6,35	4,34	2,36	2,79	0,38
	WCMT-09T304-X3	❍	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WCMT-32.51-X3	9,53	6,50	3,96	4,39	0,38
	WCMT-09T308-X3	●	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	WCMT-32.52-X3	9,53	6,50	3,96	4,39	0,79

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 G-925 G-920 G-9230 G-915 GA5023 G-20M
P15 P25 P25 P35 M15 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Not Recommended | Stocked or Available Upon Request (❍) | Stocked Standard (●)

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Ceramic Inserts

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries.





Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

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Ceramic Insert Grade Description

CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel and cobalt based super-alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

WG-600® Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels. *U.S. Patent No. 6,447,896 B1*.

WG-700™ New whisker-reinforced Al_2O_3 ceramic substrate featuring improved toughness and a unique high-speed coating. WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-machines materials. WG-700 exhibits high metal-removal rates with exceptional tool life. *U.S. Patent No. 6,447,896 B1*.

XSYTIN™-1 New phase-toughened ceramic capable of extreme feed rates. XSYTIN™-1 excels at machining a wide variety of materials including steels, cast and ductile irons, high-temperature alloys and other challenging metals. XSYTIN™-1 is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

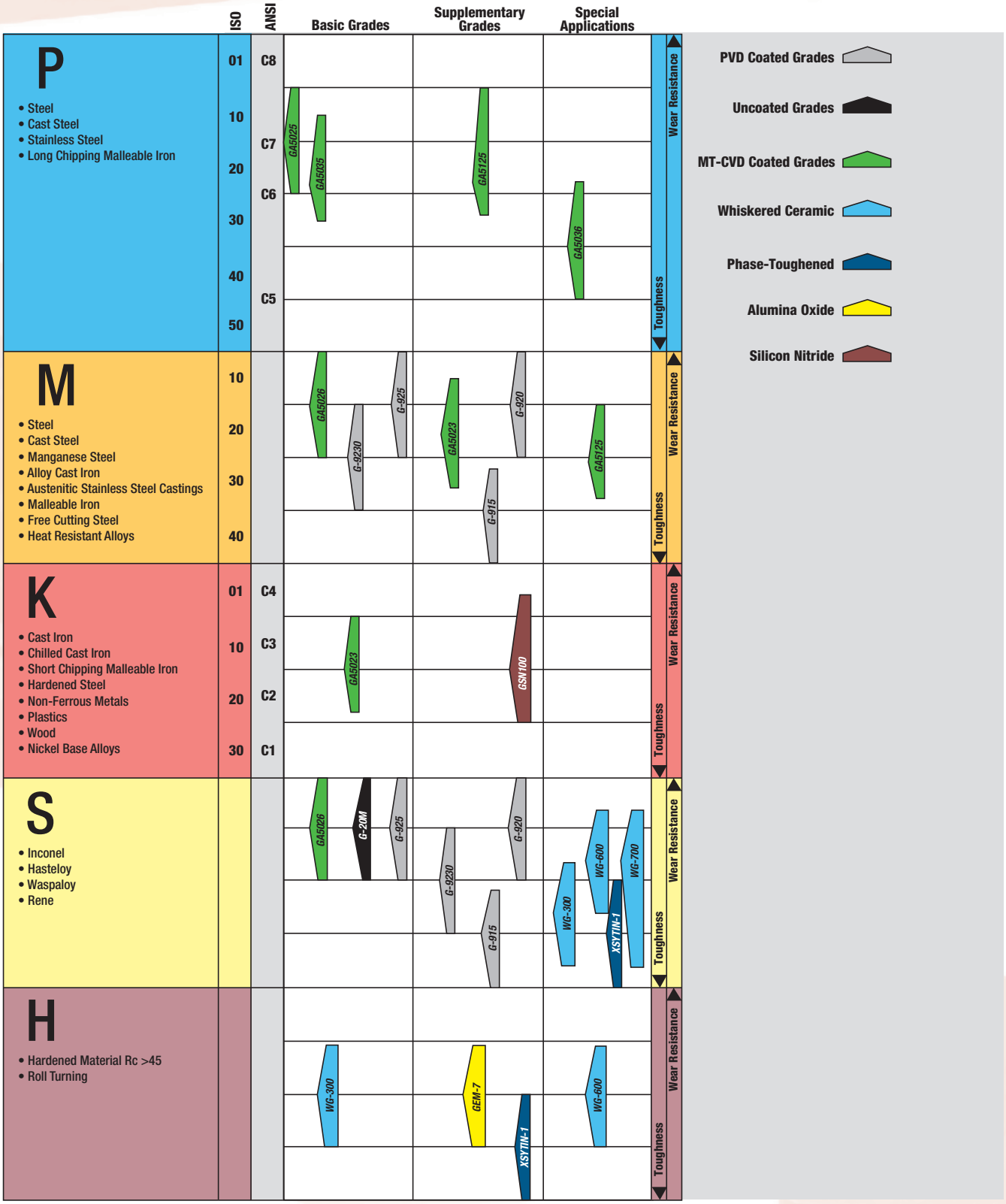
GSN100™ New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

GEM-7™ Al_2O_3 + TiC composite ceramic with a high degree of predictability in roll turning and hard alloy (up to 65 R/c) machining.

GEM-19™ Cold pressed and sintered Al_2O_3 ceramic for economical roughing and finishing of cast iron grades application range on severe interruption or old machinery.

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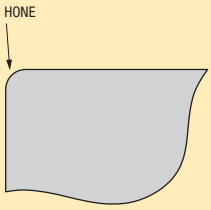
Insert Grade Reference for Turning



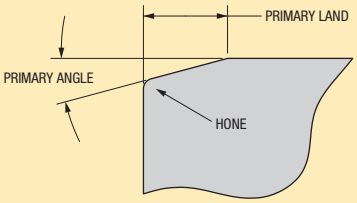
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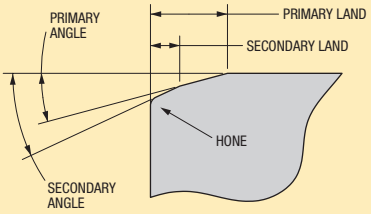
Edge Preparation and Application Guide



HONE



PRIMARY ANGLE



SECONDARY ANGLE

Edge Prep	Hone	Primary Land	Primary Angle	Application
A	0,015 R	–	–	For light finishing and grooving, also added to designated negative lands (i.e. T1, T2, T9).
T1	–	0,07	20°	General purpose for turning and light milling in clean high-temp. alloys and materials <50R/C.
T1A	0,015 R	0,07	20°	Used where more protection is needed than T1 such as in scale and light interruptions, hard turning.
T2	–	0,17	20°	General purpose chamfer for light to medium feed rates, cast-iron machining.
T2A	0,015 R	0,17	20°	Scale applications, light interruptions, weld overlays, finish turning and milling of hardened materials.

See page ATI 19 for other Greenleaf edge preps or call Greenleaf Technical Service for application concerns.

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I.S.O. Identification for Turning and Boring Inserts

Shape

A	85° parallelogram
B	82° parallelogram
C	80° diamond
D	55° diamond
H	hexagon
K	55° parallelogram
L	90° rectangle
M	86° diamond
O	octagon
P	pentagon
R	round
S	square
T	triangle
V	35° diamond
W	80° Trigon

T

Tolerance Class (±mm) (1)



	Dimensions m	s	d
A	0,005 (2)	0,025	0,025
B	0,005	0,025	0,013
C	0,013	0,025	0,025
D	0,013	0,025	0,013
E	0,025	0,025	0,025
G	0,025	0,130	0,025
J	0,005 (2)	0,025	0,050-0,130
K	0,013	0,025	0,050-0,130
L	0,025	0,025	0,050-0,130
M	0,080-0,180 (3)	0,130 (3)	0,050-0,130
U	0,130-0,380 (3)	0,130 (3)	0,080-0,250

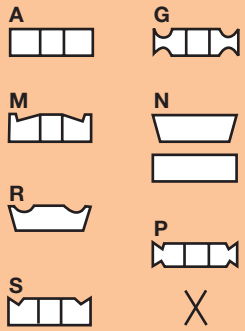
M

Clearances

A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

N

Type



G

(1) Tolerances given are plus and minus from nominal.

(2) These tolerances normally apply to indexable inserts with facets (secondary cutting edges).

(3) The tolerance depends on the size and shape of the insert and should be shown in the standards for the corresponding shapes and sizes (see ANSI B94.25).

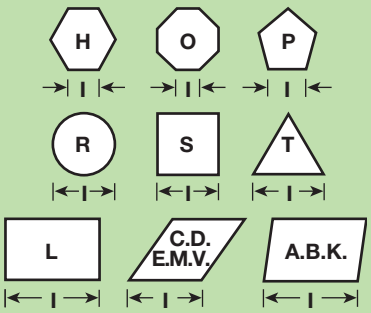
(4) Shall only be used when required.

(5) Dimensions are established prior to supplemental edge or coating modification.

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Comparison cutting edge length in mm – IC in inches

△	06	09	11	16	22	27	33	44
□ ○				09	12	15	19	25
55°					15	19		
80°					12	16	19	25
35°				16	22			



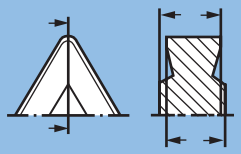
Integers to be preceded by a 0.
Example: 9,52 mm indicated by 09.

Cutting Edge Length

Unhoned	F
Honed	E
Chamfered	T
Chamfered and Honed	S

Cutting Edge

22 — **04** — **08** — **E**



01	s= 1,59
T1	s= 1,98
02	s= 2,38
03	s= 3,18
T3	s= 3,97
04	s= 4,76
05	s= 5,56
06	s= 6,35
07	s= 7,94
09	s= 9,52
10	s= 10,00
12	s= 12,00

Thickness

Radius in terms of 0.1 mm	
00	Round insert
00	sharp point
02	0.2
04	0.4
05	0.5
08	0.8
10	1.0
12	1.2
15	1.5
16	1.6
24	2.4
32	3.2
40	4.0

Cutting Point Configuration

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A.N.S.I. Identification for Turning and Boring Inserts

Tolerance Class [1]

	Roll Dim. B	I.C. A	Thickness T
A	0.0002 [2]	0.001	0.001
B	0.0002	0.001	0.005
C	0.0005	0.001	0.001
D	0.0005	0.001	0.005
E	0.001	0.001	0.001
F	0.0002 [2]	0.0005	0.001
G	0.001	0.001	0.005
H	0.0005	0.0005	0.001
J	0.0002 [2]	0.002-0.005	0.001
K	0.0005	0.002-0.005	0.001
L	0.001	0.002-0.005	0.001
M	0.002-0.010 [3]	0.002-0.004 [3]	0.005
U	0.005-0.012 [3]	0.005-0.010 [3]	0.005
N	0.002-0.010 [3]	0.002-0.004 [3]	0.001

Size (I.C.)

Regular polygons and diamonds
Number of 1/8ths of an inch in the inscribed circle as per table below:

Example:

5/32" I.C.	1.2
3/16" I.C.	1.5
7/32" I.C.	1.8
1/4" I.C.	2
5/16" I.C.	2.5
3/8" I.C.	3
1/2" I.C.	4
5/8" I.C.	5
3/4" I.C.	6
7/8" I.C.	7
1" I.C.	8
1-1/4" I.C.	10

Rectangles and parallelograms
Use two digits to size
1st digit: Number of 1/8ths of an inch in width
2nd digit: Number of 1/4ths of an inch in length

S P G A 6

Shape

- V 35° diamond
- D 55° diamond
- K 55° parallelogram
- T 60° triangle
- E 75° diamond
- C 80° diamond
- W 80° Trigon
- B 82° parallelogram
- A 85° parallelogram
- M 86° diamond
- S 90° square
- L 90° rectangle
- P 108° pentagon
- H 120° hexagon
- O 135° octagon
- R round

Clearances

- N 0°
- A 3°
- B 5°
- C 7°
- P 11°
- D 15°
- E 20°
- F 25°
- G 30°
- H 0°-11° [4]
- J 0°-14° [4]
- K 0°-17° [4]
- L 0°-20° [4]
- M 11°-14° [4]
- R 11°-17° [4]
- S 11°-20° [4]

Type

- N Without hole
- R Without hole with chip groove on one rake face
- F Without hole with chip grooves on two rake faces
- A With hole
- B With hole and one countersink (80°-90°)
- C With hole and two countersinks (80°-90°)
- W With hole and one countersink (40°-60°)
- Q With hole and two countersinks (40°-60°)
- M With hole and chip groove on one rake face
- G With hole and chip grooves on two rake faces
- H With hole, one countersink (80°-90°) and chip groove on one rake face
- J With hole, two countersinks (80°-90°) and chip grooves on two rake faces
- T With hole, one countersink (40°-60°) and chip groove on one rake face
- U With hole, two countersinks (40°-60°) and chip grooves on two rake faces

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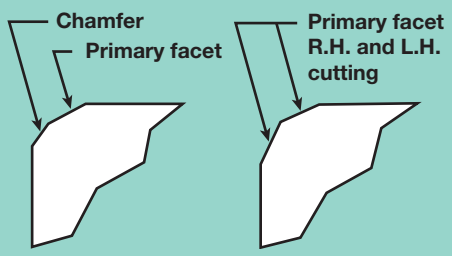
Regular polygons, diamonds, rectangles and parallelograms:
Number of 1/16ths of an inch in thickness as per table below:

Example:

3/32"	1.5
1/8"	2
5/32"	2.5
3/16"	3
7/32"	3.5
1/4"	4
5/16"	5
3/8"	6
7/16"	7
1/2"	8

Thickness

Only used following a letter in the seventh position.
Number of 1/64ths of an inch in the primary facet length.



Special Cutting Point Definition (5)

R	*Right*
L	*Left*

Hand (5)

3 **3** [ ] [ ] **A**

0 *Sharp Corner*
1 *1/64" radius*
2 *1/32" radius*
3 *3/64" radius*
4 *1/16" radius*
5 *5/64" radius*
6 *3/32" radius*
7 *7/64" radius*
8 *1/8" radius*

A *Square insert with 45° chamfer*
D *Square insert with 30° chamfer*
E *Square insert with 15° chamfer*
F *Square insert with 3° chamfer*
K *Square insert with 30° double chamfer*
L *Square insert with 15° double chamfer*
M *Square insert with 3° double chamfer*
N *Truncated triangular insert*
P *Flatted corner triangle – 90°*

Cutting Point Configuration

A	*Honed (0.0005 to less than 0.001")*
B	*Honed (0.001 to less than 0.002")*
C	*Honed (0.005 to less than 0.007")*
D	*Honed (0.007" and over)*
J	*Polished to 4 microinch AA (rake face only)*
T	*Chamfered – manufacturer's standard (negative land – rake face only)*

Other Conditions (5)

(1) Tolerances given are plus and minus from nominal.

(2) These tolerances normally apply to indexable inserts with facets (secondary cutting edges).

(3) The tolerance depends on the size and shape of the insert and should be shown in the standards for the corresponding shapes and sizes (see ANSI B94.25).

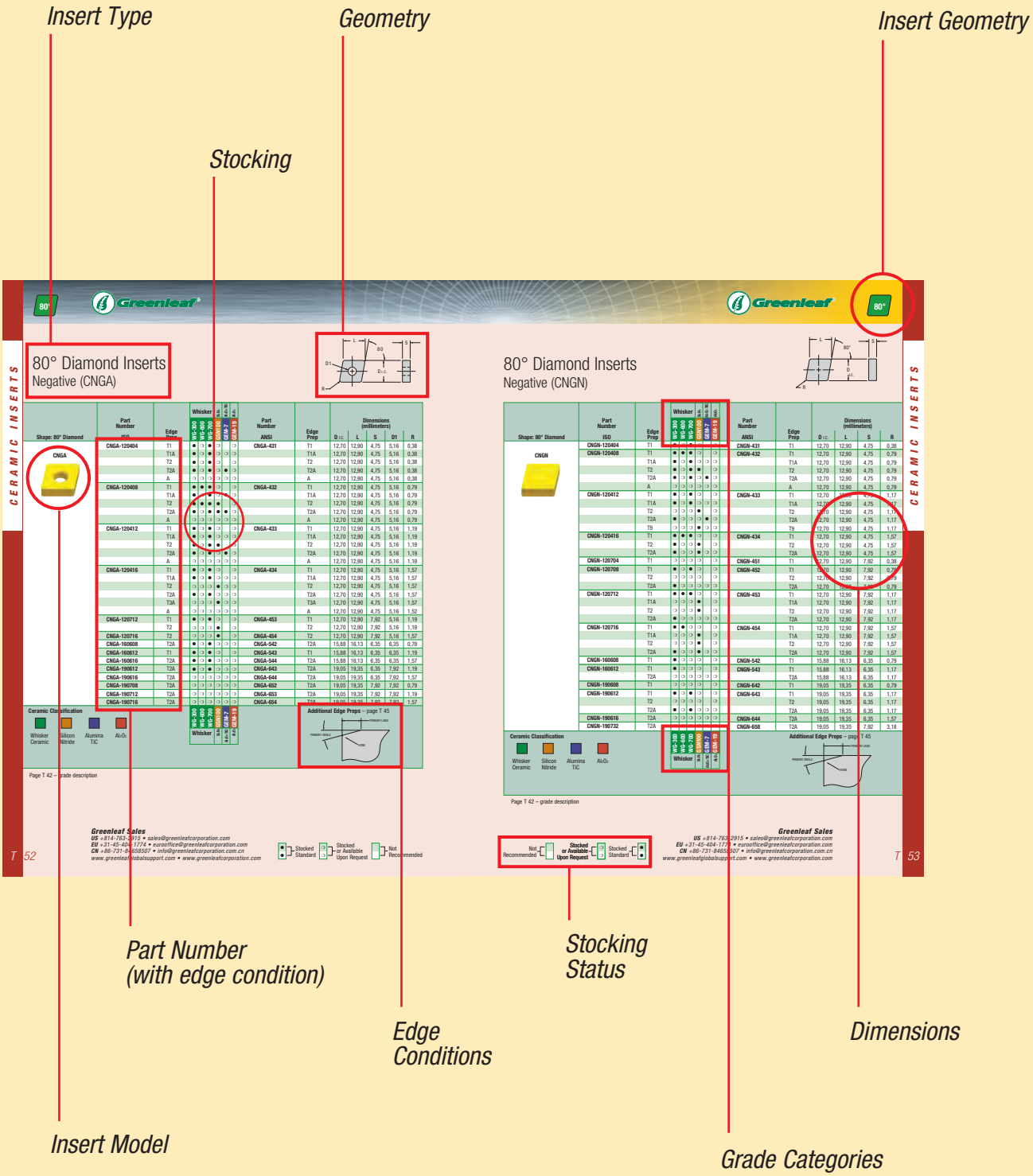
(4) Secondary facet angle may vary by +1°.

(5) Shall only be used when required.

(6) Dimensions are established prior to supplemental edge or coating modification.

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Ceramic Insert Usage Reference Guide



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Negative Inserts



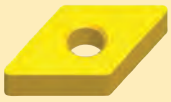
80° Diamond
page: T 52



80° Diamond
page: T 53



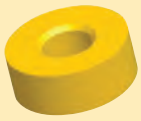
80° Diamond
Rough Stuff®
page: T 54



55° Diamond
page: T 55



55° Diamond
page: T 56



Round
page: T 57



Round
page: T 58

Negative Inserts *continued*



Square
page: T 59



Square
page: T 60



Square
Rough Stuff®
page: T 61



Triangle
page: T 62



Triangle
page: T 63



35° Diamond
page: T 64

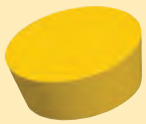


Trigon
page: T 65

Positive Inserts



80° Diamond
Positive Flat Top
page: T 66



Round
Positive Flat Top
page: T 66



Round
V-Bottom
page: T 67



Square
Positive Flat Top
page: T 68



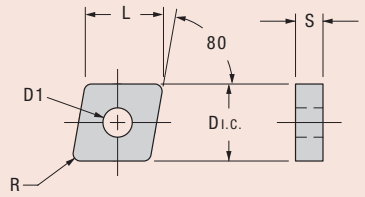
Triangle
Positive Flat Top
page: T 69



Triangle
page: T 70

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80° Diamond Inserts
Negative (CNGA)

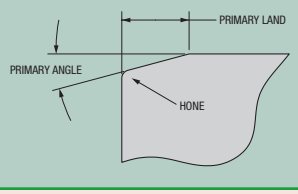


Shape: 80° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	D1	R
CNGA 	CNGA-120404	T1	●	○	●	○	○		○	CNGA-431	T1	12,70	12,90	4,75	5,16	0,38
		T1A	●	○	●	○	○	○	○		T1A	12,70	12,90	4,75	5,16	0,38
		T2	●	○	●	○	○		○		T2	12,70	12,90	4,75	5,16	0,38
		T2A	●	○	●	○	○	●	○		T2A	12,70	12,90	4,75	5,16	0,38
		A	○	○	○	○	○	○	○		A	12,70	12,90	4,75	5,16	0,38
	CNGA-120408	T1	●	●	●	●	○		○	CNGA-432	T1	12,70	12,90	4,75	5,16	0,79
		T1A	●	●	●	○	○	●	○		T1A	12,70	12,90	4,75	5,16	0,79
		T2	●	●	●	○	●		○		T2	12,70	12,90	4,75	5,16	0,79
		T2A	●	○	●	○	●	●	○		T2A	12,70	12,90	4,75	5,16	0,79
		A	○	○	○	○	○	○	○		A	12,70	12,90	4,75	5,16	0,79
	CNGA-120412	T1	●	○	●	○	○		○	CNGA-433	T1	12,70	12,90	4,75	5,16	1,19
		T1A	●	●	●	●	○	○	○		T1A	12,70	12,90	4,75	5,16	1,19
		T2	●	○	●	○	●		○		T2	12,70	12,90	4,75	5,16	1,19
		T2A	●	○	●	○	○	●	○		T2A	12,70	12,90	4,75	5,16	1,19
		A	○	○	○	●	○	○	○		A	12,70	12,90	4,75	5,16	1,19
	CNGA-120416	T1	●	○	●	○	○		○	CNGA-434	T1	12,70	12,90	4,75	5,16	1,57
		T1A	●	●	●	●	○	○	○		T1A	12,70	12,90	4,75	5,16	1,57
		T2	○	○	○	○	●	○	○		T2	12,70	12,90	4,75	5,16	1,57
		T2A	●	○	●	○	○	○	○		T2A	12,70	12,90	4,75	5,16	1,57
		T3A	○	○	○	○	●	○	○		T3A	12,70	12,90	4,75	5,16	1,57
		A	○	○	○	●	○	○	○		A	12,70	12,90	4,75	5,16	1,52
	CNGA-120712	T1	●	○	●	○	○		○	CNGA-453	T1	12,70	12,90	7,92	5,16	1,19
		T2	○	○	○	○	●		○		T2	12,70	12,90	7,92	5,16	1,19
	CNGA-120716	T2	○	○	○	○	●		○	CNGA-454	T2	12,70	12,90	7,92	5,16	1,57
	CNGA-160608	T2A	●	○	●	○	○	○	○	CNGA-542	T2A	15,88	16,13	6,35	6,35	0,79
	CNGA-160612	T1	●	○	●	○	○		○	CNGA-543	T1	15,88	16,13	6,35	6,35	1,19
	CNGA-160616	T2A	●	○	●	○	○	○	○	CNGA-544	T2A	15,88	16,13	6,35	6,35	1,57
	CNGA-190612	T2A	●	●	●	○	○	○	○	CNGA-643	T2A	19,05	19,35	6,35	7,92	1,19
	CNGA-190616	T2A	○	○	○	○	○	○	○	CNGA-644	T2A	19,05	19,35	6,35	7,92	1,57
	CNGA-190708	T2A	○	○	○	○	○	○	○	CNGA-652	T2A	19,05	19,35	7,92	7,92	0,79
	CNGA-190712	T2A	○	○	○	○	○	○	○	CNGA-653	T2A	19,05	19,35	7,92	7,92	1,19
	CNGA-190716	T2A	○	○	○	○	○	○	○	CNGA-654	T2A	19,05	19,35	7,92	7,92	1,57

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3
WG-300, WG-600, WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker	Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Additional Edge Preps – page T 45

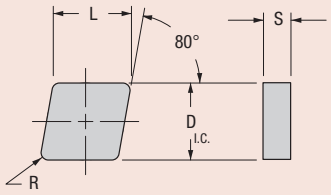


Page T 42 – grade description

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● Stocked Standard
○ Stocked or Available Upon Request
Not Recommended

80° Diamond Inserts
Negative (CNGN)

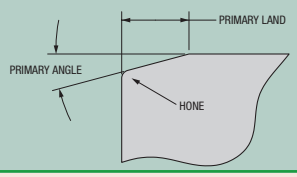


Shape: 80° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	R
CNGN	CNGN-120404	T1	●	○	●	○	○		○	CNGN-431	T1	12,70	12,90	4,75	0,38
	CNGN-120408	T1	●	●	●	●	○		○	CNGN-432	T1	12,70	12,90	4,75	0,79
		T1A	●	○	●	○	○	○	○		T1A	12,70	12,90	4,75	0,79
		T2	●	○	●	○	●		○		T2	12,70	12,90	4,75	0,79
		T2A	●	○	●	○	○	●	○		T2A	12,70	12,90	4,75	0,79
		A	○	○	○	○	○	○	○		A	12,70	12,90	4,75	0,79
	CNGN-120412	T1	●	○	●	○	○		○	CNGN-433	T1	12,70	12,90	4,75	1,19
		T1A	●	○	●	●	○	○	○		T1A	12,70	12,90	4,75	1,19
		T2	○	○	○	○	●		○		T2	12,70	12,90	4,75	1,19
		T2A	●	○	○	○	○	●	○		T2A	12,70	12,90	4,75	1,19
		T9	○	○	○	○	●	○	○		T9	12,70	12,90	4,75	1,19
		A	○	○	○	●	○	○	○	CNGN-434	T1	12,70	12,90	4,75	1,57
	CNGN-120416	T1	●	●	●	○	○		○		T2	12,70	12,90	4,75	1,57
		T1A	○	○	○	●	○	○	○		T2A	12,70	12,90	4,75	1,57
		T2	●	○	○	○	●		○	CNGN-451	T1	12,70	12,90	7,92	0,38
		T2A	●	○	○	○	●	○	○	CNGN-452	T1	12,70	12,90	7,92	0,79
		A	○	○	○	●	○	○	○		T2	12,70	12,90	7,92	0,79
	CNGN-120704	T1	○	○	○	○	○		○		T2A	12,70	12,90	7,92	0,79
	CNGN-120708	T1	●	○	●	○	○		○	CNGN-453	T1	12,70	12,90	7,92	1,19
		T2	○	○	○	○	○		○		T1A	12,70	12,90	7,92	1,19
		T2A	●	○	○	○	○	○	○		T2	12,70	12,90	7,92	1,19
	CNGN-120712	T1	●	●	●	○	○		○		T2A	12,70	12,90	7,92	1,19
		T1A	○	○	○	●	●		○	CNGN-454	T1	12,70	12,90	7,92	1,57
		T2	○	○	○	○	●		○		T1A	12,70	12,90	7,92	1,57
		T2A	●	○	○	○	○	○	○		T2	12,70	12,90	7,92	1,57
		A	○	○	○	●	○	○	○		T2A	12,70	12,90	7,92	1,57
	CNGN-120716	T1	●	●	○	○	○		○	CNGN-542	T1	15,88	16,13	6,35	0,79
		T1A	○	○	○	●	●		○	CNGN-543	T1	15,88	16,13	6,35	1,19
		T2	○	○	○	○	●		○		T2A	15,88	16,13	6,35	1,19
		T2A	●	○	○	○	●	○	○	CNGN-642	T1	19,05	19,35	6,35	0,79
		A	○	○	○	●	○	○	○	CNGN-643	T1	19,05	19,35	6,35	1,19
	CNGN-160608	T1	●	○	○	○	○		○		T2	19,05	19,35	6,35	1,19
	CNGN-160612	T1	●	○	○	○	○		○		T2A	19,05	19,35	6,35	1,19
		T2A	○	○	○	○	○	○	○	CNGN-644	T2A	19,05	19,35	6,35	1,57
	CNGN-190608	T1	○	○	○	○	○		○	CNGN-658	T2A	19,05	19,35	7,92	3,18
	CNGN-190612	T1	●	○	●	○	○		○						
		T2	○	○	○	○	○		○						
		T2A	●	○	●	○	○	○	○						
	CNGN-190616	T2A	○	○	○	○	○	○	○						
	CNGN-190732	T2A	○	○	○	○	○	○	○						

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3
WG-300, WG-600, WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker	Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Additional Edge Preps – page T 45



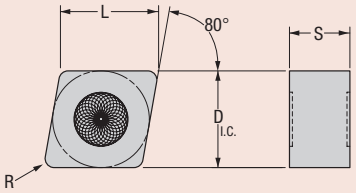
Page T 42 – grade description

Not Recommended ○ Stocked or Available Upon Request ● Stocked Standard

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80° Diamond Inserts

Rough Stuff®



Shape: 80° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Si_3N_4 GSN100	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
	**CNGX-120708-RS**	T2	❍	❍	❍	❍	**CNGX-452-RS**	T2	12,70	12,90	7,92	0,79
		T2A	❍	❍	❍	❍		T2A	12,70	12,90	7,92	0,79
	CNGX-120712-RS	T2	❍	❍	❍	❍	**CNGX-453-RS**	T2	12,70	12,90	7,92	1,19
		T2A	❍	❍	❍	❍		T2A	12,70	12,90	7,92	1,19
	CNGX-120716-RS	T2	❍	❍	❍	❍	**CNGX-454-RS**	T2	12,70	12,90	7,92	1,57
		T2A	❍	❍	❍	❍		T2A	12,70	12,90	7,92	1,57

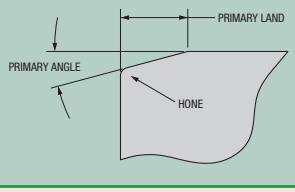
Ceramic Classification

WG-300	WG-600	WG-700	GSN100
Whisker			Si_3N_4

Whisker Ceramic — Silicon Nitride

Page T 42 – grade description

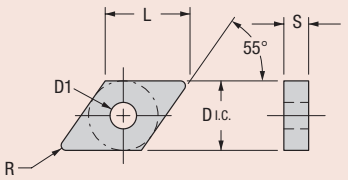
Additional Edge Preps – page T 45



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● ● Stocked Standard — ❍ ❍ Stocked or Available Upon Request — Not Recommended

55° Diamond Inserts
Negative (DNGA)



Shape: 55° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3–TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	D1	R
DNGA 	DNGA-110308	T1	○	○	○	○	○		○	DNGA-322	T1	9,53	11,63	3,18	3,81	0,79
	DNGA-110312	T1	○	○	○	○	○		○	DNGA-323	T1	9,53	11,63	3,18	3,81	1,19
	DNGA-110316	T1	○	○	○	○	○		○	DNGA-324	T1	9,53	11,63	3,18	3,81	1,57
	DNGA-110408	T1	○	○	○	○	○		○	DNGA-332	T1	9,53	11,63	4,75	3,81	0,79
	DNGA-150404	T1	●	○	○	○	○		○	DNGA-431	T1	12,70	15,49	4,75	5,16	0,38
		T2	●	○	○	○	○		○		T2	12,70	15,49	4,75	5,16	0,38
	DNGA-150408	T1	●	○	○	○	○		○	DNGA-432	T1	12,70	15,49	4,75	5,16	0,79
		T1A	●	○	○	○	○	○	○		T1A	12,70	15,49	4,75	5,16	0,79
		T2	●	○	○	○	●		○		T2	12,70	15,49	4,75	5,16	0,79
		T2A	●	○	○	○	○	●	○		T2A	12,70	15,49	4,75	5,16	0,79
		A	○	○	○	○	○	○	○		A	12,70	15,49	4,75	5,16	0,79
	DNGA-150412	T1	●	○	○	○	○		○	DNGA-433	T1	12,70	15,49	4,75	5,16	1,19
		T1A	●	○	○	○	○	○	○		T1A	12,70	15,49	4,75	5,16	1,19
		T2	●	○	○	○	●		○		T2	12,70	15,49	4,75	5,16	1,19
		T2A	●	○	○	○	○	●	○		T2A	12,70	15,49	4,75	5,16	1,19
	DNGA-150416	T1	●	○	○	○	○		○	DNGA-434	T1	12,70	15,49	4,75	5,16	1,57
		T1A	●	○	○	○	○	○	○		T1A	12,70	15,49	4,75	5,16	1,57
		T2A	●	○	○	○	○	○	○		T2A	12,70	15,49	4,75	5,16	1,57
	DNGA-150612	T1	○	○	○	○	○		○	DNGA-443	T1	12,70	15,49	6,35	5,16	1,19
	DNGA-190612	T2A	●	○	○	○	○	○	○	DNGA-543	T2A	15,88	19,38	6,35	6,35	1,19

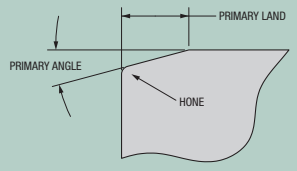
Ceramic Classification

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3–TiC	Al_2O_3

Whisker Ceramic — Phase Toughened — Silicon Nitride — Alumina TiC — Al_2O_3

Page T 42 – grade description

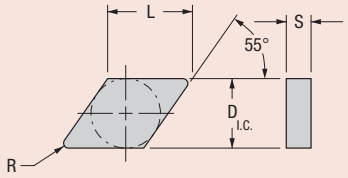
Additional Edge Preps – page T 45



Not Recommended — Stocked or Available Upon Request (○) — Stocked Standard (●)

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55° Diamond Inserts
Negative (DNGN)



Shape: 55° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	R
DNGN 	DNGN-110308	T1	❍	❍	❍	❍	❍		❍	DNGN-322	T1	9,53	11,63	3,18	0,79
	DNGN-110312	T1	❍	❍	❍	❍	❍		❍	DNGN-323	T1	9,53	11,63	3,18	1,19
	DNGN-110316	T1	❍	❍	❍	❍	❍		❍	DNGN-324	T1	9,53	11,63	3,18	1,57
	DNGN-150408	T1	●	❍	●	❍	❍		❍	DNGN-432	T1	12,70	15,49	4,75	0,79
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	12,70	15,49	4,75	0,79
	DNGN-150412	T1	●	❍	●	❍	❍		❍	DNGN-433	T1	12,70	15,49	4,75	1,19
	DNGN-150416	T1	●	❍	❍	❍	❍		❍	DNGN-434	T1	12,70	15,49	4,75	1,57
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	12,70	15,49	4,75	1,57

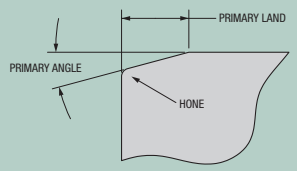
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Page T 42 – grade description

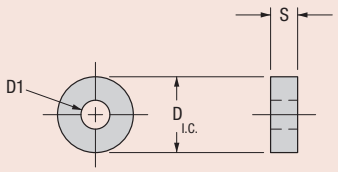
Additional Edge Preps – page T 45



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● ● Stocked Standard
❍ ❍ Stocked or Available Upon Request
Not Recommended

Round Inserts
Negative (RNGA)



Shape: Round	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTiN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	S	D1
RNGA 	RNGA-090300	T1	❍	❍	❍	❍	❍		❍	RNGA-32	T1	9,53	3,18	3,81
	RNGA-090400	T1	❍	❍	❍	❍	❍		❍	RNGA-33	T1	9,53	4,75	3,81
	RNGA-120400	T1	❍	❍	❍	❍	❍		❍	RNGA-43	T1	12,70	4,75	5,16
	RNGA-120700	T1	❍	❍	❍	❍	❍		❍	RNGA-45	T1	12,70	7,92	5,16
	RNGA-150700	T2A	❍	❍	❍	❍	❍	❍	❍	RNGA-55	T2A	15,88	7,92	6,35
	RNGA-190700	T2A	❍	❍	❍	❍	❍	❍	❍	RNGA-65	T2A	19,05	7,92	7,92
	RNGA-250700	T2A	❍	❍	❍	❍	❍	❍	❍	RNGA-85	T2A	25,40	7,92	9,12

Ceramic Classification

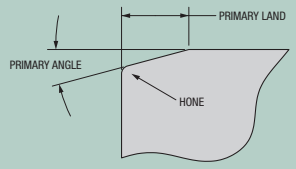
Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 WG-600 WG-700 XSYTiN-1 GSN100 GEM-7 GEM-19

Whisker | Phase Toughened | Si_3N_4 | Al_2O_3-TiC | Al_2O_3

Page T 42 – grade description

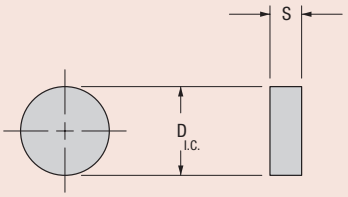
Additional Edge Preps – page T 45



Not Recommended | Stocked or Available Upon Request ❍ ❍ | Stocked Standard ● ●

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Round Inserts
Negative (RNGN)



Shape: Round	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
RNGN 	RNGN-090300	T1	●	○	○	○	○		○	RNGN-32	T1	9,53	3,18
		T1A	●	●	●	●	○	○	○		T1A	9,53	3,18
		T2A	●	○	○	○	○	○	○		T2A	9,53	3,18
		A	○	○	○	●	○	○	○		A	9,53	3,18
	RNGN-090400	T1	●	○	●	○	○		○	RNGN-33	T1	9,53	4,75
		T1A	●	○	●	○	○	○	○		T1A	9,53	4,75
		T2A	●	○	●	○	○	○	○		T2A	9,53	4,75
	RNGN-120300	T1A	●	○	○	●	○	○	○	RNGN-42	T1A	12,70	3,18
		T2A	○	○	○	○	○	○	○		T2A	12,70	3,18
		A	○	○	○	●	○	○	○		T2A	12,70	3,18
	RNGN-120400	T1	●	○	●	●	○		○		A	12,70	4,75
		T1A	●	●	●	○	○	○	○		T1A	12,70	4,75
		T2	●	○	●	●	●		○		T2	12,70	4,75
		T2A	●	●	●	○	○	●	○		T2A	12,70	4,75
		A	○	○	○	○	○	○	○		A	12,70	4,75
	RNGN-120700	T1	●	●	●	●	●		○	RNGN-45	T1	12,70	7,92
		T1A	●	●	●	●	●	○	○		T1A	12,70	7,92
		T2	●	○	●	●	●		○		T2	12,70	7,92
		T2A	●	●	●	○	●	●	○		T2A	12,70	7,92
		T5A	○	○	○	○	●	○	○		T5A	12,70	7,92
		A	●	○	○	●	●	○	○		A	12,70	7,92
	RNGN-150700	T1	●	○	○	○	○		○	RNGN-55	T1	15,88	7,92
		T2A	○	○	○	○	○	○	○		T2A	15,88	7,92
	RNGN-190600	T2A	○	○	○	○	○	○	○	RNGN-64	T2A	19,05	6,35
	RNGN-190700	T1	●	○	○	●	○		○	RNGN-65	T1	19,05	7,92
		T1A	○	○	○	○	○	○	○		T1A	19,05	7,92
		T2A	●	○	●	○	○	○	○		T2A	19,05	7,92
		A	○	○	○	●	○	○	○		A	19,05	7,92
	RNGN-250600	T2A	○	○	○	○	○	○	○	RNGN-84	T2A	25,40	6,35
	RNGN-250700	T2A	○	○	○	○	○	○	○	RNGN-85	T2A	25,40	7,92
	RNGN-250900	T2A	○	○	○	○	○	○	○	RNGN-86	T2A	25,40	9,53
	RNGN-310900	T2A	○	○	○	○	○	○	○	RNGN-106	T2A	31,75	9,53

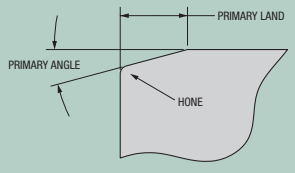
Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19

Page T 42 – grade description

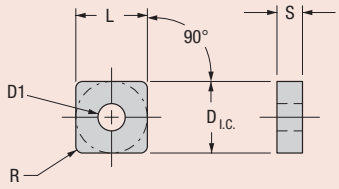
Additional Edge Preps – page T 45



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● ● Stocked Standard | ○ ○ Stocked or Available Upon Request | Not Recommended

Square Inserts
Negative (SNGA)



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTiN-1	Si3N4 GSN100	Al2O3-TiC GEM-7	Al2O3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	D1	R
SNGA 	SNGA-120408	T2	●	○	○	○	○		○	SNGA-432	T2	12,70	12,70	4,75	5,16	0,79
	SNGA-120412	T1	●	○	○	○	○		○	SNGA-433	T1	12,70	12,70	4,75	5,16	1,19
		T2	○	○	○	○	●		○		T2	12,70	12,70	4,75	5,16	1,19
		T2A	○	○	○	○	○	○	○		T2A	12,70	12,70	4,75	5,16	1,19
	SNGA-120416	T1	○	○	○	○	○		○	SNGA-434	T1	12,70	12,70	4,75	5,16	1,57
		T2	○	○	○	○	●		○		T2	12,70	12,70	4,75	5,16	1,57
	SNGA-120708	T1	○	○	○	○	○		○	SNGA-452	T1	12,70	12,70	7,92	5,16	0,79
	SNGA-120712	T1	○	○	○	○	○		○	SNGA-453	T1	12,70	12,70	7,92	5,16	1,19
		T2	○	○	○	○	●		○		T2	12,70	12,70	7,92	5,16	1,19
	SNGA-120716	T1	○	○	○	○	○		○	SNGA-454	T1	12,70	12,70	7,92	5,16	1,57
		T2	○	○	○	○	●		○		T2	12,70	12,70	7,92	5,16	1,57
	SNGA-150608	T2A	○	○	○	○	○	○	○	SNGA-542	T2A	15,88	15,88	6,35	6,35	0,79
	SNGA-150612	T2A	○	○	○	○	○	○	○	SNGA-543	T2A	15,88	15,88	6,35	6,35	1,19
	SNGA-150616	T2A	○	○	○	○	○	○	○	SNGA-544	T2A	15,88	15,88	6,35	6,35	1,57
	SNGA-190608	T2A	○	○	○	○	○	○	○	SNGA-642	T2A	19,05	19,05	6,35	7,92	0,79
	SNGA-190612	T2A	○	○	○	○	○	○	○	SNGA-643	T2A	19,05	19,05	6,35	7,92	1,19
	SNGA-190616	T2A	○	○	○	○	○	○	○	SNGA-644	T2A	19,05	19,05	6,35	7,92	1,57

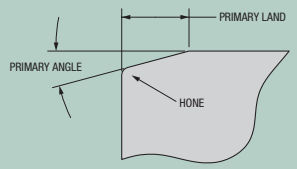
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTiN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Page T 42 – grade description

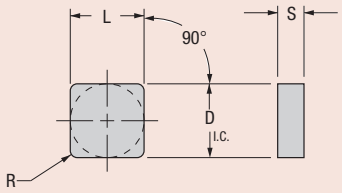
Additional Edge Preps – page T 45



Not Recommended | Stocked or Available Upon Request (○) | Stocked Standard (●)

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Square Inserts
Negative (SNGN)



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
SNGN 	SNGN-090308	T2A	○	○	○	○	○	○	○	SNGN-322	T2A	9,53	9,53	3,18	0,79
	SNGN-090412	T2	○	○	○	○	○		○	SNGN-333	T2	9,53	9,53	4,75	1,19
	SNGN-120408	T1	●	○	○	○	○		○	SNGN-432	T1	12,70	12,70	4,75	0,79
		T1A	●	○	○	○	○	○	○		T1A	12,70	12,70	4,75	0,79
		T2	○	○	○	○	○		○		T2	12,70	12,70	4,75	0,79
		T2A	●	○	○	○	○	○			T2A	12,70	12,70	4,75	0,79
		A	○	○	○	○	○	○			A	12,70	12,70	4,75	0,79
	SNGN-120412	T1	●	○	●	○	○		○	SNGN-433	T1	12,70	12,70	4,75	1,19
		T1A	○	○	○	●	●		○		T1A	12,70	12,70	4,75	1,19
		T2	●	○	●	●	●		○		T2	12,70	12,70	4,75	1,19
		T2A	●	○	●	○	●	○	○		T2A	12,70	12,70	4,75	1,19
		A	○	○	○	●	○	○	○		A	12,70	12,70	4,75	1,19
	SNGN-120416	T1	●	○	○	○	○		○	SNGN-434	T1	12,70	12,70	4,75	1,57
		T1A	○	○	○	●	●		○		T1A	12,70	12,70	4,75	1,57
		T2	●	○	○	●	●		○		T2	12,70	12,70	4,75	1,57
		T2A	●	○	○	○	○	●	○		T2A	12,70	12,70	4,75	1,57
		A	○	○	○	●	○	○	○		A	12,70	12,70	4,75	1,57
	SNGN-120708	T1	●	○	●	○	○		○	SNGN-452	T1	12,70	12,70	7,92	0,79
		T2	●	○	○	○	○		○		T2	12,70	12,70	7,92	0,79
	SNGN-120712	T1	●	○	●	○	○		○	SNGN-453	T1	12,70	12,70	7,92	1,19
		T1A	○	○	○	●	○	○	○		T1A	12,70	12,70	7,92	1,19
		T2	●	○	○	●	●		○		T2	12,70	12,70	7,92	1,19
		T2A	●	○	○	○	○	○	○		T2A	12,70	12,70	7,92	1,19
		A	○	○	○	●	○	○	○		A	12,70	12,70	7,92	1,19
	SNGN-120716	T1	●	○	○	○	○		○	SNGN-454	T1	12,70	12,70	7,92	1,57
		T1A	○	○	○	●	○	○	○		T1A	12,70	12,70	7,92	1,57
		T2	○	○	○	●	●		○		T2	12,70	12,70	7,92	1,57
		T2A	●	○	○	○	○	○	○		T2A	12,70	12,70	7,92	1,57
		A	○	○	○	●	○	○	○		A	12,70	12,70	7,92	1,57
	SNGN-150608	T2A	○	○	○	○	○	○		SNGN-542	T2A	15,88	15,88	6,35	0,79
	SNGN-150612	T1	●	○	●	○	○		○	SNGN-543	T1	15,88	15,88	6,35	1,19
		T2A	○	○	○	○	○	○	○		T2A	15,88	15,88	6,35	1,19
	SNGN-150616	T1	○	○	○	○	○		○	SNGN-544	T1	15,88	15,88	6,35	1,57
	SNGN-190663	T2A	○	○	○	○	○	○	○	SNGN-6416	T2A	19,05	19,05	6,35	6,35
	SNGN-190608	T2A	○	○	○	○	○	○	○	SNGN-642	T2A	19,05	19,05	6,35	0,79
	SNGN-190612	T1	●	○	●	●	○		○	SNGN-643	T1	19,05	19,05	6,35	1,19
		T2A	●	○	○	○	○	○	○		T2A	19,05	19,05	6,35	1,19
		A	○	○	○	●	○	○	○		A	19,05	19,05	6,35	1,19

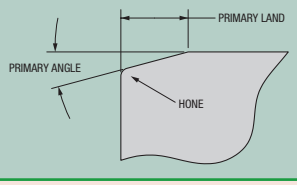
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Page T 42 – grade description

Additional Edge Preps – page T 45

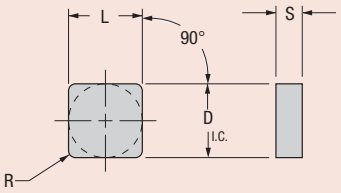


Continued on next page.

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● Stocked Standard
○ Stocked or Available Upon Request
Not Recommended

Square Inserts
Negative (SNGN) *(continued)*



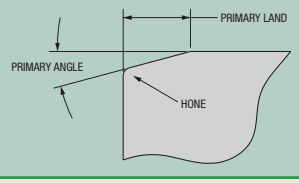
Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
SNGN 	SNGN-190616	T1	●	❍	●	●	❍		❍	SNGN-644	T1	19,05	19,05	6,35	1,57
		T1A	●	❍	❍	❍	❍	❍	❍		T1A	19,05	19,05	6,35	1,57
		T2A	●	❍	❍	❍	❍	❍	❍		T2A	19,05	19,05	6,35	1,57
		A	❍	❍	❍	●	❍	❍	❍		A	19,05	19,05	6,35	1,57
	SNGN-190708	T2A	❍	❍	●	❍	❍	❍	❍	SNGN-652	T2A	19,05	19,05	7,92	0,79
	SNGN-190712	T2A	❍	❍	❍	❍	❍	❍	❍	SNGN-653	T2A	19,05	19,05	7,92	1,19
	SNGN-190716	T1	●	❍	●	●	❍		❍	SNGN-654	T1	19,05	19,05	7,92	1,57
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	19,05	19,05	7,92	1,57
		A	❍	❍	❍	●	❍	❍	❍		A	19,05	19,05	7,92	1,57
	SNGN-190720	T2A	❍	❍	❍	❍	❍	❍	❍	SNGN-655	T2A	19,05	19,05	7,92	1,98
	SNGN-190723	A	❍	❍	❍	●	❍	❍	❍	SNGN-656	A	19,05	19,05	7,92	2,39
	SNGN-250923	T2A	❍	❍	❍	❍	❍	❍	❍	SNGN-866	T2A	25,40	25,40	9,53	2,39

Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

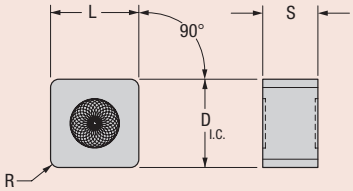
WG-300 | WG-600 | WG-700 | XSYTIN-1 | GSN100 | GEM-7 | GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3-TiC | Al_2O_3

Additional Edge Preps – page T 45



Page T 42 – grade description

Square Inserts
Rough Stuff®



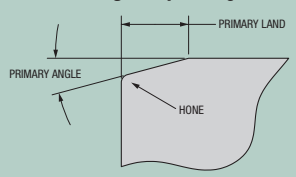
Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Si_3N_4 GSN100	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
	SNGX-120708-RS	T2	❍	❍	❍	❍	SNGX-452-RS	T2	12,70	12,70	7,92	0,79
		T2A	❍	❍	❍	❍		T2A	12,70	12,70	7,92	0,79
	SNGX-120712-RS	T2	❍	❍	❍	❍	SNGX-453-RS	T2	12,70	12,70	7,92	1,19
		T2A	❍	❍	❍	❍		T2A	12,70	12,70	7,92	1,19
	SNGX-120716-RS	T2	❍	❍	❍	❍	SNGX-454-RS	T2	12,70	12,70	7,92	1,57
		T2A	❍	❍	❍	❍		T2A	12,70	12,70	7,92	1,57

Ceramic Classification

Whisker Ceramic | Silicon Nitride

WG-300 | WG-600 | WG-700 | GSN100
Whisker | Si_3N_4

Additional Edge Preps - Page T 45

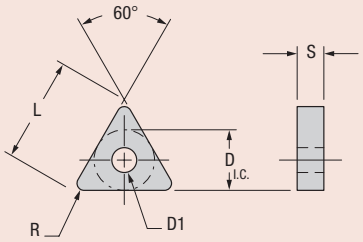


Page T 42 – grade description

Not Recommended | Stocked or Available Upon Request | Stocked Standard

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Triangle Inserts
Negative (TNGA)



Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	D1	R
TNGA 	**TNGA-160404**	T1	❍	❍	❍	❍	❍		❍	**TNGA-331**	T1	9,53	16,51	4,75	3,81	0,38
	TNGA-160408	T1	●	❍	❍	❍	❍		❍	**TNGA-332**	T1	9,53	16,51	4,75	3,81	0,38
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	9,53	16,51	4,75	3,81	0,38
	TNGA-160412	T1	❍	❍	❍	❍	❍		❍	**TNGA-333**	T1	9,53	16,51	4,75	3,81	1,19
	TNGA-160416	T1	❍	❍	❍	❍	❍		❍	**TNGA-334**	T1	9,53	16,51	4,75	3,81	1,57
	TNGA-220408	T1	●	❍	●	❍	❍		❍	**TNGA-432**	T1	12,70	22,00	4,75	5,16	0,38
		T1A	●	❍	❍	❍	❍	❍	❍		T1A	12,70	22,00	4,75	5,16	0,38
		T2A	●	❍	❍	❍	❍	●	❍		T2A	12,70	22,00	4,75	5,16	0,38
	TNGA-220412	T2A	❍	❍	❍	❍	❍	❍	❍	**TNGA-433**	T2A	12,70	22,00	4,75	5,16	1,19
	TNGA-220416	T1	●	❍	❍	❍	❍		❍	**TNGA-434**	T1	12,70	22,00	4,75	5,16	1,57
		A	❍	❍	❍	❍	❍	❍	❍		A	12,70	22,00	4,75	5,16	1,57
	TNGA-220716	T1	❍	❍	❍	❍	❍		❍	**TNGA-454**	T1	12,70	22,00	7,92	5,16	1,57

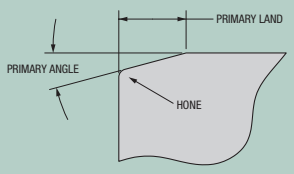
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker Phase Toughened Si_3N_4 Al_2O_3-TiC Al_2O_3

Page T 42 – grade description

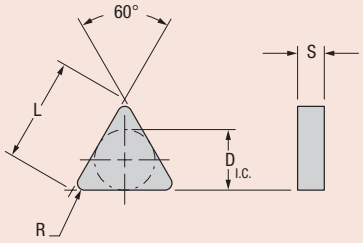
Additional Edge Preps – page T 45



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● Stocked Standard
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Not Recommended

Triangle Inserts
Negative (TNGN)



Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
TNGN 	TNGN-110308	T2A	○	○	○	○	○	○	○	TNGN-222	T2A	6,35	11,00	3,18	0,79
		A	○	○	○	○	○	○	○		A	6,35	11,00	3,18	0,79
	TNGN-160304	T1	○	○	○	○	○		○	TNGN-321	T1	9,53	16,51	3,18	0,38
	TNGN-160308	T1	○	○	○	○	○		○	TNGN-322	T1	9,53	16,51	3,18	0,79
		T2	○	○	○	○	○		○		T2	9,53	16,51	3,18	0,79
		T2A	○	○	○	○	○	○	○		T2A	9,53	16,51	3,18	0,79
	TNGN-160404	T1	○	○	○	○	○		○	TNGN-331	T1	9,53	16,51	4,75	0,38
		T2	○	○	○	○	○		○		T2	9,53	16,51	4,75	0,38
	TNGN-160408	T1	○	○	○	○	○		○	TNGN-332	T1	9,53	16,51	4,75	0,79
		T2	○	○	○	○	○		○		T2	9,53	16,51	4,75	0,79
		T2A	●	○	○	○	○	○	○		T2A	9,53	16,51	4,75	0,79
	TNGN-160412	T1	○	○	○	○	○		○	TNGN-333	T1	9,53	16,51	4,75	1,19
		T2A	●	○	○	○	○	○	○		T2A	9,53	16,51	4,75	1,19
	TNGN-160416	T1	○	○	○	○	○		○	TNGN-334	T1	9,53	16,51	4,75	1,57
	TNGN-220404	T1	●	○	○	○	○		○	TNGN-431	T1	12,70	22,00	4,75	0,38
	TNGN-220408	T1	●	○	○	○	○		○	TNGN-432	T1	12,70	22,00	4,75	0,79
		T2A	●	○	○	○	○	●	○		T2A	12,70	22,00	4,75	0,79
		A	○	○	○	○	○	○	○		A	12,70	22,00	4,75	0,79
	TNGN-220412	T1	●	○	●	○	○		○	TNGN-433	T1	12,70	22,00	4,75	1,19
	TNGN-220416	T1	●	○	●	○	○		○	TNGN-434	T1	12,70	22,00	4,75	1,57
	TNGN-220432	T2A	○	○	○	○	○	○	○	TNGN-438	T2A	12,70	22,00	4,75	3,18
	TNGN-220708	T2A	○	○	○	○	○	○	○	TNGN-452	T2A	12,70	22,00	7,92	0,79
	TNGN-220712	T1	●	○	○	○	○		○	TNGN-453	T1	12,70	22,00	7,92	1,19
		T2A	○	○	○	○	○	○	○		T2A	12,70	22,00	7,92	1,19
	TNGN-220716	T1	●	○	○	○	○		○	TNGN-454	T1	12,70	22,00	7,92	1,57
		T2A	○	○	○	○	○	○	○		T2A	12,70	22,00	7,92	1,57
	TNGN-270612	T2A	○	○	○	○	○	○	○	TNGN-543	T2A	15,88	27,51	6,35	1,19
	TNGN-270616	T1	○	○	○	○	○		○	TNGN-544	T1	15,88	27,51	6,35	1,57
		T2	○	○	○	○	○		○		T2	15,88	27,51	6,35	1,57
	TNGN-270632	T2	○	○	○	○	○		○	TNGN-548	T2	15,88	27,51	6,35	3,18
	TNGN-330924	T2A	○	○	○	○	○	○	○	TNGN-666	T2A	19,05	32,99	9,53	2,39
	TNGN-440932	T2A	○	○	○	○	○	○	○	TNGN-868	T2A	25,40	43,99	9,53	3,18

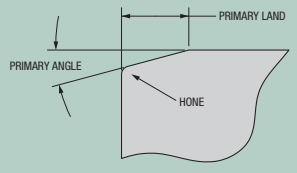
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

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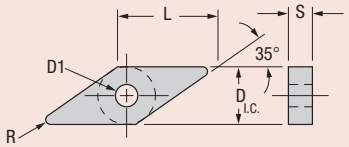
Additional Edge Preps – page T 45



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35° Diamond Inserts
Negative



Shape: 35° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	D1	R
VNGA 	VNGA-160408	T1	●	❍	●	❍	❍		❍	VNGA-332	T1	9,53	16,61	4,75	3,81	0,79
		T2A	❍	❍	❍	❍	❍	●	❍		T2A	9,53	16,61	4,75	3,81	0,79
	VNGA-160412	T1	●	❍	●	❍	❍		❍	VNGA-333	T1	9,53	16,61	4,75	3,81	1,19
	VNGA-220408	T2A	●	❍	●	❍	❍	❍	❍	VNGA-432	T2A	12,70	22,15	4,75	5,16	0,79
	VNGA-220424	T1	●	❍	●	❍	❍		❍	VNGA-436	T1	12,70	22,15	4,75	5,16	2,39

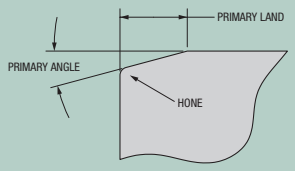
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker Phase Toughened Si_3N_4 Al_2O_3-TiC Al_2O_3

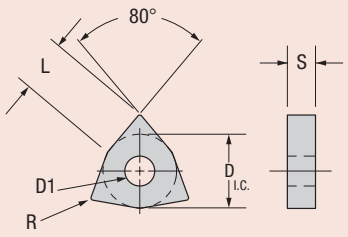
Page T 42 – grade description

Additional Edge Preps – page T 45



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❍ ❍ Stocked or Available Upon Request
Not Recommended



Trigon Inserts
Negative

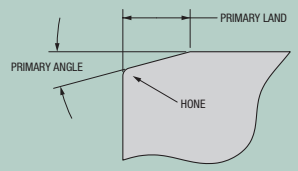
Shape: Trigon	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3–TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	D1	R
WNGA 	WNGA-060404	T1	❍	❍	❍	❍	❍		❍	WNGA-331	T1	9,53	6,53	4,75	3,86	0,38
	WNGA-060408	T1	●	●	●	❍	❍		❍	WNGA-332	T1	9,53	6,53	4,75	3,86	0,79
	WNGA-060412	T1	❍	❍	❍	❍	❍		❍	WNGA-333	T1	9,53	6,53	4,75	3,86	1,19
	WNGA-080404	T1	●	❍	❍	❍	❍		❍	WNGA-431	T1	12,70	8,69	4,75	5,16	0,38
		T1A	❍	❍	❍	❍	❍	❍	❍		T1A	12,70	8,69	4,75	5,16	0,38
	WNGA-080408	T1	●	❍	●	❍	❍		❍	WNGA-432	T1	12,70	8,69	4,75	5,16	0,79
		T1A	●	❍	❍	❍	❍	❍	❍		T1A	12,70	8,69	4,75	5,16	0,79
		T2A	●	❍	❍	❍	❍	❍	❍		T2A	12,70	8,69	4,75	5,16	0,79
	WNGA-080412	T2	❍	❍	❍	❍	●		❍	WNGA-433	T2	12,70	8,69	4,75	5,16	1,19
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	12,70	8,69	4,75	5,16	1,19

Ceramic Classification

WG-300 WG-600 WG-700 Whisker	XSYTIN-1 Phase Toughened	GSN100 Si_3N_4	GEM-7 Al_2O_3–TiC	GEM-19 Al_2O_3
Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

Page T 42 – grade description

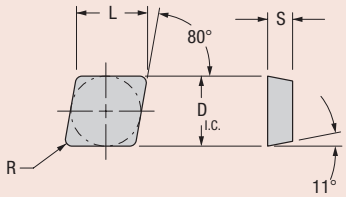
Additional Edge Preps – page T 45



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80° Diamond Inserts
Positive Flat Top



Shape: 80° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
CPGN 	CPGN-090304	T1	●	❍	●	❍	❍		❍	CPGN-321	T1	9,53	9,65	3,18	0,38
	CPGN-090308	T1	●	❍	●	❍	❍		❍	CPGN-322	T1	9,53	9,65	3,18	0,79
	CPGN-090312	T1	❍	❍	❍	❍	❍		❍	CPGN-323	T1	9,53	9,65	3,18	1,19
	CPGN-120308	T1	❍	❍	❍	❍	❍		❍	CPGN-422	T1	12,70	12,90	3,18	0,79
	CPGN-120316	T2A	❍	❍	❍	❍	❍	❍	❍	CPGN-424	T2A	12,70	12,90	3,18	1,57
	CPGN-120408	T1	●	❍	●	❍	❍		❍	CPGN-432	T1	12,70	12,90	4,75	0,79
	CPGN-120412	T1	●	❍	●	❍	❍		❍	CPGN-433	T1	12,70	12,90	4,75	1,19
		T1A	❍	❍	❍	●	❍	❍	❍		T1A	12,70	12,90	4,75	1,19
		T2	❍	❍	❍	❍	❍		❍		T2	12,70	12,90	4,75	1,19
		T2A	❍	❍	❍	❍	●	❍	❍		T2A	12,70	12,90	4,75	1,19
		A	❍	❍	❍	●	❍	❍	❍		A	12,70	12,90	4,75	1,19
	CPGN-120416	T1	●	❍	●	❍	❍		❍	CPGN-434	T1	12,70	12,90	4,75	1,57

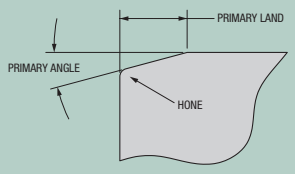
Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

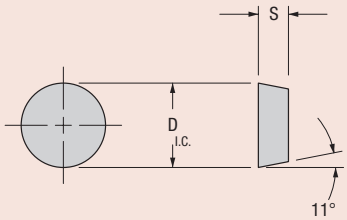
WG-300 | WG-600 | WG-700 | XSYTIN-1 (Phase Toughened) | GSN100 (Si_3N_4) | GEM-7 (Al_2O_3-TiC) | GEM-19 (Al_2O_3) — Whisker

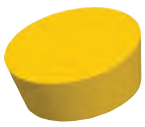
Page T 42 – grade description

Additional Edge Preps – page T 45



Round Inserts
Positive Flat Top



Shape: Round	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
RPGN 	RPGN-090300	T1	●	●	●	❍	●		❍	RPGN-32	T1	9,53	3,18
		T1A	●	●	●	●	❍	❍	❍		T1A	9,53	3,18
		T2A	❍	❍	❍	❍	❍	❍	❍		T2A	9,53	3,18
		A	❍	❍	❍	●	❍	❍	❍		A	9,53	3,18
	RPGN-120400	T1	●	❍	●	❍	●		❍	RPGN-43	T1	12,70	4,75
		T1A	●	●	●	●	●	❍	❍		T1A	12,70	4,75
		T2	❍	❍	●	●	●		❍		T2	12,70	4,75
		T2A	●	❍	❍	❍	●	❍	❍		T2A	12,70	4,75
		A	❍	❍	❍	●	❍	❍	❍		A	12,70	4,75

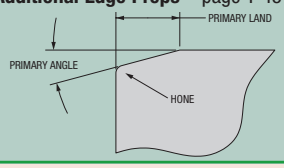
Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 | WG-600 | WG-700 | XSYTIN-1 (Phase Toughened) | GSN100 (Si_3N_4) | GEM-7 (Al_2O_3-TiC) | GEM-19 (Al_2O_3) — Whisker

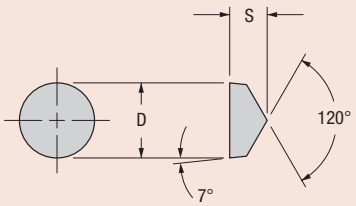
Page T 42 – grade description

Additional Edge Preps – page T 45



● Stocked Standard
❍ Stocked or Available Upon Request
Not Recommended

Round V-Bottom Inserts
Positive (RCGN-V)



Shape: Round V-Bottom	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si₃N₄ GSN100	Al₂O₃-TiC GEM-7	Al₂O₃ GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
RCGN	RCGX-060400	T1	●	●	●	●	○		○	RCGN-2V	T1	6,35	4,75
		T2A	●	○	○	○	○	●	○		T2A	6,35	4,75
		A	○	○	○	●	○	○	○		A	6,35	4,75
	RCGX-090700	T1	●	●	●	●	●		○	RCGN-3V	T1	9,53	7,92
		T1A	○	○	○	○	○	○	○		T1A	9,53	7,92
		T2A	●	●	○	○	○	●	○		T2A	9,53	7,92
		A	○	○	○	●	○	○	○		A	9,53	7,92
	RCGX-120700	T1	●	●	●	●	●		○	RCGN-4V	T1	12,70	7,92
		T1A	●	●	●	○	○	○	○		T1A	12,70	7,92
		T2	●	○	●	○	○		○		T2	12,70	7,92
		T2A	●	●	●	○	○	●	○		T2A	12,70	7,92
		A	○	○	○	●	○	○	○		A	12,70	7,92
	RCGX-191200	T2A	○	○	○	○	○	○	○	RCGN-6V	T2A	19,05	12,70

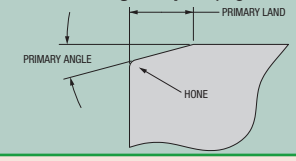
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

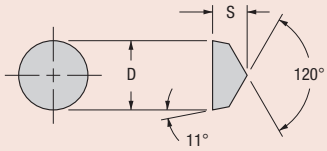
WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

Page T 42 – grade description

Additional Edge Preps – page T 45



Round V-Bottom Inserts Positive (RPGN-V)



Shape: Round V-Bottom	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si₃N₄ GSN100	Al₂O₃-TiC GEM-7	Al₂O₃ GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
RPGN	RPGX-060400	T1	●	●	●	●	○		○	RPGN-2V	T1	6,35	4,75
		T2	○	○	○	○	●	○	○		T2	6,35	4,75
		T2A	●	○	●	○	○	○	○		T2A	6,35	4,75
		A	○	○	○	●	○	○	○		A	6,35	4,75
	RPGX-090700	T1	●	●	●	●	○		○	RPGN-3V	T1	9,53	7,92
		T1A	○	○	○	○	●	○	○		T1A	9,53	7,92
		T2	○	○	○	○	●	○	○		T2	9,53	7,92
		T2A	●	●	●	○	○	○	○		T2A	9,53	7,92
		A	○	○	○	●	○	○	○		A	9,53	7,92
	RPGX-120700	T1	○	●	●	●	○		○	RPGN-4V	T1	12,70	7,92
		T1A	●	○	●	○	○	○	○		T1A	12,70	7,92
		T2	○	○	○	○	●		○		T2	12,70	7,92
		T2A	●	●	○	○	○	○	○		T2A	12,70	7,92
		A	○	○	○	●	○	○	○		A	12,70	7,92

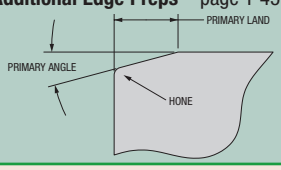
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

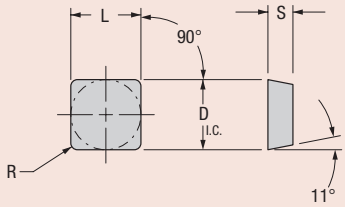
Page T 42 – grade description

Additional Edge Preps – page T 45



Not Recommended | Stocked or Available Upon Request ○ ○ | Stocked Standard ● ●

Square Inserts
Positive Flat Top



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
SPGN 	SPGN-090308	T1	●	○	○	○	○		○	SPGN-322	T1	9,53	9,53	3,18	0,79
		T1A	○	○	○	●	●		○		T1A	9,53	9,53	3,18	0,79
		A	○	○	○	●	○	○	○		A	9,53	9,53	3,18	0,79
	SPGN-120308	T1	●	○	○	○	○		○	SPGN-422	T1	12,70	12,70	3,18	0,79
		T2A	○	○	○	○	○	○	○		T2A	12,70	12,70	3,18	0,79
	SPGN-120312	T1	○	○	○	○	○		○	SPGN-423	T1	12,70	12,70	3,18	1,19
		A	○	○	○	○	○	○	○		A	12,70	12,70	3,18	1,19
	SPGN-120408	T1	●	○	●	○	○		○	SPGN-432	T1	12,70	12,70	4,75	0,79
		T1A	○	○	●	●	○		○		T1A	12,70	12,70	4,75	0,79
		T2	○	○	○	●	○	○	○		T2	12,70	12,70	4,75	0,79
		T2A	●	○	○	○	○	○	○		T2A	12,70	12,70	4,75	0,79
		A	○	○	○	●	○	○	○		A	12,70	12,70	4,75	0,79
	SPGN-120412	T1	●	○	●	○	○			SPGN-433	T1	12,70	12,70	4,75	1,19
		T1A	○	○	●	●	○		○		T1A	12,70	12,70	4,75	1,19
		T2	○	○	○	●	○	○	○		T2	12,70	12,70	4,75	1,19
		T2A	○	○	○	○	○	○	○		T2A	12,70	12,70	4,75	1,19
		A	○	○	○	●	○	○	○		A	12,70	12,70	4,75	1,19
	SPGN-120416	T1	●	○	●	○	○		○	SPGN-434	T1	12,70	12,70	4,75	1,57
		T2	○	○	○	○	○		○		T2	12,70	12,70	4,75	1,57
		T2A	●	○	○	○	●	○	○		T2A	12,70	12,70	4,75	1,57
	SPGN-190408	T2A	○	○	○	○	○	○	○	SPGN-632	T2A	19,05	19,05	4,75	0,79
	SPGN-190412	T2A	○	○	○	○	○	○	○	SPGN-633	T2A	19,05	19,05	4,75	1,19
	SPGN-190416	T2A	○	○	○	○	○	○	○	SPGN-634	T2A	19,05	19,05	4,75	1,57
	SPGN-190608	T1A	○	○	○	○	○	○	○	SPGN-642	T1A	19,05	19,05	6,35	0,79

Ceramic Classification

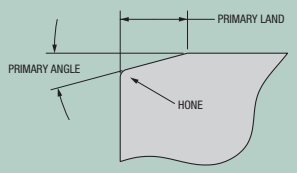
Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19

Whisker | Phase Toughened | Si_3N_4 | Al_2O_3-TiC | Al_2O_3

Page T 42 – grade description

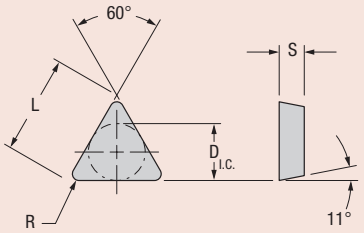
Additional Edge Preps – page T 45



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● Stocked Standard
○ Stocked or Available Upon Request
Not Recommended

Triangle Inserts
Positive Flat Top



Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTiN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	D I.C.	L	S	R
TPGN 	**TPGN-110304**	T1	●	○	●	○		○		**TPGN-221**	T1	6,35	11,00	3,18	0,38
	TPGN-110308	T1	●	○	●	○	○		○	**TPGN-222**	T1	6,35	11,00	3,18	0,79
		T1A	●	○	○	○	○	○	○		T1A	6,35	11,00	3,18	0,79
		T2A	●	○	○	○	○	○	○		T2A	6,35	11,00	3,18	0,79
	TPGN-160304	T1	●	○	●	○	○		○	**TPGN-321**	T1	9,53	16,51	3,18	0,38
		T2A	○	○	○	○	○	○	○		T2A	9,53	16,51	3,18	0,38
	TPGN-160308	T1	●	○	●	○	○		○	**TPGN-322**	T1	9,53	16,51	3,18	0,79
		T1A	○	○	○	○	○	○	○		T1A	9,53	16,51	3,18	0,79
		T2A	●	○	○	○	●	●	○		T2A	9,53	16,51	3,18	0,79
		A	○	○	○	○	○	○	○		A	9,53	16,51	3,18	0,79
	TPGN-160312	T1	●	○	●	○	○		○	**TPGN-323**	T1	9,53	16,51	3,18	1,19
		T1A	○	○	○	○	○	●	○		T1A	9,53	16,51	3,18	1,19
		A	○	○	○	○	○	○	○		A	9,53	16,51	3,18	1,19
	TPGN-160316	T1	●	○	○	○	○		○	**TPGN-324**	T1	9,53	16,51	3,18	1,57
	TPGN-220404	T1	●	○	●	○	○		○	**TPGN-431**	T1	12,70	22,00	4,75	0,38
	TPGN-220408	T1	●	○	●	○	○		○	**TPGN-432**	T1	12,70	22,00	4,75	0,79
		T2A	○	○	○	○	○	○	○		T2A	12,70	22,00	4,75	0,79
	TPGN-220412	T1	●	○	●	○	○		○	**TPGN-433**	T1	12,70	22,00	4,75	1,19
	TPGN-220416	T1	●	○	●	○	○		○	**TPGN-434**	T1	12,70	22,00	4,75	1,57

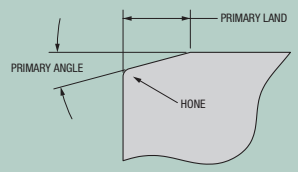
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

Page T 42 – grade description

WG-300	WG-600	WG-700	XSYTiN-1	GSN100	GEM-7	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC	Al_2O_3

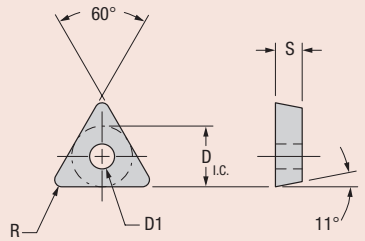
Additional Edge Preps – page T 45



Not Recommended | Stocked or Available Upon Request (○) | Stocked Standard (●)

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Triangle Inserts
Positive (TP)



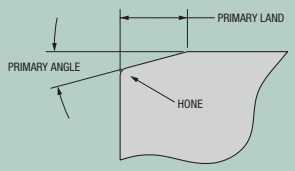
Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S	D1	R
TP 	TP-41	A	●	❍	❍	❍	❍	❍	❍	TP-41	A	6,35	2,36	3,48	0,38
	TP-42	A	❍	❍	❍	❍	❍	❍	❍	TP-42	A	6,35	2,36	3,48	0,79
	TP-62	A	❍	❍	❍	❍	❍	❍	❍	TP-62	A	9,53	3,18	4,14	0,79
	TP-64	A	❍	❍	❍	❍	❍	❍	❍	TP-64	A	9,53	3,18	4,14	1,57
	TP-82	A	❍	❍	❍	❍	❍	❍	❍	TP-82	A	12,70	4,75	5,16	0,79

Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

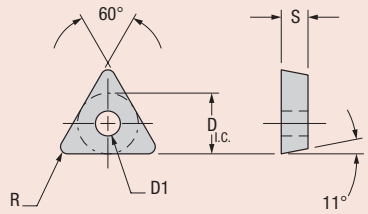
WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3-TiC | Al_2O_3

Additional Edge Preps – page T 45



Page T 42 – grade description

Triangle Inserts
Positive (TPGA)



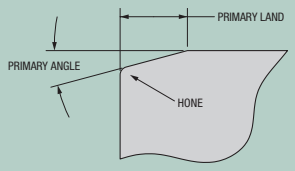
Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep	Dimensions (millimeters) D	S	D1	R
TPGA 	TPGA-160304	T1	❍	❍	❍	❍	❍		❍	TPGA-321	T1	9,53	3,18	3,81	0,38
		T1A	❍	❍	❍	❍	❍	❍	❍		T1A	9,53	3,18	3,81	0,38
	TPGA-160308	T1A	❍	❍	❍	❍	❍	❍		TPGA-322	T1A	9,53	3,18	3,81	0,38

Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3-TiC | Al_2O_3

Additional Edge Preps – page T 45



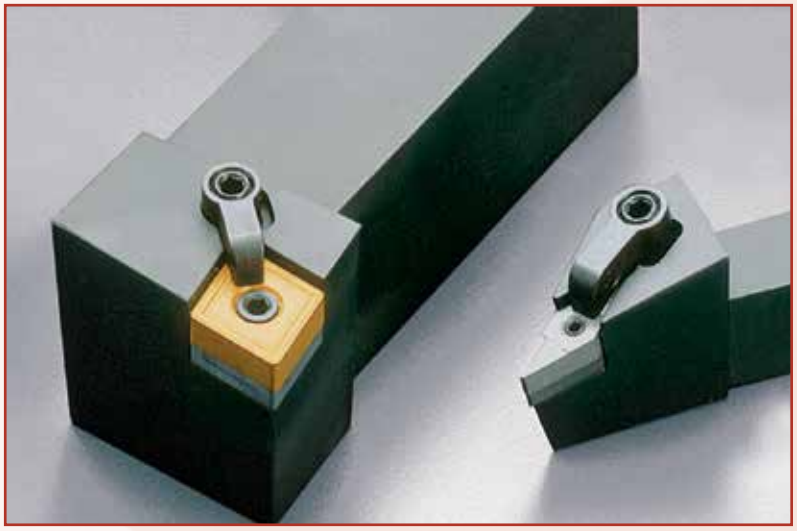
Page T 42 – grade description

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Industry-Standard Toolholders

Greenleaf manufactures a complete line of industry-standard toolholders in conformance with ANSI specifications in 4140 and 4150 alloy steel, hardened up to 42 Rc and oxide coated.



Greenleaf Tune-Up Kits

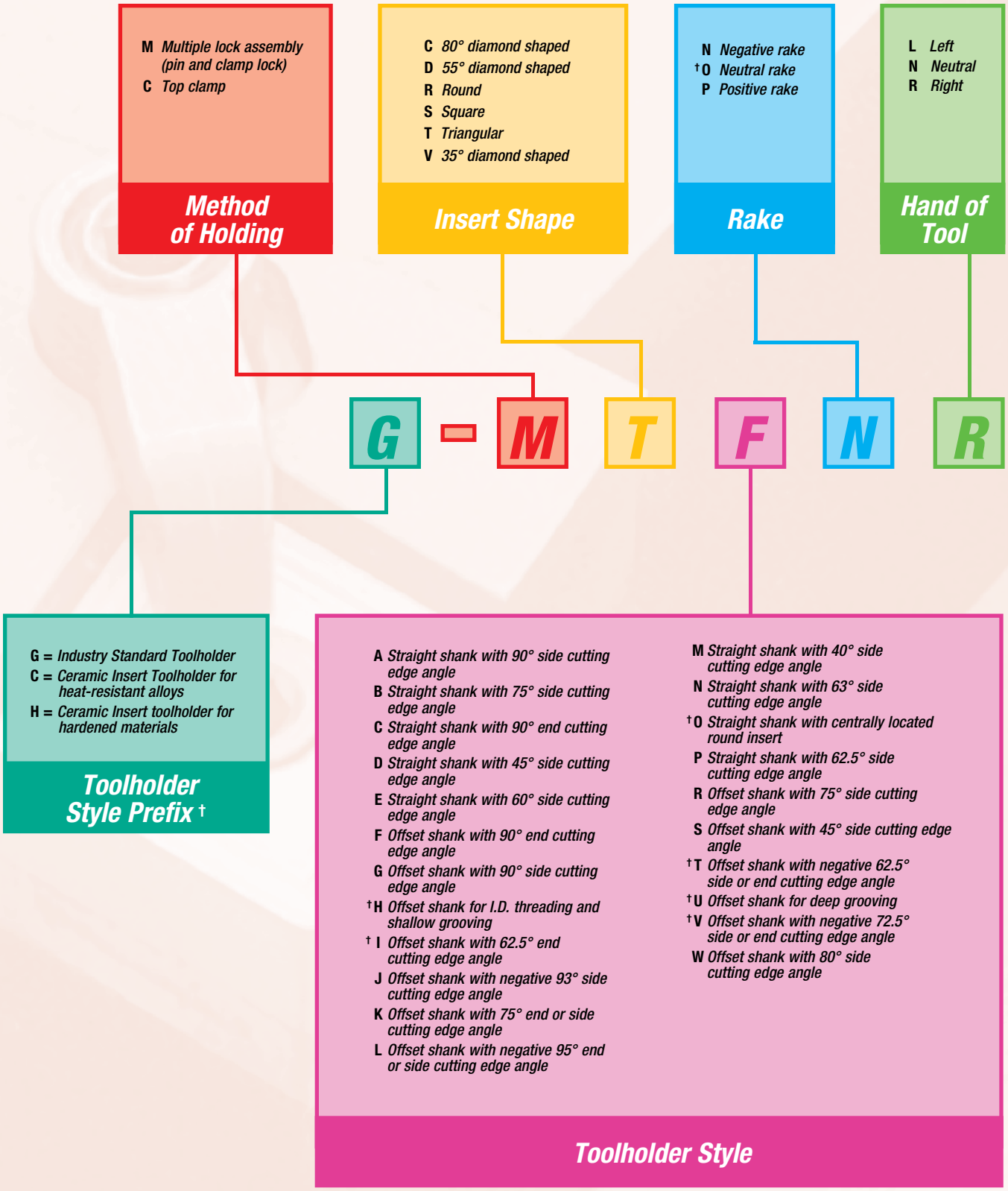
A Tune-Up Kit consists of all the standard hardware to refurbish a particular toolholder, boring bar, or milling cutter. A toolholder will have a readily visible, laser-inscribed Tune-Up Kit number on it for ease in ordering. This number will prevent any confusion created by searching a catalog for hardware, and it will help reduce downtime.

Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

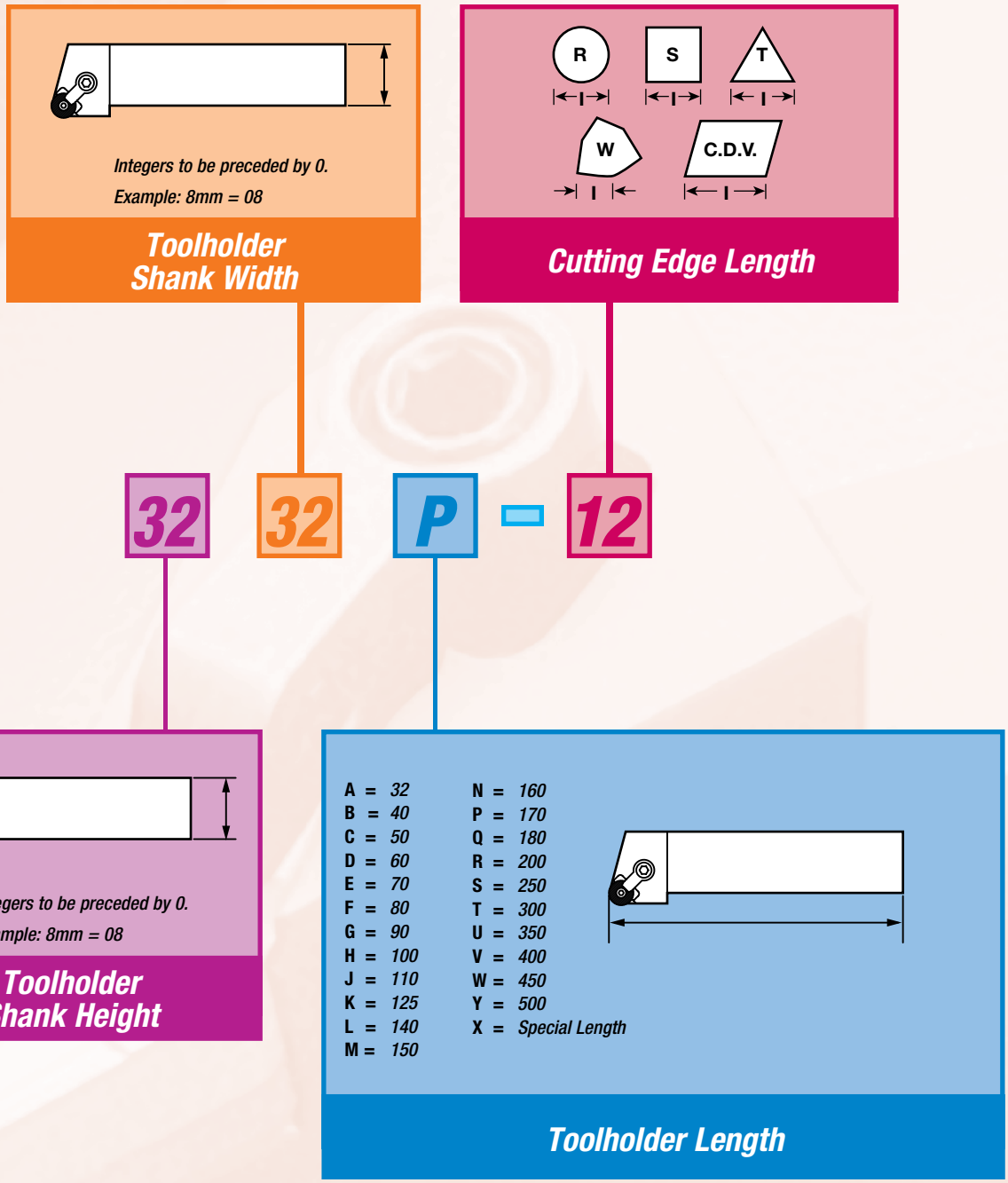
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Toolholder Identification System



† Greenleaf standard.

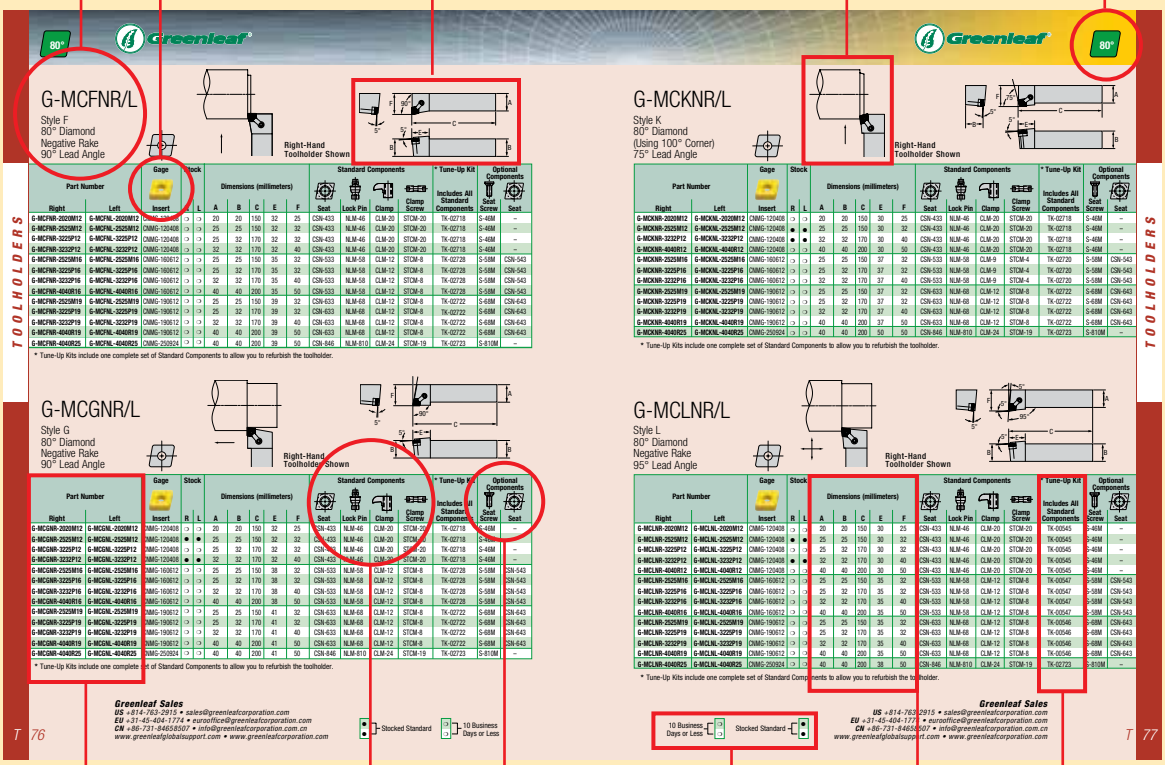
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NOTE:
All toolholders are qualified to ±0,07 over gage insert radius on the "C" and "F" dimensions as standard. Some toolholders are qualifiable on the "C" length dimension only.

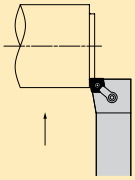
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Industry-Standard Toolholder Usage Reference Guide

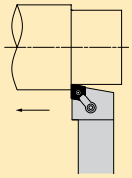


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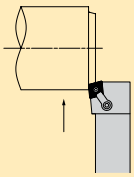
80° Diamond – Negative



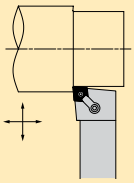
G-MCFNR/L
Style F
80° Diamond
Negative Rake
90° Lead Angle
page: T 76



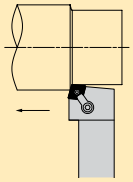
G-MCGNR/L
Style G
80° Diamond
Negative Rake
90° Lead Angle
page: T 76



G-MCKNR/L
Style K
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 77

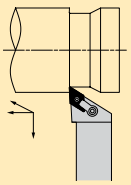


G-MCLNR/L
Style L
80° Diamond
Negative Rake
95° Lead Angle
page: T 77

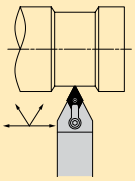


G-MCRNR/L
Style R
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 78

55° Diamond – Negative

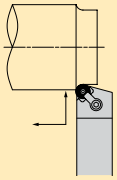


G-MDJNR/L
Style J
55° Diamond
Negative Rake
93° Lead Angle
page: T 79

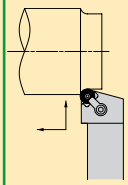


G-MDPNN
Style P
55° Diamond
Negative Rake
62,5° Lead Angle
page: T 79

Round – Negative

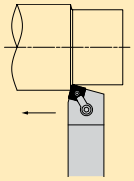


G-MRANR/L
Style A
Round
Negative Rake
page: T 80

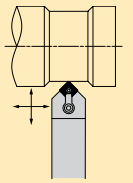


G-MRGNR/L
Style G
Round
Negative Rake
page: T 80

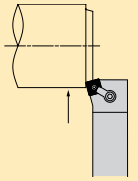
Square – Negative



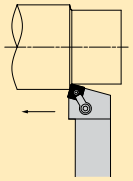
G-MSBNR/L
Style B
Square
Negative Rake
75° Lead Angle
page: T 81



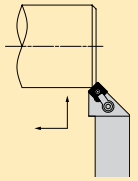
G-MSDNN
Style D
Square
Negative Rake
45° Lead Angle
page: T 82



G-MSKNR/L
Style K
Square
Negative Rake
75° Lead Angle
page: T 82

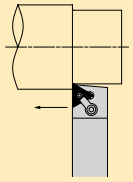


G-MSRNR/L
Style R
Square
Negative Rake
75° Lead Angle
page: T 83



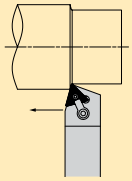
G-MSSNR/L
Style S
Square
Negative Rake
45° Lead Angle
page: T 83

Triangle – Negative

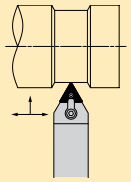


G-MTANR/L
Style A
Triangle
Negative Rake
90° Lead Angle
page: T 84

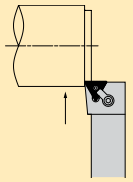
Triangle – Negative *contd.*



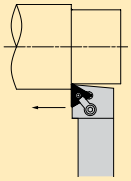
G-MTBNR/L
Style B
Triangle
Negative Rake
75° Lead Angle
page: T 84



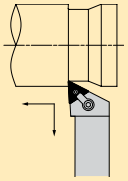
G-MTENNS
Style E
Triangle
Negative Rake
60° Lead Angle
page: T 85



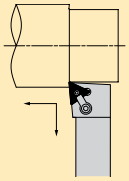
G-MTFNR/L
Style F
Triangle
Negative Rake
90° Lead Angle
page: T 86



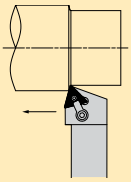
G-MTGNR/L
Style G
Triangle
Negative Rake
90° Lead Angle
page: T 87



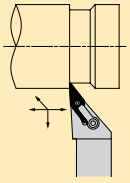
G-MTJNRS
Style J
Triangle
Negative Rake
93° Lead Angle
page: T 87



G-MTLNR/L
Style L
Triangle
Negative Rake
95° Lead Angle
page: T 88

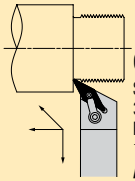


G-MTRNR/L
Style R
Triangle
Negative Rake
75° Lead Angle
page: T 88

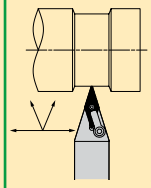


G-MVJNR/L
Style J
35° Diamond
Negative Rake
93° Lead Angle
page: T 89

35° Diamond – Negative

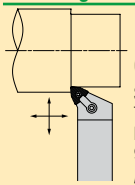


G-MVTNR/L
Style T
35° Diamond
Negative Rake
117,5° Lead Angle
page: T 89



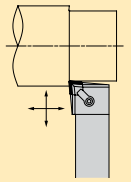
G-MVVNN
Style V
35° Diamond
Negative Rake
72,5° Lead Angle
page: T 90

Trigon – Negative

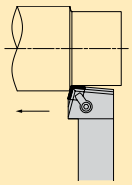


G-MWLNR/L
Style L
Trigon
Negative Rake
95° Lead Angle
page: T 90

80° Diamond – Positive

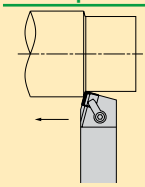


G-CCLPR/L
Style L
80° Diamond
Positive Rake
95° Lead Angle
page: T 91

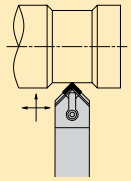


G-CCRPR/L
Style R
80° Diamond
(Using 100° Corner)
Positive Rake
75° Lead Angle
page: T 91

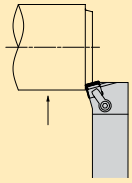
Square – Positive



G-CSBPR/L
Style B
Square
Positive Rake
75° Lead Angle
page: T 92

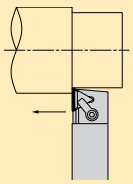


G-CSDPN
Style D
Square
Positive Rake
45° Lead Angle
page: T 92

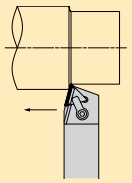


G-CSKPR/L
Style K
Square
Positive Rake
75° Lead Angle
page: T 93

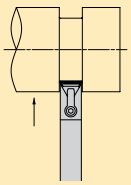
Triangle – Positive



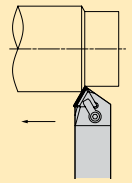
G-CTAPR/L
Style A
Triangle
Positive Rake
90° Lead Angle
page: T 94



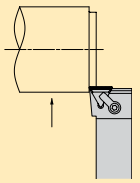
G-CTBPR/L
Style B
Triangle
Positive Rake
75° Lead Angle
page: T 94



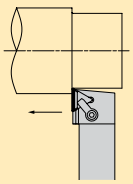
G-CTCPN
Style C
Triangle
Positive Rake
90° Lead Angle
page: T 95



G-CTEOR/L
Style E
Triangle
Positive Rake
60° Lead Angle
page: T 95



G-CTFPR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 96



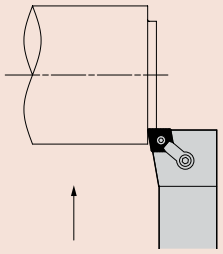
G-CTGPR/L
Style G
Triangle
Positive Rake
90° Lead Angle
page: T 96

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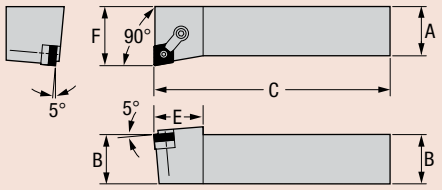
G-MCFNR/L

Style F
80° Diamond
Negative Rake
90° Lead Angle





Right-Hand
Toolholder Shown



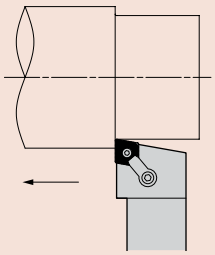
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MCFNR-2020M12	G-MCFNL-2020M12	CNMG-120408	❍	❍	20	20	150	32	25	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCFNR-2525M12	G-MCFNL-2525M12	CNMG-120408	❍	❍	25	25	150	32	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCFNR-3225P12	G-MCFNL-3225P12	CNMG-120408	❍	❍	25	32	170	32	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCFNR-3232P12	G-MCFNL-3232P12	CNMG-120408	❍	❍	32	32	170	32	40	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCFNR-2525M16	G-MCFNL-2525M16	CNMG-160612	❍	❍	25	25	150	35	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCFNR-3225P16	G-MCFNL-3225P16	CNMG-160612	❍	❍	25	32	170	35	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCFNR-3232P16	G-MCFNL-3232P16	CNMG-160612	❍	❍	32	32	170	35	40	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCFNR-4040R16	G-MCFNL-4040R16	CNMG-160612	❍	❍	40	40	200	35	50	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCFNR-2525M19	G-MCFNL-2525M19	CNMG-190612	❍	❍	25	25	150	39	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCFNR-3225P19	G-MCFNL-3225P19	CNMG-190612	❍	❍	25	32	170	39	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCFNR-3232P19	G-MCFNL-3232P19	CNMG-190612	❍	❍	32	32	170	39	40	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCFNR-4040R19	G-MCFNL-4040R19	CNMG-190612	❍	❍	40	40	200	39	50	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCFNR-4040R25	G-MCFNL-4040R25	CNMG-250924	❍	❍	40	40	200	39	50	CSN-846	NLM-810	CLM-24	STCM-19	TK-02723	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

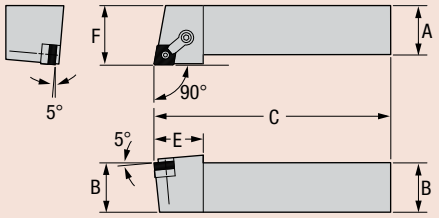
G-MCGNR/L

Style G
80° Diamond
Negative Rake
90° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MCGNR-2020M12	G-MCGNL-2020M12	CNMG-120408	❍	❍	20	20	150	32	25	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCGNR-2525M12	G-MCGNL-2525M12	CNMG-120408	●	●	25	25	150	32	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCGNR-3225P12	G-MCGNL-3225P12	CNMG-120408	❍	❍	25	32	170	32	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCGNR-3232P12	G-MCGNL-3232P12	CNMG-120408	●	●	32	32	170	32	40	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCGNR-2525M16	G-MCGNL-2525M16	CNMG-160612	❍	❍	25	25	150	38	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCGNR-3225P16	G-MCGNL-3225P16	CNMG-160612	❍	❍	25	32	170	38	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCGNR-3232P16	G-MCGNL-3232P16	CNMG-160612	❍	❍	32	32	170	38	40	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCGNR-4040R16	G-MCGNL-4040R16	CNMG-160612	❍	❍	40	40	200	38	50	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCGNR-2525M19	G-MCGNL-2525M19	CNMG-190612	❍	❍	25	25	150	41	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCGNR-3225P19	G-MCGNL-3225P19	CNMG-190612	❍	❍	25	32	170	41	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCGNR-3232P19	G-MCGNL-3232P19	CNMG-190612	❍	❍	32	32	170	41	40	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCGNR-4040R19	G-MCGNL-4040R19	CNMG-190612	❍	❍	40	40	200	41	50	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCGNR-4040R25	G-MCGNL-4040R25	CNMG-250924	❍	❍	40	40	200	41	50	CSN-846	NLM-810	CLM-24	STCM-19	TK-02723	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

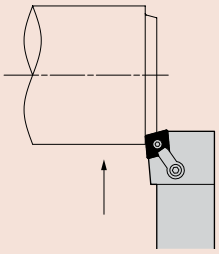
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● ● Stocked Standard

❍ ❍ 10 Business Days or Less

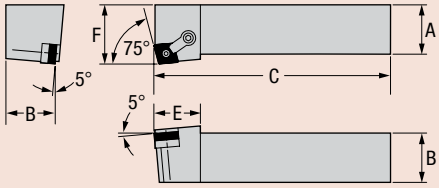
G-MCKNR/L

Style K
80° Diamond
(Using 100° Corner)
75° Lead Angle





Right-Hand
Toolholder Shown

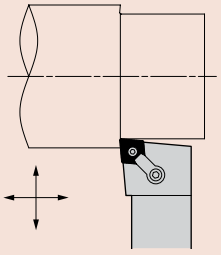


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MCKNR-2020M12	G-MCKNL-2020M12	CNMG-120408	❍	❍	20	20	150	30	25	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCKNR-2525M12	G-MCKNL-2525M12	CNMG-120408	●	●	25	25	150	30	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCKNR-3232P12	G-MCKNL-3232P12	CNMG-120408	●	●	32	32	170	30	40	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCKNR-4040R12	G-MCKNL-4040R12	CNMG-120408	❍	❍	40	40	200	30	50	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCKNR-2525M16	G-MCKNL-2525M16	CNMG-160612	❍	❍	25	25	150	37	32	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCKNR-3225P16	G-MCKNL-3225P16	CNMG-160612	❍	❍	25	32	170	37	32	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCKNR-3232P16	G-MCKNL-3232P16	CNMG-160612	❍	❍	32	32	170	37	40	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCKNR-2525M19	G-MCKNL-2525M19	CNMG-190612	❍	❍	25	25	150	37	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCKNR-3225P19	G-MCKNL-3225P19	CNMG-190612	❍	❍	25	32	170	37	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCKNR-3232P19	G-MCKNL-3232P19	CNMG-190612	❍	❍	32	32	170	37	40	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCKNR-4040R19	G-MCKNL-4040R19	CNMG-190612	❍	❍	40	40	200	37	50	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCKNR-4040R25	G-MCKNL-4040R25	CNMG-250924	❍	❍	40	40	200	50	50	CSN-846	NLM-810	CLM-24	STCM-19	TK-02723	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

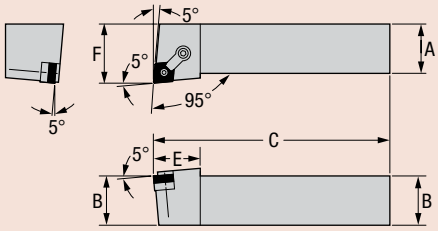
G-MCLNR/L

Style L
80° Diamond
Negative Rake
95° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MCLNR-2020M12	G-MCLNL-2020M12	CNMG-120408	❍	❍	20	20	150	30	25	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCLNR-2525M12	G-MCLNL-2525M12	CNMG-120408	●	●	25	25	150	30	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCLNR-3225P12	G-MCLNL-3225P12	CNMG-120408	❍	❍	25	32	170	30	32	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCLNR-3232P12	G-MCLNL-3232P12	CNMG-120408	●	●	32	32	170	30	40	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCLNR-4040R12	G-MCLNL-4040R12	CNMG-120408	❍	❍	40	40	200	30	50	CSN-433	NLM-46	CLM-20	STCM-20	TK-02718	S-46M	–
G-MCLNR-2525M16	G-MCLNL-2525M16	CNMG-160612	❍	❍	25	25	150	35	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCLNR-3225P16	G-MCLNL-3225P16	CNMG-160612	❍	❍	25	32	170	35	32	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCLNR-3232P16	G-MCLNL-3232P16	CNMG-160612	❍	❍	32	32	170	35	40	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCLNR-4040R16	G-MCLNL-4040R16	CNMG-160612	❍	❍	40	40	200	35	50	CSN-533	NLM-58	CLM-12	STCM-8	TK-02728	S-58M	CSN-543
G-MCLNR-2525M19	G-MCLNL-2525M19	CNMG-190612	❍	❍	25	25	150	35	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCLNR-3225P19	G-MCLNL-3225P19	CNMG-190612	❍	❍	25	32	170	35	32	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCLNR-3232P19	G-MCLNL-3232P19	CNMG-190612	❍	❍	32	32	170	35	40	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCLNR-4040R19	G-MCLNL-4040R19	CNMG-190612	❍	❍	40	40	200	35	50	CSN-633	NLM-68	CLM-12	STCM-8	TK-02722	S-68M	CSN-643
G-MCLNR-4040R25	G-MCLNL-4040R25	CNMG-250924	❍	❍	40	40	200	38	50	CSN-846	NLM-810	CLM-24	STCM-19	TK-02723	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

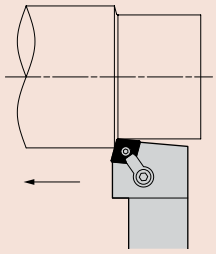
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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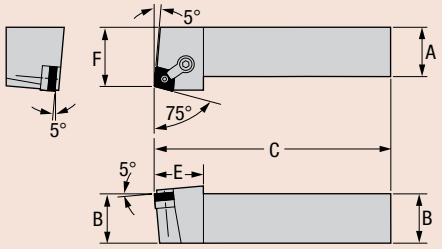
G-MCRNR/L

Style R, 80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MCRNR-2020M12	G-MCRNL-2020M12	CNMG-120708	❍	❍	20	20	150	32	25	CSN-433	NLM-46	CLM-9	STCM-4	TK-02719	S-46M	–
G-MCRNR-2525M12	G-MCRNL-2525M12	CNMG-120708	●	●	25	25	150	32	32	CSN-433	NLM-46	CLM-9	STCM-4	TK-02719	S-46M	–
G-MCRNR-3232P12	G-MCRNL-3232P12	CNMG-120708	●	●	32	32	170	32	40	CSN-433	NLM-46	CLM-9	STCM-4	TK-02719	S-46M	–
G-MCRNR-4040R12	G-MCRNL-4040R12	CNMG-120708	❍	❍	40	40	200	32	50	CSN-433	NLM-46	CLM-9	STCM-4	TK-02719	S-46M	–
G-MCRNR-2525M16	G-MCRNL-2525M16	CNMG-160612	❍	❍	25	25	150	34	32	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCRNR-3225P16	G-MCRNL-3225P16	CNMG-160612	❍	❍	25	32	170	34	32	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCRNR-3232P16	G-MCRNL-3232P16	CNMG-160612	❍	❍	32	32	170	34	40	CSN-533	NLM-58	CLM-9	STCM-4	TK-02720	S-58M	CSN-543
G-MCRNR-3225M19	G-MCRNL-3225M19	CNMG-196012	❍	❍	25	32	150	38	32	CSN-633	NLM-68	CLM-12	STCM-4	TK-02721	S-68M	CSN-643
G-MCRNR-3232P19	G-MCRNL-3232P19	CNMG-196012	❍	❍	32	32	170	38	40	CSN-633	NLM-68	CLM-12	STCM-4	TK-02721	S-68M	CSN-643
G-MCRNR-4040R19	G-MCRNL-4040R19	CNMG-196012	❍	❍	40	40	200	38	50	CSN-633	NLM-68	CLM-12	STCM-4	TK-02721	S-68M	CSN-643
G-MCRNR-4040R25	G-MCRNL-4040R25	CNMG-250923	❍	❍	40	40	200	42	50	CSN-846	NLM-810	CLM-24	STCM-19	TK-02723	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

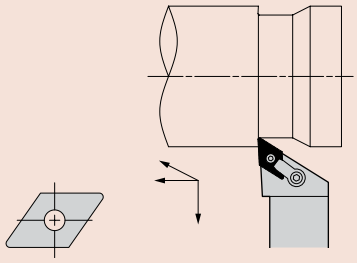
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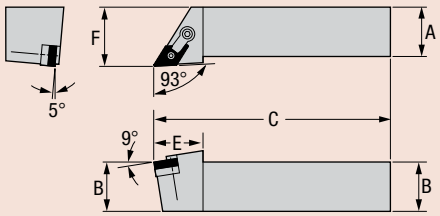
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

G-MDJNR/L

Style J
55° Diamond
Negative Rake
93° Lead Angle





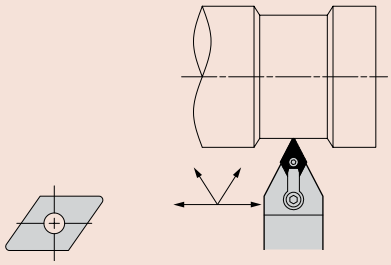
Right-Hand
Toolholder Shown

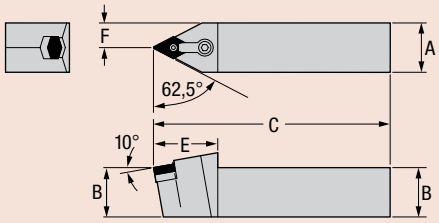
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MDJNR-2020M15	G-MDJNL-2020M15	DNMG-150408	❍	❍	20	20	150	35	25	DSN-433	NLM-46	CLM-20	STCM-26	TK-02724	S-46M	DSN-423**
G-MDJNR-2525M15	G-MDJNL-2525M15	DNMG-150408	●	●	25	25	150	35	32	DSN-433	NLM-46	CLM-20	STCM-26	TK-02724	S-46M	DSN-423**
G-MDJNR-3225P15	G-MDJNL-3225P15	DNMG-150408	❍	❍	25	32	170	35	32	DSN-433	NLM-46	CLM-20	STCM-26	TK-02724	S-46M	DSN-423**
G-MDJNR-3232P15	G-MDJNL-3232P15	DNMG-150408	●	●	32	32	170	35	40	DSN-433	NLM-46	CLM-20	STCM-26	TK-02724	S-46M	DSN-423**
G-MDJNR-4040R15	G-MDJNL-4040R15	DNMG-150408	❍	❍	40	40	200	35	50	DSN-433	NLM-46	CLM-20	STCM-26	TK-02724	S-46M	DSN-423**
G-MDJNR-2525M19	G-MDJNL-2525M19	DNMG-190612	❍	❍	25	25	150	38	32	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDJNR-3225P19	G-MDJNL-3225P19	DNMG-190612	❍	❍	25	32	170	38	32	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDJNR-3232P19	G-MDJNL-3232P19	DNMG-190612	❍	❍	32	32	170	38	40	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDJNR-4040R19	G-MDJNL-4040R19	DNMG-190612	❍	❍	40	40	200	38	50	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** Cannot be used with lock pin.

G-MDPNN

Style P
55° Diamond
Negative Rake
62,5° Lead Angle





Neutral
Toolholder Shown

Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Neutral	Insert	N	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MDPNN-2020M15	DNMG-150408	❍	20	20	150	42	10	DSN-433	NLM-46	CLM-12	STCM-4	TK-02725	S-46M	DSN-423**
G-MDPNN-2525M15	DNMG-150408	●	25	25	150	42	12,5	DSN-433	NLM-46	CLM-12	STCM-4	TK-02725	S-46M	DSN-423**
G-MDPNN-3225P15	DNMG-150408	❍	25	32	170	42	12,5	DSN-433	NLM-46	CLM-12	STCM-4	TK-02725	S-46M	DSN-423**
G-MDPNN-3232P15	DNMG-150408	●	32	32	170	42	16	DSN-433	NLM-46	CLM-12	STCM-4	TK-02725	S-46M	DSN-423**
G-MDPNN-4040R15	DNMG-150408	❍	40	40	200	42	20	DSN-433	NLM-46	CLM-12	STCM-4	TK-02725	S-46M	DSN-423**
G-MDPNN-2525M19	DNMG-190612	❍	25	25	150	49	12,5	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDPNN-3225P19	DNMG-190612	❍	25	32	170	49	12,5	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDPNN-3232P19	DNMG-190612	❍	32	32	170	49	16	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543
G-MDPNN-4040R19	DNMG-190612	❍	40	40	200	49	20	DSN-533	NLM-58	CLM-12	STCM-4	TK-02726	S-58M	DSN-543

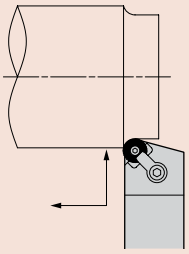
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** Cannot be used with lock pin.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

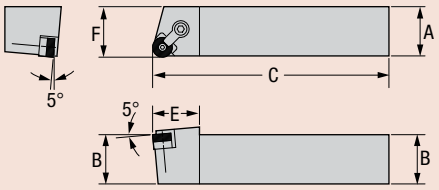
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G-MRANR/L

Style A
Round
Negative Rake



Right-Hand
Toolholder Shown

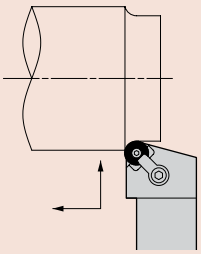


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MRANR-2525M12	G-MRANL-2525M12	RNMG-120400	❍	❍	25	25	150	30	26	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRANR-3225P12	G-MRANL-3225P12	RNMG-120400	❍	❍	25	32	170	30	26	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRANR-3232P12	G-MRANL-3232P12	RNMG-120400	❍	❍	32	32	170	30	33	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRANR-2525M15	G-MRANL-2525M15	RNMG-150600	❍	❍	25	25	150	33	26	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRANR-3225P15	G-MRANL-3225P15	RNMG-150600	❍	❍	25	32	170	33	26	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRANR-3232P15	G-MRANL-3232P15	RNMG-150600	❍	❍	32	32	170	33	33	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRANR-2525M19	G-MRANL-2525M19	RNMG-190600	❍	❍	25	25	150	40	26	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRANR-3225P19	G-MRANL-3225P19	RNMG-190600	❍	❍	25	32	170	40	26	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRANR-3232P19	G-MRANL-3232P19	RNMG-190600	❍	❍	32	32	170	40	33	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRANR-4040R25	G-MRANL-4040R25	RNMG-250900	❍	❍	40	40	200	43	41	RSN-84	NLM-810	CLM-24	STCM-20	TK-02708	S-810M	–

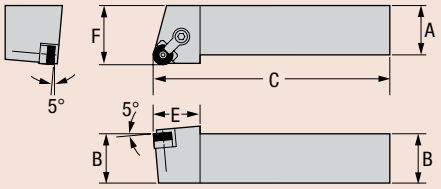
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-MRGNR/L

Style G
Round
Negative Rake



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MRGNR-2020M09	G-MRGNL-2020M09	RNMG-090300	❍	❍	20	20	150	25	25	–	NLM-33	CLM-6	STCM-25	TK-02727	–	–
G-MRGNR-2020M12	G-MRGNL-2020M12	RNMG-120400	❍	❍	20	20	150	30	25	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRGNR-2525M12	G-MRGNL-2525M12	RNMG-120400	●	●	25	25	150	30	32	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRGNR-3225P12	G-MRGNL-3225P12	RNMG-120400	❍	❍	25	32	170	30	32	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRGNR-3232P12	G-MRGNL-3232P12	RNMG-120400	●	●	32	32	170	30	40	IRSN-43	NLM-46	CLM-9	STCM-4	TK-02705	S-46M	IRSN-44
G-MRGNR-2525M15	G-MRGNL-2525M15	RNMG-150600	❍	❍	25	25	150	35	32	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRGNR-3225P15	G-MRGNL-3225P15	RNMG-150600	❍	❍	25	32	170	35	32	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRGNR-3232P15	G-MRGNL-3232P15	RNMG-150600	❍	❍	32	32	170	35	40	RSN-53	NLM-58	CLM-9	STCM-4	TK-02706	S-58M	–
G-MRGNR-2525M19	G-MRGNL-2525M19	RNMG-190600	❍	❍	25	25	150	39	32	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRGNR-3225P19	G-MRGNL-3225P19	RNMG-190600	❍	❍	25	32	170	39	32	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRGNR-3232P19	G-MRGNL-3232P19	RNMG-190600	❍	❍	32	32	170	39	40	RSN-63	NLM-68	CLM-12	STCM-4	TK-02707	S-68M	–
G-MRGNR-4040R25	G-MRGNL-4040R25	RNMG-250900	❍	❍	40	40	200	43	50	RSN-84	NLM-810	CLM-24	STCM-20	TK-02708	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

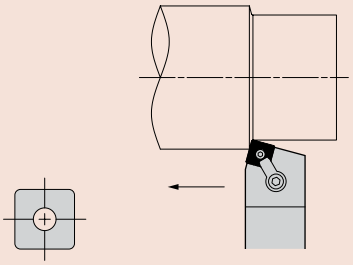
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● ● Stocked Standard

❍ ❍ 10 Business Days or Less

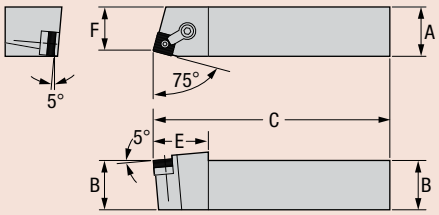
G-MSBNR/L

Style B
Square
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MSBNR-1616M09	G-MSBNL-1616M09	SNMG-090308	❍	❍	16	16	150	27	12	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSBNR-2020M09	G-MSBNL-2020M09	SNMG-090308	❍	❍	20	20	150	27	16	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSBNR-2525M09	G-MSBNL-2525M09	SNMG-090308	❍	❍	25	25	150	27	22	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSBNR-2020M12	G-MSBNL-2020M12	SNMG-120408	❍	❍	20	20	150	36	20	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSBNR-2525M12	G-MSBNL-2525M12	SNMG-120408	●	●	25	25	150	36	22	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSBNR-3225P12	G-MSBNL-3225P12	SNMG-120408	❍	❍	25	32	170	36	22	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSBNR-3232P12	G-MSBNL-3232P12	SNMG-120408	●	●	32	32	170	36	28	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSBNR-2525M15	G-MSBNL-2525M15	SNMG-150612	❍	❍	25	25	150	40	21	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSBNR-3225P15	G-MSBNL-3225P15	SNMG-150612	❍	❍	25	32	170	40	21	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSBNR-3232P15	G-MSBNL-3232P15	SNMG-150612	❍	❍	32	32	170	40	28	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSBNR-4040R15	G-MSBNL-4040R15	SNMG-150612	❍	❍	40	40	200	40	34	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSBNR-3232P19	G-MSBNL-3232P19	SNMG-190612	❍	❍	32	32	170	40	26	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSBNR-4040R19	G-MSBNL-4040R19	SNMG-190612	❍	❍	40	40	200	40	33	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSBNR-4040R25	G-MSBNL-4040R25	SNMG-250924	❍	❍	40	40	200	50	32	SSN-844	NLM-810	CLM-24	STCM-19	TK-02647	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

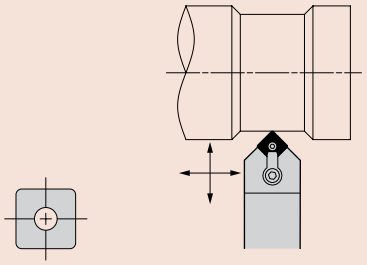
10 Business Days or Less ❍ ❍

Stocked Standard ● ●

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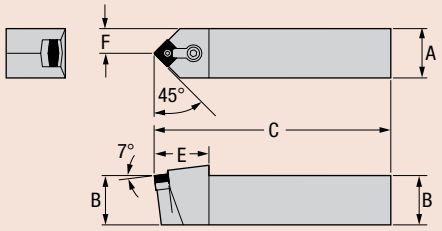
G-MSDNN

Style D
Square
Negative Rake
45° Lead Angle





Neutral
Toolholder Shown

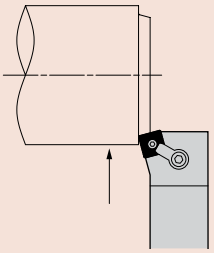


Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Neutral	Insert	N	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MSDNN-1616M09	SNMG-090308	❍	16	16	150	29	8	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSDNN-2020M09	SNMG-090308	❍	20	20	150	29	10	ISSN-322	NLM-34L	CLM-6	STCM-25	TK-02711	S-34M	–
G-MSDNN-2020M12	SNMG-120408	❍	20	20	150	35	10	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSDNN-2525M12	SNMG-120408	●	25	25	150	35	12,5	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSDNN-3225P12	SNMG-120408	❍	25	32	170	35	12,5	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSDNN-3232P12	SNMG-120408	●	32	32	170	35	16	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSDNN-2525M15	SNMG-150612	❍	25	25	150	41	12,5	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSDNN-3225P15	SNMG-150612	❍	25	32	170	41	12,5	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSDNN-3232P15	SNMG-150612	❍	32	32	170	41	16	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSDNN-4040R15	SNMG-150612	❍	40	40	200	41	20	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSDNN-3225P19	SNMG-190612	❍	25	32	170	44	12,5	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSDNN-3232P19	SNMG-190612	❍	32	32	170	44	16	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSDNN-4040R19	SNMG-190612	❍	40	40	200	44	20	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSDNN-4040R25	SNMG-250924	❍	40	40	200	57	20	SSN-844	NLM-810	CLM-24	STCM-19	TK-02647	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

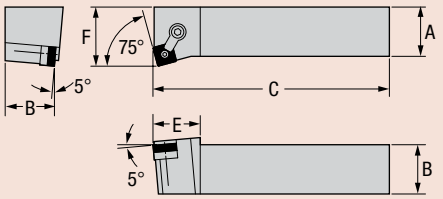
G-MSKNR/L

Style K
Square
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MSKNR-1616M09	G-MSKNL-1616M09	SNMG-090308	❍	❍	16	16	150	25	20	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSKNR-2020M09	G-MSKNL-2020M09	SNMG-090308	❍	❍	20	20	150	25	25	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSKNR-2525M09	G-MSKNL-2525M09	SNMG-090308	❍	❍	25	25	150	25	32	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSKNR-2020M12	G-MSKNL-2020M12	SNMG-120408	❍	❍	20	20	150	31	25	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSKNR-2525M12	G-MSKNL-2525M12	SNMG-120408	❍	❍	25	25	150	31	32	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSKNR-3225P12	G-MSKNL-3225P12	SNMG-120408	❍	❍	25	32	170	31	32	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSKNR-3232P12	G-MSKNL-3232P12	SNMG-120408	❍	❍	32	32	170	31	40	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSKNR-2525M15	G-MSKNL-2525M15	SNMG-150612	❍	❍	25	25	150	37	32	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSKNR-3225P15	G-MSKNL-3225P15	SNMG-150612	❍	❍	25	32	170	37	32	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSKNR-3232P15	G-MSKNL-3232P15	SNMG-150612	❍	❍	32	32	170	37	40	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSKNR-3225P19	G-MSKNL-3225P19	SNMG-190612	❍	❍	25	32	170	40	32	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSKNR-3232P19	G-MSKNL-3232P19	SNMG-190612	❍	❍	32	32	170	40	40	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSKNR-4040R19	G-MSKNL-4040R19	SNMG-190612	❍	❍	40	40	200	40	50	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSKNR-4040R25	G-MSKNL-4040R25	SNMG-250924	❍	❍	40	40	200	50	50	SSN-844	NLM-810	CLM-24	STCM-19	TK-02647	S-810M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

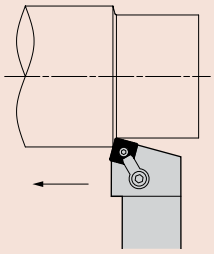
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● ● Stocked Standard

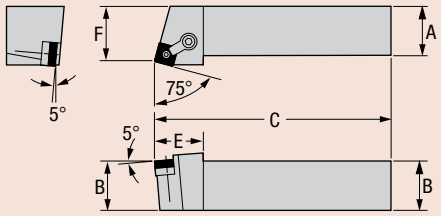
❍ ❍ 10 Business Days or Less

G-MSRNR/L

Style R
Square
Negative Rake
75° Lead Angle



Right-Hand
Toolholder Shown

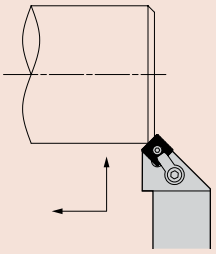


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MSRNR-1616M09	G-MSRNL-1616M09	SNMG-090308	❍	❍	16	16	150	27	20	ISSN-322	NLM-34	CLM-6	STCM-25	TK-02710	S-34M	–
G-MSRNR-2020M09	G-MSRNL-2020M09	SNMG-090308	❍	❍	20	20	150	27	23	ISSN-322	NLM-34L	CLM-6	STCM-25	TK-02711	S-34M	–
G-MSRNR-2020M12	G-MSRNL-2020M12	SNMG-120408	❍	❍	20	20	150	31	22	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSRNR-2525M12	G-MSRNL-2525M12	SNMG-120408	●	●	25	25	150	31	29	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSRNR-3225P12	G-MSRNL-3225P12	SNMG-120408	❍	❍	25	32	170	31	29	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSRNR-3232P12	G-MSRNL-3232P12	SNMG-120408	●	●	32	32	170	31	35	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSRNR-2525M15	G-MSRNL-2525M15	SNMG-150612	❍	❍	25	25	150	37	28	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSRNR-3225P15	G-MSRNL-3225P15	SNMG-150612	❍	❍	25	32	170	37	28	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSRNR-3232P15	G-MSRNL-3232P15	SNMG-150612	❍	❍	32	32	170	37	34	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSRNR-4040R15	G-MSRNL-4040R15	SNMG-150612	❍	❍	40	40	200	37	47	SSN-533	NLM-58	CLM-12	STCM-4	TK-02713	S-58M	ISSN-543
G-MSRNR-3225P19	G-MSRNL-3225P19	SNMG-190612	❍	❍	25	32	170	38	27	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSRNR-3232P19	G-MSRNL-3232P19	SNMG-190612	❍	❍	32	32	170	38	33	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSRNR-4040R19	G-MSRNL-4040R19	SNMG-190612	❍	❍	40	40	200	38	46	ISSN-633	NLM-68	CLM-12	STCM-4	TK-02714	S-68M	ISSN-643
G-MSRNR-4040R25	G-MSRNL-4040R25	SNMG-250924	❍	❍	40	40	200	41	45	SSN-844	NLM-810	CLM-24	STCM-19	TK-02647	S-810M	–

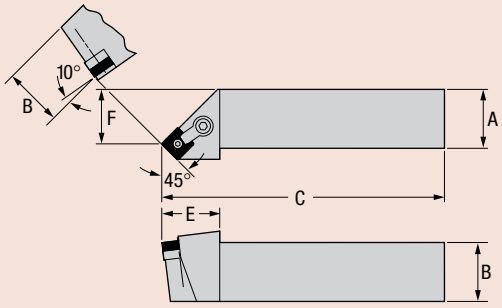
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-MSSNR/L

Style S
Square
Negative Rake
45° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MSSNR-2020M12	G-MSSNL-2020M12	SNMG-120408	❍	❍	20	20	150	31	17	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSSNR-2525M12	G-MSSNL-2525M12	SNMG-120408	●	●	25	25	150	31	23	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSSNR-3225P12	G-MSSNL-3225P12	SNMG-120408	❍	❍	25	32	170	31	23	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSSNR-3232P12	G-MSSNL-3232P12	SNMG-120408	●	●	32	32	170	31	30	ISSN-433	NLM-46	CLM-9	STCM-4	TK-02712	S-46M	ISSN-443
G-MSSNR-2525M15	G-MSSNL-2525M15	SNMG-150612	❍	❍	25	25	150	35	21	SSN-533	NLM-58	CLM-9	STCM-4	TK-02688	S-58M	ISSN-543
G-MSSNR-3225P15	G-MSSNL-3225P15	SNMG-150612	❍	❍	25	32	170	35	21	SSN-533	NLM-58	CLM-9	STCM-4	TK-02688	S-58M	ISSN-543
G-MSSNR-3232P15	G-MSSNL-3232P15	SNMG-150612	❍	❍	32	32	170	35	27	SSN-533	NLM-58	CLM-9	STCM-4	TK-02688	S-58M	ISSN-543
G-MSSNR-4040R15	G-MSSNL-4040R15	SNMG-150612	❍	❍	40	40	200	35	34	SSN-533	NLM-58	CLM-9	STCM-4	TK-02688	S-58M	ISSN-543
G-MSSNR-3225P19	G-MSSNL-3225P19	SNMG-190612	❍	❍	25	32	170	38	20	ISSN-633	NLM-68	CLM-9	STCM-4	TK-02735	S-68M	ISSN-643
G-MSSNR-3232P19	G-MSSNL-3232P19	SNMG-190612	❍	❍	32	32	170	38	25	ISSN-633	NLM-68	CLM-9	STCM-4	TK-02735	S-68M	ISSN-643
G-MSSNR-4040R19	G-MSSNL-4040R19	SNMG-190612	❍	❍	40	40	200	38	40	ISSN-633	NLM-68	CLM-9	STCM-4	TK-02735	S-68M	ISSN-643

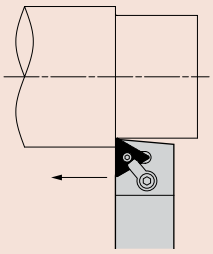
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

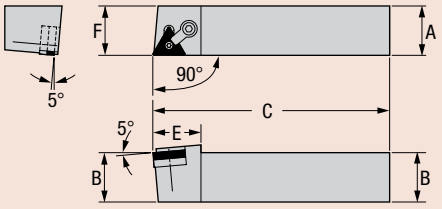
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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G-MTANR/L

Style A
Triangle
Negative Rake
90° Lead Angle





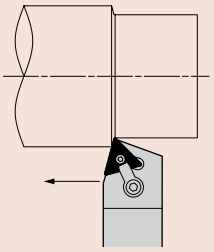
Right-Hand
Toolholder Shown

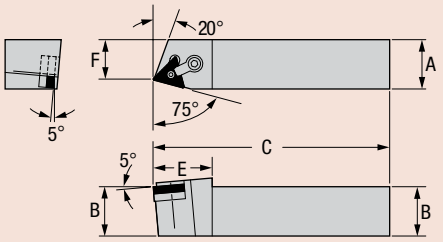
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTANR-1616M11	G-MTANL-1616M11	TNMG-110304	❍	❍	16	16	150	25	16	–	NLM-23	CLM-19	STCM-25	TK-02762	–	–
G-MTANR-1616M16	G-MTANL-1616M16	TNMG-160308	❍	❍	16	16	150	29	16	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTANR-2020M16	G-MTANL-2020M16	TNMG-160308	❍	❍	20	20	150	29	20	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTANR-2525M16	G-MTANL-2525M16	TNMG-160308	❍	❍	25	25	150	29	25	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTANR-3225P16	G-MTANL-3225P16	TNMG-160308	❍	❍	25	32	170	29	25	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTANR-2525M22	G-MTANL-2525M22	TNMG-220408	●	●	25	25	150	29	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02763	S-46M	ITSN-424
G-MTANR-3225P22	G-MTANL-3225P22	TNMG-220408	❍	❍	25	32	170	29	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02763	S-46M	ITSN-424
G-MTANR-3232P22	G-MTANL-3232P22	TNMG-220408	●	●	32	32	170	29	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02763	S-46M	ITSN-424
G-MTANR-4040R22	G-MTANL-4040R22	TNMG-220408	❍	❍	40	40	200	29	40	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02763	S-46M	ITSN-424
G-MTANR-2525M27	G-MTANL-2525M27	TNMG-270612	❍	❍	25	25	150	37	25	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTANR-3225P27	G-MTANL-3225P27	TNMG-270612	❍	❍	25	32	170	37	25	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTANR-3232P27	G-MTANL-3232P27	TNMG-270612	❍	❍	32	32	170	37	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTANR-4040R27	G-MTANL-4040R27	TNMG-270612	❍	❍	40	40	200	37	40	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTANR-4040R33	G-MTANL-4040R33	TNMG-330912	❍	❍	40	40	200	50	40	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** Cannot be used with lock pin.

G-MTBNR/L

Style B
Triangle
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTBNR-1616M11	G-MTBNL-1616M11	TNMG-110304	❍	❍	16	16	150	23	13	–	NLM-23	CLM-6	STCM-25	TK-02764	–	–
G-MTBNR-1616M16	G-MTBNL-1616M16	TNMG-160308	❍	❍	16	16	150	34	11	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTBNR-2020M16	G-MTBNL-2020M16	TNMG-160308	❍	❍	20	20	150	34	15	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTBNR-2525M16	G-MTBNL-2525M16	TNMG-160308	❍	❍	25	25	150	34	21	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTBNR-3225P16	G-MTBNL-3225P16	TNMG-160308	❍	❍	25	32	170	34	21	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTBNR-2525M22	G-MTBNL-2525M22	TNMG-220408	❍	❍	25	25	150	38	20	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTBNR-3225P22	G-MTBNL-3225P22	TNMG-220408	❍	❍	25	32	170	38	20	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTBNR-3232P22	G-MTBNL-3232P22	TNMG-220408	❍	❍	32	32	170	38	26	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTBNR-4040R22	G-MTBNL-4040R22	TNMG-220408	❍	❍	40	40	200	38	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTBNR-2525M27	G-MTBNL-2525M27	TNMG-270612	❍	❍	25	25	150	43	18	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTBNR-3225P27	G-MTBNL-3225P27	TNMG-270612	❍	❍	25	32	170	43	18	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTBNR-3232P27	G-MTBNL-3232P27	TNMG-270612	❍	❍	32	32	170	43	25	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTBNR-4040R27	G-MTBNL-4040R27	TNMG-270612	❍	❍	40	40	200	43	31	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTBNR-4040R33	G-MTBNL-4040R33	TNMG-330912	❍	❍	40	40	200	45	30	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

** Cannot be used with lock pin.

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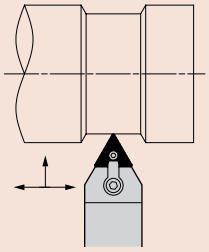
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

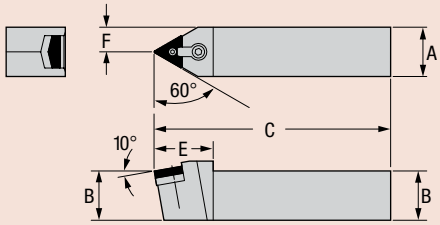
G-MTENNS

Style E
Triangle
Negative Rake
60° Lead Angle





Neutral
Toolholder Shown



Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Neutral	Insert	N	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTENNS-1616M11	TNMG-110304	❍	16	16	150	25	8	–	NLM-23	CLM-6	STCM-25	TK-02752	–	–
G-MTENNS-1616M16	TNMG-060308	❍	16	16	150	30	8	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTENNS-2020M16	TNMG-060308	❍	20	20	150	30	10	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTENNS-2525M16	TNMG-060308	❍	25	25	150	30	12,5	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTENNS-3225P16	TNMG-060308	❍	25	32	170	30	12,5	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTENNS-2020M22	TNMG-220408	❍	20	20	150	38	10	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTENNS-2525M22	TNMG-220408	●	25	25	150	38	12,5	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTENNS-3225P22	TNMG-220408	❍	25	32	170	38	12,5	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTENNS-3232P22	TNMG-220408	●	32	32	170	38	16	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTENNS-3232P27	TNMG-270612	❍	32	32	170	42	16	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	–
G-MTENNS-4040R27	TNMG-270612	❍	40	40	200	42	20	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	–
G-MTENNS-4040R33	TNMG-330912	❍	40	40	200	50	20	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

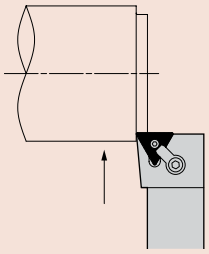
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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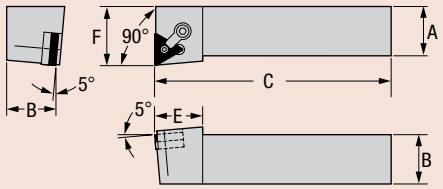
G-MTFNR/L

Style F
Triangle
Negative Rake
90° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTFNR-1616M11	G-MTFNL-1616M11	TNMG-110304	❍	❍	16	16	150	20	22	–	NLM-23	CLM-19	STCM-25	TK-02762	–	–
G-MTFNR-1616M16	G-MTFNL-1616M16	TNMG-160308	❍	❍	16	16	150	24	22	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTFNR-2020M16	G-MTFNL-2020M16	TNMG-160308	❍	❍	20	20	150	24	25	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTFNR-2525M16	G-MTFNL-2525M16	TNMG-160308	❍	❍	25	25	150	24	32	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTFNR-3225P16	G-MTFNL-3225P16	TNMG-160308	❍	❍	25	32	170	24	32	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTFNR-3232P16	G-MTFNL-3232P16	TNMG-160308	❍	❍	32	32	170	24	40	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTFNR-2525M22	G-MTFNL-2525M22	TNMG-220408	●	●	25	25	150	31	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTFNR-3225P22	G-MTFNL-3225P22	TNMG-220408	❍	❍	25	32	170	31	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTFNR-3232P22	G-MTFNL-3232P22	TNMG-220408	●	●	32	32	170	31	40	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTFNR-4040R22	G-MTFNL-4040R22	TNMG-220408	❍	❍	40	40	200	31	50	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTFNR-2525M27	G-MTFNL-2525M27	TNMG-270612	❍	❍	25	25	150	36	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTFNR-3225P27	G-MTFNL-3225P27	TNMG-270612	❍	❍	25	32	170	36	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTFNR-3232P27	G-MTFNL-3232P27	TNMG-270612	❍	❍	32	32	170	36	40	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTFNR-4040R27	G-MTFNL-4040R27	TNMG-270612	❍	❍	40	40	200	36	50	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTFNR-4040R33	G-MTFNL-4040R33	TNMG-330912	❍	❍	40	40	200	38	50	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

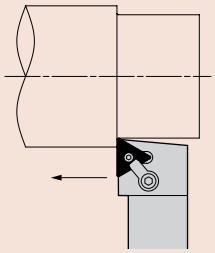
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** Cannot be used with lock pin.

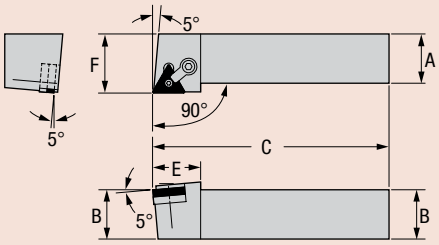
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

G-MTGNR/L

Style G
Triangle
Negative Rake
90° Lead Angle





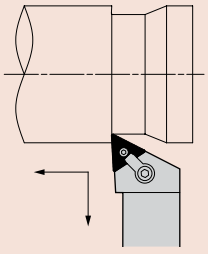
Right-Hand
Toolholder Shown

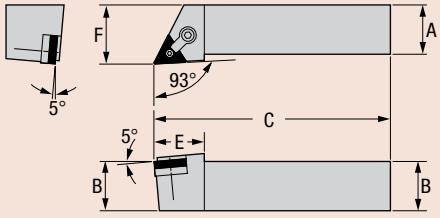
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTGNR-1616M11	G-MTGNL-1616M11	TNMG-110304	❍	❍	16	16	150	25	20	–	NLM-23	CLM-19	STCM-25	TK-02639	–	–
G-MTGNR-1616M16	G-MTGNL-1616M16	TNMG-160308	❍	❍	16	16	150	28	22	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTGNR-2020M16	G-MTGNL-2020M16	TNMG-160308	❍	❍	20	20	150	28	25	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTGNR-2525M16	G-MTGNL-2525M16	TNMG-160308	❍	❍	25	25	150	28	32	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTGNR-3225P16	G-MTGNL-3225P16	TNMG-160308	❍	❍	25	32	170	28	32	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTGNR-3232P16	G-MTGNL-3232P16	TNMG-160308	❍	❍	32	32	170	28	40	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTGNR-2020M22	G-MTGNL-2020M22	TNMG-220408	❍	❍	20	20	150	31	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTGNR-2525M22	G-MTGNL-2525M22	TNMG-220408	●	●	25	25	150	31	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTGNR-3225P22	G-MTGNL-3225P22	TNMG-220408	❍	❍	25	32	170	31	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTGNR-3232P22	G-MTGNL-3232P22	TNMG-220408	●	●	32	32	170	31	40	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTGNR-4040R22	G-MTGNL-4040R22	TNMG-220408	❍	❍	40	40	200	31	50	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	ITSN-424
G-MTGNR-2525M27	G-MTGNL-2525M27	TNMG-270612	❍	❍	25	25	150	37	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTGNR-3225P27	G-MTGNL-3225P27	TNMG-270612	❍	❍	25	32	170	37	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTGNR-3232P27	G-MTGNL-3232P27	TNMG-270612	❍	❍	32	32	170	37	40	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTGNR-4040R27	G-MTGNL-4040R27	TNMG-270612	❍	❍	40	40	200	37	50	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTGNR-4040R33	G-MTGNL-4040R33	TNMG-330912	❍	❍	40	40	200	38	50	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-MTJNRS

Style J
Triangle
Negative Rake
93° Lead Angle





Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Component	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTJNRS-2020M16	G-MTJNLS-2020M16	TNMG-160308	❍	❍	20	20	150	28	25	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTJNRS-2525M16	G-MTJNLS-2525M16	TNMG-160308	❍	❍	25	25	150	28	32	ITSN-333	NLM-34L	CLM-6	STCM-25	TK-02753	S-34M	ITSN-323
G-MTJNRS-2525M22	G-MTJNLS-2525M22	TNMG-220408	●	●	25	25	150	30	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTJNRS-3225P22	G-MTJNLS-3225P22	TNMG-220408	❍	❍	25	32	170	30	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTJNRS-3232P22	G-MTJNLS-3232P22	TNMG-220408	●	●	32	32	170	30	40	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	–
G-MTJNRS-3232P27	G-MTJNLS-3232P27	TNMG-270612	❍	❍	32	32	170	36	40	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	–
G-MTJNRS-4040R27	G-MTJNLS-4040R27	TNMG-270612	❍	❍	40	40	200	36	50	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	–
G-MTJNRS-4040R33	G-MTJNLS-4040R33	TNMG-330912	❍	❍	40	40	200	42	50	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	–

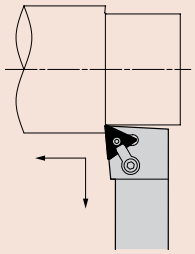
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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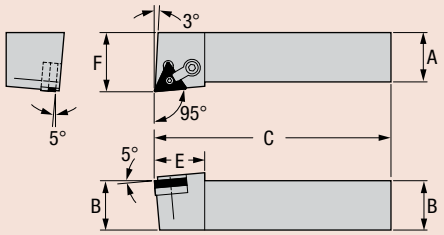
G-MTLNR/L

Style L
Triangle
Negative Rake
95° Lead Angle





Right-Hand
Toolholder Shown

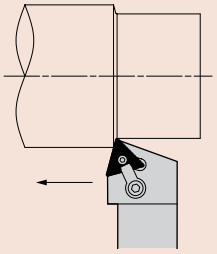


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTLNR-2525M22	G-MTLNL-2525M22	TNMG-220408	❍	❍	25	25	150	32	25	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTLNR-3225P22	G-MTLNL-3225P22	TNMG-220408	❍	❍	25	32	170	32	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTLNR-3232P22	G-MTLNL-3232P22	TNMG-220408	❍	❍	32	32	170	32	40	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTLNR-3232P27	G-MTLNL-3232P27	TNMG-270612	❍	❍	32	32	170	36	40	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTLNR-4040R27	G-MTLNL-4040R27	TNMG-270612	❍	❍	40	40	200	36	50	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTLNR-4040R33	G-MTLNL-4040R33	TNMG-330912	❍	❍	40	40	200	39	50	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

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** Cannot be used with lock pin.

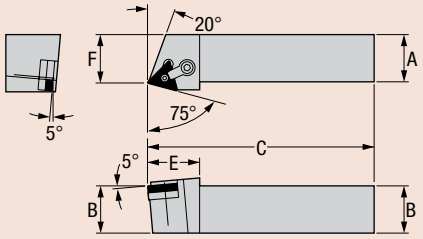
G-MTRNR/L

Style R
Triangle
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw	Seat
G-MTRNR-1616M11	G-MTRNL-1616M11	TNMG-110304	❍	❍	16	16	150	26	20	–	NLM-23	CLM-19	STCM-25	TK-02762	–	–
G-MTRNR-1616M16	G-MTRNL-1616M16	TNMG-160308	❍	❍	16	16	150	31	20	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTRNR-2020M16	G-MTRNL-2020M16	TNMG-160308	❍	❍	20	20	150	31	22	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTRNR-2525M16	G-MTRNL-2525M16	TNMG-160308	❍	❍	25	25	150	31	28	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTRNR-3225P16	G-MTRNL-3225P16	TNMG-160308	❍	❍	25	32	170	31	28	ITSN-333	NLM-34L	CLM-20	STCM-32	TK-02765	S-34M	ITSN-323
G-MTRNR-2525M22	G-MTRNL-2525M22	TNMG-220408	❍	❍	25	25	150	35	26	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTRNR-3225P22	G-MTRNL-3225P22	TNMG-220408	❍	❍	25	32	170	35	26	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTRNR-3232P22	G-MTRNL-3232P22	TNMG-220408	❍	❍	32	32	170	35	32	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTRNR-4040R22	G-MTRNL-4040R22	TNMG-220408	❍	❍	40	40	200	35	45	ITSN-433	NLM-46	CLM-9	STCM-4	TK-02754	S-46M	TS-424**
G-MTRNR-2525M27	G-MTRNL-2525M27	TNMG-270612	❍	❍	25	25	150	41	25	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTRNR-3225P27	G-MTRNL-3225P27	TNMG-270612	❍	❍	25	32	170	41	25	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTRNR-3232P27	G-MTRNL-3232P27	TNMG-270612	❍	❍	32	32	170	41	32	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTRNR-4040R27	G-MTRNL-4040R27	TNMG-270612	❍	❍	40	40	200	41	45	ITSN-533	NLM-58	CLM-9	STCM-4	TK-02755	S-58M	ITSN-543
G-MTRNR-4040R33	G-MTRNL-4040R33	TNMG-330912	❍	❍	40	40	200	45	43	TSN-637	NLM-68L	CLM-12	STCM-4	TK-02756	S-68M	TSN-657

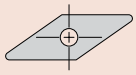
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** Cannot be used with lock pin.

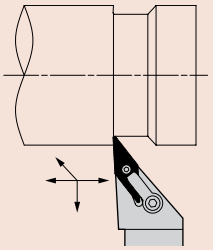
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

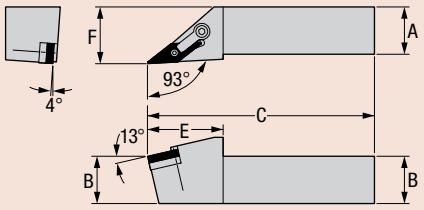
G-MVJNR/L

Style J
35° Diamond
Negative Rake
93° Lead Angle





Right-Hand
Toolholder Shown

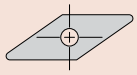


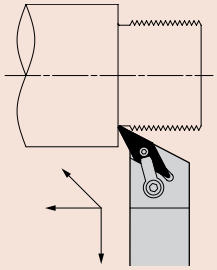
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Component
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw
G-MVJNR-2020M16	G-MVJNL-2020M16	VNMG-160408	❍	❍	20	20	150	43	25	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVJNR-2525M16	G-MVJNL-2525M16	VNMG-160408	●	●	25	25	150	43	32	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVJNR-3225P16	G-MVJNL-3225P16	VNMG-160408	❍	❍	25	32	170	43	32	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVJNR-3232P16	G-MVJNL-3232P16	VNMG-160408	●	●	32	32	170	43	40	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVJNR-4040R16	G-MVJNL-4040R16	VNMG-160408	❍	❍	40	40	200	43	50	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVJNR-2525M22	G-MVJNL-2525M22	VNMG-220408	●	●	25	25	150	50	32	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M
G-MVJNR-3232P22	G-MVJNL-3232P22	VNMG-220408	●	●	32	32	170	50	40	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M
G-MVJNR-4040R22	G-MVJNL-4040R22	VNMG-220408	❍	❍	40	40	200	50	50	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

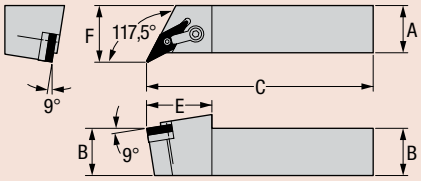
G-MVTNR/L

Style T
35° Diamond
Negative Rake
117,5° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Component
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw
G-MVTNR-2020M16	G-MVTNL-2020M16	VNMG-160408	❍	❍	20	20	150	44	25	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVTNR-2525M16	G-MVTNL-2525M16	VNMG-160408	●	●	25	25	150	44	32	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVTNR-3225P16	G-MVTNL-3225P16	VNMG-160408	❍	❍	25	32	170	44	32	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVTNR-3232P16	G-MVTNL-3232P16	VNMG-160408	●	●	32	32	170	44	40	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVTNR-4040R16	G-MVTNL-4040R16	VNMG-160408	❍	❍	40	40	200	44	45	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M

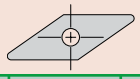
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

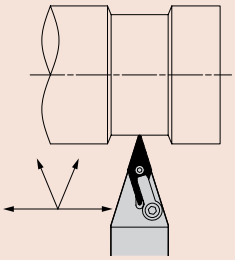
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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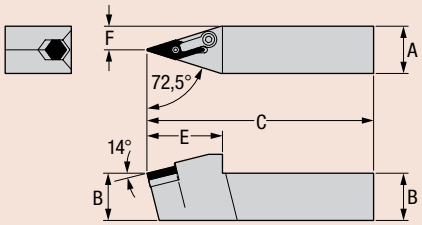
G-MVVNN

Style V
35° Diamond
Negative Rake
72,5° Lead Angle





Neutral
Toolholder Shown



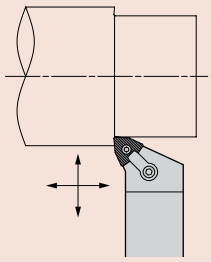
Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Component
Neutral	Insert	N	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat Screw
G-MVVNN-2020M16	VNMG-160408	❍	20	20	150	45	10	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVVNN-2525M16	VNMG-160408	●	25	25	150	45	12,5	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVVNN-3225P16	VNMG-160408	❍	25	32	170	45	12,5	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVVNN-3232P16	VNMG-160408	●	32	32	170	45	16	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVVNN-4040R16	VNMG-160408	❍	40	40	200	45	20	IVSN-322	NLM-34L	CLM-30	STCM-4	TK-02758	S-34M
G-MVVNN-2525M22	VNMG-220408	●	25	25	150	54	12,5	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M
G-MVVNN-3232P22	VNMG-220408	●	32	32	170	54	16	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M
G-MVVNN-4040R22	VNMG-220408	❍	40	40	200	54	20	IVSN-433	NLM-46	CLM-30	STCM-4	TK-02759	S-46M

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

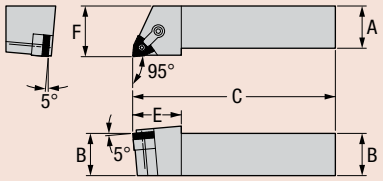
G-MWLNR/L

Style L
Trigon
Negative Rake
95° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Component
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat
G-MWLNR-2020M06	G-MWLNL-2020M06	WNMG-060408	❍	❍	20	20	150	25	25	IWSN-323	NLM-34L	CLM-6	STCM-25	TK-02807	IWSN-332
G-MWLNR-2525M06	G-MWLNL-2525M06	WNMG-060408	❍	❍	25	25	150	25	32	IWSN-323	NLM-34L	CLM-6	STCM-25	TK-02807	IWSN-332
G-MWLNR-3232P06	G-MWLNL-3232P06	WNMG-060408	❍	❍	32	32	170	25	40	IWSN-323	NLM-34L	CLM-6	STCM-25	TK-02807	IWSN-332
G-MWLNR-4040R06	G-MWLNL-4040R06	WNMG-060408	❍	❍	40	40	200	25	50	IWSN-323	NLM-34L	CLM-6	STCM-25	TK-02807	IWSN-332
G-MWLNR-2020M08	G-MWLNL-2020M08	WNMG-080408	❍	❍	20	20	150	30	25	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–
G-MWLNR-2525M08	G-MWLNL-2525M08	WNMG-080408	●	●	25	25	150	30	32	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–
G-MWLNR-3232P08	G-MWLNL-3232P08	WNMG-080408	●	●	32	32	170	30	40	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–
G-MWLNR-4040R08	G-MWLNL-4040R08	WNMG-080408	❍	❍	40	40	200	30	50	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

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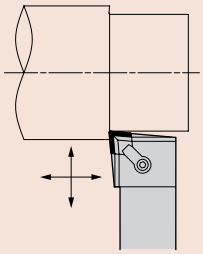
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

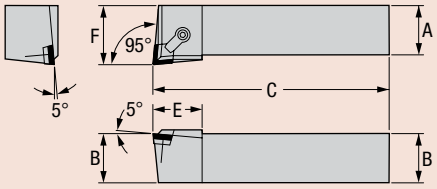
G-CCLPR/L

Style L
80° Diamond
Positive Rake
95° Lead Angle





Right-Hand
Toolholder Shown



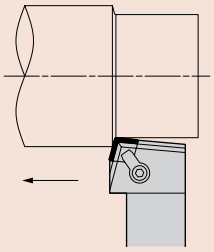
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CCLPR-2020M12	G-CCLPL-2020M12	CPGN-120308	❍	❍	20	20	150	32	25	CSP-422	TFHCS M3-0.5x10mm	CLM-20	STCM-11	CBDC-4L	TK-02781
G-CCLPR-2525M12	G-CCLPL-2525M12	CPGN-120308	❍	❍	25	25	150	32	32	CSP-422	TFHCS M3-0.5x10mm	CLM-20	STCM-11	CBDC-4L	TK-02781
G-CCLPR-3225P12	G-CCLPL-3225P12	CPGN-120308	❍	❍	25	32	170	32	32	CSP-422	TFHCS M3-0.5x10mm	CLM-20	STCM-11	CBDC-4L	TK-02781
G-CCLPR-3232P12	G-CCLPL-3232P12	CPGN-120308	❍	❍	32	32	170	32	40	CSP-422	TFHCS M3-0.5x10mm	CLM-20	STCM-11	CBDC-4L	TK-02781
G-CCLPR-4040R12	G-CCLPL-4040R12	CPGN-120308	❍	❍	40	40	200	32	50	CSP-422	TFHCS M3-0.5x10mm	CLM-20	STCM-11	CBDC-4L	TK-02781
G-CCLPR-2525M19	G-CCLPL-2525M19	CPGN-190412	❍	❍	25	25	150	40	32	CSP-632	TFHCS M3-0.5x10mm	CLM-30	STCM-4	CBDC-6G	TK-02784
G-CCLPR-3225P19	G-CCLPL-3225P19	CPGN-190412	❍	❍	25	32	170	40	32	CSP-632	TFHCS M3-0.5x10mm	CLM-30	STCM-4	CBDC-6G	TK-02784
G-CCLPR-3232P19	G-CCLPL-3232P19	CPGN-190412	❍	❍	32	32	170	40	40	CSP-632	TFHCS M3-0.5x10mm	CLM-30	STCM-4	CBDC-6G	TK-02784
G-CCLPR-4040R19	G-CCLPL-4040R19	CPGN-190412	❍	❍	40	40	200	40	50	CSP-632	TFHCS M3-0.5x10mm	CLM-30	STCM-4	CBDC-6G	TK-02784

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

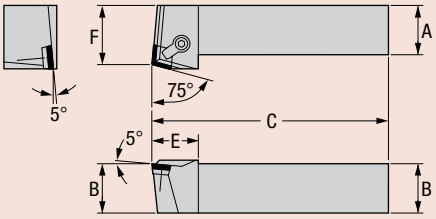
G-CCRPR/L

Style R
80° Diamond
(Using 100° Corner)
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CCRPR-2020M12	G-CCRPL-2020M12	CPGN-120308	❍	❍	20	20	150	31	25	CSP-422	TFHCS M3-0.5x10mm	CLM-9	STCM-4	CBDC-415L	TK-02737
G-CCRPR-2525M12	G-CCRPL-2525M12	CPGN-120308	❍	❍	25	25	150	31	32	CSP-422	TFHCS M3-0.5x10mm	CLM-9	STCM-4	CBDC-415L	TK-02737
G-CCRPR-3225P12	G-CCRPL-3225P12	CPGN-120308	❍	❍	25	32	170	31	32	CSP-422	TFHCS M3-0.5x10mm	CLM-9	STCM-4	CBDC-415L	TK-02737
G-CCRPR-3232P12	G-CCRPL-3232P12	CPGN-120308	❍	❍	32	32	170	31	40	CSP-422	TFHCS M3-0.5x10mm	CLM-9	STCM-4	CBDC-415L	TK-02737
G-CCRPR-4040R12	G-CCRPL-4040R12	CPGN-120308	❍	❍	40	40	200	31	50	CSP-422	TFHCS M3-0.5x10mm	CLM-9	STCM-4	CBDC-415L	TK-02737
G-CCRPR-2525M19	G-CCRPL-2525M19	CPGN-190412	❍	❍	25	25	150	33	32	CSP-632	TFHCS M3-0.5x10mm	CLM-12	STCM-4	CBDC-615G	TK-02742
G-CCRPR-3225P19	G-CCRPL-3225P19	CPGN-190412	❍	❍	25	32	170	33	32	CSP-632	TFHCS M3-0.5x10mm	CLM-12	STCM-4	CBDC-615G	TK-02742
G-CCRPR-3232P19	G-CCRPL-3232P19	CPGN-190412	❍	❍	32	32	170	33	40	CSP-632	TFHCS M3-0.5x10mm	CLM-12	STCM-4	CBDC-615G	TK-02742
G-CCRPR-4040R19	G-CCRPL-4040R19	CPGN-190412	❍	❍	40	40	200	33	50	CSP-632	TFHCS M3-0.5x10mm	CLM-12	STCM-4	CBDC-615G	TK-02742

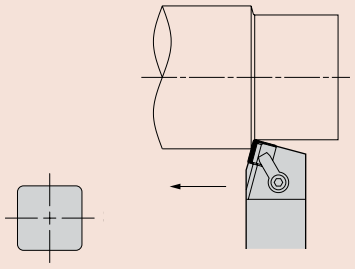
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

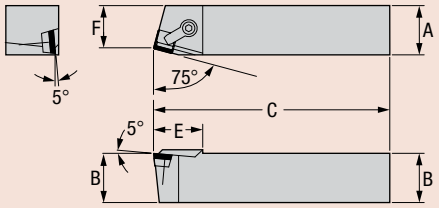
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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G-CSBPR/L

Style B
Square
Positive Rake
75° Lead Angle





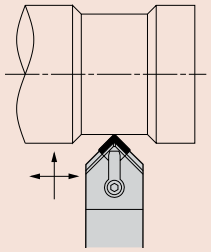
Right-Hand
Toolholder Shown

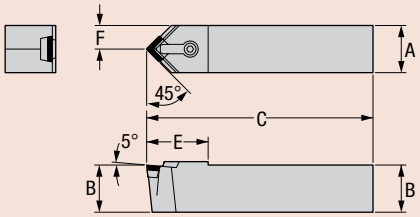
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CSBPR-2020M12	G-CSBPL-2020M12	SPGN-120308	❍	❍	20	20	150	32	15	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-8	CBS-4G	TK-02766
G-CSBPR-2525M12	G-CSBPL-2525M12	SPGN-120308	❍	❍	25	25	150	32	21	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-8	CBS-4G	TK-02766
G-CSBPR-3232P12	G-CSBPL-3232P12	SPGN-120308	❍	❍	32	32	170	32	28	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4G	TK-02767
G-CSBPR-4040R12	G-CSBPL-4040R12	SPGN-120308	❍	❍	40	40	200	32	34	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4G	TK-02767
G-CSBPR-2525M19	G-CSBPL-2525M19	SPGN-190412	❍	❍	25	25	150	37	20	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768
G-CSBPR-3232P19	G-CSBPL-3232P19	SPGN-190412	❍	❍	32	32	170	37	26	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768
G-CSBPR-4040R19	G-CSBPL-4040R19	SPGN-190412	❍	❍	40	40	200	37	32	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-CSDPN

Style D
Square
Positive Rake
45° Lead





Neutral
Toolholder Shown

Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Neutral	Insert	N	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CSDPN-2020M12	SPGN-120308	❍	20	20	150	41	10	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4E	TK-02769
G-CSDPN-2525M12	SPGN-120308	❍	25	25	150	41	12,5	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4E	TK-02769
G-CSDPN-3232P12	SPGN-120308	❍	32	32	170	41	16	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4E	TK-02769
G-CSDPN-4040R12	SPGN-120308	❍	40	40	200	41	20	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4E	TK-02769
G-CSDPN-2525M19	SPGN-190412	❍	25	25	150	45	12,5	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6E	TK-02770
G-CSDPN-3232P19	SPGN-190412	❍	32	32	170	45	16	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6E	TK-02770
G-CSDPN-4040R19	SPGN-190412	❍	40	40	200	45	20	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6E	TK-02770

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

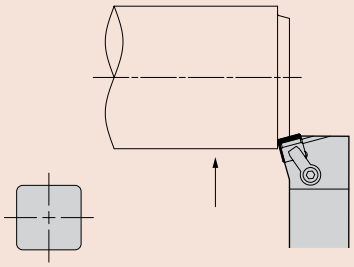
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● ● Stocked Standard

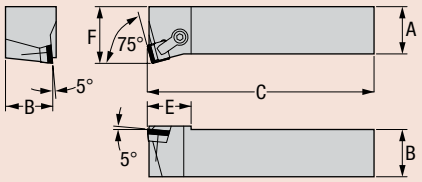
❍ ❍ 10 Business Days or Less

G-CSKPR/L

Style K
Square
Positive Rake
75° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CSKPR-2020M12	G-CSKPL-2020M12	SPGN-120308	❍	❍	20	20	150	29	25	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-8	CBS-4G	TK-02771
G-CSKPR-2525M12	G-CSKPL-2525M12	SPGN-120308	❍	❍	25	25	150	29	32	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-8	CBS-4G	TK-02771
G-CSKPR-3225P12	G-CSKPL-3225P12	SPGN-120308	❍	❍	25	32	170	29	32	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4G	TK-02772
G-CSKPR-3232P12	G-CSKPL-3232P12	SPGN-120308	❍	❍	32	32	170	29	40	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4G	TK-02772
G-CSKPR-4040R12	G-CSKPL-4040R12	SPGN-120308	❍	❍	40	40	200	29	50	SP-40	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBS-4G	TK-02772
G-CSKPR-2525M19	G-CSKPL-2525M19	SPGN 190412	❍	❍	25	25	150	38	32	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768
G-CSKPR-3225P19	G-CSKPL-3225P19	SPGN 190412	❍	❍	25	32	170	38	32	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768
G-CSKPR-3232P19	G-CSKPL-3232P19	SPGN 190412	❍	❍	32	32	170	38	40	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768
G-CSKPR-4040R19	G-CSKPL-4040R19	SPGN 190412	❍	❍	40	40	200	38	50	SP-60M	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBS-6G	TK-02768

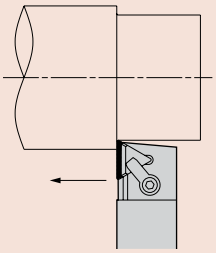
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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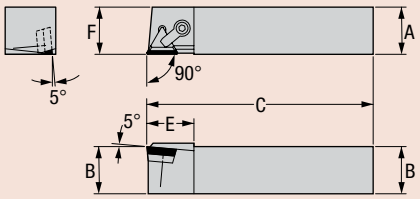
G-CTAPR/L

Style A
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Toolholder Shown

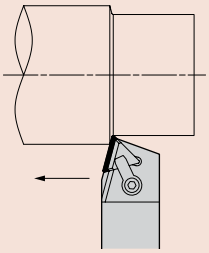


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CTAPR-2020M16	G-CTAPL-2020M16	TPGN-160308	❍	❍	20	20	150	25	20	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTAPR-2525M16	G-CTAPL-2525M16	TPGN-160308	❍	❍	25	25	150	25	25	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTAPR-3225P16	G-CTAPL-3225P16	TPGN-160308	❍	❍	25	32	170	25	25	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTAPR-2525M22	G-CTAPL-2525M22	TPGN-220408	❍	❍	25	25	150	32	25	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTAPR-3225P22	G-CTAPL-3225P22	TPGN-220408	❍	❍	25	32	170	32	25	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTAPR-3232P22	G-CTAPL-3232P22	TPGN-220408	❍	❍	32	32	170	32	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTAPR-4040R22	G-CTAPL-4040R22	TPGN-220408	❍	❍	40	40	200	32	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTAPR-2525M27	G-CTAPL-2525M27	TPGN-270612	❍	❍	25	25	150	35	25	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTAPR-3232P27	G-CTAPL-3232P27	TPGN-270612	❍	❍	32	32	170	35	32	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTAPR-4040R27	G-CTAPL-4040R27	TPGN-270612	❍	❍	40	40	200	35	40	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTAPR-4040R33	G-CTAPL-4040R33	TPGN-330924	❍	❍	40	40	200	40	40	SP-6	TFHCS M5-0.8x12mm	CLM-12	STCM-4	CBT-6G	TK-02776

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

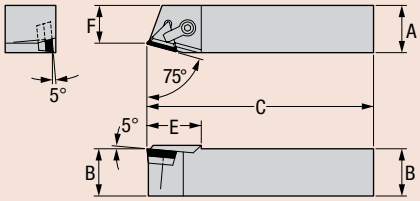
G-CTBPR/L

Style B
Triangle
Positive Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CTBPR-2020M16	G-CTBPL-2020M16	TPGN-160308	❍	❍	20	20	150	25	15	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTBPR-2525M16	G-CTBPL-2525M16	TPGN-160308	❍	❍	25	25	150	25	21	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTBPR-3225P16	G-CTBPL-3225P16	TPGN-160308	❍	❍	25	32	170	25	27	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTBPR-2525M22	G-CTBPL-2525M22	TPGN-220408	❍	❍	25	25	150	32	19	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTBPR-3225P22	G-CTBPL-3225P22	TPGN-220408	❍	❍	25	32	170	32	19	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTBPR-3232P22	G-CTBPL-3232P22	TPGN-220408	❍	❍	32	32	170	32	26	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTBPR-4040R22	G-CTBPL-4040R22	TPGN-220408	❍	❍	40	40	200	32	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTBPR-2525M27	G-CTBPL-2525M27	TPGN-270612	❍	❍	25	25	150	40	18	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTBPR-3225P27	G-CTBPL-3225P27	TPGN-270612	❍	❍	25	32	170	40	18	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTBPR-3232P27	G-CTBPL-3232P27	TPGN-270612	❍	❍	32	32	170	40	25	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTBPR-4040R27	G-CTBPL-4040R27	TPGN-270612	❍	❍	40	40	200	40	31	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTBPR-4040R33	G-CTBPL-4040R33	TPGN-330924	❍	❍	40	40	200	40	30	SP-6	TFHCS M5-0.8x12mm	CLM-12	STCM-4	CBT-6G	TK-02776

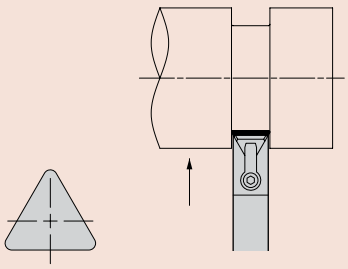
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

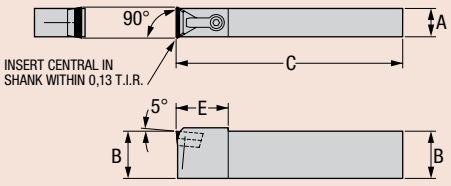
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

G-CTCPN

Style C
Triangle
Positive Rake
90° Lead Angle





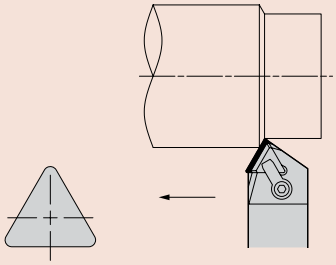
Neutral
Toolholder Shown

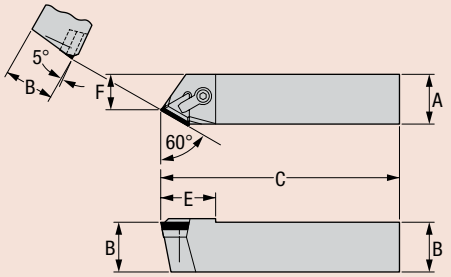
Part Number	Gage	Stock	Dimensions (millimeters)				Standard Components					* Tune-Up Kit
Neutral	Insert	N	A	B	C	E	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CTCPN-2512M16	TPGN-160308	❍	12	25	150	32	TSP-321	TFHCS M3-0.5x10mm	CLM-22	STCM-26	CBT-3G	TK-02830
G-CTCPN-2520M22	TPGN-220408	●	20	25	150	35	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	CBT-4G	TK-02831
G-CTCPN-3220P22	TPGN-220408	●	20	32	170	35	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	CBT-4G	TK-02831
G-CTCPN-4020R22	TPGN-220408	❍	20	40	200	35	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	CBT-4G	TK-02831
G-CTCPN-4025R27	TPGN-270612	❍	22	40	200	40	SP-5	TFHCS M5-0.8x12mm	CLM-30	STCM-4	CBT-5G	TK-02832

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-CTEOR/L

Style E
Triangle
Positive Rake
60° Lead Angle





Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components						* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker		Includes All Standard Components
G-CTEOR-1616M16	G-CTEOL-1616M16	TPGN-160308	❍	❍	16	16	150	27	10	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G		TK-02773
G-CTEOR-2020M16	G-CTEOL-2020M16	TPGN-160308	❍	❍	20	20	150	27	13	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G		TK-02773
G-CTEOR-2525M16	G-CTEOL-2525M16	TPGN-160308	❍	❍	25	25	150	27	19	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G		TK-02773
G-CTEOR-3225P16	G-CTEOL-3225P16	TPGN-160308	❍	❍	25	32	170	27	19	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G		TK-02773
G-CTEOR-2525M22	G-CTEOL-2525M22	TPGN-220408	❍	❍	25	25	150	35	16	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G		TK-02774
G-CTEOR-3225P22	G-CTEOL-3225P22	TPGN-220408	❍	❍	25	32	170	35	16	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G		TK-02774
G-CTEOR-3232P22	G-CTEOL-3232P22	TPGN-220408	❍	❍	32	32	170	35	22	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G		TK-02774
G-CTEOR-4040R22	G-CTEOL-4040R22	TPGN-220408	❍	❍	40	40	200	35	29	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G		TK-02774
G-CTEOR-3232P27	G-CTEOL-3232P27	TPGN-270612	❍	❍	32	32	170	39	20	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G		TK-02775
G-CTEOR-4040R27	G-CTEOL-4040R27	TPGN-270612	❍	❍	40	40	200	39	27	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G		TK-02775
G-CTEOR-4040R33	G-CTEOL-4040R33	TPGN-330924	❍	❍	40	40	200	45	24	SP-6	TFHCS M5-0.8x12mm	CLM-12	STCM-4	CBT-6G		TK-02776

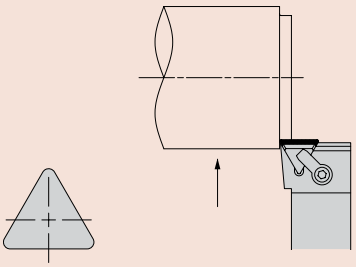
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

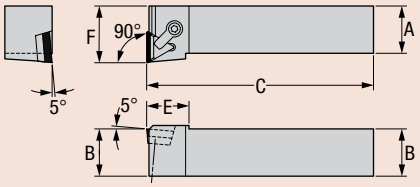
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G-CTFPR/L

Style F
Triangle
Positive Rake
90° Lead Angle



Right-Hand
Toolholder Shown

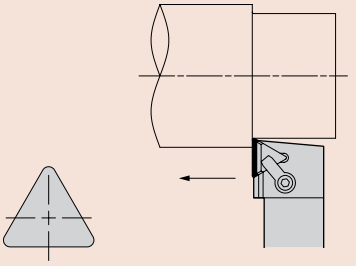


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CTFPR-1616M16	G-CTFPL-1616M16	TPGN-160308	❍	❍	16	16	150	25	22	TSP-321	TFHCS M3-0.5x10mm	CLM-6	STCM-25	CBT-3G	TK-02787
G-CTFPR-2020M16	G-CTFPL-2020M16	TPGN-160308	❍	❍	20	20	150	25	25	TSP-321	TFHCS M3-0.5x10mm	CLM-6	STCM-25	CBT-3G	TK-02787
G-CTFPR-2525M16	G-CTFPL-2525M16	TPGN-160308	❍	❍	25	25	150	25	32	TSP-321	TFHCS M3-0.5x10mm	CLM-6	STCM-25	CBT-3G	TK-02787
G-CTFPR-3225P16	G-CTFPL-3225P16	TPGN-160308	❍	❍	25	32	170	25	32	TSP-321	TFHCS M3-0.5x10mm	CLM-6	STCM-25	CBT-3G	TK-02787
G-CTFPR-2525M22	G-CTFPL-2525M22	TPGN-220408	❍	❍	25	25	150	28	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTFPR-3225P22	G-CTFPL-3225P22	TPGN-220408	❍	❍	25	32	170	28	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTFPR-3232P22	G-CTFPL-3232P22	TPGN-220408	❍	❍	32	32	170	28	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTFPR-4040R22	G-CTFPL-4040R22	TPGN-220408	❍	❍	40	40	200	28	50	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTFPR-2525M27	G-CTFPL-2525M27	TPGN-270612	❍	❍	25	25	150	40	32	SP-5	TFHCS M4-0.7x12mm	CLM-30	STCM-4	CBT-5G	TK-02800
G-CTFPR-3225P27	G-CTFPL-3225P27	TPGN-270612	❍	❍	25	32	170	40	32	SP-5	TFHCS M4-0.7x12mm	CLM-30	STCM-4	CBT-5G	TK-02800
G-CTFPR-3232P27	G-CTFPL-3232P27	TPGN-270612	❍	❍	32	32	170	40	40	SP-5	TFHCS M4-0.7x12mm	CLM-30	STCM-4	CBT-5G	TK-02800
G-CTFPR-4040R27	G-CTFPL-4040R27	TPGN-270612	❍	❍	40	40	200	40	50	SP-5	TFHCS M4-0.7x12mm	CLM-30	STCM-4	CBT-5G	TK-02800
G-CTFPR-4040R33	G-CTFPL-4040R33	TPGN-330924	–	–	40	40	200	40	50	SP-6	TFHCS M5-0.8x12mm	CLM-12	STCM-4	CBT-6G	TK-02776

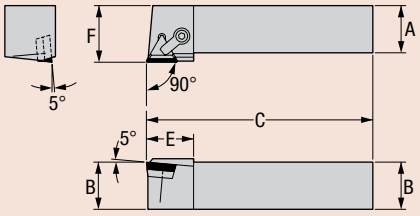
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

G-CTGPR/L

Style G
Triangle
Positive Rake
90° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Seat	Seat Screw	Clamp	Clamp Screw	Chip Breaker	Includes All Standard Components
G-CTGPR-1616M16	G-CTGPL-1616M16	TPGN-160308	❍	❍	16	16	150	25	22	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTGPR-2020M16	G-CTGPL-2020M16	TPGN-160308	❍	❍	20	20	150	25	25	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTGPR-2525M16	G-CTGPL-2525M16	TPGN-160308	❍	❍	25	25	150	25	32	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTGPR-3225P16	G-CTGPL-3225P16	TPGN-160308	❍	❍	25	32	170	25	32	TSP-321	TFHCS M3-0.5x10mm	CLM-7	STCM-25	CBT-3G	TK-02773
G-CTGPR-2525M22	G-CTGPL-2525M22	TPGN-220408	❍	❍	25	25	150	32	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTGPR-3225P22	G-CTGPL-3225P22	TPGN-220408	❍	❍	25	32	170	32	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTGPR-3232P22	G-CTGPL-3232P22	TPGN-220408	❍	❍	32	32	170	32	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTGPR-4040R22	G-CTGPL-4040R22	TPGN-220408	❍	❍	40	40	200	32	50	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	CBT-4G	TK-02774
G-CTGPR-2525M27	G-CTGPL-2525M27	TPGN-270612	❍	❍	25	25	150	35	32	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTGPR-3225P27	G-CTGPL-3225P27	TPGN-270612	❍	❍	25	32	170	35	32	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTGPR-3232P27	G-CTGPL-3232P27	TPGN-270612	❍	❍	32	32	170	35	40	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTGPR-4040R27	G-CTGPL-4040R27	TPGN-270612	❍	❍	40	40	200	35	50	SP-5	TFHCS M4-0.7x12mm	CLM-12	STCM-4	CBT-5G	TK-02775
G-CTGPR-4040R33	G-CTGPL-4040R33	TPGN-330924	❍	❍	40	40	200	40	50	SP-6	TFHCS M5-0.8x12mm	CLM-12	STCM-4	CBT-6G	TK-02776

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

Advanced Ceramic Toolholders

Greenleaf toolholder systems for use with ceramic inserts are based upon industry standard hardware. However, geometry and pocket depth are designed to maximize ceramic performance. Negative tools have a 10° negative side rake rather than the 5° usually found in tools for carbide inserts. This will increase clearance and, in turn, tool life. The additional pocket depth allows for thicker inserts with shims available to adjust the thickness stack-up for thinner tools if necessary.

The standard clamp is the long series to secure the inserts without a hole which is a stronger set-up. (Short clamps are an optional item.) All tools are fully heat-treated alloy steel and are qualified to ±0,07 on the "F" and "C" dimensions.

Greenleaf has designated a "C" prefix for a ceramic insert toolholder and an "H" prefix for ceramic insert toolholder for hard material machining.





Rough Stuff® Surface Treatment
Greatly improved insert-gripping power for greater accuracy, speed and pocket retention. Available on WG-300®, WG-600®, WG-700™, and GSN100™ ceramics.
U.S. Patent No. 6,712,564 B1

Greenleaf Tune-Up Kits

A Tune-Up Kit consists of all the standard hardware to refurbish a particular toolholder, boring bar, or milling cutter. A toolholder will have a readily visible, laser-inscribed Tune-Up Kit number on it for ease in ordering. This number will prevent any confusion created by searching a catalog for hardware, and it will help reduce downtime.

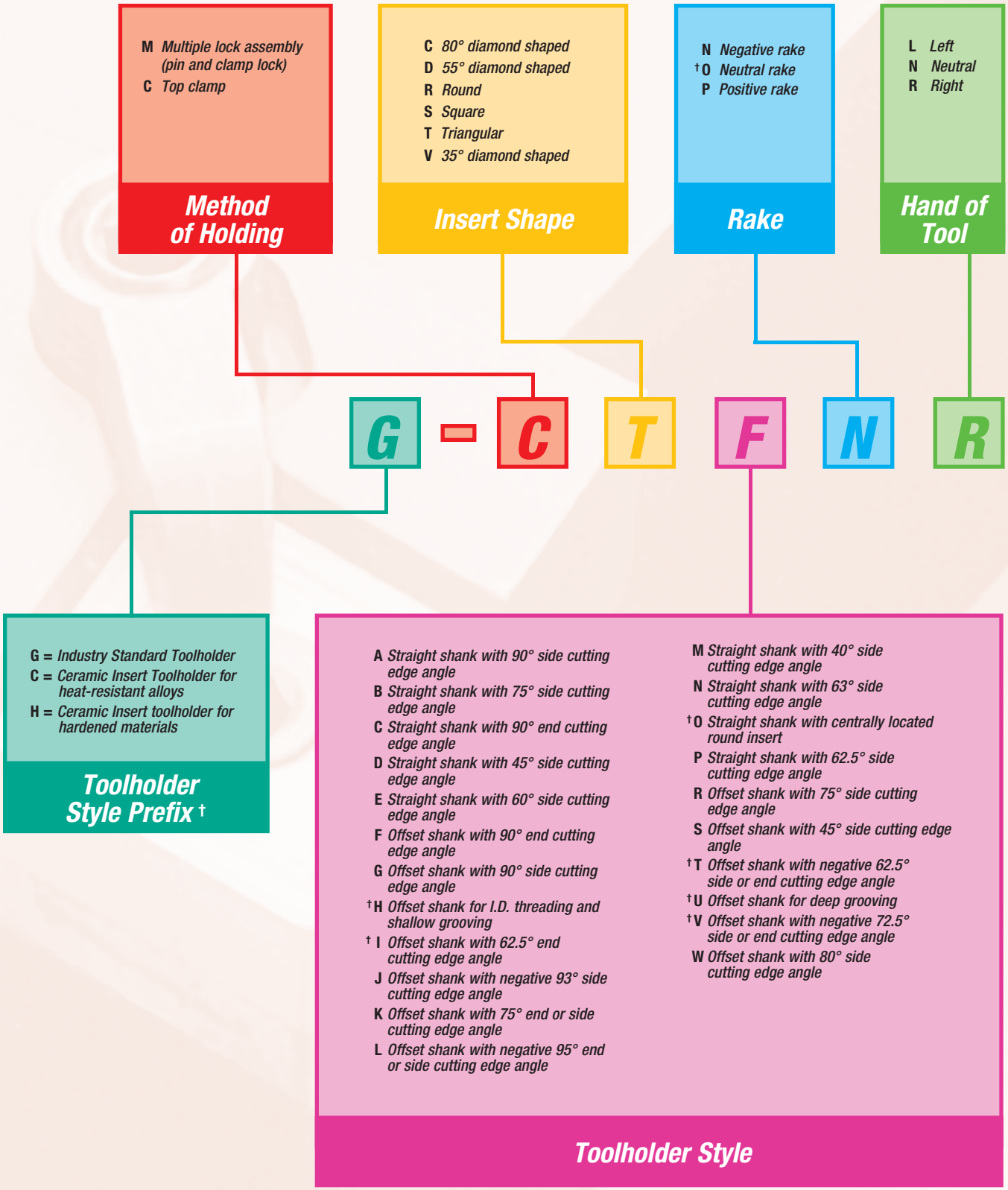


Greenleaf Corporation is continually upgrading its products. For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

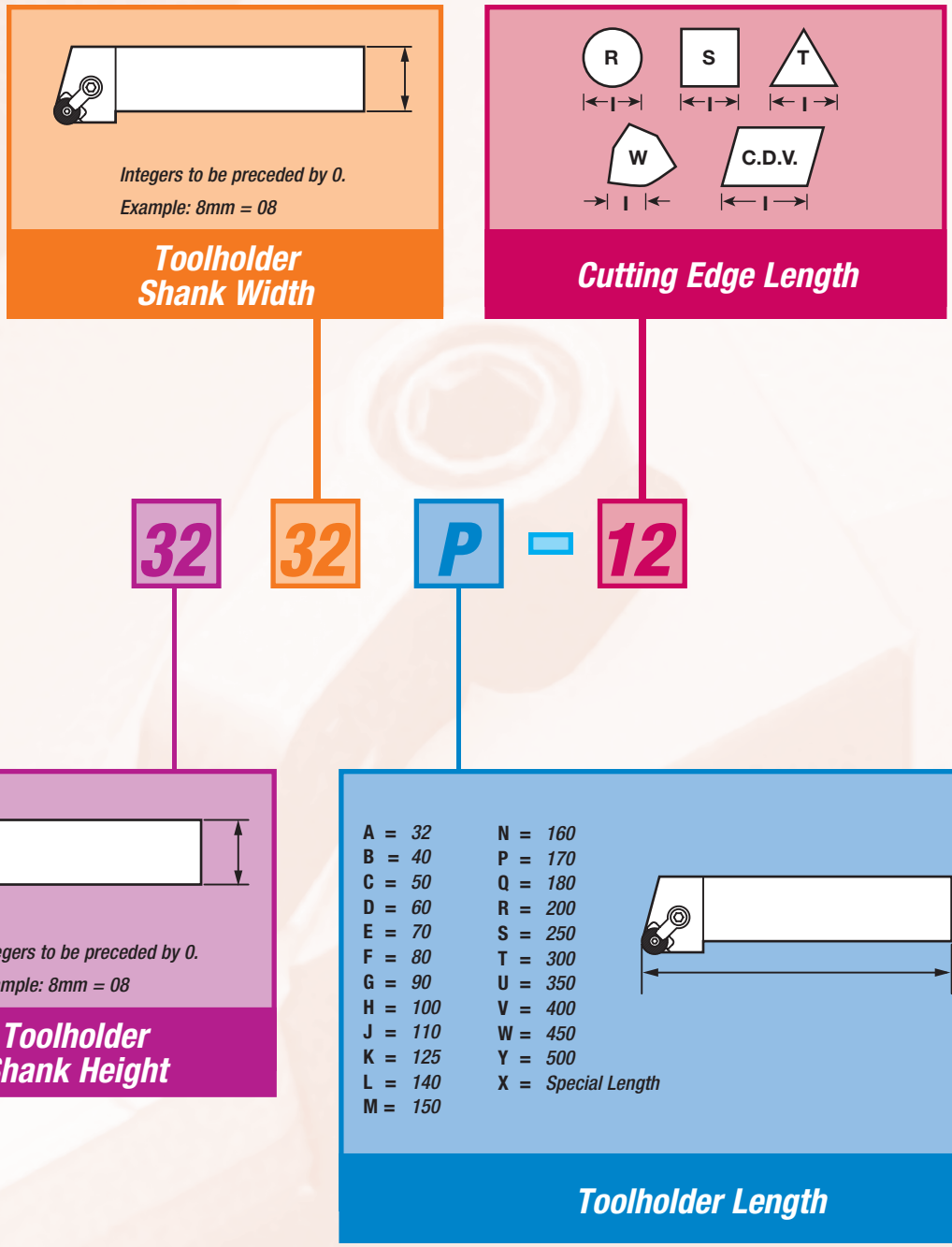
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Toolholder Identification System



† Greenleaf standard.

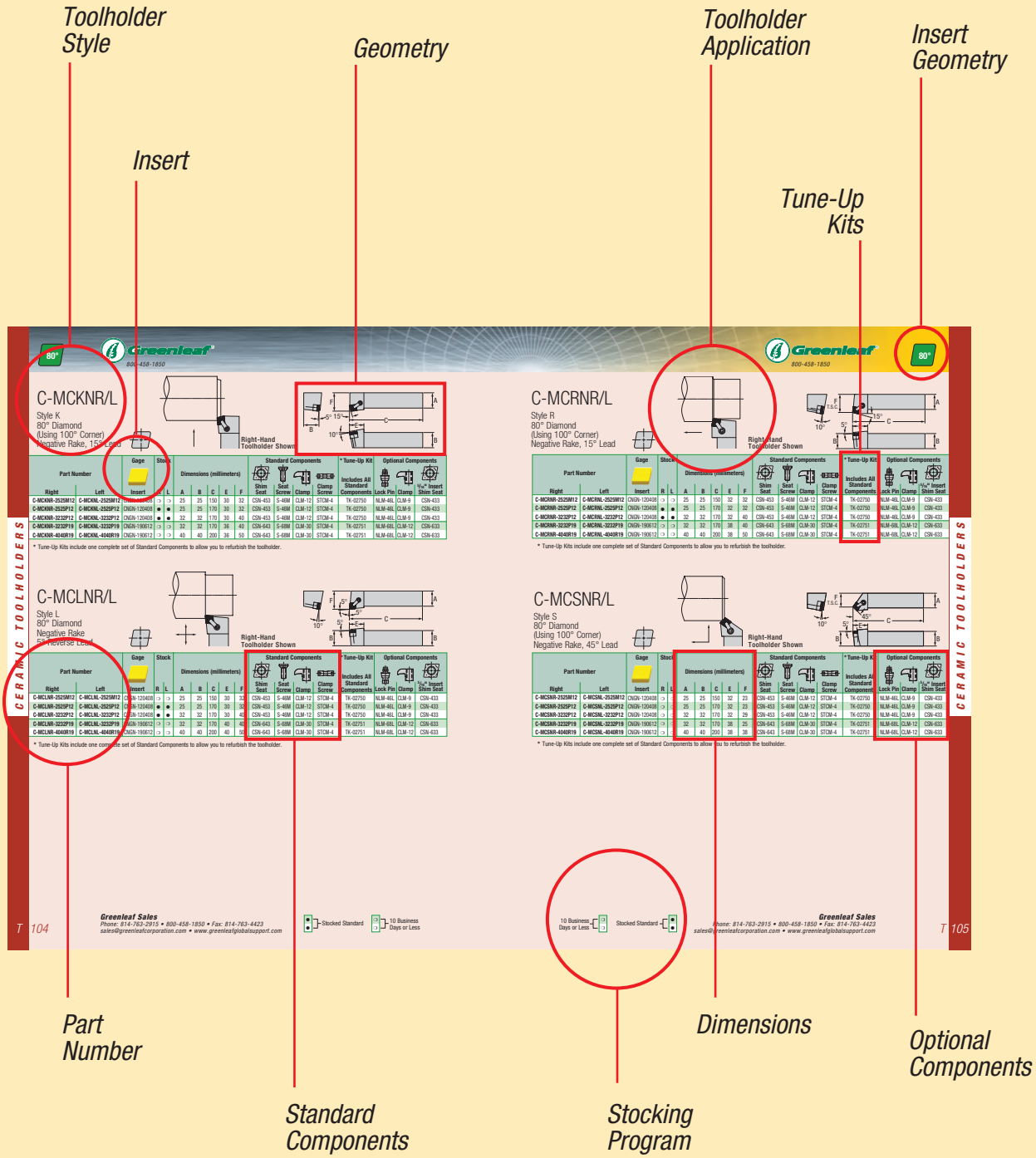
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NOTE:
All toolholders are qualified to ±0,07 over gage insert radius on the "C" and "F" dimensions as standard. Some toolholders are qualifiable on the "C" length dimension only.

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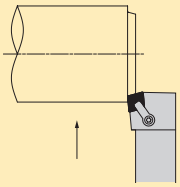
Advanced Ceramic Toolholder Usage Reference Guide



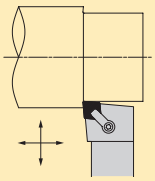
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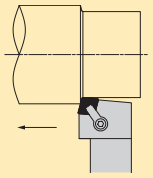
80°/100° Diamond – Negative



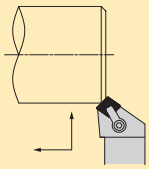
C-MCKNR/L
Style K
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 104



C-MCLNR/L
Style L
80° Diamond
Negative Rake
95° Lead Angle
page: T 104

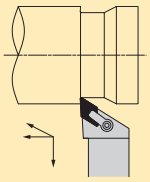


C-MCRNR/L
Style R
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 105

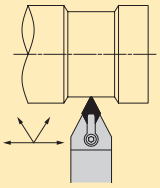


C-MCSNR/L
Style S
80° Diamond
(Using 100° Corner)
Negative Rake
45° Lead Angle
page: T 105

55° Diamond – Negative

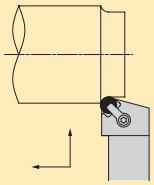


C-MDJNR/L
Style J
55° Diamond
Negative Rake
93° Lead Angle
page: T 106

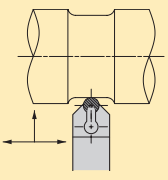


C-MDPNN
Style P
55° Diamond
Negative Rake
72,5° Lead Angle
page: T 106

Round – Negative

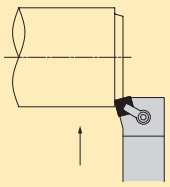


C-MRGNR/L
Style G
Round
Negative Rake
page: T 107

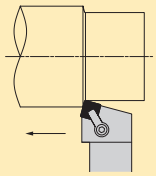


C-MRDNN
Style D
Round
Negative Rake
page: T 107

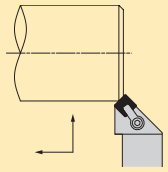
Square – Negative



C-MSKNR/L
Style K
Square
Negative Rake
75° Lead Angle
page: T 108

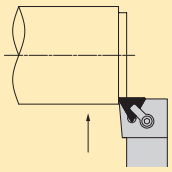


C-MSRNR/L
Style R
Square
Negative Rake
75° Lead Angle
page: T 108

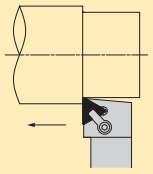


C-MSSNR/L
Style S
Square
Negative Rake
45° Lead Angle
page: T 109

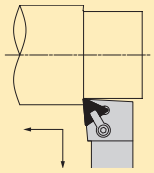
Triangle – Negative



C-MTFNR/L
Style F
Triangle
Negative Rake
90° Lead Angle
page: T 110

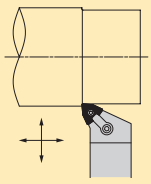


C-MTGNR/L
Style G
Triangle
Negative Rake
90° Lead Angle
page: T 110



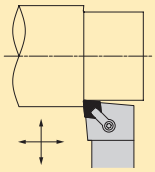
C-MTLNR/L
Style L
Triangle
Negative Rake
95° Lead Angle
page: T 111

Trigon – Negative

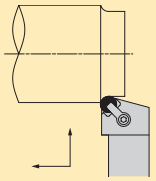


C-MWLNR/L
Style L
Trigon
Negative Rake
95° Lead Angle
page: T 111

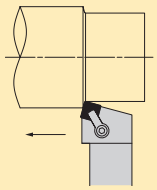
Hard-Turning – Negative



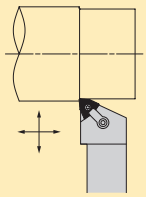
H-MCLNR/L
Style L
80° Diamond
Negative Rake
95° Lead Angle
page: T 112



H-MRGNR/L
Style G
Round
Negative Rake
page: T 112

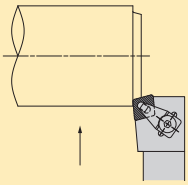


H-MSRNR/L
Style R
Square
Negative Rake
75° Lead Angle
page: T 113

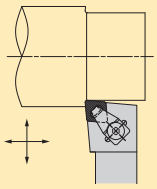


H-MWLNR/L
Style L
Trigon
Negative Rake
95° Lead Angle
page: T 113

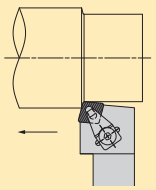
80°/100° Diamond – Positive



C-CCKPR/L
Style K
80° Diamond
(Using 100° Corner)
Positive Rake
75° Lead Angle
page: T 114

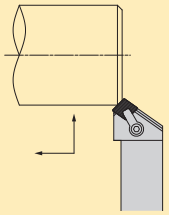


C-CCLPR/L
Style L
80° Diamond
Positive Rake
95° Lead Angle
page: T 114



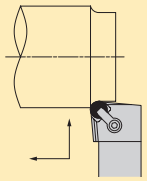
C-CCRPR/L
Style R
80° Diamond
(Using 100° Corner)
Positive Rake
75° Lead Angle
page: T 114

80°/100° Diamond – Positive *continued*



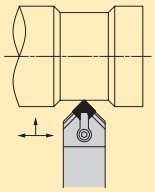
C-CCSPR/L
Style S
80° Diamond
(Using 100° Corner)
Positive Rake
45° Lead Angle
page: T 115

Round – Positive

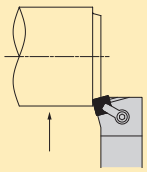


C-CRGPR/L
Style G
Round
Positive Rake
page: T 115

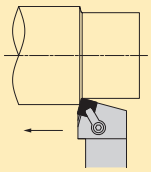
Square – Positive



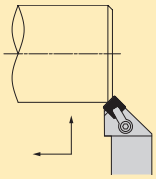
C-CSDPN
Style D
Square
Positive Rake
45° Lead Angle
page: T 116



C-CSKPR/L
Style K
Square
Positive Rake
75° Lead Angle
page: T 116



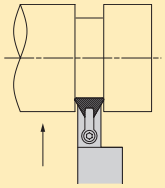
C-CSRPR/L
Style R
Square
Positive Rake
75° Lead Angle
page: T 117



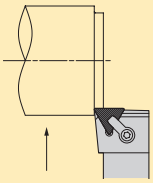
C-CSSPR/L
Style S
Square
Positive Rake
45° Lead Angle
page: T 117

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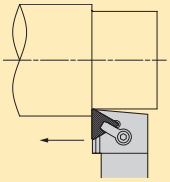
Triangle – Positive



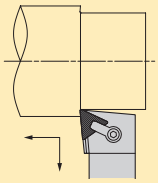
C-CTCPR/L
Style C
Triangle
Positive Rake
90° Lead Angle
page: T 118



C-CTFPR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 118



C-CTGPR/L
Style G
Triangle
Positive Rake
90° Lead Angle
page: T 119

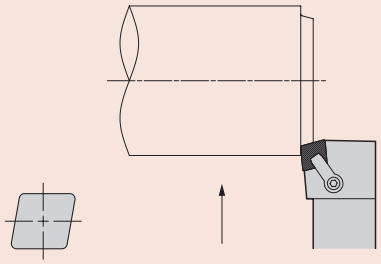


C-CTLPR/L
Style L
Triangle
Positive Rake
95° Lead Angle
page: T 119

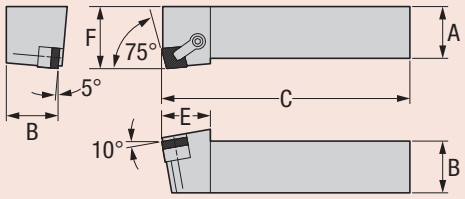
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C-MCKNR/L

Style K, 80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle



Right-Hand
Toolholder Shown

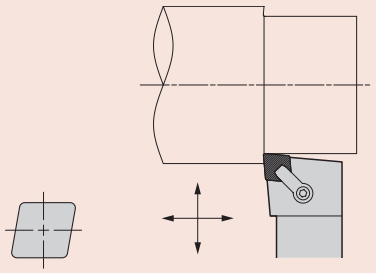


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
C-MCKNR-2525M12	C-MCKNL-2525M12	CNGN-120408	❍	❍	25	25	150	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCKNR-2525P12	C-MCKNL-2525P12	CNGN-120408	●	●	25	25	170	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCKNR-3232P12	C-MCKNL-3232P12	CNGN-120408	●	●	32	32	170	30	40	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCKNR-3232P19	C-MCKNL-3232P19	CNGN-190612	❍	❍	32	32	170	36	40	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633
C-MCKNR-4040R19	C-MCKNL-4040R19	CNGN-190612	❍	❍	40	40	200	36	50	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633

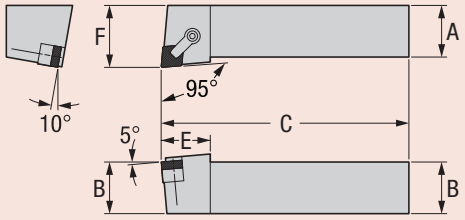
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

C-MCLNR/L

Style L
80° Diamond
Negative Rake
95° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
C-MCLNR-2525M12	C-MCLNL-2525M12	CNGN-120408	❍	❍	25	25	150	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCLNR-2525P12	C-MCLNL-2525P12	CNGN-120408	●	●	25	25	170	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCLNR-3232P12	C-MCLNL-3232P12	CNGN-120408	●	●	32	32	170	30	40	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCLNR-3232P19	C-MCLNL-3232P19	CNGN-190612	❍	❍	32	32	170	40	40	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633
C-MCLNR-4040R19	C-MCLNL-4040R19	CNGN-190612	❍	❍	40	40	200	40	50	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

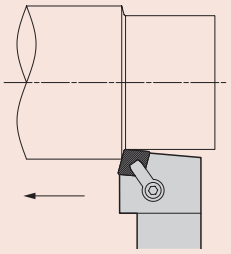
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

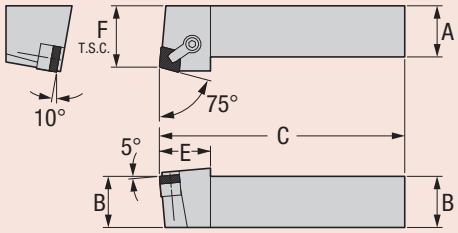
C-MCRNR/L

Style R, 80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown



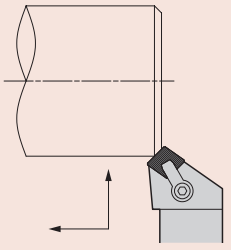
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
C-MCRNR-2525M12	C-MCRNL-2525M12	CNGN-120408	○	○	25	25	150	32	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCRNR-2525P12	C-MCRNL-2525P12	CNGN-120408	●	●	25	25	170	32	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCRNR-3232P12	C-MCRNL-3232P12	CNGN-120408	●	●	32	32	170	32	40	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCRNR-3232P19	C-MCRNL-3232P19	CNGN-190612	○	○	32	32	170	38	40	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633
C-MCRNR-4040R19	C-MCRNL-4040R19	CNGN-190612	○	○	40	40	200	38	50	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

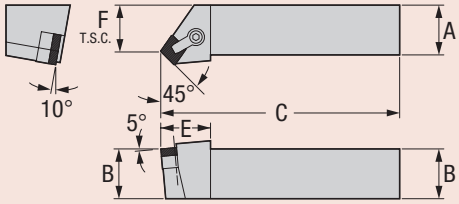
C-MCSNR/L

Style S, 80° Diamond
(Using 100° Corner)
Negative Rake
45° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
C-MCSNR-2525M12	C-MCSNL-2525M12	CNGN-120408	○	○	25	25	150	32	23	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCSNR-2525P12	C-MCSNL-2525P12	CNGN-120408	○	○	25	25	170	32	23	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCSNR-3232P12	C-MCSNL-3232P12	CNGN-120408	○	○	32	32	170	32	29	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
C-MCSNR-3232P19	C-MCSNL-3232P19	CNGN-190612	○	○	32	32	170	38	25	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633
C-MCSNR-4040R19	C-MCSNL-4040R19	CNGN-190612	○	○	40	40	200	38	38	CSN-643	S-68M	CLM-30	STCM-4	TK-02751	NLM-68L	CLM-12	CSN-633

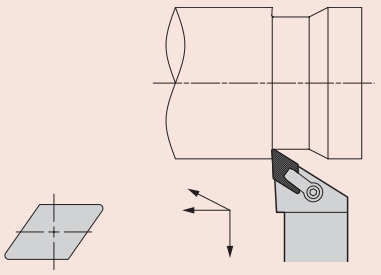
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

10 Business Days or Less ○ ○
Stocked Standard ● ●

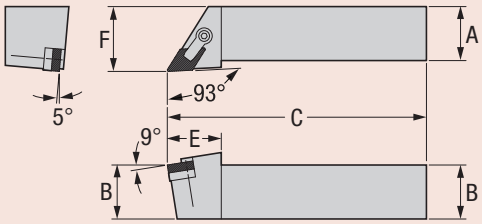
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C-MDJNR/L

Style J
55° Diamond
Negative Rake
93° Lead Angle



Right-Hand
Toolholder Shown

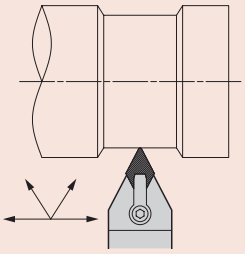


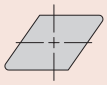
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
Right	Left	Insert	R	L	A	B	C	E	F							
C-MDJNR-2525M11	C-MDJNL-2525M11	DNGN-110308	❍	❍	25	25	150	25	32	DSN-333	S-34M	CLM-7	STCM-25	TK-02788	NLM-34L	CLM-6
C-MDJNR-2525P11	C-MDJNL-2525P11	DNGN-110308	❍	❍	25	25	170	25	32	DSN-333	S-34M	CLM-7	STCM-25	TK-02788	NLM-34L	CLM-6
C-MDJNR-3232P11	C-MDJNL-3232P11	DNGN-110308	❍	❍	32	32	170	25	40	DSN-333	S-34M	CLM-7	STCM-25	TK-02788	NLM-34L	CLM-6
C-MDJNR-2525M15	C-MDJNL-2525M15	DNGN-150408	❍	❍	25	25	150	32	32	DSN-433	S-46M	CLM-22	STCM-26	TK-02789	NLM-46	CLM-20
C-MDJNR-2525P15	C-MDJNL-2525P15	DNGN-150408	●	●	25	25	170	32	32	DSN-433	S-46M	CLM-22	STCM-26	TK-02789	NLM-46	CLM-20
C-MDJNR-3232P15	C-MDJNL-3232P15	DNGN-150408	●	●	32	32	170	32	40	DSN-433	S-46M	CLM-22	STCM-26	TK-02789	NLM-46	CLM-20
C-MDJNR-4040R15	C-MDJNL-4040R15	DNGN-150408	❍	❍	40	40	200	32	50	DSN-433	S-46M	CLM-22	STCM-26	TK-02789	NLM-46	CLM-20

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

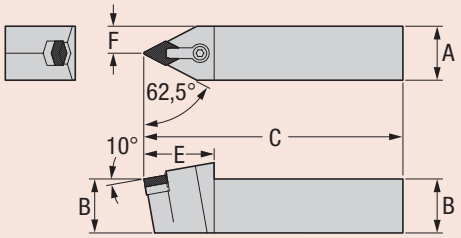
C-MDPNN

Style P
55° Diamond
Negative Rake
62,5° Lead Angle





Neutral
Toolholder Shown



Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components	
								Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
Neutral	Insert	Stock	A	B	C	E	F							
C-MDPNN-2525M11	DNGN-110308	❍	25	25	150	40	12,5	DSN-333	S-34M	CLM-12	STCM-4	TK-02785	NLM-34L	CLM-9
C-MDPNN-2525P11	DNGN-110308	❍	25	25	170	40	12,5	DSN-333	S-34M	CLM-12	STCM-4	TK-02785	NLM-34L	CLM-9
C-MDPNN-3232P11	DNGN-110308	❍	32	32	170	40	16	DSN-333	S-34M	CLM-12	STCM-4	TK-02785	NLM-34L	CLM-9
C-MDPNN-2525M15	DNGN-150408	❍	25	25	150	41	12,5	DSN-433	S-46M	CLM-30	STCM-4	TK-02786	NLM-46L	CLM-12
C-MDPNN-2525P15	DNGN-150408	●	25	25	170	41	12,5	DSN-433	S-46M	CLM-30	STCM-4	TK-02786	NLM-46L	CLM-12
C-MDPNN-3232P15	DNGN-150408	●	32	32	170	41	16	DSN-433	S-46M	CLM-30	STCM-4	TK-02786	NLM-46L	CLM-12
C-MDPNN-4040R15	DNGN-150408	❍	40	40	200	41	20	DSN-433	S-46M	CLM-30	STCM-4	TK-02786	NLM-46L	CLM-12

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

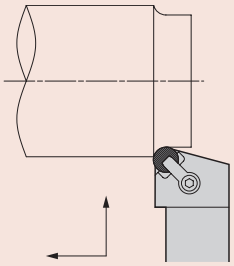
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

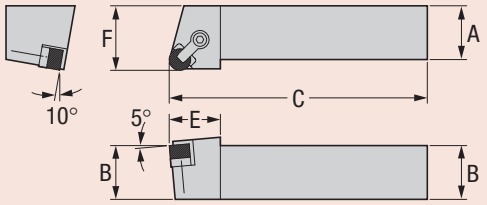
C-MRGNR/L

Style G
Round
Negative Rake





Right-Hand
Toolholder Shown

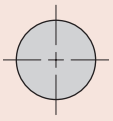


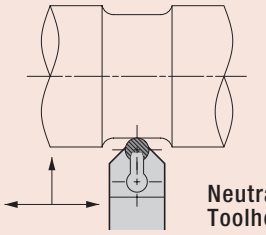
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit Includes All Std. Compo-nents	Optional Components #1		Optional Components #2	
										Shim Seat	Seat Screw	Clamp	Clamp Screw		Lock Pin	Clamp	Ins. Thk.	Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F									
C-MRGNR-2525M09	C-MRGNL-2525M09	RNGN-090400	❍	❍	25	25	150	25	32	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRGNR-2525P09	C-MRGNL-2525P09	RNGN-090400	❍	❍	25	25	170	25	32	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRGNR-3232P09	C-MRGNL-3232P09	RNGN-090400	❍	❍	32	32	170	25	40	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRGNR-2525M12	C-MRGNL-2525M12	RNGN-120700	❍	❍	25	25	150	30	32	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRGNR-2525P12	C-MRGNL-2525P12	RNGN-120700	●	●	25	25	170	30	32	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRGNR-3232P12	C-MRGNL-3232P12	RNGN-120700	●	●	32	32	170	30	40	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRGNR-4040R12	C-MRGNL-4040R12	RNGN-120700	❍	❍	40	40	200	30	50	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRGNR-2525M19	C-MRGNL-2525M19	RNGN-190700	❍	❍	25	25	150	38	32	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRGNR-2525P19	C-MRGNL-2525P19	RNGN-190700	❍	❍	25	25	170	38	32	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRGNR-3232P19	C-MRGNL-3232P19	RNGN-190700	❍	❍	32	32	170	38	40	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRGNR-4040R19	C-MRGNL-4040R19	RNGN-190700	❍	❍	40	40	200	38	50	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

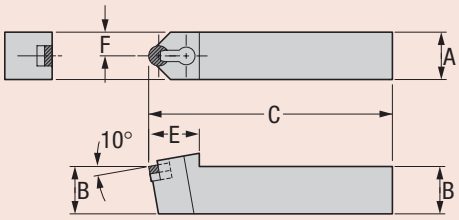
C-MRDNN

Style D
Round
Negative Rake





Neutral
Toolholder Shown



Part Number	Gage	Stock	Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components #1		Optional Components #2	
								Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	Insert Thcknss	Shim Seat
Neutral	Insert		A	B	C	E	F									
C-MRDNN-2525M09	RNGN-090400	❍	25	25	150	25	12,5	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRDNN-2525P09	RNGN-090400	❍	25	25	170	25	12,5	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRDNN-3232P09	RNGN-090400	❍	32	32	170	25	16	RSN-32	S-34M	CLM-7	STCM-25	TK-02790	NLM-34L	CLM-6	3,18	RSN-33
C-MRDNN-2525M12	RNGN-120700	❍	25	25	150	35	12,5	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRDNN-2525P12	RNGN-120700	●	25	25	170	35	12,5	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRDNN-3232P12	RNGN-120700	●	32	32	170	35	16	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRDNN-4040R12	RNGN-120700	❍	40	40	200	35	20	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	4,75	IRSN-45
C-MRDNN-2525M19	RNGN-190700	❍	25	25	150	40	12,5	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRDNN-2525P19	RNGN-190700	❍	25	25	170	40	12,5	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRDNN-3232P19	RNGN-190700	❍	32	32	170	40	16	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–
C-MRDNN-4040R19	RNGN-190700	❍	40	40	200	40	20	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	NLM-68L	CLM-12	–	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

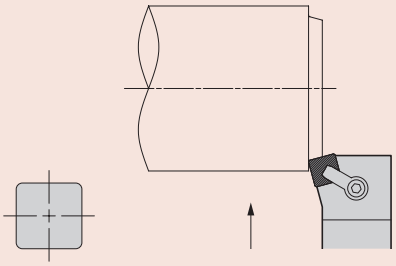
10 Business Days or Less ❍ ❍

Stocked Standard ● ●

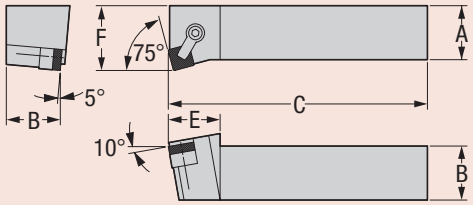
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C-MSKNR/L

Style K
Square
Negative Rake
75° Lead Angle



Right-Hand
Toolholder Shown

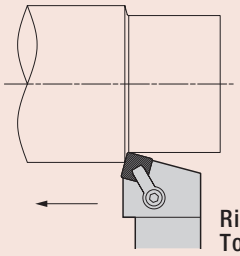


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F								
C-MSKNR-2525M12	C-MSKNL-2525M12	SNGN-120408	❍	❍	25	25	150	31	32	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSKNR-2525P12	C-MSKNL-2525P12	SNGN-120408	●	●	25	25	170	31	32	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSKNR-3232P12	C-MSKNL-3232P12	SNGN-120408	●	●	32	32	170	31	40	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSKNR-3232P15	C-MSKNL-3232P15	SNGN-150612	❍	❍	32	32	170	36	40	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSKNR-4040R15	C-MSKNL-4040R15	SNGN-150612	❍	❍	40	40	200	36	50	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSKNR-3232P19	C-MSKNL-3232P19	SNGN-190612	❍	❍	32	32	170	40	40	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623
C-MSKNR-4040R19	C-MSKNL-4040R19	SNGN-190612	❍	❍	40	40	200	40	50	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623

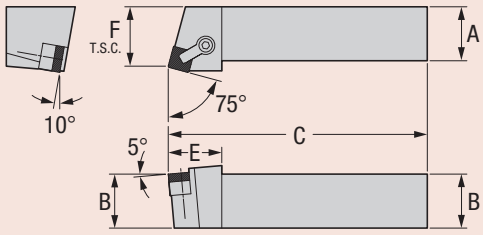
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** The lock pin option can NOT be used with this shim.

C-MSRNR/L

Style R
Square
Negative Rake
75° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F								
C-MSRNR-2525M12	C-MSRNL-2525M12	SNGN-120408	❍	❍	25	25	150	31	28	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSRNR-2525P12	C-MSRNL-2525P12	SNGN-120408	❍	❍	25	25	170	31	28	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSRNR-3232P12	C-MSRNL-3232P12	SNGN-120408	❍	❍	32	32	170	31	39	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSRNR-3232P15	C-MSRNL-3232P15	SNGN-150612	❍	❍	32	32	170	37	34	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSRNR-4040R15	C-MSRNL-4040R15	SNGN-150612	❍	❍	40	40	200	37	47	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSRNR-3232P19	C-MSRNL-3232P19	SNGN-190612	❍	❍	32	32	170	40	33	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623
C-MSRNR-4040R19	C-MSRNL-4040R19	SNGN-190612	❍	❍	40	40	200	40	46	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623

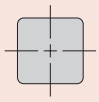
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** The lock pin option can NOT be used with this shim.

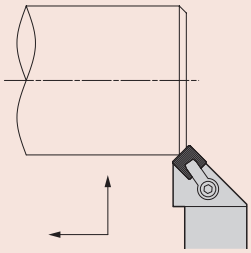
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

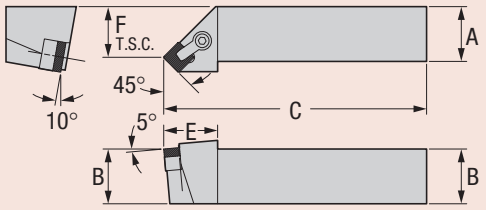
C-MSSNR/L

Style S
Square
Negative Rake
45° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
C-MSSNR-2525M12	C-MSSNL-2525M12	SNGN-120408	❍	❍	25	25	150	31	23	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSSNR-2525P12	C-MSSNL-2525P12	SNGN-120408	●	●	25	25	170	31	23	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSSNR-3232P12	C-MSSNL-3232P12	SNGN-120408	●	●	32	32	170	31	29	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
C-MSSNR-3232P15	C-MSSNL-3232P15	SNGN-150612	❍	❍	32	32	170	35	27	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSSNR-4040R15	C-MSSNL-4040R15	SNGN-150612	❍	❍	40	40	200	35	40	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9	–
C-MSSNR-3232P19	C-MSSNL-3232P19	SNGN-190612	❍	❍	32	32	170	38	25	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623
C-MSSNR-4040R19	C-MSSNL-4040R19	SNGN-190612	❍	❍	40	40	200	38	40	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12	**ISSN-623

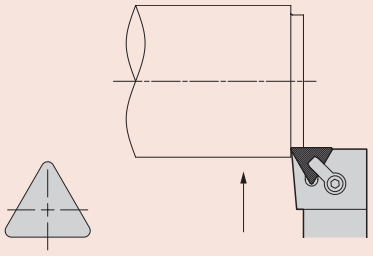
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** The lock pin option can NOT be used with this shim.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

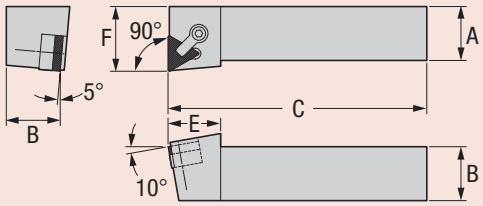
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C-MTFNR/L

Style F
Triangle
Negative Rake
90° Lead Angle



Right-Hand
Toolholder Shown

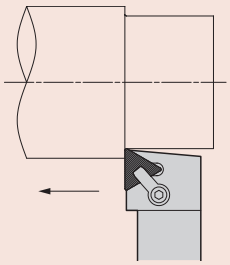


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F								
C-MTFNR-2525M16	C-MTFNL-2525M16	TNGN-160408	❍	❍	25	25	150	24	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTFNR-2525P16	C-MTFNL-2525P16	TNGN-160408	❍	❍	25	25	170	24	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTFNR-3232P16	C-MTFNL-3232P16	TNGN-160408	❍	❍	32	32	170	24	40	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTFNR-2525M22	C-MTFNL-2525M22	TNGN-220408	❍	❍	25	25	150	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTFNR-2525P22	C-MTFNL-2525P22	TNGN-220408	❍	❍	25	25	170	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTFNR-3232P22	C-MTFNL-3232P22	TNGN-220408	❍	❍	32	32	170	30	40	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTFNR-4040R22	C-MTFNL-4040R22	TNGN-220408	❍	❍	40	40	200	30	50	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

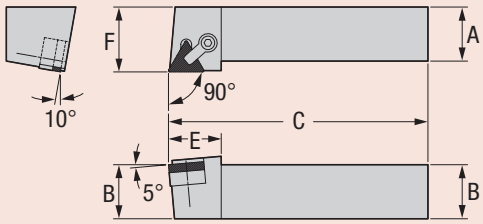
C-MTGNR/L

Style G
Triangle
Negative Rake
90° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F								
C-MTGNR-2525M16	C-MTGNL-2525M16	TNGN-160408	❍	❍	25	25	150	28	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTGNR-2525P16	C-MTGNL-2525P16	TNGN-160408	❍	❍	25	25	170	28	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTGNR-3232P16	C-MTGNL-3232P16	TNGN-160408	❍	❍	32	32	170	28	40	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTGNR-2525M22	C-MTGNL-2525M22	TNGN-220408	❍	❍	25	25	150	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTGNR-2525P22	C-MTGNL-2525P22	TNGN-220408	❍	❍	25	25	170	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTGNR-3232P22	C-MTGNL-3232P22	TNGN-220408	❍	❍	32	32	170	30	40	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTGNR-4040R22	C-MTGNL-4040R22	TNGN-220408	❍	❍	40	40	200	30	50	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** The lock pin option can NOT be used with this shim.

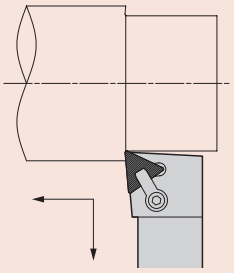
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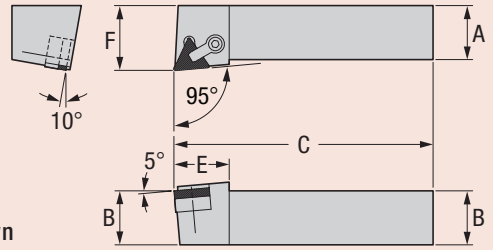
● ● Stocked Standard
❍ ❍ 10 Business Days or Less

C-MTLNR/L

Style L
Triangle
Negative Rake
95° Lead Angle







Right-Hand
Toolholder Shown

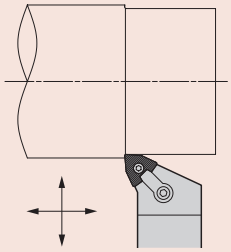
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
										Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
Right	Left	Insert	R	L	A	B	C	E	F								
C-MTLNR-2525M16	C-MTLNL-2525M16	TNGN-160408	❍	❍	25	25	150	28	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTLNR-2525P16	C-MTLNL-2525P16	TNGN-160408	❍	❍	25	25	170	28	32	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTLNR-3232P16	C-MTLNL-3232P16	TNGN-160408	❍	❍	32	32	170	28	40	ITSN-322	S-34M	CLM-7	STCM-25	TK-02809	NLM-34L	CLM-6	–
C-MTLNR-2525M22	C-MTLNL-2525M22	TNGN-220408	❍	❍	25	25	150	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTLNR-2525P22	C-MTLNL-2525P22	TNGN-220408	❍	❍	25	25	170	30	32	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTLNR-3232P22	C-MTLNL-3232P22	TNGN-220408	❍	❍	32	32	170	30	40	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433
C-MTLNR-4040R22	C-MTLNL-4040R22	TNGN-220408	❍	❍	40	40	200	30	50	ITSN-453	S-46M	CLM-12	STCM-4	TK-02810	NLM-46L	CLM-9	ITSN-433

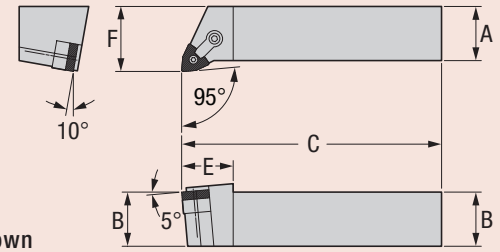
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

C-MWLNR/L

Style L
Trigon
Negative Rake
95° Lead Angle







Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
										Shim Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components
Right	Left	Insert	R	L	A	B	C	E	F					
C-MWLNR-2020M06	C-MWLNL-2020M06	WNGA-060408	❍	❍	20	20	150	25	25	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
C-MWLNR-2525M06	C-MWLNL-2525M06	WNGA-060408	❍	❍	25	25	150	25	32	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
C-MWLNR-3232P06	C-MWLNL-3232P06	WNGA-060408	❍	❍	32	32	170	25	40	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
C-MWLNR-4040R06	C-MWLNL-4040R06	WNGA-060408	❍	❍	40	40	200	25	50	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
C-MWLNR-2020M08	C-MWLNL-2020M08	WNGA-080408	❍	❍	20	20	150	27	25	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
C-MWLNR-2525M08	C-MWLNL-2525M08	WNGA-080408	❍	❍	25	25	150	27	32	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
C-MWLNR-3232P08	C-MWLNL-3232P08	WNGA-080408	❍	❍	32	32	170	27	40	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
C-MWLNR-4040R08	C-MWLNL-4040R08	WNGA-080408	❍	❍	40	40	200	27	50	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812

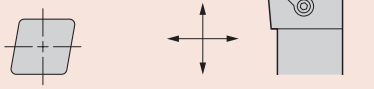
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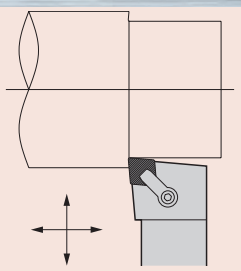
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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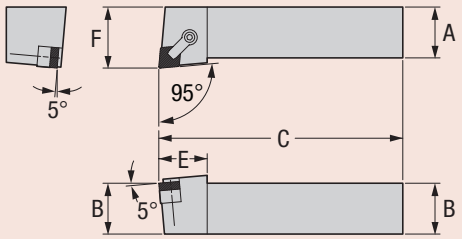
H-MCLNR/L

Style L
80° Diamond
Negative Rake
95° Lead Angle





Right-Hand
Toolholder Shown



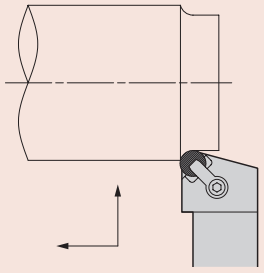
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7,92 Insert Shim Seat
H-MCLNR-2525M12	H-MCLNL-2525M12	CNGN-120408	❍	❍	25	25	150	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
H-MCLNR-2525P12	H-MCLNL-2525P12	CNGN-120408	●	●	25	25	170	30	32	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433
H-MCLNR-3232P12	H-MCLNL-3232P12	CNGN-120408	●	●	32	32	170	30	40	CSN-453	S-46M	CLM-12	STCM-4	TK-02750	NLM-46L	CLM-9	CSN-433

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

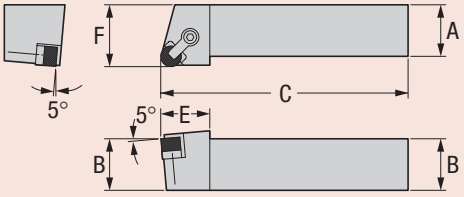
H-MRGNR/L

Style G
Round
Negative Rake





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	4,75 Insert Shim Seat
H-MRGNR-2525M12	H-MRGNL-2525M12	RNGN-120700	❍	❍	25	25	150	30	32	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	IRSN-45
H-MRGNR-2525P12	H-MRGNL-2525P12	RNGN-120700	●	●	25	25	170	30	32	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	IRSN-45
H-MRGNR-3232P12	H-MRGNL-3232P12	RNGN-120700	●	●	32	32	170	30	40	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	IRSN-45
H-MRGNR-3232R12	H-MRGNL-3232R12	RNGN-120700	❍	❍	40	40	200	30	50	IRSN-43	S-46M	CLM-12	STCM-4	TK-02791	NLM-46L	CLM-9	IRSN-45

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

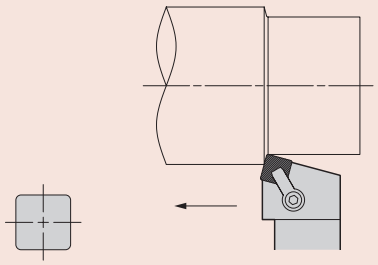
These toolholders are for hard turning with ceramic inserts using industry standard components.

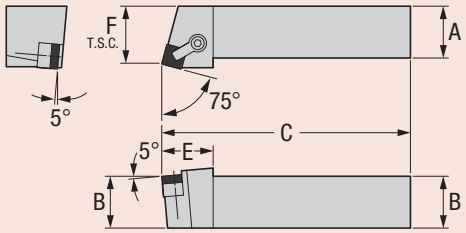
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

H-MSRNR/L

Style R
Square
Negative Rake
75° Lead Angle





Right-Hand
Toolholder Shown

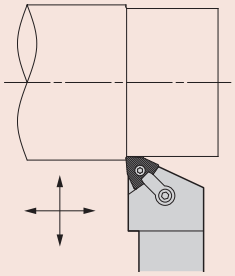
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp	7.92 Insert Shim Seat
H-MSRNR-2525M12	H-MSRNL-2525M12	SNGN-120408	❍	❍	25	25	150	31	28	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
H-MSRNR-2525P12	H-MSRNL-2525P12	SNGN-120408	❍	❍	25	25	170	31	28	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433
H-MSRNR-3232P12	H-MSRNL-3232P12	SNGN-120408	❍	❍	32	32	170	31	35	ISSN-453	S-46M	CLM-12	STCM-4	TK-02793	NLM-46L	CLM-9	ISSN-433

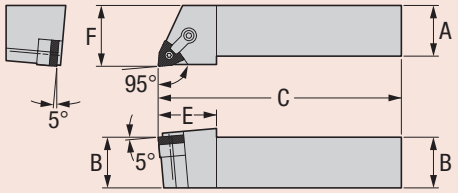
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

H-MWLNR/L

Style L
Trigon
Negative Rake
95° Lead Angle







Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
H-MWLNR-2020M06	H-MWLNL-2020M06	WNGA-060408	❍	❍	20	20	150	25	25	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
H-MWLNR-2525M06	H-MWLNL-2525M06	WNGA-060408	❍	❍	25	25	150	25	32	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
H-MWLNR-3232P06	H-MWLNL-3232P06	WNGA-060408	❍	❍	32	32	170	25	40	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
H-MWLNR-4040R06	H-MWLNL-4040R06	WNGA-060408	❍	❍	40	40	200	25	50	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811
H-MWLNR-2020M08	H-MWLNL-2020M08	WNGA-080408	❍	❍	20	20	150	27	25	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
H-MWLNR-2525M08	H-MWLNL-2525M08	WNGA-080408	❍	❍	25	25	150	27	32	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
H-MWLNR-3232P08	H-MWLNL-3232P08	WNGA-080408	❍	❍	32	32	170	27	40	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812
H-MWLNR-4040R08	H-MWLNL-4040R08	WNGA-080408	❍	❍	40	40	200	27	50	IWSN-453	NLM-46L	CLM-20	STCM-26	TK-02812

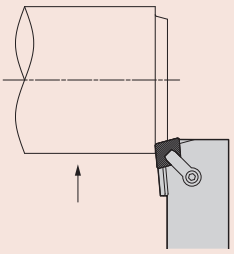
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

These toolholders are for hard turning with ceramic inserts using industry standard components.

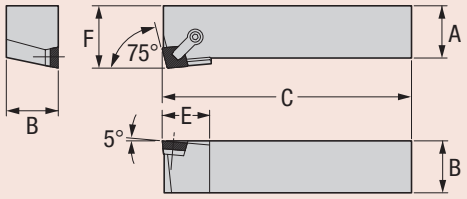
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C-CCKPR/L

Style K
80° Diamond (Using 100° Corner)
Positive Rake
75° Lead Angle



Right-Hand
Toolholder Shown

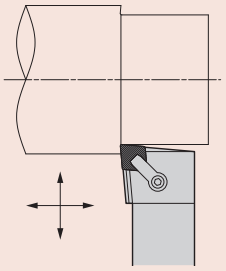


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CCKPR-2525M12	C-CCKPL-2525M12	CPGN-120408	❍	❍	25	25	150	30	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCKPR-2525P12	C-CCKPL-2525P12	CPGN-120408	❍	❍	25	25	170	30	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCKPR-3232P12	C-CCKPL-3232P12	CPGN-120408	❍	❍	32	32	170	30	40	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

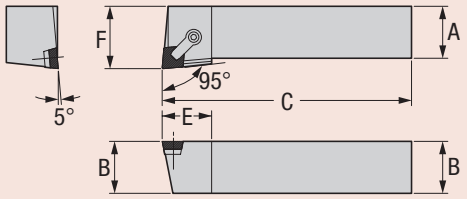
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

C-CCLPR/L

Style L
80° Diamond
Positive Rake
95° Lead Angle



Right-Hand
Toolholder Shown

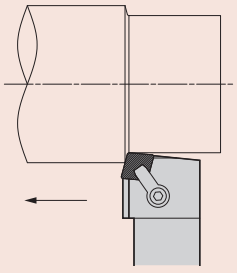


Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CCLPR-2525M12	C-CCLPL-2525M12	CPGN-120408	❍	❍	25	25	150	30	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCLPR-2525P12	C-CCLPL-2525P12	CPGN-120408	❍	❍	25	25	170	30	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCLPR-3232P12	C-CCLPL-3232P12	CPGN-120408	❍	❍	32	32	170	30	40	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

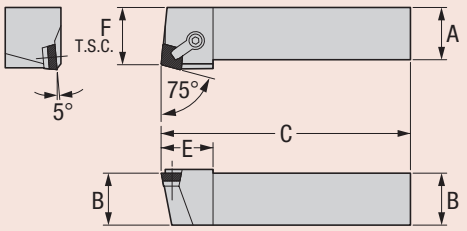
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

C-CCRPR/L

Style R
80° Diamond (Using 100° Corner)
Positive Rake
75° Lead Angle



Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CCRPR-2525M12	C-CCRPL-2525M12	CPGN-120408	❍	❍	25	25	150	32	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCRPR-2525P12	C-CCRPL-2525P12	CPGN-120408	❍	❍	25	25	170	32	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCRPR-3232P12	C-CCRPL-3232P12	CPGN-120408	❍	❍	32	32	170	32	40	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

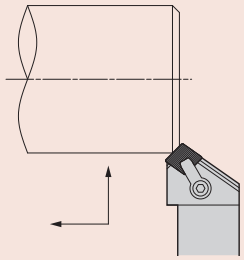
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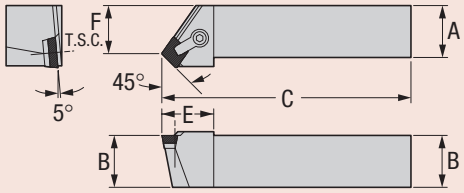
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

C-CCSPR/L

Style S
80° Diamond (Using 100° Corner)
Positive Rake
45° Lead Angle





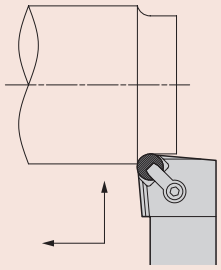
Right-Hand
Toolholder Shown

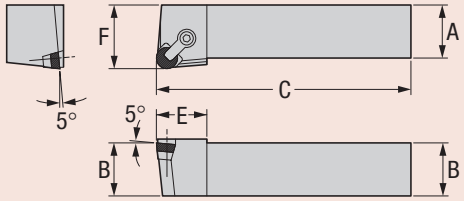
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CCSPR-2525M12	C-CCSPL-2525M12	CPGN-120408	❍	❍	25	25	150	32	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCSPR-2525P12	C-CCSPL-2525P12	CPGN-120408	❍	❍	25	25	170	32	32	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
C-CCSPR-3232P12	C-CCSPL-3232P12	CPGN-120408	❍	❍	32	32	170	32	40	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

C-CRGPR/L

Style G
Round
Positive Rake





Right-Hand
Toolholder Shown

Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CRGPR-2525M09	C-CRGPL-2525M09	RPGN-090300	❍	❍	25	25	150	25	32	SP-34	TSHCS M2-0.4x6mm	CLM-7	STCM-25	TK-02813
C-CRGPR-2525P09	C-CRGPL-2525P09	RPGN-090300	❍	❍	25	25	170	25	32	SP-34	TSHCS M2-0.4x6mm	CLM-7	STCM-25	TK-02813
C-CRGPR-3232P09	C-CRGPL-3232P09	RPGN-090300	❍	❍	32	32	170	25	40	SP-34	TSHCS M2-0.4x6mm	CLM-7	STCM-25	TK-02813
C-CRGPR-2525M12	C-CRGPL-2525M12	RPGN-120400	❍	❍	25	25	150	30	32	SP-44	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02814
C-CRGPR-2525P12	C-CRGPL-2525P12	RPGN-120400	●	●	25	25	170	30	32	SP-44	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02814
C-CRGPR-3232P12	C-CRGPL-3232P12	RPGN-120400	●	●	32	32	170	30	40	SP-44	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02814
C-CRGPR-4040R12	C-CRGPL-4040R12	RPGN-120400	❍	❍	40	40	200	30	50	SP-44	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02814

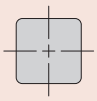
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

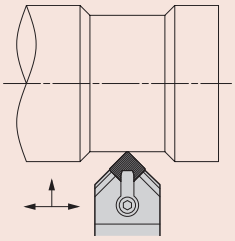
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Stocked Standard ● ●

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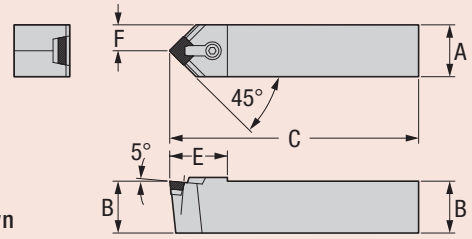
C-CSDPN

Style D
Square
Positive Rake
45° Lead Angle





Neutral
Toolholder Shown

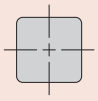


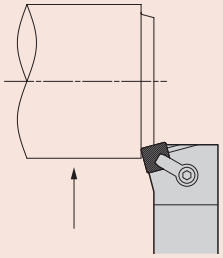
Part Number	Gage Insert	Stock	Dimensions (millimeters) A	B	C	E	F	Standard Components Shim Seat	Seat Screw	Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components
C-CSDPN-2525M12	SPGN-120408	❍	25	25	150	35	12,5	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSDPN-2525P12	SPGN-120408	●	25	25	170	35	12,5	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSDPN-3232P12	SPGN-120408	●	32	32	170	35	16	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

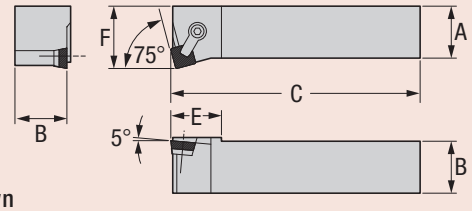
C-CSKPR/L

Style K
Square
Positive Rake
75° Lead Angle





Right-Hand
Toolholder Shown



Part Number Right	Left	Gage Insert	Stock R	L	Dimensions (millimeters) A	B	C	E	F	Standard Components Shim Seat	Seat Screw	Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components
C-CSKPR-2525M12	**C-CSKPL-2525M12**	SPGN-120408	❍	❍	25	25	150	31	32	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSKPR-2525P12	**C-CSKPL-2525P12**	SPGN-120408	❍	❍	25	25	170	31	32	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSKPR-3232P12	**C-CSKPL-3232P12**	SPGN-120408	❍	❍	32	32	170	31	40	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

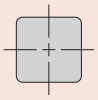
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

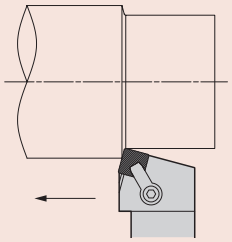
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● Stocked Standard
❍ 10 Business Days or Less

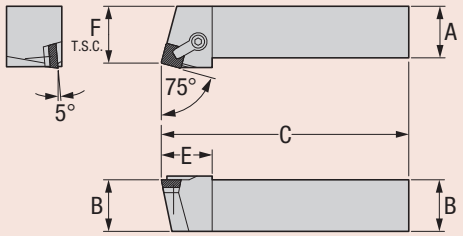
C-CSRPR/L

Style R
Square
Positive Rake
75° Lead Angle





Right-Hand
Toolholder Shown

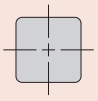


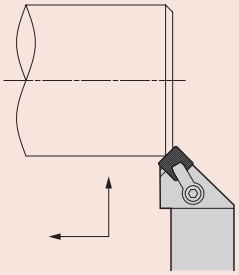
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CSRPR-2525M12	C-CSRPL-2525M12	SPGN-120408	❍	❍	25	25	150	31	28	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSRPR-2525P12	C-CSRPL-2525P12	SPGN-120408	❍	❍	25	25	170	31	28	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSRPR-3232P12	C-CSRPL-3232P12	SPGN-120408	❍	❍	32	32	170	31	35	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

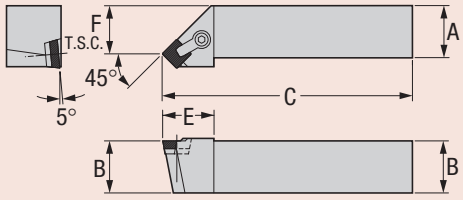
C-CSSPR/L

Style S
Square
Positive Rake
45° Lead





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CSSPR-2525M12	C-CSSPL-2525M12	SPGN-120408	❍	❍	25	25	150	31	23	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSSPR-2525P12	C-CSSPL-2525P12	SPGN-120408	❍	❍	25	25	170	31	23	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
C-CSSPR-3232P12	C-CSSPL-3232P12	SPGN-120408	❍	❍	32	32	170	31	29	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

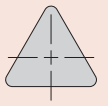
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

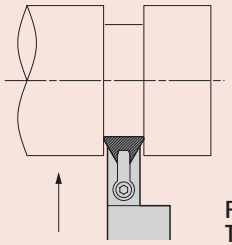
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Stocked Standard ● ●

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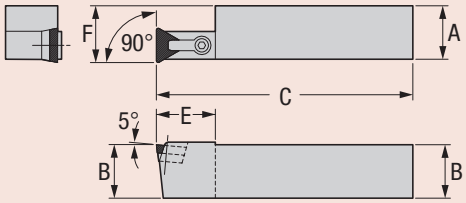
C-CTCPR/L

Style C
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Toolholder Shown

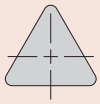


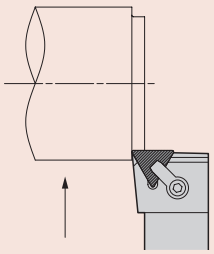
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CTCPR-2525M16	C-CTCPL-2525M16	TPGN-160308	❍	❍	25	25	150	29	26,2	SP3A	TFHCS M3-0.5x10mm	CLM-22	STCM-26	TK-02815
C-CTCPR-2525P16	C-CTCPL-2525P16	TPGN-160308	❍	❍	25	25	170	29	26,2	SP3A	TFHCS M3-0.5x10mm	CLM-22	STCM-26	TK-02815
C-CTCPR-3232P16	C-CTCPL-3232P16	TPGN-160308	❍	❍	32	32	170	29	33,2	SP3A	TFHCS M3-0.5x10mm	CLM-22	STCM-26	TK-02815
C-CTCPR-2525M22	C-CTCPL-2525M22	TPGN-220408	❍	❍	25	25	150	35	27	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	TK-02816
C-CTCPR-2525P22	C-CTCPL-2525P22	TPGN-220408	❍	❍	25	25	170	35	27	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	TK-02816
C-CTCPR-3232P22	C-CTCPL-3232P22	TPGN-220408	❍	❍	32	32	170	35	34	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	TK-02816
C-CTCPR-4040R22	C-CTCPL-4040R22	TPGN-220408	❍	❍	40	40	200	35	42	SP-4	TFHCS M3-0.5x12mm	CLM-30	STCM-4	TK-02816

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

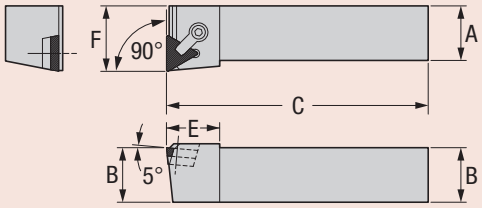
C-CTFPR/L

Style F
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CTFPR-2525M16	C-CTFPL-2525M16	TPGN-160308	❍	❍	25	25	150	24	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTFPR-2525P16	C-CTFPL-2525P16	TPGN-160308	❍	❍	25	25	170	24	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTFPR-3232P16	C-CTFPL-3232P16	TPGN-160308	❍	❍	32	32	170	24	40	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTFPR-2525M22	C-CTFPL-2525M22	TPGN-220408	❍	❍	25	25	150	31	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTFPR-2525P22	C-CTFPL-2525P22	TPGN-220408	❍	❍	25	25	170	31	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTFPR-3232P22	C-CTFPL-3232P22	TPGN-220408	❍	❍	32	32	170	31	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTFPR-4040R22	C-CTFPL-4040R22	TPGN-220408	❍	❍	40	40	200	31	50	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818

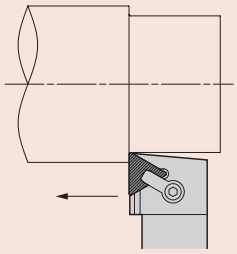
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

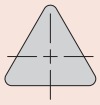
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

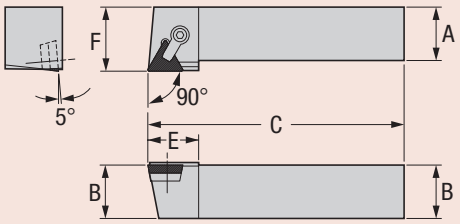
C-CTGPR/L

Style G
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Toolholder Shown

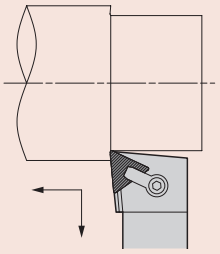


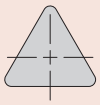
Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CTGPR-2525M16	C-CTGPL-2525M16	TPGN-160308	❍	❍	25	25	150	28	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTGPR-2525P16	C-CTGPL-2525P16	TPGN-160308	❍	❍	25	25	170	28	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTGPR-3232P16	C-CTGPL-3232P16	TPGN-160308	❍	❍	32	32	170	28	40	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTGPR-2525M22	C-CTGPL-2525M22	TPGN-220408	❍	❍	25	25	150	30	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTGPR-2525P22	C-CTGPL-2525P22	TPGN-220408	❍	❍	25	25	170	30	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTGPR-3232P22	C-CTGPL-3232P22	TPGN-220408	❍	❍	32	32	170	30	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTGPR-4040R22	C-CTGPL-4040R22	TPGN-220408	❍	❍	40	40	200	30	50	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

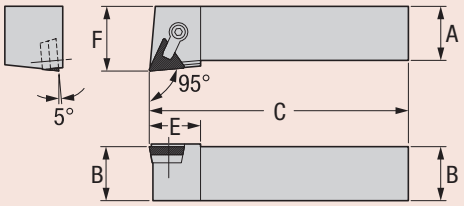
C-CTLPR/L

Style L
Triangle
Positive Rake
95° Lead Angle





Right-Hand
Toolholder Shown



Part Number		Gage	Stock		Dimensions (millimeters)					Standard Components				*Tune-Up Kit
Right	Left	Insert	R	L	A	B	C	E	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
C-CTLPR-2525M16	C-CTLPL-2525M16	TPGN-160308	❍	❍	25	25	150	28	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTLPR-2525P16	C-CTLPL-2525P16	TPGN-160308	❍	❍	25	25	170	28	32	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTLPR-3232P16	C-CTLPL-3232P16	TPGN-160308	❍	❍	32	32	170	28	40	SP3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
C-CTLPR-2525M22	C-CTLPL-2525M22	TPGN-220408	❍	❍	25	25	150	30	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTLPR-2525P22	C-CTLPL-2525P22	TPGN-220408	❍	❍	25	25	170	30	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTLPR-3232P22	C-CTLPL-3232P22	TPGN-220408	❍	❍	32	32	170	30	40	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818
C-CTLPR-4040R22	C-CTLPL-4040R22	TPGN-220408	❍	❍	40	40	200	30	50	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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Industry-Standard Boring Bars for Carbide Inserts

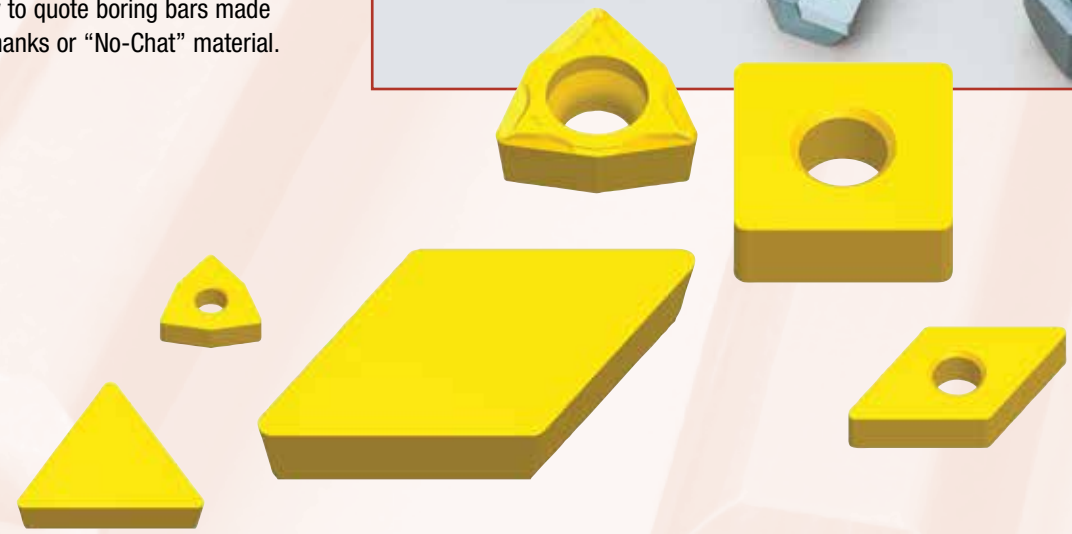
The boring bar systems and cartridges in this catalog are designed around industry standard hardware. This gives complete interchangeability with other tooling components and minimizes spare parts inventories.

Most bars incorporate “through the bar” coolant feed with directable outlet nozzle.

Greenleaf uses heat treated alloy steel to insure a consistent high quality product for maximum life performance.

Custom engineered tooling is a Greenleaf specialty and we will be pleased to quote your special requirements for boring. Additionally, Greenleaf has the capability to quote boring bars made of heavy metal shanks or “No-Chat” material.



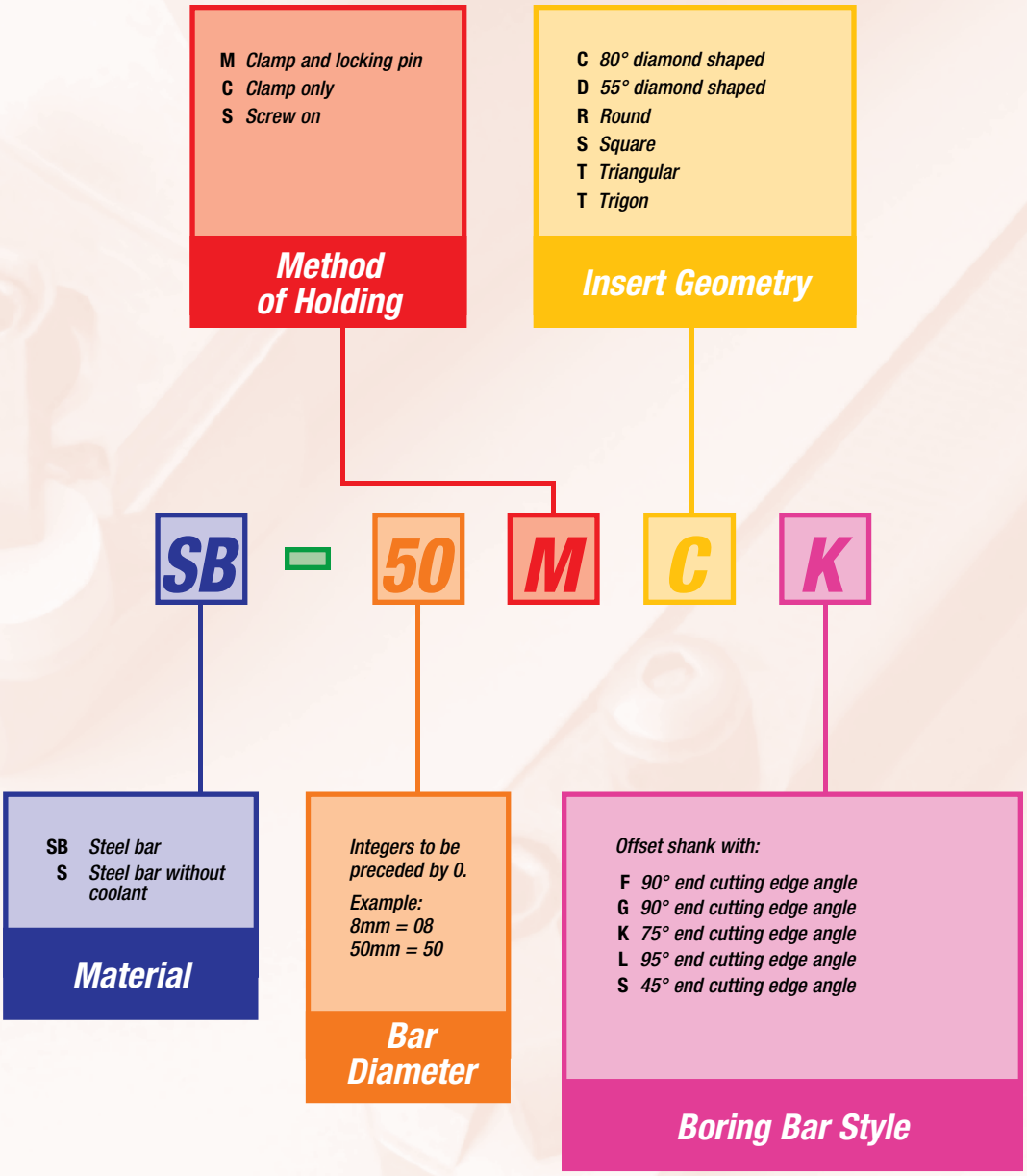


Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

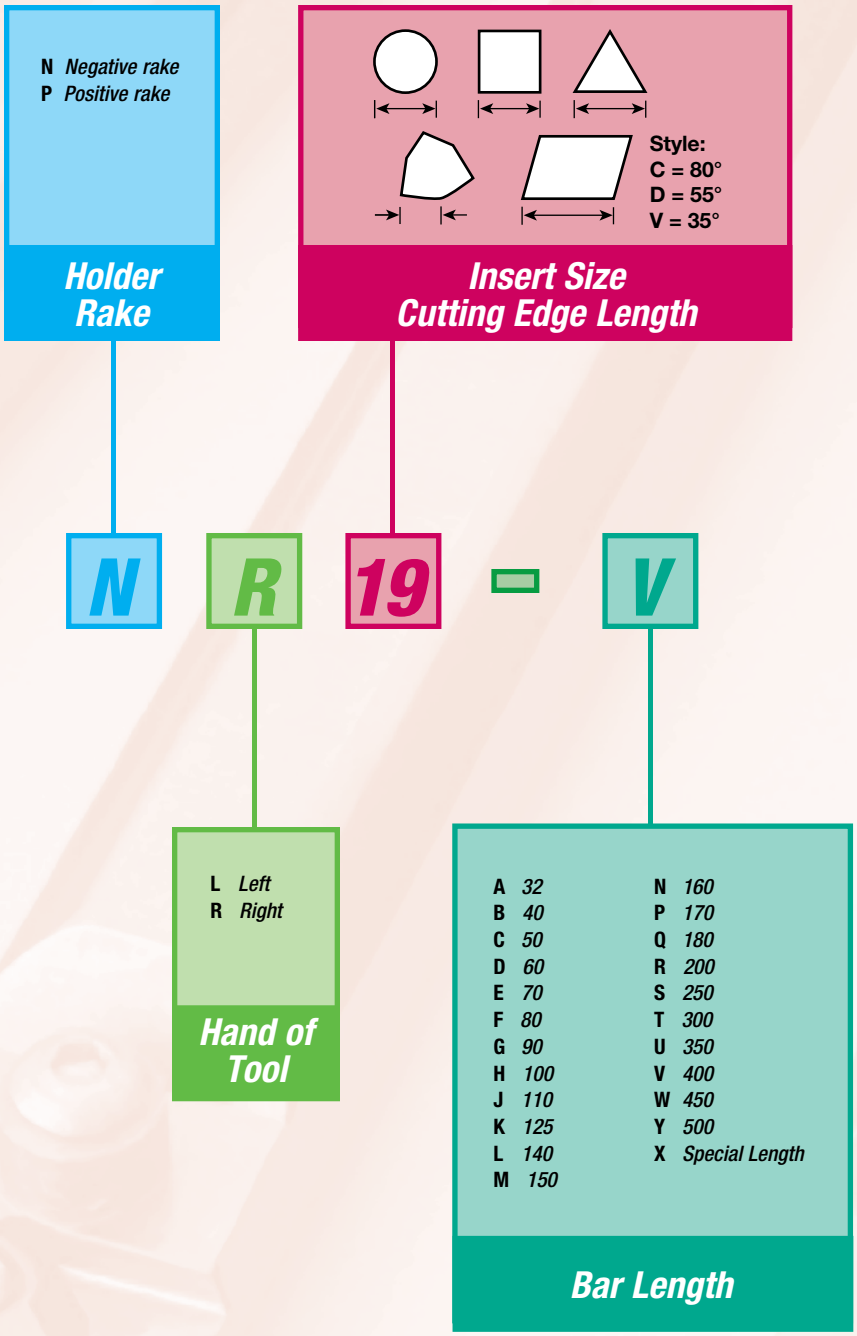
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Boring Bar Identification System

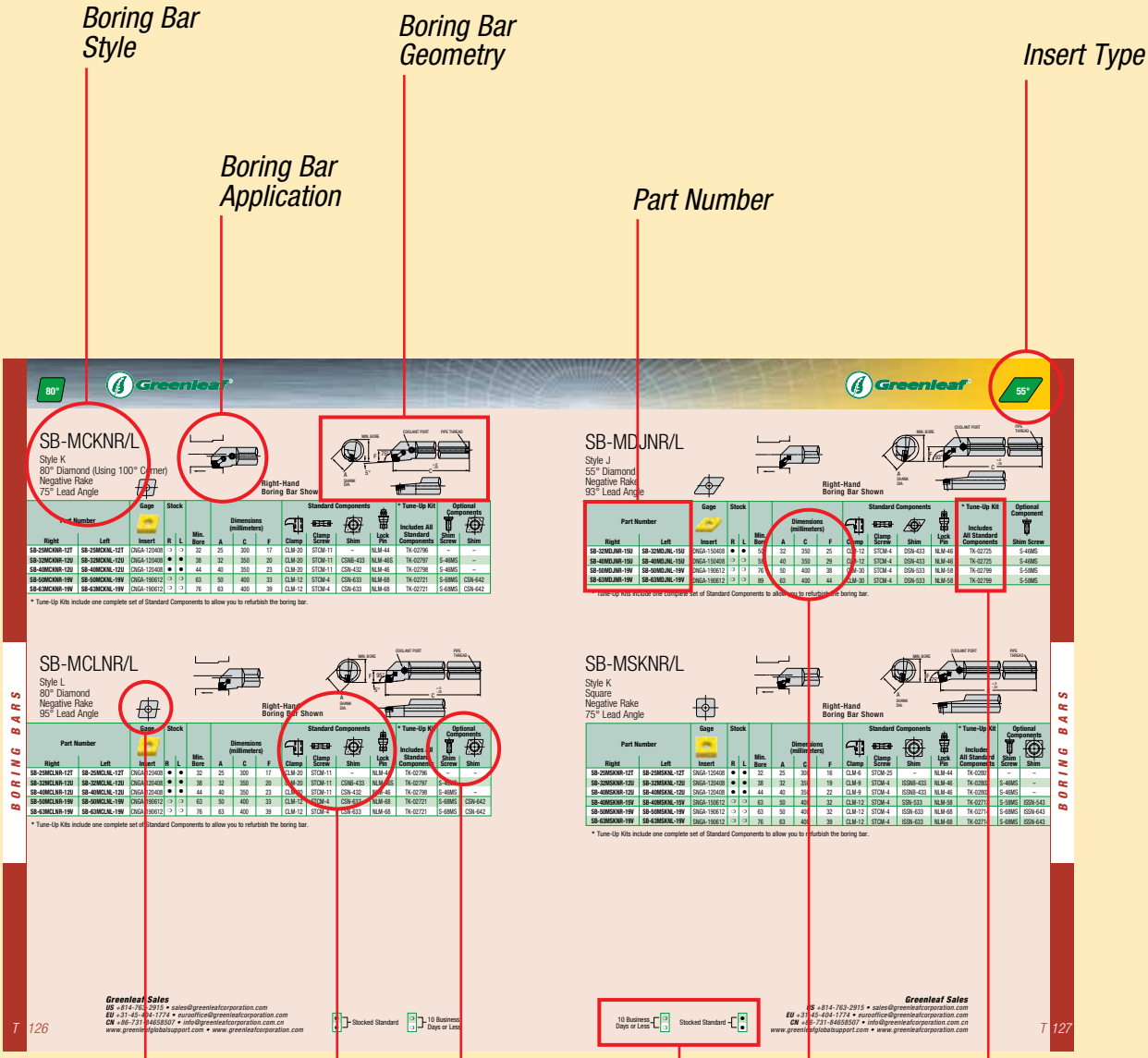


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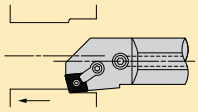
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Boring Bar Usage Reference Guide

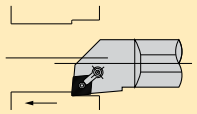


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80° Diamond – Negative

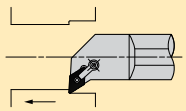


SB-MCKNR/L
Style K
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 126



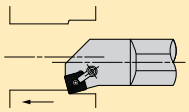
SB-MCLNR/L
Style L
80° Diamond
Negative Rake
95° Lead Angle
page: T 126

55° Diamond – Negative



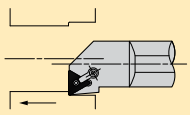
SB-MDJNR/L
Style J
55° Diamond
Negative Rake
93° Lead Angle
page: T 127

Square – Negative

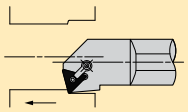


SB-MSKNR/L
Style K
Square
Negative Rake
75° Lead Angle
page: T 127

Triangle – Negative

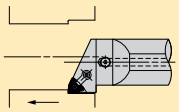


SB-MTFNR/L
Style F
Triangle
Negative Rake
90° Lead Angle
page: T 128



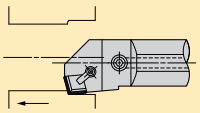
SB-MTKNR/L
Style K
Triangle
Negative Rake
75° Lead Angle
page: T 128

Trigon – Negative

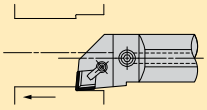


SB-MWLNR/L
Style L
80° Trigon
Negative Rake
95° Lead Angle
page: T 129

80° Diamond – Positive

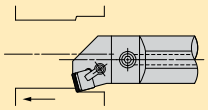


SB-CCKPR/L
Style K
80° Diamond
(Using 100° Corner)
Positive Rake
75° Lead Angle
page: T 129



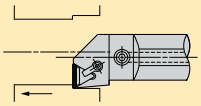
SB-CCLPR/L
Style L
80° Diamond
Positive Rake
95° Lead Angle
page: T 130

Square – Positive

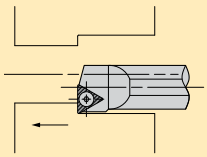


SB-CSKPR/L
Style K
Square
Positive Rake
75° Lead Angle
page: T 130

Triangle – Positive

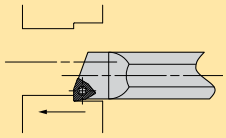


SB-CTFPR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 131

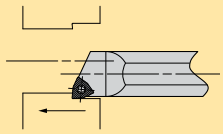


S-STFNR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 131

Screw-On Trigon



S-SWFCR/L
Style F
Screw-On Trigon
Solid Steel
90° Lead Angle
page: T 132



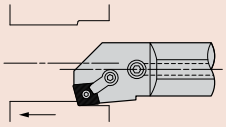
S-SWLCR/L
Style L
Screw-On Trigon
Solid Steel
95° Lead Angle
page: T 133

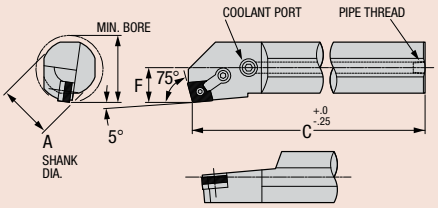
These Boring Bars do not follow the Boring Bar Identification System.

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SB-MCKNR/L

Style K
80° Diamond (Using 100° Corner)
Negative Rake
75° Lead Angle





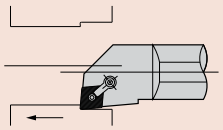
Right-Hand
Boring Bar Shown

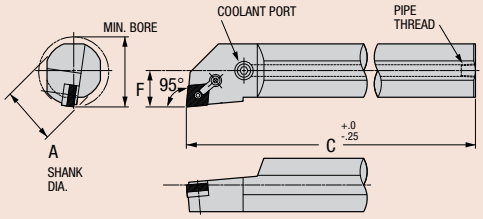
Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Min. Bore	A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw	Shim
SB25-MCKNR-12T	SB25-MCKNL-12T	CNGA-120408	❍	❍	32	25	300	17	CLM-20	STCM-11	–	NLM-44	TK-02796	–	–
SB32-MCKNR-12U	SB32-MCKNL-12U	CNGA-120408	●	●	38	32	350	20	CLM-20	STCM-11	CSNB-433	NLM-46S	TK-02797	S-46MS	–
SB40-MCKNR-12U	SB40-MCKNL-12U	CNGA-120408	●	●	44	40	350	23	CLM-20	STCM-11	CSN-432	NLM-46	TK-02798	S-46MS	–
SB50-MCKNR-19V	SB50-MCKNL-19V	CNGA-190612	❍	❍	63	50	400	33	CLM-12	STCM-4	CSN-633	NLM-68	TK-02721	S-68MS	CSN-642

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

SB-MCLNR/L

Style L
80° Diamond
Negative Rake
95° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Min. Bore	A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw	Shim
SB25-MCLNR-12T	SB25-MCLNL-12T	CNGA-120408	●	●	32	25	300	17	CLM-20	STCM-11	–	NLM-44	TK-02796	–	–
SB32-MCLNR-12U	SB32-MCLNL-12U	CNGA-120408	●	●	38	32	350	20	CLM-20	STCM-11	CSNB-433	NLM-46S	TK-02797	S-46MS	–
SB40-MCLNR-12U	SB40-MCLNL-12U	CNGA-120408	●	●	44	40	350	23	CLM-20	STCM-11	CSN-432	NLM-46	TK-02798	S-46MS	–
SB50-MCLNR-19V	SB50-MCLNL-19V	CNGA-190612	❍	❍	63	50	400	33	CLM-12	STCM-4	CSN-633	NLM-68	TK-02721	S-68MS	CSN-642

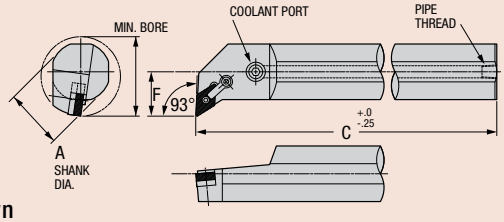
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

SB-MDJNR/L

Style J
55° Diamond
Negative Rake
93° Lead Angle



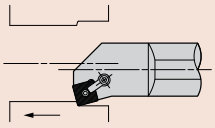
Right-Hand
Boring Bar Shown

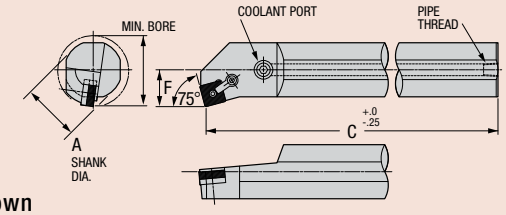
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Component
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw
SB32-MDJNR-15U	SB32-MDJNL-15U	DNGA-150408	●	●	50	32	350	25	CLM-12	STCM-4	DSN-433	NLM-46	TK-02725	S-46MS
SB40-MDJNR-15U	SB40-MDJNL-15U	DNGA-150408	❍	❍	58	40	350	29	CLM-12	STCM-4	DSN-433	NLM-46	TK-02725	S-46MS
SB50-MDJNR-19V	SB50-MDJNL-19V	DNGA-190612	❍	❍	76	50	400	38	CLM-30	STCM-4	DSN-533	NLM-58	TK-02799	S-58MS

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

SB-MSKNR/L

Style K
Square
Negative Rake
75° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw	Shim
SB25-MSKNR-12T	SB25-MSKNL-12T	SNGA-120408	●	●	32	25	300	16	CLM-6	STCM-25	–	NLM-44	TK-02801	–	–
SB32-MSKNR-12U	SB32-MSKNL-12U	SNGA-120408	●	●	38	32	350	19	CLM-9	STCM-4	ISSNB-433	NLM-46	TK-02802	S-46MS	–
SB40-MSKNR-12U	SB40-MSKNL-12U	SNGA-120408	●	●	44	40	350	22	CLM-9	STCM-4	ISSNB-433	NLM-46	TK-02802	S-46MS	–
SB40-MSKNR-15V	SB40-MSKNL-15V	SNGA-150612	❍	❍	63	50	400	32	CLM-12	STCM-4	SSN-533	NLM-58	TK-02713	S-58MS	ISSN-543
SB50-MSKNR-19V	SB50-MSKNL-19V	SNGA-190612	❍	❍	63	50	400	32	CLM-12	STCM-4	ISSN-633	NLM-68	TK-02714	S-68MS	ISSN-643

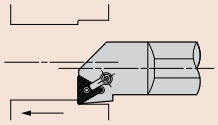
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

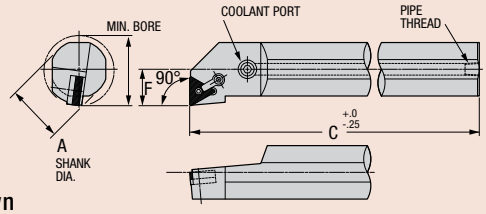
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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SB-MTFNR/L

Style F
Triangle
Negative Rake
90° Lead Angle





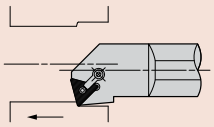
Right-Hand
Boring Bar Shown

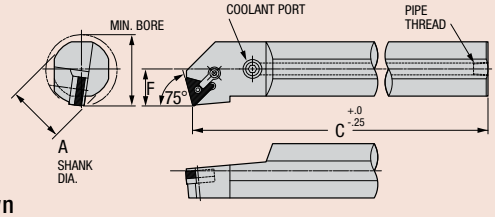
Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw	Shim
SB25-MTFNR-16T	SB25-MTFNL-16T	TNGA-160408	❍	❍	32	25	300	16	CLM-6	STCM-25	–	NLM-33L	TK-02803	–	–
SB32-MTFNR-16U	SB32-MTFNL-16U	TNGA-160408	❍	❍	38	32	350	19	CLM-6	STCM-25	ITSN-322	NLM-34L	TK-02804	S-34MS	–
SB40-MTFNR-16U	SB40-MTFNL-16U	TNGA-160408	❍	❍	44	40	350	22	CLM-6	STCM-25	ITSN-322	NLM-34L	TK-02804	S-34MS	–
SB40-MTFNR-22U	SB40-MTFNL-22U	TNGA-220408	●	●	50	40	350	26	CLM-9	STCM-4	ITSN-432	NLM-46	TK-02805	S-46MS	TS-424
SB50-MTFNR-27V	SB50-MTFNL-27V	TNGA-270612	❍	❍	63	50	400	32	CLM-12	STCM-4	ITSN-533	NLM-58	TK-02806	S-58MS	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

SB-MTKNR/L

Style K
Triangle
Negative Rake
75° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Clamp	Clamp Screw	Shim	Lock Pin	Includes All Standard Components	Shim Screw	Shim
SB25-MTKNR-16T	SB25-MTKNL-16T	TNGA-160408	❍	❍	32	25	300	16	CLM-6	STCM-9	–	NLM-33L	TK-02777	–	–
SB32-MTKNR-16U	SB32-MTKNL-16U	TNGA-160408	❍	❍	38	32	350	19	CLM-6	STCM-9	ITSN-322	NLM-34L	TK-02828	S-34MS	–
SB40-MTKNR-16U	SB40-MTKNL-16U	TNGA-160408	❍	❍	44	40	350	22	CLM-6	STCM-9	ITSN-322	NLM-34L	TK-02828	S-34MS	–
SB40-MTKNR-22U	SB40-MTKNL-22U	TNGA-220408	●	●	50	40	350	26	CLM-9	STCM-4	ITSN-432	NLM-46	TK-02805	S-46MS	TS-424
SB50-MTKNR-27V	SB50-MTKNL-27V	TNGA-270612	❍	❍	63	50	400	32	CLM-12	STCM-4	ITSN-533	NLM-58	TK-02806	S-58MS	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

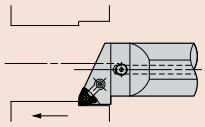
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

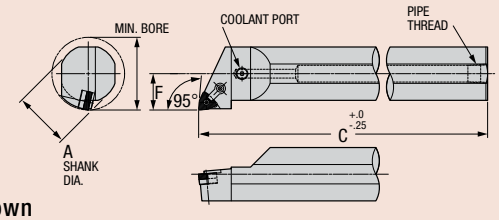
SB-MWLNR/L

Style L
80° Trigon
Negative Rake
95° Lead Angle





Right-Hand
Boring Bar Shown

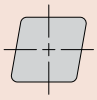


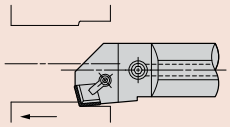
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	Optional Component
Right	Left	Insert	R	L		A	C	F	Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	Seat
†SB20-MWLNR-06S	†SB20-MWLNL-06S	WNMA-060408	❍	❍	24	20	250	13	–	NLM-33L	CLM-6	STCM-25	TK-02803	–
SB25-MWLNR-06T	SB25-MWLNL-06T	WNMA-060408	❍	❍	30	25	300	16	–	NLM-33L	CLM-6	STCM-25	TK-02803	–
SB32-MWLNR-06U	SB32-MWLNL-06U	WNMA-060408	❍	❍	38	32	350	19	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811	IWSN-332
SB40-MWLNR-06U	SB40-MWLNL-06U	WNMA-060408	❍	❍	46	40	350	22	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811	IWSN-332
SB25-MWLNR-08T	SB25-MWLNL-08T	WNMA-080408	●	❍	33	25	300	16	–	NLM-44	CLM-20	STCM-11	TK-02796	–
SB32-MWLNR-08U	SB32-MWLNL-08U	WNMA-080408	●	●	39	32	350	19	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–
SB40-MWLNR-08U	SB40-MWLNL-08U	WNMA-080408	●	❍	45	40	350	22	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.
† Coolant port not available.

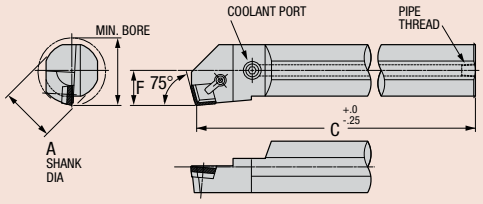
SB-CCKPR/L

Style K
80° Diamond
(Using 100° Corner)
75° Lead Angle





Right-Hand
Boring Bar Shown



Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Shim Screw	Chip-breaker	Includes All Standard Components
SB25-CCKPR-12T	SB25-CCKPL-12T	CPGN-120308	❍	❍	32	25	300	16	CLM-7	STCM-25	–	–	CBDC-415L	TK-02833
SB32-CCKPR-12U	SB32-CCKPL-12U	CPGN-120308	❍	❍	38	32	350	19	CLM-20	STCM-11	CSP-422	TFHCS M3-0.5x6mm	CBDC-415L	TK-02834
SB40-CCKPR-12U	SB40-CCKPL-12U	CPGN-120308	❍	❍	44	40	350	22	CLM-20	STCM-11	CSP-422	TFHCS M3-0.5x6mm	CBDC-415L	TK-02834
SB50-CCKPR-19V	SB50-CCKPL-19V	CPGN-190412	❍	❍	63	50	400	32	CLM-30	STCM-4	CSP-632	TFHCS M3-0.5x10mm	CBDC-615G	TK-02835

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

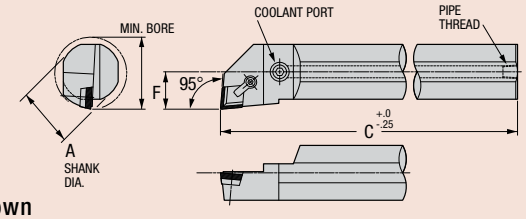
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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SB-CCLPR/L

Style L
80° Diamond
Positive Rake
95° Lead Angle





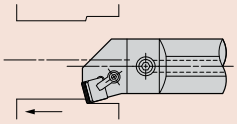
Right-Hand
Boring Bar Shown

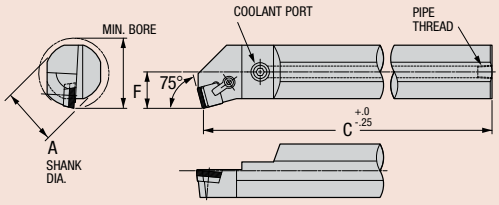
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Shim Screw	Chip-breaker	Includes All Standard Components
SB25-CCLPR-12T	SB25-CCLPL-12T	CPGN-120308	❍	❍	32	25	300	16	CLM-7	STCM-25	–	–	CBDC-4L	TK-02782
SB32-CCLPR-12U	SB32-CCLPL-12U	CPGN-120308	❍	❍	38	32	350	19	CLM-20	STCM-11	CSP-422	TFHCS M3-0.5x6mm	CBDC-4L	TK-02836
SB40-CCLPR-12U	SB40-CCLPL-12U	CPGN-120308	❍	❍	44	40	350	22	CLM-20	STCM-11	CSP-422	TFHCS M3-0.5x6mm	CBDC-4L	TK-02836
SB50-CCLPR-19V	SB50-CCLPL-19V	CPGN-190412	❍	❍	63	50	400	32	CLM-30	STCM-4	CSP-632	TFHCS M3-0.5x10mm	CBDC-6G	TK-02784

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

SB-CSKPR/L

Style K
Square
Positive Rake
75° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Shim Screw	Chip-breaker	Includes All Standard Components
SB25-CSKPR-12T	SB25-CSKPL-12T	SPGN-120308	❍	❍	32	25	300	16	CLM-7	STCM-25	–	–	CBS-4G	TK-02782
SB32-CSKPR-12U	SB32-CSKPL-12U	SPGN-120308	❍	❍	38	32	350	19	CLM-20	STCM-11	–	–	CBS-4G	TK-02868
SB40-CSKPR-12U	SB40-CSKPL-12U	SPGN-120308	❍	❍	44	40	350	22	CLM-20	STCM-11	SP-40	TFHCS M3-0.5x12mm	CBS-4G	TK-02869
SB50-CSKPR-19V	SB50-CSKPL-19V	SPGN-190412	❍	❍	63	50	400	32	CLM-30	STCM-4	SP-60	TFHCS M4-0.7x12mm	CBS-6G	TK-02870

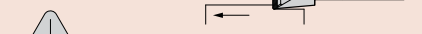
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

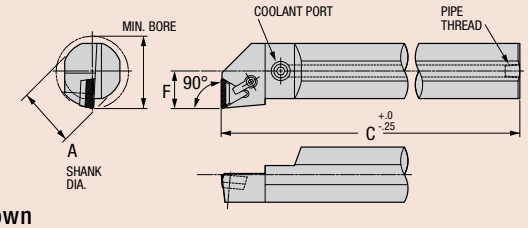
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

SB-CTFPR/L

Style F
Triangle
Positive Rake
90° Lead Angle





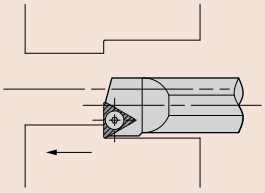
Right-Hand
Boring Bar Shown

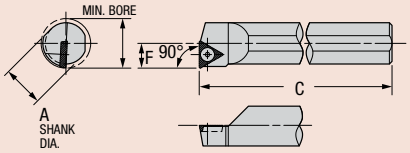
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components					* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Clamp	Clamp Screw	Shim	Shim Screw	Chip-breaker	Includes All Standard Components
SB25-CTFPR-16T	SB25-CTFPL-16T	TPGN-160308	❍	❍	32	25	300	16	CLM-7	STCM-25	–	–	CBT-3G	TK-02783
SB32-CTFPR-16U	SB32-CTFPL-16U	TPGN-160308	❍	❍	38	32	350	19	CLM-6	STCM-25	TSP-321	–	CBT-3G	TK-02840
SB40-CTFPR-16U	SB40-CTFPL-16U	TPGN-160308	❍	❍	44	40	350	22	CLM-6	STCM-25	TSP-321	TFHCS M3-0.5x10mm	CBT-3G	TK-02840
SB40-CTFPR-22U	SB40-CTFPL-22U	TPGN-220408	❍	❍	50	40	350	26	CLM-12	STCM-8	SP-4	TFHCS M3-0.5x12mm	CBT-4G	TK-02748
SB50-CTFPR-27V	SB50-CTFPL-27V	TPGN-270612	❍	❍	63	50	400	32	CLM-12	STCM-4	SP-5	TFHCS M3-0.5x12mm	CBT-5G	TK-02749

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-STFNR/L

Style F
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Component	* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Insert Screw	Includes All Standard Components
S10-STFNR-11M	S10-STFNL-11M	TP41	❍	❍	13	10	150	6	TBHCS M3-0.5x6mm	TK-02838
S12-STFNR-11R	S12-STFNL-11R	TP41	❍	❍	16	12	200	8	TBHCS M3-0.5x6mm	TK-02838
S16-STFNR-11S	S16-STFNL-11S	TP41	❍	❍	20	16	250	9	TBHCS M3-0.5x6mm	TK-02838

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

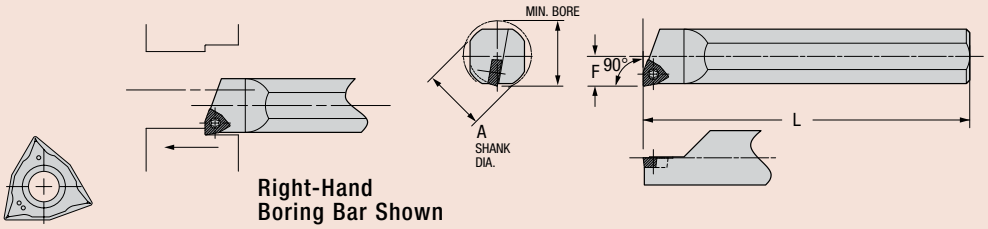
See page T 38 for carbide inserts.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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S-SWFCR/L

Style F
Screw-On Trigon
Solid Steel
90° Lead Angle



Right-Hand
Boring Bar Shown

Part Number		Gage	Stock			Dimensions (millimeters)			Standard Component	* Tune-Up Kit
Right	Left	Insert	R	L	Min. Bore Dia.	A	F	L	Insert Screw	Includes All Standard Components
S10-SWFCR-04K	S10-SWFCL-04K	WCMT-060204	❍	❍	11	10	5,5	125	PT-589T	TK-00804
S12-SWFCR-04M	S12-SWFCL-04M	WCMT-060204	❍	❍	14	12	7	150	PT-589T	TK-00804
S12-SWFCR-06D	S12-SWFCL-06D	WCMT-09T304	❍	❍	16	12	8	60	PT-559T	TK-00807
S12-SWFCR-06M	S12-SWFCL-06M	WCMT-09T304	❍	❍	16	12	8	150	PT-559T	TK-00807
S16-SWFCR-06H	S16-SWFCL-06H	WCMT-09T304	❍	❍	18	16	9	100	PT-559T	TK-00807
S16-SWFCR-06Q	S16-SWFCL-06Q	WCMT-09T304	❍	❍	18	16	9	180	PT-559T	TK-00807
S20-SWFCR-06H	S20-SWFCL-06H	WCMT-09T304	❍	❍	22	20	11	100	PT-559T	TK-00807
S20-SWFCR-06R	S20-SWFCL-06R	WCMT-09T304	❍	❍	22	20	11	200	PT-559T	TK-00807
S25-SWFCR-06K	S25-SWFCL-06K	WCMT-09T304	❍	❍	28	25	14	125	PT-559T	TK-00807
S25-SWFCR-06S	S25-SWFCL-06S	WCMT-09T304	❍	❍	28	25	14	250	PT-559T	TK-00807
S32-SWFCR-06T	S32-SWFCL-06T	WCMT-09T304	❍	❍	34	32	17	300	PT-559T	TK-00807

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

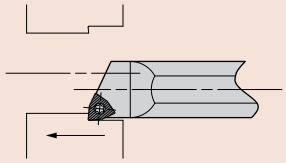
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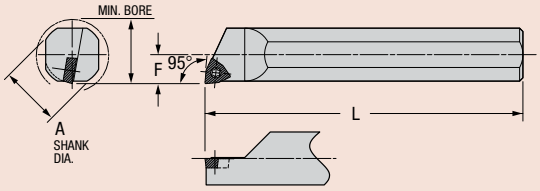
● ● Stocked Standard
❍ ❍ 10 Business Days or Less

S-SWLCR/L

Style L
Screw-On Trigon
Solid Steel
95° Lead Angle







Right-Hand
Boring Bar Shown

Part Number		Gage	Stock			Dimensions (millimeters)			Standard Component	* Tune-Up Kit
Right	Left	Insert	R	L	Min. Bore Dia.	A	F	L	Insert Screw	Includes All Standard Components
S10-SWLCR-04K	**S10-SWLCL-04K**	WCMT-060204	❍	❍	11	10	5,5	125	PT-589T	TK-00804
S12-SWLCR-04M	**S12-SWLCL-04M**	WCMT-060204	❍	❍	14	12	7	150	PT-589T	TK-00804
S12-SWLCR-06D	**S12-SWLCL-06D**	WCMT-09T304	❍	❍	16	12	8	60	PT-559T	TK-00807
S12-SWLCR-06M	**S12-SWLCL-06M**	WCMT-09T304	❍	❍	16	12	8	150	PT-559T	TK-00807
S16-SWLCR-06H	**S16-SWLCL-06H**	WCMT-09T304	❍	❍	18	16	9	100	PT-559T	TK-00807
S16-SWLCR-06Q	**S16-SWLCL-06Q**	WCMT-09T304	❍	❍	18	16	9	180	PT-559T	TK-00807
S20-SWLCR-06H	**S20-SWLCL-06H**	WCMT-09T304	❍	❍	22	20	11	100	PT-559T	TK-00807
S20-SWLCR-06R	**S20-SWLCL-06R**	WCMT-09T304	❍	❍	22	20	11	200	PT-559T	TK-00807
S25-SWLCR-06K	**S25-SWLCL-06K**	WCMT-09T304	❍	❍	28	25	14	125	PT-559T	TK-00807
S25-SWLCR-06S	**S25-SWLCL-06S**	WCMT-09T304	❍	❍	28	25	14	250	PT-559T	TK-00807
S32-SWLCR-06T	**S32-SWLCL-06T**	WCMT-09T304	❍	❍	34	32	17	300	PT-559T	TK-00807

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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Boring Bars for Ceramic Inserts

This section contains boring bars using ceramic inserts that Greenleaf believes are most often used by industry.

In addition to tempered-steel bars, Greenleaf also can supply *Heavy Metal* or *"No Chat"* high-density steel bars that can reduce, and sometimes eliminate, "chatter" for those applications that require a longer reach.

Greenleaf's boring bar capability includes numerous additional styles not shown in this catalog. Contact us if you do not see the bar you need. Our special design and build services can be counted on to meet your individual needs.

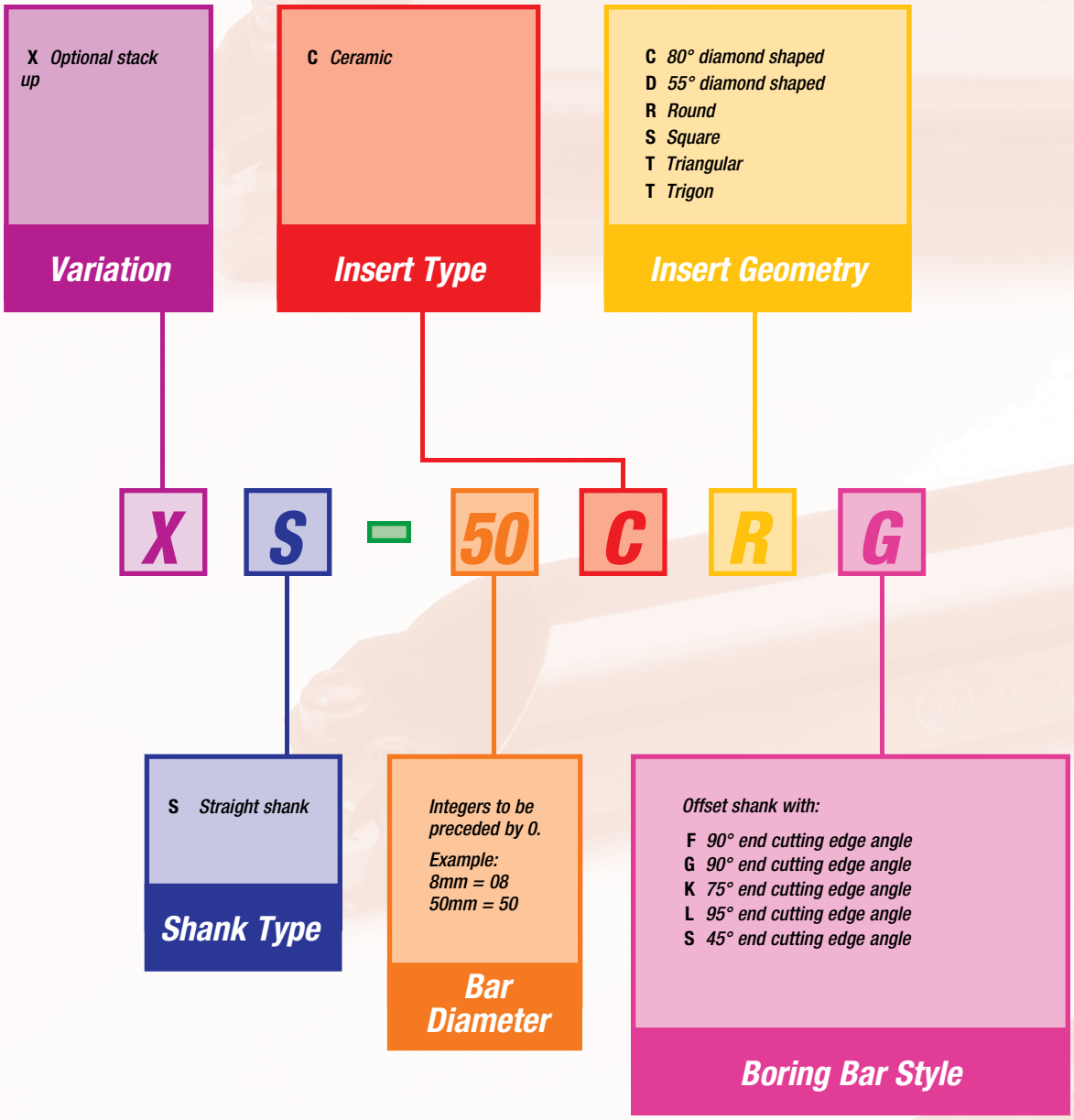


Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

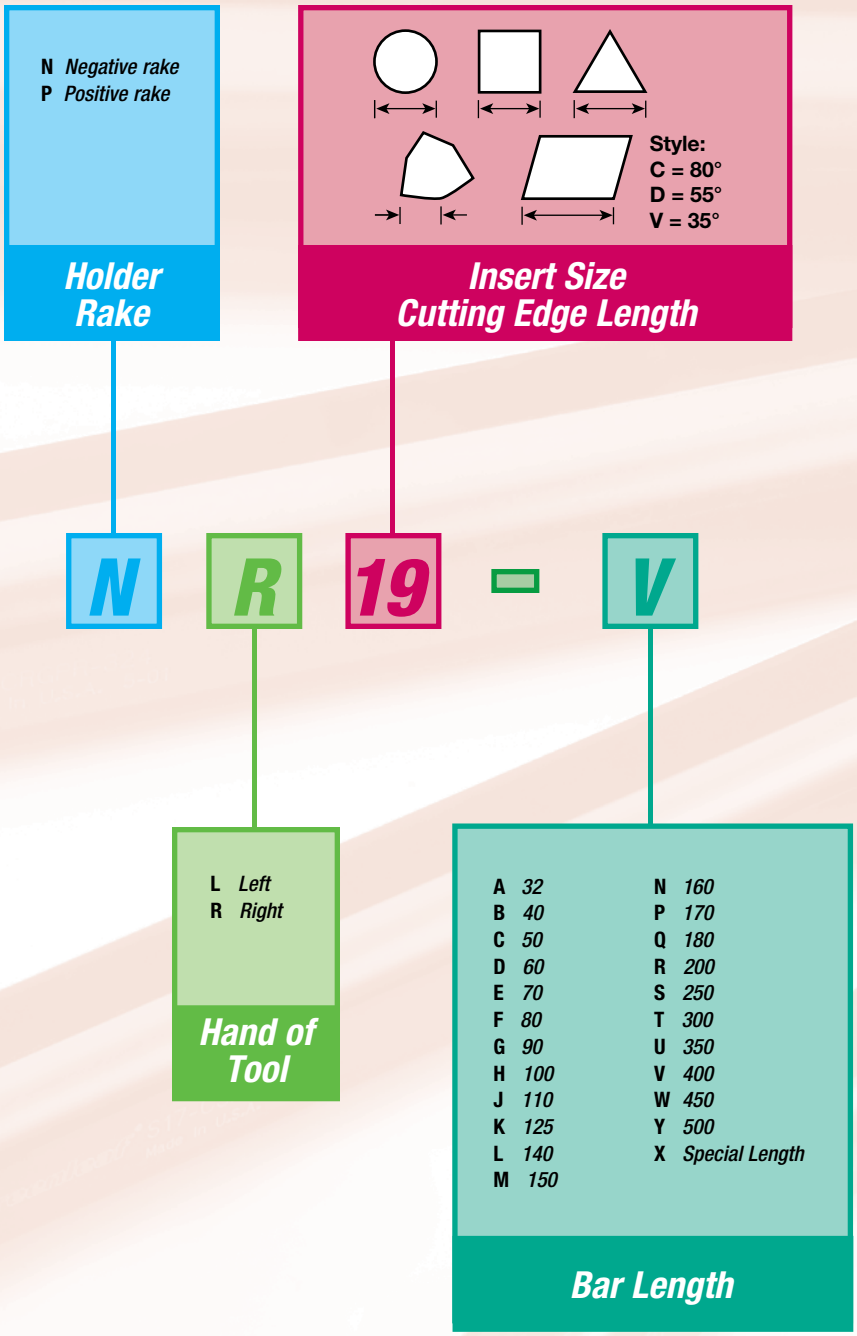
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Ceramic-Insert Boring Bar Identification System

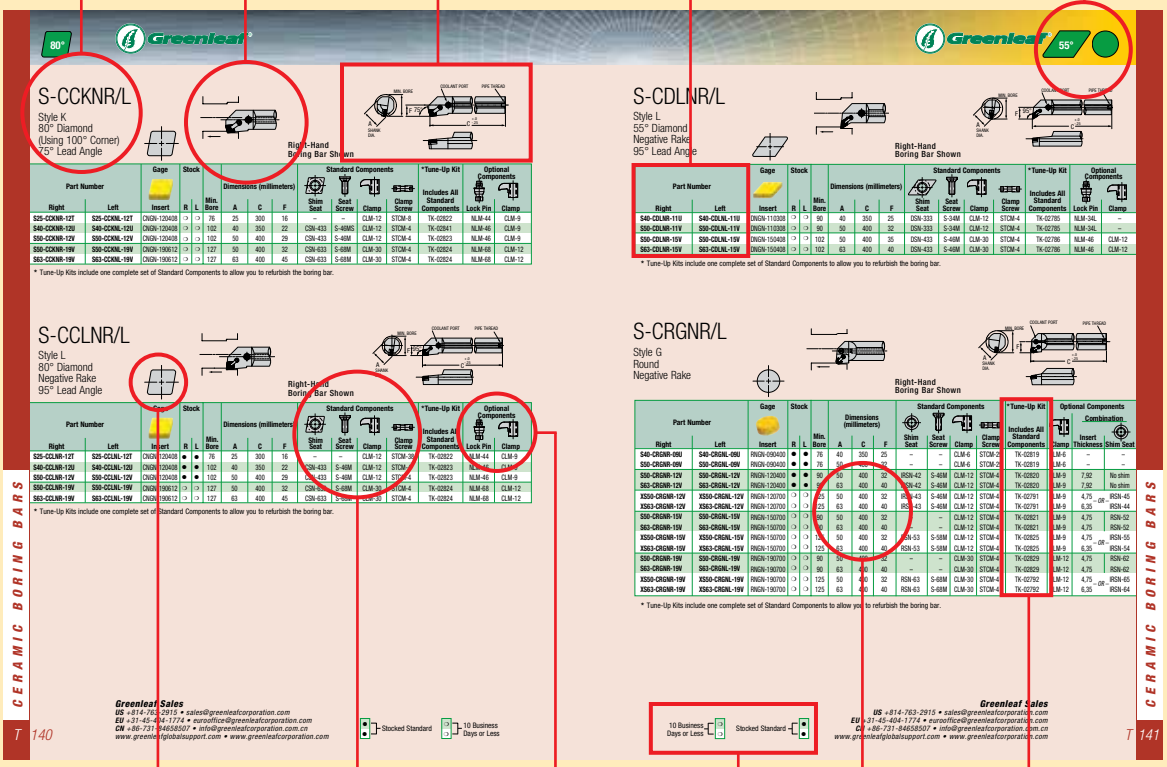


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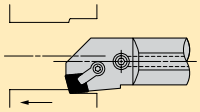
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Ceramic-Insert Boring Bar Usage Reference Guide

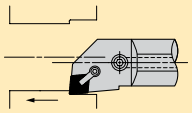


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80°/100° Diamond – Negative

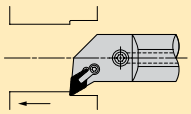


S-CCKNR/L
Style K
80° Diamond
(Using 100° Corner)
Negative Rake
75° Lead Angle
page: T 140



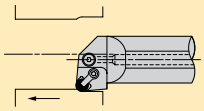
S-CCLNR/L
Style L
80° Diamond
Negative Rake
95° Lead Angle
page: T 140

55° Diamond – Negative



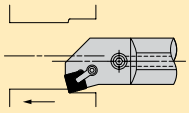
S-CDLNR/L
Style L
55° Diamond
Negative Rake
95° Lead Angle
page: T 141

Round – Negative

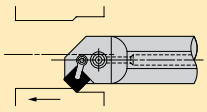


S-CRGNR/L
Style G
Round
Negative Rake
page: T 141

Square – Negative

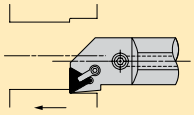


S-CSKNR/L
Style K
Square
Negative Rake
75° Lead Angle
page: T 142



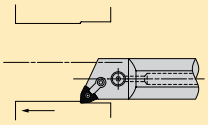
S-CSSNR/L
Style S
Square
Negative Rake
45° Lead Angle
page: T 142

Triangle – Negative



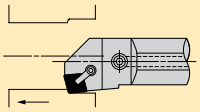
S-CTFNR/L
Style F
Triangle
Negative Rake
90° Lead Angle
page: T 143

Trigon – Negative

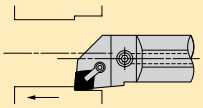


S-CWLNR/L
Style L
Trigon
Negative Rake
95° Lead Angle
page: T 143

80° Diamond – Positive

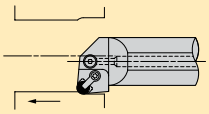


S-CCKPR/L
Style K
80° Diamond
(Using 100° Corner)
Positive Rake
75° Lead Angle
page: T 144



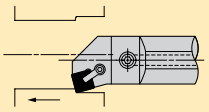
S-CCLPR/L
Style L
80° Diamond
Positive Rake
95° Lead Angle
page: T 144

Round – Positive

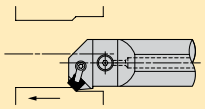


S-CRGPR/L
Style G
Round
Positive Rake
page: T 144

Square – Positive

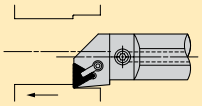


S-CSKPR/L
Style K
Square
Positive Rake
75° Lead Angle
page: T 145

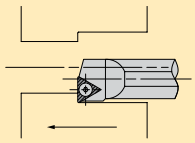


S-CSSPR/L
Style S
Square
Positive Rake
45° Lead Angle
page: T 145

Triangle – Positive



S-CTFPR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 146

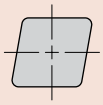


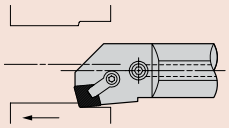
S-STFNR/L
Style F
Triangle
Positive Rake
90° Lead Angle
page: T 146

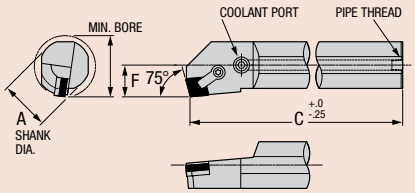
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S-CCKNR/L

Style K
80° Diamond
(Using 100° Corner)
75° Lead Angle







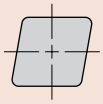
Right-Hand
Boring Bar Shown

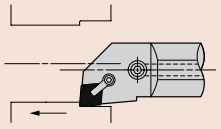
Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S25-CCKNR-12T	S25-CCKNL-12T	CNGN-120408	❍	❍	76	25	300	16	–	–	CLM-12	STCM-8	TK-02822	NLM-44	CLM-9
S40-CCKNR-12U	S40-CCKNL-12U	CNGN-120408	❍	❍	102	40	350	22	CSN-433	S-46MS	CLM-12	STCM-4	TK-02841	NLM-46	CLM-9
S50-CCKNR-12V	S50-CCKNL-12V	CNGN-120408	❍	❍	102	50	400	29	CSN-433	S-46M	CLM-12	STCM-4	TK-02823	NLM-46	CLM-9
S50-CCKNR-19V	S50-CCKNL-19V	CNGN-190612	❍	❍	127	50	400	32	CSN-633	S-68M	CLM-30	STCM-4	TK-02824	NLM-68	CLM-12

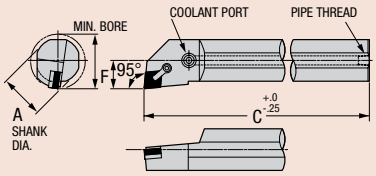
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-CCLNR/L

Style L
80° Diamond
Negative Rake
95° Lead Angle







Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S25-CCLNR-12T	S25-CCLNL-12T	CNGN-120408	●	●	76	25	300	16	–	–	CLM-12	STCM-8	TK-02822	NLM-44	CLM-9
S40-CCLNR-12U	S40-CCLNL-12U	CNGN-120408	●	●	102	40	350	22	CSN-433	S-46M	CLM-12	STCM-4	TK-02823	NLM-46	CLM-9
S50-CCLNR-12V	S50-CCLNL-12V	CNGN-120408	●	●	102	50	400	29	CSN-433	S-46M	CLM-12	STCM-4	TK-02823	NLM-46	CLM-9
S50-CCLNR-19V	S50-CCLNL-19V	CNGN-190612	❍	❍	127	50	400	32	CSN-633	S-68M	CLM-30	STCM-4	TK-02824	NLM-68	CLM-12

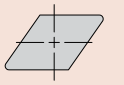
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

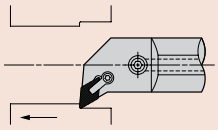
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

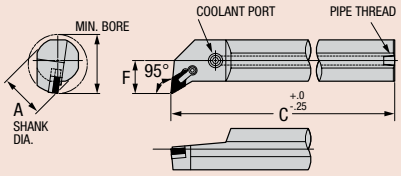
S-CDLNR/L

Style L
55° Diamond
Negative Rake
95° Lead Angle





Right-Hand
Boring Bar Shown



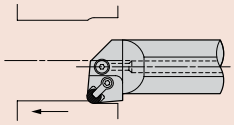
Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Min. Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S40-CDLNR-11U	S40-CDLNL-11U	DNGN-110308	❍	❍	90	40	350	25	DSN-333	S-34M	CLM-12	STCM-4	TK-02785	NLM-34L	–
S50-CDLNR-11V	S50-CDLNL-11V	DNGN-110308	❍	❍	90	50	400	32	DSN-333	S-34M	CLM-12	STCM-4	TK-02785	NLM-34L	–
S50-CDLNR-15V	S50-CDLNL-15V	DNGN-150408	❍	❍	102	50	400	35	DSN-433	S-46M	CLM-30	STCM-4	TK-02786	NLM-46	CLM-12

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

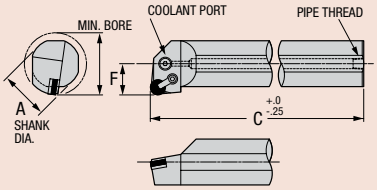
S-CRGNR/L

Style G
Round
Negative Rake





Right-Hand
Boring Bar Shown



Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components		
Right	Left	Insert	R	L	Min. Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Clamp	Combination Insert Thickness	Combination Shim Seat
S40-CRGNR-09U	S40-CRGNL-09U	RNGN-090400	●	●	76	40	350	25	–	–	CLM-6	STCM-25	TK-02819	CLM-6	–	–
S50-CRGNR-09V	S50-CRGNL-09V	RNGN-090400	●	●	76	50	400	32	–	–	CLM-6	STCM-25	TK-02819	CLM-6	–	–
S50-CRGNR-12V	S50-CRGNL-12V	RNGN-120400	●	●	90	50	400	32	IRSN-42	S-46M	CLM-12	STCM-4	TK-02820	CLM-9	7,92	No shim
XS50-CRGNR-12V	XS50-CRGNL-12V	RNGN-120700	❍	❍	125	50	400	32	IRSN-43	S-46MS	CLM-12	STCM-4	TK-03064	CLM-9	4,75	IRSN-45
S50-CRGNR-15V	S50-CRGNL-15V	RNGN-150700	❍	❍	90	50	400	32	–	–	CLM-12	STCM-4	TK-02821	CLM-9	4,75	RSN-52
XS50-CRGNR-15V	XS50-CRGNL-15V	RNGN-150700	❍	❍	125	50	400	32	RSN-53	S-58M	CLM-12	STCM-4	TK-02825	CLM-9	4,75	IRSN-55
S50-CRGNR-19V	S50-CRGNL-19V	RNGN-190700	❍	❍	90	50	400	32	–	–	CLM-30	STCM-4	TK-02829	CLM-12	4,75	RSN-62
XS50-CRGNR-19V	XS50-CRGNL-19V	RNGN-190700	❍	❍	125	50	400	32	RSN-63	S-68M	CLM-30	STCM-4	TK-02792	CLM-12	4,75	IRSN-65

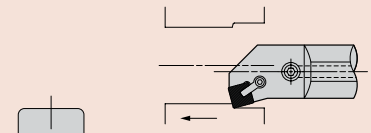
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

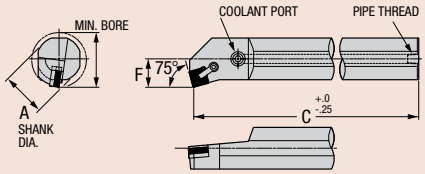
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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S-CSKNR/L

Style K
Square
Negative Rake
75° Lead Angle





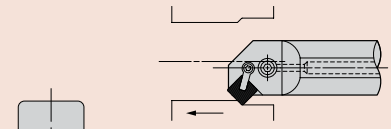
Right-Hand
Boring Bar Shown

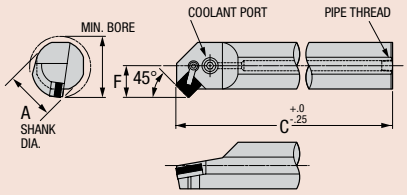
Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S25-CSKNR-12T	S25-CSKNL-12T	SNGN-120408	❍	❍	76	25	300	16	–	–	CLM-12	STCM-8	TK-02822	NLM-44	CLM-9
S40-CSKNR-12U	S40-CSKNL-12U	SNGN-120408	❍	❍	102	40	350	22	ISSN-433	S-46M	CLM-12	STCM-4	TK-02844	NLM-46	CLM-9
S50-CSKNR-12V	S50-CSKNL-12V	SNGN-120408	❍	❍	102	50	400	29	ISSN-433	S-46M	CLM-12	STCM-4	TK-02844	NLM-46	CLM-9
S50-CSKNR-15V	S50-CSKNL-15V	SNGN-150612	❍	❍	127	50	400	32	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9
S50-CSKNR-19V	S50-CSKNL-19V	SNGN-190612	❍	❍	127	50	400	32	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-CSSNR/L

Style S
Square
Negative Rake
45° Lead Angle





Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L	Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S25-CSSNR-12T	S25-CSSNL-12T	SNGN-120408	❍	❍	76	25	300	16	–	–	CLM-12	STCM-4	TK-02821	NLM-44	CLM-9
S40-CSSNR-12U	S40-CSSNL-12U	SNGN-120408	❍	❍	102	40	350	22	ISSN-433	S-46M	CLM-12	STCM-4	TK-02821	NLM-46	CLM-9
S50-CSSNR-12V	S50-CSSNL-12V	SNGN-120408	❍	❍	102	50	400	29	ISSN-433	S-46M	CLM-12	STCM-4	TK-02844	NLM-46	CLM-9
S50-CSSNR-15V	S50-CSSNL-15V	SNGN-150612	❍	❍	127	50	400	32	SSN-533	S-58M	CLM-12	STCM-4	TK-02794	NLM-58	CLM-9
S50-CSSNR-19V	S50-CSSNL-19V	SNGN-190612	❍	❍	127	50	400	32	ISSN-633	S-68M	CLM-30	STCM-4	TK-02795	NLM-68	CLM-12

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

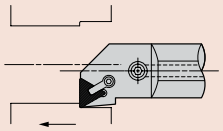
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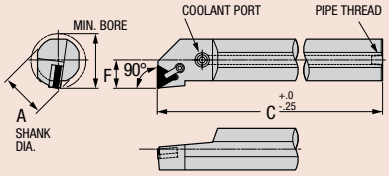
● ● Stocked Standard
❍ ❍ 10 Business Days or Less

S-CTFNR/L

Style F
Triangle
Negative Rake
90° Lead Angle







Right-Hand
Boring Bar Shown

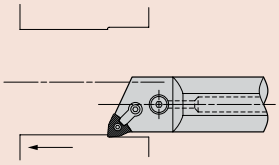
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				*Tune-Up Kit	Optional Components	
Right	Left	Insert	R	L		A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components	Lock Pin	Clamp
S25-CTFNR-16T	**S25-CTFNL-16T**	TNGN-160408	❍	❍	76	25	300	16	–	–	CLM-7	STCM-25	TK-02782	NLM-33L	CLM-6
S40-CTFNR-16U	**S40-CTFNL-16U**	TNGN-160408	❍	❍	90	40	350	22	ITSN-322	S-34M	CLM-7	STCM-25	TK-02757	NLM-34L	CLM-6
S40-CTFNR-22U	**S40-CTFNL-22U**	TNGN-220408	●	●	102	40	350	26	ITSN-432	S-46M	CLM-12	STCM-4	TK-02771	NLM-46	CLM-9
S50-CTFNR-22V	**S50-CTFNL-22V**	TNGN-220408	●	●	102	50	400	32	ITSN-432	S-46M	CLM-12	STCM-4	TK-02771	NLM-46	CLM-9

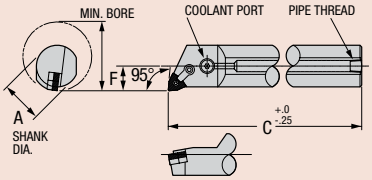
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-CWLNR/L

Style L
Trigon
Negative Rake
95° Lead Angle







Right-Hand
Boring Bar Shown

Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit	
Right	Left	Insert	R	L		A	C	F	Shim Seat	Lock Pin	Clamp	Clamp Screw	Includes All Standard Components	
S25-CWLNR-06T	**S25-CWLNL-06T**	WNGA-060408	❍	❍	76	25	300	16	–	NLM-33L	CLM-6	STCM-25	TK-02803	
S40-CWLNR-06U	**S40-CWLNL-06U**	WNGA-060408	❍	❍	90	40	350	22	IWSN-322	NLM-34L	CLM-6	STCM-25	TK-02811	
S40-CWLNR-08T	**S40-CWLNL-08T**	WNGA-080408	❍	❍	76	25	300	16	–	NLM-44	CLM-20	STCM-26	TK-02826	
S50-CWLNR-08U	**S50-CWLNL-08U**	WNGA-080408	●	●	102	40	350	22	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	
S63-CWLNR-08V	**S63-CWLNL-08V**	WNGA-080408	❍	❍	102	50	400	32	IWSN-433	NLM-46	CLM-20	STCM-26	TK-02808	

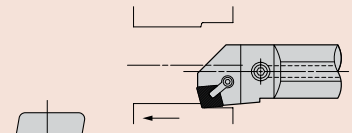
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

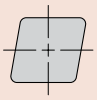
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

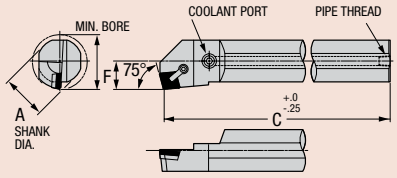
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S-CCKPR/L

Style K
80° Diamond
(Using 100° Corner)
75° Lead Angle







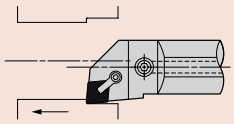
Right-Hand
Boring Bar Shown

Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	Min. Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CCKPR-12T	S25-CCKPL-12T	CPGN-120408	❍	❍	32	25	300	16	–	–	CLM-22	STCM-32	TK-02778
S40-CCKPR-12U	S40-CCKPL-12U	CPGN-120408	❍	❍	44	40	350	22	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
S50-CCKPR-12V	S50-CCKPL-12V	CPGN-120408	❍	❍	56	50	400	29	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

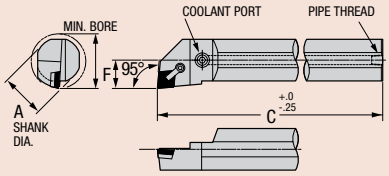
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-CCLPR/L

Style L
80° Diamond
Positive Rake
95° Lead Angle







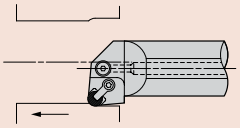
Right-Hand
Boring Bar Shown

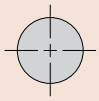
Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	Min. Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CCLPR-12T	S25-CCLPL-12T	CPGN-120408	❍	❍	32	25	300	16	–	–	CLM-22	STCM-32	TK-02778
S40-CCLPR-12U	S40-CCLPL-12U	CPGN-120408	❍	❍	44	40	350	22	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779
S50-CCLPR-12V	S50-CCLPL-12V	CPGN-120408	❍	❍	56	50	400	29	SP-49	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02779

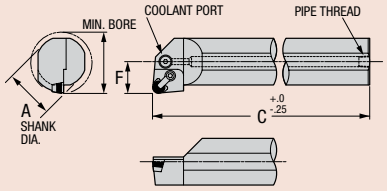
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

S-CRGPR/L

Style G
Round
Positive Rake







Right-Hand
Boring Bar Shown

Part Number		Gage	Stock			Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	Min. Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CRGPR-09T	S25-CRGPL-09T	RPGN-090300	●	●	32	25	300	16	–	–	CLM-7	STCM-25	TK-02782
S40-CRGPR-09U	S40-CRGPL-09U	RPGN-090300	●	●	44	40	350	22	SP-34	TSHCS M2-0.4x6mm	CLM-7	STCM-25	TK-02813
S50-CRGPR-09V	S50-CRGPL-09V	RPGN-090300	●	●	56	50	400	29	SP-34	TSHCS M2-0.4x6mm	CLM-7	STCM-25	TK-02813
S50-CRGPR-12V	S50-CRGPL-12V	RPGN-120400	●	●	63	50	400	32	SP-44	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02814

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

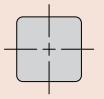
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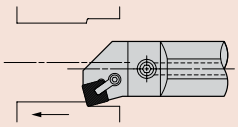
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

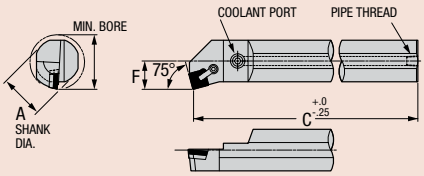
S-CSKPR/L

Style K
Square
Positive Rake
75° Lead Angle





Right-Hand
Boring Bar Shown



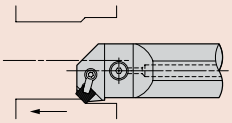
Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CSKPR-12T	S25-CSKPL-12T	SPGN-120408	❍	❍	32	25	300	16	–	–	CLM-7	STCM-25	TK-02782
S40-CSKPR-12U	S40-CSKPL-12U	SPGN-120408	❍	❍	44	40	350	22	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
S50-CSKPR-12V	S50-CSKPL-12V	SPGN-120408	❍	❍	56	50	400	29	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

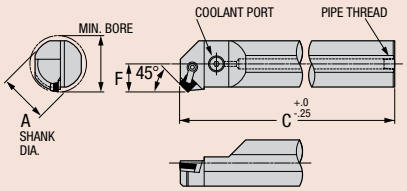
S-CSSPR/L

Style S
Square
Positive Rake
45° Lead Angle





Right-Hand
Boring Bar Shown



Part Number		Gage	Stock		Min. Bore	Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L		A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CSSPR-12T	S25-CSSPL-12T	SPGN-120408	❍	❍	32	25	300	16	–	–	CLM-7	STCM-25	TK-02782
S40-CSSPR-12U	S40-CSSPL-12U	SPGN-120408	❍	❍	44	40	350	22	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780
S50-CSSPR-12V	S50-CSSPL-12V	SPGN-120408	❍	❍	56	50	400	29	SP-41	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02780

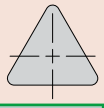
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

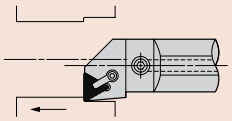
10 Business Days or Less ❍ ❍
Stocked Standard ● ●

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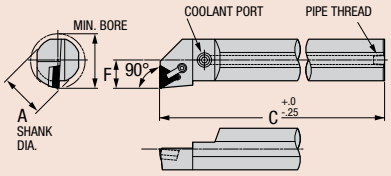
S-CTFPR/L

Style F
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Boring Bar Shown



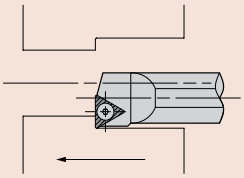
Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components				* Tune-Up Kit
Right	Left	Insert	R	L	Bore	A	C	F	Shim Seat	Seat Screw	Clamp	Clamp Screw	Includes All Standard Components
S25-CTFPR-16T	S25-CTFPL-16T	TPGN-160308	❍	❍	32	25	300	16	–	–	CLM-7	STCM-25	TK-02782
S40-CTFPR-16U	S40-CTFPL-16U	TPGN-160308	❍	❍	44	40	350	22	SP-3A	TFHCS M3-0.5x10mm	CLM-7	STCM-25	TK-02817
S40-CTFPR-22U	S40-CTFPL-22U	TPGN-220408	❍	❍	50	40	350	26	SP-4	TFHCS M3-0.5x10mm	CLM-12	STCM-4	TK-02839
S50-CTFPR-22V	S50-CTFPL-22V	TPGN-220408	●	●	63	50	400	32	SP-4	TFHCS M3-0.5x12mm	CLM-12	STCM-4	TK-02818

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

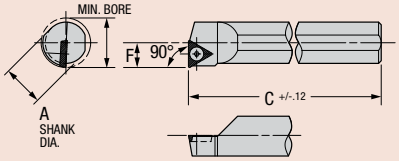
S-STFNR/L

Style F
Triangle
Positive Rake
90° Lead Angle





Right-Hand
Boring Bar Shown



Part Number		Gage	Stock		Min.	Dimensions (millimeters)			Standard Components	* Tune-Up Kit
Right	Left	Insert	R	L	Bore	A	C	F	Insert Screw	Includes All Standard Components
S10-STFNR-11M	S10-STFNL-11M	TP41	❍	❍	13	10	150	6	TBHCS M3-0.5x6mm	TK-02838
S12-STFNR-11R	S12-STFNL-11R	TP41	❍	❍	16	12	200	8	TBHCS M3-0.5x6mm	TK-02838
S16-STFNR-11S	S16-STFNL-11S	TP41	❍	❍	20	16	250	9	TBHCS M3-0.5x6mm	TK-02838

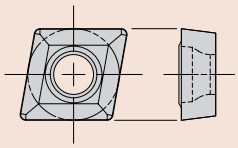
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the boring bar.

See page T 70 for ceramic inserts.

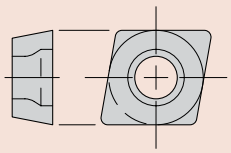
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

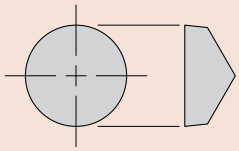
Additional Greenleaf Turning Inserts



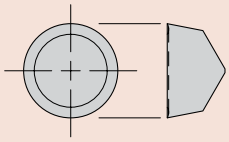
CCMT 060204 X2
CCMT 09T308 X2
CPMT 060204 X2
CPMT 09T308 X2



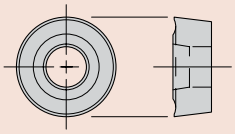
CPMW 050204
(310993)



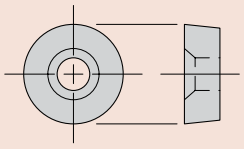
RCMX 102
(309161)
RCMX 105
(303788)
RCMX 106
(312242)



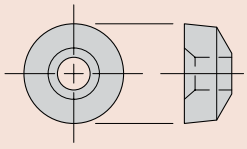
Ceramic
with Chipform
(425196)
(425022)



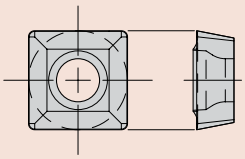
RCMM 120400
RCMM 190600
RCMM 250900
RCGT 120400 GP
(421930)
(310520)



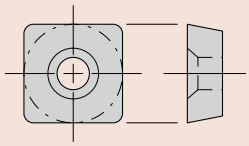
RD-8P
RD-9P
RD-10P
RD-12P
RD-16P



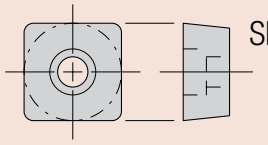
RD6-C
RD8-C



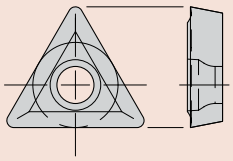
SCMT 06T308 X2
SCMT 220408 X2



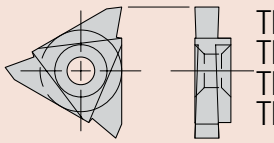
SD-7P
SD-8P
SD-12P



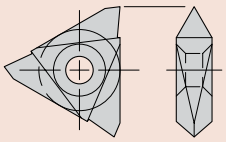
SDH-42



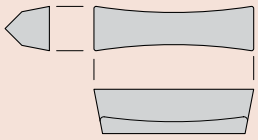
TCMT 060204 X2
TCMT 09T308 X2
TPMT 060204 X2
TPMT 09T308 X2



TPMA-_NG
TNMA-_NG
TNMC-_NG
TPMC-_NG

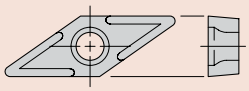


TPMA-_NV
TNMA-_NV
TNMC-_NV
TPMC-_NV

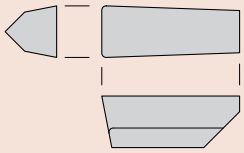


VDB 188RA
VDB 188A015
VDB 218RA
VDB 250 RB
VDB 250B015

ZT 1967
(420555)



VBMT
(420864)



WG
Carbide

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Heavy Turning Introduction ..... *HT 03*

Grade Descriptions ..... *HT 04-05*

Edge Preparations ..... *HT 06*

Chipform Application Range ..... *HT 07*

Pictorial Index ..... *HT 08-09*

Heavy Turning Inserts

- *Carbide* ..... *HT 10-20*
- *Ceramic* ..... *HT 21-25*
- *Roll Turning* ..... *HT 26-32*

Heavy Turning Tooling Options ..... *HT 34-35*

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Heavy Turning Inserts

The manufacture of rolls for use in steel making is an area where machinability has been decreased significantly by the introduction of alloyed materials, especially chromium content. In addition, the use of forged rolls is increasing, and centrifugally cast products with high hardness levels and surface contamination are another challenge.

Ceramic cutting tools such as Greenleaf GEM-7™ composite material and WG-300® whiskered material are finding an important place in heavy turning when combined with rigid, well-designed holding systems.

Greenleaf has extensive experience in the design and manufacture of heavy-turning tooling systems. For more than thirty years, we have supplied O.E.M. packages to many of the largest lathe manufacturers – both domestic and overseas.

We will be pleased to quote tooling systems for any type of machine to effectively use ceramic or carbide inserts. Most of the options regularly manufactured are outlined on page HT 34.

Call a Greenleaf heavy-turning specialist at 1-814-763-2915 to discuss your particular needs.



Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

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CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chip-breakers for heavy roughing through finishing.

COATED – MT-CVD

GA5023 A high-speed performance grade for turning and milling cast iron. GA5023 features an advanced MT-CVD coating specifically developed for abrasive wear resistance. Application ranges from roughing to finishing on most cast iron materials including gray iron, ductile, nodular and other alloyed irons. The high wear and shock resistance of GA5023 allows machining at high speeds and a variety of feeds.

GA5035 A high-performance MT-CVD coated grade for turning all types of steels, and selected stainless steels. GA5035 can be used in rough, semi-finish, and finish turning situations requiring resistance to heat deformation, thermal shock, and abrasion. GA5035 should be applied at high speeds and a range of feeds.

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy- and light-duty milling at high cutting speeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

COATED – PVD

G-915 Multi-layer PVD-coated grade, excellent for cut off, milling and turning high-temp alloys, stainless steel, and low carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-935 Multi-layer PVD-coated grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

CARBIDE

UNCOATED

G-20M A sub-micron C-2 carbide grade suited for use in turning and milling titanium and nickel-based super-alloys. G-20M has the strength and edge wear characteristics to resist notching when turning high-strength materials.

G-50 Heavy roughing grade for steel and steel castings under difficult conditions, and ferritic stainless steels in most applications. G-50 is tough enough to enable the use of positive rakes for turning.

G-74 Roughing or finishing grade for steel and steel castings. G-74 has higher shock resistance than G-70, and should be applied at high speeds and moderate to heavy feeds. Well suited for turning of steel rolls.

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CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel and cobalt based super-alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

WG-600® Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels. *U.S. Patent No. 6,447,896 B1.*

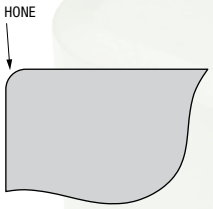
WG-700™ New whisker-reinforced Al_2O_3 ceramic substrate featuring improved toughness and a unique high-speed coating. WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-machines materials. WG-700 exhibits high metal-removal rates with exceptional tool life.
U.S. Patent No. 6,447,896 B1

XSYTIN™-1 New phase-toughened ceramic capable of extreme feed rates. XSYTIN™-1 excels at machining a wide variety of materials including steels, cast and ductile irons, high-temperature alloys and other challenging metals. XSYTIN™-1 is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

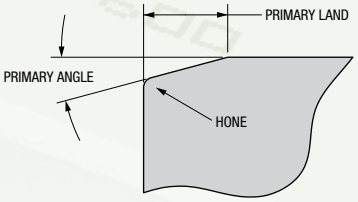
GSN100™ New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

GEM-7™ Al_2O_3 + TiC composite ceramic with a high degree of predictability in roll turning and hard alloy (up to 65 R/c) machining.

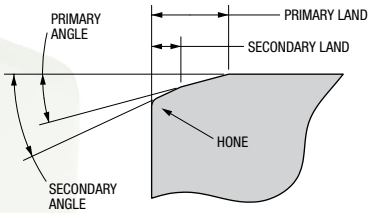
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HONE



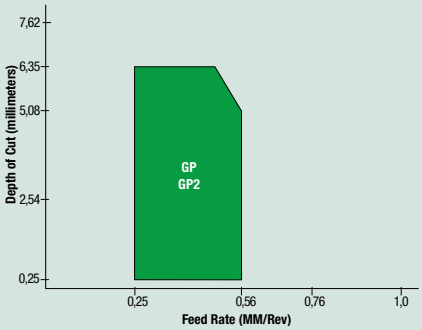
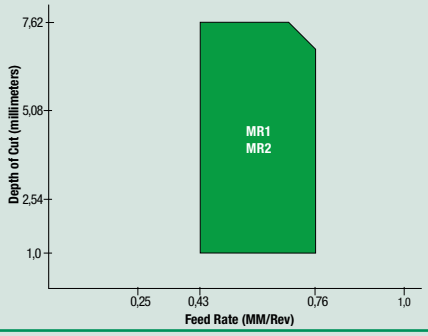
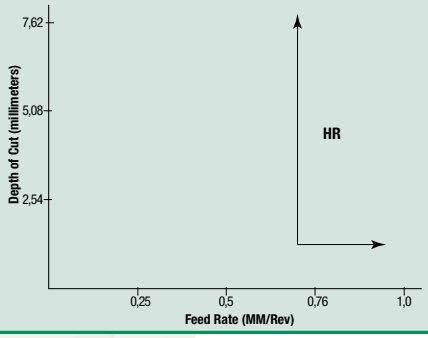
PRIMARY ANGLE



SECONDARY ANGLE

Edge Prep	Hone	Primary Land	Primary Angle	Secondary Land	Secondary Angle	Application
T2A	0,015R	0,17	20°			Scale applications, light interruptions, weld overlays, finish turning and milling of hardened materials.
T4A	0,015R	1,90	10°	0,17	25°	Heavy machining <19mm IC - Roll turning, 3V, 4V, CDH-22, CDH-33.
T4B	0,035R	1,90	10°	0,17	25°	Heavy machining <19mm IC - Roll turning, 3V, 4V, CDH-22, CDH-33.
T10B	0,035R	2,41	15°	0,17	30°	Heavy machining, iron and steel roll turning >19mm IC, CDH-43, CDH-53.

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GENERAL PURPOSE	GP and GP2 	General purpose chipbreaker. Feed rates up to 0,56/rev and 6,35 depth of cut.	
MEDIUM ROUGHING	MR and MR2 	Used for medium roughing of all material. Feeds up to 0,71/rev and depths up to 7,62.	
HEAVY ROUGHING	HR *single sided* 	Heavy roughing for all materials. Feeds above 0,58/rev. One-sided chipbreaker for heaviest feeds (MM). *Example: CNMM-190612 HR*	

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Carbide Inserts – Negative



80° Diamond
Chip Control
GP2, MR, HR – single sided
page: HT 10



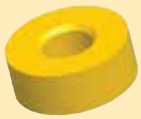
80° Diamond
Flat Top
page: HT 11



80° Diamond
Flat Top
page: HT 11



Round
Chip Control
MR, MR – single sided
page: HT 12



Round
Flat Top
page: HT 13



Round
Flat Top
page: HT 13



Square
Chip Control
GP2, MR,
HR – single sided
page: HT 14

Carbide Inserts – Negative *continued*



Square
Flat Top
page: HT 15



Square
Flat Top
page: HT 16



Triangle
Chip Control
MR
page: HT 17



Triangle
Flat Top
page: HT 17



Triangle
Flat Top
TNGN, TNUN
page: HT 18

Carbide Inserts – Positive



Triangle
Flat Top
page: HT 19



Square
Flat Top
page: HT 20

Ceramic Inserts – Negative



80° Diamond
page: HT 21



Round
page: HT 22



Square
page: HT 23



Triangle
page: HT 24

Ceramic Inserts – Positive



Square
page: HT 25

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Roll Turning



Roll Turning
page: HT 26



Roll Turning
page: HT 27



Roll Turning
page: HT 28



Roll Turning
page: HT 29



Round
V-Bottom
page: HT 30



Round
V-Bottom
page: HT 31

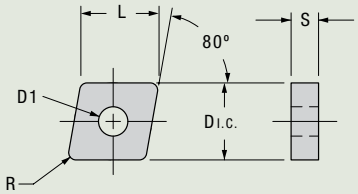


Square
Negative
page: HT 32

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80° Diamond Inserts

Chip Control



	Shape: 80° Diamond	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
GENERAL PURPOSE	GP 	CNMG-190612-GP	●	❍	❍	❍	❍	❍	●		CNMG-643-GP	19,05	19,33	6,35	7,92	1,19
MEDIUM ROUGHING	MR 	CNMG-190608-MR	❍	❍	❍	❍	❍	❍	❍		CNMG-642-MR	19,05	19,33	6,35	7,92	0,79
		CNMG-190612-MR	●	❍	●	●	●	●	●	❍	CNMG-643-MR	19,05	19,33	6,35	7,92	1,19
		CNMG-190616-MR	❍	❍	●	❍	●	❍	●		CNMG-644-MR	19,05	19,33	6,35	7,92	1,57
HEAVY ROUGHING	HR – single sided 	CNMM-190612-HR	❍	❍	❍	❍	❍	❍	❍	❍	CNMM-643-HR	19,05	19,33	6,35	7,92	1,19

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

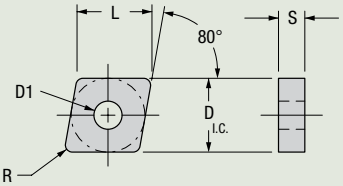
GA5035 | GA5125 | GA5036 | GA5023 | G-915 | GA5023 | G-915 | G-20M
P25 | P25 | P35 | M20 | M35 | K15 | S
Steel | S. Steel | Cast Iron | H-T A.

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80° Diamond Inserts
Flat Top (CNMA)



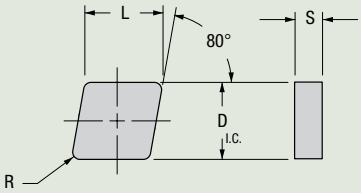
Shape: 80° Diamond	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
	CNMA-190608	❍	❍	❍	❍	❍	❍	❍	❍	CNMA-642	19,05	19,33	6,35	7,92	0,79
	CNMA-190612	❍	❍	❍	❍	❍	❍	❍	❍	CNMA-643	19,05	19,33	6,35	7,92	1,19
	CNMA-190616	❍	❍	❍	❍	❍	❍	❍	❍	CNMA-644	19,05	19,33	6,35	7,92	1,57
	CNMA-250924	❍	❍	❍	❍	❍	❍	❍	❍	CNMA-866	25,40	25,78	9,53	9,12	2,36

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

	GA5035	GA5125	GA5036	GA5023	G-915	GA5023	G-915	G-20M
	P25	P25	P35	M20	M35	K15	S	
	Steel			S. Steel		Cast Iron	H-T A.	

80° Diamond Inserts
Flat Top (CNGN)



Shape: 80° Diamond	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	CNGN-190408	❍	❍	❍	❍	❍	❍	❍	❍	CNGN-632	19,05	19,33	4,75	0,79
	CNGN-190412	❍	❍	❍	❍	❍	❍	❍	❍	CNGN-633	19,05	19,33	4,75	1,19
	CNGN-190416	❍	❍	❍	❍	❍	❍	❍	❍	CNGN-634	19,05	19,33	4,75	1,57
	CNGN-190612	❍	❍	❍	❍	❍	❍	❍	❍	CNGN-643	19,05	19,33	6,35	1,19
	CNGN-190616	❍	❍	❍	❍	❍	❍	❍	❍	CNGN-644	19,05	19,33	6,35	1,57

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

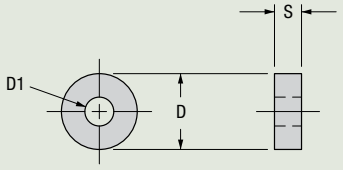
	GA5035	GA5125	GA5036	GA5023	G-915	GA5023	G-915	G-20M
	P25	P25	P35	M20	M35	K15	S	
	Steel			S. Steel		Cast Iron	H-T A.	

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Round Inserts

Chip Control



	Shape: Round	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D	S	D1
MEDIUM ROUGHING	MR 	RNMG-190600-MR	❍	●	❍	❍	❍	❍	❍	❍	RNMG-64-MR	19,05	6,35	7,92
		RNMG-250900-MR	❍	❍	❍	❍	❍	❍	❍	❍	RNMG-86-MR	25,40	9,53	9,12
HEAVY ROUGHING	MR – single sided 	RNMM-250600-MR	❍	❍	❍	❍	❍	❍	❍	❍	RNMM-84-MR	25,40	6,35	9,12

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5035 GA5125 GA5036 GA5023 G-915 GA5023 G-915 G-20M
P25 P25 P35 M20 M35 K15 S
Steel S. Steel Cast Iron H-T A.

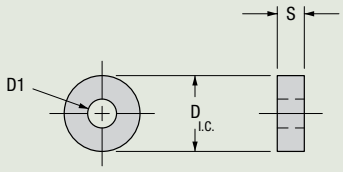
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Round Inserts

Flat Top (RNMA)



Shape: Round	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	S	D1
	RNMA-190600	❍	❍	❍	❍	❍	❍	❍	❍	RNMA-64	19,05	6,35	7,92
	RNMA-250900	❍	❍	❍	❍	❍	❍	❍	❍	RNMA-86	25,40	9,53	9,12

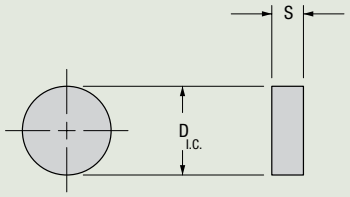
Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

Steel P25 GA5035 | Steel P25 GA5125 | Steel P35 GA5036 | S. Steel M20 GA5023 | S. Steel M35 G-915 | Cast Iron K15 GA5023 | H-T A. S G-915 | H-T A. S G-20M

Round Inserts

Flat Top (RNGN)



Shape: Round	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	S
	RNGN-190400	❍	❍	❍	❍	❍	❍	❍	❍	RNGN-63	19,05	4,75
	RNGN-250600	❍	❍	❍	❍	❍	❍	❍	❍	RNGN-84	25,40	6,35

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

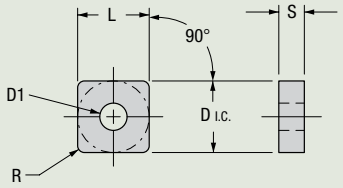
Steel P25 GA5035 | Steel P25 GA5125 | Steel P35 GA5036 | S. Steel M20 GA5023 | S. Steel M35 G-915 | Cast Iron K15 GA5023 | H-T A. S G-915 | H-T A. S G-20M

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Square Inserts

Chip Control



	Shape: Square	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
GENERAL PURPOSE	GP2 	SNMG-190612-GP2	●	❍	●	❍	●	❍	●	❍	SNMG-643-GP2	19,05	19,05	6,35	7,92	1,19
		SNMG-190616-GP2	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-644-GP2	19,05	19,05	6,35	7,92	1,57
MEDIUM ROUGHING	MR 	SNMG-190612-MR	●	❍	●	❍	●	❍	●	❍	SNMG-643-MR	19,05	19,05	6,35	7,92	1,19
		SNMG-190616-MR	❍	❍	●	❍	❍	❍	❍	●	SNMG-644-MR	19,05	19,05	6,35	7,92	1,57
		SNMG-250924-MR	❍	❍	❍	❍	❍	❍	❍	❍	SNMG-866-MR	25,40	25,40	9,53	9,12	2,36
HEAVY ROUGHING	HR – single sided 	SNMM-190612-HR	❍	❍	❍	❍	❍	❍	❍	❍	SNMM-643-HR	19,05	19,05	6,35	7,92	1,19
		SNMM-190616-HR	❍	❍	❍	❍	❍	❍	❍	❍	SNMM-644-HR	19,05	19,05	6,35	7,92	1,57

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5035 GA5125 GA5036 GA5023 G-915 GA5023 G-915 G-20M
P25 P25 P35 M20 M35 K15 S
Steel S. Steel Cast Iron H-T A.

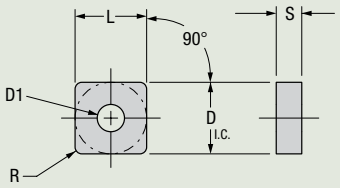
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Square Inserts

Flat Top (SNMA)



Shape: Square	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
	**SNMA-190612**	❍	❍	❍	❍	❍	❍	❍	❍	**SNMA-643**	19,05	19,05	6,35	7,92	1,19
	SNMA-190616	❍	❍	❍	❍	❍	❍	❍	❍	**SNMA-644**	19,05	19,05	6,35	7,92	1,57
	SNMA-250916	❍	❍	❍	❍	❍	❍	❍	❍	**SNMA-864**	25,40	25,40	9,53	9,12	1,57
	SNMA-250924	❍	❍	❍	❍	❍	❍	❍	❍	**SNMA-866**	25,40	25,40	9,53	9,12	2,36

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

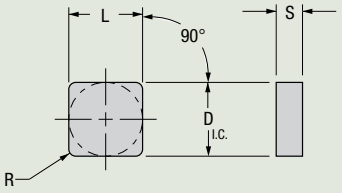
GA5035 | GA5125 | GA5036 | GA5023 | G-915 | GA5023 | G-915 | G-20M
P25 | P25 | P35 | M20 | M35 | K15 | S
Steel | S. Steel | Cast Iron | H-T A.

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Square Inserts

Flat Top (SNGN/SNUN)



Shape: Square	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) DI.C.	L	S	R
	SNGN-190412	○	○	○	○	○	○	○	○	SNGN-633	19,05	19,05	4,75	1,19
	SNGN-190416	○	○	○	○	○	○	○	○	SNGN-634	19,05	19,05	4,75	1,57
	SNGN-190432	○	○	○	○	○	○	○	○	SNGN-638	19,05	19,05	4,75	3,18
	SNGN-190612	○	●	○	○	○	○	○	○	SNGN-643	19,05	19,05	6,35	1,19
	SNGN-190616	○	●	○	○	○	○	○	○	SNGN-644	19,05	19,05	6,35	1,57
	SNGN-190624	○	○	○	○	○	○	○	○	SNGN-646	19,05	19,05	6,35	2,36
	SNGN-250616	○	○	○	○	○	○	○	○	SNGN-844	25,40	25,40	6,35	1,57
	SNGN-250716	○	○	○	○	○	○	○	○	SNGN-854	25,40	25,40	7,92	1,57
	SNGN-310648	○	○	○	○	○	○	○	○	SNGN-10412	31,75	31,75	6,35	4,75
	SNGN-310924	○	○	○	○	○	○	○	○	SNGN-1066	31,75	31,75	9,53	2,36
	SNGN-310932	○	○	○	○	○	○	○	○	SNGN-1068	31,75	31,75	9,53	3,18
	SNGN-381232	○	○	○	○	○	○	○	○	SNGN-1288	38,10	38,10	12,70	3,18
	SNUN-190412	○	○	○	○	○	○	○	○	SNUN-633	19,05	19,05	4,75	1,19
	SNUN-190416	○	○	○	○	○	○	○	○	SNUN-634	19,05	19,05	4,75	1,57
	SNUN-250616	○	○	○	○	○	○	○	○	SNUN-844	25,40	25,40	6,35	1,57
	SNUN-250632	○	○	○	○	○	○	○	○	SNUN-848	25,40	25,40	6,35	3,18
	SNUN-250716	○	○	○	○	○	○	○	○	SNUN-854	25,40	25,40	7,92	1,57
	SNUN-310924	○	○	○	○	○	○	○	○	SNUN-1066	31,75	31,75	9,53	2,36
	SNUN-310932	○	○	○	○	○	○	○	○	SNUN-1068	31,75	31,75	9,53	3,18
	SNUN-381232	○	○	○	○	○	○	○	○	SNUN-1288	38,10	38,10	12,70	3,18

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

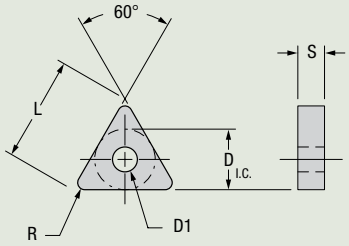
GA5035	GA5125	GA5036	GA5023	G-915	GA5023	G-915	G-20M
P25	P25	P35	M20	M35	K15	S	
Steel			S. Steel		Cast Iron	H-T A.	

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Triangle Inserts
Chip Control



	Shape: Triangle	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
MEDIUM ROUGHING	MR	TNMG-330924-MR	●	❍	❍	❍	❍	❍	❍	❍	TNMG-666-MR	19,05	32,99	9,53	7,92	2,39

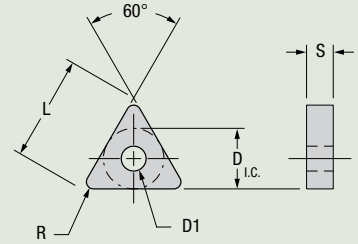


Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

			Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M
			P25 GA5035	P25 GA5125	P35 GA5036	M20 GA5023	M35 G-915	K15 GA5023	S G-915	S G-20M
			Steel			S. Steel		Cast Iron	H-T A.	

Triangle Inserts
Flat Top (TNMA)



Shape: Triangle	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	D1	R
	TNMA-330608	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-642	19,05	32,99	6,35	7,92	0,79
	TNMA-330612	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-643	19,05	32,99	6,35	7,92	1,19
	TNMA-330616	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-644	19,05	32,99	6,35	7,92	1,57
	TNMA-330916	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-664	19,05	32,99	9,53	7,92	1,57
	TNMA-330924	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-666	19,05	32,99	9,53	7,92	2,36
	TNMA-330932	❍	❍	❍	❍	❍	❍	❍	❍	TNMA-668	19,05	32,99	9,53	7,92	3,18



Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

			Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M
			P25 GA5035	P25 GA5125	P35 GA5036	M20 GA5023	M35 G-915	K15 GA5023	S G-915	S G-20M
			Steel			S. Steel		Cast Iron	H-T A.	

Stocked or Available Upon Request ❍ ❍

Stocked Standard ● ●

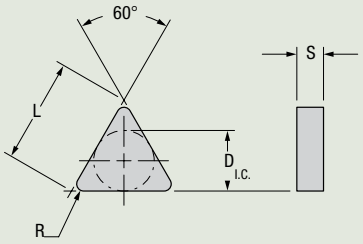
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60°

Greenleaf®

Triangle Inserts

Flat Top (TNGN)



Shape: Triangle	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	TNGN-330716	●	●	●	●	●	●	●	●	TNGN-654	19,05	32,99	7,92	1,57
	TNGN-330724	●	●	●	●	●	●	●	●	TNGN-656	19,05	32,99	7,92	2,36
	TNGN-330916	●	●	●	●	●	●	●	●	TNGN-664	19,05	32,99	9,53	1,57
	TNGN-330924	●	●	●	●	●	●	●	●	TNGN-666	19,05	32,99	9,53	2,36
	TNGN-330932	●	●	●	●	●	●	●	●	TNGN-668	19,05	32,99	9,53	3,18
	TNGN-381124	●	●	●	●	●	●	●	●	TNGN-776	22,23	38,51	11,10	2,36
	TNGN-381132	●	●	●	●	●	●	●	●	TNGN-778	22,23	38,51	11,10	3,18
	TNGN-381140	●	●	●	●	●	●	●	●	TNGN-7710	22,23	38,51	11,10	3,96
	TNGN-441132	●	●	●	●	●	●	●	●	TNGN-878	25,40	43,99	11,10	3,18

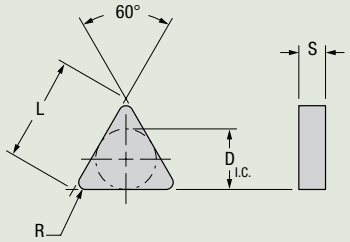
Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

GA5035 GA5125 GA5036 GA5023 G-915 GA5023 G-915 G-20M
P25 P25 P35 M20 M35 K15 S
Steel S. Steel Cast Iron H-T A.

Triangle Inserts

Flat Top (TNUN)



Shape: Triangle	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	TNUN-330716	●	●	●	●	●	●	●	●	TNUN-654	19,05	32,99	7,92	1,57
	TNUN-330724	●	●	●	●	●	●	●	●	TNUN-656	19,05	32,99	7,92	2,36
	TNUN-330916	●	●	●	●	●	●	●	●	TNUN-664	19,05	32,99	9,53	1,57
	TNUN-330924	●	●	●	●	●	●	●	●	TNUN-666	19,05	32,99	9,53	2,36
	TNUN-330932	●	●	●	●	●	●	●	●	TNUN-668	19,05	32,99	9,53	3,18
	TNUN-381124	●	●	●	●	●	●	●	●	TNUN-776	22,23	38,51	11,10	2,36
	TNUN-381132	●	●	●	●	●	●	●	●	TNUN-778	22,23	38,51	11,10	3,18
	TNUN-381140	●	●	●	●	●	●	●	●	TNUN-7710	22,23	38,51	11,10	3,96
	TNUN-441132	●	●	●	●	●	●	●	●	TNUN-878	25,40	43,99	11,10	3,18

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

GA5035 GA5125 GA5036 GA5023 G-915 GA5023 G-915 G-20M
P25 P25 P35 M20 M35 K15 S
Steel S. Steel Cast Iron H-T A.

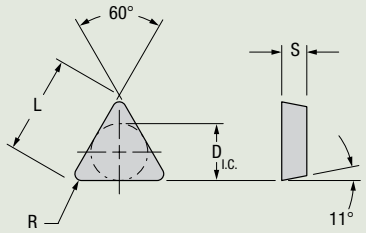
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○ Stocked or Available Upon Request

Triangle Inserts

Flat Top (TPGN/TPUN)



Shape: Triangle	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	TPGN-330924	❍	❍	❍	❍	❍	❍	❍	❍	TPGN-666	19,05	32,99	9,53	2,36
	TPUN-330916	❍	❍	❍	❍	❍	❍	❍	❍	TPUN-664	19,05	32,99	9,53	1,57
	TPUN-330924	❍	❍	❍	❍	❍	❍	❍	❍	TPUN-666	19,05	32,99	9,53	2,36

Carbide Coatings

MT-CVD Coated — PVD Coated — Uncoated

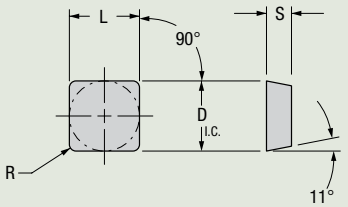
Stocked or Available Upon Request — ❍

Stocked Standard — ●

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Square Inserts

Flat Top



Shape: Square	Part Number ISO	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	S. Steel M20 GA5023	S. Steel M35 G-915	Cast Iron K15 GA5023	H-T A. S G-915	H-T A. S G-20M	Part Number ANSI	Dimensions (millimeters) D I.C.	L	S	R
	SPGN-190412	❍	❍	●	❍	❍	❍	❍	❍	SPGN-633	19,05	19,05	4,75	1,19
	SPGN-190416	❍	●	●	❍	❍	❍	❍	❍	SPGN-634	19,05	19,05	4,75	1,57
	SPGN-190424	❍	❍	❍	❍	❍	❍	❍	❍	SPGN-636	19,05	19,05	4,75	2,36
	SPGN-190432	❍	❍	❍	❍	❍	❍	❍	❍	SPGN-638	19,05	19,05	4,75	3,18
	SPUN-190412	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-633	19,05	19,05	4,75	1,19
	SPUN-190416	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-634	19,05	19,05	4,75	1,57
	SPUN-190612	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-643	19,05	19,05	6,35	1,19
	SPUN-190616	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-644	19,05	19,05	6,35	1,57
	SPUN-250916	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-864	25,40	25,40	9,53	1,57
	SPUN-250924	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-866	25,40	25,40	9,53	2,36
	SPUN-250932	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-868	25,40	25,40	9,53	3,18
	SPUN-310932	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-1068	31,75	31,75	9,53	3,18
	SPUN-381232	❍	❍	❍	❍	❍	❍	❍	❍	SPUN-1288	38,10	38,10	12,70	3,18

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5035 GA5125 GA5036 GA5023 G-915 GA5023 G-915 G-20M
P25 P25 P35 M20 M35 K15 S
Steel S. Steel Cast Iron H-T A.

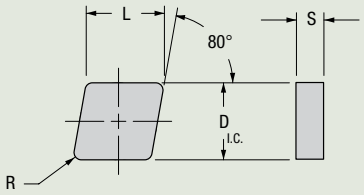
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80° Diamond Inserts

Negative



Shape: 80° Diamond	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
	**CNGN-190608**	T2A	❍	❍	❍	❍	❍	❍	**CNGN-642**	T2A	19,05	19,33	6,35	0,79
	CNGN-190612	T4A	❍	❍	❍	❍	❍	❍	**CNGN-643**	T4A	19,05	19,33	6,35	1,19
		T2A	❍	❍	●	❍	❍	❍		T2A	19,05	19,33	6,35	1,19
	CNGN-190616	T2A	❍	❍	❍	❍	❍	❍	**CNGN-644**	T2A	19,05	19,33	6,35	1,57

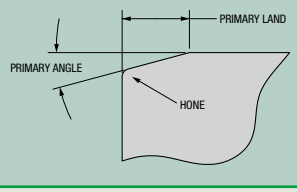
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

WG-300 / WG-600 / WG-700 / XSYTIN-1 / GSN100 / GEM-7 — Whisker / Phase Toughened / Si_3N_4 / Al_2O_3-TiC

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Edge Prep Descriptions – HT 06



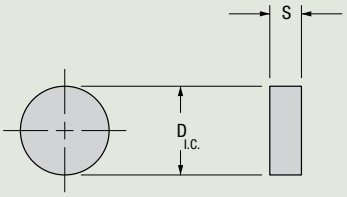
If edge prep is not shown, call Greenleaf Technical Service for assistance.

Inserts and Steel Products *Only*		Inserts *Only*		Steel Products	
10 Business Days or Less	❍ ❍	Stocked or Available Upon Request	❍ ❍	Stocked Standard	● ●

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Round Inserts

Negative



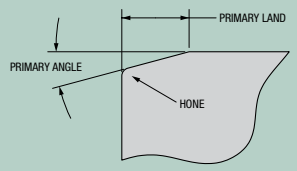
Shape: Round	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
	**RNGN-190600**	T2A	❍	❍	❍	❍	❍	❍	**RNGN-64**	T2A	19,05	6,35
	RNGN-190700	T2A	●	❍	●	❍	❍	❍	**RNGN-65**	T2A	19,05	7,92
		T10B	❍	❍	❍	❍	❍	●		T10B	19,05	7,92
	RNGN-250600	T2A	❍	❍	❍	❍	❍	❍	**RNGN-84**	T2A	25,40	6,35
	RNGN-250700	T2A	❍	❍	❍	❍	❍	❍	**RNGN-85**	T2A	25,40	7,92
	RNGN-250900	T2A	❍	❍	❍	❍	❍	❍	**RNGN-86**	T2A	25,40	9,53
	RNGN-310900	T4B	❍	❍	❍	❍	❍	●	**RNGN-106**	T4B	31,75	9,53
		T10B	❍	❍	❍	❍	❍	●		T10B	31,75	9,53

Ceramic Classification

WG-300 WG-600 WG-700 Whisker	XSYTIN-1 Phase Toughened	GSN100 Si_3N_4	GEM-7 Al_2O_3-TiC
Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



If edge prep is not shown, call Greenleaf Technical Service for assistance.

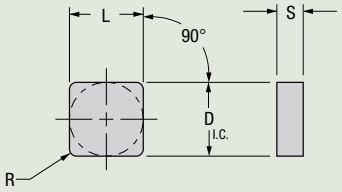
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● ● Stocked Standard

❍ ❍ Stocked or Available Upon Request

Square Inserts

Negative



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
	**SNGN-190608**	T2A	❍	❍	❍	❍	❍	❍	**SNGN-642**	T2A	19,05	19,05	6,35	0,79
	SNGN-190612	T2A	●	❍	❍	❍	❍	❍	**SNGN-643**	T2A	19,05	19,05	6,35	1,19
	SNGN-190616	T2A	●	❍	❍	❍	❍	❍	**SNGN-644**	T2A	19,05	19,05	6,35	1,57
	SNGN-190712	T2A	❍	❍	❍	❍	❍	❍	**SNGN-653**	T2A	19,05	19,05	7,92	1,19
	SNGN-190716	T10B	❍	❍	❍	❍	❍	❍	**SNGN-654**	T10B	19,05	19,05	7,92	1,57
	SNGN-190720	T2A	❍	❍	❍	❍	❍	❍	**SNGN-655**	T2A	19,05	19,05	7,92	1,98
	SNGN-250924	T10B	❍	❍	❍	❍	❍	❍	**SNGN-866**	T10B	25,40	25,40	9,53	2,39

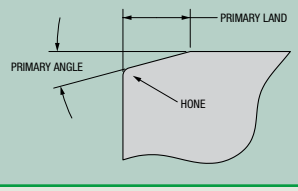
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

Page HT 05 – grade descriptions

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC

Edge Prep Descriptions – HT 06



If edge prep is not shown, call Greenleaf Technical Service for assistance.

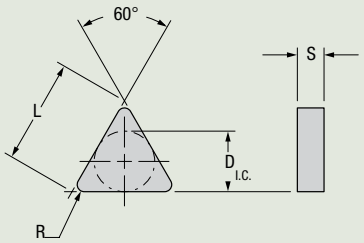
Stocked or Available Upon Request ❍ ❍

Stocked Standard ● ●

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Triangle Inserts

Negative



Shape: Triangle	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	L	S	R
	**TNGN-330924**	T4B	❍	❍	❍	❍	❍	❍	**TNGN-666**	T4B	19,05	32,99	9,53	2,39
	TNGN-440932	T10B	❍	❍	❍	❍	❍	❍	**TNGN-868**	T10B	25,40	43,99	9,53	3,18

Ceramic Classification

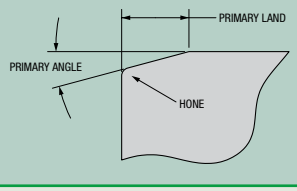
Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7

Whisker — Phase Toughened — Si_3N_4 — Al_2O_3-TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – page HT 06



If edge prep is not shown, call Greenleaf Technical Service for assistance.

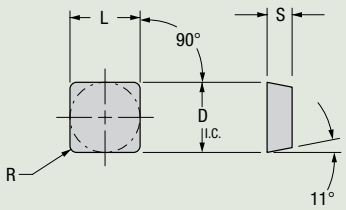
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❍ ❍ Stocked or Available Upon Request

Square Inserts

Positive



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (mimllimeters) D I.C.	L	S	R
	**SPGN-190412**	T2A	❍	❍	❍	❍	❍	❍	**SPGN-633**	T2A	19,05	19,05	4,75	1,19
	SPGN-190416	T2A	❍	❍	❍	❍	❍	❍	**SPGN-634**	T2A	19,05	19,05	4,75	1,57
	SPGN-190608	T2A	❍	❍	❍	❍	❍	❍	**SPGN-642**	T2A	19,05	19,05	6,35	0,79

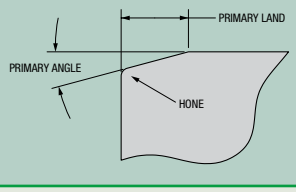
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



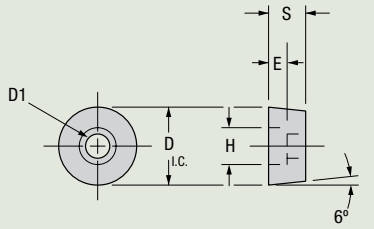
If edge prep is not shown, call Greenleaf Technical Service for assistance.

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Roll Turning Inserts



Shape: CDH	Part Number ISO	GA5035	G-935	G-50	G-74	Part Number ANSI	Dimensions (millimeters) D I.C.	S	H	D1	E
	CDH-42	❍	❍	❍	❍	CDH-42	25,40	12,70	10,31	6,73	6,35
	CDH-43	❍	❍	❍	❍	CDH-43	25,40	19,05	10,31	6,73	12,70
	CDH-51.5	❍	❍	❍	❍	CDH-51.5	31,75	9,53	15,06	9,91	9,53
	CDH-53	❍	❍	❍	❍	CDH-53	31,75	19,05	15,06	9,91	9,53

Carbide Coatings

GA5035	G-935	G-50	G-74

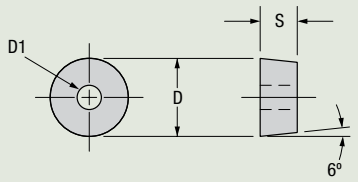
MT-CVD Coated | PVD Coated | Uncoated

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Roll Turning Inserts



Shape: C-CDH	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S	D1
	**C-CDH-21**	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-21**	T4B	12,70	6,35	3,18
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	6,35	3,18
	C-CDH-22	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-22**	T4B	12,70	12,70	3,18
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	12,70	3,18
	C-CDH-31	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-31**	T4B	19,05	6,35	6,73
		T10B	❍	❍	❍	❍	❍	❍		T10B	19,05	6,35	6,73
	C-CDH-31.5	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-31.5**	T4B	19,05	9,53	6,73
		T10B	❍	❍	❍	❍	❍	❍		T10B	19,05	9,53	6,73
	C-CDH-42	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-42**	T4B	25,40	12,70	6,73
		T10B	●	❍	❍	❍	❍	●		T10B	25,40	12,70	6,73
	C-CDH-43	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-43**	T4B	25,40	19,05	6,73
		T10B	❍	❍	❍	❍	❍	❍		T10B	25,40	19,05	6,73
	C-CDH-51.5	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-51.5**	T4B	31,75	9,53	9,91
		T10B	❍	❍	❍	❍	❍	❍		T10B	31,75	9,53	9,91
	C-CDH-53	T4B	❍	❍	❍	❍	❍	❍	**C-CDH-53**	T4B	31,75	19,05	9,91
		T10B	❍	❍	❍	❍	❍	●		T10B	31,75	19,05	9,91

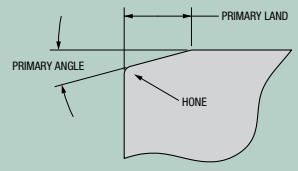
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



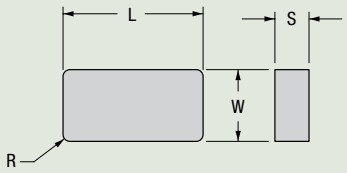
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Roll Turning Inserts



Shape: LNUN	Part Number ISO	GA5035	G-935	G-50	G-74	Part Number ANSI	Dimensions (millimeters) W	L	S	R
	LNUN-4442	○	○	○	○	LNUN-4442	12,70	25,40	6,35	0,79
	LNUN-4444	○	○	○	○	LNUN-4444	12,70	25,40	6,35	1,57
	LNUN-4452	○	○	○	○	LNUN-4452	12,70	25,40	7,92	0,79
	LNUN-4454	○	○	○	○	LNUN-4454	12,70	25,40	7,92	1,57
	LNUN-5444	○	○	○	○	LNUN-5444	15,88	25,40	6,35	1,57
	LNUN-5464	○	○	○	○	LNUN-5464	15,88	25,40	9,53	1,57
	LNUN-5564	○	○	○	○	LNUN-5564	15,88	31,75	9,53	1,57
	LNUN-6568	○	○	○	○	LNUN-6568	19,05	31,75	9,53	3,18
	LNUN-6684	○	○	○	○	LNUN-6684	19,05	38,10	12,70	1,57
	LNUN-6688	○	○	●	○	LNUN-6688	19,05	38,10	12,70	3,18
	LNUN-66812	○	○	○	○	LNUN-66812	19,05	38,10	12,70	4,75
	LNUN-68812	○	○	○	○	LNUN-68812	19,05	50,80	12,70	4,75

Carbide Coatings

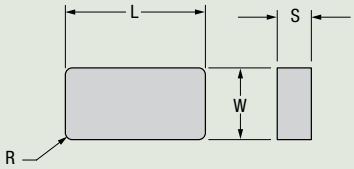
GA5035	G-935	G-50	G-74
MT-CVD Coated	PVD Coated	Uncoated	

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Roll Turning Inserts



Shape: LNMN	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) W	L	S	R
	**LNMN-4442**	T4B	❍	❍	❍	❍	❍	❍	**LNMN-4442**	T4B	12,70	25,40	6,35	0,79
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	25,40	6,35	0,79
	LNMN-4444	T4B	❍	❍	❍	❍	❍	❍	**LNMN-4444**	T4B	12,70	25,40	6,35	1,57
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	25,40	6,35	1,57
	LNMN-4452	T4B	❍	❍	❍	❍	❍	❍	**LNMN-4452**	T4B	12,70	25,40	7,92	0,79
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	25,40	7,92	0,79
	LNMN-4454	T4B	❍	❍	❍	❍	❍	❍	**LNMN-4454**	T4B	12,70	25,40	7,92	1,57
		T10B	❍	❍	❍	❍	❍	❍		T10B	12,70	25,40	7,92	1,57
	LNMN-5444	T4B	❍	❍	❍	❍	❍	❍	**LNMN-5444**	T4B	15,88	25,40	6,35	1,57
		T10B	❍	❍	❍	❍	❍	❍		T10B	15,88	25,40	6,35	1,57
	LNMN-5464	T4B	❍	❍	❍	❍	❍	❍	**LNMN-5464**	T4B	15,88	25,40	9,53	1,57
		T10B	❍	❍	❍	❍	❍	●		T10B	15,88	25,40	9,53	1,57
	LNMN-5564	T4B	❍	❍	❍	❍	❍	❍	**LNMN-5564**	T4B	15,88	31,75	9,53	1,57
		T10B	❍	❍	❍	❍	❍	❍		T10B	15,88	31,75	9,53	1,57
	LNMN-6568	T4B	❍	❍	❍	❍	❍	❍	**LNMN-6568**	T4B	19,05	31,75	9,53	3,18
		T10B	❍	❍	❍	❍	❍	❍		T10B	19,05	31,75	9,53	3,18
	LNMN-6684	T4B	❍	❍	❍	❍	❍	❍	**LNMN-6684**	T4B	19,05	38,10	12,70	1,57
		T10B	❍	❍	❍	❍	❍	❍		T10B	19,05	38,10	12,70	1,57
	LNMN-6688	T4B	❍	❍	●	❍	❍	❍	**LNMN-6688**	T4B	19,05	38,10	12,70	3,18
		T10B	●	●	●	❍	❍	●		T10B	19,05	38,10	12,70	3,18
	LNMN-66812	T4B	❍	❍	❍	❍	❍	❍	**LNMN-66812**	T4B	19,05	38,10	12,70	4,75
		T10B	❍	❍	❍	❍	❍	❍		T10B	19,05	38,10	12,70	4,75

Ceramic Classification

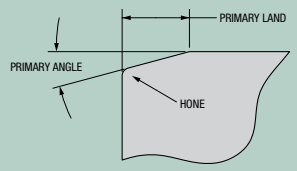


Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC

Page HT 05 – grade descriptions

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC

Edge Prep Descriptions – HT 06



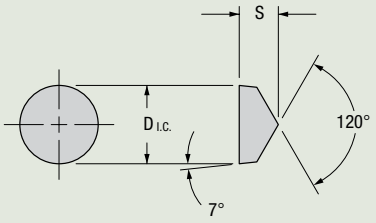
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Round V-Bottom Inserts



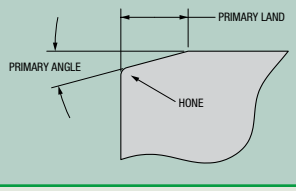
Shape: Round V-Bottom	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
	**RCGX-060400**	T2A	○	○	○	○	○	●	**RCGN-2V**	T2A	6,35	4,75
	RCGX-090700	T2A	●	○	○	○	○	●	**RCGN-3V**	T2A	9,53	7,92
		T4B	●	○	○	○	○	○		T5B	9,53	7,92
	RCGX-120700	T2A	●	●	●	○	○	●	**RCGN-4V**	T2A	12,70	7,92
		T4A	○	○	○	○	○	●		T4A	12,70	7,92
		T5A	●	○	○	○	○	●		T5A	12,70	7,92
		T5B	●	○	○	○	○	●		T5B	12,70	7,92
	RCGX-151000	T2A	○	○	○	○	○	○	**RCGN-5V**	T2A	15,88	10,01
	RCGX-191000	T2A	○	○	○	○	○	○	**RCGX-106**	T2A	19,05	10,01
	RCGX-191200	T2A	○	○	○	○	○	○	**RCGN-6V**	T2A	19,05	12,70

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



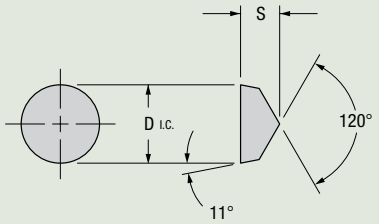
Page HT 34 – toolholders:
If edge prep is not shown, call Greenleaf Technical Service for assistance.

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Round V-Bottom Inserts



Shape: Round V-Bottom	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S
	**RPGX-060400**	T2A	●	❍	●	❍	❍	❍	**RPGN-2V**	T2A	6,35	4,75
	RPGX-090700	T2A	●	●	●	❍	❍	❍	**RPGN-3V**	T2A	9,53	7,92
		T4B	❍	❍	❍	❍	❍	❍		T4B	9,53	7,92
	RPGX-120700	T2A	●	●	❍	❍	❍	❍	**RPGN-4V**	T2A	12,70	7,92
		T4B	❍	❍	❍	❍	❍	❍		T4B	12,70	7,92

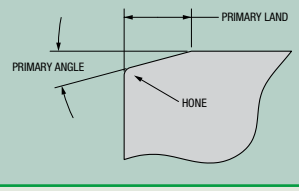
Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-7
Whisker			Phase Toughened	Si_3N_4	Al_2O_3-TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



If edge prep is not shown, call Greenleaf Technical Service for assistance.

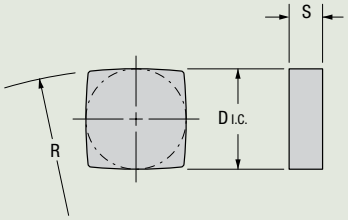
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Square Inserts

Negative



Shape: Square	Part Number ISO	Edge Prep	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Part Number ANSI	Edge Prep	Dimensions (millimeters) D I.C.	S	R
	**SNGN-128-R4.5**	T4B	❍	❍	❍	❍	❍	❍	**SNGN-128-R4.5**	T4B	38,10	12,70	114,30

Ceramic Classification

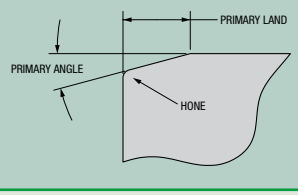
Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7

Whisker — Phase Toughened — Si_3N_4 — Al_2O_3-TiC

Page HT 05 – grade descriptions

Edge Prep Descriptions – HT 06



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Inserts

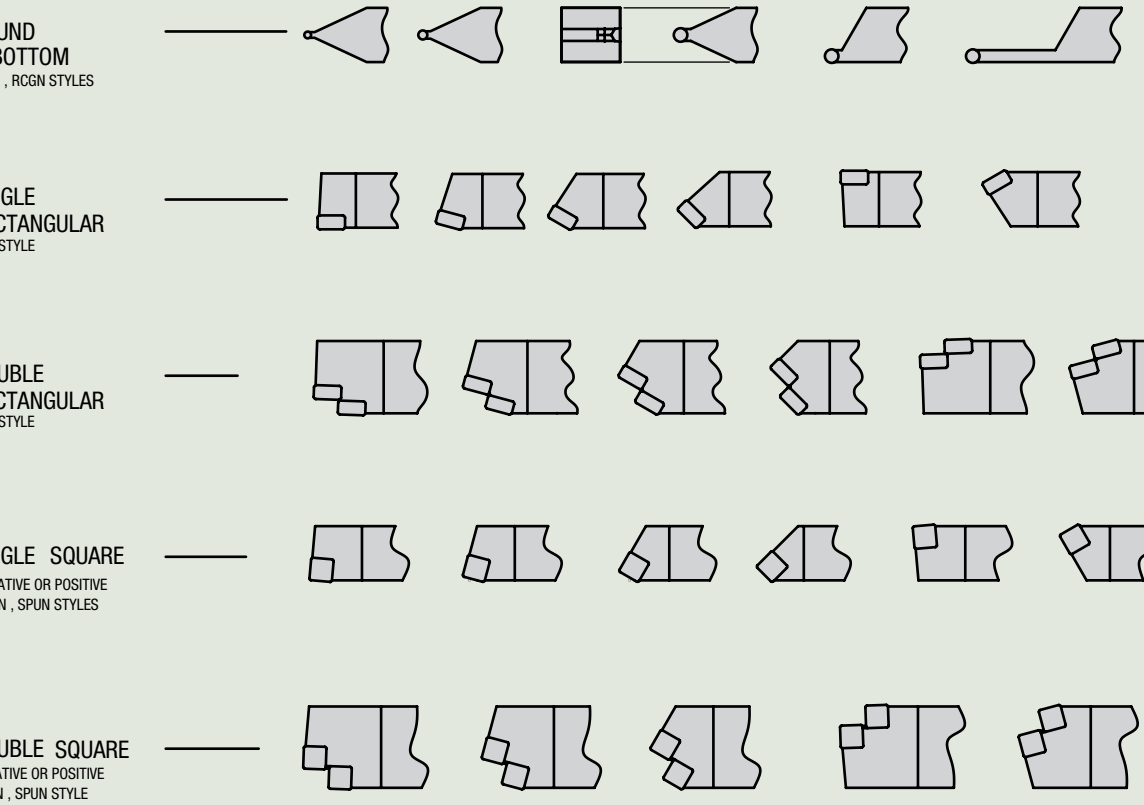
ROUND
V-BOTTOM
RPGN , RCGN STYLES

SINGLE
RECTANGULAR
LNU STYLE

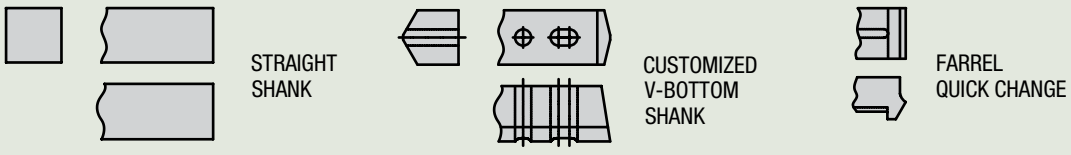
DOUBLE
RECTANGULAR
LNU STYLE

SINGLE SQUARE
NEGATIVE OR POSITIVE
SNUN , SPUN STYLES

DOUBLE SQUARE
NEGATIVE OR POSITIVE
SNUN , SPUN STYLE



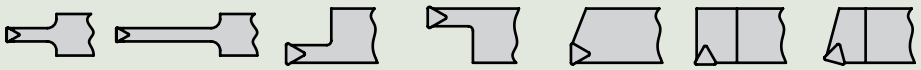
Shank Options



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Inserts *continued*

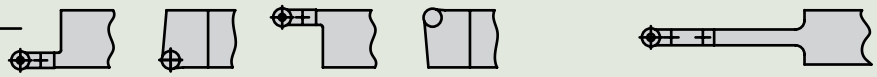
TRIANGULAR INSERT
NEGATIVE OR POSITIVE
TPGN , TNUN STYLES



DIAMOND INSERT
NEGATIVE OR POSITIVE
CNGN , CPGN STYLES

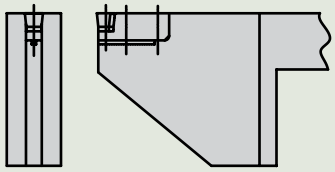


ROUND INSERT
NEGATIVE OR POSITIVE
RNGN , RCGN STYLES
CDH STYLES

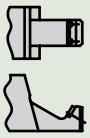


FINISHING INSERT
SNGN-128R4.5

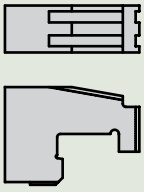




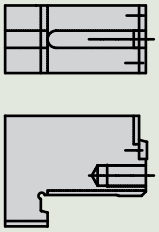
Shank Options *continued*



GREENLEAF
CAM LOCK



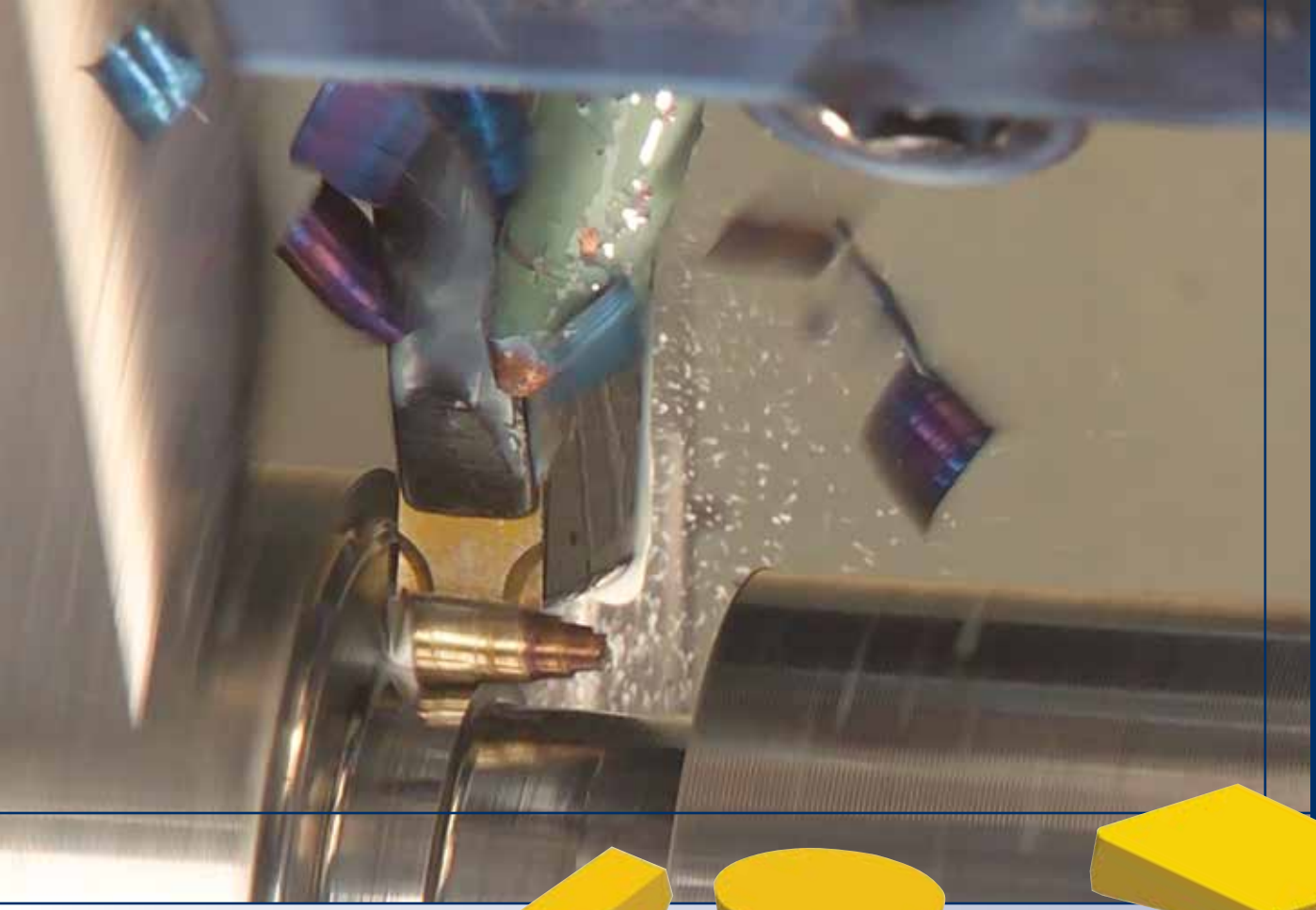
CUSTOMIZED
SHANK FOR
HERCULES
LATHES

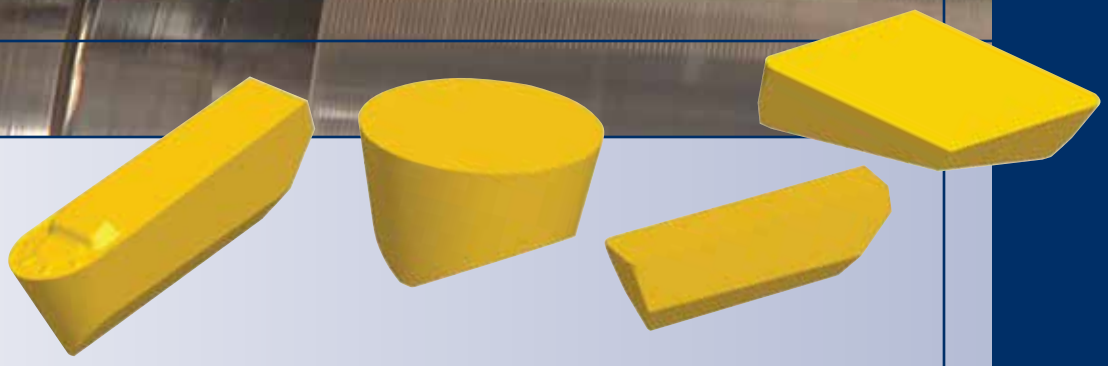


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SIEGEN
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Grooving, Profiling and Cut-Off Inserts ..... ***GP 02-03***

Grade Descriptions ..... ***GP 04***
Insert Grade Reference ..... ***GP 05***
Pictorial Index ..... ***GP 07***
Inserts ..... ***GP 08-18***

Toolholders and Bars ..... ***GP 19-38***

Support Blades and Holders ..... ***GP 39-55***

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Grooving, Profiling and Cut-Off Inserts

Greenleaf offers one of the most comprehensive lines of grooving, profiling and cut-off inserts in the industry. Every application on the shop floor can use this unique tooling system that accommodates both ceramic and carbide inserts.

Our advanced MT-CVD coated and PVD-coated grades have the strength and wear resistance needed for higher cutting speeds and longer tool life.

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts including WG-600®, the only commercially available, second generation, coated ceramic-composite cutting tool using whisker reinforcement. WG-600 is one of seven prominent advanced-ceramic grades that continue to increase productivity in industry.





Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

www.greenleafglobalsupport.com

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CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chipbreakers for heavy roughing through finishing.

COATED – MT-CVD

GA5025 A high-speed MT-CVD coated grade for turning, light roughing and finishing of carbon and alloy steels, as well as selected stainless steels.

GA5026 A high-speed grade developed for turning nickel- and cobalt-based super-alloys, stainless steels, and refractory metals. The advanced MT-CVD coating over a micro-grain substrate offers high wear resistance. GA5026 has exceptional resistance to the notching and deformation common to machining high strength materials. Apply at high speeds and light feeds in turning and selected milling applications.

GA5035 A high-performance MT-CVD coated grade for turning all types of steels, and selected stainless steels. GA5035 can be used in rough, semi-finish, and finish turning situations requiring resistance to heat deformation, thermal shock, and abrasion. GA5035 should be applied at high speeds and a range of feeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

COATED – PVD

G-915 Multi-layer PVD-coated grade, excellent for cut off, milling and turning high-temp alloys, stainless steel, and low carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-920 PVD-coated grade for turning and milling high-strength materials such as high-temp alloys, titanium and stainless steel. G-920 is also an excellent grade for aluminum and refractory metals. This grade has the resistance to deformation and notching required for higher speeds than G-910.

G-925 Multi-layer PVD-coated grade specifically designed for machining abrasive and difficult-to-machine materials. Typical applications include high-temp alloys, titanium and other refractory metals, stainless steel, and many cast irons. G-925 exhibits excellent resistance to notching and deformation. Apply at moderate to high speeds and moderate feeds.

G-935 Multi-layer PVD-coated grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

UNCOATED

G-20M A sub-micron C-2 carbide grade suited for use in turning and milling titanium and nickel-based super-alloys. G-20M has the strength and edge wear characteristics to resist notching when turning high-strength materials.

CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel and cobalt based super-alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

WG-600® Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels. *U.S. Patent No. 6,447,896 B1.*

WG-700™ New whisker-reinforced Al_2O_3 ceramic substrate featuring improved toughness and a unique high-speed coating. WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-machine materials. WG-700 exhibits high metal-removal rates with exceptional tool life. *U.S. Patent No. 6,447,896 B1*

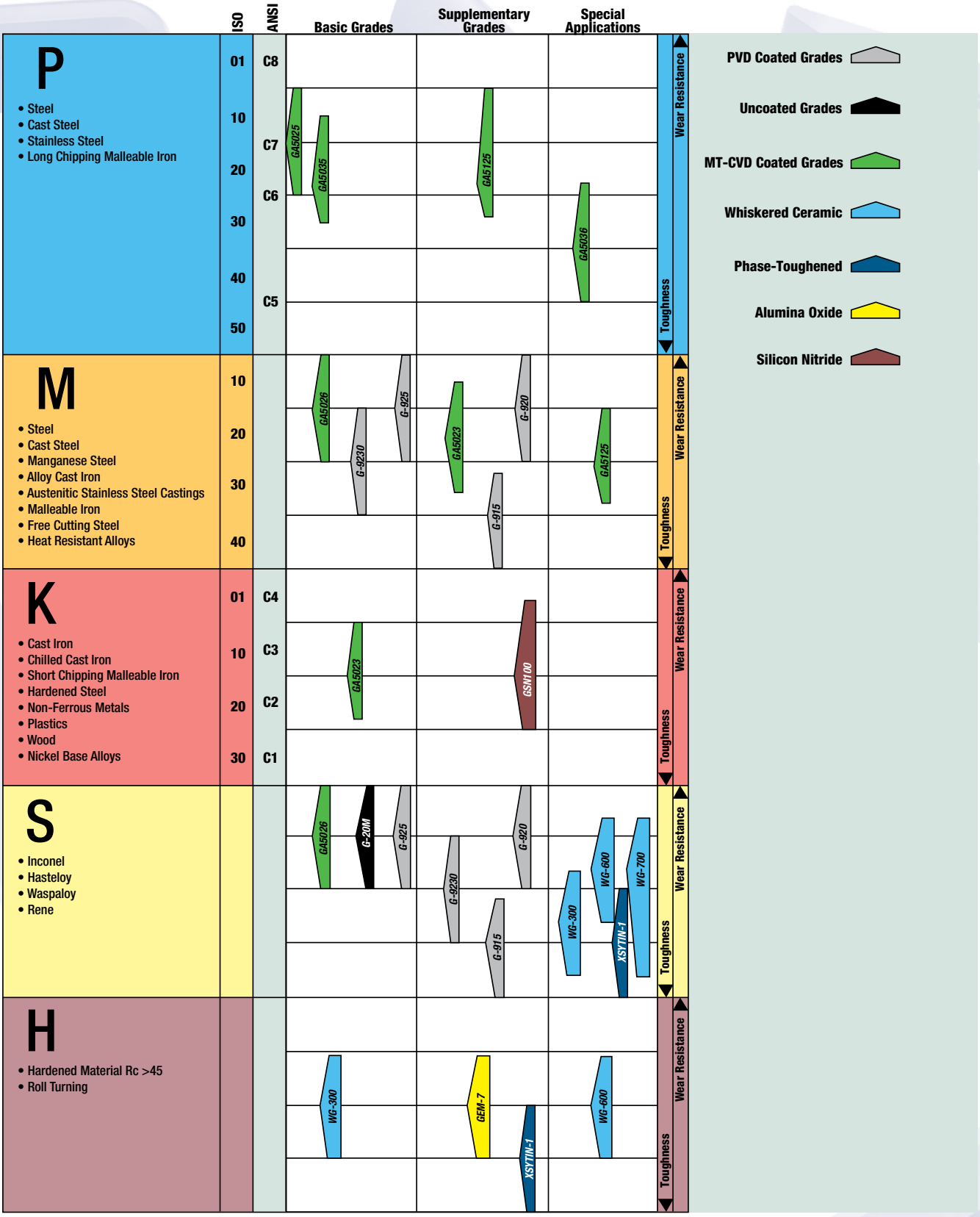
XSYTIN™-1 New phase-toughened ceramic capable of extreme feed rates. XSYTIN™-1 excels at machining a wide variety of materials including steels, cast and ductile irons, high-temperature alloys and other challenging metals. XSYTIN™-1 is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

GSN100™ New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

GEM-7™ Al_2O_3 + TiC composite ceramic with a high degree of predictability in roll turning and hard alloy (up to 65 R/c) machining.

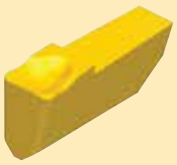
GEM-19™ Cold pressed and sintered Al_2O_3 ceramic for economical roughing and finishing of cast iron grades application range on severe interruption or old machinery.

Insert Grade Reference for Grooving, Profiling and Cut Off



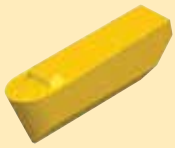
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Greenleaf Cut-Off System

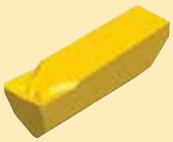


COS
page: GP 08

Single-Ended Groovers



Full Nose
page: GP 09



Flat Nose
page: GP 09



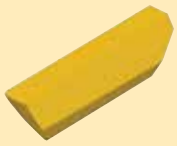
WG-Style
Full Nose
page: GP 10



WG-Style
Flat Nose
page: GP 11



WGC
Full Nose
page: GP 12



WGC
Flat Nose
page: GP 13

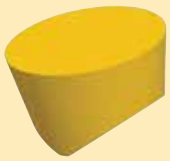
V-Bottom Round Inserts



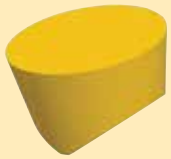
RCGX
Positive: Carbide
page: GP 14



RCGX
Positive: Ceramic
page: GP 14



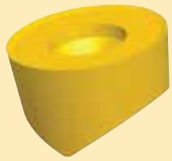
RPGX
Positive: Carbide
page: GP 15



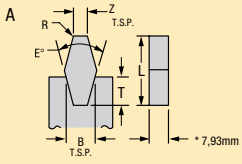
RPGX
Positive: Ceramic
page: GP 15



RCGR/RPGR
Positive Chipform
V-Bottom
page: GP 16



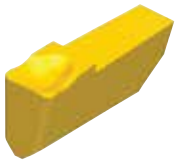
RCGT/RPGT
Positive Chipform
V-Bottom
page: GP 17

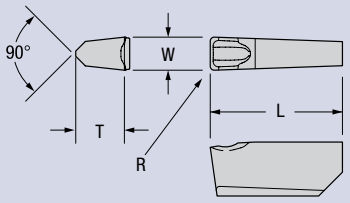


Pulley and
Poly Groove
Inserts
page: GP 18

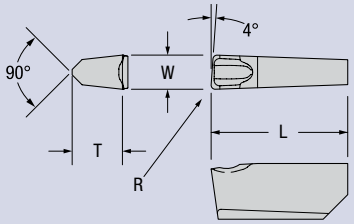
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Greenleaf Cut-Off System

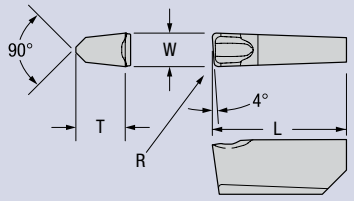
Shape: Groove/Turn	Part Number ISO	G-915	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	COS-4094-0	●	COS-4094-0	2,39	12,70	4,75	0,25
	COS-4125-0	●	COS-4125-0	3,18	12,70	4,75	0,25
	COS-4187-0	●	COS-4187-0	4,75	12,70	4,75	0,25
	COS-4094-4L	●	COS-4094-4L	2,39	12,70	4,75	0,25
	COS-4125-4L	●	COS-4125-4L	3,18	12,70	4,75	0,25
	COS-4187-4L	●	COS-4187-4L	4,75	12,70	4,75	0,25
	COS-4094-4R	●	COS-4094-4R	2,39	12,70	4,75	0,25
	COS-4125-4R	●	COS-4125-4R	3,18	12,70	4,75	0,25
	COS-4187-4R	●	COS-4187-4R	4,75	12,70	4,75	
				0,25			
Carbide Coatings PVD Coated		G-915					



0° Lead



4° Left Hand



4° Right Hand

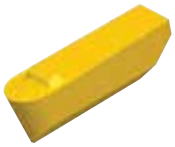
See pages GP29, GP32, GP34, GP35, GP43 and GP44 for toolholders.

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● ● Stocked Standard

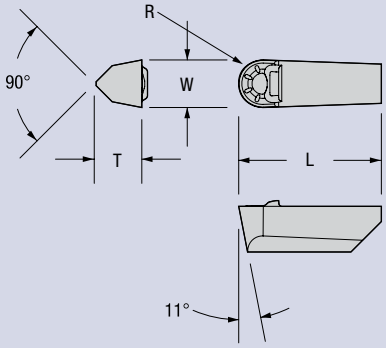
○ ○ Stocked or Available Upon Request

Full Nose Grooving Inserts

Shape: Groove/Turn	Part Number ISO	GA5026	GA5035	G-935	G-925	G-915	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	GTS-4125	●	●	●		●	GTS-4125	3,18	12,70	4,75	1,59
	GTS-4187	●	●	●		●	GTS-4187	4,75	12,70	4,75	2,37
	GTS-6250	●	●	○	●	●	GTS-6250	6,35	19,05	6,35	3,18

Carbide Coatings

GA5026	GA5035	G-935	G-925	G-915
MT-CVD Coated		PVD Coated		Uncoated

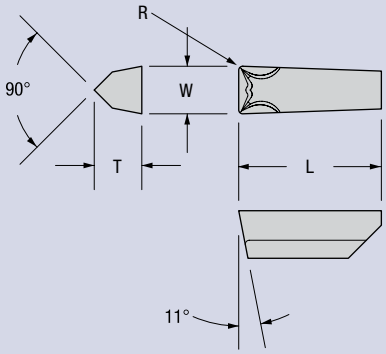


Flat Nose Grooving Inserts

Shape: Groove/Turn	Part Number ISO	GA5026	GA5035	G-935	G-915	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	GTS-4125-1	●	●	●	●	GTS-4125-1	3,18	12,70	4,75	0,38
	GTS-4125-2	●	●	●	●	GTS-4125-2	3,18	12,70	4,75	0,79
	GTS-4187-1	●	●	●	●	GTS-4187-1	4,75	12,70	4,75	0,38
	GTS-4187-2	●	●	●	●	GTS-4187-2	4,75	12,70	4,75	0,79
	GTS-6250-1	●	●	●	●	GTS-6250-1	6,35	19,05	6,35	0,38
	GTS-6250-2	●	●	●	●	GTS-6250-2	6,35	19,05	6,35	0,79

Carbide Coatings

GA5026	GA5035	G-935	G-915
MT-CVD Coated		PVD Coated	Uncoated

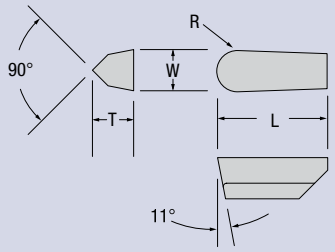


Stocked or Available Upon Request ○ ○

Stocked Standard ● ●

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WG-Style, Full Nose Grooving Inserts



Shape: Groover	Part Number ISO	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3 GEM-19	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	WG-4094	●	○	●	○	○	○	WG-4094	2,39	12,70	4,75	1,19
	WG-4125	●	●	●	○	○	○	WG-4125	3,18	12,70	4,75	1,59
	WG-4156	●	●	●	○	○	○	WG-4156	3,96	12,70	4,75	1,98
	WG-4187	●	●	●	○	○	○	WG-4187	4,75	12,70	4,75	2,37
	WG-6218	●	●	●	○	○	○	WG-6218	5,54	19,05	6,35	2,77
	WG-6250	●	●	●	○	○	○	WG-6250	6,35	19,05	6,35	3,18
	WG-6281	●	○	○	○	○	○	WG-6281	7,14	19,05	6,35	3,57
	WG-8312	●	○	●	○	○	○	WG-8312	7,93	25,40	8,56	3,96
	WG-8344	○	○	○	○	○	○	WG-8344	8,74	25,40	8,56	4,37
	WG-8375	●	○	○	○	○	○	WG-8375	9,53	25,40	8,56	4,76

Ceramic Classification

WG-300 / WG-600 / WG-700	XSYTIN-1	GSN100	GEM-19
Whisker	Phase Toughened	Si_3N_4	Al_2O_3

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

Page GP 04 – grade description

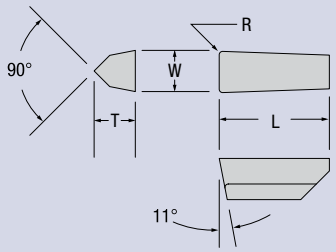
* The standard edge prep for WG groovers is “A” hone (0,012–0,025mm).

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● ● Stocked Standard

○ ○ Stocked or Available Upon Request

WG-Style, Flat Nose Grooving Inserts



Shape: Groover	Part Number ISO	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3 GEM-19	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	WG-4094-1	●	○	●	○	○	○	WG-4094-1	2,39	12,70	4,75	0,38
	WG-4094-2	○	○	○	○	○	○	WG-4094-2	2,39	12,70	4,75	0,79
	WG-4125-1	●	○	●	○	○	○	WG-4125-1	3,18	12,70	4,75	0,38
	WG-4125-2	●	○	●	○	●	○	WG-4125-2	3,18	12,70	4,75	0,79
	WG-4156-1	●	○	●	○	○	○	WG-4156-1	3,96	12,70	4,75	0,38
	WG-4156-2	●	○	●	○	○	○	WG-4156-2	3,96	12,70	4,75	0,79
	WG-4156-3	●	○	●	○	○	○	WG-4156-3	3,96	12,70	4,75	1,17
	WG-4187-1	●	○	●	○	○	○	WG-4187-1	4,75	12,70	4,75	0,38
	WG-4187-2	●	○	●	○	●	○	WG-4187-2	4,75	12,70	4,75	0,79
	WG-6218-1	●	○	●	○	○	○	WG-6218-1	5,54	19,05	6,35	0,38
	WG-6218-2	●	○	●	○	○	○	WG-6218-2	5,54	19,05	6,35	0,79
	WG-6250-1	●	●	●	○	○	○	WG-6250-1	6,35	19,05	6,35	0,38
	WG-6250-2	●	●	●	○	●	○	WG-6250-2	6,35	19,05	6,35	0,79
	WG-6250-3	●	●	●	○	○	○	WG-6250-3	6,35	19,05	6,35	1,17
	WG-6250-4	●	○	●	○	○	○	WG-6250-4	6,35	19,05	6,35	1,57
	WG-6281-1	●	○	○	○	○	○	WG-6281-1	7,14	19,05	6,35	0,38
	WG-6281-2	○	○	○	○	○	○	WG-6281-2	7,14	19,05	6,35	0,79
	WG-6281-3	○	○	○	○	○	○	WG-6281-3	7,14	19,05	6,35	1,17
	WG-8312-1	●	○	●	○	○	○	WG-8312-1	7,92	25,40	8,56	0,38
	WG-8312-2	●	○	●	○	○	○	WG-8312-2	7,92	25,40	8,56	0,79
	WG-8312-3	●	○	●	○	○	○	WG-8312-3	7,92	25,40	8,56	1,17
	WG-8312-4	○	○	○	○	○	○	WG-8312-4	7,92	25,40	8,56	1,57
	WG-8344-1	○	○	○	○	○	○	WG-8344-1	8,74	25,40	8,56	0,38
	WG-8344-2	○	○	○	○	○	○	WG-8344-2	8,74	25,40	8,56	0,79
	WG-8344-3	○	○	○	○	○	○	WG-8344-3	8,74	25,40	8,56	1,17
	WG-8344-4	○	○	○	○	○	○	WG-8344-4	8,74	25,40	8,56	1,57
	WG-8375-1	○	○	○	○	○	○	WG-8375-1	9,53	25,40	8,56	0,38
	WG-8375-2	●	○	●	○	●	○	WG-8375-2	9,53	25,40	8,56	0,79
	WG-8375-3	○	○	○	○	○	○	WG-8375-3	9,53	25,40	8,56	1,17
	WG-8375-4	●	○	○	○	○	○	WG-8375-4	9,53	25,40	8,56	1,57

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

WG-300	WG-600	WG-700	XSYTIN-1	GSN100	GEM-19
Whisker			Phase Toughened	Si_3N_4	Al_2O_3

Page GP 04 – grade description

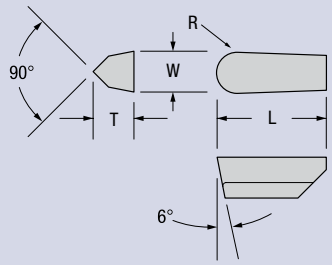
* The standard edge prep for WG groovers is “A” hone (0,012–0,025mm).

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Stocked Standard ● ●

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WGC Full Nose Grooving Inserts



Shape: Groover	Part Number ISO	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	WGC-4094	❍	❍	❍	❍	❍	❍	❍	WGC-4094	2,39	12,70	4,75	1,19
	WGC-4125	❍	❍	❍	❍	❍	❍	❍	WGC-4125	3,18	12,70	4,75	1,59
	WGC-4156	❍	❍	❍	❍	❍	❍	❍	WGC-4156	3,96	12,70	4,75	1,98
	WGC-4187	❍	❍	❍	❍	❍	❍	❍	WGC-4187	4,75	12,70	4,75	2,37
	WGC-6218	❍	❍	❍	❍	❍	❍	❍	WGC-6218	5,54	19,05	6,35	2,77
	WGC-6250	❍	❍	❍	❍	❍	●	❍	WGC-6250	6,35	19,05	6,35	3,18
	WGC-6281	❍	❍	❍	❍	❍	❍	❍	WGC-6281	7,14	19,05	6,35	3,57
	WGC-8312	❍	❍	❍	❍	❍	❍	❍	WGC-8312	7,93	25,40	8,56	3,96
	WGC-8344	❍	❍	❍	❍	❍	❍	❍	WGC-8344	8,74	25,40	8,56	4,37
	WGC-8375	❍	❍	❍	❍	❍	❍	❍	WGC-8375	9,53	25,40	8,56	4,76

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19

Page GP 04 – grade description

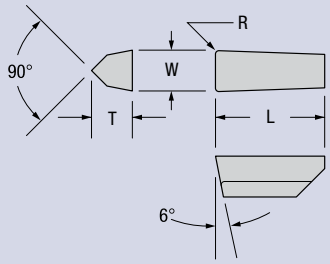
* WGC style inserts come standard with a "T1A" edge prep (0,05–0,10mm x 20 degrees and 0,012–0,025mm hone).

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❍ ❍ Stocked or Available Upon Request

WGC Flat Nose Grooving Inserts



Shape: Groover	Part Number ISO	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Dimensions (millimeters) W	L	T	R
	WGC-4094-1	❍	❍	❍	❍	❍	❍	❍	WGC-4094-1	2,39	12,70	4,75	0,38
	WGC-4094-2	❍	❍	❍	❍	❍	❍	❍	WGC-4094-2	2,39	12,70	4,75	0,79
	WGC-4125-1	❍	❍	❍	❍	❍	●	❍	WGC-4125-1	3,18	12,70	4,75	0,38
	WGC-4125-2	❍	❍	❍	❍	❍	❍	❍	WGC-4125-2	3,18	12,70	4,75	0,79
	WGC-4156-1	❍	❍	❍	❍	❍	❍	❍	WGC-4156-1	3,96	12,70	4,75	0,38
	WGC-4156-2	❍	❍	❍	❍	❍	❍	❍	WGC-4156-2	3,96	12,70	4,75	0,79
	WGC-4187-1	❍	❍	❍	❍	❍	❍	❍	WGC-4187-1	4,75	12,70	4,75	0,38
	WGC-4187-2	❍	❍	❍	❍	❍	❍	❍	WGC-4187-2	4,75	12,70	4,75	0,79
	WGC-6218-1	❍	❍	❍	❍	❍	❍	❍	WGC-6218-1	5,54	19,05	6,35	0,38
	WGC-6218-2	❍	❍	❍	❍	❍	❍	❍	WGC-6218-2	5,54	19,05	6,35	0,79
	WGC-6250-1	❍	❍	❍	❍	❍	❍	❍	WGC-6250-1	6,35	19,05	6,35	0,38
	WGC-6250-2	❍	❍	❍	❍	❍	❍	❍	WGC-6250-2	6,35	19,05	6,35	0,79
	WGC-6250-3	❍	❍	❍	❍	❍	❍	❍	WGC-6250-3	6,35	19,05	6,35	1,17
	WGC-6281-1	❍	❍	❍	❍	❍	❍	❍	WGC-6281-1	7,14	19,05	6,35	0,38
	WGC-6281-2	❍	❍	❍	❍	❍	❍	❍	WGC-6281-2	7,14	19,05	6,35	0,79
	WGC-6281-3	❍	❍	❍	❍	❍	❍	❍	WGC-6281-3	7,14	19,05	6,35	1,17
	WGC-8312-1	❍	❍	❍	❍	❍	❍	❍	WGC-8312-1	7,92	25,40	8,56	0,38
	WGC-8312-2	❍	❍	❍	❍	❍	❍	❍	WGC-8312-2	7,92	25,40	8,56	0,79
	WGC-8312-3	❍	❍	❍	❍	❍	❍	❍	WGC-8312-3	7,92	25,40	8,56	1,17
	WGC-8312-4	❍	❍	❍	❍	❍	❍	❍	WGC-8312-4	7,92	25,40	8,56	1,57
	WGC-8344-1	❍	❍	❍	❍	❍	❍	❍	WGC-8344-1	8,74	25,40	8,56	0,38
	WGC-8344-2	❍	❍	❍	❍	❍	❍	❍	WGC-8344-2	8,74	25,40	8,56	0,79
	WGC-8344-3	❍	❍	❍	❍	❍	❍	❍	WGC-8344-3	8,74	25,40	8,56	1,17
	WGC-8344-4	❍	❍	❍	❍	❍	❍	❍	WGC-8344-4	8,74	25,40	8,56	1,57
	WGC-8375-1	❍	❍	❍	❍	❍	❍	❍	WGC-8375-1	9,53	25,40	8,56	0,38
	WGC-8375-2	❍	❍	❍	❍	❍	❍	❍	WGC-8375-2	9,53	25,40	8,56	0,79
	WGC-8375-3	❍	❍	❍	❍	❍	❍	❍	WGC-8375-3	9,53	25,40	8,56	1,17
	WGC-8375-4	❍	❍	❍	❍	❍	❍	❍	WGC-8375-4	9,53	25,40	8,56	1,57

Ceramic Classification

Whisker Ceramic	Phase Toughened	Silicon Nitride	Alumina TiC	Al_2O_3

Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3-TiC GEM-7	Al_2O_3 GEM-19

Page GP 04 – grade description

* WGC style inserts come standard with a "T1A" edge prep (0,05–0,10mm x 20° and 0,012–0,025mm hone).

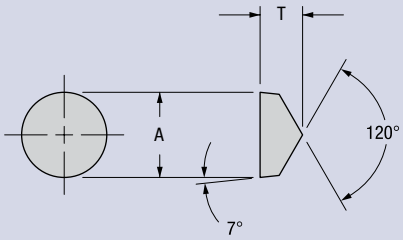
Stocked or Available Upon Request ❍ ❍

Stocked Standard ● ●

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Round: Positive V-Bottom Inserts (RCGX)

Carbide



Shape: Round V-Bottom	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) A	Dimensions (millimeters) T
	RCGX-060400	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RCGN-2V	6,35	4,75
	RCGX-060600	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	RCGX-102	6,35	6,35
	RCGX-090700	○	○	○	○	●	●	○	○	○	○	●	●	○	○	●	RCGN-3V	9,53	7,92
	RCGX-120700	○	○	○	○	●	●	○	○	○	○	●	●	○	○	●	RCGN-4V	12,70	7,92

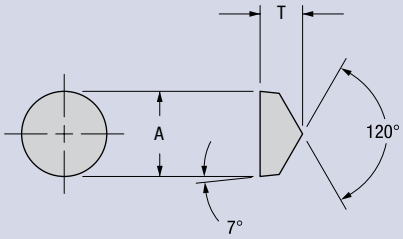
Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

Steel P15 GA5025 | Steel P25 GA5035 | Steel P25 GA5125 | Steel P35 GA5036 | Stainless Steel M15 GA5026 | Stainless Steel M15 G-925 | Stainless Steel M15 G-920 | Stainless Steel M20 GA5023 | Stainless Steel M35 G-915 | Cast Iron K15 GA5023 | High-Temp Alloys S GA5026 | High-Temp Alloys S G-925 | High-Temp Alloys S G-920 | High-Temp Alloys S G-915 | High-Temp Alloys S G-20M

Round: Positive V-Bottom Inserts (RCGX)

Ceramic



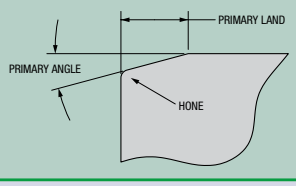
Shape: Round V-Bottom	Part Number ISO	Edge Prep*	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3–TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep*	Dimensions (millimeters) A	Dimensions (millimeters) T
	RCGX-060400	T1	●	●	●	●	○		○	RCGN-2V	T1	6,35	4,75
		T2A	●	○	○	○	○	●	○		T2A	6,35	4,75
	RCGX-090700	T1	●	●	●	●	●		○	RCGN-3V	T1	9,53	7,92
		T1A	○	○	○	○	○	○	○		T1A	9,53	7,92
		T2A	●	○	○	○	○	●	○		T2A	9,53	7,92
	RCGX-120700	T1	●	●	●	●	●		○	RCGN-4V	T1	12,70	7,92
		T1A	●	●	●	○	○	○	○		T1A	12,70	7,92
		T2	●	○	●	○	○		○		T2	12,70	7,92
		T2A	●	●	●	○	○	●	○		T2A	12,70	7,92

Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 | WG-600 | WG-700 | XSYTIN-1 | GSN100 | GEM-7 | GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3–TiC | Al_2O_3

Additional Edge Preps



Page GP 04 – grade description

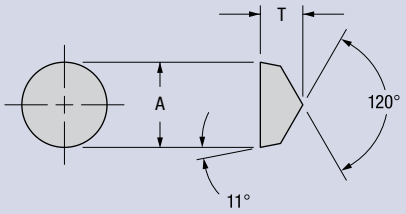
* If edge prep is not shown, call Greenleaf technical service for assistance.

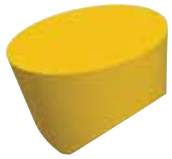
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● Stocked Standard | ○ Stocked or Available Upon Request | Not Recommended

Round: Positive V-Bottom Inserts (RPGX)

Carbide



Shape: Round V-Bottom	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) A	Dimensions (millimeters) T
	RPGX-060400	●	❍	❍	❍	●	●	●	❍	❍	❍	●	●	●	❍	●	RPGN-2V	6,35	4,75
	RPGX-090700	●	❍	❍	❍	●	●	●	❍	❍	❍	●	●	●	❍	●	RPGN-3V	9,53	7,92
	RPGX-120700	❍	❍	❍	❍	●	●	●	❍	❍	❍	●	●	●	❍	●	RPGN-4V	12,70	7,92

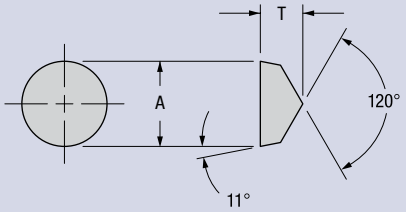
Carbide Coatings

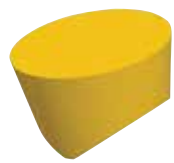
MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Round: Positive V-Bottom Inserts (RPGX)

Ceramic



Shape: Round V-Bottom	Part Number ISO	Edge Prep*	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3–TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep*	Dimensions (millimeters) A	Dimensions (millimeters) T
	RPGX-060400	T1	●	●	●	●	❍		❍	RPGN-2V	T1	6,35	4,75
		T2	❍	❍	❍	❍	●		❍		T2	6,35	4,75
		T2A	●	❍	●	❍	❍	❍	❍		T2A	6,35	4,75
	RPGX-090700	T1	●	●	●	●	❍		❍	RPGN-3V	T1	9,53	7,92
		T1A	❍	❍	❍	❍	●		❍		T1A	9,53	7,92
		T2	❍	❍	❍	❍	●		❍		T2	9,53	7,92
	RPGX-120700	T1	●	❍	●	●	❍		❍	RPGN-4V	T1	12,70	7,92
		T2	❍	❍	❍	❍	●		❍		T2	12,70	7,92

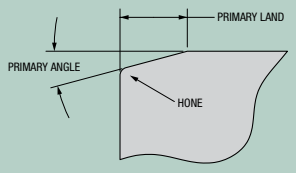
Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3–TiC | Al_2O_3

Page GP 04 – grade description

Additional Edge Preps



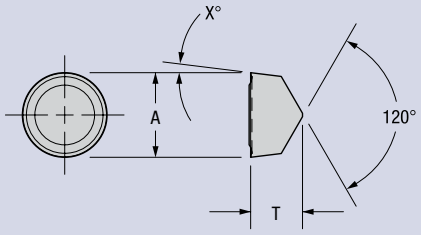
* If edge prep is not shown, call Greenleaf technical service for assistance.

Not Recommended | Stocked or Available Upon Request | Stocked Standard

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Round Inserts (RCGR-V/RPGX-V)

Positive Chipform V-Bottom
Carbide



Shape: Round V-Bottom	Part Number ISO	Steel P15 GA5025	Steel P25 GA5035	Steel P25 GA5125	Steel P35 GA5036	Stainless Steel M15 GA5026	Stainless Steel M15 G-925	Stainless Steel M15 G-920	Stainless Steel M20 GA5023	Stainless Steel M35 G-915	Cast Iron K15 GA5023	High-Temp Alloys S GA5026	High-Temp Alloys S G-925	High-Temp Alloys S G-920	High-Temp Alloys S G-915	High-Temp Alloys S G-20M	Part Number ANSI	Dimensions (millimeters) A	T	X
	RCGR-060400V-TF					❍	❍	❍				❍	❍	❍		●	RCGR-2V-TF	6,35	4,75	7°
	RCGR-090700V-TF					❍	❍	●				❍	❍	●		❍	RCGR-3V-TF	9,53	7,92	7°
	RCGR-120700V-TF					❍	❍	❍				❍	❍	❍		❍	RCGR-4V-TF	12,70	7,92	7°
	RPGX-060400V-TF					❍	●	❍				❍	●	❍		●	RPGR-2V-TF	6,35	4,75	11°
	RPGX-090700V-TF					●	●	●				●	●	●		●	RPGR-3V-TF	9,53	7,92	11°
	RPGX-120700V-TF					●	●	●				●	●	●		❍	RPGR-4V-TF	12,70	7,92	11°

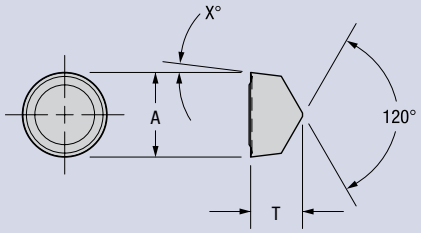
Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

GA5025 GA5035 GA5125 GA5036 GA5026 G-925 G-920 GA5023 G-915 GA5023 GA5026 G-925 G-920 G-915 G-20M
P15 P25 P25 P35 M15 M15 M15 M20 M35 K15 S
Steel | Stainless Steel | Cast Iron | High-Temp Alloys

Round Inserts (RCGR-V/RPGR-V)

Positive Chipform V-Bottom
Ceramic



Shape: Round V-Bottom	Part Number ISO	Edge Prep *	Whisker WG-300	Whisker WG-600	Whisker WG-700	Phase Toughened XSYTIN-1	Si_3N_4 GSN100	Al_2O_3–TiC GEM-7	Al_2O_3 GEM-19	Part Number ANSI	Edge Prep *	Dimensions (millimeters) A	T	X
	RCGR-060400V-GF1	A	❍	❍	❍	❍				RCGR-2V-GF1	A	6,35	4,75	7°
	RCGR-090700V-GF1	A	❍	❍	❍	❍				RCGR-3V-GF1	A	9,53	7,92	7°
	RCGR-120700V-GF1	A	●	❍	❍	❍				RCGR-4V-GF1	A	12,70	7,92	7°
	RPGR-060400V-GF1	A	❍	❍	❍	❍				RPGR-2V-GF1	A	6,35	4,75	11°
	RPGR-090700V-GF1	A	❍	❍	❍	❍				RPGR-3V-GF1	A	9,53	7,92	11°

Ceramic Classification

Whisker Ceramic | Phase Toughened | Silicon Nitride | Alumina TiC | Al_2O_3

WG-300 WG-600 WG-700 XSYTIN-1 GSN100 GEM-7 GEM-19
Whisker | Phase Toughened | Si_3N_4 | Al_2O_3–TiC | Al_2O_3

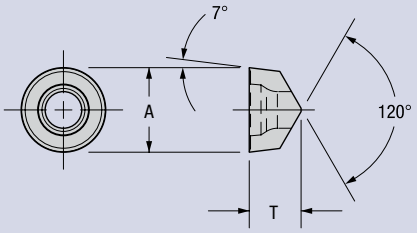
Page GP 04 – grade description

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● Stocked Standard | ❍ Stocked or Available Upon Request | Not Recommended

Round Inserts (RCGT-V)

Positive Chipform V-Bottom
Carbide



Shape: Round V-Bottom	Part Number ISO	Steel				Stainless Steel					Cast Iron	High-Temp Alloys					Part Number ANSI	Dimensions (millimeters) A I.C.	T
		P15	P25	P25	P35	M15	M15	M15	M20	M35	K15	S							
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-915	G-20M			
	RCGT-060400V-TF					❍	❍	❍				❍	❍	❍		●	RCGT-2V-TF	6,35	4,75
	RCGT-090700V-TF					❍	●	❍				❍	●	❍		❍	RCGT-3V-TF	9,53	7,92
	RCGT-120700V-TF					❍	●	❍				❍	●	❍		●	RCGT-4V-TF	12,70	7,92

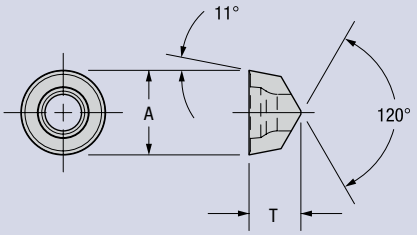
Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-915	G-20M			
		P15	P25	P25	P35	M15	M15	M15	M20	M35	K15	S							
		Steel				Stainless Steel					Cast Iron	High-Temp Alloys							

Round Inserts (RPGT-V)

Positive Chipform V-Bottom
Carbide



Shape: Round V-Bottom	Part Number ISO	Steel				Stainless Steel					Cast Iron	High-Temp Alloys					Part Number ANSI	Dimensions (millimeters) A I.C.	T
		P15	P25	P25	P35	M15	M15	M15	M20	M35	K15	S							
		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-915	G-20M			
	RPGT-060400V-TF					❍	●	●				❍	●	●		❍	RPGT-2V-TF	6,35	4,75
	RPGT-090700V-TF					●	❍	❍				●	❍	❍		●	RPGT-3V-TF	9,53	7,92
	RPGT-120700V-TF					❍	❍	❍				❍	❍	❍		❍	RPGT-4V-TF	12,70	7,92

Carbide Coatings

MT-CVD Coated | PVD Coated | Uncoated

		GA5025	GA5035	GA5125	GA5036	GA5026	G-925	G-920	GA5023	G-915	GA5023	GA5026	G-925	G-920	G-915	G-20M			
		P15	P25	P25	P35	M15	M15	M15	M20	M35	K15	S							
		Steel				Stainless Steel					Cast Iron	High-Temp Alloys							

Not Recommended | Stocked or Available Upon Request ❍ ❍ | Stocked Standard ● ●

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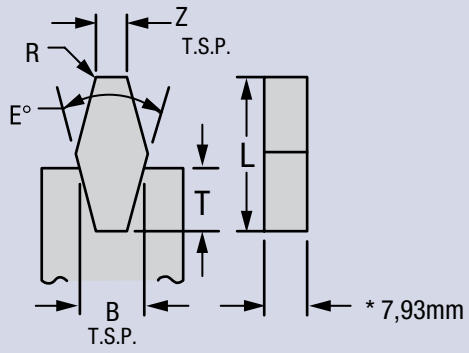
Pulley and Poly Grooving Inserts

When ordering or requesting quotations, you should provide a part print and a sketch with dimensions as indicated in the following format:

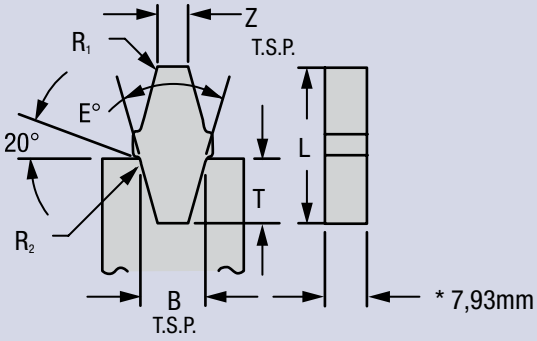
Insert Style	B	E°	L
R_1	R_2	T	Z

* Recommended – other specifications available upon request.

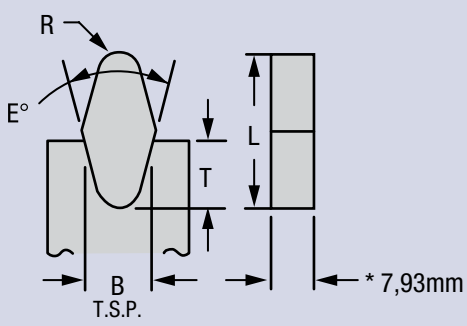
A



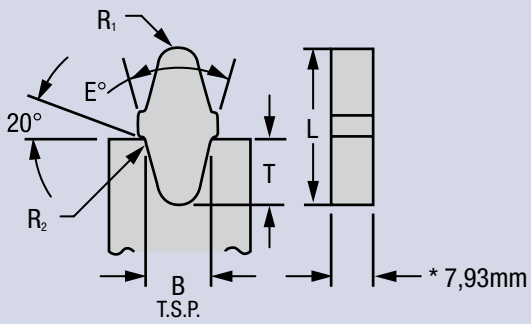
B



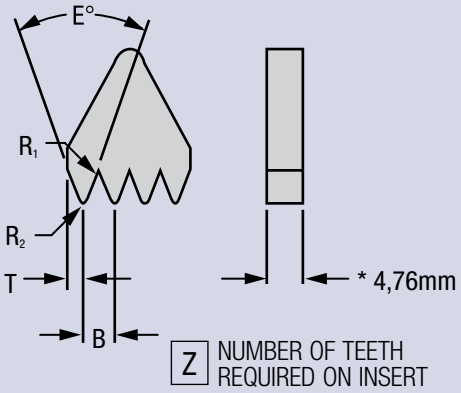
C



D



E



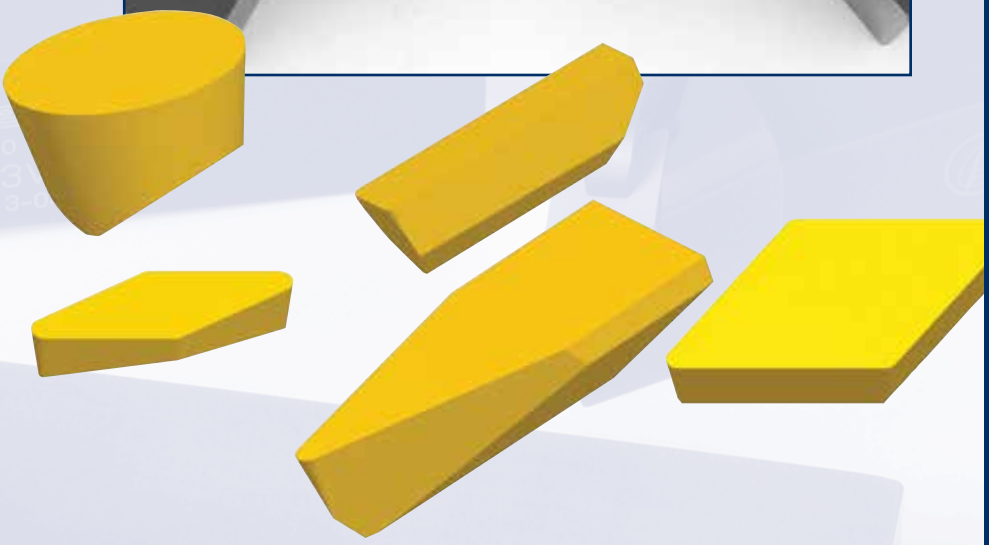
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Grooving, Profiling and Cut-Off Toolholders and Bars

The Greenleaf Advanced Tooling System for grooving, profiling and cut off provides every specific application with unsurpassed support to ensure the longest tool life and highest material-removal rates with both carbide and ceramic inserts. All of the tools in this system are designed to use Greenleaf carbide or ceramic inserts interchangeably for maximum versatility.

Utilizing 4140 alloyed steel at 42-44 RC, these qualified toolholders are offered in both milled nest and replaceable nest designs to provide further options in your tooling requirements.



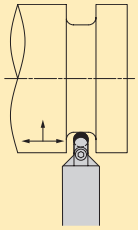


Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

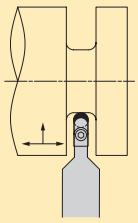
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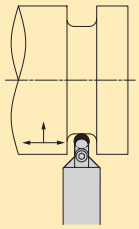
V-Bottom Round Toolholders



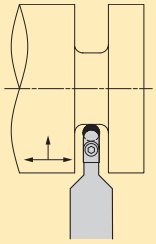
CRDPN-VS
Replaceable Nest
Shallow D.O.C.
page: GP 22



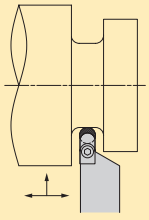
CRDPN-V
Replaceable Nest
Deep D.O.C.
page: GP 22



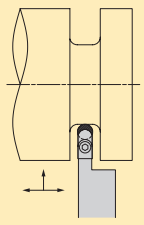
CRDPN-VMS
Milled Nest
Shallow D.O.C.
page: GP 23



CRDPN-VM
Milled Nest
Deep D.O.C.
page: GP 23

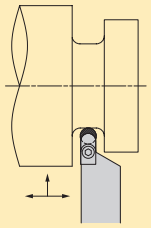


O.D.
Replaceable Nest
Shallow D.O.C.
page: GP 24

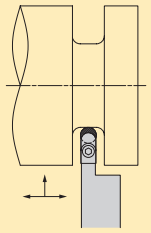


O.D.
Replaceable Nest
Deep D.O.C.
page: GP 24

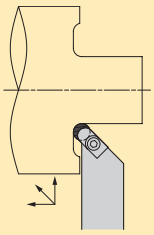
V-Bottom Round Toolholders *continued*



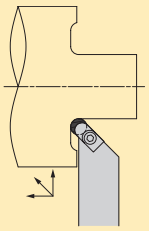
O.D.
Milled Nest
Shallow D.O.C.
page: GP 25



O.D.
Milled Nest
Deep D.O.C.
page: GP 25

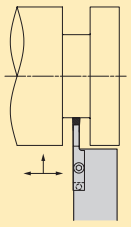


CRGPR-V
CRGPL-V
45°
Replaceable Nest
page: GP 26

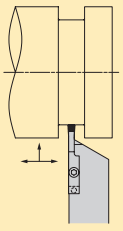


CRGPR-VM
CRGPL-VM
45°
Milled Nest
page: GP 26

Single-Ended Groovers

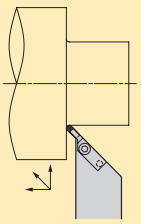


Deep D.O.C.
page: GP 27-28

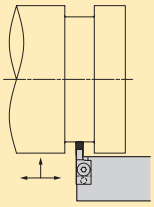


Shallow D.O.C.
page: GP 29-30

Single-Ended Groovers *continued*

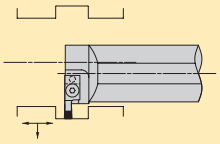


45° G/P
Toolholder
page: GP 31

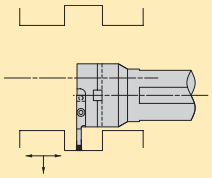


90° G/P
Toolholder
page: GP 32-33

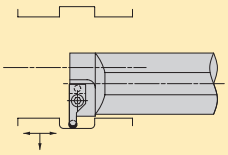
Grooving, Profiling and Cut-Off Bars



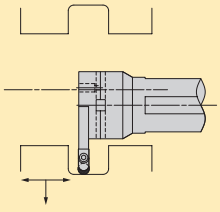
Cut-Off
Grooving Bar
page: GP 34



Cut-Off
Grooving
Support Blade
For Single-Ended,
V-Bottom Inserts
page: GP 35

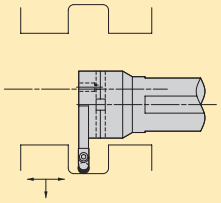


Profiling Bar
Round V-Bottom Insert
Milled Nest
page: GP 36



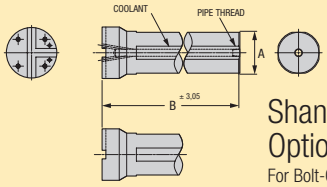
Profiling
Support Blade
Round V-Bottom Insert
Milled Nest
page: GP 37

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Profiling Support Blade

Round V-Bottom Insert
Replaceable Nest
page: GP 37



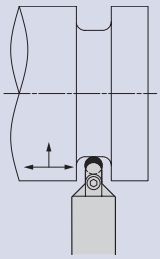
Shank Options

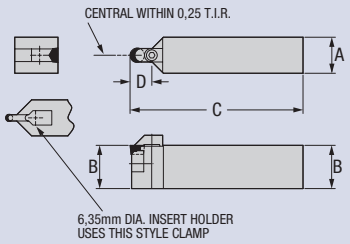
For Bolt-On
Support Blades
page: GP 38

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CRDPN-VS Toolholder

Round V-Bottom Insert; Replaceable Nest
Shallow D.O.C. (D) Series





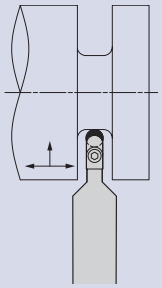
Part Number	Gage Insert	Stock	D.O.C. D	Dimensions (millimeters) A	B	C	Standard Components Nest	Nest Screw	Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components
CRDPN-2525-06VS		●	10	25	25	150	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-3232-06VS	**RPGX-	●	10	32	32	170	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-4040-06VS	060400	❍	10	40	40	200	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-2525-09VS		●	15	25	25	150	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-3232-09VS	**RPGX-090700	●	15	32	32	170	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-4040-09VS		❍	15	40	40	200	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-2525-12VS		●	20	25	25	150	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
CRDPN-3232-12VS	**RPGX-120700	●	20	32	32	170	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
CRDPN-4040-12VS		❍	20	40	40	200	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686

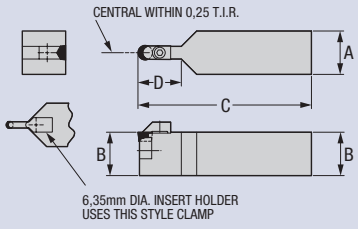
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** RCGX can be used in place of RPGX.

See page GP 14 for ceramic and carbide inserts.

CRDPN-V Toolholder

Round V-Bottom Insert; Replaceable Nest Deep
D.O.C. (D) Series





Part Number	Gage Insert	Stock	D.O.C. D	Dimensions (millimeters) A	B	C	Standard Components Nest	Nest Screw	Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components
CRDPN-2525-06V		●	19	25	25	150	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-3232-06V	**RPGX-060400	●	19	32	32	170	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-4040-06V		❍	19	40	40	200	410631	BHCS M2.5-0.45x10mm	411910-250VRC	434416	TK-02684
CRDPN-2525-09V		●	28	25	25	150	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-3232-09V	**RPGX-090700	●	28	32	32	170	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-4040-09V		❍	28	40	40	200	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
CRDPN-2525-12V		●	38	25	25	150	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
CRDPN-3232-12V	**RPGX-120700	●	38	32	32	170	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
CRDPN-4040-12V		❍	38	40	40	200	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.
** RCGX can be used in place of RPGX .

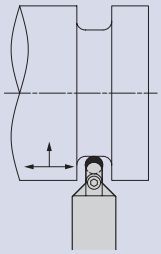
See page GP 14 for ceramic and carbide inserts.

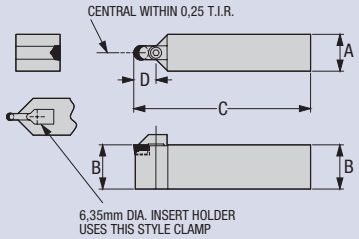
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

CRDPN-VMS Toolholder

Round V-Bottom Insert; Milled Nest
Shallow D.O.C. (D) Series





Part Number	Gage Insert	Stock	D.O.C. D	Dimensions (millimeters) A	B	C	Standard Components Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components	Optional Component Insert Screw Key Code
CRDPN-2525-06VMS		●	10	25	25	150	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-3232-06VMS	**RPGX-060400	●	10	32	32	170	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-4040-06VMS		●	10	40	40	200	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-2525-09VMS		●	15	25	25	150	308063	TSHCS M5-0.8x12mm	TK-01709	PT-545T
CRDPN-3232-09VMS	**RPGX-090700	●	15	32	32	170	308063	TSHCS M5-0.8x12mm	TK-01709	PT-545T
CRDPN-4040-09VMS		●	15	40	40	200	308063	TSHCS M5-0.8x12mm	TK-01709	PT-545T
CRDPN-2525-12VMS		●	20	25	25	150	308136	434258	TK-02691	CO-5018
CRDPN-3232-12VMS	**RPGX-120700	●	20	32	32	170	308136	434258	TK-02691	CO-5018
CRDPN-4040-12VMS		●	20	40	40	200	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

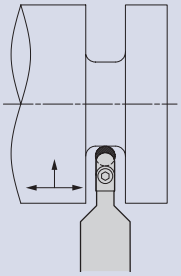
See page GP 14 for ceramic and carbide inserts.

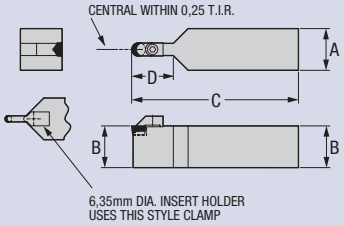
** RCGX can be used in place of RPGX.

NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

CRDPN-VM Toolholder

Round V-Bottom Insert; Milled Nest
Deep D.O.C. (D) Series





Part Number	Gage Insert	Stock	D.O.C. D	Dimensions (millimeters) A	B	C	Standard Components Clamp	Clamp Screw	*Tune-Up Kit Includes All Standard Components	Optional Component Insert Screw Key Code
CRDPN-2525-06VM		●	19	25	25	150	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-3232-06VM	**RPGX-060400	●	19	32	32	170	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-4040-06VM		●	19	40	40	200	411910-250VRC	434416	TK-02717	PT-542T
CRDPN-2525-09VM		●	28	25	25	150	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
CRDPN-3232-09VM	**RPGX-090700	●	28	32	32	170	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
CRDPN-4040-09VM		●	28	40	40	200	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
CRDPN-2525-12VM		●	38	25	25	150	308136	434258	TK-02691	CO-5018
CRDPN-3232-12VM	**RPGX-120700	●	38	32	32	170	308136	434258	TK-02691	CO-5018
CRDPN-4040-12VM		●	38	40	40	200	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

See page GP 14 for ceramic and carbide inserts.

** RCGX can be used in place of RPGX.

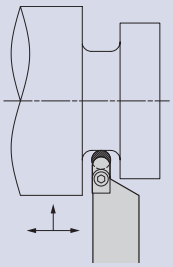
NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

10 Business Days or Less ○ ○ Stocked Standard ● ●

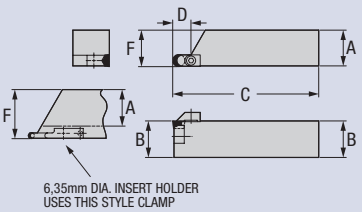
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O.D. Grooving/Profiling Toolholder

Round V-Bottom Insert; Replaceable Nest
Shallow D.O.C. (D) Series



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components				*Tune-Up Kit Includes All Std. Components
Right	Left	Insert	R	L	D	A	B	C	F	Nest	Nest Screw	Clamp	Clamp Screw	
M-415419-06VRS	–	** RPGX-060400	●		10	25	25	150	38	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-415420-06VRS			●	10	25	25	150	38	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-415421-06VRS	–		●		10	32	32	170	45	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-415422-06VRS			●	10	32	32	170	45	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-415423-06VRS	–		●		10	40	40	200	53	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-415424-06VRS			●	10	40	40	200	53	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-415427-09VRS	M-415428-09VRS	** RPGX-090700	●	●	15	25	25	150	25	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-415429-09VRS	M-415430-09VRS		●	●	15	32	32	170	32	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-415431-09VRS	M-415432-09VRS		●	●	15	40	40	200	40	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-415435-12VRS	M-415436-12VRS	** RPGX-120700	●	●	20	25	25	150	25	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02696
M-415437-12VRS	M-415438-12VRS		●	●	20	32	32	170	32	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02696
M-415439-12VRS	M-415440-12VRS		●	●	20	40	40	200	40	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02696

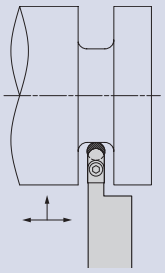
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

** RCGX can be used in place of RPGX.

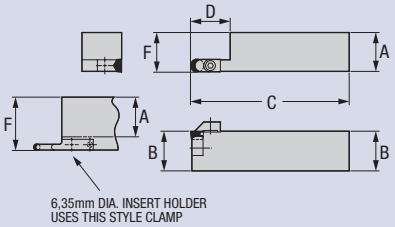
See page GP 14 for ceramic and carbide inserts.

O.D. Grooving/Profiling Toolholder

Round, V-Bottom Insert; Replaceable Nest
Deep D.O.C. (D) Series



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components				*Tune-Up Kit Includes All Std. Components
Right	Left	Insert	R	L	D	A	B	C	F	Nest	Nest Screw	Clamp	Clamp Screw	
M-411149-06VRS	–	** RPGX-060400	●		19	25	25	150	38	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-411150-06VRS			●	19	25	25	150	38	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-411151-06VRS	–		●		19	32	32	170	45	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-411956-06VRS			●	19	32	32	170	45	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-411957-06VRS	–		●		19	40	40	200	53	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-411958-06VRS			●	19	40	40	200	53	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-411157-09VRS	M-411158-09VRS	** RPGX-090700	❍	❍	29	25	25	150	25	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-411159-09VRS	M-411160-09VRS		●	●	29	32	32	170	32	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-411161-09VRS	M-411162-09VRS		❍	❍	29	40	40	200	40	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-411165-12VRS	M-411166-12VRS	** RPGX-120700	●	●	38	25	25	150	25	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
M-411167-12VRS	M-411168-12VRS		●	●	38	32	32	170	32	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686
M-411169-12VRS	M-411170-12VRS		❍	❍	38	40	40	200	40	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

** RCGX can be used in place of RPGX.

See page GP 14 for ceramic and carbide inserts.

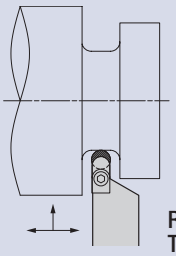
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● ● Stocked Standard

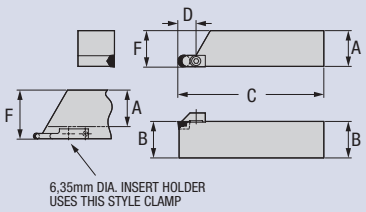
❍ ❍ 10 Business Days or Less

O.D. Grooving/Profiling Toolholder

Round, V-Bottom Insert; Milled Nest
Shallow D.O.C. (D) Series



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components	Optional Component
Right	Left	Insert	R	L	D	A	B	C	F	Clamp	Clamp Screw		Insert Screw
M-421450-06VMRS	–	** RPGX-060400	●		10	25	25	150	38	411905-250VRC	434259	TK-02689	PT-542T
–	M-421451-06VMRS			●	10	25	25	150	38	411906-250VRC	434259	TK-02690	PT-542T
M-421452-06VMRS	–		●		10	32	32	170	45	411905-250VRC	434259	TK-02689	PT-542T
–	M-421453-06VMRS			●	10	32	32	170	45	411906-250VRC	434259	TK-02690	PT-542T
M-421454-06VMRS	–		❍		10	40	40	200	53	411905-250VRC	434259	TK-02689	PT-542T
–	M-421455-06VMRS			❍	10	40	40	200	53	411906-250VRC	434259	TK-02690	PT-542T
M-421458-09VMRS	M-421459-09VMRS	** RPGX-090700	●	●	15	25	25	150	25	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421460-09VMRS	M-421461-09VMRS		●	●	15	32	32	170	32	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421462-09VMRS	M-421463-09VMRS		❍	❍	15	40	40	200	40	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421466-12VMRS	M-421467-12VMRS	** RPGX-120700	●	●	20	25	25	150	25	308136	434258	TK-02691	CO-5018
M-421468-12VMRS	M-421469-12VMRS		●	●	20	32	32	170	32	308136	434258	TK-02691	CO-5018
M-421470-12VMRS	M-421471-12VMRS		❍	❍	20	40	40	200	40	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

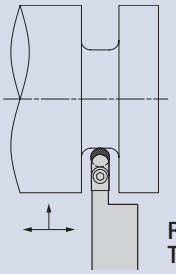
See page GP 14 for ceramic and carbide inserts.

** RCGX can be used in place of RPGX.

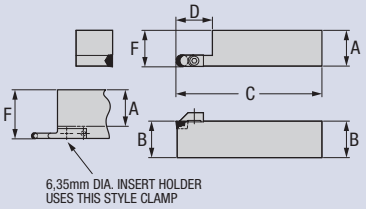
NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

O.D. Grooving/Profiling Toolholder

Round, V-Bottom Insert; Milled Nest
Deep D.O.C. (D) Series



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components	Optional Component
Right	Left	Insert	R	L	D	A	B	C	F	Clamp	Clamp Screw		Insert Screw
M-421498-06VMRS	–	** RPGX-060400	●		19	25	25	150	38	411905-250VRC	434259	TK-02689	PT-542T
–	M-421499-06VMRS			●	19	25	25	150	38	411906-250VRC	434259	TK-02690	PT-542T
M-421500-06VMRS	–		●		19	32	32	170	45	411905-250VRC	434259	TK-02689	PT-542T
–	M-421501-06VMRS			●	19	32	32	170	45	411906-250VRC	434259	TK-02690	PT-542T
M-421502-06VMRS	–		●		19	40	40	200	53	411905-250VRC	434259	TK-02689	PT-542T
–	M-421503-06VMRS			●	19	40	40	200	53	411906-250VRC	434259	TK-02690	PT-542T
M-421504-09VMRS	M-421505-09VMRS	** RPGX-090700	●	●	29	25	25	150	25	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421506-09VMRS	M-421507-09VMRS		●	●	29	32	32	170	32	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421508-09VMRS	M-421509-09VMRS		●	●	29	40	40	200	40	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421510-12VMRS	M-421511-12VMRS	** RPGX-120700	●	●	38	25	25	150	25	308136	434258	TK-02691	CO-5018
M-421512-12VMRS	M-421513-12VMRS		●	●	38	32	32	170	32	308136	434258	TK-02691	CO-5018
M-421514-12VMRS	M-421515-12VMRS		●	●	38	40	40	200	40	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

See page GP 14 for ceramic and carbide inserts.

** RCGX can be used in place of RPGX.

NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

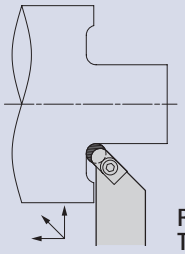
10 Business Days or Less ❍ ❍

Stocked Standard ● ●

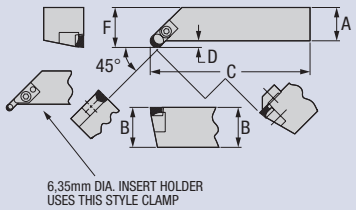
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CRGPR-V/CRGPL-V

45˚ Grooving/Profiling Toolholder
Round V-Bottom Insert; Replaceable Nest



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components				*Tune-Up Kit Includes All Std. Components
Right	Left	Insert	R	L	D	A	B	C	F	Nest	Nest Screw	Clamp	Clamp Screw	
CRGPR-2525-06V	–	** RPGX-060400	●		7	25	25	150	32	411108	BHCS M2.5-0.45x10mm	412131-250GC	434258	TK-02687
–	CRGPL-2525-06V			●	7	25	25	150	32	411108	BHCS M2.5-0.45x10mm	412132-250GC	434258	TK-02731
CRGPR-3232-06V	–		●		7	32	32	170	39	411108	BHCS M2.5-0.45x10mm	412131-250GC	434258	TK-02687
–	CRGPL-3232-06V			●	7	32	32	170	39	411108	BHCS M2.5-0.45x10mm	412132-250GC	434258	TK-02731
CRGPR-4040-06V	–		❍		7	40	40	200	47	411108	BHCS M2.5-0.45x10mm	412131-250GC	434258	TK-02687
–	CRGPL-4040-06V			❍	7	40	40	200	47	411108	BHCS M2.5-0.45x10mm	412132-250GC	434258	TK-02731
CRGPR-2525-09V	CRGPL-2525-09V	** RPGX-090700	●	●	7	25	25	150	32	414009	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02733
CRGPR-3232-09V	CRGPL-3232-09V		●	●	7	32	32	170	39	414009	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02733
CRGPR-4040-09V	CRGPL-4040-09V		❍	❍	7	40	40	200	47	414009	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02733
CRGPR-2525-12V	CRGPL-2525-12V	** RPGX-120700	●	●	7	25	25	150	32	414008	TBHCS M5-0.8x16mm	308136	434258	TK-02732
CRGPR-3232-12V	CRGPL-3232-12V		●	●	7	32	32	170	39	414008	TBHCS M5-0.8x16mm	308136	434258	TK-02732
CRGPR-4040-12V	CRGPL-4040-12V		❍	❍	7	40	40	200	47	414008	TBHCS M5-0.8x16mm	308136	434258	TK-02732

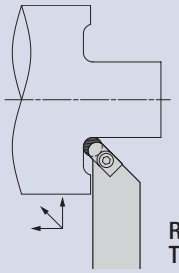
* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

See page GP 14 for ceramic and carbide inserts.

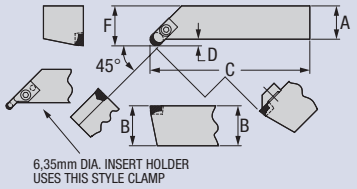
** RCGX can be used in place of RPGX.

CRGPR-VM/CRGPL-VM

45˚ Grooving/Profiling Toolholder
Round V-Bottom Insert; Milled Nest



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components	Optional Component
Right	Left	Insert	R	L	D	A	B	C	F	Clamp	Clamp Screw		Insert Screw
CRGPR-2525-06VM	–	** RPGX-060400	●		7	25	25	150	32	412131-250GC	434259	TK-02745	PT-542T
–	CRGPL-2525-06VM			●	7	25	25	150	32	412132-250GC	434259	TK-02746	PT-542T
CRGPR-3232-06VM	–		●		7	32	32	170	39	412131-250GC	434259	TK-02745	PT-542T
–	CRGPL-3232-06VM			●	7	32	32	170	39	412132-250GC	434259	TK-02746	PT-542T
CRGPR-4040-06VM	–		❍		7	40	40	200	47	412131-250GC	434259	TK-02745	PT-542T
–	CRGPL-4040-06VM			❍	7	40	40	200	47	412132-250GC	434259	TK-02746	PT-542T
CRGPR-2525-09VM	CRGPL-2525-09VM	** RPGX-090700	●	●	7	25	25	150	32	308063	TSHCS M5-0.8x12mm	TK-02733	PT-545T
CRGPR-3232-09VM	CRGPL-3232-09VM		●	●	7	32	32	170	39	308063	TSHCS M5-0.8x12mm	TK-02733	PT-545T
CRGPR-4040-09VM	CRGPL-4040-09VM		❍	❍	7	40	40	200	47	308063	TSHCS M5-0.8x12mm	TK-02733	PT-545T
CRGPR-2525-12VM	CRGPL-2525-12VM	** RPGX-120700	●	●	7	25	25	150	32	308136	434258	TK-02691	CO-5018
CRGPR-3232-12VM	CRGPL-3232-12VM		●	●	7	32	32	170	39	308136	434258	TK-02691	CO-5018
CRGPR-4040-12VM	CRGPL-4040-12VM		❍	❍	7	40	40	200	47	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

See page GP 14 for ceramic and carbide inserts.

** RCGN can be used in place of RPGN.

NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

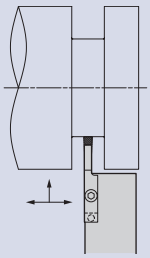
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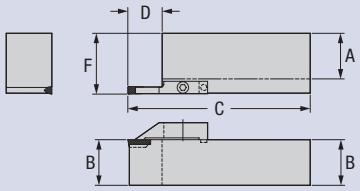
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

Grooving/Profiling/ Cut-Off Toolholder

Deep D.O.C. Series





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-427635-094VGS	–	2,39	●		19	25	25	150	38		427651-094GC	TK-02626		429524-094GC
–	M-427636-094VGS	2,39		●	19	25	25	150	38	WGC-4094	427652-094GC	TK-02627	COS-4094-0	429525-094GC
M-427637-094VGS	–	2,39	●		19	32	32	170	45		427651-094GC	TK-02626		429524-094GC
–	M-427638-094VGS	2,39		●	19	32	32	170	45	WG-4094	427652-094GC	TK-02627	COS-4094-4L	429525-094GC
M-427639-094VGS	–	2,39	❍		19	40	40	200	53		427651-094GC	TK-02626		429524-094GC
–	M-427640-094VGS	2,39		❍	19	40	40	200	53		427652-094GC	TK-02627	COS-4094-4R	429525-094GC
M-411173-125VGS	–	3,18	●		19	25	25	150	38		411966-125GC	TK-02628		429512-125GC
–	M-411961-125VGS	3,18		●	19	25	25	150	38	WGC-4125	411967-125GC	TK-02629	GTS-4125	429513-125GC
M-411250-125VGS	–	3,18	●		19	32	32	170	45	WG-4125	411966-125GC	TK-02628	COS-4125-0	429512-125GC
–	M-411251-125VGS	3,18		●	19	32	32	170	45	GTS-4125-1	411967-125GC	TK-02629	COS-4125-4L	429513-125GC
M-411962-125VGS	–	3,18	❍		19	40	40	200	53	GTS-4125-2	411966-125GC	TK-02628	COS-4125-4R	429512-125GC
–	M-411963-125VGS	3,18		❍	19	40	40	200	53		411967-125GC	TK-02629		429513-125GC
M-411964-156VGS	–	3,96	●		19	25	25	150	38		411968-156GC	TK-02630		436373-156GC
–	M-411965-156VGS	3,96		●	19	25	25	150	38	WGC-4156	411969-156GC	TK-02631		436374-156GC
M-411256-156VGS	–	3,96	●		19	32	32	170	45		411968-156GC	TK-02630	GTS-4156	436373-156GC
–	M-411257-156VGS	3,96		●	19	32	32	170	45	WG-4156	411969-156GC	TK-02631		436374-156GC
M-411258-156VGS	–	3,96	❍		19	40	40	200	53		411968-156GC	TK-02630		436373-156GC
–	M-411259-156VGS	3,96		❍	19	40	40	200	53		411969-156GC	TK-02631		436374-156GC
M-411970-187VGS	–	4,75	●		19	25	25	150	38	WGC-4187	411977-187GC	TK-02632		429518-187GC
–	M-411178-187VGS	4,75		●	19	25	25	150	38	WG-4187	411978-187GC	TK-02633	GTS-4187	429519-187GC
M-411262-187VGS	–	4,75	●		19	32	32	170	45		411977-187GC	TK-02632	COS-4187-0	429518-187GC
–	M-411263-187VGS	4,75		●	19	32	32	170	45	GTS-4187-1	411978-187GC	TK-02633	COS-4187-4L	429519-187GC
M-411971-187VGS	–	4,75	❍		19	40	40	200	53	GTS-4187-2	411977-187GC	TK-02632	COS-4187-4R	429518-187GC
–	M-411972-187VGS	4,75		❍	19	40	40	200	53		411978-187GC	TK-02633		429519-187GC
M-411179-218VGS	–	5,54	●		29	25	25	150	38		411979-218GC	TK-02634	–	–
–	M-411180-218VGS	5,54		●	29	25	25	150	38	WGC-6218	411130-218GC	TK-02635	–	–
M-411268-218VGS	–	5,54	●		29	32	32	170	45		411979-218GC	TK-02634	–	–
–	M-411269-218VGS	5,54		●	29	32	32	170	45	WG-6218	411130-218GC	TK-02635	–	–
M-411270-218VGS	–	5,54	❍		29	40	40	200	53		411979-218GC	TK-02634	–	–
–	M-411271-218VGS	5,54		❍	29	40	40	200	53		411130-218GC	TK-02635	–	–
M-411973-250VGS	–	6,35	●		29	25	25	150	38	WGC-6250	411980-250GC	TK-02636	–	–
–	M-411974-250VGS	6,35		●	29	25	25	150	38	WG-6250	411981-250GC	TK-02637	–	–
M-411975-250VGS	–	6,35	●		29	32	32	170	45		411980-250GC	TK-02636	–	–
–	M-411275-250VGS	6,35		●	29	32	32	170	45	GTS-6250	411981-250GC	TK-02637	–	–
M-411276-250VGS	–	6,35	❍		29	40	40	200	53	GTS-6250-1	411980-250GC	TK-02636	–	–
–	M-411277-250VGS	6,35		❍	29	40	40	200	53	GTS-6250-2	411981-250GC	TK-02637	–	–
M-411183-281VGS	–	7,14	●		29	25	25	150	38		411133-281GC	TK-02638	–	–
–	M-411184-281VGS	7,14		●	29	25	25	150	38	WGC-6281	411134-281GC	TK-02648	–	–
M-411280-281VGS	–	7,14	●		29	32	32	170	45		411133-281GC	TK-02638	–	–
–	M-411281-281VGS	7,14		●	29	32	32	170	45	WG-6281	411134-281GC	TK-02648	–	–
M-411282-281VGS	–	7,14	❍		29	40	40	200	53		411133-281GC	TK-02638	–	–
–	M-411283-281VGS	7,14		❍	29	40	40	200	53		411134-281GC	TK-02648	–	–

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

* All toolholders include standard clamp and clamp screw 33-434259-000 (Greenleaf Metric M6-1.0 clamp screw).

Continued on next page.

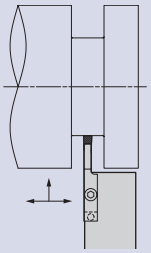
10 Business Days or Less ❍ ❍

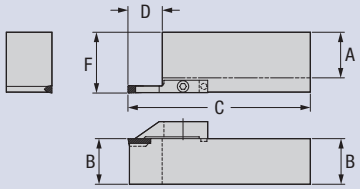
Stocked Standard ● ●

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Grooving/Profiling/ Cut-Off Toolholder

Deep D.O.C. Series (Continued)





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-411982-312VGS	–	7,92	●		38	25	25	150	38		411985-312GC	TK-02640	–	–
–	M-411186-312VGS	7,92		●	38	25	25	150	38	WGC-8312	411136-312GC	TK-02641	–	–
M-411286-312VGS	–	7,92	●		38	32	32	170	45		411985-312GC	TK-02640	–	–
–	M-411287-312VGS	7,92		●	38	32	32	170	45	WG-8312	411136-312GC	TK-02641	–	–
M-411288-312VGS	–	7,92	❍		38	40	40	200	53		411985-312GC	TK-02640	–	–
–	M-411289-312VGS	7,92		❍	38	40	40	200	53		411136-312GC	TK-02641	–	–
M-411187-344VGS	–	8,74	●		38	25	25	150	38		411137-344GC	TK-02642	–	–
–	M-411188-344VGS	8,74		●	38	25	25	150	38	WGC-8344	411138-344GC	TK-02643	–	–
M-411292-344VGS	–	8,74	●		38	32	32	170	45		411137-344GC	TK-02642	–	–
–	M-411293-344VGS	8,74		●	38	32	32	170	45	WG-8344	411138-344GC	TK-02643	–	–
M-411294-344VGS	–	8,74	❍		38	40	40	200	53		411137-344GC	TK-02642	–	–
–	M-411295-344VGS	8,74		❍	38	40	40	200	53		411138-344GC	TK-02643	–	–
M-411189-375VGS	–	9,53	●		38	25	25	150	38		411986-375GC	TK-02649	–	–
–	M-411190-375VGS	9,53		●	38	25	25	150	38		411987-375GC	TK-02645	–	–
M-411983-375VGS	–	9,53	●		38	32	32	170	45	WGC-8375	411986-375GC	TK-02649	–	–
–	M-411984-375VGS	9,53		●	38	32	32	170	45		411987-375GC	TK-02645	–	–
M-411300-375VGS	–	9,53	❍		38	40	40	200	53	WG-8375	411986-375GC	TK-02649	–	–
–	M-411301-375VGS	9,53		❍	38	40	40	200	53		411987-375GC	TK-02645	–	–

* All toolholders include standard clamp and clamp screw 33-434259-000 (Greenleaf Metric M6-1.0 clamp screw).

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
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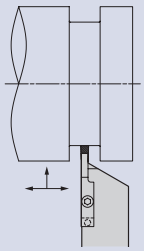
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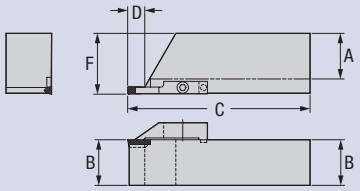
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

Grooving/Profiling/ Cut-Off Toolholder

Shallow D.O.C. Series





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-427641-094VGS	–	2,39	❍		10	25	25	150	38		427651-094GC	TK-02626		429524-094GC
–	M-427642-094VGS	2,39		❍	10	25	25	150	38		427652-094GC	TK-02627	COS-4094-0	429525-094GC
M-427643-094VGS	–	2,39	❍		10	32	32	170	45	WG-4094	427651-094GC	TK-02626		429524-094GC
–	M-427644-094VGS	2,39		❍	10	32	32	170	45	WGC-4094	427652-094GC	TK-02627	COS-4094-4L	429525-094GC
M-427645-094VGS	–	2,39	❍		10	40	40	200	53		427651-094GC	TK-02626	COS-4094-4R	429524-094GC
–	M-427646-094VGS	2,39		❍	10	40	40	200	53		427652-094GC	TK-02627		429525-094GC
M-415316-125VGS	–	3,18	❍		10	25	25	150	38		411966-125GC	TK-02628		429512-125GC
–	M-415317-125VGS	3,18		❍	10	25	25	150	38	GTS-4125-1	411967-125GC	TK-02629	GTS-4125	429513-125GC
M-415318-125VGS	–	3,18	❍		10	32	32	170	45	GTS-4125-2	411966-125GC	TK-02628	COS-4125-0	429512-125GC
–	M-415319-125VGS	3,18		❍	10	32	32	170	45	WG-4125	411967-125GC	TK-02629	COS-4125-4L	429513-125GC
M-415320-125VGS	–	3,18	❍		10	40	40	200	53	WGC-4125	411966-125GC	TK-02628	COS-4125-4R	429512-125GC
–	M-415321-125VGS	3,18		❍	10	40	40	200	53		411967-125GC	TK-02629		429513-125GC
M-415324-156VGS	–	3,96	❍		10	25	25	150	38		411968-156GC	TK-02630		436373-156GC
–	M-415325-156VGS	3,96		❍	10	25	25	150	38	WG-4156	411969-156GC	TK-02631		436374-156GC
M-415326-156VGS	–	3,96	❍		10	32	32	170	45		411968-156GC	TK-02630	GTS-4156	436373-156GC
–	M-415327-156VGS	3,96		❍	10	32	32	170	45	WGC-4156	411969-156GC	TK-02631		436374-156GC
M-415328-156VGS	–	3,96	❍		10	40	40	200	53		411968-156GC	TK-02630		436373-156GC
–	M-415329-156VGS	3,96		❍	10	40	40	200	53		411969-156GC	TK-02631		436374-156GC
M-415332-187VGS	–	4,75	❍		10	25	25	150	38		411977-187GC	TK-02632		429518-187GC
–	M-415333-187VGS	4,75		❍	10	25	25	150	38	GTS-4187-1	411978-187GC	TK-02633	GTS-4187	429519-187GC
M-415334-187VGS	–	4,75	❍		10	32	32	170	45	GTS-4187-2	411977-187GC	TK-02632	COS-4187-0	429518-187GC
–	M-415335-187VGS	4,75		❍	10	32	32	170	45	WG-4187	411978-187GC	TK-02633	COS-4187-4L	429519-187GC
M-415336-187VGS	–	4,75	❍		10	40	40	200	53	WGC-4187	411977-187GC	TK-02632	COS-4187-4R	429518-187GC
–	M-415337-187VGS	4,75		❍	10	40	40	200	53		411978-187GC	TK-02633		429519-187GC
M-415340-218VGS	–	5,54	❍		15	25	25	150	38		411979-218GC	TK-02634	–	–
–	M-415341-218VGS	5,54		❍	15	25	25	150	38	WG-6218	411130-218GC	TK-02635	–	–
M-415342-218VGS	–	5,54	❍		15	32	32	170	45		411979-218GC	TK-02634	–	–
–	M-415343-218VGS	5,54		❍	15	32	32	170	45	WGC-6218	411130-218GC	TK-02635	–	–
M-415344-218VGS	–	5,54	❍		15	40	40	200	53		411979-218GC	TK-02634	–	–
–	M-415345-218VGS	5,54		❍	15	40	40	200	53		411130-218GC	TK-02635	–	–
M-415348-250VGS	–	6,35	●		15	25	25	150	38		411980-250GC	TK-02636	–	–
–	M-415349-250VGS	6,35		●	15	25	25	150	38	GTS-6250	411981-250GC	TK-02637	–	–
M-415350-250VGS	–	6,35	●		15	32	32	170	45	GTS-6250-1	411980-250GC	TK-02636	–	–
–	M-415351-250VGS	6,35		●	15	32	32	170	45	GTS-6250-2	411981-250GC	TK-02637	–	–
M-415352-250VGS	–	6,35	❍		15	40	40	200	53	WG-6250	411980-250GC	TK-02636	–	–
–	M-415353-250VGS	6,35		❍	15	40	40	200	53	WGC-6250	411981-250GC	TK-02637	–	–
M-415356-281VGS	–	7,14	❍		15	25	25	150	38		411133-281GC	TK-02638	–	–
–	M-415357-281VGS	7,14		❍	15	25	25	150	38	WG-6281	411134-281GC	TK-02648	–	–
M-415358-281VGS	–	7,14	❍		15	32	32	170	45		411133-281GC	TK-02638	–	–
–	M-415359-281VGS	7,14		❍	15	32	32	170	45	WGC-6281	411134-281GC	TK-02648	–	–
M-415360-281VGS	–	7,14	❍		15	40	40	200	53		411133-281GC	TK-02638	–	–
–	M-415361-281VGS	7,14		❍	15	40	40	200	53		411134-281GC	TK-02648	–	–

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WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
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* All toolholders include standard clamp and clamp screw 33-434259-000 (Greenleaf Metric M6-1.0 clamp screw).

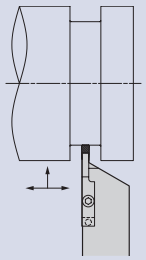
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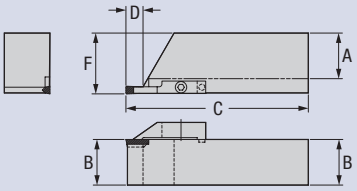
10 Business Days or Less ❍ ❍ Stocked Standard ● ●

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Grooving/Profiling/ Cut-Off Toolholder

Shallow D.O.C. Series (Continued)





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-415364-312VGS	–	7,92	●		20	25	25	150	38		411985-312GC	TK-02640	–	–
–	M-415365-312VGS	7,92		●	20	25	25	150	38	WG-8312	411136-312GC	TK-02641	–	–
M-415366-312VGS	–	7,92	●		20	32	32	170	45		411985-312GC	TK-02640	–	–
–	M-415367-312VGS	7,92		●	20	32	32	170	45	WGC-8312	411136-312GC	TK-02641	–	–
M-415368-312VGS	–	7,92	❍		20	40	40	200	53		411985-312GC	TK-02640	–	–
–	M-415369-312VGS	7,92		❍	20	40	40	200	53		411136-312GC	TK-02641	–	–
M-415372-344VGS	–	8,74	❍		20	25	25	150	38		411137-344GC	TK-02642	–	–
–	M-415373-344VGS	8,74		❍	20	25	25	150	38		411138-344GC	TK-02643	–	–
M-415374-344VGS	–	8,74	❍		20	32	32	170	45	WG-8344	411137-344GC	TK-02642	–	–
–	M-415375-344VGS	8,74		❍	20	32	32	170	45		411138-344GC	TK-02643	–	–
M-415376-344VGS	–	8,74	❍		20	40	40	200	53	WGC-8344	411137-344GC	TK-02642	–	–
–	M-415377-344VGS	8,74		❍	20	40	40	200	53		411138-344GC	TK-02643	–	–
M-415380-375VGS	–	9,53	❍		20	25	25	150	38		411986-375GC	TK-02649	–	–
–	M-415381-375VGS	9,53		❍	20	25	25	150	38		411987-375GC	TK-02645	–	–
M-415382-375VGS	–	9,53	❍		20	32	32	170	45	WG-8375	411986-375GC	TK-02649	–	–
–	M-415383-375VGS	9,53		❍	20	32	32	170	45		411987-375GC	TK-02645	–	–
M-415384-375VGS	–	9,53	❍		20	40	40	200	53		411986-375GC	TK-02649	–	–
–	M-415385-375VGS	9,53		❍	20	40	40	200	53		411987-375GC	TK-02645	–	–

* All toolholders include standard clamp and clamp screw 33-434259-000 (Greenleaf Metric M6-1.0 clamp screw).

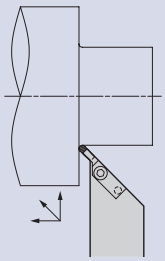
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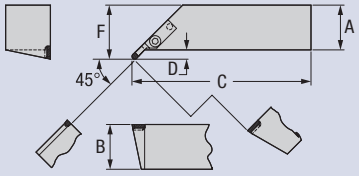
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

45° Grooving/Profiling Toolholder



Right-Hand Toolholder Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)				Standard Components	Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left	Insert	R	L	D	A	B	C	F	Clamp		Insert	Clamp
		GTS-4125-1			8	25	25	150,5	33,43				
		GTS-4125-2			8	25	25	150,3	33,25				
		WG-4125			8	25	25	150,0	32,92	415305-GC	TK-02655		429514-GC
M-415293-45VGS	–	WG-4125-1	❍		8	25	25	150,5	33,43	415306-GC	TK-02656	GTS-4125	429515-GC
–	M-415294-45VGS	WG-4125-2		❍	8	25	25	150,3	33,25				
		WG-4156			8	25	25	150,1	33,05				
		WG-4156-1			8	25	25	150,6	33,71				
		WG-4156-2			8	25	25	150,6	33,53				
		GTS-4125-1			8	32	32	170,5	40,43				
		GTS-4125-2			8	32	32	170,3	40,26				
		WG-4125			8	32	32	170,0	39,93	415305-GC	TK-02655		429514-GC
M-415295-45VGS	–	WG-4125-1	❍		8	32	32	170,5	40,43	415306-GC	TK-02656	GTS-4125	429515-GC
–	M-415296-45VGS	WG-4125-2		❍	8	32	32	170,3	40,26				
		WG-4156			8	32	32	170,1	40,05				
		WG-4156-1			8	32	32	170,6	40,71				
		WG-4156-2			8	32	32	170,6	40,53				
		GTS-4125-1			8	40	40	200,5	33,43				
		GTS-4125-2			8	40	40	200,3	33,43				
		WG-4125			8	40	40	200,0	47,93	415305-GC	TK-02655		429514-GC
M-415297-45VGS	–	WG-4125-1	❍		8	40	40	200,5	48,43	415306-GC	TK-02656	GTS-4125	429515-GC
–	M-415298-45VGS	WG-4125-2		❍	8	40	40	200,3	48,26				
		WG-4156			8	40	40	200,1	48,05				
		WG-4156-1			8	40	40	200,8	33,43				
		WG-4156-2			8	40	40	200,6	33,43				
		GTS-4187-1			8	25	25	150,83	33,76				
M-415299-45VGS	–	GTS-4187-2	❍		8	25	25	150,66	33,59	415307-GC	TK-02657	GTS-4187	429520-GC
–	M-415300-45VGS	WG-4187		❍	8	25	25	150,00	32,92	415308-GC	TK-02658		429521-GC
		WG-4187-1			8	25	25	150,83	33,76				
		WG-4187-2			8	25	25	150,66	33,58				
		GTS-4187-1			8	32	32	170,83	40,76				
M-415301-45VGS	–	GTS-4187-2	❍		8	32	32	170,66	40,59	415307-GC	TK-02657	GTS-4187	429520-GC
–	M-415302-45VGS	WG-4187		❍	8	32	32	170,0	39,92	415308-GC	TK-02658		429521-GC
		WG-4187-1			8	32	32	170,83	40,76				
		WG-4187-2			8	32	32	170,66	40,59				
		GTS-4187-1			8	40	40	200,8	48,76				
M-415303-45VGS	–	GTS-4187-2	❍		8	40	40	200,7	49,73	415307-GC	TK-02657	GTS-4187	429520-GC
–	M-415304-45VGS	WG-4187		❍	8	40	40	200,0	47,92	415308-GC	TK-02658		429521-GC
		WG-4187-1			8	40	40	200,8	48,76				
		WG-4187-2			8	40	40	200,7	48,58				

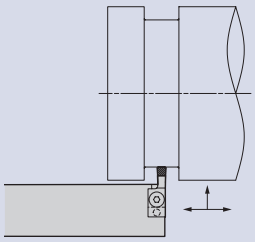
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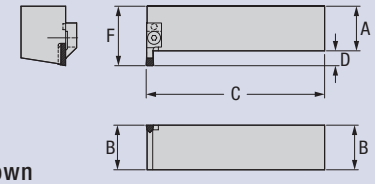
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10 Business Days or Less ❍ ❍ Stocked Standard ● ●

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90° Grooving/Profiling Toolholder





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-411693-125VGS	–	3,18	❍		10	25	25	150	35		411765-125GC	TK-02659		429516-125GC
–	M-411694-125VGS	3,18		❍	10	25	25	150	35	GTS-4125-1	411766-125GC	TK-02660	GTS-4125	429517-125GC
M-411695-125VGS	–	3,18	❍		10	32	32	170	42	GTS-4125-2	411765-125GC	TK-02659	COS-4125-0	429516-125GC
–	M-411696-125VGS	3,18		❍	10	32	32	170	42	WG-4125	411766-125GC	TK-02660	COS-4125-4R	429517-125GC
M-411697-125VGS	–	3,18	❍		10	40	40	200	50	WGC-4125	411765-125GC	TK-02659	COS-4125-4L	429516-125GC
–	M-411698-125VGS	3,18		❍	10	40	40	200	50		411766-125GC	TK-02660		429517-125GC
M-411701-156VGS	–	3,96	❍		10	25	25	150	35		411767-156GC	TK-02661	–	–
–	M-411702-156VGS	3,96		❍	10	25	25	150	35	WG-4156	411768-156GC	TK-02662	–	–
M-411703-156VGS	–	3,96	❍		10	32	32	170	42		411767-156GC	TK-02661	–	–
–	M-411704-156VGS	3,96		❍	10	32	32	170	42	WGC-4156	411768-156GC	TK-02662	–	–
M-411705-156VGS	–	3,96	❍		10	40	40	200	50		411767-156GC	TK-02661	–	–
–	M-411706-156VGS	3,96		❍	10	40	40	200	50		411768-156GC	TK-02662	–	–
M-411709-187VGS	–	4,75	❍		10	25	25	150	35		411769-187GC	TK-02663		429522-187GC
–	M-411710-187VGS	4,75		❍	10	25	25	150	35	GTS-4187-1	411770-187GC	TK-02664	GTS-4187	429523-187GC
M-411711-187VGS	–	4,75	❍		10	32	32	170	42	GTS-4187-2	411769-187GC	TK-02663	COS-4187-0	429522-187GC
–	M-411712-187VGS	4,75		❍	10	32	32	170	42	WG-4187	411770-187GC	TK-02664	COS-4187-4R	429523-187GC
M-411713-187VGS	–	4,75	❍		10	40	40	200	50	WGC-4187	411769-187GC	TK-02663	COS-4187-4L	429522-187GC
–	M-411714-187VGS	4,75		❍	10	40	40	200	50		411770-187GC	TK-02664		429523-187GC
M-411717-218VGS	–	5,54	❍		13	25	25	150	38		411771-218GC	TK-02665	–	–
–	M-411718-218VGS	5,54		❍	13	25	25	150	38	WG-6218	411772-218GC	TK-02666	–	–
M-411719-218VGS	–	5,54	❍		13	32	32	170	45		411771-218GC	TK-02665	–	–
–	M-411720-218VGS	5,54		❍	13	32	32	170	45	WGC-6218	411772-218GC	TK-02666	–	–
M-411721-218VGS	–	5,54	❍		13	40	40	200	53		411771-218GC	TK-02665	–	–
–	M-411722-218VGS	5,54		❍	13	40	40	200	53		411772-218GC	TK-02666	–	–
M-411725-250VGS	–	6,35	●		13	25	25	150	38		411773-250GC	TK-02667	–	–
–	M-411726-250VGS	6,35		●	13	25	25	150	38	GTS-6250	411774-250GC	TK-02668	–	–
M-411727-250VGS	–	6,35	●		13	32	32	170	45	GTS-6250-1	411773-250GC	TK-02667	–	–
–	M-411728-250VGS	6,35		●	13	32	32	170	45	GTS-6250-2	411774-250GC	TK-02668	–	–
M-411729-250VGS	–	6,35	❍		13	40	40	200	53	WG-6250	411773-250GC	TK-02667	–	–
–	M-411730-250VGS	6,35		❍	13	40	40	200	53	WGC-6250	411774-250GC	TK-02668	–	–
M-411733-281VGS	–	7,14	❍		13	25	25	150	38		411775-281GC	TK-02669	–	–
–	M-411734-281VGS	7,14		❍	13	25	25	150	38	WG-6281	411776-281GC	TK-02670	–	–
M-411735-281VGS	–	7,14	❍		13	32	32	170	45		411775-281GC	TK-02669	–	–
–	M-411736-281VGS	7,14		❍	13	32	32	170	45	WGC-6281	411776-281GC	TK-02670	–	–
M-411737-281VGS	–	7,14	❍		13	40	40	200	53		411775-281GC	TK-02669	–	–
–	M-411738-281VGS	7,14		❍	13	40	40	200	53		411776-281GC	TK-02670	–	–
M-411743-312VGS	–	7,92	❍		16	32	32	170	48		411777-312GC	TK-02671	–	–
–	M-411744-312VGS	7,92		❍	16	32	32	170	48	WG-8312	411778-312GC	TK-02672	–	–
M-411745-312VGS	–	7,92	❍		16	40	40	200	56	WGC-8312	411777-312GC	TK-02671	–	–
–	M-411746-312VGS	7,92		❍	16	40	40	200	56		411778-312GC	TK-02672	–	–

* All toolholders include standard clamp and BHCS clamp screw 31-434416-000.

Continued on next page.

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

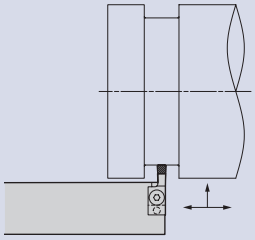
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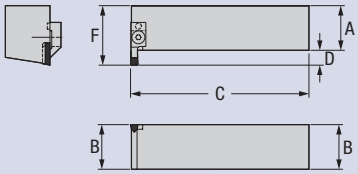
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

90° Grooving/Profiling Toolholder

(Continued)





Right-Hand Toolholder Shown

Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)				Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	A	B	C	F	Insert	Clamp		Insert	Clamp
M-411751-344VGS	–	8,74	❍		16	32	32	170	48		411779-344GC	TK-02673	–	–
–	M-411752-344VGS	8,74		❍	16	32	32	170	48	WG-8344	411780-344GC	TK-02674	–	–
M-411753-344VGS	–	8,74	❍		16	40	40	200	56	WGC-8344	411779-344GC	TK-02673	–	–
–	M-411754-344VGS	8,74		❍	16	40	40	200	56		411780-344GC	TK-02674	–	–
M-411759-375VGS	–	9,53	❍		16	32	32	170	48		411781-375GC	TK-02675	–	–
–	M-411760-375VGS	9,53		❍	16	32	32	170	48	WG-8375	411782-375GC	TK-02676	–	–
M-411761-375VGS	–	9,53	❍		16	40	40	200	56	WGC-8375	411781-375GC	TK-02675	–	–
–	M-411762-375VGS	9,53		❍	16	40	40	200	56		411782-375GC	TK-02676	–	–

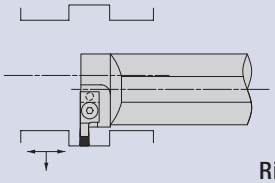
* All toolholders include standard clamp and BHCS clamp screw 31-434416-000.

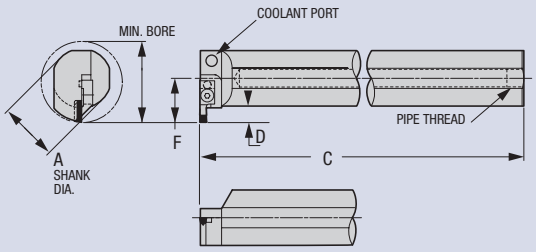
GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

10 Business Days or Less ❍ ❍ Stocked Standard ● ●

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Cut-Off Grooving Bar





Right-Hand
Grooving Bar Shown

Part Number		Groove Width	Stock		D.O.C.	Min. Bore	Dimensions (millimeters)			Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D		A	C	F	Insert	Clamp		Insert	Clamp
M-512074-125VGS	–	3,18	❍		10	63	50	400	35	GTS-4125-1	411765-125GC	TK-02659	GTS-4125	429516-125GC
–	M-512075-125VGS	3,18		❍	10	63	50	400	35	GTS-4125-2	411766-125GC	TK-02660	COS-4125-0	429517-125GC
										WG-4125			COS-4125-4R	
										WGC-4125			COS-4125-4L	
M-512086-156VGS	–	3,96	❍		10	63	50	400	35	WG-4156	411767-156GC	TK-02661	–	–
–	M-512087-156VGS	3,96		❍	10	63	50	400	35	WGC-4156	411768-156GC	TK-02662	–	–
M-512098-187VGS	–	4,75	❍		10	63	50	400	35	GTS-4187-1	411769-187GC	TK-02663	GTS-4187	429522-187GC
–	M-512099-187VGS	4,75		❍	10	63	50	400	35	GTS-4187-2	411770-187GC	TK-02664	COS-4187-0	429523-187GC
										WG-4187			COS-4187-4R	
										WGC-4187			COS-4187-4L	
M-512106-218VGS	–	5,54	❍		13	70	50	400	38	WG-6218	411771-218GC	TK-02665	–	–
–	M-512107-218VGS	5,54		❍	13	70	50	400	38	WGC-6218	411772-218GC	TK-02666	–	–
M-512116-250VGS	–	6,35	●		13	70	50	400	38	GTS-6250	411773-250GC	TK-02667	–	–
–	M-512117-250VGS	6,35		●	13	70	50	400	38	GTS-6250-1	411774-250GC	TK-02668	–	–
										GTS-6250-2				
										WG-6250				
										WGC-6250				
M-512126-281VGS	–	7,14	❍		13	70	50	400	38	WG-6281	411775-281GC	TK-02669	–	–
–	M-512127-281VGS	7,14		❍	13	70	50	400	38	WGC-6281	411776-281GC	TK-02670	–	–
M-512132-312VGS	–	7,92	❍		16	77	50	400	41	WG-8312	411777-312GC	TK-02671	–	–
–	M-512133-312VGS	7,92		❍	16	77	50	400	41	WGC-8312	411778-312GC	TK-02672	–	–
M-512138-344VGS	–	8,74	❍		16	77	50	400	41	WG-8344	411779-344GC	TK-02673	–	–
–	M-512139-344VGS	8,74		❍	16	77	50	400	41	WGC-8344	411780-344GC	TK-02674	–	–
M-512144-375VGS	–	9,53	❍		16	77	50	400	41	WG-8375	411781-375GC	TK-02675	–	–
–	M-512145-375VGS	9,53		❍	16	77	50	400	41	WGC-8375	411782-375GC	TK-02676	–	–

* All toolholders include standard clamp and BHCS clamp screw 31-434416-000.

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

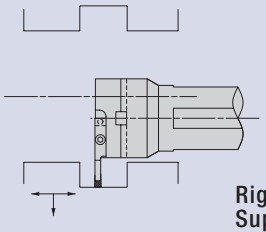
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● ● Stocked Standard

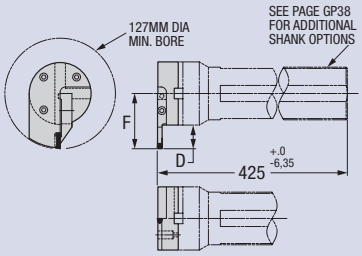
❍ ❍ 10 Business Days or Less

Cut-Off Grooving Support Blade

For Single Ended V-Bottom Inserts



Right-Hand
Support Blade Shown



Part Number		Groove Width	Stock		D.O.C.	Dimensions (millimeters)	Standard Components		Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Right	Left		R	L	D	F	Insert	Clamp		Insert	Clamp
M-511309-125VGB	–	3,18	❍		19	57,15	GTS-4125-1	411967-125GC	TK-02629	GTS-4125	429513-125GC
–	M-512228-125VGB	3,18		❍	19	57,15	GTS-4125-2	411966-125GC	TK-02628	COS-4125-0	429512-125GC
							WG-4125			COS-4125-4R	
							WGC-4125			COS-4125-4L	
M-511311-156VGB	–	3,96	❍		19	57,15	WG-4156	411969-156GC	TK-02631	–	–
–	M-511312-156VGB	3,96		❍	19	57,15	WGC-4156	411968-156GC	TK-02630	–	–
M-511313-187VGB	–	4,75	❍		19	57,15	GTS-4187-1	411978-187GC	TK-02633	GTS-4187	429519-187GC
–	M-511314-187VGB	4,75		❍	19	57,15	GTS-4187-2	411977-187GC	TK-02632	COS-4187-0	429518-187GC
							WG-4187			COS-4187-4R	
							WGC-4187			COS-4187-4L	
M-511315-218VGB	–	5,54	❍		28,6	66,68	WG-6218	411130-218GC	TK-02635	–	–
–	M-512229-218VGB	5,54		❍	28,6	66,68	WGC-6218	411979-218GC	TK-02634	–	–
M-512230-250VGB	–	6,35	❍		28,6	66,68	GTS-6250	411981-250GC	TK-02637	–	–
–	M-511318-250VGB	6,35		❍	28,6	66,68	GTS-6250-1	411980-250GC	TK-02636	–	–
							GTS-6250-2				
							WG-6250				
							WGC-6250				
M-511319-281VGB	–	7,14	❍		28,6	66,68	WG-6281	411134-281GC	TK-02648	–	–
–	M-511320-281VGB	7,14		❍	28,6	66,68	WGC-6281	411133-281GC	TK-02638	–	–
M-511321-312-VGB	–	7,92	❍		38,1	76,20	WG-8312	411136-312GC	TK-02641	–	–
–	M-511322-312VGB	7,92		❍	38,1	76,20	WGC-8312	411985-312GC	TK-02640	–	–
M-511323-344VGB	–	8,74	❍		38,1	76,20	WG-8344	411138-344GC	TK-02643	–	–
–	M-511324-344VGB	8,74		❍	38,1	76,20	WGC-8344	411137-344GC	TK-02642	–	–
M-511325-375VGB	–	9,53	❍		38,1	76,20	WG-8375	411987-375GC	TK-02645	–	–
–	M-511326-375VGB	9,53		❍	38,1	76,20	WGC-8375	411986-375GC	TK-02649	–	–

See page GP 38 for additional shank options.
All toolholders include standard clamp and clamp screw 31-434259-000.

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

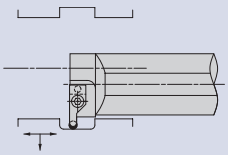
10 Business Days or Less ❍ ❍

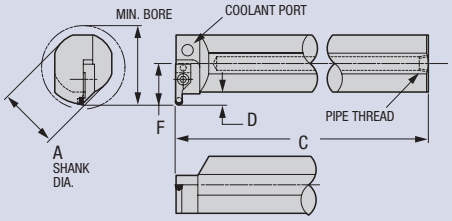
Stocked Standard ● ●

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Profiling Bar

Round V-Bottom Insert
Milled Nest





Right-Hand
Profiling Bar Shown

Part Number		Gage–Option 1		Gage–Option 2		Stock		D.O.C.	Dimensions (millimeters)			Standard Components		*Tune-Up Kit Includes All Std. Components	Optional Component
Right	Left	Insert	Min. Bore	Insert	Min. Bore	R	L	D	A	C	F	Clamp	Clamp Screw		Insert Screw
M-519700-06VMRB	–	RPGN-060400	38	RCGN-060400	90	❍		10	25	300	22	412131-250GC	434258	TK-02745	PT-542T
–	M-519701-06VMRB	RPGN-060400	38	RCGN-060400	90		❍	10	25	300	22	412132-250GC	434258	TK-02746	PT-542T
M-519702-06VMRB	–	RPGN-060400	45	RCGN-060400	90	❍		10	32	300	25	412131-250GC	434258	TK-02745	PT-542T
–	M-519703-06VMRB	RPGN-060400	45	RCGN-060400	90		❍	10	32	300	25	412132-250GC	434258	TK-02746	PT-542T
M-519704-06VMRB	–	RPGN-060400	50	RCGN-060400	90	❍		10	40	350	28	412131-250GC	434258	TK-02745	PT-542T
–	M-519705-06VMRB	RPGN-060400	50	RCGN-060400	90		❍	10	40	350	28	412132-250GC	434258	TK-02746	PT-542T
M-519706-06VMRB	–	RPGN-060400	64	RCGN-060400	90	❍		10	50	400	35	412131-250GC	434258	TK-02745	PT-542T
–	M-519707-06VMRB	RPGN-060400	64	RCGN-060400	90		❍	10	50	400	35	412132-250GC	434258	TK-02746	PT-542T
M-519708-09VMRB	M-519709-09VMRB	RPGN-090700	57	RCGN-090700	115	❍	❍	13	32	300	29	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-519710-09VMRB	M-519711-09VMRB	RPGN-090700	64	RCGN-090700	115	●	●	13	40	350	33	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-519712-09VMRB	M-519713-09VMRB	RPGN-090700	70	RCGN-090700	115	●	●	13	50	400	38	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-519714-12VMRB	M-519715-12VMRB	RPGN-120700	57	RCGN-120700	115	❍	❍	16	32	300	32	308136	434258	TK-02691	CO-5018
M-519716-12VMRB	M-519717-12VMRB	RPGN-120700	64	RCGN-120700	115	●	●	16	40	350	35	308136	434258	TK-02691	CO-5018
M-519718-12VMRB	M-519719-12VMRB	RPGN-120700	70	RCGN-120700	115	●	●	16	50	400	41	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the profiling bar.

See page GP 14 for ceramic and carbide inserts.

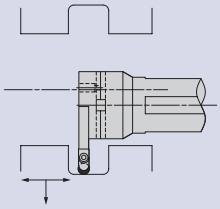
NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

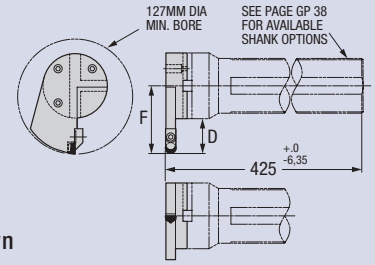
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● ● Stocked Standard
❍ ❍ 10 Business Days or Less

Profiling Support Blade

Round V-Bottom Insert
Milled Nest





Right-Hand
Profiling Bar Shown

Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)	Standard Components		*Tune-Up Kit Includes All Standard Components	Optional Component
Right	Left	Insert	R	L	D	F	Clamp	Clamp Screw		Insert Screw
M-519740-06VMRB	–	** RPGN-060400	❍		19,05	60,33	411906-250VRC	434259	TK-02690	PT-542T
–	M-519741-06VMRB	** RPGN-060400		❍	19,05	60,33	411905-250VRC	434259	TK-02689	PT-542T
M-519742-09VMRB	–	** RPGN-090700	❍		28,60	69,85	308063	TSHCS M5-0.8x16mm	TK-01709	PT-545T
–	M-519743-09VMRB	** RPGN-090700		❍	28,60	69,85	308063	TSHCS M5-0.8x16mm	TK-01709	PT-545T
M-519744-12VMRB	–	** RPGN-120700	❍		38,10	79,38	308136	434258	TK-02691	CO-5018
–	M-519745-12VMRB	** RPGN-120700		❍	38,10	79,38	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

** RCGN can be used in place of RPGN.

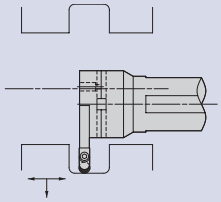
NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

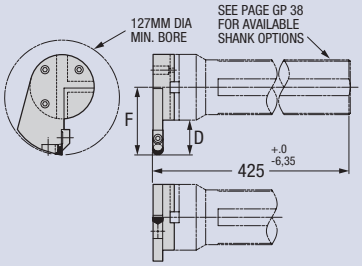
See page GP 14 for ceramic and carbide inserts.

See page GP 38 for available shank options.

Profiling Support Blade

Round V-Bottom Insert
Replaceable Nest





Right-Hand
Profiling Bar Shown

Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)	Standard Components				*Tune-Up Kit Includes All Standard Components
Right	Left	Insert	R	L	D	F	Nest	Nest Screw	Clamp	Clamp Screw	
M-512227-06VRB	–	** RPGN-060400	❍		19,05	60,33	411108	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02739
–	M-511287-06VRB	** RPGN-060400		❍	19,05	60,33	411108	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02740
M-511288-09VRB	–	** RPGN-090700	❍		38,10	69,85	414009	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02741
–	M-511289-09VRB	** RPGN-090700		❍	38,10	69,85	414009	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02741
M-511290-12VRB	–	** RPGN-120700	❍		38,10	79,38	414008	TBHCS M5-0.8x16mm	308136	434258	TK-02732
–	M-511291-12VRB	** RPGN-120700		❍	38,10	79,38	414008	TBHCS M5-0.8x16mm	308136	434258	TK-02732

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

** RCGN can be used in place of RPGN.

See page GP 14 for ceramic and carbide inserts.

See page GP 38 for available shank options.

10 Business Days or Less ❍ ❍

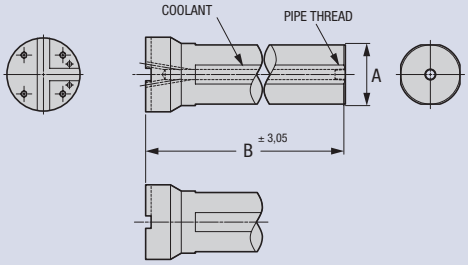
Stocked Standard ● ●

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Shank Options

For Bolt-On Support Blades

Part Number Shank No.	Stock	Dimensions (millimeters) A	 B
M-529756	❍	50	400
M-529757	❍	60	400
M-529758	❍	72	400



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● ● Stocked Standard

❍ ❍ 10 Business Days or Less

Grooving, Profiling and Cut-Off Support Blades

The Greenleaf Advanced Tooling System for grooving, profiling and cut off is further expanded to a support blade system that couples qualified shanks and qualified support blades to increase the application range of each toolholder or bar. Each Greenleaf tool has the option to utilize 252 support blade combinations of cut-off, V-bottom round profilers, and grooving inserts to meet your cut-off, grooving, profiling and face-grooving application needs.

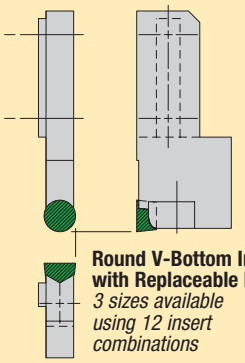
Quick-change shanks such as CAPTO or KM, as well as straight shank holders and bars, are all part of this tooling system. Call Greenleaf to design your unique right- or left-hand support blade.



Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

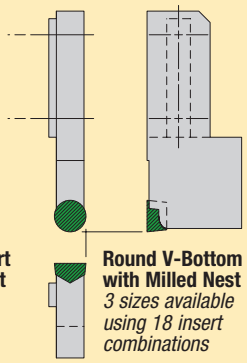
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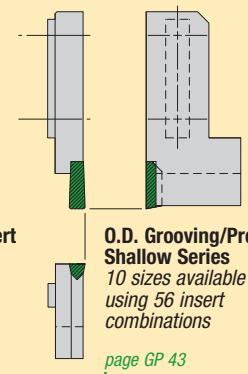
Round V-Bottom Insert with Replaceable Nest
3 sizes available using 12 insert combinations

page GP 42



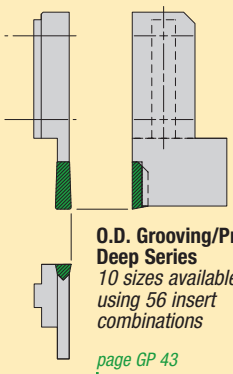
Round V-Bottom Insert with Milled Nest
3 sizes available using 18 insert combinations

page GP 42



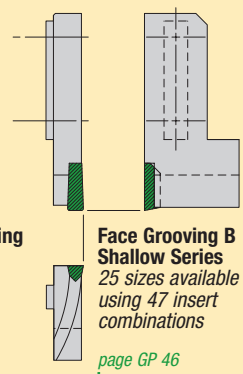
O.D. Grooving/Profiling Shallow Series
10 sizes available using 56 insert combinations

page GP 43



O.D. Grooving/Profiling Deep Series
10 sizes available using 56 insert combinations

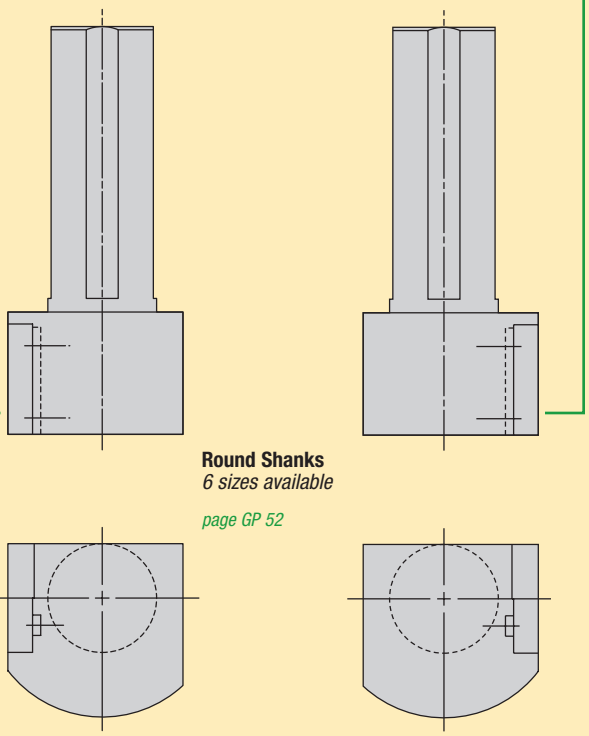
page GP 43



Face Grooving B Shallow Series
25 sizes available using 47 insert combinations

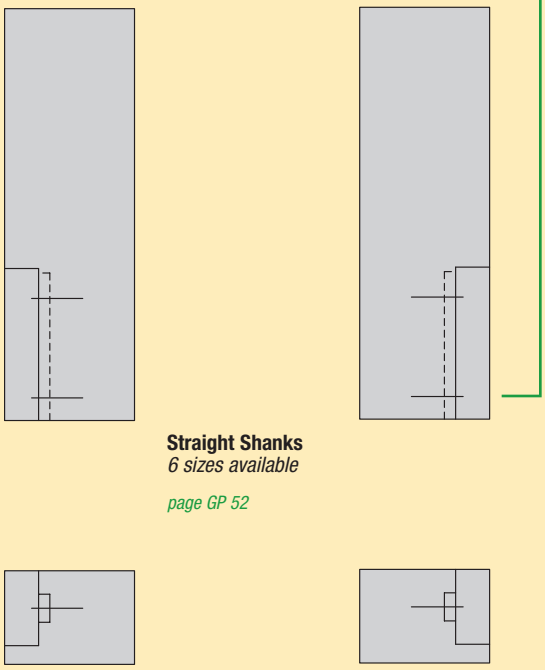
page GP 46

RIGHT HAND



Round Shanks
6 sizes available

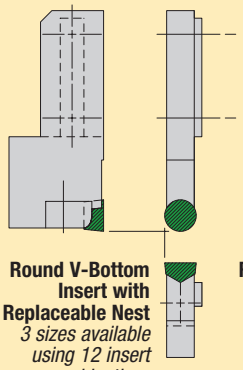
page GP 52



Straight Shanks
6 sizes available

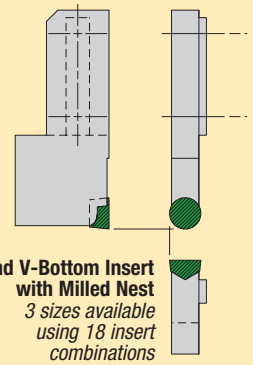
page GP 52

LEFT HAND



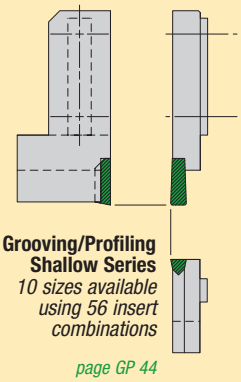
Round V-Bottom Insert with Replaceable Nest
3 sizes available using 12 insert combinations

page GP 42



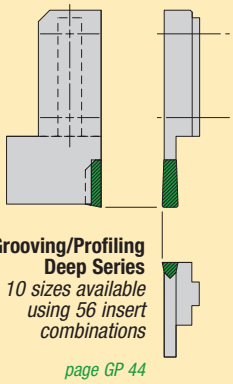
Round V-Bottom Insert with Milled Nest
3 sizes available using 18 insert combinations

page GP 42



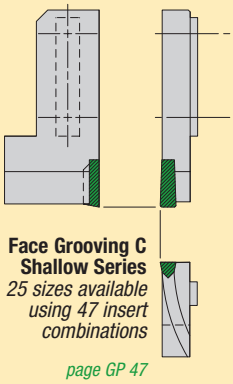
O.D. Grooving/Profiling Shallow Series
10 sizes available using 56 insert combinations

page GP 44



O.D. Grooving/Profiling Deep Series
10 sizes available using 56 insert combinations

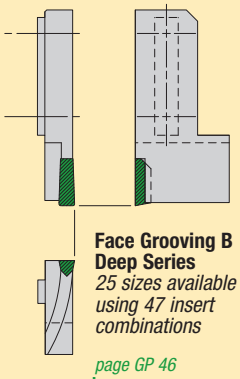
page GP 44



Face Grooving C Shallow Series
25 sizes available using 47 insert combinations

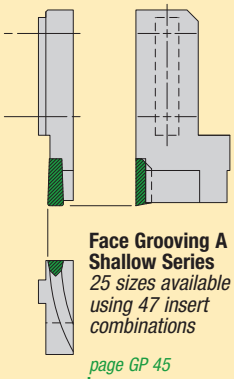
page GP 47

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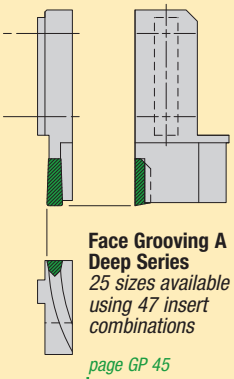
Face Grooving B Deep Series
25 sizes available using 47 insert combinations

page GP 46



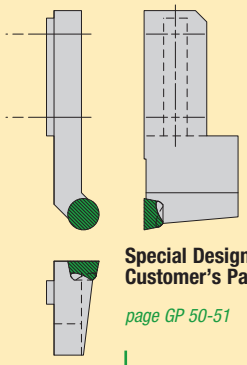
Face Grooving A Shallow Series
25 sizes available using 47 insert combinations

page GP 45



Face Grooving A Deep Series
25 sizes available using 47 insert combinations

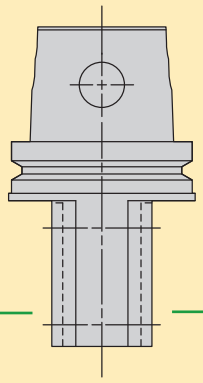
page GP 45

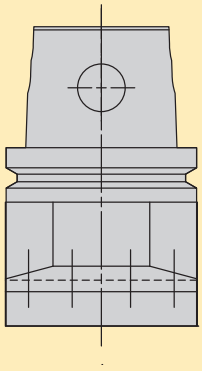


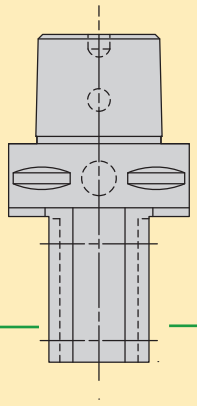
Special Designs to Fit Customer's Parts

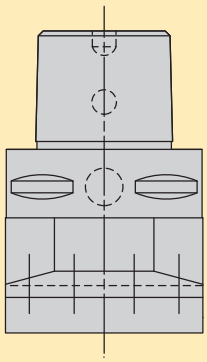
page GP 50-51

RIGHT HAND



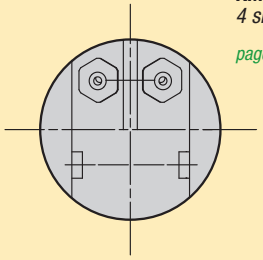


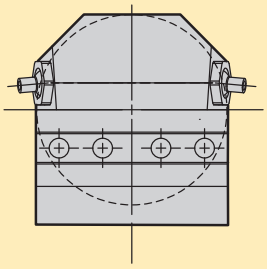




KM Tool Shanks
4 sizes available

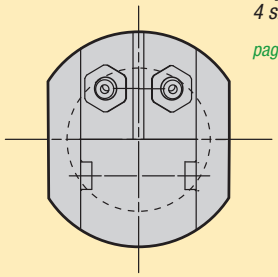
page GP 53

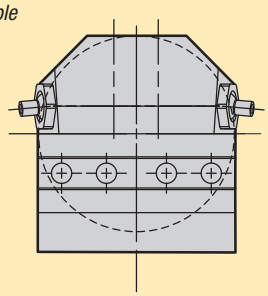




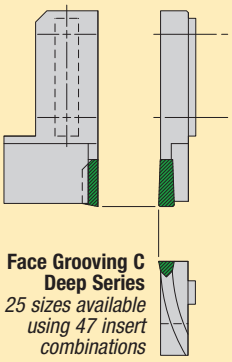
Capto Tool Shanks
4 sizes available

page GP 54



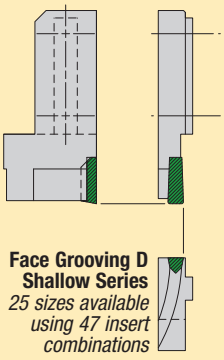


LEFT HAND



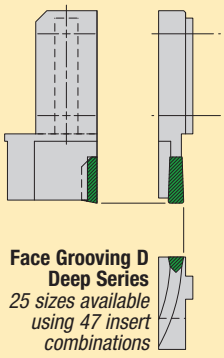
Face Grooving C Deep Series
25 sizes available using 47 insert combinations

page GP 47



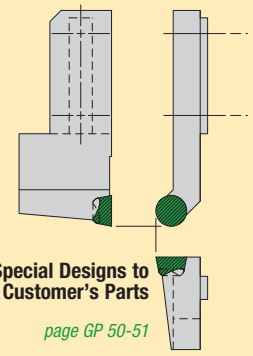
Face Grooving D Shallow Series
25 sizes available using 47 insert combinations

page GP 48



Face Grooving D Deep Series
25 sizes available using 47 insert combinations

page GP 48



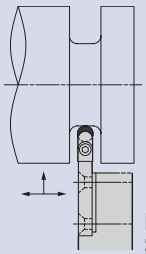
Special Designs to Fit Customer's Parts

page GP 50-51

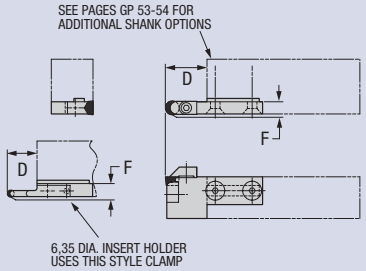
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O.D. Grooving/Profiling Support Blade

Round V-Bottom Insert
Replaceable Nest



Right-Hand
Support Blade Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)	Standard Components				*Tune-Up Kit Includes All Std. Components
Right	Left	Insert	R	L	D	F	Nest	Nest Screw	Clamp	Clamp Screw	
M-411959-06VR	–	** RPGN-060400	●		19,05	11,91	410631	BHCS M2.5-0.45x10mm	411905-250VRC	434259	TK-02692
–	M-411960-06VR	** RPGN-060400		●	19,05	11,91	410631	BHCS M2.5-0.45x10mm	411906-250VRC	434259	TK-02693
M-411011-09VR	M-411012-09VR	** RPGN-090700	●	●	28,60	11,91	413970	TBHCS M3-0.5x12mm	308063	TSHCS M5-0.8x12mm	TK-02685
M-411009-12VR	M-411010-12VR	** RPGN-120700	●	●	38,10	11,91	414007	TBHCS M5-0.8x16mm	308136	434258	TK-02686

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

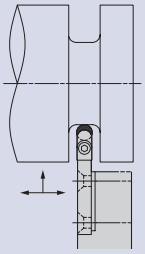
See page GP 14 for ceramic and carbide inserts.

** RCGN can be used in place of RPGN.

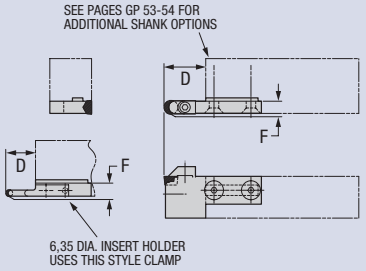
See pages GP 53-54 for additional shank options.

O.D. Grooving/Profiling Support Blade

Round V-Bottom Insert
Milled Nest



Right-Hand
Support Blade Shown



Part Number		Gage	Stock		D.O.C.	Dimensions (millimeters)	Standard Components		*Tune-Up Kit Includes All Standard Components	Optional Component
Right	Left	Insert	R	L	D	F	Clamp	Clamp Screw		Insert Screw
M-421534-06VMR	–	** RPGN-060400	●		19,05	11,91	411905-250VRC	434259	TK-02689	PT-542T
–	M-421535-06VMR	** RPGN-060400		●	19,05	11,91	411906-250VRC	434259	TK-02690	PT-542T
M-421536-09VMR	M-421537-09VMR	** RPGN-090700	●	●	28,60	11,91	308063	TSHCS M5-0.8x12mm	TK-02734	PT-545T
M-421538-12VMR	M-421539-12VMR	** RPGN-120700	●	●	38,10	11,91	308136	434258	TK-02691	CO-5018

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

See page GP 14 for ceramic and carbide inserts.

** RCGN can be used in place of RPGN.

See pages GP 53-54 for additional shank options.

NOTE: Use carbide inserts RCGT and RPGT with optional insert screw for finishing.

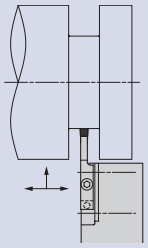
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● ● Stocked Standard

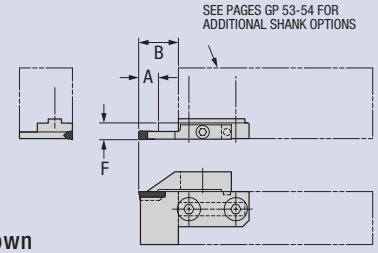
○ ○ 10 Business Days or Less

O.D. Grooving/Profiling/ Cut-Off Support Blade

Right Hand



Right-Hand
Support Blade Shown



Part Number		Groove Width	Stock		Dimensions (millimeters)			Standard Components		*Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
Shallow Series	Deep Series		Shallow	Deep	A	B	F	Insert	Clamp		Insert	Clamp
M-427647-094VG		2,39	❍		9,6	–	11,91	WG-4094	427651-094GC	TK-02626	COS-4094-0	429524-094GC
	M-427648-094VG			❍	–	19	11,91	WGC-4094	427651-094GC	TK-02626	COS-4094-4L	429524-094GC
											COS-4094-4R	
M-421109-125VG		3,18	●		9,6	–	11,91	GTS-4125-1	411966-125GC	TK-02628	GTS-4125	429512-125GC
	M-411988-125VG			●	–	19	11,91	GTS-4125-2	411966-125GC	TK-02628	COS-4125-0	429512-125GC
								WG-4125			COS-4125-4R	
								WGC-4125			COS-4125-4L	
M-421110-156VG		3,96	❍		9,6	–	11,91	WG-4156	411968-156GC	TK-02630		
	M-411066-156VG			❍	–	19	11,91	WGC-4156	411968-156GC	TK-02630	–	–
M-421111-187VG		4,75	❍		9,6	–	11,91	GTS-4187-1	411977-187GC	TK-02632	GTS-4187	429518-187GC
	M-411068-187VG			❍	–	19	11,91	GTS-4187-2	411977-187GC	TK-02632	COS-4187-0	429518-187GC
								WG-4187			COS-4187-4R	
								WGC-4187			COS-4187-4L	
M-421112-218VG		5,54	❍		14,2	–	11,91	WG-6218	411979-218GC	TK-02634		
	M-411081-218VG			❍	–	28,7	11,91	WGC-6218	411979-218GC	TK-02634	–	–
M-421113-250VG		6,35	●		14,2	–	11,91	WG-6250	411980-250GC	TK-02636		
	M-411992-250VG			●	–	28,7	11,91	WGC-6250	411980-250GC	TK-02636	–	–
								GTS-6250				
								GTS-6250-1				
								GTS-6250-2				
M-421114-281VG		7,14	❍		14,2	–	11,91	WG-6281	411133-281GC	TK-02638		
	M-411085-281VG			❍	–	28,7	11,91	WGC-6281	411133-281GC	TK-02638	–	–
M-421115-312VG		7,92	●		19	–	11,91	WG-8312	411985-312GC	TK-02640		
	M-411087-312VG			●	–	38,1	11,91	WGC-8312	411985-312GC	TK-02640	–	–
M-421116-344VG		8,74	❍		19	–	11,91	WG-8344	411137-344GC	TK-02642		
	M-411089-344VG			❍	–	38,1	11,91	WGC-8344	411137-344GC	TK-02642	–	–
M-421117-375VG		9,53	❍		19	–	11,91	WG-8375	411986-375GC	TK-02649		
	M-411994-375VG			❍	–	38,1	11,91	WGC-8375	411986-375GC	TK-02649	–	–

***** Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

All support blades include standard clamp and clamp screw 31-434259-000.

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

See pages GP 53-54 for additional shank options.

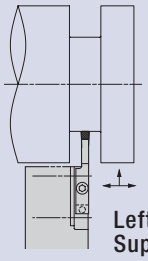
10 Business Days or Less ❍ ❍

Stocked Standard ● ●

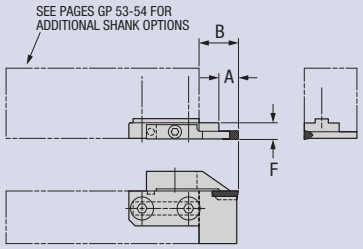
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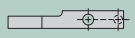
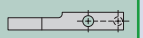
O.D. Grooving/Profiling/ Cut-Off Support Blade

Left Hand



Left-Hand
Support Blade Shown



Part Number		Groove Width	Stock		Dimensions (millimeters)			Standard Components		*Tune-Up Kit Includes Standard Clamp and *Clamp Screw	Optional Components	
												
Shallow Series	Deep Series		Shallow	Deep	A	B	F	Insert	Clamp		Insert	Clamp
M-427649-094VG			❍		9,6	–	11,91	WG-4094	427652-094GC	TK-02627	COS-4094-0	429525-094GC
	M-427650-094VG	2,39		❍	–	19,05	11,91	WGC-4094	427652-094GC	TK-02627	COS-4094-4L	429525-094GC
											COS-4094-4R	
M-421100-125VG			●		9,6	–	11,91	GTS-4125-1	411967-125GC	TK-02629	GTS-4125	429513-125GC
	M-411989-125VG	3,18		●	–	19,05	11,91	GTS-4125-2	411967-125GC	TK-02629	COS-4125-0	429513-125GC
								WG-4125			COS-4125-4R	
								WGC-4125			COS-4125-4L	
M-421101-156VG			❍		9,6	–	11,91	WG-4156	411969-156GC	TK-02631		
	M-411990-156VG	3,96		❍	–	19,05	11,91	WGC-4156	411969-156GC	TK-02631	–	–
M-421102-187VG			❍		9,6	–	11,91	GTS-4187-1	411978-187GC	TK-02633	GTS-4187	429519-187GC
	M-411991-187VG	4,75		❍	–	19,05	11,91	GTS-4187-2	411978-187GC	TK-02633	COS-4187-0	429519-187GC
								WG-4187			COS-4187-4R	
								WGC-4187			COS-4187-4L	
M-421103-218VG			❍		14,2	–	11,91	WG-6218	411130-218GC	TK-02635		
	M-411082-218VG	5,54		❍	–	28,7	11,91	WGC-6218	411130-218GC	TK-02635	–	–
M-421104-250VG			●		14,2	–	11,91	WG-6250	411981-250GC	TK-02637		
	M-411993-250VG	6,35		●	–	28,7	11,91	WGC-6250	411981-250GC	TK-02637	–	–
								GTS-6250				
								GTS-6250-1				
								GTS-6250-2				
M-421105-281VG			❍		14,2	–	11,91	WG-6281	411134-281GC	TK-02648		
	M-411086-281VG	7,14		❍	–	28,7	11,91	WGC-6281	411134-281GC	TK-02648	–	–
M-421106-312VG			●		19	–	11,91	WG-8312	411136-312GC	TK-02641		
	M-411088-312VG	7,92		●	–	38,1	11,91	WGC-8312	411136-312GC	TK-02641	–	–
M-421107-344VG			❍		19	–	11,91	WG-8344	411138-344GC	TK-02643		
	M-411090-344VG	8,74		❍	–	38,1	11,91	WGC-8344	411138-344GC	TK-02643	–	–
M-421108-375VG			❍		19	–	11,91	WG-8375	411987-375GC	TK-02645		
	M-411122-375VG	9,53		❍	–	38,1	11,91	WGC-8375	411987-375GC	TK-02645	–	–

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

All support blades include standard clamp and clamp screw 31-434259-000.

GTS is Greenleaf's groove/turn system insert with chip control. Page GP 09.
COS is Greenleaf's cut-off system insert. Page GP 08.
WG is Greenleaf flat-top groover with an 11° nose clearance. Pages GP 10 and GP 11.
WGC is Greenleaf's flat-top groover with a 6° nose clearance. Pages GP 12 and GP 13.

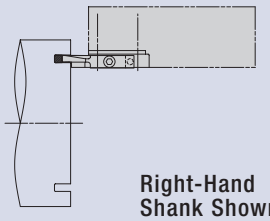
See pages GP 53-54 for additional shank options.

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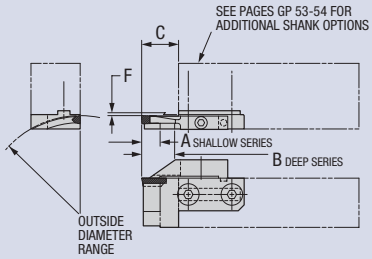
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

Face Grooving Support Blade A



Right-Hand Shank Shown



Part Number		Gage	Stock		Outside Diameter Range	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components
Shallow Series	Deep Series	Insert	Shallow	Deep		A	B	C	F	Clamp	Clamp Screw	
M-421218-125S-030	M-421243-125L-030	WG-4125	❍	❍	76,20 - 88,90	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421219-125S-035	M-421244-125L-035	WG-4125	❍	❍	88,90 - 107,95	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421220-125S-0425	M-421245-125L-0425	WG-4125	❍	❍	107,95 - 139,70	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421221-125S-055	M-421246-125L-055	WG-4125	❍	❍	139,70 - 190,50	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421222-125S-075	M-421247-125L-075	WG-4125	❍	❍	190,50 - 317,50	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421223-125S-125	M-421248-125L-125	WG-4125	❍	❍	317,50 - 1016,0	9,65	16	19,05	0,79	421323-125GC	434259	TK-02650
M-421224-187S-030	M-421249-187L-030	WG-4187	❍	❍	76,20 - 88,90	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421225-187S-035	M-421250-187L-035	WG-4187	❍	❍	88,90 - 107,95	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421226-187S-0425	M-421251-187L-0425	WG-4187	❍	❍	107,95 - 139,70	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421227-187S-055	M-421252-187L-055	WG-4187	❍	❍	139,70 - 190,50	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421228-187S-075	M-421253-187L-075	WG-4187	❍	❍	190,50 - 317,50	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421229-187S-125	M-421254-187L-125	WG-4187	❍	❍	317,50 - 1016,0	9,65	16	19,05	0,79	421324-187GC	434259	TK-02651
M-421230-250S-030	M-421255-250L-030	WG-6250	❍	❍	76,20 - 107,95	14,22	25,40	28,58	0,79	421325-250GC	434259	TK-02652
M-421231-250S-0425	M-421256-250L-0425	WG-6250	❍	❍	107,95 - 152,40	14,22	25,40	28,58	0,79	421325-250GC	434259	TK-02652
M-421232-250S-060	M-421257-250L-060	WG-6250	❍	❍	152,40 - 215,90	14,22	25,40	28,58	0,79	421325-250GC	434259	TK-02652
M-421233-250S-085	M-421258-250L-085	WG-6250	❍	❍	215,90 - 393,70	14,22	25,40	28,58	0,79	421325-250GC	434259	TK-02652
M-421234-250S-155	M-421259-250L-155	WG-6250	❍	❍	393,70 - 1016,0	14,22	25,40	28,58	0,79	421325-250GC	434259	TK-02652
M-421235-312S-030	M-421260-312L-030	WG-8312	❍	❍	76,20 - 127,00	19,05	33,27	38,10	0,79	421326-312GC	434259	TK-02653
M-421236-312S-050	M-421261-312L-050	WG-8312	❍	❍	127,00 - 228,60	19,05	33,27	38,10	0,79	421326-312GC	434259	TK-02653
M-421237-312S-090	M-421262-312L-090	WG-8312	❍	❍	228,60 - 482,60	19,05	33,27	38,10	0,79	421326-312GC	434259	TK-02653
M-421238-312S-190	M-421263-312L-190	WG-8312	❍	❍	482,60 -	19,05	33,27	38,10	0,79	421326-312GC	434259	TK-02653
M-421239-375S-030	M-421264-375L-030	WG-8375	❍	❍	76,20 - 127,00	19,05	33,27	38,10	0,79	421327-375GC	434259	TK-02654
M-421240-375S-050	M-421265-375L-050	WG-8375	❍	❍	127,00 - 228,60	19,05	33,27	38,10	0,79	421327-375GC	434259	TK-02654
M-421241-375S-090	M-421266-375L-090	WG-8375	❍	❍	228,60 - 482,60	19,05	33,27	38,10	0,79	421327-375GC	434259	TK-02654
M-421242-375S-190	M-421267-375L-190	WG-8375	❍	❍	482,60 -	19,05	33,27	38,10	0,79	421327-375GC	434259	TK-02654

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

See pages GP 10 and GP 11 for ceramic and carbide inserts.

See pages GP 53-54 for additional shank options.

10 Business Days or Less ❍ ❍

Stocked Standard ● ●

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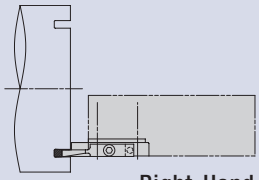
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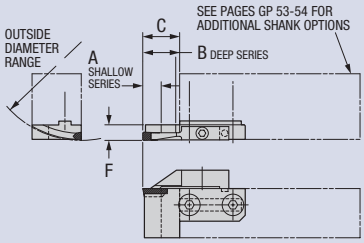
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Face Grooving Support Blade B



Right-Hand Shank Shown



Part Number		Gage	Stock		Outside Diameter Range	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components
Shallow Series	Deep Series	Insert	Shallow	Deep		A	B	C	F	Clamp	Clamp Screw	
M-421118-125S-030	M-421143-125L-030	WG-4125	❍	❍	76,20 - 88,90	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421119-125S-035	M-421144-125L-035	WG-4125	❍	❍	88,90 - 107,95	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421120-125S-0425	M-421145-125L-0425	WG-4125	❍	❍	107,95 - 139,70	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421121-125S-055	M-421146-125L-055	WG-4125	❍	❍	139,70 - 190,50	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421122-125S-075	M-421147-125L-075	WG-4125	❍	❍	190,50 - 317,50	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421123-125S-125	M-421148-125L-125	WG-4125	❍	❍	317,50 - 1016,0	9,65	16	19,05	11,91	421318-125GC	434259	TK-02677
M-421124-187S-030	M-421149-187L-030	WG-4187	❍	❍	76,20 - 88,90	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421125-187S-035	M-421150-187L-035	WG-4187	❍	❍	88,90 - 107,95	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421126-187S-0425	M-421151-187L-0425	WG-4187	❍	❍	107,95 - 139,70	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421127-187S-055	M-421152-187L-055	WG-4187	❍	❍	139,70 - 190,50	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421128-187S-075	M-421153-187L-075	WG-4187	❍	❍	190,50 - 317,50	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421129-187S-125	M-421154-187L-125	WG-4187	❍	❍	317,50 - 1016,0	9,65	16	19,05	11,91	421319-187GC	434259	TK-02678
M-421130-250S-030	M-421155-250L-030	WG-6250	❍	❍	76,20 - 107,95	14,22	25,40	28,58	11,91	421320-250GC	434259	TK-02679
M-421131-250S-0425	M-421156-250L-0425	WG-6250	❍	❍	107,95 - 152,40	14,22	25,40	28,58	11,91	421320-250GC	434259	TK-02679
M-421132-250S-060	M-421157-250L-060	WG-6250	❍	❍	152,40 - 215,90	14,22	25,40	28,58	11,91	421320-250GC	434259	TK-02679
M-421133-250S-085	M-421158-250L-085	WG-6250	❍	❍	215,90 - 393,70	14,22	25,40	28,58	11,91	421320-250GC	434259	TK-02679
M-421134-250S-155	M-421159-250L-155	WG-6250	❍	❍	393,70 - 1016,0	14,22	25,40	28,58	11,91	421320-250GC	434259	TK-02679
M-421135-312S-030	M-421160-312L-030	WG-8312	❍	❍	76,20 - 127,00	19,05	33,27	38,10	11,91	421321-312GC	434259	TK-02680
M-421136-312S-050	M-421161-312L-050	WG-8312	❍	❍	127,00 - 228,60	19,05	33,27	38,10	11,91	421321-312GC	434259	TK-02680
M-421137-312S-090	M-421162-312L-090	WG-8312	❍	❍	228,60 - 482,60	19,05	33,27	38,10	11,91	421321-312GC	434259	TK-02680
M-421138-312S-190	M-421163-312L-190	WG-8312	❍	❍	482,60 -	19,05	33,27	38,10	11,91	421321-312GC	434259	TK-02680
M-421139-375S-030	M-421164-375L-030	WG-8375	❍	❍	76,20 - 127,00	19,05	33,27	38,10	11,91	421322-375GC	434259	TK-02681
M-421140-375S-050	M-421165-375L-050	WG-8375	❍	❍	127,00 - 228,60	19,05	33,27	38,10	11,91	421322-375GC	434259	TK-02681
M-421141-375S-090	M-421166-375L-090	WG-8375	❍	❍	228,60 - 482,60	19,05	33,27	38,10	11,91	421322-375GC	434259	TK-02681
M-421142-375S-190	M-421167-375L-190	WG-8375	❍	❍	482,60 -	19,05	33,27	38,10	11,91	421322-375GC	434259	TK-02681

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

See page GP 10 and GP 11 for ceramic and carbide inserts.

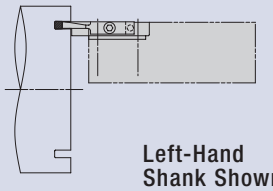
See pages GP 53-54 for additional shank options.

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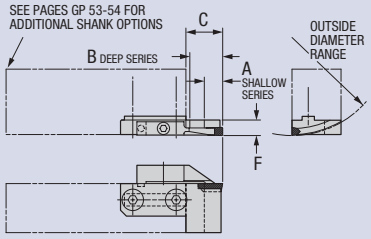
● ● Stocked Standard

❍ ❍ 10 Business Days or Less

Face Grooving Support Blade C



Left-Hand Shank Shown



Part Number		Gage	Stock		Outside Diameter Range	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components
Shallow Series	Deep Series	Insert	Shallow	Deep		A	B	C	F	Clamp	Clamp Screw	
M-421168-125S-030	M-421193-125L-030	WG-4125	❍	❍	76,20 - 88,90	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421169-125S-035	M-421194-125L-035	WG-4125	❍	❍	88,90 - 107,95	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421170-125S-0425	M-421195-125L-0425	WG-4125	❍	❍	107,95 - 139,70	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421171-125S-055	M-421196-125L-055	WG-4125	❍	❍	139,70 - 190,50	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421172-125S-075	M-421197-125L-075	WG-4125	❍	❍	190,50 - 317,50	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421173-125S-125	M-421198-125L-125	WG-4125	❍	❍	317,50 - 1016,0	9,65	16	19,05	11,91	421323-125GC	434259	TK-02650
M-421174-187S-030	M-421199-187L-030	WG-4187	❍	❍	76,20 - 88,90	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421175-187S-035	M-421200-187L-035	WG-4187	❍	❍	88,90 - 107,95	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421176-187S-0425	M-421201-187L-0425	WG-4187	❍	❍	107,95 - 139,70	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421177-187S-055	M-421202-187L-055	WG-4187	❍	❍	139,70 - 190,50	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421178-187S-075	M-421203-187L-075	WG-4187	❍	❍	190,50 - 317,50	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421179-187S-125	M-421204-187L-125	WG-4187	❍	❍	317,50 - 1016,0	9,65	16	19,05	11,91	421324-187GC	434259	TK-02651
M-421180-250S-030	M-421205-250L-030	WG-6250	❍	❍	76,20 - 107,95	14,22	25,40	28,58	11,91	421325-250GC	434259	TK-02652
M-421181-250S-0425	M-421206-250L-0425	WG-6250	❍	❍	107,95 - 152,40	14,22	25,40	28,58	11,91	421325-250GC	434259	TK-02652
M-421182-250S-060	M-421207-250L-060	WG-6250	❍	❍	152,40 - 215,90	14,22	25,40	28,58	11,91	421325-250GC	434259	TK-02652
M-421183-250S-085	M-421208-250L-085	WG-6250	❍	❍	215,90 - 393,70	14,22	25,40	28,58	11,91	421325-250GC	434259	TK-02652
M-421184-250S-155	M-421209-250L-155	WG-6250	❍	❍	393,70 - 1016,0	14,22	25,40	28,58	11,91	421325-250GC	434259	TK-02652
M-421185-312S-030	M-421210-312L-030	WG-8312	❍	❍	76,20 - 127,00	19,05	33,27	38,10	11,91	421326-312GC	434259	TK-02653
M-421186-312S-050	M-421211-312L-050	WG-8312	❍	❍	127,00 - 228,60	19,05	33,27	38,10	11,91	421326-312GC	434259	TK-02653
M-421187-312S-090	M-421212-312L-090	WG-8312	❍	❍	228,60 - 482,60	19,05	33,27	38,10	11,91	421326-312GC	434259	TK-02653
M-421188-312S-190	M-421213-312L-190	WG-8312	❍	❍	482,60 -	19,05	33,27	38,10	11,91	421326-312GC	434259	TK-02653
M-421189-375S-030	M-421214-375L-030	WG-8375	❍	❍	76,20 - 127,00	19,05	33,27	38,10	11,91	421327-375GC	434259	TK-02654
M-421190-375S-050	M-421215-375L-050	WG-8375	❍	❍	127,00 - 228,60	19,05	33,27	38,10	11,91	421327-375GC	434259	TK-02654
M-421191-375S-090	M-421216-375L-090	WG-8375	❍	❍	228,60 - 482,60	19,05	33,27	38,10	11,91	421327-375GC	434259	TK-02654
M-421192-375S-190	M-421217-375L-190	WG-8375	❍	❍	482,60 -	19,05	33,27	38,10	11,91	421327-375GC	434259	TK-02654

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

See page GP 10 and GP 11 for ceramic and carbide inserts.

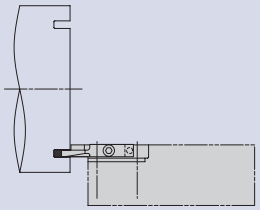
See pages GP 53-54 for additional shank options.

10 Business Days or Less ❍ ❍

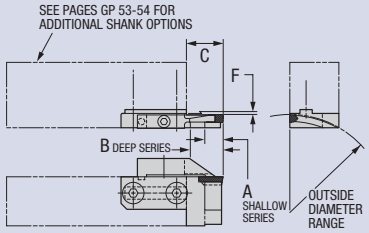
Stocked Standard ● ●

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Face Grooving Support Blade D



Left-Hand Shank Shown



Part Number		Gage	Stock		Outside Diameter Range	Dimensions (millimeters)				Standard Components		*Tune-Up Kit Includes All Standard Components
Shallow Series	Deep Series	Insert	Shallow	Deep		A	B	C	F	Clamp	Clamp Screw	
M-421268-125S-030	M-421293-125L-030	WG-4125	❍	❍	76,20 - 88,90	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421269-125S-035	M-421294-125L-035	WG-4125	❍	❍	88,90 - 107,95	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421270-125S-0425	M-421295-125L-0425	WG-4125	❍	❍	107,95 - 139,70	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421271-125S-055	M-421296-125L-055	WG-4125	❍	❍	139,70 - 190,50	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421272-125S-075	M-421297-125L-075	WG-4125	❍	❍	190,50 - 317,50	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421273-125S-125	M-421298-125L-125	WG-4125	❍	❍	317,50 - 1016,0	9,65	16	19,05	0,79	421318-125GC	434259	TK-02677
M-421274-187S-030	M-421299-187L-030	WG-4187	❍	❍	76,20 - 88,90	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421275-187S-035	M-421300-187L-035	WG-4187	❍	❍	88,90 - 107,95	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421276-187S-0425	M-421301-187L-0425	WG-4187	❍	❍	107,95 - 139,70	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421277-187S-055	M-421302-187L-055	WG-4187	❍	❍	139,70 - 190,50	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421278-187S-075	M-421303-187L-075	WG-4187	❍	❍	190,50 - 317,50	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421279-187S-125	M-421304-187L-125	WG-4187	❍	❍	317,50 - 1016,0	9,65	16	19,05	0,79	421319-187GC	434259	TK-02678
M-421280-250S-030	M-421305-250L-030	WG-6250	❍	❍	76,20 - 107,95	14,22	25,40	28,58	0,79	421320-250GC	434259	TK-02679
M-421281-250S-0425	M-421306-250L-0425	WG-6250	❍	❍	107,95 - 152,40	14,22	25,40	28,58	0,79	421320-250GC	434259	TK-02679
M-421282-250S-060	M-421307-250L-060	WG-6250	❍	❍	152,40 - 215,90	14,22	25,40	28,58	0,79	421320-250GC	434259	TK-02679
M-421283-250S-085	M-421308-250L-085	WG-6250	❍	❍	215,90 - 393,70	14,22	25,40	28,58	0,79	421320-250GC	434259	TK-02679
M-421284-250S-155	M-421309-250L-155	WG-6250	❍	❍	393,70 - 1016,0	14,22	25,40	28,58	0,79	421320-250GC	434259	TK-02679
M-421285-312S-030	M-421310-312L-030	WG-8312	❍	❍	76,20 - 127,00	19,05	33,27	38,10	0,79	421321-312GC	434259	TK-02680
M-421286-312S-050	M-421311-312L-050	WG-8312	❍	❍	127,00 - 228,60	19,05	33,27	38,10	0,79	421321-312GC	434259	TK-02680
M-421287-312S-090	M-421312-312L-090	WG-8312	❍	❍	228,60 - 482,60	19,05	33,27	38,10	0,79	421321-312GC	434259	TK-02680
M-421288-312S-190	M-421313-312L-190	WG-8312	❍	❍	482,60 -	19,05	33,27	38,10	0,79	421321-312GC	434259	TK-02680
M-421289-375S-030	M-421314-375L-030	WG-8375	❍	❍	76,20 - 127,00	19,05	33,27	38,10	0,79	421322-375GC	434259	TK-02681
M-421290-375S-050	M-421315-375L-050	WG-8375	❍	❍	127,00 - 228,60	19,05	33,27	38,10	0,79	421322-375GC	434259	TK-02681
M-421291-375S-090	M-421316-375L-090	WG-8375	❍	❍	228,60 - 482,60	19,05	33,27	38,10	0,79	421322-375GC	434259	TK-02681
M-421292-375S-190	M-421317-375L-190	WG-8375	❍	❍	482,60 -	19,05	33,27	38,10	0,79	421322-375GC	434259	TK-02681

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the support blade.

See page GP 10 and GP 11 for ceramic and carbide inserts.

See pages GP 53-54 for additional shank options.

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Face Grooving Tools - Ordering Instructions

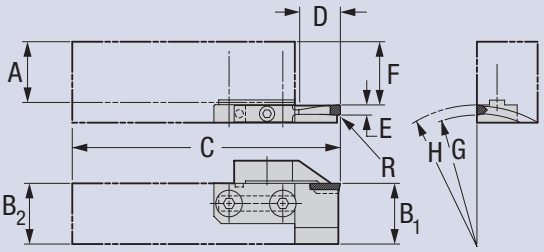
Face grooving tools must be matched to a specific radius and are, therefore, manufactured to order for your particular application.

We offer tools either with integral support blades (SFG) or with separate replaceable blades (AFG). Four combinations are available relative to hand of tool and hand of radius.

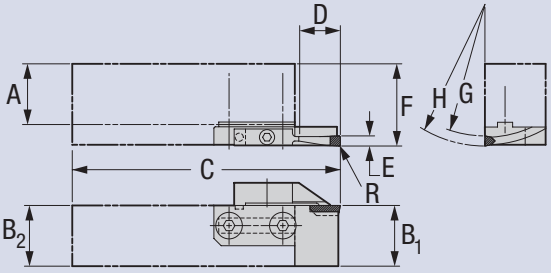
When ordering replaceable blade styles, we suggest the purchase of additional back-up blades at time of original order.

For your convenience in ordering or request for quotation, we have published sample blank engineering data forms. You must provide *ALL* of the dimensional data listed to ensure the correct tool being manufactured.

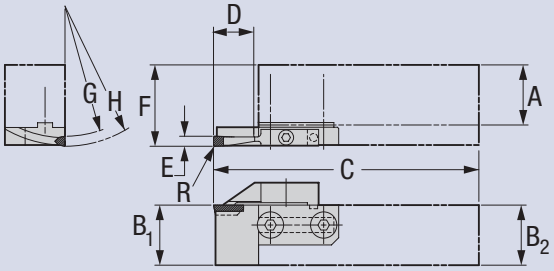
Note: *Tools will be quoted either with radius relieved blades or angular relieved blades, according to groove diameter. Radius relieved blades are illustrated.*



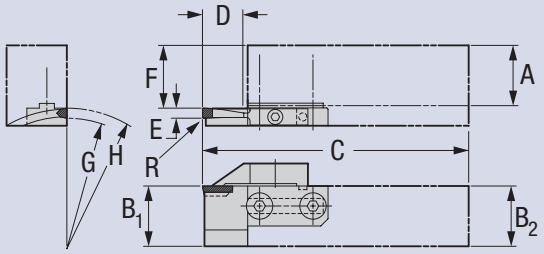
AFGVLL



AFGVLR

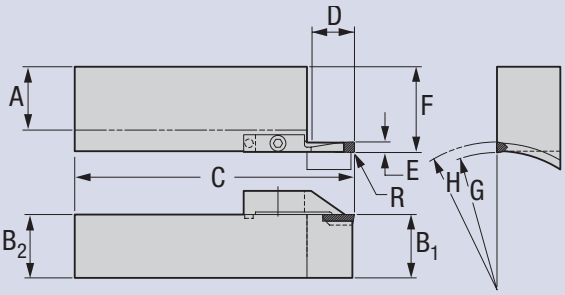


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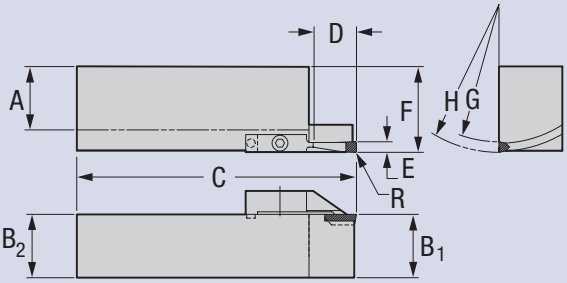


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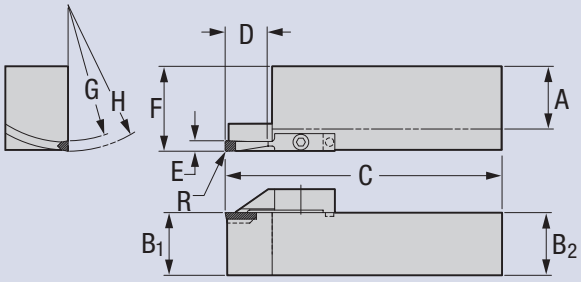
AFGV_ _	A	C	F
Drawing #	B_1	D (depth of cut)	G (radius)
R (radius)	B_2	E	H (radius)



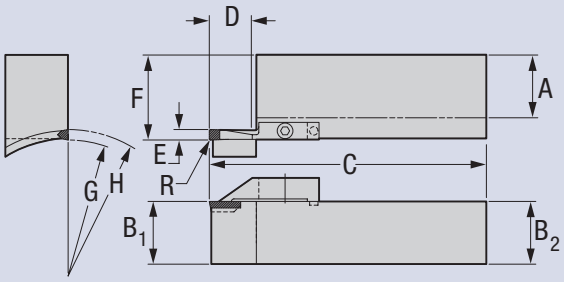
SFGVLL



SFGVLR



SFGVRL

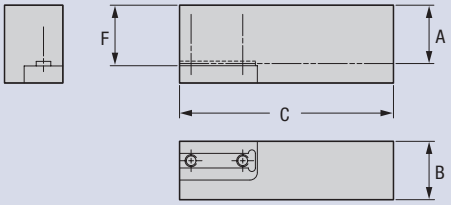


SFGVRR

SFGV_ _	A	C	F
Drawing #	B_1	D (depth of cut)	G (radius)
R (radius)	B_2	E	H (radius)

Straight Shank Holder

For Support Blades

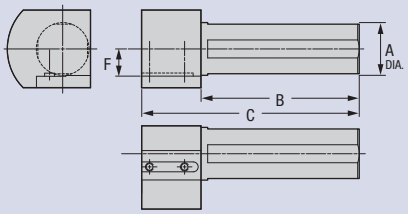


Part Number		Stock		Dimensions (millimeters)				Standard Component	*Tune-Up Kit Includes All Standard Components
Right	Left	R	L	A	B	C	F	Mounting Screw	
M-411055	M-411056	●	●	25	25	125	26	FHCS M8-1.25x25mm	TK-02682
M-411059	M-411449	●	●	32	32	150	33	FHCS M8-1.25x25mm	TK-02682
M-411015	M-411016	❍	❍	40	40	200	41	FHCS M8-1.25x25mm	TK-02682

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

Round Shank Holder

For Support Blades



Part Number		Stock		Dimensions (millimeters)				Standard Component	*Tune-Up Kit Includes All Standard Components
Right	Left	R	L	A	B	C	F	Mounting Screw	
M-529678	M-529679	❍	❍	32	150	200	23	FHCS M8-1.25x25mm	TK-02682
M-529680	M-529681	●	●	40	150	200	27	FHCS M8-1.25x25mm	TK-02682
M-529682	M-529683	●	●	50	150	200	32	FHCS M8-1.25x25mm	TK-02682
M-529684	M-529685	❍	❍	60	150	200	37	FHCS M8-1.25x25mm	TK-02682

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

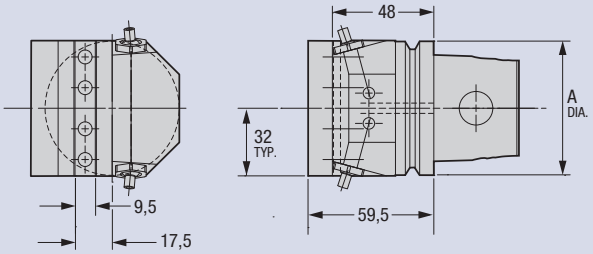
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● ● Stocked Standard

❍ ❍ 10 Business Days or Less

KM Shank

Face Mount



Part Number † Face Mount	Stock	Dimensions (millimeters) A	Standard Component Mounting Screw	*Tune-Up Kit Includes All Standard Components
M-SBH-KM50-F	❍	50	FHCS M8-1.25x25mm	TK-02682
M-SBH-KM63-F	❍	63	FHCS M8-1.25x25mm	TK-02682

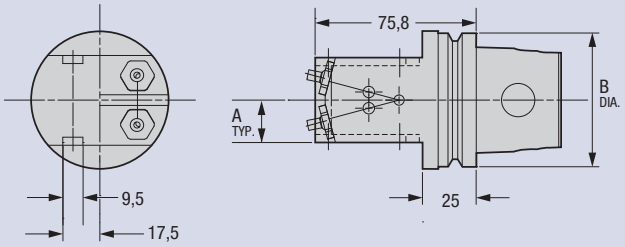
High-pressure coolant – 1,500 PSI Max (100 bar)

***** Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

† These tools based on KM63UT shank.

KM Shank

Side Mount



Part Number † Side Mount	Stock	Dimensions (millimeters) A	 B	Standard Component Mounting Screw	*Tune-Up Kit Includes All Standard Components
M-SBH-KM50-S	❍	17,5	50	FHCS M8-1.25x25mm	TK-02682
M-SBH-KM63-S	❍	20	63	FHCS M8-1.25x25mm	TK-02682

High-pressure coolant – 1,500 PSI Max (100 bar)

***** Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

† These tools based on KM63UT shank.

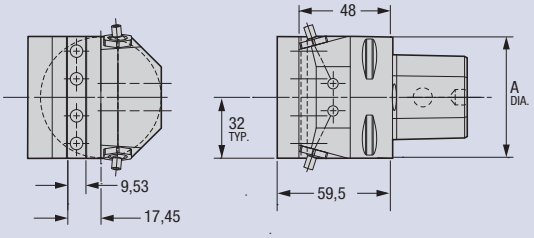
10 Business Days or Less ❍ ❍

Stocked Standard ● ●

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Capto Shank

Face Mount



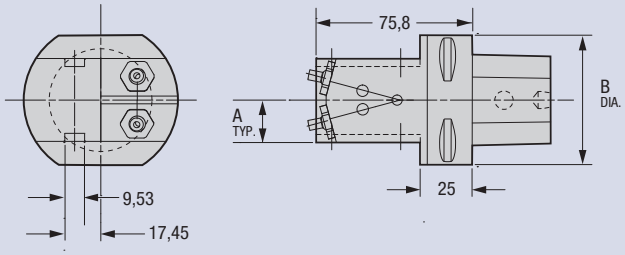
Part Number Face Mount	Stock	Dimensions (millimeters) A	Standard Component Mounting Screw	*Tune-Up Kit Includes All Standard Components
M-SBH-C5-F	❍	50	FHCS M8-1.25x25mm	TK-02682
M-SBH-C6-F	❍	63	FHCS M8-1.25x25mm	TK-02682

High-pressure coolant – 1,500 PSI Max (100 bar)

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

Capto Shank

Side Mount



Part Number Side Mount	Stock	Dimensions (millimeters) A	 B	Standard Component Mounting Screw	*Tune-Up Kit Includes All Standard Components
M-SBH-C5-S	❍	17,5	50	FHCS M8-1.25x25mm	TK-02682
M-SBH-C6-S	❍	20	63	FHCS M8-1.25x25mm	TK-02682

High-pressure coolant – 1,500 PSI Max (100 bar)

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the toolholder.

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● ● Stocked Standard

❍ ❍ 10 Business Days or Less

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API RING GROOVE MACHINING

Ring Max™ Inserts ..... *RM 03-08*
Ring Max™ II ..... *RM 09-22*
Ring Max™ III ..... *RM 23-33*
Ring Max™ Cartridges ..... *RM 34-36*
Ring Max™ STX ..... *RM 37-44*

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Ring Max™ Grooving Inserts

Utilizing the latest cutting tool technology and coatings, there is a Greenleaf high-performance insert grade for every ring groove need:

- WG-300® whisker-reinforced ceramics for Inconel 625 clad overlay
- Carbide grade G-915 for stainless steel
- Carbide grade GA5036 for alloy steel



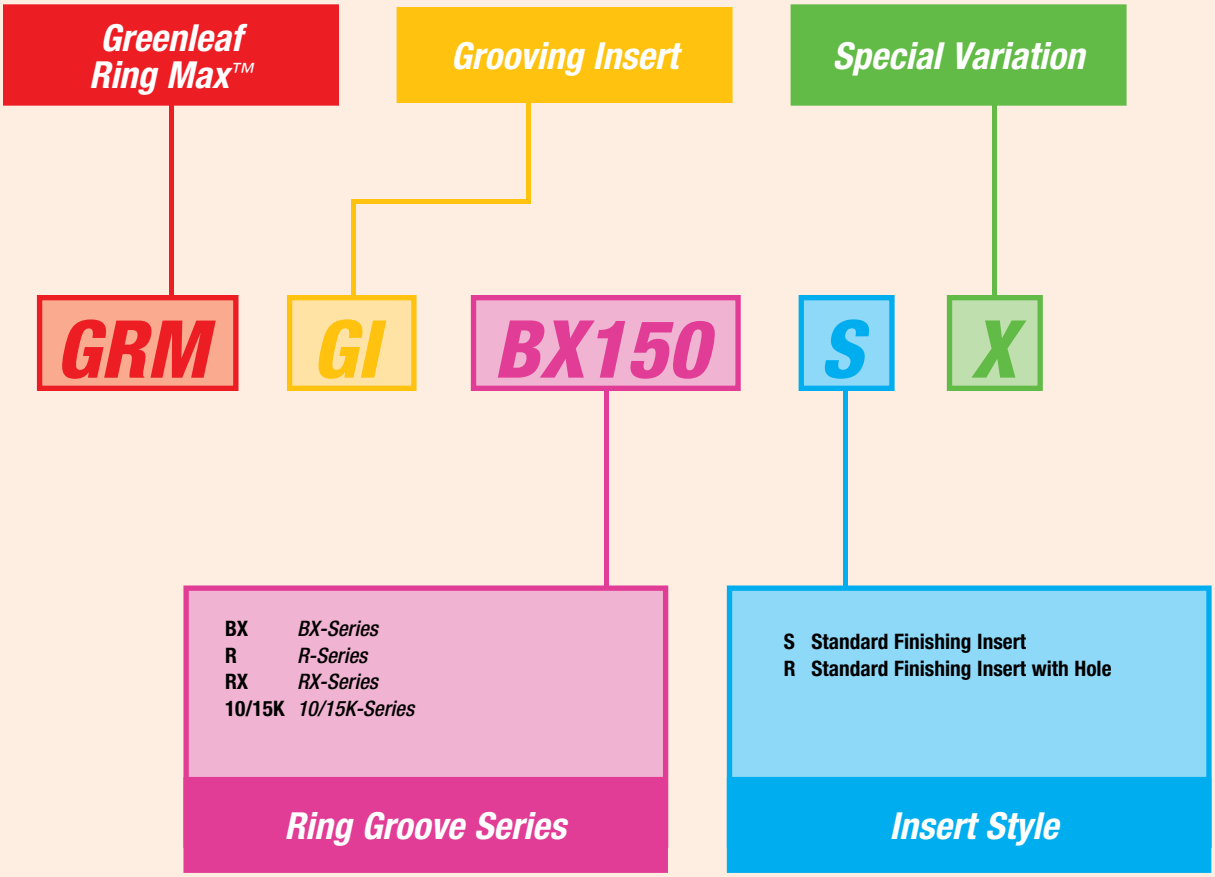


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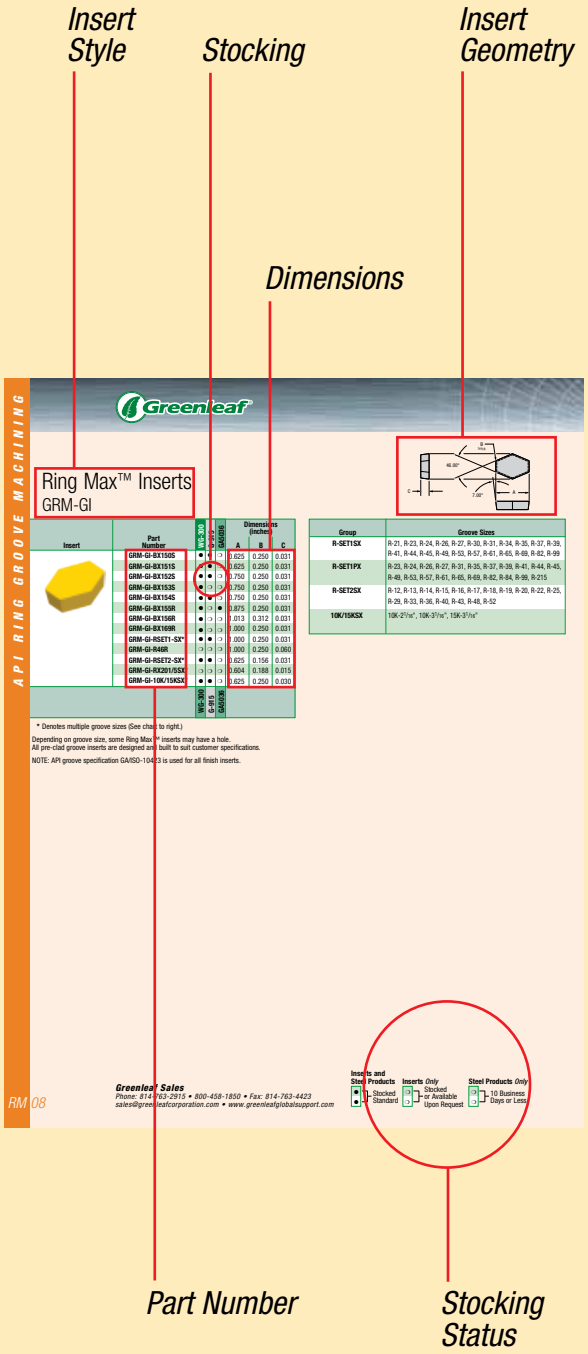
Ring Max™ Grooving Insert Identification System



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Ring Max™ Grooving Insert Reference Guide



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CARBIDE

COATED

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy- and light-duty milling at high cutting speeds.

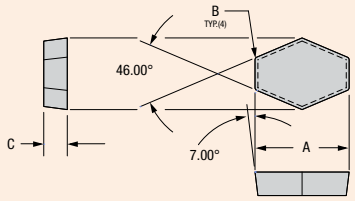
G-915 Multi-layer PVD-coated grade, excellent for milling and turning high-temp alloys, stainless steel, and low-carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

CERAMIC

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel- and cobalt-based super alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

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Ring Max™ Inserts
GRM-GI



Insert	Part Number	WG-300	G-915	GA5036	Dimensions (mm) A	B	C
	GRM-GI-BX150S	●	●	❍	15,88	6,35	0,79
	GRM-GI-BX151S	●	●	❍	15,88	6,35	0,79
	GRM-GI-BX152S	●	●	❍	19,05	6,35	0,79
	GRM-GI-BX153S	●	❍	❍	19,05	6,35	0,79
	GRM-GI-BX154S	●	●	❍	19,05	6,35	0,79
	GRM-GI-BX155R	●	❍	●	22,23	6,35	0,79
	GRM-GI-BX156R	●	❍	❍	25,73	7,93	0,79
	GRM-GI-BX169R	●	❍	❍	25,40	6,35	0,79
	GRM-GI-RSET1-SX*	●	●	❍	25,40	6,35	0,79
	GRM-GI-R46R	❍	❍	❍	25,40	6,35	1,52
	GRM-GI-RSET2-SX*	●	❍	❍	15,88	3,96	0,79
	GRM-GI-RX201/5SX*	❍	❍	❍	15,34	4,78	0,38
	GRM-GI-10K/15KSX*	●	❍	❍	15,88	6,35	0,76
		WG-300	G-915	GA5036			

Group	Groove Sizes
R-SET1SX	R-21, R-23, R-24, R-26, R-27, R-30, R-31, R-34, R-35, R-37, R-39, R-41, R-44, R-45, R-49, R-53, R-57, R-61, R-65, R-69, R-82, R-84, R-99
R-SET2SX	R-12, R-13, R-14, R-15, R-16, R-17, R-18, R-19, R-20, R-22, R-25, R-29, R-33, R-36, R-40, R-43, R-48, R-52
10K/15KSX	10K-2 1/16", 10K-3 1/16", 15K-3 1/16"

* Denotes multiple groove sizes (See chart to right.)

NOTE: Depending on groove size, some Ring Max™ inserts may have a hole.
All pre-clad groove inserts are designed and built to suit customer specifications.

NOTE: API groove specification GA/ISO-10423 is used for all finish inserts.

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Inserts and Steel Products ● Stocked Standard
Inserts *Only* ❍ Stocked or Available Upon Request
Steel Products *Only* ❍ 10 Business Days or Less

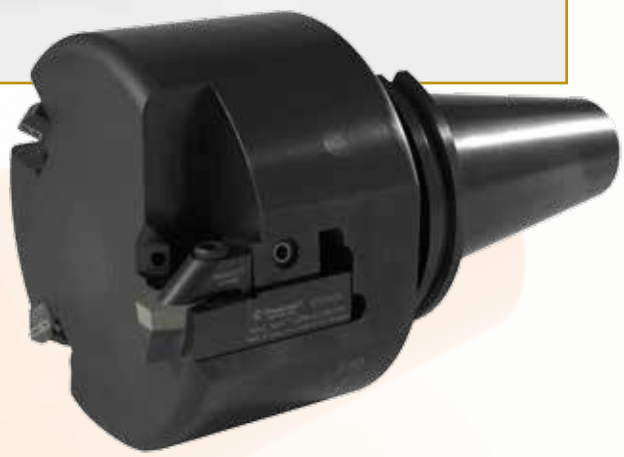
Ring Max™ II Ring Groove Tooling

The Ring Max™ II cutters are designed to use fewer components for even greater dimensional accuracy and repeatability from groove to groove. Their unique design ensures accurate seating and secure locking of the insert cartridge into the cutter body.

Standard features and benefits include:

- Roughing and finishing of BX, R and RX API ring grooves in Inconel 625 clad overlay in less than one minute
- Adjustable and replaceable cartridge design for easy maintenance
- Machining the groove and chamfers in one operation
- Availability for grooving in stainless and alloy steel



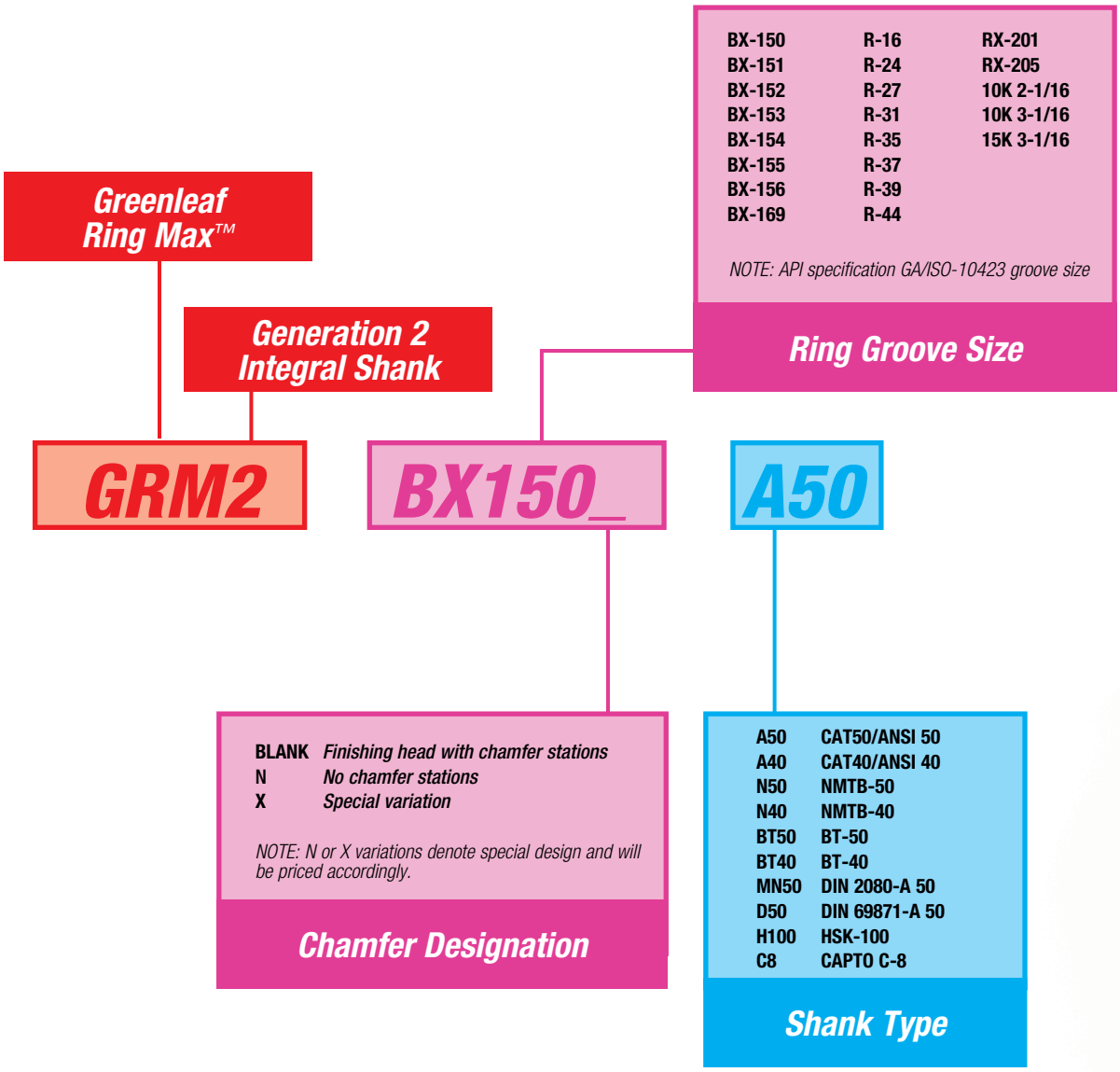


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Ring Max™ II – Finishing Head Identification System



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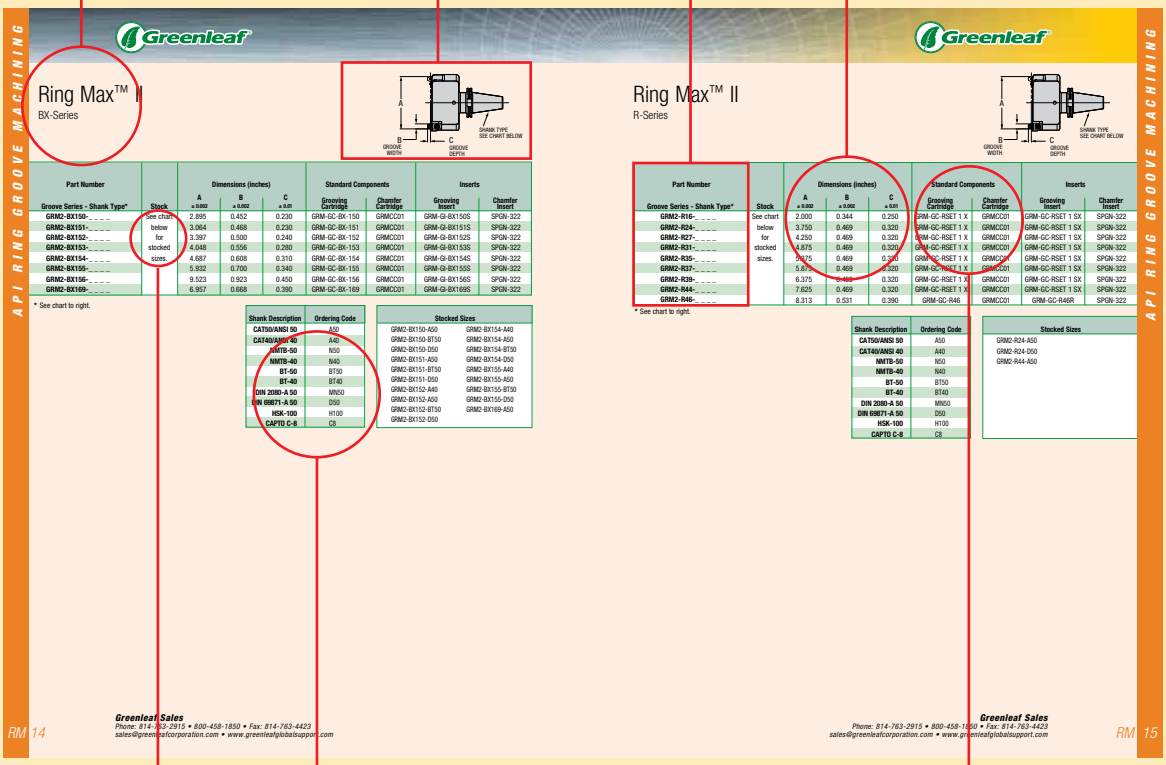
Ring Max™ II – Ring Groove Tooling Usage Reference Guide

Tooling Style

Tooling Geometry

Part Number

Dimensions



Ring Max™ II
BX-Series

Part Number Groove Series - Shank Type*	Stock	Dimensions (inches) A ±.002	B ±.002	C ±.01	Standard Components Grooving Cartridge	Chamfer Cartridge	Inserts Grooving Insert	Chamfer Insert
GRM2-BX150-____	See chart below for stocked sizes.	2.895	0.452	0.230	GRM-GC-BX-150	GRMCC01	GRM-GI-BX150S	SPGN-322
GRM2-BX151-____		3.064	0.468	0.230	GRM-GC-BX-151	GRMCC01	GRM-GI-BX151S	SPGN-322
GRM2-BX152-____		3.397	0.500	0.240	GRM-GC-BX-152	GRMCC01	GRM-GI-BX152S	SPGN-322
GRM2-BX153-____		4.048	0.556	0.280	GRM-GC-BX-153	GRMCC01	GRM-GI-BX153S	SPGN-322
GRM2-BX154-____		4.687	0.608	0.310	GRM-GC-BX-154	GRMCC01	GRM-GI-BX154S	SPGN-322
GRM2-BX155-____		5.932	0.700	0.340	GRM-GC-BX-155	GRMCC01	GRM-GI-BX155S	SPGN-322
GRM2-BX156-____		9.523	0.923	0.450	GRM-GC-BX-156	GRMCC01	GRM-GI-BX156S	SPGN-322
GRM2-BX169-____		6.957	0.668	0.390	GRM-GC-BX-169	GRMCC01	GRM-GI-BX169S	SPGN-322

* See chart to right.

Shank Description	Ordering Code
CAT50/ANSI 50	A50
CAT40/ANSI 40	A40
NMTB-50	N50
NMTB-40	N40
BT-50	BT50
BT-40	BT40
DIN 2080-A 50	MN50
DIN 69871-A 50	D50
HSK-100	H100
CAPTO C-8	C8

Stocked Sizes	
GRM2-BX150-A50	GRM2-BX154-A40
GRM2-BX150-BT50	GRM2-BX154-A50
GRM2-BX150-D50	GRM2-BX154-BT50
GRM2-BX151-A50	GRM2-BX154-D50
GRM2-BX151-BT50	GRM2-BX155-A40
GRM2-BX151-D50	GRM2-BX155-A50
GRM2-BX152-A40	GRM2-BX155-BT50
GRM2-BX152-A50	GRM2-BX155-D50
GRM2-BX152-BT50	GRM2-BX169-A50
GRM2-BX152-D50	

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Ring Max™ II
R-Series

Part Number Groove Series - Shank Type*	Stock	Dimensions (inches) A ±.002	B ±.002	C ±.01	Standard Components Grooving Cartridge	Chamfer Cartridge	Inserts Grooving Insert	Chamfer Insert
GRM2-R16-____	See chart below for stocked sizes.	2.000	0.344	0.250	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R24-____		3.750	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R27-____		4.250	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R31-____		4.875	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R35-____		5.375	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R37-____		5.875	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R39-____		6.375	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R44-____		7.625	0.469	0.320	GRM-GC-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
GRM2-R46-____		8.313	0.531	0.390	GRM-GC-R46	GRMCC01	GRM-GC-R46R	SPGN-322

* See chart to right.

Shank Description	Ordering Code
CAT50/ANSI 50	A50
CAT40/ANSI 40	A40
NMTB-50	N50
NMTB-40	N40
BT-50	BT50
BT-40	BT40
DIN 2080-A 50	MN50
DIN 69871-A 50	D50
HSK-100	H100
CAPTO C-8	C8

Stocked Sizes
GRM2-R24-A50
GRM2-R24-D50
GRM2-R44-A50

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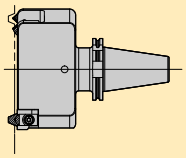
Stocking Information

Shank Options

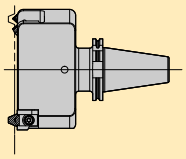
Standard Components

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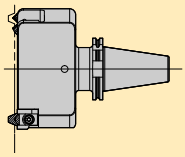
Ring Groove Tooling



Ring Max™ II
BX Series
page: RM 14



Ring Max™ II
R Series
page: RM 15



Ring Max™ II
RX Series
10/15K Series
page: RM 16

Reference

Ring Max™ II
Models
page: RM 17

Special Toolchanger Clearance
Request Form
page: RM 18

Pre-Clad Head
Quote Request Form
page: RM 19

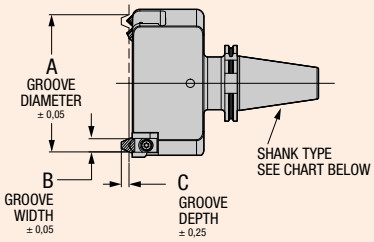
Ring Max™ II Pre-Clad
Models
page: RM 20

Machining Methods
Reference Guide
page: RM 21

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Ring Max™ II

BX Series



Part Number		Dimensions (mm)			Standard Components		Inserts	
Groove Series - Shank Type*	Stock	A	B	C	Grooving Cartridge	Chamfer Cartridge	Grooving Insert	Chamfer Insert
GRM2-BX150-_ _ _ _	See chart	73,53	11,48	5,84	GRM-GC-BX-150	GRMCC01	GRM-GI-BX150S	SPGN-322
GRM2-BX151-_ _ _ _	below	77,83	11,89	5,84	GRM-GC-BX-151	GRMCC01	GRM-GI-BX151S	SPGN-322
GRM2-BX152-_ _ _ _	for	86,28	12,70	6,10	GRM-GC-BX-152	GRMCC01	GRM-GI-BX152S	SPGN-322
GRM2-BX153-_ _ _ _	stocked	102,82	14,12	7,11	GRM-GC-BX-153	GRMCC01	GRM-GI-BX153S	SPGN-322
GRM2-BX154-_ _ _ _	sizes.	119,05	15,44	7,87	GRM-GC-BX-154	GRMCC01	GRM-GI-BX154S	SPGN-322
GRM2-BX155-_ _ _ _		150,67	17,78	8,64	GRM-GC-BX-155	GRMCC01	GRM-GI-BX155R	SPGN-322
GRM2-BX156-_ _ _ _		241,88	23,44	11,43	GRM-GC-BX-156	GRMCC01	GRM-GI-BX156R	SPGN-322
GRM2-BX169-_ _ _ _		176,71	16,97	9,91	GRM-GC-BX-169	GRMCC01	GRM-GI-BX169R	SPGN-322

***** See chart to right.

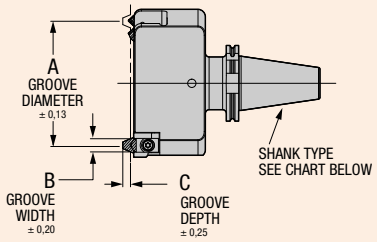
Shank Description	Ordering Code
CAT50/ANSI 50	A50
CAT40/ANSI 40	A40
NMTB-50	N50
NMTB-40	N40
BT-50	BT50
BT-40	BT40
DIN 2080-A 50	MN50
DIN 69871-A 50	D50
HSK-100	H100
CAPTO C-8	C8

Stocked Sizes	
GRM2-BX150-A50	GRM2-BX154-A40
GRM2-BX150-BT50	GRM2-BX154-A50
GRM2-BX150-D50	GRM2-BX154-BT50
GRM2-BX151-A50	GRM2-BX154-D50
GRM2-BX151-BT50	GRM2-BX155-A40
GRM2-BX151-D50	GRM2-BX155-A50
GRM2-BX152-A40	GRM2-BX155-BT50
GRM2-BX152-A50	GRM2-BX155-D50
GRM2-BX152-BT50	GRM2-BX156-A50
GRM2-BX152-D50	GRM2-BX169-A50

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Ring Max™ II

R Series



Part Number		Dimensions (mm)			Standard Components		Inserts	
Groove Series - Shank Type*	Stock	A	B	C	Grooving Cartridge	Chamfer Cartridge	Grooving Insert	Chamfer Insert
GRM2-R16-_ _ _ _	See chart	50,80	8,74	6,35	GRM-GC-RSET 2 X	GRMCC01	GRM-GI-RSET 2 SX	SPGN-322
GRM2-R24-_ _ _ _	below	95,25	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R27-_ _ _ _	for	107,95	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R31-_ _ _ _	stocked	123,83	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R35-_ _ _ _	sizes.	136,53	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R37-_ _ _ _		149,23	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R39-_ _ _ _		161,93	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R44-_ _ _ _		193,68	11,91	8,13	GRM-GC-RSET 1 X	GRMCC01	GRM-GI-RSET 1 SX	SPGN-322
GRM2-R46-_ _ _ _		211,15	13,49	9,91	GRM-GC-R46	GRMCC01	GRM-GI-R46R	SPGN-322

***** See chart to right.

Shank Description	Ordering Code
CAT50/ANSI 50	A50
CAT40/ANSI 40	A40
NMTB-50	N50
NMTB-40	N40
BT-50	BT50
BT-40	BT40
DIN 2080-A 50	MN50
DIN 69871-A 50	D50
HSK-100	H100
CAPTO C-8	C8

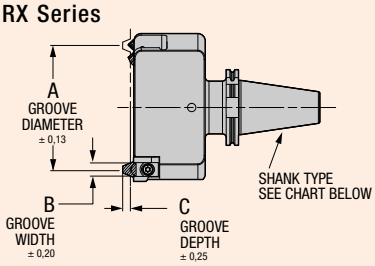
Stocked Sizes
GRM2-R24-A50
GRM2-R24-D50
GRM2-R24N-A50
GRM2-R24N-D50

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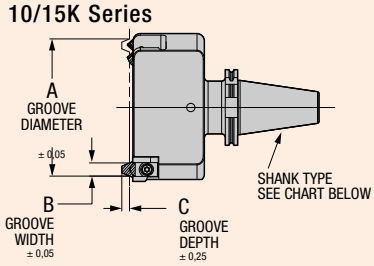
Ring Max™ II

RX Series
10K and 15K Series

RX Series



10/15K Series



Part Number		Dimensions (mm)			Standard Components		Inserts	
Groove Series - Shank Type*	Stock	A	B	C	Grooving Cartridge	Chamfer Cartridge	Grooving Insert	Chamfer Insert
GRM2-RX201N-_ _ _ _	See chart	46,05	5,56	4,06	GRM-GCRX201/5-X	N/A	GRM-GI-RX201/5SX	N/A
GRM2-RX205N-_ _ _ _	below	57,15	5,56	4,06	GRM-GCRX201/5-X	N/A	GRM-GI-RX201/5SX	N/A
GRM2-10K2-_ _ _ _	for	117,42	9,58	6,55	GRM-GC10/15K-X	GRMCC01	GRM-GI-10/15KSX	SPGN-322
GRM2-10K3N-_ _ _ _	stocked	146,00	9,58	6,55	GRM-GC10/15K-X	N/A	GRM-GI-10/15KSX	N/A
GRM2-10K5-_ _ _ _	sizes.	222,20	9,58	6,55	GRM-GC10/15K-X	GRMCC01	GRM-GI-10/15KSX	SPGN-322
GRM2-15K3-_ _ _ _		168,22	9,58	6,55	GRM-GC10/15K-X	GRMCC01	GRM-GI-10/15KSX	SPGN-322

* See chart to right.

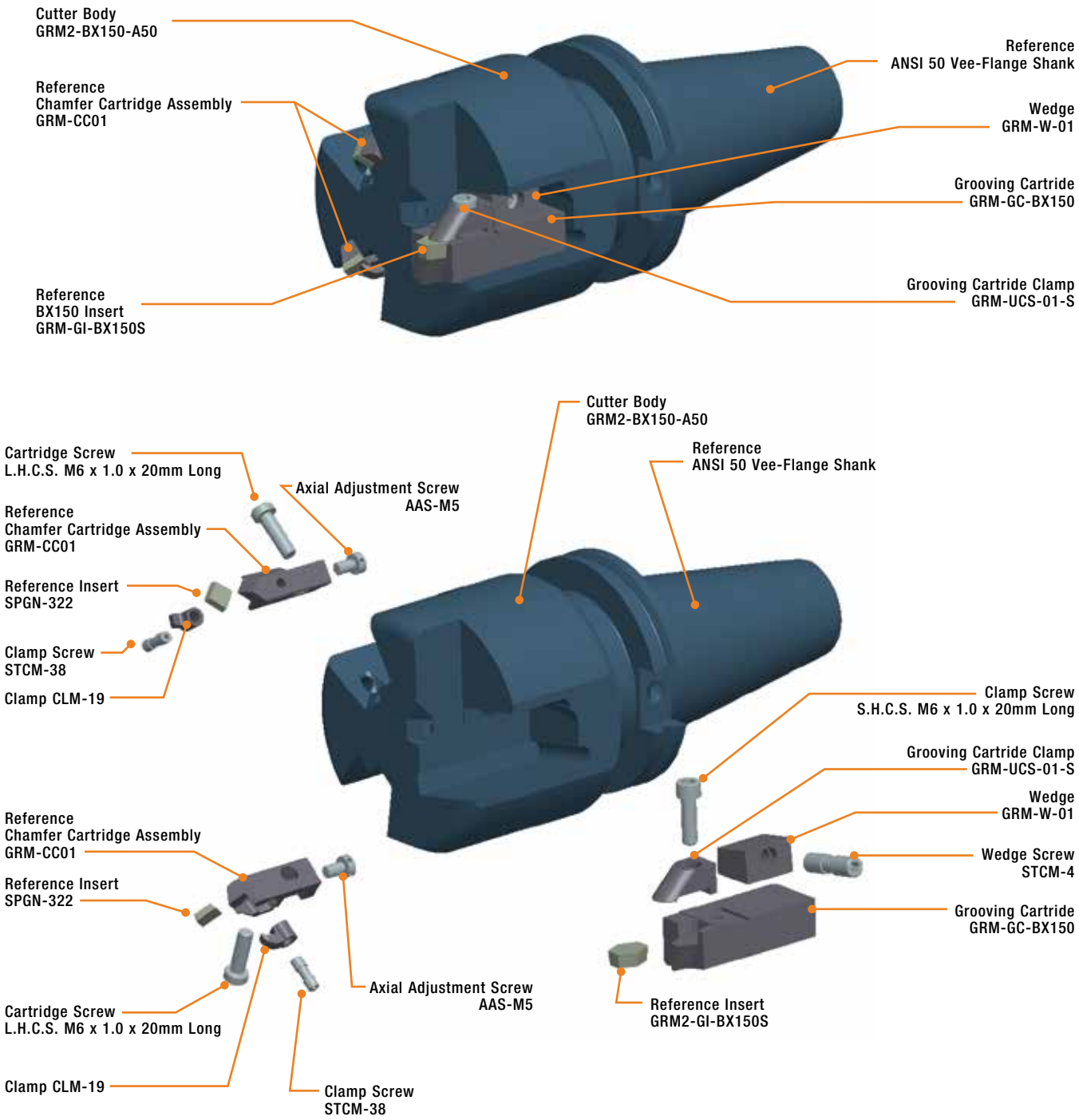
Shank Description	Ordering Code
CAT50/ANSI 50	A50
CAT40/ANSI 40	A40
NMTB-50	N50
NMTB-40	N40
BT-50	BT50
BT-40	BT40
DIN 2080-A 50	MN50
DIN 69871-A 50	D50
HSK-100	H100
CAPTO C-8	C8

Stocked Sizes

Ring Max™ II RX and 10/15K Series are not standard stocked items.

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Ring Max™ II – Assembled & Exploded Views Reference Guide



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engineering@ greenleafcorporation.com
via **FAX**
814-763-4040

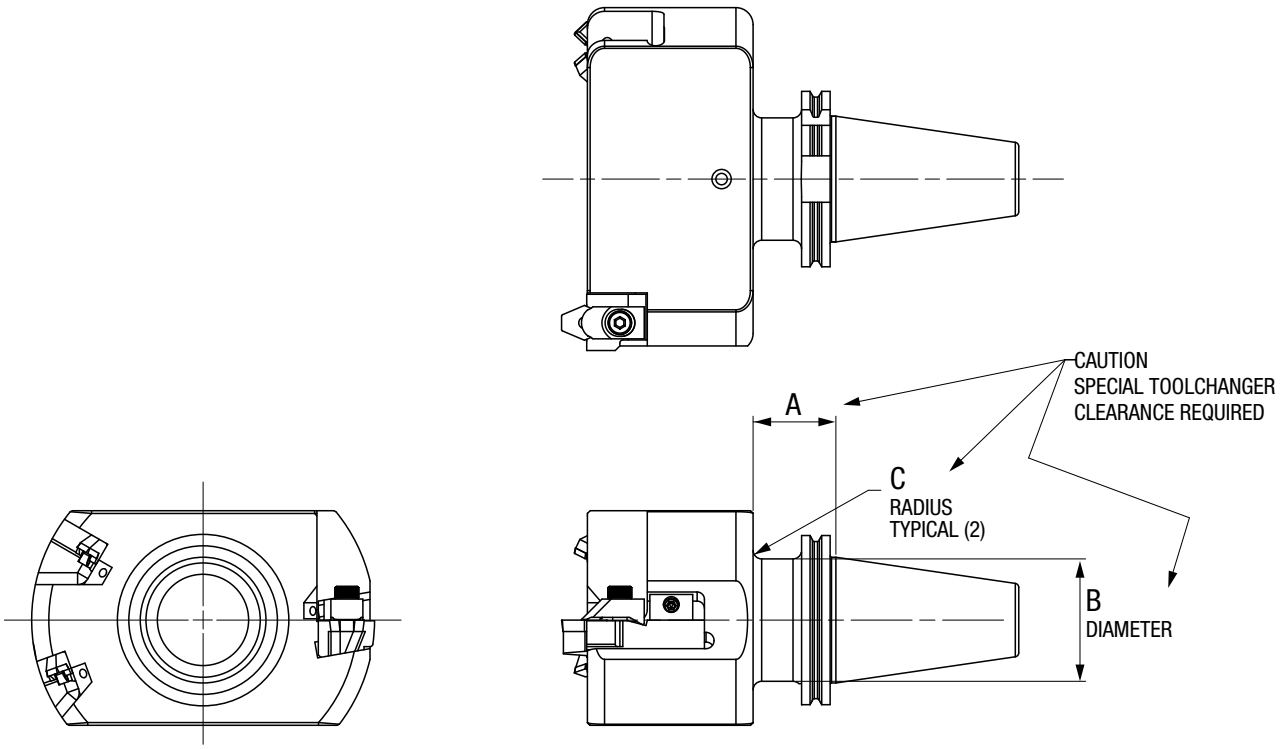
Special Toolchanger Clearance Request Form

Part Information:

Reference Groove Number: _____ Reference Shank Size: _____

A distance: _____ B diameter: _____ C radius: _____

Additional comments: _____



Company _____ Customer Number _____

Attention _____ Customer Inquiry Number _____

Street _____ Ship to City _____ Country _____

City _____ State _____ Zip Code _____ Send Copy to _____

Phone _____ FAX _____ _____

Email _____ Sales Rep _____ Date Received _____ Due Date _____

FOR FAST QUOTE, complete form and send
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engineering@ greenleafcorporation.com
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Pre-Clad Head Quote Request Form

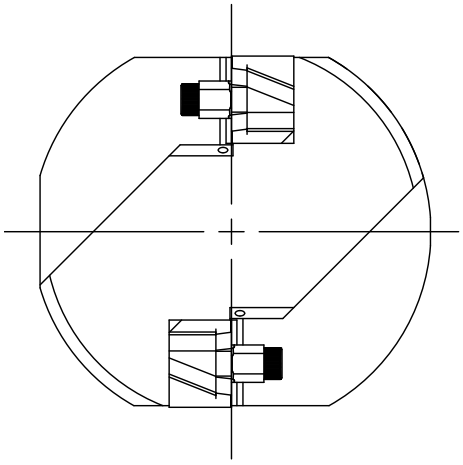
Part Information:

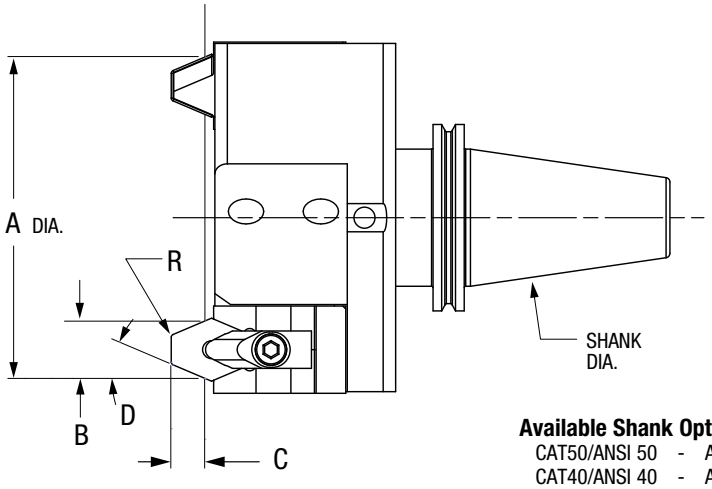
Part Name: _____

Clad Material: _____ Insert Grade: _____

Quote quantities: Heads: _____ Cartiridges: _____ Inserts: _____

Additional comments: _____





Available Shank Options:

CAT50/ANSI 50	-	A50
CAT40/ANSI 40	-	A40
NMTB-50	-	N50
NMTB-40	-	N40
BT-50	-	BT50
BT-40	-	BT40
DIN 2080-A 50	-	MN50
DIN 69871-A 50	-	D50
HSK-100	-	H100
CAPTO C-8	-	C8

Dimensions *(Please provide required tolerances.)*					Shank
A ±_____	B ±_____	C ±_____	D ±_____	R ±_____	

Company _____ **Customer Number** _____

Attention _____ **Customer Inquiry Number** _____

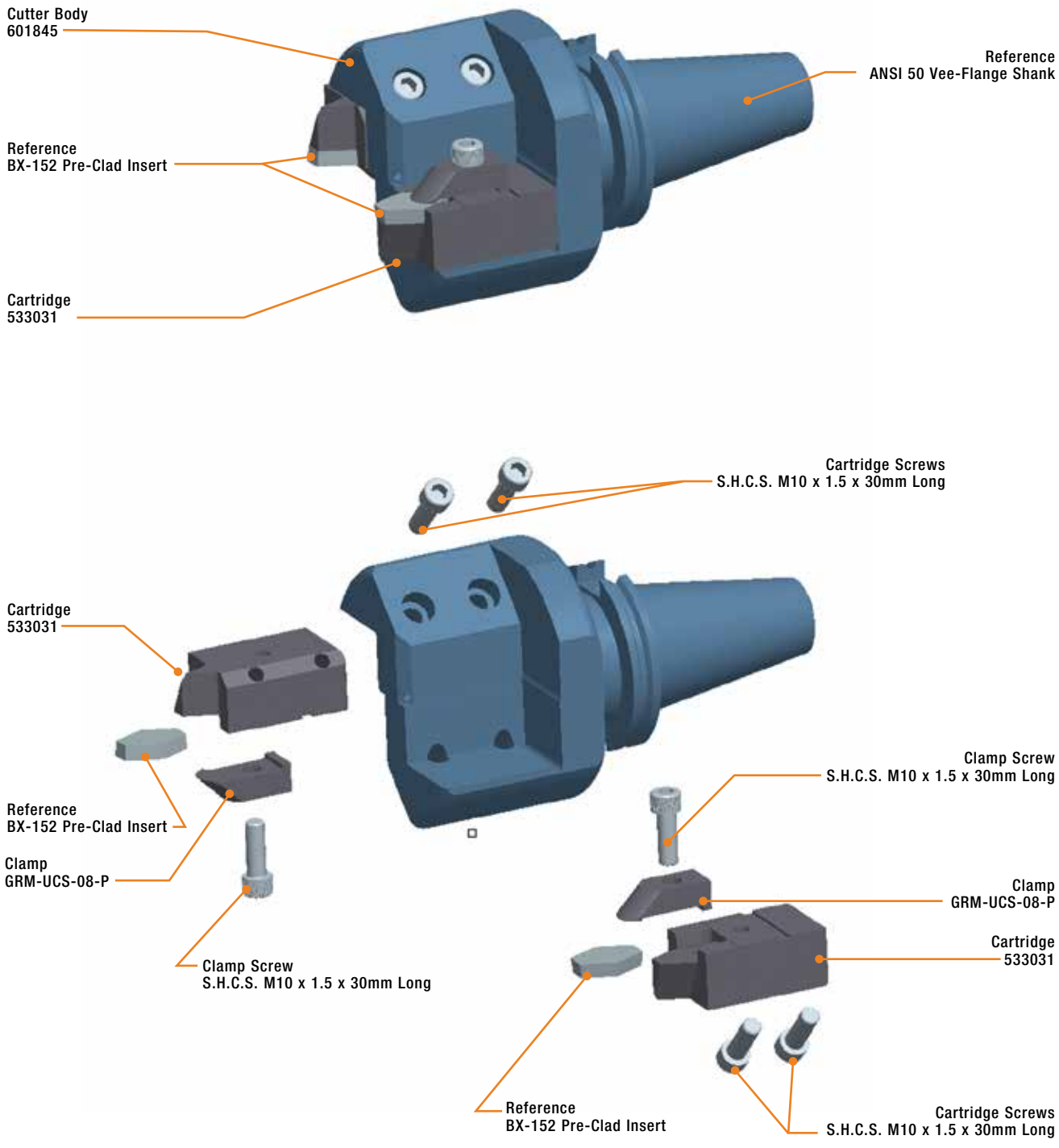
Street _____ **Ship to City** _____ **Country** _____

City _____ **State** _____ **Zip Code** _____ **Send Copy to** _____

Phone _____ **FAX** _____ _____

Email _____ **Sales Rep** _____ **Date Received** _____ **Quote Due Date** _____

Ring Max™ BX-152 Pre-Clad – Assembled & Exploded Views Reference Guide



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Ring Max™ – Machining Methods Reference Guide

Method One

Use these instructions for setting gage points and establishing target ring groove depths using an optical comparator.

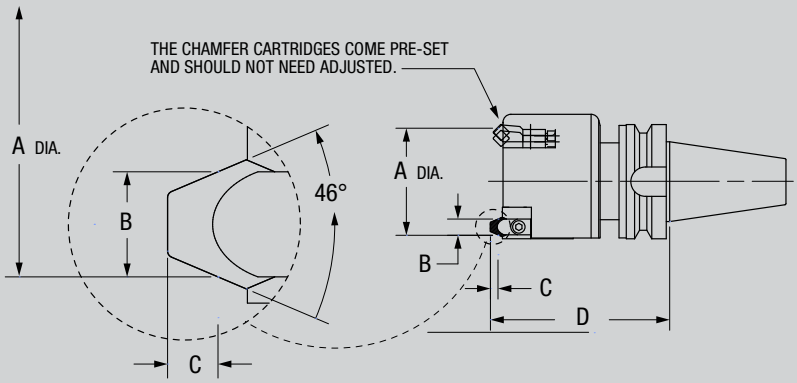
Step One:

Using an optical comparator, find and set the gage points at the groove's A diameter at mid-tolerance. The groove's B dimension will be within the allowable tolerance range.

Step Two:

Once the gage points in Step One have been determined, measure and record the tool's Z length and the actual measured C dimension over the insert nose.

NOTE: The measured C dimension is the target machining depth and will be within the groove's allowable part tolerance.



Example for BX-152

A		B	C		Z
Part print dimension and tolerance	Target this diameter for gage points	Part print dimension and tolerance	Part print dimension and tolerance	Measure and target this depth for programming	Measure and use this depth for programming
86,233mm + 0.10 – 0.00	86,283mm	12,649mm + 0.10 – 0.00	5,84mm		

Method Two

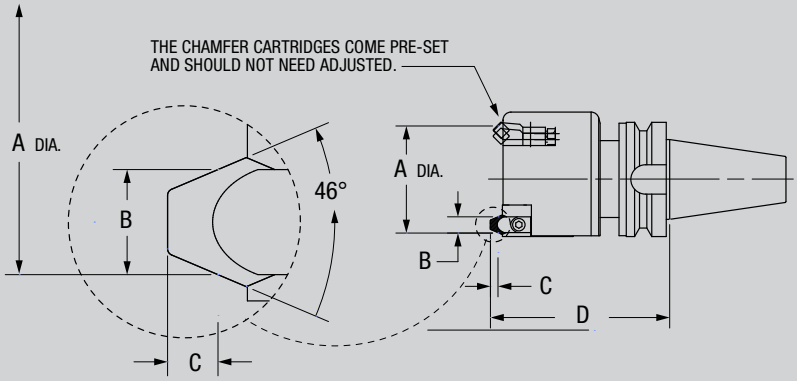
This method is used to machine ring grooves in a rough and finish pass.

Step One:

Machine the groove but reduce the groove depth to leave stock for the finish pass.

Step Two:

Measure the groove's A diameter and use the chart below to determine the additional D depth necessary to bring the A diameter into mid-tolerance.



If the A groove diameter is undersize by:	Increase the groove depth D by:
0.025mm	0.029mm
0.050mm	0.059mm
0.075mm	0.088mm
0.100mm	0.118mm
0.125mm	0.147mm
0.150mm	0.177mm
0.175mm	0.206mm
0.200mm	0.236mm
0.225mm	0.265mm
0.250mm	0.295mm
0.275mm	0.324mm
0.300mm	0.353mm

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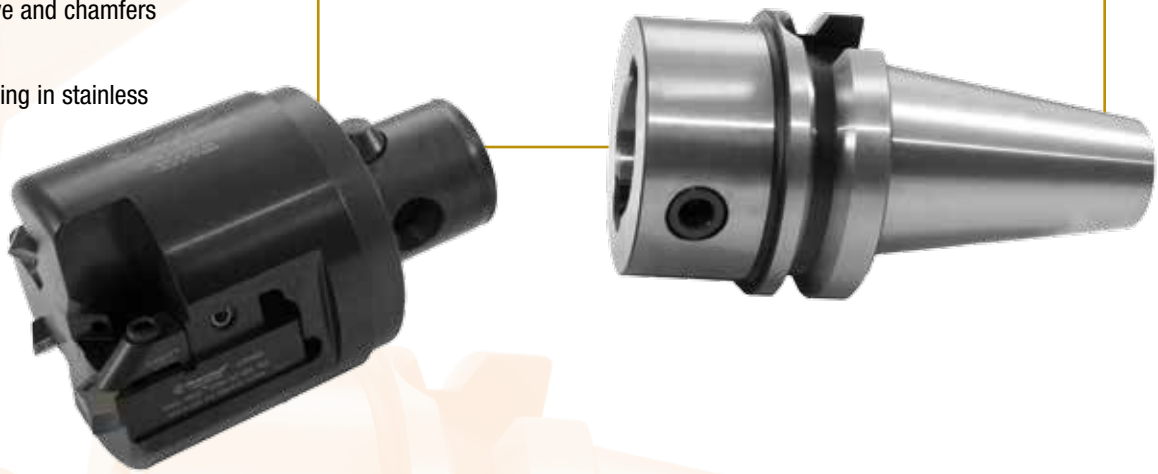
Ring Max™ III Ring Groove Tooling

The Ring Max™ III is a high-precision, two-piece modular system for shop versatility. This system offers many head and shank configurations, including adaptability to Greenleaf's Excelerator® face mills. The Ring Max™ III line delivers the ultimate economical and flexible solution for any shop machining multiple API ring groove sizes.

Standard features and benefits include:

- Roughing and finishing of BX, R and RX API ring grooves in Inconel 625 clad overlay in less than one minute
- Adjustable and replaceable cartridge design for easy maintenance
- Machining the groove and chamfers in one operation
- Availability for grooving in stainless and alloy steel



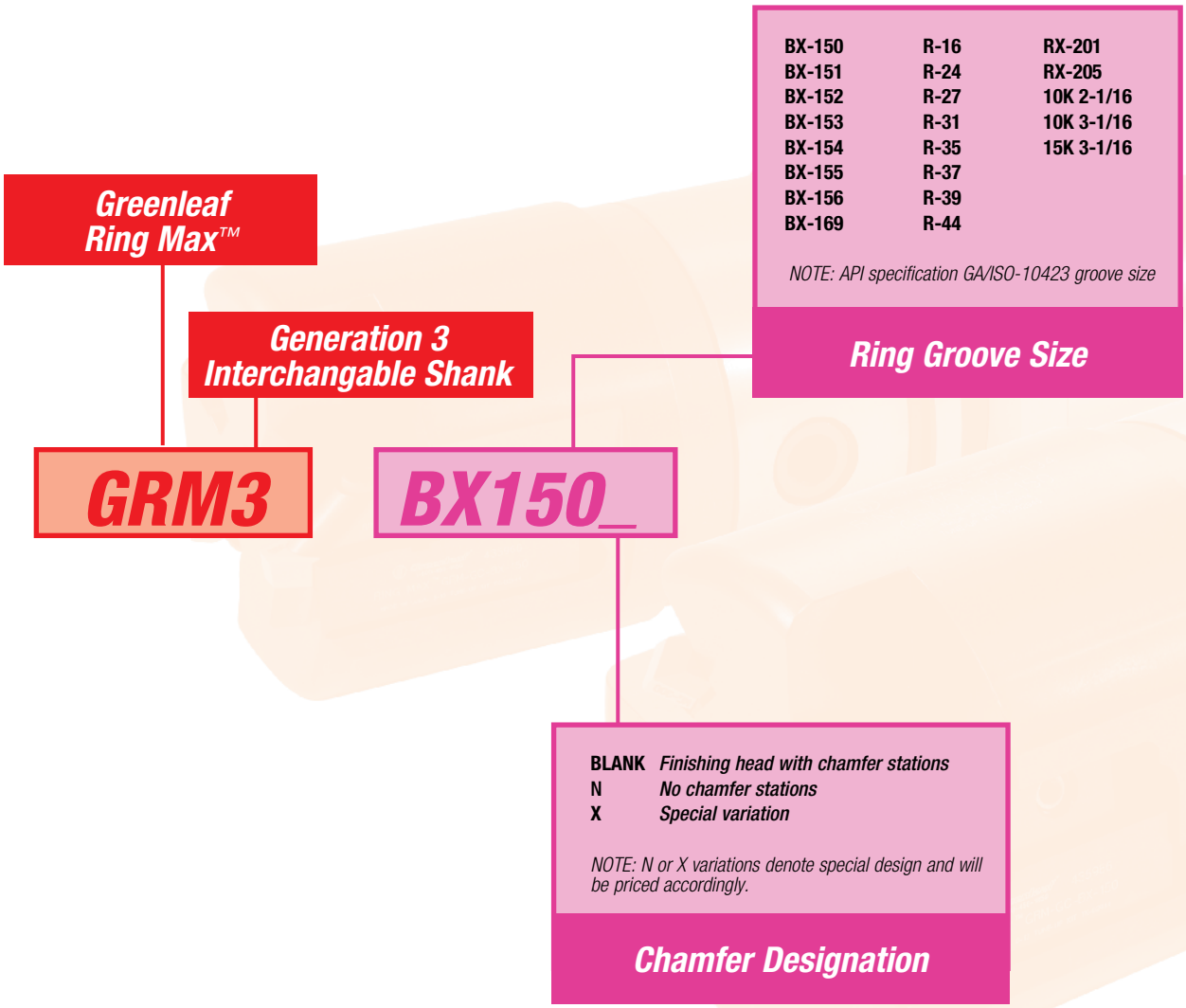


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Ring Max™ III – Finishing Head Identification System



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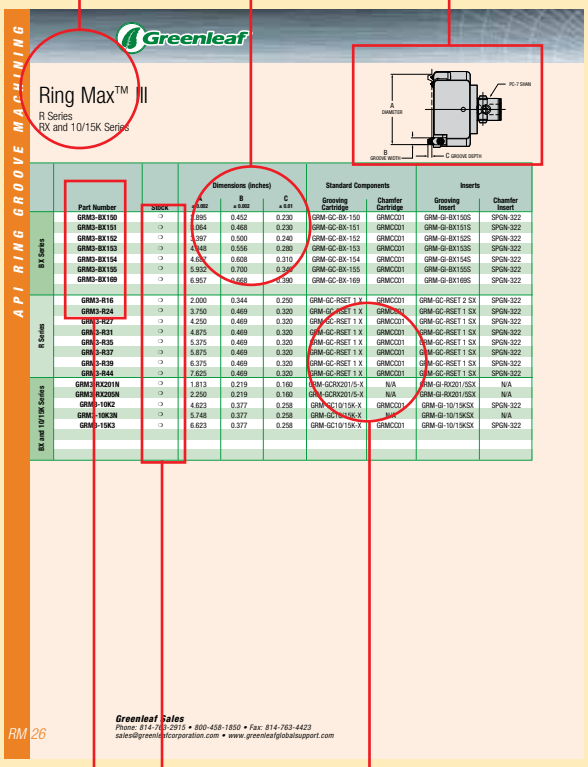
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Ring Max™ III – Ring Groove Tooling Usage Reference Guide

Tooling Style

Tooling Geometry

Dimensions



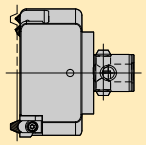
Stocking Program

Part Number

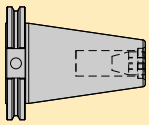
Standard Components

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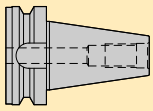
Ring Groove Tooling

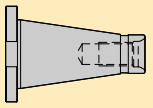


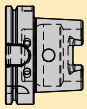
Ring Max™ III
BX Series
R Series
RX Series
10/15K Series
page: RM 28

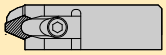


Ring Max™
Shank Options
page: RM 29

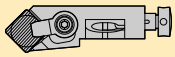








Ring Max™
Grooving Cartridge
page: RM 35



Ring Max™
Chamfer Cartridge
page: RM 36

Reference

Ring Max™ III
Models
page: RM 30

Ring Max™ III Pre-Clad
Models
page: RM 31

Pre-Clad Head
Quote Request Form
page: RM 32

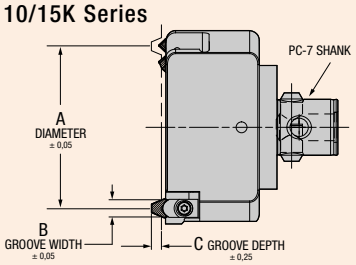
Machining Methods
Reference Guide
page: RM 33

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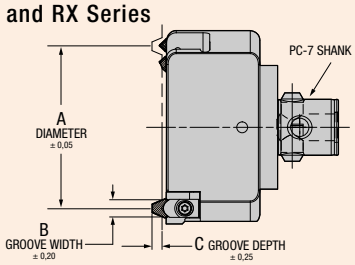
Ring Max™ III

BX Series
R Series
RX and 10/15K Series

BX and 10/15K Series



R and RX Series



	Part Number	Stock	Dimensions (mm) A	B	C	Standard Components Grooving Cartridge	Chamfer Cartridge	Inserts Grooving Insert	Chamfer Insert
BX Series	GRM3-BX150	❍	73,53	11,48	5,84	GRM-GI-BX-150	GRMCC01	GRM-GI-BX150S	SPGN-322
	GRM3-BX151	❍	77,83	11,89	5,84	GRM-GI-BX-151	GRMCC01	GRM-GI-BX151S	SPGN-322
	GRM3-BX152	●	86,28	12,70	6,10	GRM-GI-BX-152	GRMCC01	GRM-GI-BX152S	SPGN-322
	GRM3-BX153	❍	102,82	14,12	7,11	GRM-GI-BX-153	GRMCC01	GRM-GI-BX153S	SPGN-322
	GRM3-BX154	●	119,05	15,44	7,87	GRM-GI-BX-154	GRMCC01	GRM-GI-BX154S	SPGN-322
	GRM3-BX155	●	150,67	17,78	8,64	GRM-GI-BX-155	GRMCC01	GRM-GI-BX155S	SPGN-322
	GRM3-BX169	❍	176,71	16,97	9,91	GRM-GI-BX-169	GRMCC01	GRM-GI-BX169S	SPGN-322
R Series	GRM3-R16	❍	50,80	8,74	6,35	GRM-GI-RSET 2 AX	GRMCC01	GRM-GC-RSET 2 SX	SPGN-322
	GRM3-R24	●	95,25	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R27	❍	107,95	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R31	❍	123,83	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R35	❍	136,53	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R37	❍	149,23	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R39	❍	161,93	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
	GRM3-R44	❍	193,68	11,91	8,13	GRM-GI-RSET 1 X	GRMCC01	GRM-GC-RSET 1 SX	SPGN-322
RX and 10/15K Series	GRM3-RX201N	❍	46,05	5,56	4,06	GRM-GIRX201/5-X	N/A	GRM-GI-RX201/5SX	N/A
	GRM3-RX205N	❍	57,15	5,56	4,06	GRM-GIRX201/5-X	N/A	GRM-GI-RX201/5SX	N/A
	GRM3-10K2	❍	117,42	9,58	6,55	GRM-GI10/15K-X	GRMCC01	GRM-GI-10/15KSX	SPGN-322
	GRM3-10K3N	❍	146,00	9,58	6,55	GRM-GI10/15K-X	N/A	GRM-GI-10/15KSX	N/A
	GRM3-15K3	❍	168,22	9,58	6,55	GRM-GI10/15K-X	GRMCC01	GRM-GI-10/15KSX	SPGN-322

NOTE: Due to blank availability, special designs may need to be a two-piece weld construction or no quote.

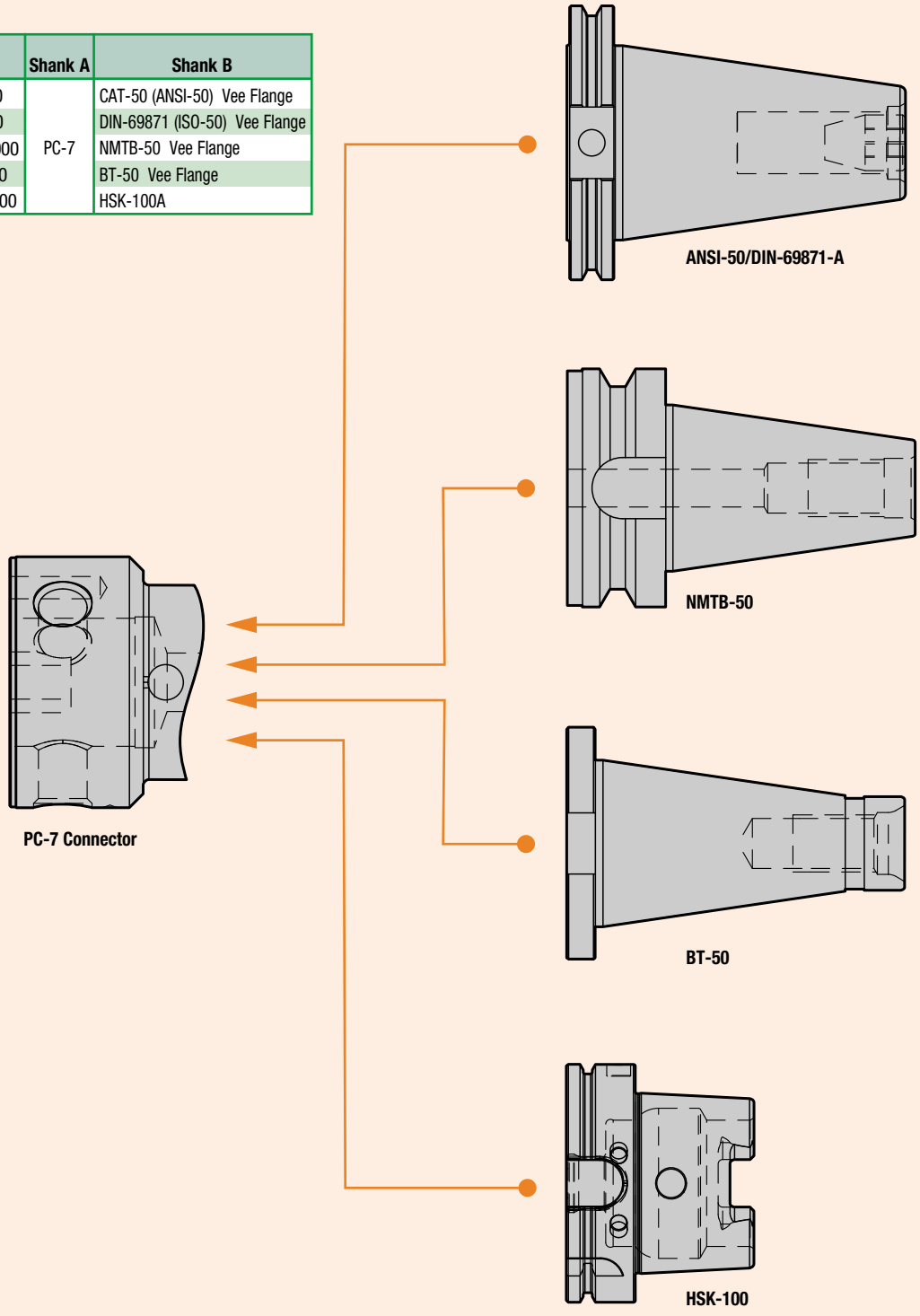
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Ring Max™ III

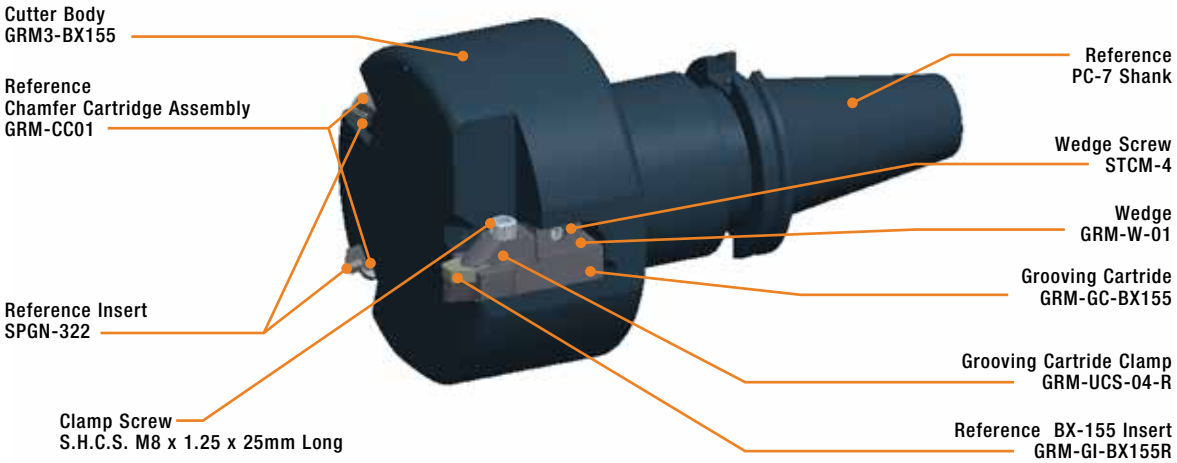
Shank Options

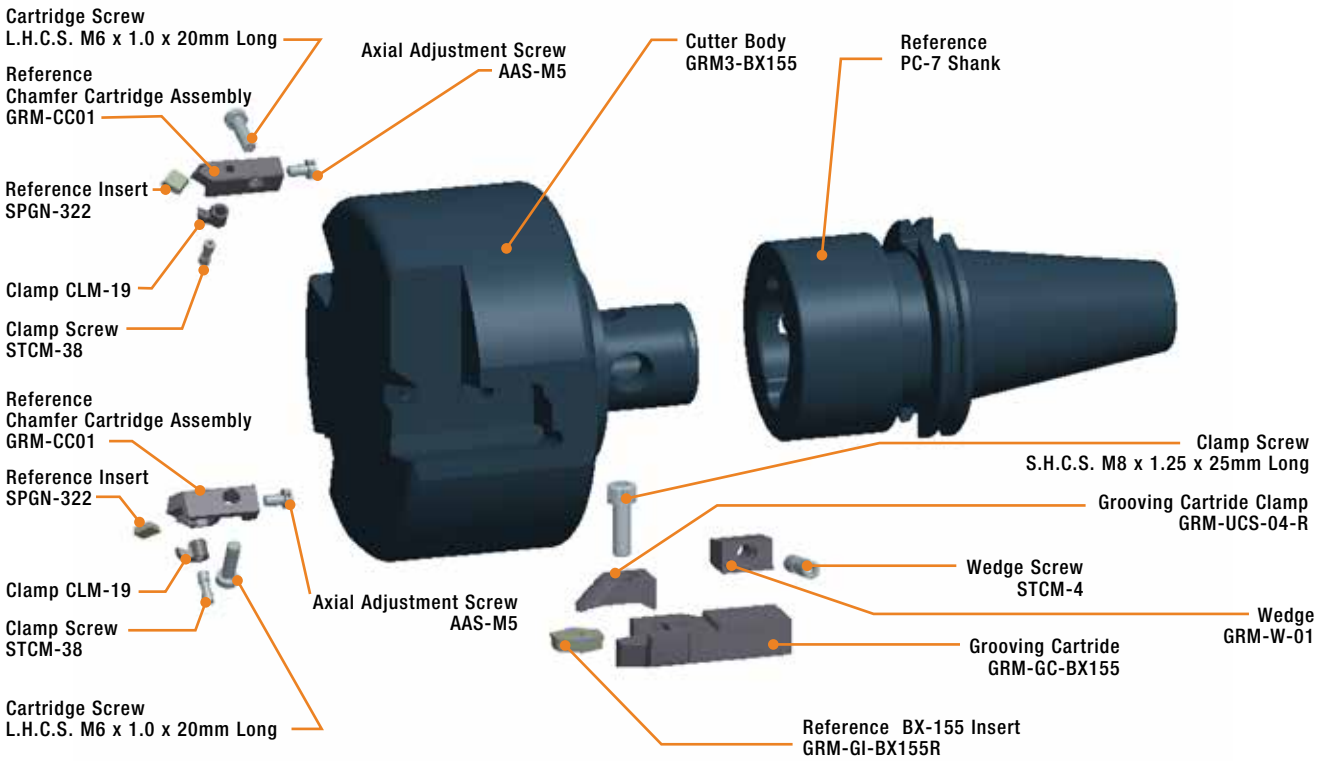
Adapter Designation	Shank A	Shank B
04-GRMA50-000	PC-7	CAT-50 (ANSI-50) Vee Flange
04-GRMD50-000		DIN-69871 (ISO-50) Vee Flange
04-GRMNMTB50-000		NMTB-50 Vee Flange
04-GRMBT50-000		BT-50 Vee Flange
04-GRMHSK100-000		HSK-100A



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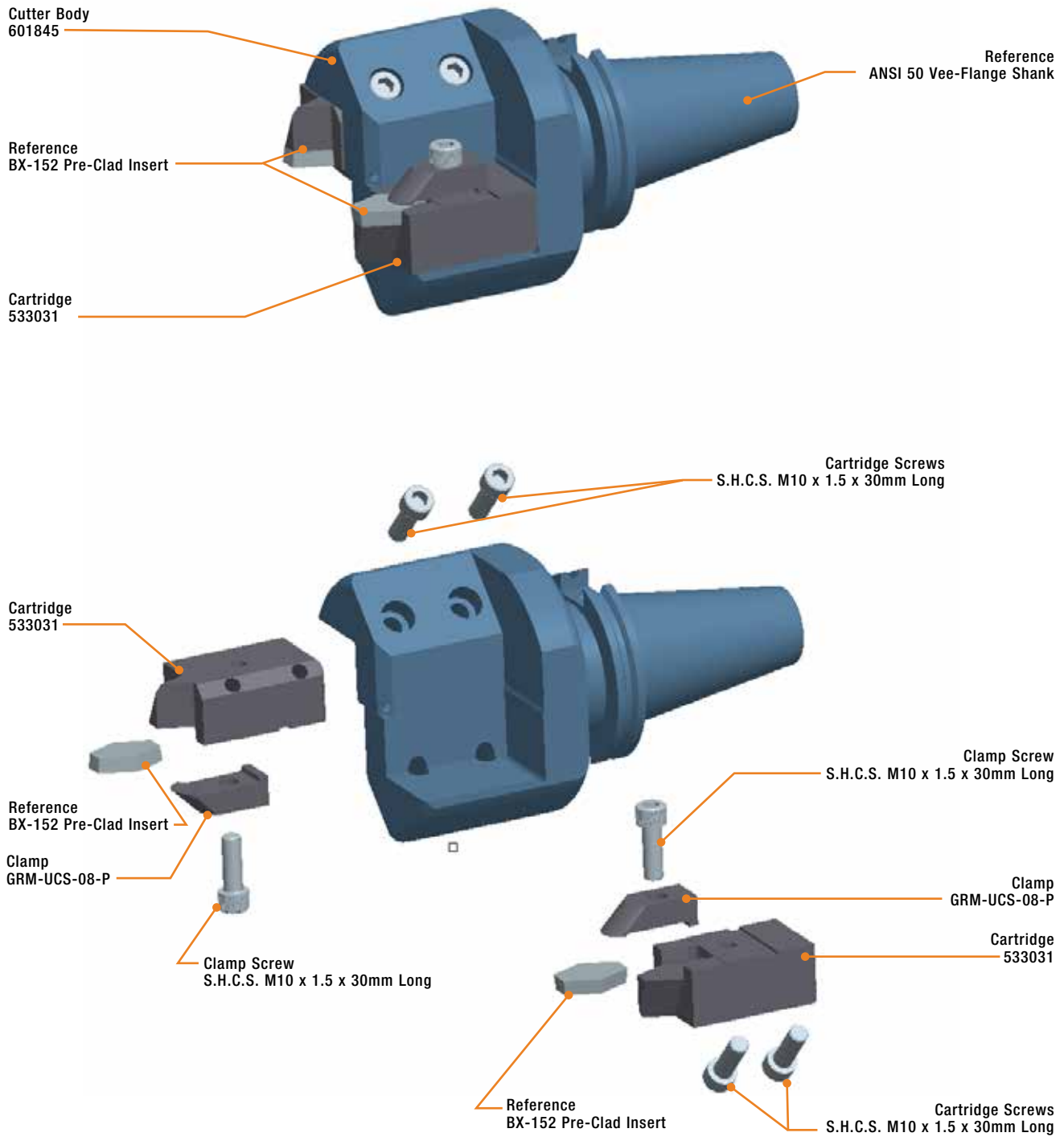
Ring Max™ GRM3-BX155 – Assembled and Exploded Views Reference Guide





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Ring Max™ Pre-Clad – Assembled and Exploded Views Reference Guide



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Pre-Clad Head Quote Request Form

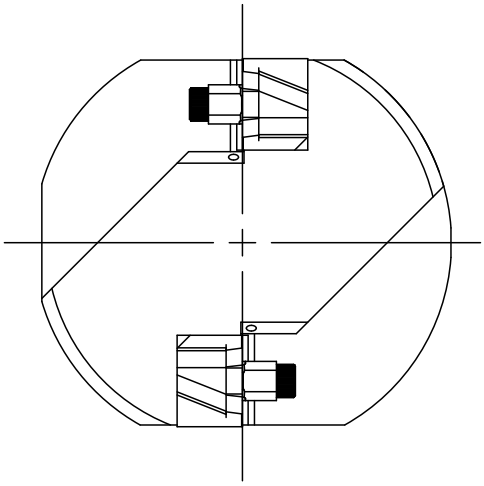
Part Information:

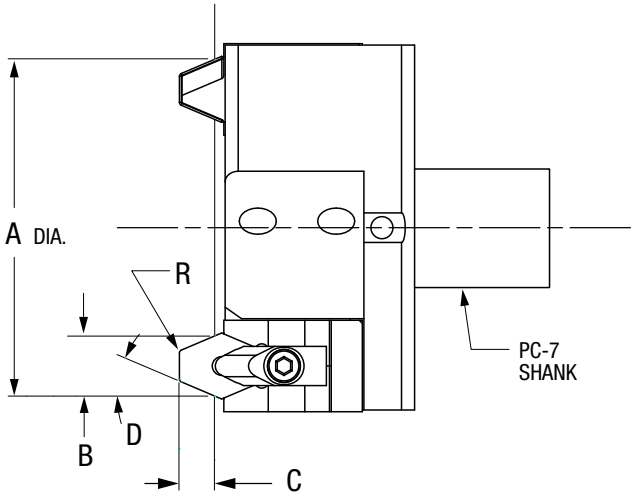
Part Name: _____

Clad Material: _____ Insert Grade: _____

Quote quantities: Heads: _____ Cartiridges: _____ Inserts: _____

Additional comments: _____





Dimensions *(Please provide required tolerances.)*				
A ±_____	B ±_____	C ±_____	D ±_____	R ±_____

Company _____ Customer Number _____

Attention _____ Rep Number _____

Street _____ Ship to City _____ Country _____

City _____ State _____ Zip Code _____ Send Copy to _____

Phone _____ FAX _____

Email _____ Sales Rep _____ Date Received _____ Quote Due Date _____

Ring Max™ – Machining Methods Reference Guide

Method One

Use these instructions for setting gage points and establishing target ring groove depths using an optical comparator.

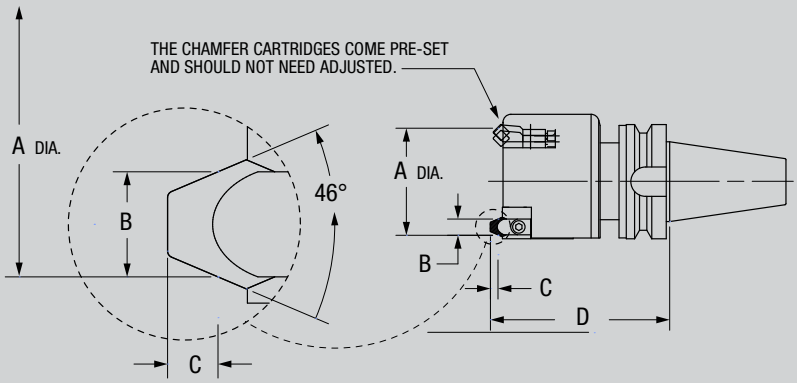
Step One:

Using an optical comparator, find and set the gage points at the groove's A diameter at mid-tolerance. The groove's B dimension will be within the allowable tolerance range.

Step Two:

Once the gage points in Step One have been determined, measure and record the tool's Z length and the actual measured C dimension over the insert nose.

NOTE: The measured C dimension is the target machining depth and will be within the groove's allowable part tolerance.



Example for BX-152

A		B	C		Z
Part print dimension and tolerance	Target this diameter for gage points	Part print dimension and tolerance	Part print dimension and tolerance	Measure and target this depth for programming	Measure and use this depth for programming
86,233mm $^{+0.10}_{-0.00}$	86,283mm	12,649mm $^{+0.10}_{-0.00}$	5,84mm		

Method Two

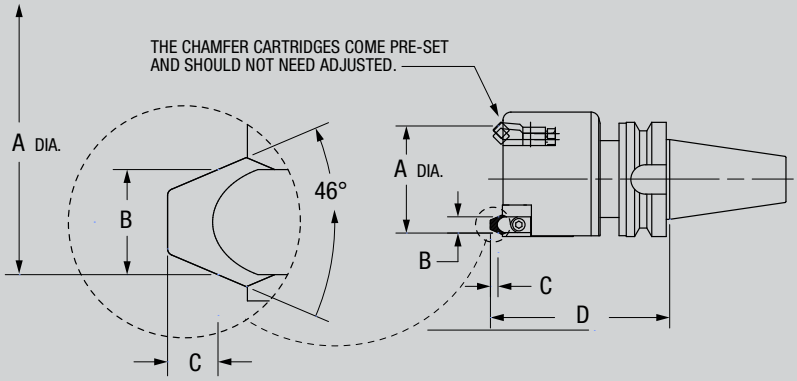
This method is used to machine ring grooves in a rough and finish pass.

Step One:

Machine the groove but reduce the groove depth to leave stock for the finish pass.

Step Two:

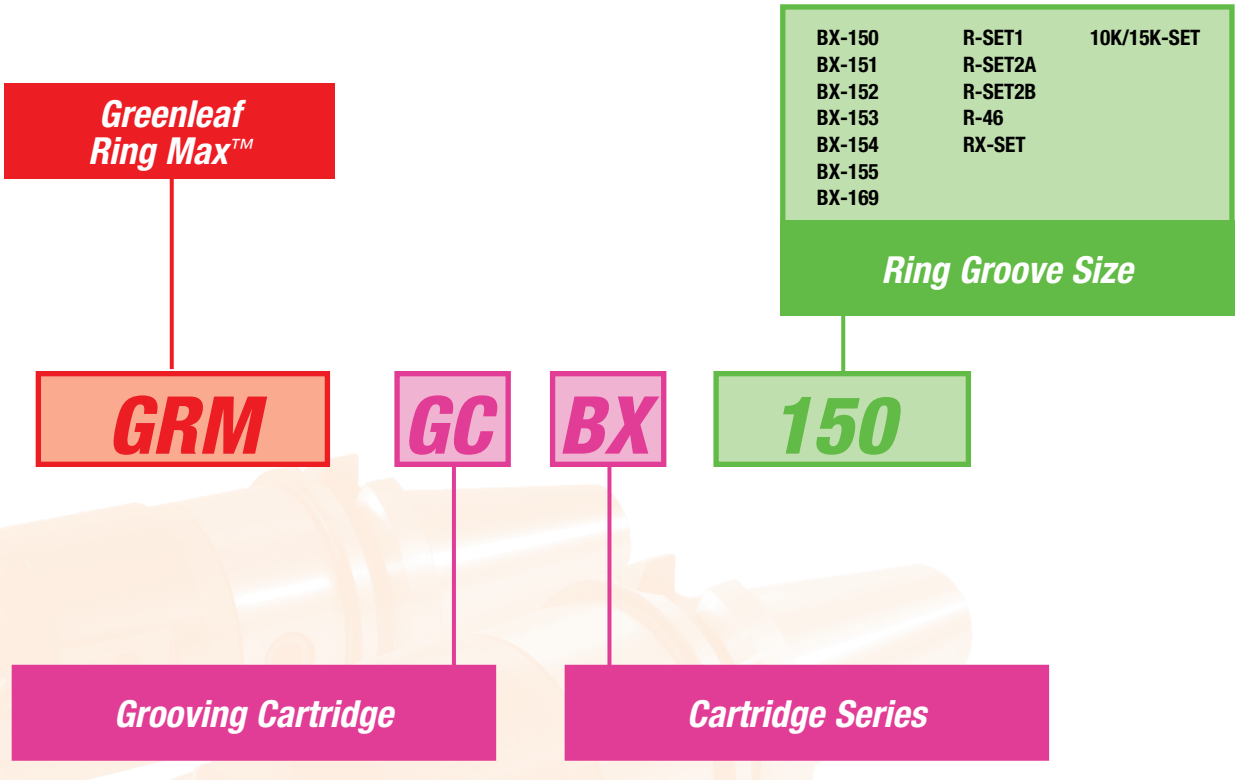
Measure the groove's A diameter and use the chart below to determine the additional D depth necessary to bring the A diameter into mid-tolerance.



If the A groove diameter is undersize by:	Increase the groove depth D by:
0.025mm	0.029mm
0.050mm	0.059mm
0.075mm	0.088mm
0.100mm	0.118mm
0.125mm	0.147mm
0.150mm	0.177mm
0.175mm	0.206mm
0.200mm	0.236mm
0.225mm	0.265mm
0.250mm	0.295mm
0.275mm	0.324mm
0.300mm	0.353mm

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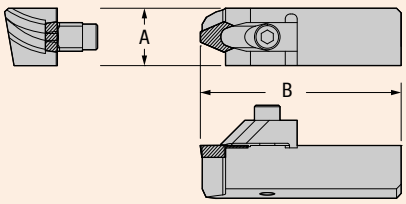
Ring Max™ – Grooving Cartridge Identification System



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Ring Max™

Grooving Cartridge



Cartridge			Dimensions (mm)		Standard Components		Inserts
Groove Size	Part Number	Stock	A	B	Clamp	Clamp Screw	Purchased Seperately
BX-150	**GRM-GC-BX-150**	●	25,40	66,68	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX150S
BX-151	**GRM-GC-BX-151**	●	25,40	66,68	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX151S
BX-152	**GRM-GC-BX-152**	●	25,40	66,68	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX152S
BX-153	**GRM-GC-BX-153**	●	25,40	66,68	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX153S
BX-154	**GRM-GC-BX-154**	●	28,37	66,68	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX154S
BX-155	**GRM-GC-BX-155**	●	31,98	79,38	GRMUCS04R	M8-1.25 SHCS	GRM-GI-BX155R
BX-156	**GRM-GC-BX-156**	●	30,18	79,38	GRMUCS04R	M8-1.25 SHCS	GRM-GI-BX156R
BX-169	**GRM-GC-BX-169**	●	25,40	79,38	GRMUCS04R	M8-1.25 SHCS	GRM-GI-BX169R
R-SET1*	**GRM-GCRSET1-X**	●	25,40	79,38	GRMUCS03S	M6-1.0 SHCS	GRM-GI-RSET1SX
R-SET2A*	**GRM-GCRSET2A-X**	❍	19,05	66,68	GRMUCS05S	M5-0.8 SHCS	GRM-GI-RSET2SX
R-SET2B*	**GRM-GCRSET2B-X**	❍	25,40	66,68	GRMUCS03S	M5-0.8 SHCS	GRM-GI-RSET2SX
R-46	**GRM-GCR46**	❍	25,40	79,38	GRMUCS04r	M8-1.25 SHCS	GRM-GI-R46R
RX-SET*	**GRM-GCRX201/5-X**	❍	19,05	66,68	GRMUCS05S	M5-0.8 SHCS	GRM-GI-RX201/5SX
10/15K-SET*	**GRM-GC10/15-X**	❍	25,40	66,68	GRMUCS05S	M5-0.8 SHCS	GRM-GI-10/15KSX

***** Denotes multiple groove sizes (See chart below.)

Multiple-Groove Compatibility

Single cartridges can produce multiple grooves when used in the proper gage diameter Ring Max™ grooving head. Use this chart for compatibility.

Group	Groove Sizes
R-SET1	R-21, R-23, R-24, R-26, R-27, R-31, R-35, R-37, R-39, R-41, R-44, R-45, R-49, R-53, R-57, R-65, R-69, R-82, R-84
R-SET2A	R-12, R-13, R-14, R-15, R-16, R-17, R-18, R-19, R-20
R-SET2B	R-22, R-25, R-29, R-33, R-36, R-40, R-43, R-48, R-52
RX-SET	RX-201, RX-205
10/15K-SET	10K-2$^{1}/_{16}$", 10K-3$^{1}/_{16}$", 10K-5$^{1}/_{16}$", 15K-3$^{1}/_{16}$"

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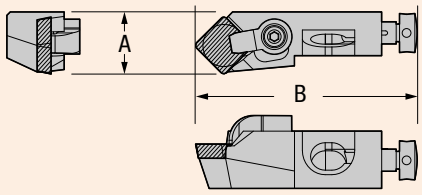
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Ring Max™

Chamfer Cartridge



Cartridge	Stock	Dimensions (mm) A	Dimensions (mm) B	Standard Components Clamp	Standard Components Clamp Screw	Standard Components Adj. Screw	Inserts Purchased Seperately	Mounting Screw Supplied with Grooving Head
GRM-CC01	●	14,00	50,06	CLM-19	STCM-38	AAS-M5	SPGN-322	M6-1.0 LHCS

All Ring Max™ heads for generation 2 and 3 use the same chamfer cartridges.

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Ring Max™ STX – Lathe Tooling

The Ring Max™ STX system provides the same productivity gains as the Ring Max™ II and Ring Max™ III systems in a square shank tool. Whether you are machining a large diameter groove, or a standard BX, R, or RX groove, the Ring Max™ STX system is your solution for maximizing productivity in multiple API ring groove sizes.



Standard features and benefits include:

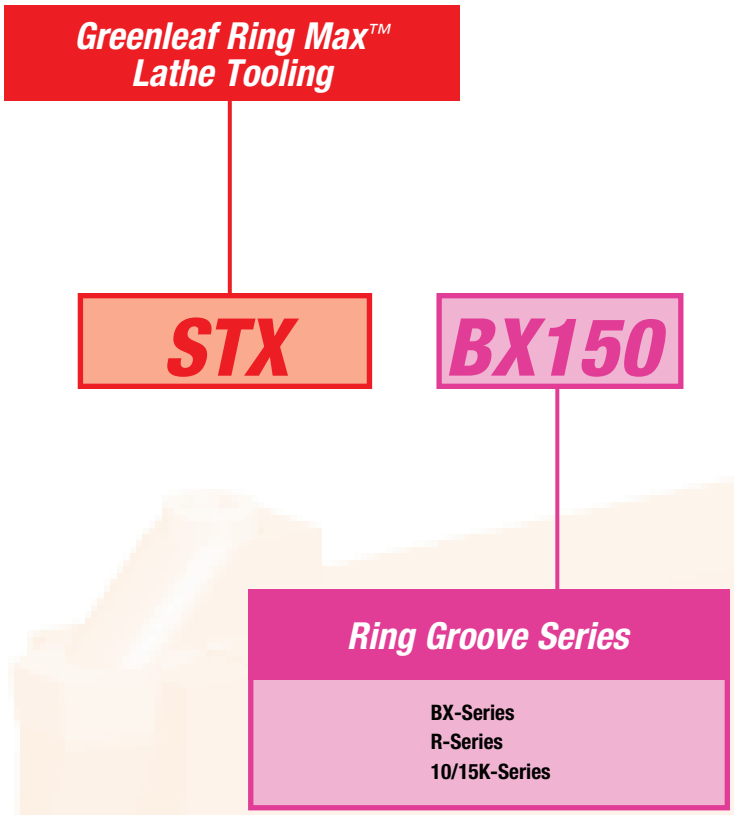
- Roughing and finishing of BX, R and RX API ring grooves in Inconel 625 clad overlay in less than one minute
- Utilization of the same clamping system and inserts as the Ring Max™ II and Ring Max III™ cutter systems.
- Available in common standard inch and metric shank sizes.
- Availability for grooving in stainless and alloy steel

Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

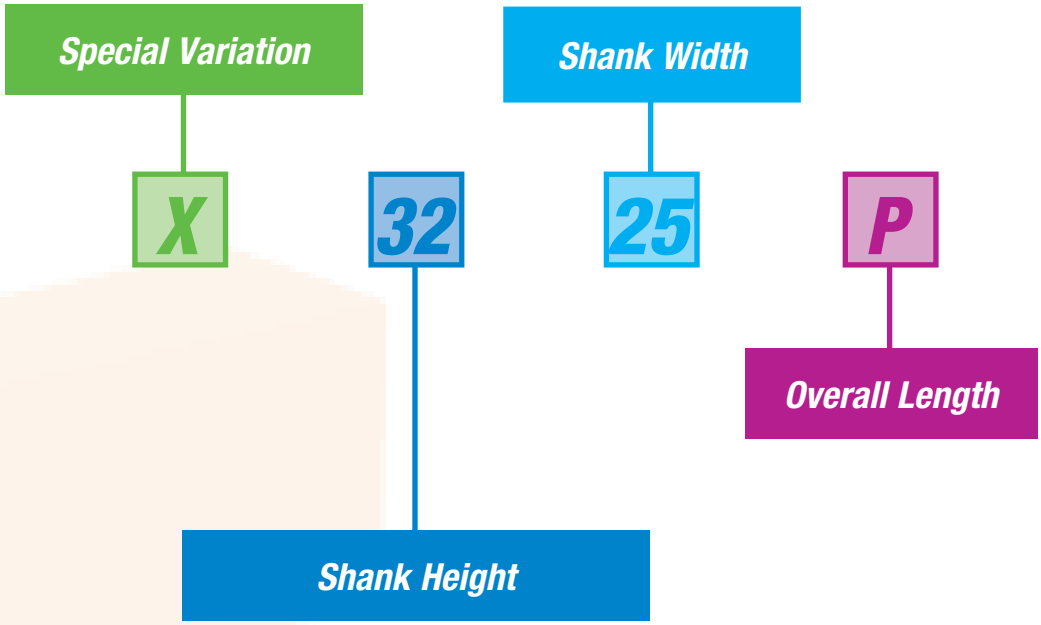
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Ring Max™ STX – Lathe Tooling Identification System



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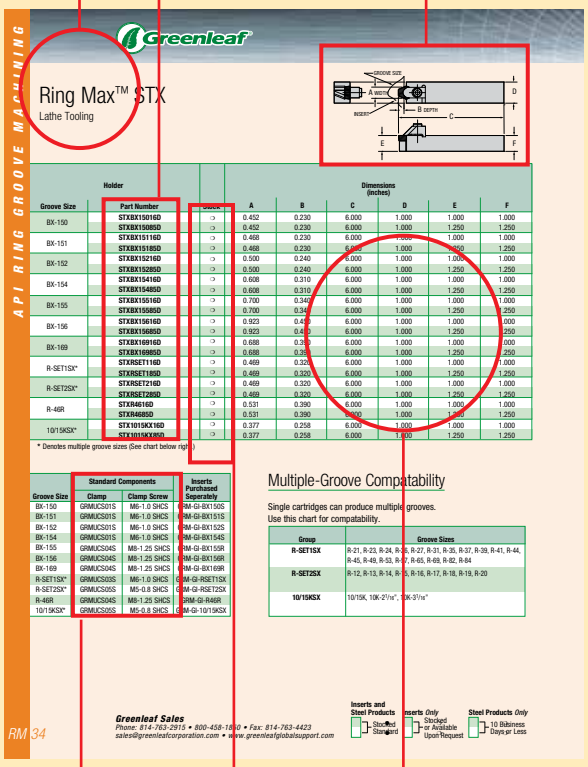
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Ring Max™ STX – Lathe Tooling Usage Reference Guide

Tooling Style

Tooling Geometry

Part Number



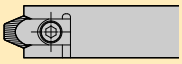
Standard Components

Dimensions

Stocking Information

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RING MAX™ Lathe Tooling



Ring Max™ STX
Lathe Tooling
page: RM 42

Reference

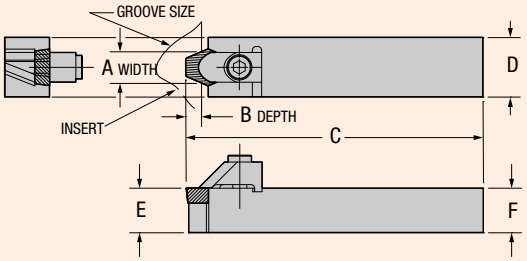
Ring Max™ STX
Models
page: RM 43

Lathe Tool
Quote Request Form
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Ring Max™ STX

Lathe Tooling



Holder			Dimensions (mm)					
Groove Size	Part Number	Stock	A†	B†	C	D	E	F
BX-150	**STXBX1502525P**	❍	11,48	5,84	170	25	25	25
	STXBX1503225P	❍	11,48	5,84	170	25	32	32
BX-151	**STXBX1512525P**	❍	11,89	5,84	170	25	25	25
	STXBX1513225P	❍	11,89	5,84	170	25	32	32
BX-152	**STXBX1522525P**	❍	12,70	6,10	170	25	25	25
	STXBX1523225P	❍	12,70	6,10	170	25	32	32
BX-154	**STXBX1542525P**	❍	15,44	7,87	170	25	25	25
	STXBX1543225P	❍	15,44	7,87	170	25	32	32
BX-155	**STXBX1552525P**	❍	17,78	8,64	170	25	25	25
	STXBX1553225P	❍	17,78	8,64	170	25	32	32
BX-156	**STXBX1562525P**	❍	23,44	11,43	170	25	25	25
	STXBX1563225P	❍	23,44	11,43	170	25	32	32
BX-169	**STXBX1692525P**	❍	16,97	9,91	170	25	25	25
	STXBX1693225P	❍	16,97	9,91	170	25	32	32
R-SET1SX*	**STXRSET12525P**	❍	11,91	8,13	170	25	25	25
	STXRSET13225P	❍	11,91	8,13	170	25	32	32
R-SET2SX*	**STXRSET22525P**	❍	8,74	6,35	170	25	25	25
	STXRSET23225P	❍	8,74	6,35	170	25	32	32
R-46R	**STXR462525P**	❍	13,49	9,91	170	25	25	25
	STXR463225P	❍	13,49	9,91	170	25	32	32
10/15KSX*	**STX1015KX2525P**	❍	9,58	6,55	170	25	25	25
	STX1015KX3225P	❍	9,58	6,55	170	25	32	32

* Denotes multiple groove sizes (See chart below right.)

† Groove width and depth tolerances comply with API Standard 6A/ISO 10423.

	Standard Components		Inserts Purchased Seperately
Groove Size	Clamp	Clamp Screw	
BX-150	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX150S
BX-151	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX151S
BX-152	GRMUCS01S	M6-1.0 SHCS	GRM-GI-BX152S
BX-154	GRMUCS01R	M6-1.0 SHCS	GRM-GI-BX154S
BX-155	GRMUCS04R	M8-1.25 SHCS	GRM-GI-BX155R
BX-156	GRMUCS04R	M8-1.25 SHCS	GRM-GI-BX156R
BX-169	GRMUCS04S	M8-1.25 SHCS	GRM-GI-BX169R
R-SET1SX*	GRMUCS03S	M6-1.0 SHCS	GRM-GI-RSET1SX
R-SET2SX*	GRMUCS05S	M5-0.8 SHCS	GRM-GI-RSET2SX
R-46R	GRMUCS04R	M8-1.25 SHCS	GRM-GI-R46R
10/15KSX*	GRMUCS05S	M5-0.8 SHCS	GRM-GI-10/15KSX

Multiple-Groove Compatibility

Single cartridges can produce multiple grooves.
Use this chart for compatibility.

Group	Groove Sizes
R-SET1SX	R-21, R-23, R-24, R-26, R-27, R-31, R-35, R-37, R-39, R-41, R-44, R-45, R-49, R-53, R-57, R-65, R-69, R-82, R-84
R-SET2SX	R-12, R-13, R-14, R-15, R-16, R-17, R-18, R-19, R-20
10/15KSX	10/15K, 10K-2 1/16", 10K-3 1/16"

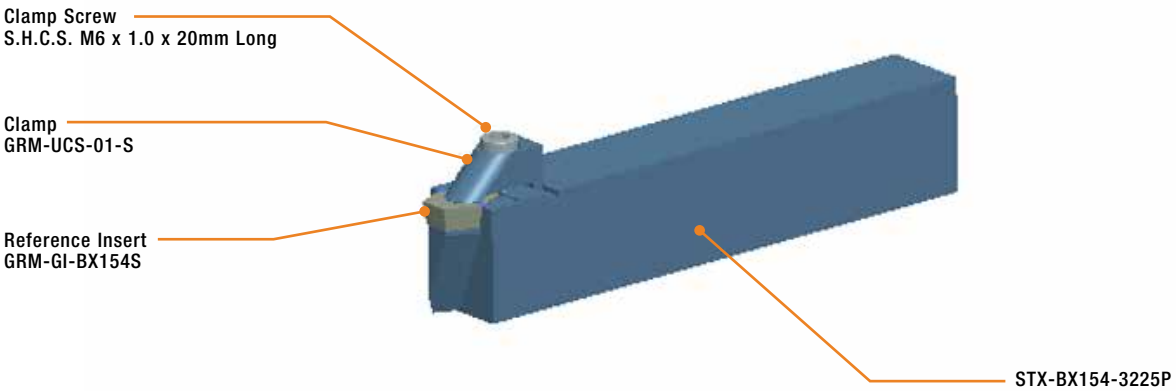
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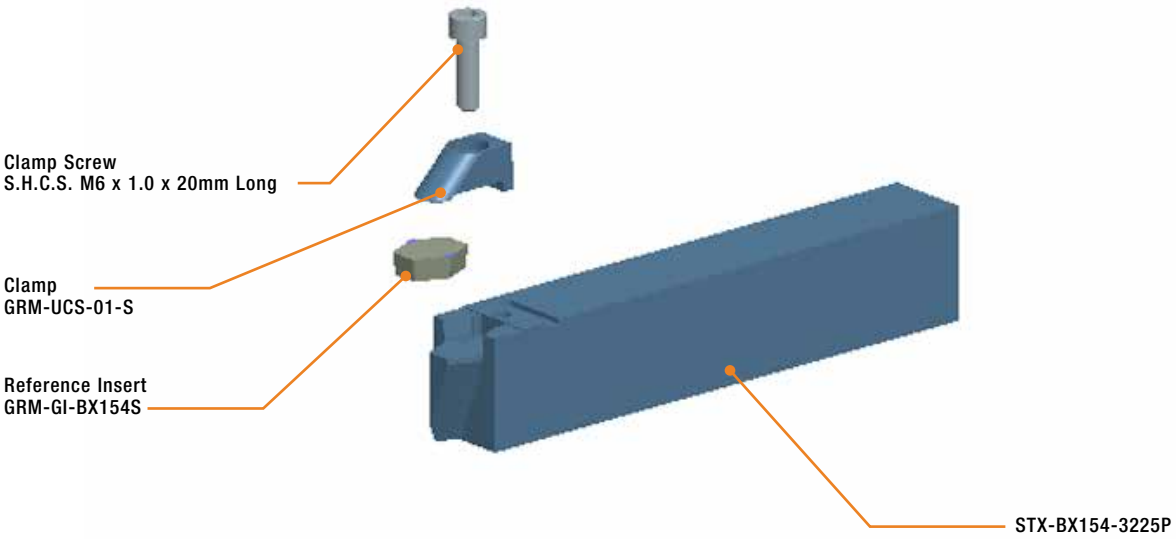
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Lathe Tool Quote Request Form

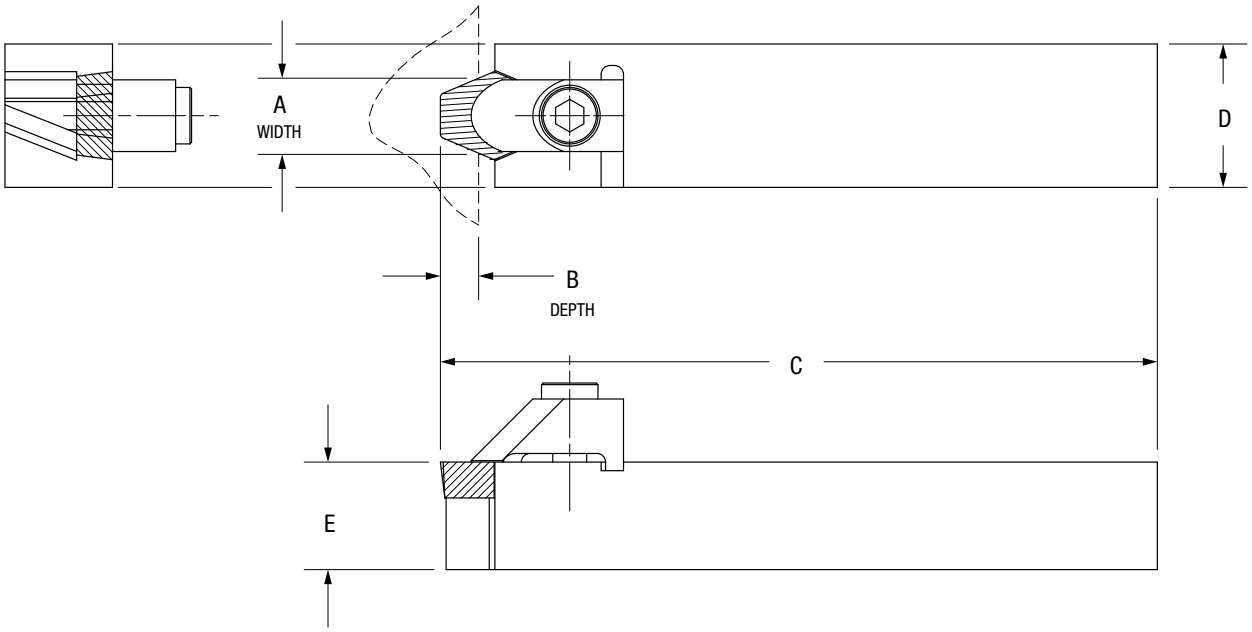
Part Information:

Part Name: _____

Clad Material: _____ Insert Grade: _____

Quote quantities: Heads: _____ Cartiridges: _____ Inserts: _____

Additional comments: _____



Dimensions *(Please provide required tolerances.)*				
A ±_____	B ±_____	C ±_____	D ±_____	E ±_____

Company _____ Customer Number _____

Attention _____ Rep Number _____

Street _____ Ship to City _____ Country _____

City _____ State _____ Zip Code _____ Send Copy to _____

Phone _____ FAX _____

Email _____ Sales Rep _____ Date Received _____ Quote Due Date _____

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Holemill™ Drilling System ..... ID 04
Technical Data ..... ID 05

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Indexable Drilling

The Holemill™ is an indexable drill utilizing Greenleaf's advanced coated-carbide grades for higher speeds, quieter cutting, longer tool life and reduced horsepower consumption. Inserts are positive squares (SPMT) for four indexes per insert. The Holemill is available from 24mm to 40mm diameters in increments of 1mm.

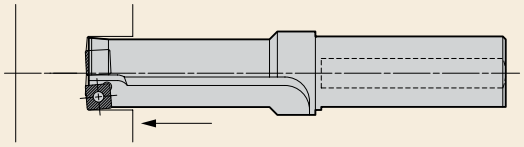


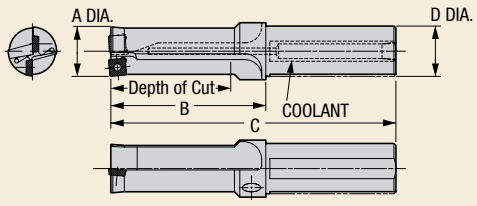
Greenleaf Corporation is continually upgrading its products.
For the most current information, please visit our web site at:

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Holemill™ System



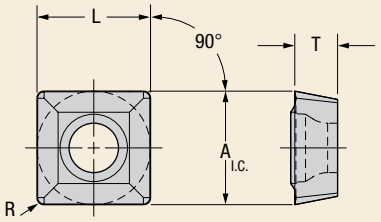


Part Number	Stock	Gage Insert Inboard	Qty	Insert Outboard	Qty	Dimensions (millimeters) A	Depth of Cut	B	C	D	Standard Components Insert Screw	* Tune-Up Kit Includes All Standard Components
M-HM3X-24	○	SPMT-070308-X2	1	SPMT-070308-X2	1	24	72	99	164	32	PT-543-T	TK-00737
M-HM3X-25	○	SPMT-070308-X2	1	SPMT-070308-X2	1	25	75	104	169	32	PT-543-T	TK-00737
M-HM3X-26	○	SPMT-070308-X2	1	SPMT-09T308-X2	1	26	78	107	172	32	PT-543-T & PT-559-T	TK-02619
M-HM3X-27	○	SPMT-070308-X2	1	SPMT-09T308-X2	1	27	81	110	175	32	PT-543-T & PT-559-T	TK-02619
M-HM3X-28	○	SPMT-070308-X2	1	SPMT-09T308-X2	1	28	84	118	183	32	PT-588-T & PT-559-T	TK-02619
M-HM3X-29	○	SPMT-09T308-X2	1	SPMT-09T308-X2	1	29	87	121	186	32	PT-559-T	TK-00738
M-HM3X-30	○	SPMT-09T308-X2	1	SPMT-09T308-X2	1	30	90	124	189	32	PT-559-T	TK-00738
M-HM3X-31	○	SPMT-09T308-X2	1	SPMT-09T308-X2	1	31	93	127	192	32	PT-559-T	TK-00738
M-HM3X-32	○	SPMT-09T308-X2	1	SPMT-09T308-X2	1	32	96	135	200	32	PT-559-T	TK-00738
M-HM3X-33	○	SPMT-09T308-X2	1	SPMT-120408-X2	1	33	99	138	213	40	PT-559-T & PT-588-T	TK-00936
M-HM3X-34	○	SPMT-09T308-X2	1	SPMT-120408-X2	1	34	102	141	216	40	PT-559-T & PT-588-T	TK-00936
M-HM3X-35	○	SPMT-09T308-X2	1	SPMT-120408-X2	1	35	105	144	219	40	PT-559-T & PT-588-T	TK-00936
M-HM3X-36	○	SPMT-09T308-X2	1	SPMT-120408-X2	1	36	108	147	222	40	PT-559-T & PT-588-T	TK-00936
M-HM3X-37	○	SPMT-09T308-X2	1	SPMT-120408-X2	1	37	111	150	225	40	PT-559-T & PT-588-T	TK-00936
M-HM3X-38	○	SPMT-120408-X2	1	SPMT-120408-X2	1	38	114	153	228	40	PT-588-T	TK-00739
M-HM3X-39	○	SPMT-120408-X2	1	SPMT-120408-X2	1	39	117	156	231	40	PT-588-T	TK-00739
M-HM3X-40	○	SPMT-120408-X2	1	SPMT-120408-X2	1	40	120	159	234	40	PT-588-T	TK-00739

* Tune-Up Kits include one complete set of Standard Components to allow you to refurbish the Holemill.

Holemill™ Inserts

SPMT-X2



Inserts	Part Number ISO	Insert Position	P G-935	M G-915	K G-915	S G-935	Part Number ANSI	Dimensions (millimeters) A	L	T	R
 SPMT	SPMT-070308-X2	Inboard	●			●	SPMT-2.522-X2	7,92	7,92	3,18	0,79
	SPMT-070308-X2	Outboard	●	●	●	●	SPMT-2.522-X2	7,92	7,92	3,18	0,79
	SPMT-09T308-X2	Inboard	●			●	SPMT-32.52-X2	9,53	9,53	3,96	0,79
	SPMT-09T308-X2	Outboard	●	●	●	●	SPMT-32.52-X2	9,53	9,53	3,96	0,79
	SPMT-120408-X2	Inboard	●			●	SPMT-432-X2	12,70	12,70	4,75	0,79
	SPMT-120408-X2	Outboard	●	●	●	●	SPMT-432-X2	12,70	12,70	4,75	0,79

P G-935 | M G-915 | K G-915 | S G-935

G-915 (PVD coated) Excellent for high-temp alloys, stainless steel, and low-carbon steels. Should be run at moderate speeds and moderate to high feeds.

G-935 (PVD coated) Multi-layer grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

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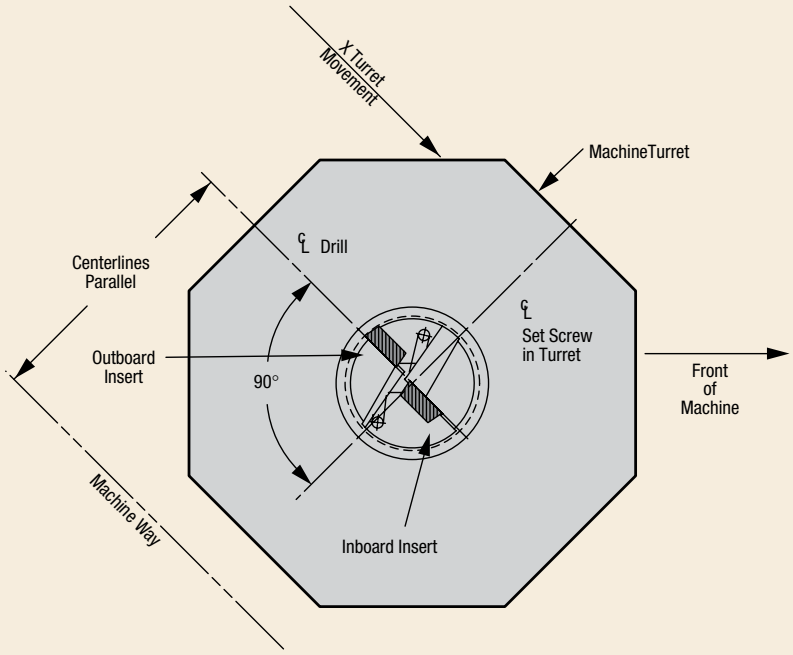
● ● Stocked Standard | ○ ○ Stocked or Available Upon Request | Not Recommended

Feed and Speed for Greenleaf Holemill™

Material	Hardness (Rc)	Vc M/M	Feed Rate per Revolution (MMPR)	
			25,40 – 50 Dia.	50 – 80 Dia.
Unalloyed Steel	up to 25	140–305	0,1–0,2	0,13–0,25
C-10, C-15, 9SMnPb36				
High-Carbon Steel	25-40	60–180	0,1–0,2	0,13–0,25
36Mn7, 100Cr6				
Low-Alloy Steel	15-30	120–275	0,1–0,2	0,13–0,25
42CrMo4, 20MoCrS4				
High-Alloy Tool Steel	up to 30	75–180	0,1–0,2	0,13–0,25
X155CrVMo12-1, 40CrMnNiMo8-6-4, X40CrMoV51				
High-Temp Alloys	up to 45	25–70	0,075–0,13	0,075–0,13
ISO-S Material				
Stainless Steel	up to 32	75–170	0,075–0,18	0,1–0,2
Austenitic Alloys				

Greenleaf Holemill™ Operational Information

For best results in static drilling, set up the Greenleaf Holemill with the drill in the turret in an attitude that puts the inserts parallel to the ways of the machine with the inboard insert located toward the operator as shown.



Static Drilling

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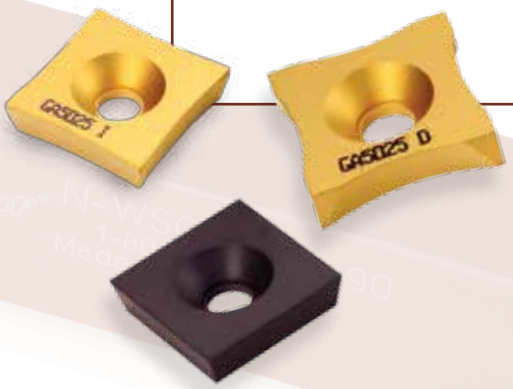
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Tube Scarfing

Greenleaf's modern tube scarfing system using indexable inserts offers greatly increased productivity potential from decreased downtime, longer tool life, faster tool change time, decreased tool costs and elimination of regrinding problems. In addition, a superior seam can be expected since an accurate radius form is always available on each side of the insert.





Greenleaf Corporation is continually upgrading its products.
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CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries.

COATED

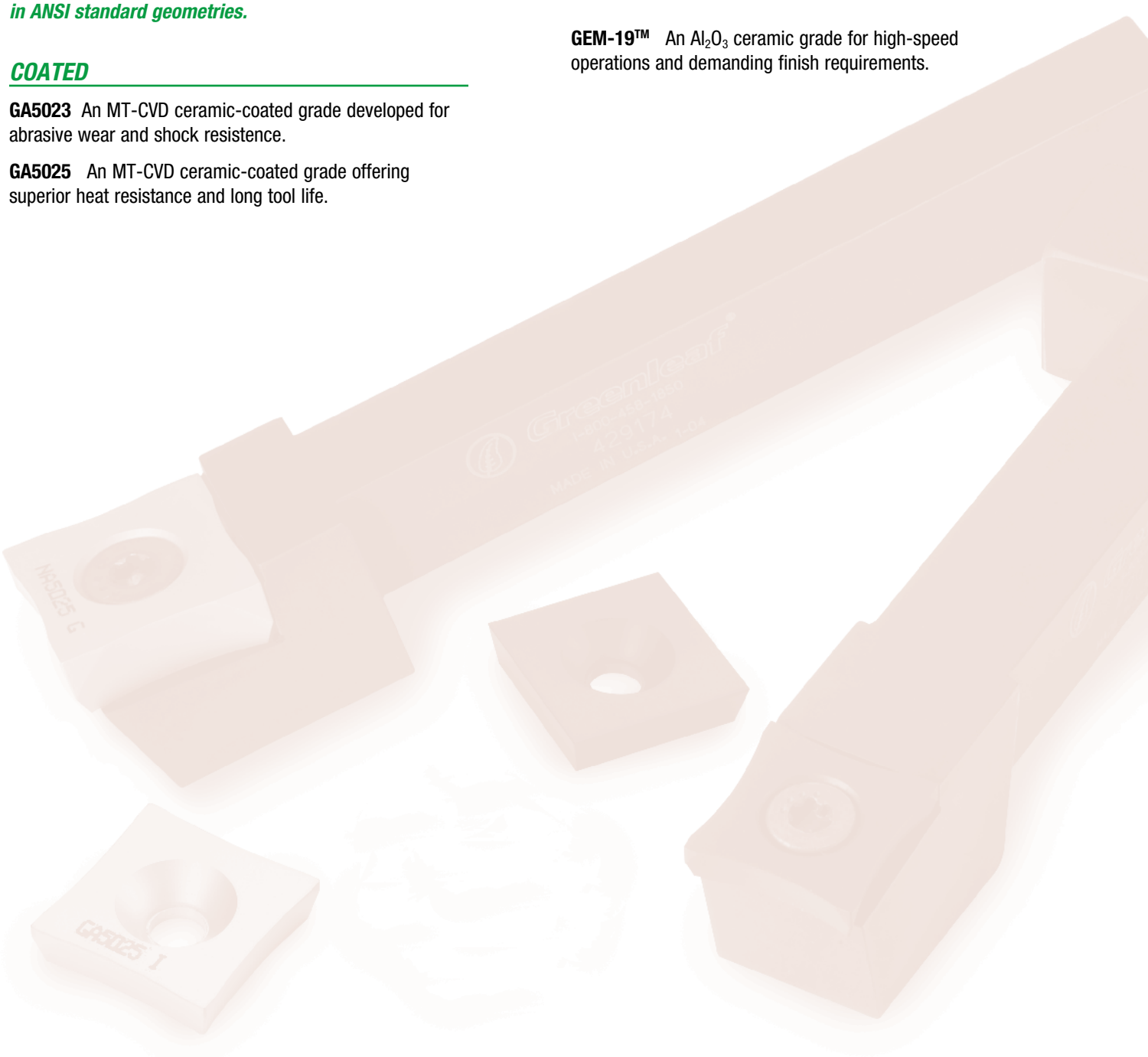
GA5023 An MT-CVD ceramic-coated grade developed for abrasive wear and shock resistence.

GA5025 An MT-CVD ceramic-coated grade offering superior heat resistance and long tool life.

CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. One of the most prominent is:

GEM-19™ An Al_2O_3 ceramic grade for high-speed operations and demanding finish requirements.



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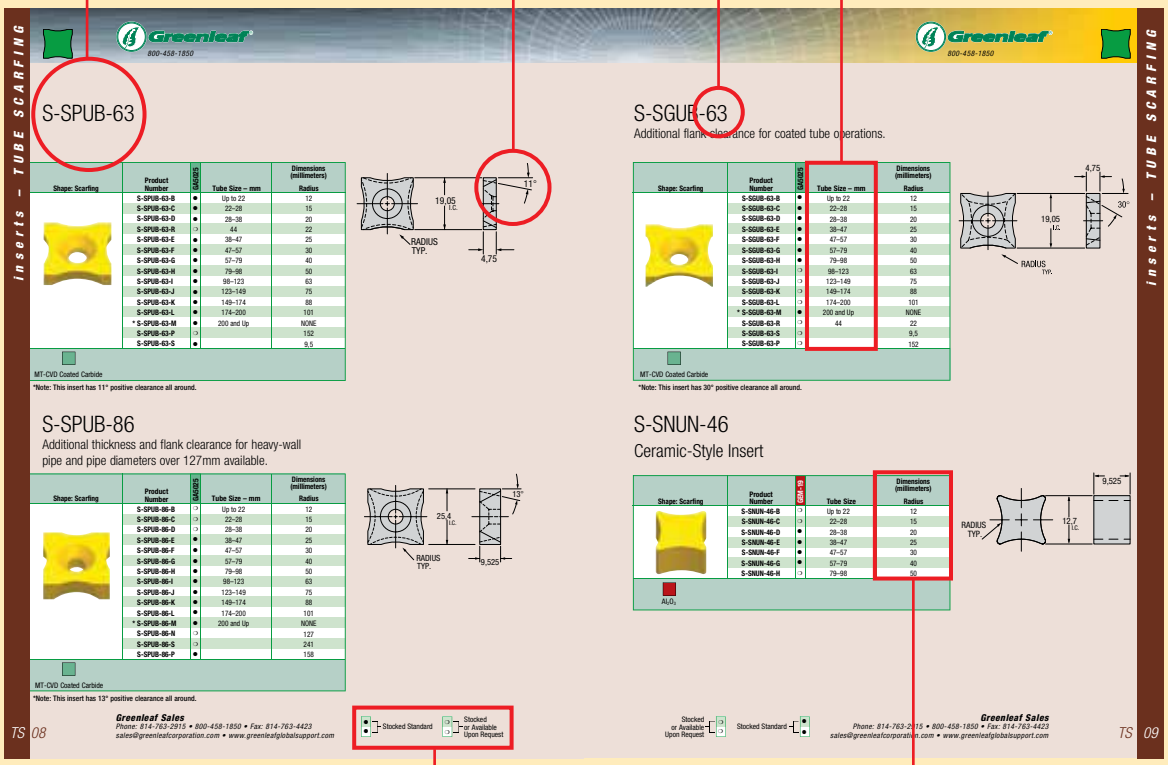
Greenleaf®

Flank Clearance

Insert Style

Insert IC and Thickness

Pipe Diameter



S-SPUB-63

Shape: Scarfing	Product Number	GAUGES	Tube Size – mm	Dimensions (millimeters) Radius
	S-SPUB-63-B	●	Up to 22	12
	S-SPUB-63-C	●	22–28	15
	S-SPUB-63-D	●	28–38	20
	S-SPUB-63-R	○	44	22
	S-SPUB-63-E	●	38–47	25
	S-SPUB-63-F	●	47–57	30
	S-SPUB-63-G	●	57–79	40
	S-SPUB-63-H	●	79–98	50
	S-SPUB-63-I	●	98–123	63
	S-SPUB-63-J	●	123–149	75
	S-SPUB-63-K	●	149–174	88
	S-SPUB-63-L	●	174–200	101
	* S-SPUB-63-M	●	200 and Up	NONE
	S-SPUB-63-P	○		152
	S-SPUB-63-S	●		9,5

MT-CVD Coated Carbide

*Note: This insert has 11° positive clearance all around.

S-SGUB-63

Additional flank clearance for coated tube operations.

Shape: Scarfing	Product Number	GAUGES	Tube Size – mm	Dimensions (millimeters) Radius
	S-SGUB-63-B	●	Up to 22	12
	S-SGUB-63-C	●	22–28	15
	S-SGUB-63-D	●	28–38	20
	S-SGUB-63-E	●	38–47	25
	S-SGUB-63-F	●	47–57	30
	S-SGUB-63-G	●	57–79	40
	S-SGUB-63-H	●	79–98	50
	S-SGUB-63-I	○	98–123	63
	S-SGUB-63-J	○	123–149	75
	S-SGUB-63-K	○	149–174	88
	S-SGUB-63-L	○	174–200	101
	* S-SGUB-63-M	●	200 and Up	NONE
	S-SGUB-63-R	○	44	22
	S-SGUB-63-S	○		9,5
	S-SGUB-63-P	○		152

MT-CVD Coated Carbide

*Note: This insert has 30° positive clearance all around.

S-SPUB-86

Additional thickness and flank clearance for heavy-wall pipe and pipe diameters over 127mm available.

Shape: Scarfing	Product Number	GAUGES	Tube Size – mm	Dimensions (millimeters) Radius
	S-SPUB-86-B	○	Up to 22	12
	S-SPUB-86-C	○	22–28	15
	S-SPUB-86-D	○	28–38	20
	S-SPUB-86-E	●	38–47	25
	S-SPUB-86-F	●	47–57	30
	S-SPUB-86-G	●	57–79	40
	S-SPUB-86-H	●	79–98	50
	S-SPUB-86-I	●	98–123	63
	S-SPUB-86-J	●	123–149	75
	S-SPUB-86-K	●	149–174	88
	S-SPUB-86-L	●	174–200	101
	* S-SPUB-86-M	●	200 and Up	NONE
	S-SPUB-86-N	○		127
	S-SPUB-86-S	○		241
	S-SPUB-86-P	●		158

MT-CVD Coated Carbide

*Note: This insert has 13° positive clearance all around.

S-SNUN-46

Ceramic-Style Insert

Shape: Scarfing	Product Number	GAUGES	Tube Size	Dimensions (millimeters) Radius
	S-SNUN-46-B	○	Up to 22	12
	S-SNUN-46-C	○	22–28	15
	S-SNUN-46-D	●	28–38	20
	S-SNUN-46-E	●	38–47	25
	S-SNUN-46-F	●	47–57	30
	S-SNUN-46-G	●	57–79	40
	S-SNUN-46-H	○	79–98	50

Al_2O_3

Stocked Standard

Stocked or Available Upon Request

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Stocking Status

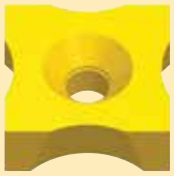
Insert Radius

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Inserts



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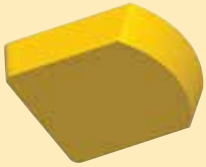
S-SPUB-86
page: TS 08



S-SGUB-63
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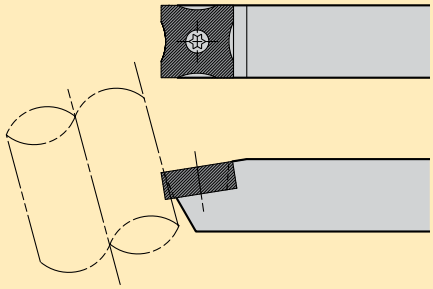
S-SNUN-46
page: TS 09



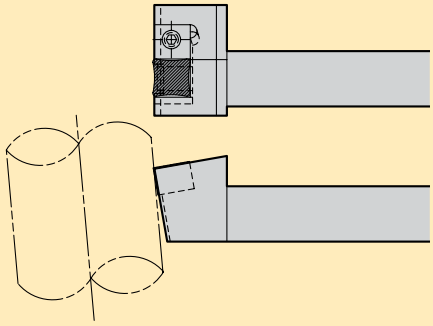
ID Scarfing Insert
page: TS 10

Toolholders

M-SSCPS
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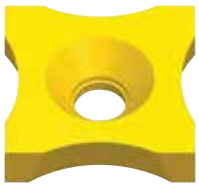


M-WSCNN
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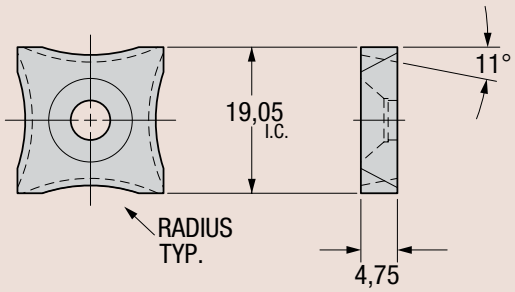
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S-SPUB-63

Shape: Scarfing	Product Number	GA5023	GA5025	Tube Size – mm	Dimensions (millimeters) Radius
	S-SPUB-63-B	❍	●	Up to 22	12
	S-SPUB-63-C	❍	●	22–28	15
	S-SPUB-63-D	●	●	28–38	20
	S-SPUB-63-R	❍	❍	44	22
	S-SPUB-63-E	●	●	38–47	25
	S-SPUB-63-F	●	●	47–57	30
	S-SPUB-63-G	●	●	57–79	40
	S-SPUB-63-H	●	●	79–98	50
	S-SPUB-63-I	●	●	98–123	63
	S-SPUB-63-J	●	●	123–149	75
	S-SPUB-63-K	❍	●	149–174	88
	S-SPUB-63-L	❍	●	174–200	101
	* S-SPUB-63-M	●	●	200 and Up	NONE
	S-SPUB-63-P	❍	❍		152
	S-SPUB-63-S	❍	●		9,5

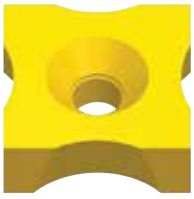
MT-CVD Coated Carbide

*Note: This insert has 11° positive clearance all around.



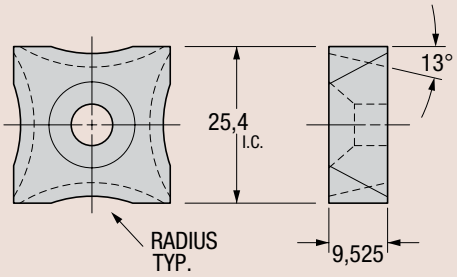
S-SPUB-86

Additional thickness and flank clearance for heavy-wall pipe and pipe diameters over 127mm available.

Shape: Scarfing	Product Number	GA5023	GA5025	Tube Size – mm	Dimensions (millimeters) Radius
	S-SPUB-86-B	❍	❍	Up to 22	12
	S-SPUB-86-C	❍	❍	22–28	15
	S-SPUB-86-D	❍	❍	28–38	20
	S-SPUB-86-E	❍	●	38–47	25
	S-SPUB-86-F	❍	●	47–57	30
	S-SPUB-86-G	❍	●	57–79	40
	S-SPUB-86-H	❍	●	79–98	50
	S-SPUB-86-I	❍	●	98–123	63
	S-SPUB-86-J	❍	●	123–149	75
	S-SPUB-86-K	❍	●	149–174	88
	S-SPUB-86-L	❍	●	174–200	101
	* S-SPUB-86-M	❍	●	200 and Up	NONE
	S-SPUB-86-N	❍	❍		127
	S-SPUB-86-S	❍	❍		241
	S-SPUB-86-P	❍	●		158

MT-CVD Coated Carbide

*Note: This insert has 13° positive clearance all around.



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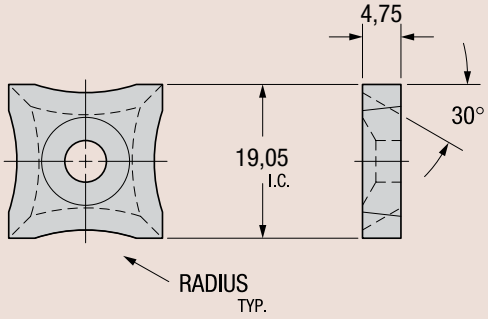
● Stocked Standard
❍ Stocked or Available Upon Request

S-SGUB-63

Additional flank clearance for coated tube operations.

Shape: Scarfing	Product Number	GA5025	Tube Size – mm	Dimensions (millimeters) Radius
	S-SGUB-63-B	●	Up to 22	12
	S-SGUB-63-C	●	22–28	15
	S-SGUB-63-D	●	28–38	20
	S-SGUB-63-E	●	38–47	25
	S-SGUB-63-F	●	47–57	30
	S-SGUB-63-G	●	57–79	40
	S-SGUB-63-H	●	79–98	50
	S-SGUB-63-I	❍	98–123	63
	S-SGUB-63-J	❍	123–149	75
	S-SGUB-63-K	❍	149–174	88
	S-SGUB-63-L	❍	174–200	101
	* S-SGUB-63-M	●	200 and Up	NONE
	S-SGUB-63-R	❍	44	22
	S-SGUB-63-S	❍		9,5
	S-SGUB-63-P	❍		152

MT-CVD Coated Carbide



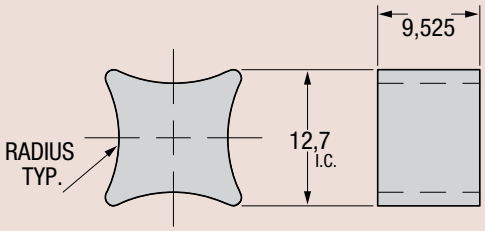
*Note: This insert has 30° positive clearance all around.

S-SNUN-46

Ceramic-Style Insert

Shape: Scarfing	Product Number	GEM-19	Tube Size	Dimensions (millimeters) Radius
	S-SNUN-46-B	❍	Up to 22	12
	S-SNUN-46-C	❍	22–28	15
	S-SNUN-46-D	❍	28–38	20
	S-SNUN-46-E	❍	38–47	25
	S-SNUN-46-F	❍	47–57	30
	S-SNUN-46-G	❍	57–79	40
	S-SNUN-46-H	❍	79–98	50

Al_2O_3



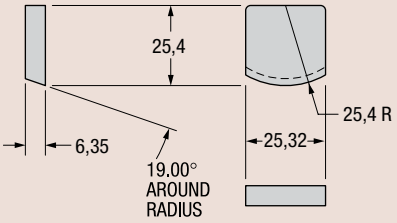
Stocked or Available Upon Request ❍ ❍

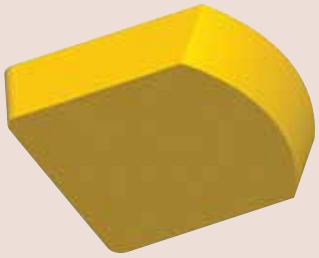
Stocked Standard ● ●

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ID Scarfing Insert

Other sizes available upon request.

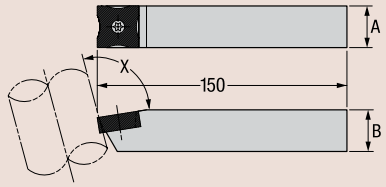




Stocked Standard

Stocked or Available Upon Request

M-SSCPS



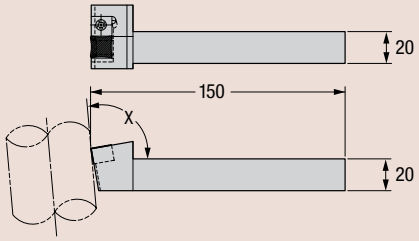


Product Number	Gage Insert	Stock	Angle X	Dimensions (mms) A	Dimensions (mms) B	Standard Component Insert Screw	Tune-Up Kit Includes All Standard Components
M-SSCPS-2090	S-SPUB-63	●	90°	20	20	TORX SCREW #10-32 x 1/2 TFHCS	TK-00576
M-SSCPS-2095	S-SPUB-63	❍	95°	20	20	TORX SCREW #10-32 x 1/2 TFHCS	TK-00576
M-SSCPS-20100	S-SPUB-63	●	100°	20	20	TORX SCREW #10-32 x 1/2 TFHCS	TK-00576
M-SSCPS-20105	S-SPUB-63	●	105°	20	20	TORX SCREW #10-32 x 1/2 TFHCS	TK-00576
M-SSCPS-2590	S-SPUB-86	❍	90°	25	25	TORX SCREW 1/4-20 x 3/4 TFHCS	TK-00760
M-SSCPS-2595	S-SPUB-86	❍	95°	25	25	TORX SCREW 1/4-20 x 3/4 TFHCS	TK-00760
M-SSCPS-25100	S-SPUB-86	❍	100°	25	25	TORX SCREW 1/4-20 x 3/4 TFHCS	TK-00760
M-SSCPS-25105	S-SPUB-86	●	105°	25	25	TORX SCREW 1/4-20 x 3/4 TFHCS	TK-00760

M-WSCNN Ceramic Insert Holder



Product Number	Gage Insert	Stock	Angle X	Standard Components Wedge	Standard Components Wedge Screw	Tune-Up Kit Includes All Std. Components
M-WSCNN-2090	S-SNUN-46	❍	90°	313393	STCM-11	TK-02624
M-WSCNN-2095	S-SNUN-46	❍	95°	313393	STCM-11	TK-02624
M-WSCNN-20100	S-SNUN-46	❍	100°	313393	STCM-11	TK-02624
M-WSCNN-20105	S-SNUN-46	❍	105°	313393	STCM-11	TK-02624

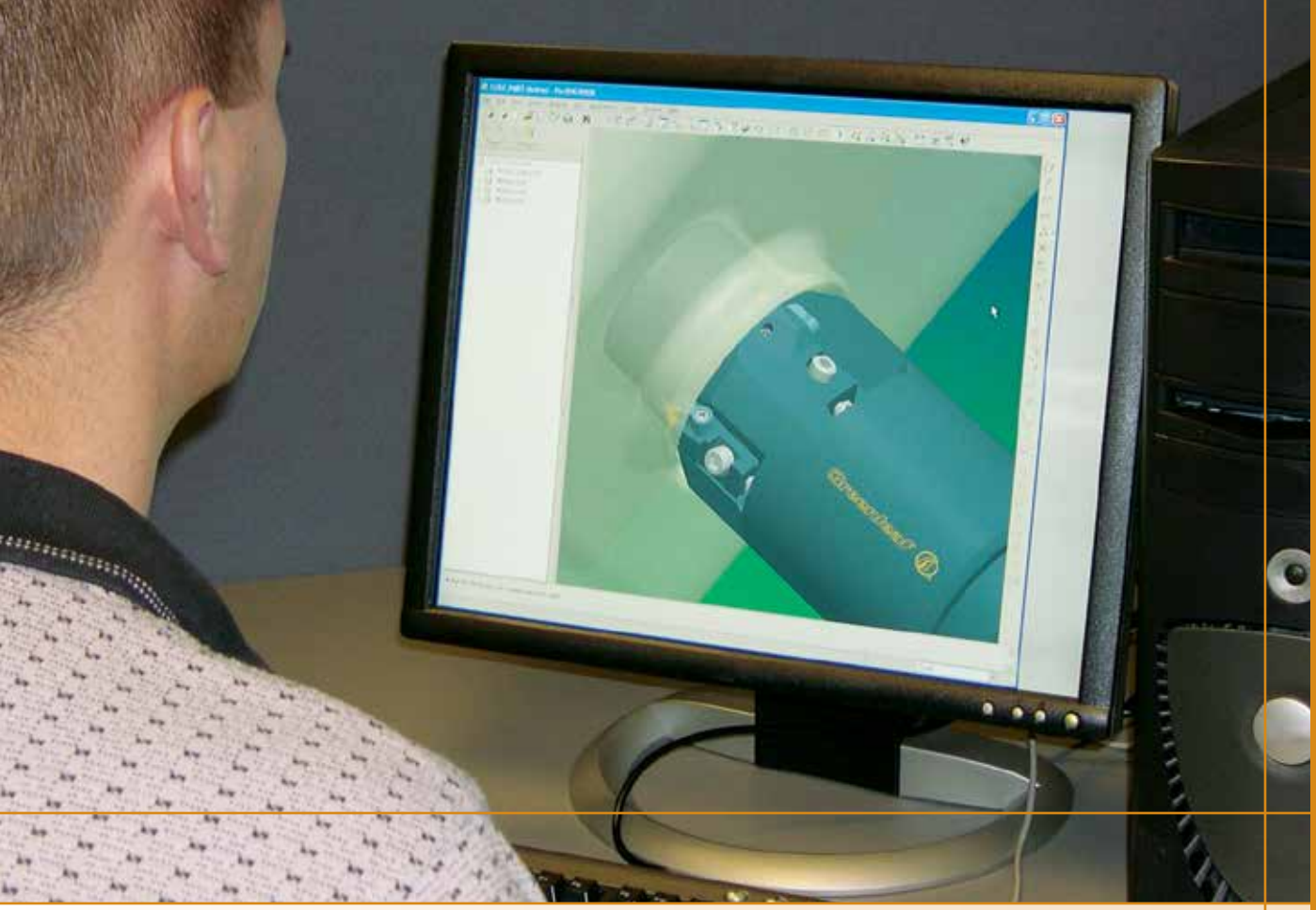


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Stocked Standard ● ●

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Aerospace Tools
Milling Cutters
Special Inserts
Special Designs/Layouts

Special Tool Design Information Checklist

Greenleaf®

Special Engineering

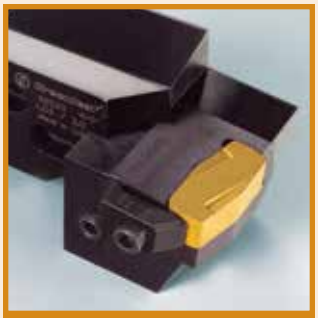
Greenleaf Corporation is a leading supplier of cutting-tool technology, specializing in the manufacture of high-performance tungsten carbide and ceramic inserts, as well as inventive tool-holding systems. Greenleaf continues to build on 60 years of innovation which centers on supplying customers with productive solutions to their metalcutting needs.

Today, Greenleaf Corporation is positioned to serve the evolving needs of companies in all major segments of the metalcutting industry including gas turbine, steel, medical, roll turning, automotive, machine tools and rail. Greenleaf's products are engineered to provide optimal performance against a wide range of materials under the most rigorous metalcutting conditions.

Special engineered or custom engineered products is a visible strength of the Greenleaf product line. Customers from around the world utilize the Greenleaf engineering services to address their specific, and often complex, requirements. For example, a cantilevered heavy metal head *(pictured at right)* was held to ± 0,012 inch tolerance for a VTL in the aerospace industry. Ask us to determine if we can assist you in your cutting tool special requirements.

In addition to specially engineered tooling systems and a comprehensive line of carbide inserts, Greenleaf offers high-quality ceramic and ceramic-composite materials which can be custom designed for specific machining applications.

From its headquarters in Saegertown, Pennsylvania, and a facility in North Carolina, Greenleaf maintains its commitment to pioneering breakthroughs in cutting-tool technology and to delivering ***Excel****erated* solutions for customers around the world.



Bar Peeler Cartridge



KM and Capto Shank



Heavy Metal Head



Keyslot



Quick Change Roll Tool



Race Track Groovers

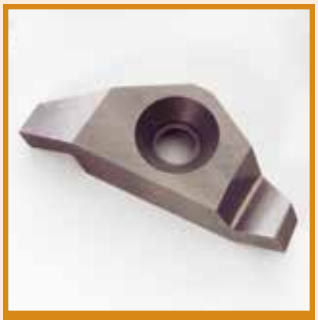


Roll Turning

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Dovetail Cutter



Heligroove Group



Hogmill



Hook Groove Holder



Long Shaft End Mill



Plungeface Cutter



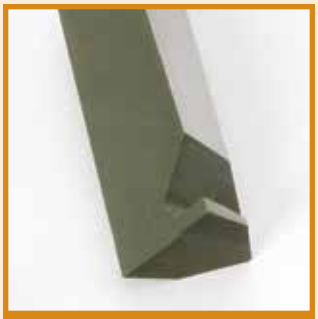
Pod Bore Head



Special Form Insert



Roll Lathe Tool



V-Bottom



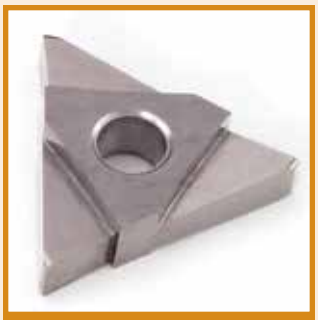
Aero Grooving Tools



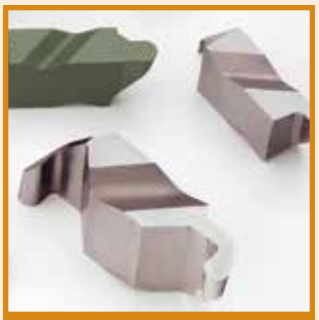
Roll Turning Tool



Heavy Turning



Tri-Thread Groover



Powerlock® Grooving Inserts

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via **EMAIL**
engineering@greenleafcorporation.com
via **FAX**
814-763-4040

Special Tool Design Information Checklist ✓

❑ Operation Information

Specify Operation: ❑ Milling ❑ Turning ❑ Boring ❑ Other: _____
Hand of Tool: ❑ Right Hand ❑ Left Hand ❑ Neutral

Specify size and style of mounting bore or shank: _____

❑ Machine Information

Type of Machine: _____ Horsepower or KW: _____
Condition: ❑ New ❑ Good ❑ Fair ❑ Poor

❑ Part Information:

Part Name: _____ Part End Use: _____

Part Material: _____ Hardness: _____ Condition: _____

❑ Furnish part drawing. *(Note areas to be machined and specify centerline of tool along with direction of feed and rotation.)*

❑ Furnish IGES or DXF file of part drawing if a tool layout is being requested.

❑ Furnish process sheets if available.

❑ Furnish digital photos of art or machine mounting if possible.

❑ Quote quantities: Tooling: _____ Inserts: _____

If parts are currently being machined, please complete this section:

❑ Furnish drawings, sketch or sample of existing tools.

❑ Describe problems with existing tools: _____

❑ Specify preferred insert style, grade, and edge prep: _____

Additional comments: _____

Company _____ **Customer Number** _____

Attention _____ **Customer Inquiry Number** _____

Street _____ **Ship to City** _____ **Country** _____

City _____ **State** _____ **Zip Code** _____ **Send Copy to** _____

Phone _____ **FAX** _____ _____

Email _____ **Sales Rep** _____ **Date Received** _____ **Quote Due Date** _____

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Carbide

Grade Descriptions ..... ATI 02-03
Feed and Speed Data ..... ATI 04-09
Chipform Application Range ..... ATI 10
Insert Grade Reference ..... ATI 12-13

Ceramic

Grade Descriptions ..... ATI 14
Feed and Speed Data ..... ATI 16-18
Edge Preparation and Application Guide ..... ATI 19
Insert Grade Reference ..... ATI 20-21

Formulas for Turning and Facing ..... ATI 22

Optional Clamps ..... ATI 23

Ceramic Productivity Manual ..... ATI 25-74

Greenleaf®

CARBIDE

Greenleaf offers a comprehensive line of carbide inserts in grades ranging from sub-micron C-1 through C-8 classifications. An industry pioneer in coated carbide, Greenleaf offers a variety of uncoated, MT-CVD coated and PVD-coated grades. Carbide inserts are available in ANSI standard geometries with multi-purpose chip-breakers for heavy roughing through finishing.

COATED – MT-CVD

GA5023 A high-speed performance grade for turning and milling cast iron. GA5023 features an advanced MT-CVD coating specifically developed for abrasive wear resistance. Application ranges from roughing to finishing on most cast iron materials including gray iron, ductile, nodular and other alloyed irons. The high wear and shock resistance of GA5023 allows machining at high speeds and a variety of feeds.

GA5025 A high-speed MT-CVD coated grade for turning, light roughing and finishing of carbon and alloy steels, as well as selected stainless steels.

GA5026 A high-speed grade developed for turning nickel- and cobalt-based super-alloys, stainless steels, and refractory metals. The advanced MT-CVD coating over a micro-grain substrate offers high wear resistance. GA5026 has exceptional resistance to the notching and deformation common to machining high strength materials. Apply at high speeds and light feeds in turning and selected milling applications.

GA5035 A high-performance MT-CVD coated grade for turning all types of steels, and selected stainless steels. GA5035 can be used in rough, semi-finish, and finish turning situations requiring resistance to heat deformation, thermal shock, and abrasion. GA5035 should be applied at high speeds and a range of feeds.

GA5036 A high-performance MT-CVD coated grade for milling steels at high speed. GA5036 should be used when milling forged and cast steels and selected ductile irons. GA5036 has a unique combination of toughness and heat resistance making it suitable for heavy and light duty milling at high cutting speeds.

GA5125 New high-performance MT-CVD coated carbide milling grade especially suited for manganese steel. GA5125 is also applicable on chrome-moly steel, tool steel and similar high alloy steels. GA5125 provides excellent resistance to abrasion, crater wear, thermal shock, deformation and edge build-up. GA5125 should be applied at high speeds with moderate feed rates.

COATED – PVD

G-910 PVD-coated grade for milling high-temp alloys, stainless steel, and low carbon steels. G-910 is a medium-speed grade and should be applied at moderate to high feed rates.

G-9120 PVD-coated grade for milling and turning steel castings and steel forgings. G-9120 is engineered to maximize productivity at moderate to heavy feed rates and depths of cut.

G-915 Multi-layer PVD-coated grade, excellent for cut off, milling and turning high-temp alloys, stainless steel, and low carbon steels. The multi-layer PVD coating adds heat and abrasion resistance to the tough, shock-resistant substrate. G-915 should be run at moderate speeds and moderate to high feeds in milling and interrupted turning applications.

G-920 PVD-coated grade for turning and milling high-strength materials such as high-temp alloys, titanium and stainless steel. G-920 is also an excellent grade for aluminum and refractory metals. This grade has the resistance to deformation and notching required for higher speeds than G-910.

G-9230 PVD-coated grade developed for medium to heavy machining of nickel alloys, cobolt alloys, titanium alloys, stainless steels and alloyed irons. G-9230 has superior wear resistance amd toughness and is excellent for cast and forged scale machining conditions.

G-925 Multi-layer PVD-coated grade specifically designed for machining abrasive and difficult-to-machine materials. Typical applications include high-temp alloys, titanium and other refractory metals, stainless steel, and many cast irons. G-925 exhibits excellent resistance to notching and deformation. Apply at moderate to high speeds and moderate feeds.

G-935 Multi-layer PVD-coated grade for steel milling and turning applications requiring additional resistance to mechanical and thermal shock. The multi-layered PVD coating increases the speed capability and wear resistance in tough milling and interrupted turning applications.

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UNCOATED

G-01 Developed for milling high-temp alloys, stainless steel, and low-carbon steels at low speeds and moderate to high feeds. Also can be used for turning in the same application range on severe interruption or old machinery.

G-01M A tough, sub-micron grade used for milling and roughing austenitic stainless steels, and stainless steel castings – even when rolling or casting skin is present. The edge strength of G-01M allows the use of sharp edges, high positive rakes, and intermittent cuts.

G-10 For roughing all cast irons under severe conditions, including broaching. The edge strength of G-10 makes it a good choice for roughing high-temp alloys with positive rakes and machining non-ferrous materials when toughness is of prime importance. Apply at moderate speeds and feeds.

G-02 An excellent general-purpose cast iron grade. G-02 can be applied to milling and turning cast iron at moderately high speeds and medium feeds. G-02 is also a good choice for machining aluminum with positive rakes, and light roughing of some high-temp alloys and stainless steels.

G-20M A sub-micron C-2 carbide grade suited for use in turning and milling titanium and nickel-based super-alloys. G-20M has the strength and edge wear characteristics to resist notching when turning high-strength materials.

G-23 A finishing grade for all cast irons and other short-chipping non-ferrous materials, such as brass and bronze. Apply at moderately high speeds and moderate feed rates.

G-40 Finish turning of cast iron and other hard-wearing materials at high speeds and light feeds in good conditions.

G-50 Heavy roughing grade for steel and steel castings under difficult conditions, and ferritic stainless steels in most applications. G-50 is tough enough to enable the use of positive rakes for turning.

G-53 Excellent general-purpose milling grade for steel and steel alloys at moderate speeds and feeds. Good combination of toughness and wear resistance for milling, or as an all-around grade for mixed production applications. G-53 is not recommended for continuous turning.

G-60 Heavy rough turning of steel, steel castings, and steel forgings. Apply G-60 at moderate speeds and heavy feed rates and depths of cut. More wear resistant than G-50, but lower in toughness.

G-74 Roughing or finishing grade for steel and steel castings. G-74 has higher shock resistance than G-70, and should be applied at high speeds and moderate to heavy feeds. Well suited for turning of steel rolls.

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Uncoated Carbide Grade Machining Recommendations for Turning

Type of Material	Hardness		Maximum Surface Speed (M/Min)								
	R/C	BHN	G-60 G-53	G-70	G-50	G-10 G-02	G-23	G-20M	G-01M	G-40	G-74
Non-Alloy Carbon Steel:											
C < 0.25 %		110	187	202	119	N/A	N/A	N/A	N/A	N/A	202
C < 0.80 %	6	150	143	156	91	N/A	N/A	N/A	N/A	N/A	156
C < 1.40 %	33	310	114	124	73	N/A	N/A	N/A	N/A	N/A	124
Low-Alloy Steels:											
Annealed, Medium - High Carbon	12	180	119	130	75	N/A	N/A	N/A	N/A	N/A	130
Hardened	36	330	78	83	49	N/A	N/A	N/A	N/A	N/A	83
High-Alloy Steels:											
Annealed	16	200	73	78	47	N/A	N/A	N/A	N/A	N/A	78
Hardened	41	380	52	57	34	N/A	N/A	N/A	N/A	N/A	57
High-Alloy Tool Steel:											
Hardened	36	330	75	81	47	N/A	N/A	N/A	N/A	N/A	81
Cast Steel:											
Non-Alloy	6	150	143	156	91	N/A	N/A	N/A	N/A	N/A	156
Low-Alloy	16	200	114	124	73	N/A	N/A	N/A	N/A	N/A	124
High-Alloy	16	200	101	109	65	N/A	N/A	N/A	N/A	N/A	109
Stainless Steels:											
Ferritic, 400 Series	16	200	114	124	73	N/A	N/A	N/A	N/A	N/A	124
Austenitic, 300 Series	16	200	N/A	N/A	N/A	81	104	91	N/A	N/A	N/A
Gray, Perlitic Cast Irons:											
Low Tensile	12	180	N/A	N/A	N/A	117	156	130	92	214	N/A
High Tensile	26	260	N/A	N/A	N/A	52	65	60	46	107	N/A
Nodular / Malleable Irons:											
Short Chipping	6	150	176	192	114	N/A	N/A	N/A	N/A	N/A	192
Long Chipping	21	230	104	114	65	N/A	N/A	N/A	N/A	N/A	114
Aluminum Alloys:			N/A	N/A	N/A	363	467	389	305	580	N/A
Brass, Copper, Bronze:			N/A	N/A	N/A	130	156	143	107	214	N/A
Hardened Steels (> 50 Rc):			N/A	N/A	N/A	N/A	N/A	N/A	N/A	15	13
Chilled, Hardened Irons (> 50 Rc):			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Titanium, Refractory Metals:			N/A	N/A	N/A	26	39	34	21	N/A	N/A
Nickel & Iron Based Superalloys:											
Inconels			N/A	N/A	N/A	21	N/A	26	18	N/A	N/A
Hastelloys			N/A	N/A	N/A	31	N/A	36	27	N/A	N/A
Waspaloys			N/A	N/A	N/A	21	N/A	26	18	N/A	N/A
Renes			N/A	N/A	N/A	16	N/A	21	12	N/A	N/A
Monels			N/A	N/A	N/A	16	N/A	21	12	N/A	N/A
Cobalt Based Superalloys:											
Stellites			N/A	N/A	N/A	13	N/A	16	12	N/A	N/A
Haynes Alloys			N/A	N/A	N/A	13	N/A	16	12	N/A	N/A

Finishing: 0,08 to 0,38 mm/rev
General Purpose: 0,20 to 0,51 mm/rev
Medium Roughing: 0,38 to 0,76 mm/rev
Heavy Roughing: > 0,76 mm/rev

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Uncoated Carbide Grade Machining Recommendations for Milling

Type of Material	Hardness		Maximum Surface Speeds (M/Min)								
	R/C	BHN	G-60 G-53	G-70	G-50	G-10 G-02	G-23	G-20M	G-01M	G-40	G-74
Non-Alloy Carbon Steel:											
C < 0.25 %		110	220	238	140	N/A	N/A	N/A	N/A	N/A	N/A
C < 0.80 %	6	150	168	183	107	N/A	N/A	N/A	N/A	N/A	N/A
C < 1.40 %	33	310	134	146	85	N/A	N/A	N/A	N/A	N/A	N/A
Low-Alloy Steels:											
Annealed, Medium - High Carbon	12	180	140	153	88	N/A	N/A	N/A	N/A	N/A	N/A
Hardened	36	330	92	98	58	N/A	N/A	N/A	N/A	N/A	N/A
High-Alloy Steels:											
Annealed	16	200	85	92	55	N/A	N/A	N/A	N/A	N/A	N/A
Hardened	41	380	61	67	40	N/A	N/A	N/A	N/A	N/A	N/A
High-Alloy Tool Steel:											
Hardened	36	330	88	95	55	N/A	N/A	N/A	N/A	N/A	N/A
Cast Steel:											
Non-Alloy	6	150	168	183	107	N/A	N/A	N/A	N/A	N/A	N/A
Low-Alloy	16	200	134	146	85	N/A	N/A	N/A	N/A	N/A	N/A
High-Alloy	16	200	119	128	76	N/A	N/A	N/A	N/A	N/A	N/A
Stainless Steels:											
Ferritic, 400 Series	16	200	134	146	85	N/A	N/A	N/A	N/A	N/A	N/A
Austenitic, 300 Series	16	200	N/A	N/A	N/A	95	122	107	N/A	N/A	N/A
Gray, Perlitic Cast Irons:											
Low Tensile	12	180	N/A	N/A	N/A	137	183	153	N/A	N/A	N/A
High Tensile	26	260	N/A	N/A	N/A	61	76	70	N/A	N/A	N/A
Nodular / Malleable Irons:											
Short Chipping	6	150	207	226	134	N/A	N/A	N/A	N/A	N/A	N/A
Long Chipping	21	230	122	134	76	N/A	N/A	N/A	N/A	N/A	N/A
Aluminum Alloys:			N/A	N/A	N/A	427	549	458	N/A	N/A	N/A
Brass, Copper, Bronze:			N/A	N/A	N/A	153	183	168	N/A	N/A	N/A
Hardened Steels (> 50 Rc):			N/A	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chilled, Hardened Irons (> 50 Rc):			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Titanium, Refractory Metals:			N/A	N/A	N/A	31	46	40	N/A	N/A	N/A
Nickel & Iron Based Superalloys:											
Inconels			N/A	N/A	N/A	24	N/A	31	N/A	N/A	N/A
Hastelloys			N/A	N/A	N/A	37	N/A	43	N/A	N/A	N/A
Waspaloys			N/A	N/A	N/A	24	N/A	31	N/A	N/A	N/A
Renes			N/A	N/A	N/A	18	N/A	24	N/A	N/A	N/A
Monels			N/A	N/A	N/A	18	N/A	24	N/A	N/A	N/A
Cobalt Based Superalloys:											
Stellites			N/A	N/A	N/A	15	N/A	18	N/A	N/A	N/A
Haynes Alloys			N/A	N/A	N/A	15	N/A	18	N/A	N/A	N/A

Feeds should be in the range of 0,08 to 0,30 mm/tooth.
Higher speeds require lower feeds, whereas, low speeds use higher feed rates.
A good general starting point for feed rate in milling is 0,10 mm/tooth.

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MT-CVD Coated Carbide Grade Machining Recommendations for Turning

Type of Material	Hardness		Maximum Surface Speeds (M/Min)		
	R/C	BHN	GA5025 GA5035	GA5026	GA5023
Non-Alloy Carbon Steel					
C < 0.25 %		110	337	N/A	N/A
C < 0.80 %	6	150	259	N/A	N/A
C < 1.40 %	33	310	207	N/A	N/A
Low-Alloy Steels					
Annealed, Medium - High Carbon	12	180	218	N/A	N/A
Hardened	36	330	140	N/A	N/A
High-Alloy Steels					
Annealed	16	200	130	N/A	N/A
Hardened	41	380	93	N/A	N/A
High-Alloy Tool Steel					
Hardened	36	330	135	N/A	N/A
Cast Steel					
Non-Alloy	6	150	259	N/A	N/A
Low-Alloy	16	200	207	N/A	N/A
High-Alloy	16	200	181	N/A	N/A
Stainless Steels					
Ferritic, 400 Series	16	200	N/A	N/A	195
Ferritic, 400 Series	32	310	183	N/A	N/A
Austenitic, 300 Series	16	200	N/A	N/A	130
Gray, Perlitic Cast Irons					
Low Tensile	12	180	N/A	183	246
High Tensile	26	260	N/A	107	88
Nodular / Malleable Irons					
Short Chipping	6	150	N/A	N/A	355
Long Chipping	21	230	N/A	N/A	213
Aluminum Alloys			N/A	610	N/A
Brass, Copper, Bronze			N/A	214	N/A
Hardened Steels (> 50 Rc)			N/A	N/A	N/A
Chilled, Hardened Irons (> 50 Rc)			N/A	N/A	N/A
Titanium, Refractory Metals			N/A	61	N/A
Nickel & Iron Based Superalloys					
Inconels			N/A	79	N/A
Hastelloys			N/A	104	N/A
Waspaloys			N/A	79	N/A
Renes			N/A	67	N/A
Monels			N/A	67	N/A
Cobalt Based Superalloys					
Stellites			N/A	55	N/A
Haynes Alloys			N/A	55	N/A

Finishing: 0,08 to 0,38 mm/rev
General Purpose: 0,20 to 0,51 mm/rev
Medium Roughing: 0,38 to 0,76 mm/rev
Heavy Roughing: > 0,76 mm/rev

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MT-CVD Coated Carbide Grade Machining Recommendations for Milling

Type of Material	Hardness		Maximum Surface Speeds (M/Min)			
	R/C	BHN	GA5036	GA5026	GA5023	GA5125
Non-Alloy Carbon Steel:						
C < 0.25 %		110	320	N/A	N/A	N/A
C < 0.80 %	6	150	259	N/A	N/A	N/A
C < 1.40 %	33	310	214	N/A	N/A	N/A
Low-Alloy Steels:						
Medium - High Carbon, Annealed	12	180	214	N/A	N/A	N/A
Hardened	36	330	171	N/A	N/A	N/A
High-Alloy Steels:						
Annealed	16	200	153	N/A	N/A	N/A
Hardened	41	380	122	N/A	N/A	N/A
Manganese Steel	20	230	N/A	N/A	N/A	153
High-Alloy Tool Steel:						
Hardened	36	330	137	N/A	N/A	N/A
Cast Steel:						
Non-Alloy	6	150	223	N/A	N/A	N/A
Low-Alloy	16	200	174	N/A	N/A	N/A
High-Alloy	16	200	153	N/A	N/A	N/A
Stainless Steels:						
Ferritic, 400 Series	16	200	N/A	N/A	232	N/A
Ferritic, 400 Series	32	310	153	N/A	201	N/A
Austenitic, 300 Series	16	200	N/A	137	153	N/A
Gray, Perlitic Cast Irons:						
Low Tensile	12	180	N/A	183	290	N/A
High Tensile	26	260	N/A	107	104	N/A
Nodular / Malleable Irons:						
Short Chipping	6	150	N/A	N/A	418	N/A
Long Chipping	21	230	N/A	N/A	250	N/A
Aluminum Alloys:			N/A	549	N/A	N/A
Brass, Copper, Bronze:			N/A	214	N/A	N/A
Hardened Steels (> 50 Rc):			N/A	N/A	N/A	N/A
Chilled, Hardened Irons (> 50 Rc):			N/A	N/A	N/A	N/A
Titanium, Refractory Metals:			N/A	61	N/A	N/A
Nickel & Iron Based Superalloys:						
Inconels			N/A	40	N/A	N/A
Hastelloys			N/A	52	N/A	N/A
Waspaloys			N/A	40	N/A	N/A
Renes			N/A	34	N/A	N/A
Monels			N/A	34	N/A	N/A
Cobalt Based Superalloys:						
Stellites			N/A	27	N/A	N/A
Haynes Alloys			N/A	27	N/A	N/A

Feeds should be in the range of 0,08 to 0,30 mm/tooth.
Higher speeds require lower feeds, whereas, low speeds use higher feed rates.
A good general starting point for feed rate in milling is 0,10 mm/tooth.

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PVD-Coated Carbide Grade Machining Recommendations for Milling and Turning

Type of Material	Hardness		Maximum Surface Speeds (M/Min)				
	R/C	BHN	G-9120 G-935	G-9230 G-925	G-920	G-910	G-915
Non-Alloy Carbon Steel:							
C < 0.25 %		110	458	N/A	N/A	198	250
C < 0.80 %	6	150	366	N/A	N/A	153	192
C < 1.40 %	33	310	305	N/A	N/A	122	153
Low-Alloy Steels:							
Medium - High Carbon, Annealed	12	180	275	N/A	N/A	130	162
Hardened	36	330	183	N/A	N/A	82	104
High-Alloy Steels:							
Annealed	16	200	183	N/A	N/A	78	98
Hardened	41	380	122	N/A	N/A	56	70
High-Alloy Tool Steel:							
Hardened	36	330	183	N/A	N/A	81	101
Cast Steel:							
Non-Alloy	6	150	366	N/A	N/A	153	192
Low-Alloy	16	200	305	N/A	N/A	122	153
High-Alloy	16	200	259	N/A	N/A	107	134
Stainless Steels:							
Ferritic, 400 Series	16	200	N/A	N/A	N/A	153	192
Ferritic, 400 Series	32	310	177	N/A	N/A	114	143
Austenitic, 300 Series	16	200	N/A	137	107	79	99
Gray, Perlitic Cast Irons:							
Low Tensile	12	180	336	183	153	N/A	N/A
High Tensile	26	260	122	107	76	N/A	N/A
Nodular / Malleable Irons:							
Short Chipping	6	150	458	N/A	N/A	N/A	N/A
Long Chipping	21	230	275	N/A	N/A	N/A	N/A
Aluminum Alloys:			259	549	458	N/A	N/A
Brass, Copper, Bronze:			198	214	168	N/A	N/A
Hardened Steels (> 50 Rc):			N/A	N/A	N/A	N/A	N/A
Chilled, Hardened Irons (> 50 Rc):			N/A	N/A	N/A	N/A	N/A
Titanium, Refractory Metals:			N/A	61	46	24	29
Nickel & Iron Based Superalloys:							
Inconels			N/A	40	31	21	26
Hastelloys			N/A	52	43	31	37
Waspaloys			N/A	40	31	21	26
Renes			N/A	34	24	15	18
Monels			N/A	34	24	15	18
Cobalt Based Superalloys:							
Stellites			N/A	27	18	15	18
Haynes Alloys			N/A	27	18	15	18

Milling

Feeds should be in the range of 0,08 to 0,30 mm/tooth.
Higher speeds require lower feeds, whereas, low speeds use higher feed rates.
A good general starting point for feed rate in milling is 0,10 mm/tooth.

Turning

Finishing: 0,08 to 0,38 mm/rev
General Purpose: 0,20 to 0,51 mm/rev
Medium Roughing: 0,38 to 0,76 mm/rev
Heavy Roughing: > 0,76 mm/rev

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Suggested Cutting Speeds (M/Min) for TurboForm® (TF) Inserts

Alloy	AMS#	Uncoated G-20M	PVD G-920 G-925	MT-CVD GA5026
A-286	5732	32	40	66
Astroloy		29	37	60
Custom 455 Stainless	5617	34	43	70
Greek Ascoloy	5616	61	76	126
Hastelloy B		44	55	91
Hastelloy C	5750	44	55	91
Hastelloy D		44	55	91
Hastelloy G		44	55	91
Hastelloy N	5771	44	55	91
Hastelloy S	5711	44	55	91
Hastelloy W	5755	32	40	66
Hastelloy X	5754	32	40	66
Haynes 188	5772	21	26	43
Haynes 25	5759	21	26	43
Haynes 263		21	26	43
IN-100	5397	15	18	30
Inconel 600	5665	34	43	70
Inconel 601	5715	34	43	70
Inconel 617		34	43	70
Inconel 625	5666	28	35	58
Inconel 702		28	35	58
Inconel 706	5702	28	35	58
Inconel 718	5662	24	31	50
Inconel 721		34	43	70
Inconel 722	5717	34	43	70
Inconel 751		28	35	58
Inconel X-750	5668	24	31	50
Incoloy 825		15	18	30
Incoloy 903		29	37	60
Incoloy 925		24	31	50
Monel 400		28	35	58
Monel 401		28	35	58
Monel 404		28	35	58
Monel 502		28	35	58
Monel K500		28	35	58
Monel R405		28	35	58
MP-35-N	5758	28	35	58
Nickel 200		28	35	58
Nickel 201		28	35	58
Nickel 205		28	35	58
Nickel 211		28	35	58
Nickel 220		28	35	58
Nimonic 75		28	35	58
Nimonic 80		28	35	58
Nimonic 90		28	35	58
Nimonic 95		28	35	58
Nimonic Alloy 901 Mod	5661	28	35	58

Alloy	AMS#	Uncoated G-20M	PVD G-920 G-925	MT-CVD GA5026
Nitralloy 230		29	37	60
Nitralloy N		29	37	60
Permanickel 300		29	37	60
Rene 41	5712	20	24	40
Rene 63		20	24	40
Rene 77		20	24	40
Rene 80		20	24	40
Rene 95		20	24	40
Stainless Steel 15-5PH	5659	28	35	58
Stainless Steel 17-4PH	5622	28	35	58
Udimet 500	5751	24	31	50
Udimet 630		21	26	43
Udimet 700		21	26	43
Udimet 710		21	26	43
Udimet M-252	5756	24	31	50
Waspaloy	5706	24	31	50

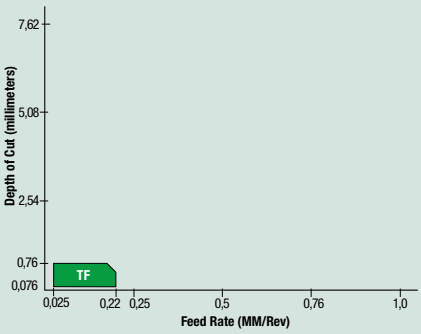
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PRECISION FINISHING

TF



Precision ground chipbreaker for nickel alloys. Good for feeds up to 0,22/rev and depths to 0,76.

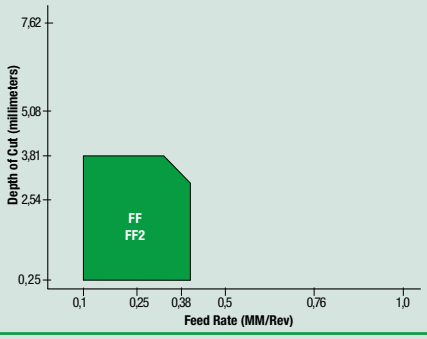


FINISHING

FF and FF2



For finishing all types of material. Designed for feeds up to 0,47/rev and 3,81 depth of cut.

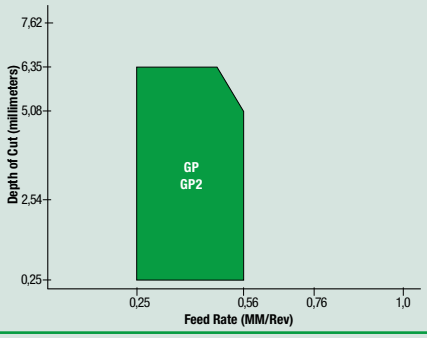


GENERAL PURPOSE

GP and GP2



General purpose chipbreaker. Feed rates up to 0,56/rev and 6,35 depth of cut.

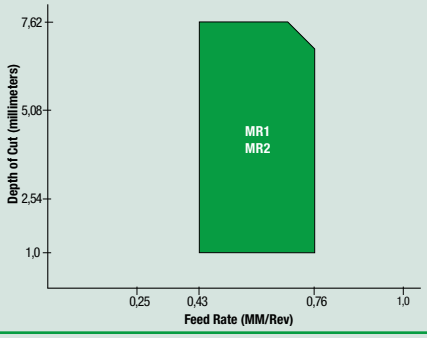


MEDIUM ROUGHING

MR and MR2



Used for medium roughing of all material. Feeds up to 0,71/rev and depths up to 7,62.



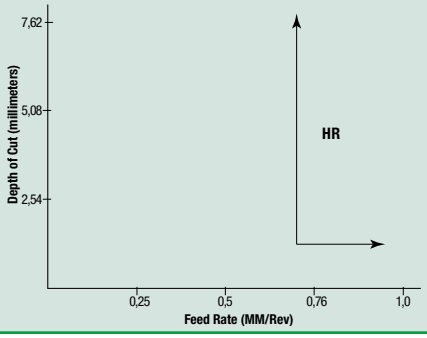
HEAVY ROUGHING

HR



Heavy roughing for all materials. Feeds above 0,58/rev. One-sided chipbreaker for heaviest feeds (MM).

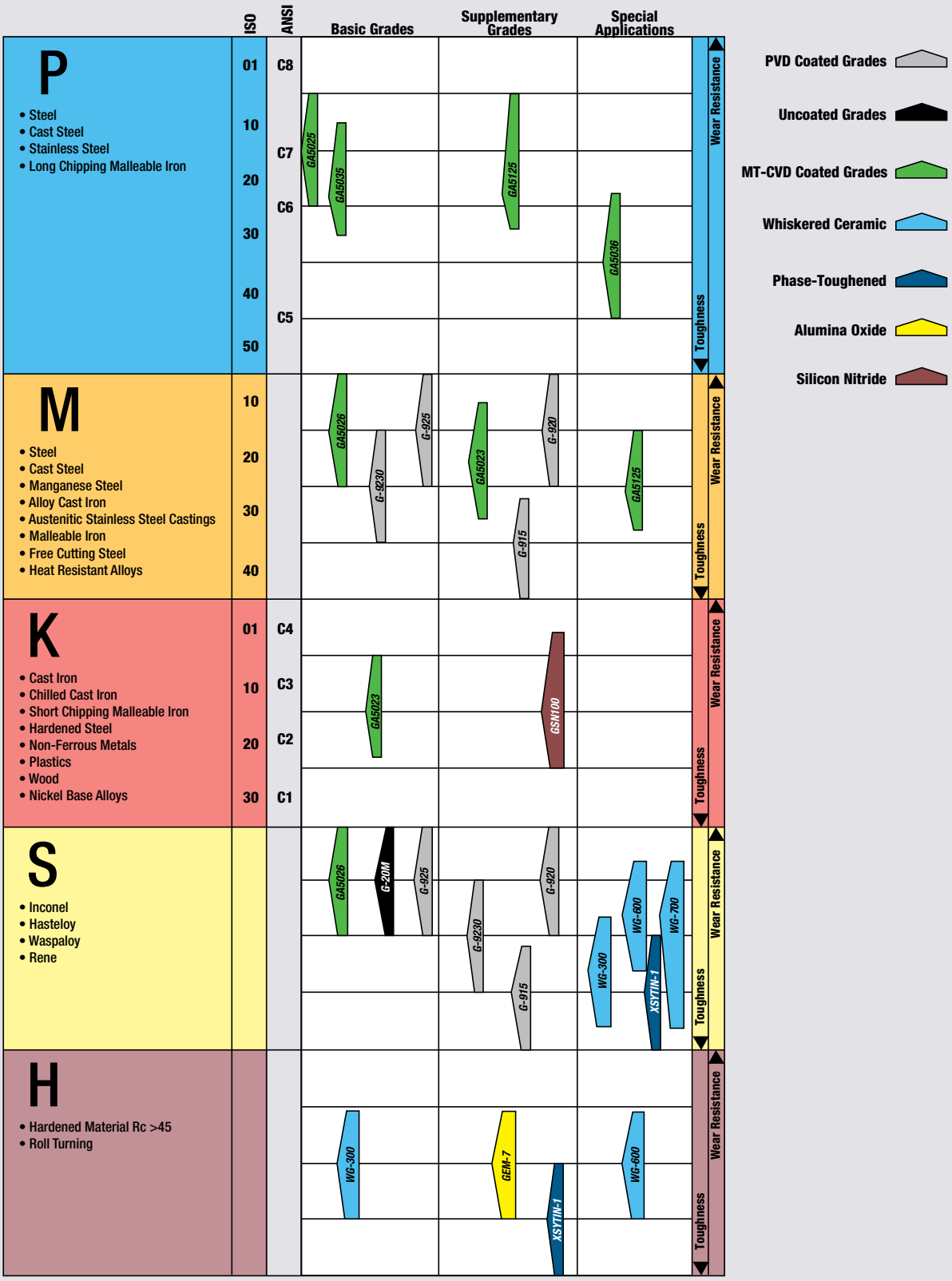
Example: CNMM-190612 HR



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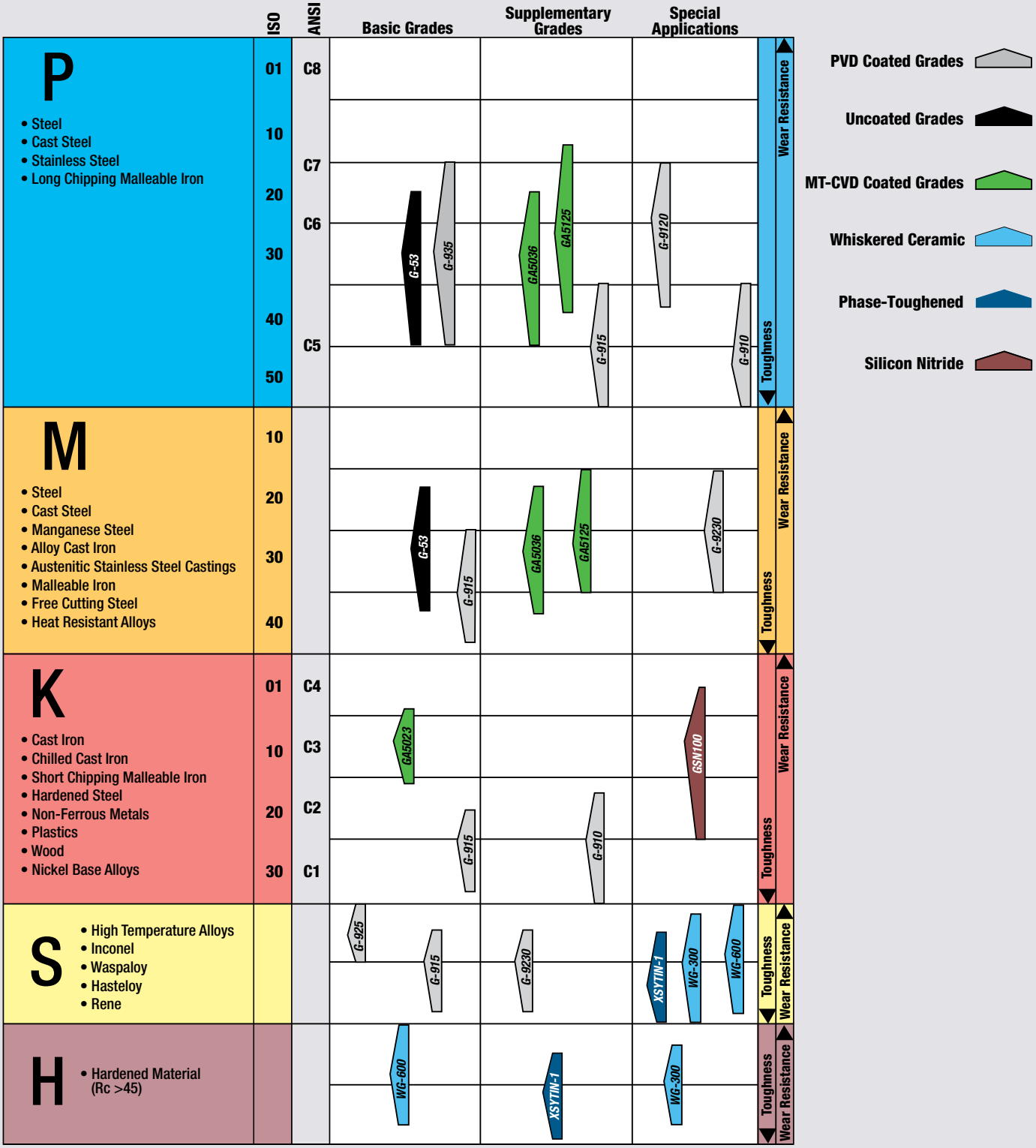
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Insert Grade Reference for Turning, Grooving and Profiling



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Insert Grade Reference for Milling



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CERAMIC

Greenleaf is the industry leader in the development and manufacture of ceramic and coated ceramic inserts in ANSI standard and special geometries. Some of the most prominent include:

WG-300® Whisker-reinforced ceramic with excellent wear and shock resistance at high surface speeds. WG-300 is very effective at machining nickel and cobalt based super-alloys, and other hard materials at metal removal rates up to 10 times higher than carbide.

WG-600® Coated whisker-reinforced ceramic offering longer tool life and better performance over uncoated ceramics due to outstanding thermal properties and shock-resistance at high cutting speeds. Application areas include rough and finish turning, as well as high-performance milling of high-strength alloys, hardened steels and select stainless steels.
U.S. Patent No. 6,447,896 B1.

WG-700™ New whisker-reinforced Al_2O_3 ceramic substrate featuring improved toughness and a unique high-speed coating. WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-machines materials. WG-700 exhibits high metal-removal rates with exceptional tool life. *U.S. Patent No. 6,447,896 B1.*

XSYTIN™-1 New phase-thoughened ceramic capable of extreme feed rates. XSYTIN™-1excels at machining a wide variety of materials including steels, cast and ductile irons, high-temperature alloys amd other challenging metals. XSYTIN™-1is ideal for use in interrupted cuts, scale, abrasive casting materials and milling.

GSN100™ New engineered blend of silicon nitride and proprietary toughening agents that redefines productivity in the machining of cast iron. GSN100 delivers outstanding tool life at high cutting speeds in turning, grooving and milling applications.

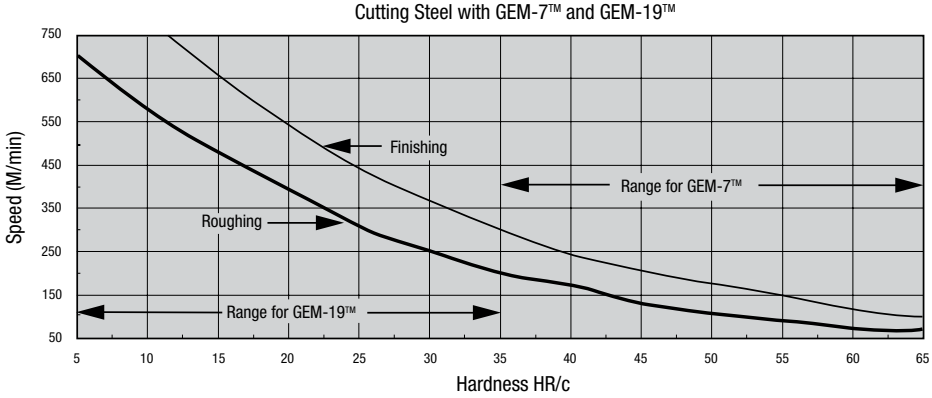
GEM-7™ Al_2O_3 + TiC composite ceramic with a high degree of predictability in roll turning and hard alloy (up to 65 R/c) machining.

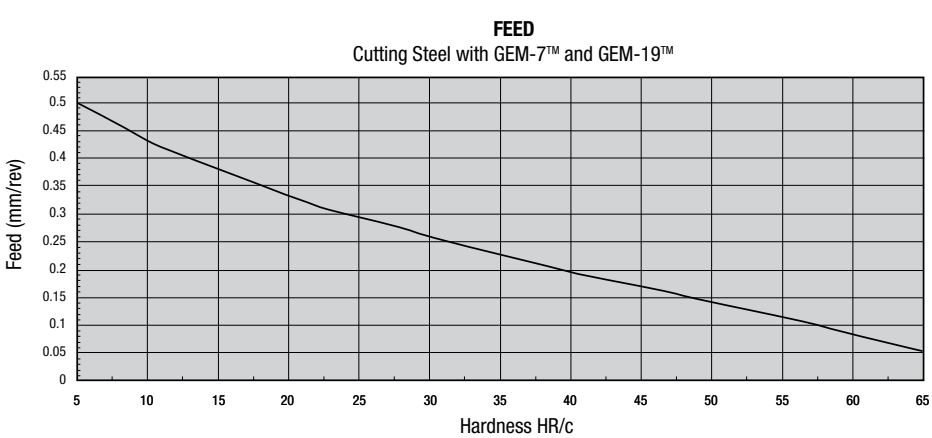
GEM-19™ Cold pressed and sintered Al_2O_3 ceramic for economical roughing and finishing of cast iron grades application range on severe interruption or old machinery.

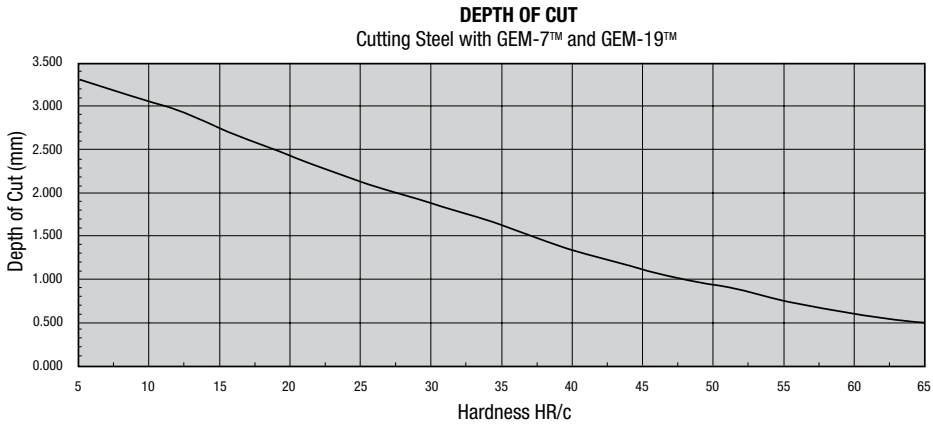
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Cutting Steel with GEM-7™ and GEM-19™

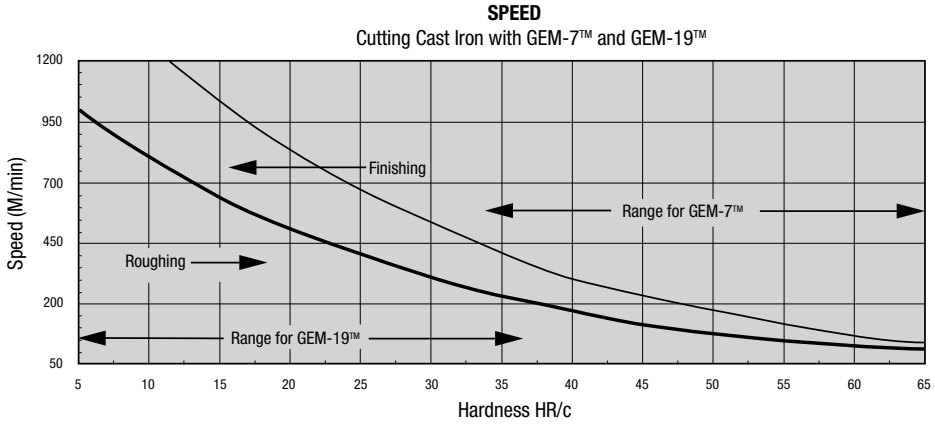


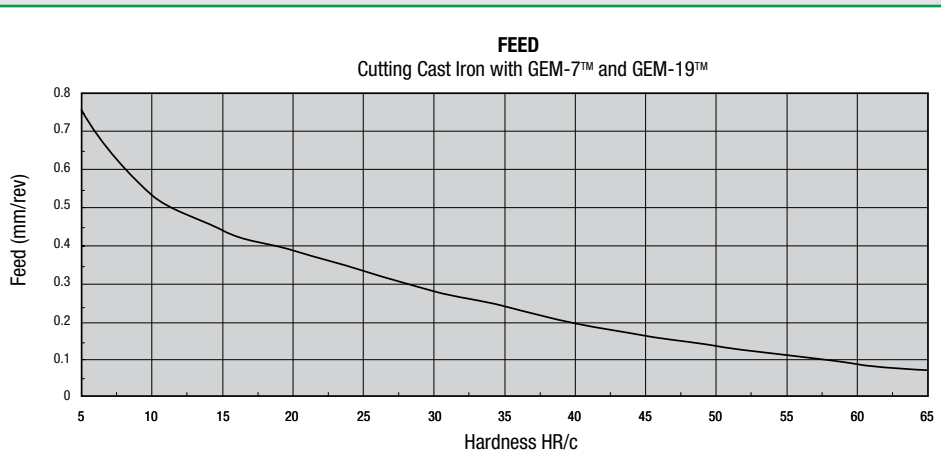


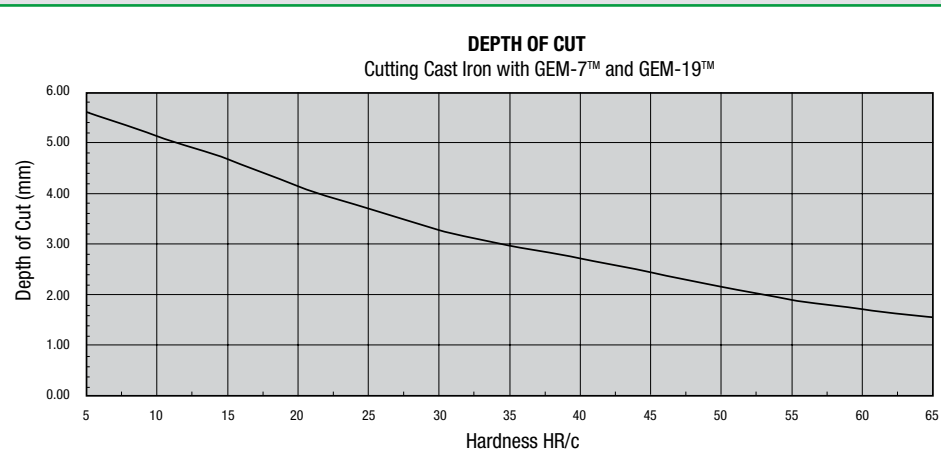


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Cutting Cast Iron with GEM-7™ and GEM-19™

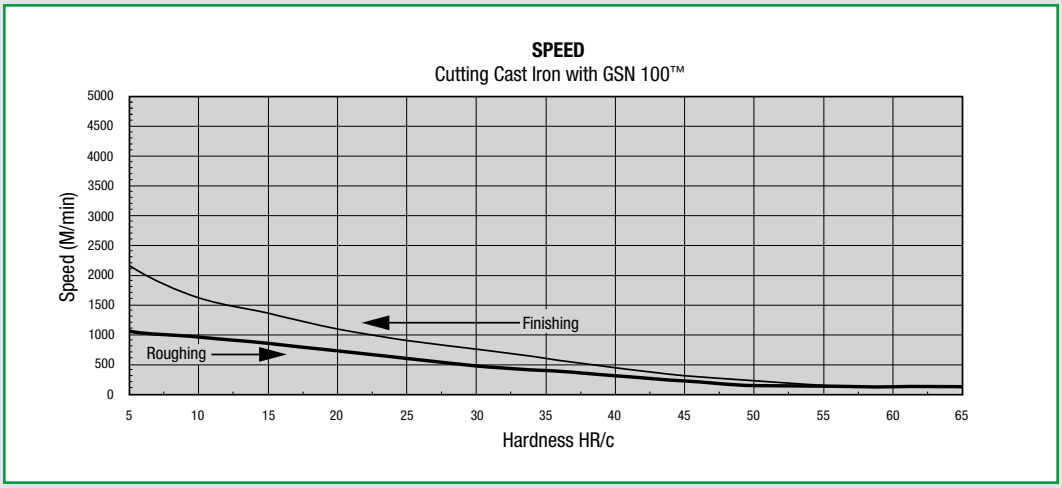


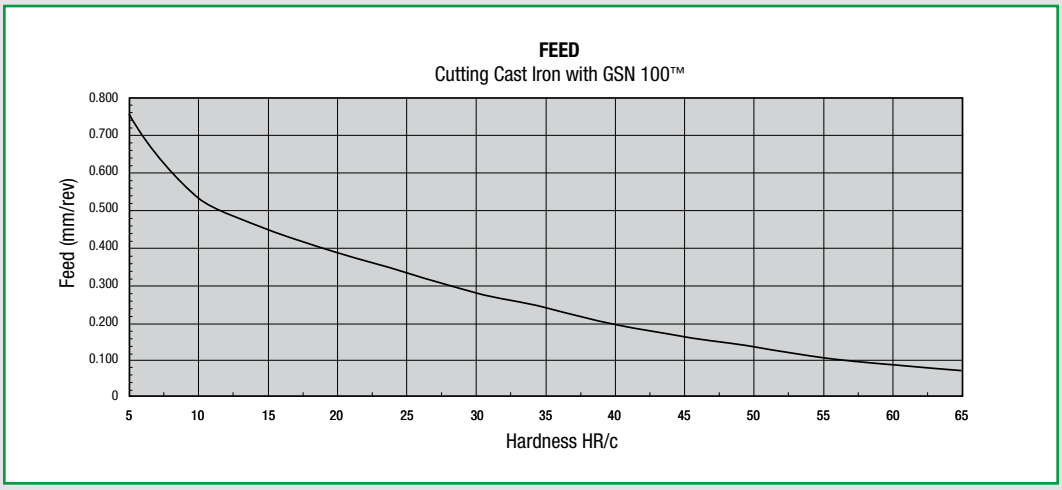


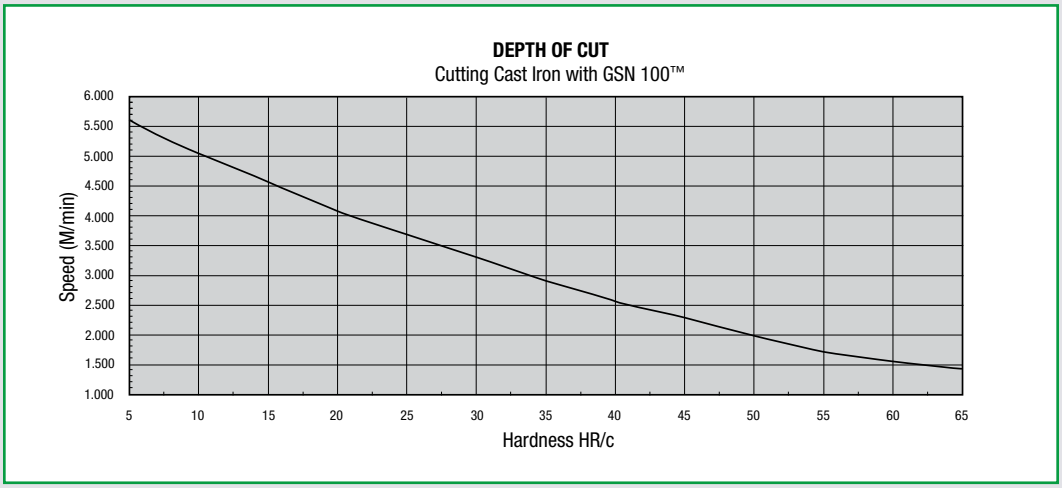


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Cutting Cast Iron with GSN100™

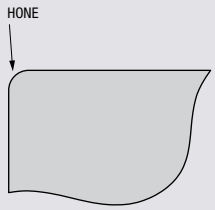




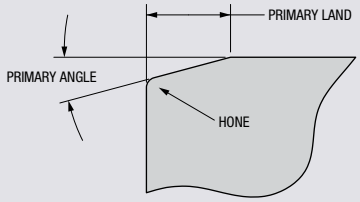


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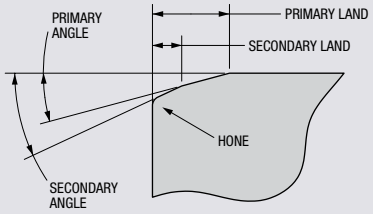
Edge Preparations and Application Guide



HONE



PRIMARY ANGLE

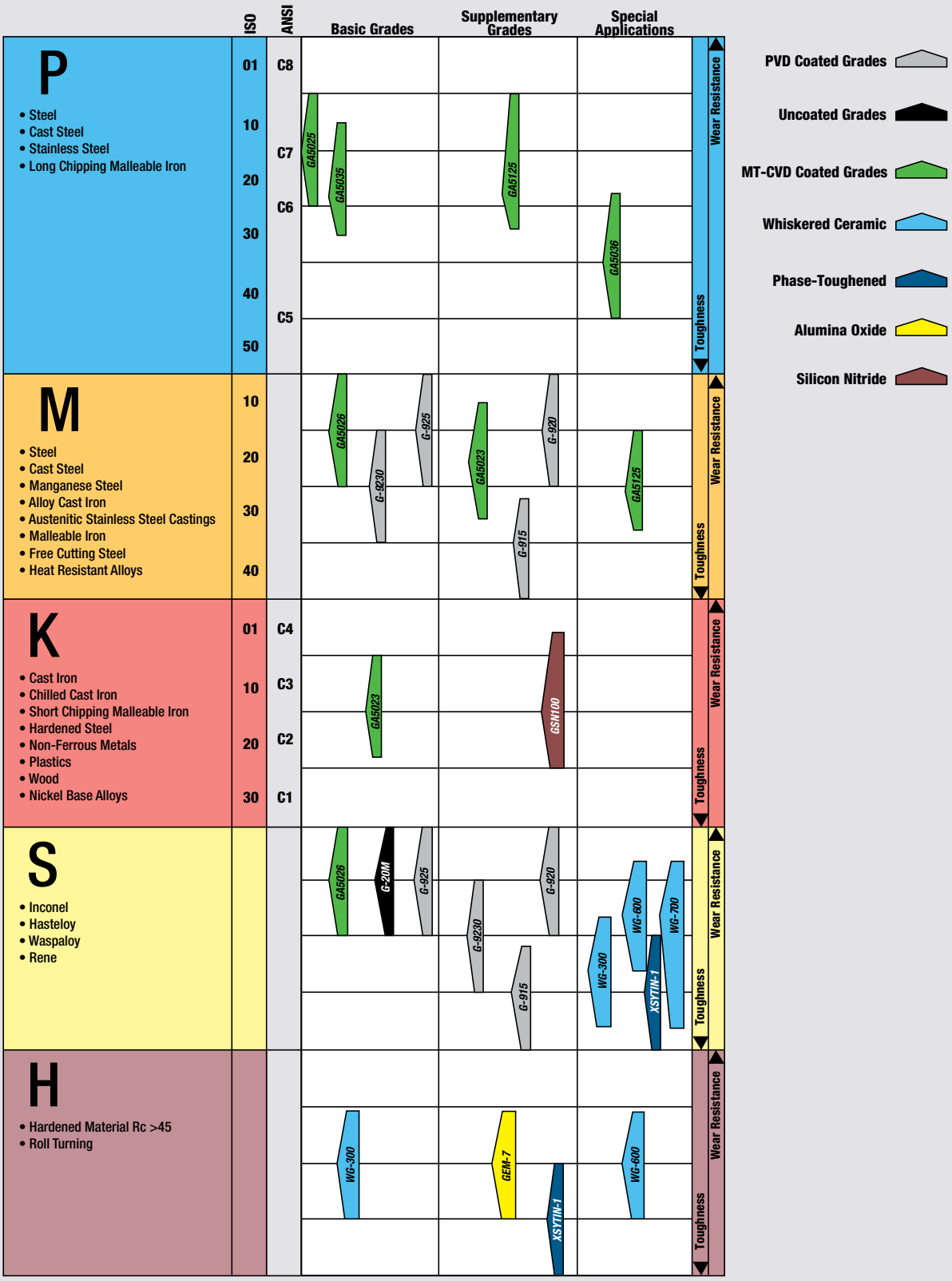


SECONDARY ANGLE

Edge Prep	Hone	Primary Land	Primary Angle	Secondary Land	Secondary Angle	Application
A	0,013 - 0,025mm R					For light finishing and grooving, also added to designated negative lands (i.e. T1, T2, T9).
B	0,025 - 0,051mm R					Used in addition to heavy machining chamfers and designated negative lands (i.e. T4, T10).
T1		0,051 - 0,102mm	20°			General purpose for turning and light milling in clean high-temp. alloys and materials <50R/C.
T1A	0,013 - 0,025mm R	0,051 - 0,102mm	20°			Used where more protection is needed than T1 such as in scale and light interruptions, hard turning.
T2		0,152 - 0,203mm	20°			General purpose chamfer for light to medium feed rates, cast-iron machining.
T2A	0,013 - 0,025mm R	0,152 - 0,203mm	20°			Scale applications, light interruptions, weld overlays, finish turning and milling of hardened materials.
T3		0,330 - 0,381mm	30°			Used on smaller IC inserts as an alternative to T7.
T3A	0,013 - 0,025mm R	0,330 - 0,381mm	30°			Used on smaller IC inserts as an alternative to T7A.
T4B	0,025 - 0,051mm R	1,90	10°	0,17	25°	Heavy machining <19mm IC - Roll turning, 090700, 120700, CDH-22, CDH-33.
T5B	0,025 - 0,051mm R	1,52	15°	0,17	30°	Heavy machining - alternative to T4B.
T7		0,381 - 0,508mm	20°			For use in similar applications as T2 - use in heavier feed areas.
T7A	0,013 - 0,025mm R	0,381 - 0,508mm	20°			For use in similar applications as T2A - use in heavier feed areas.
T9		0,152 - 0,203mm	30°			General purpose chamfer for medium to heavy feed rates, milling, cast-iron machining <16mm IC.
T9A	0,013 - 0,025mm R	0,152 - 0,203mm	30°			For medium to heavy feed rates, milling, cast-iron machining for heavier interruptions <16mm IC.
T10A	0,013 - 0,025mm R	2,290 - 2,540mm	15°	0,17	30°	Heavy machining, iron and steel roll turning >19mm IC, CDH-43, CDH-53.
T10B	0,025 - 0,051mm R	2,290 - 2,540mm	15°	0,17	30°	Heavy machining, iron and steel roll turning >19mm IC, CDH-43, CDH-53.

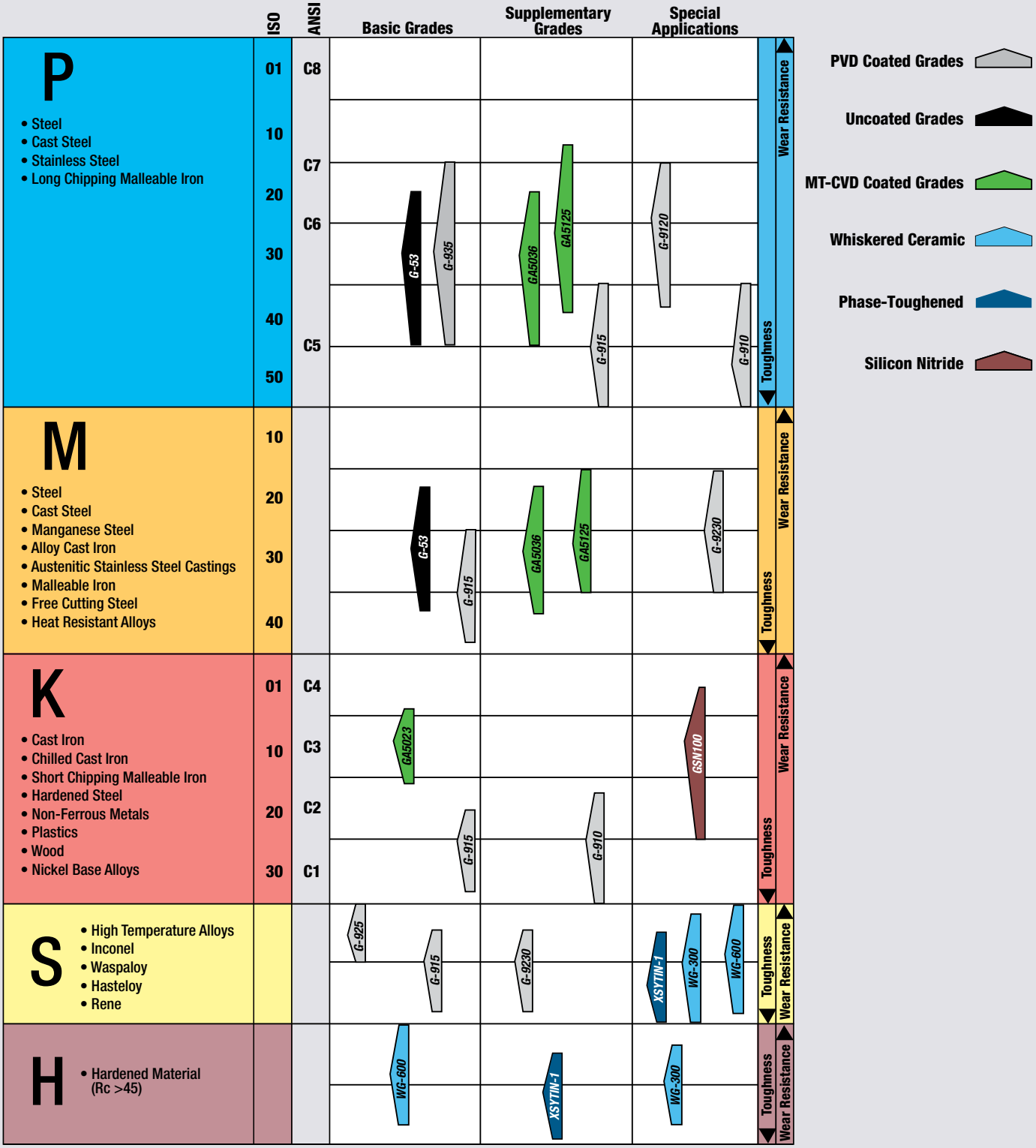
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Insert Grade Reference for Turning, Grooving and Profiling



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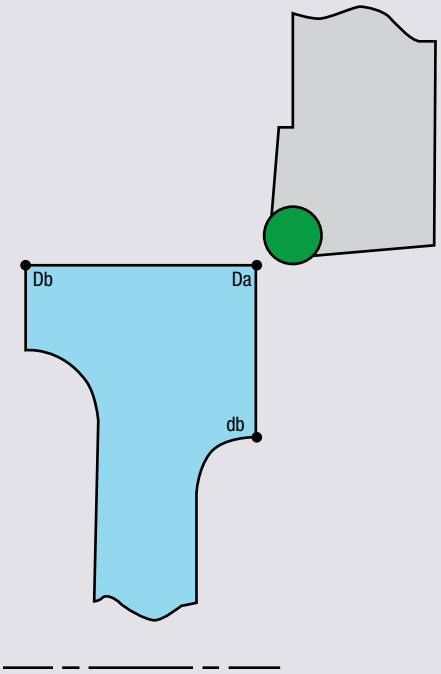
Insert Grade Reference for Milling



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Formulas for Turning and Facing

Imperial



Turning

$$SFM = \frac{Dia. \times \pi \times RPM}{12} \qquad RPM = \frac{SFM \times 12}{Dia. \times \pi}$$

$$T = \frac{LOC}{IPR \times RPM} \qquad LOC\ Da\ to\ Db = \frac{SFM \times 12 \times IPR \times T}{Dia. \times \pi}$$

Facing

To calculate the time (T) for a facing operation from starting point (Da) to finishing point (db):

$$\textbf{Time}\ Da\ to\ db = \frac{\pi\ (Da^2 - db^2)}{48 \times SFM \times IPR}$$

To calculate the endpoint (db) for facing from starting point (Da) to finishing point (db):

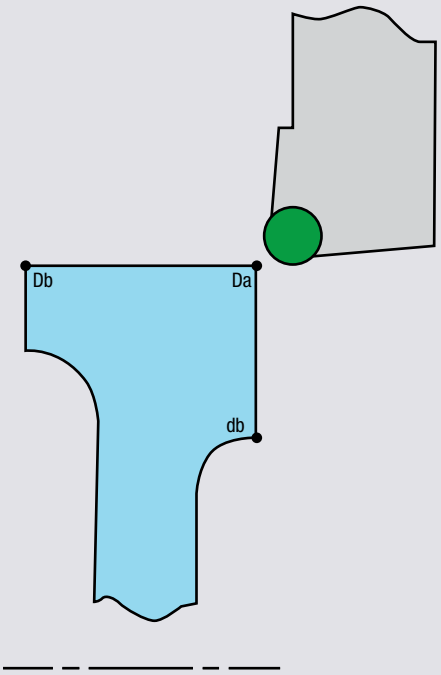
$$db = \sqrt{Da^2 - (15.279 \times T \times SFM \times IPR)}$$

If db is minus, you have passed center.

SFM = Surface Speed (feet/minute)
IPR = Feed Rate (inches/revolution)
LOC = Length of cut (inches)
T = Time (min.)
π = 3.1416
D = Large Diameter (inches)
d = Small Diameter (inches)
15.279 = $\frac{48}{\pi}$

Note: The constant speed capabilities of the lathe are assumed in the above facing calculations.

Metric



Turning

$$V = \frac{Dia. \times \pi \times RPM}{1000} \qquad RPM = \frac{V \times 1000}{Dia. \times \pi}$$

$$T = \frac{LOC}{S \times RPM} \qquad LOC\ Da\ to\ Db = \frac{V \times 1000 \times S \times T}{Dia. \times \pi}$$

Facing

To calculate the time (T) for a facing operation from starting point (Da) to finishing point (db):

$$\textbf{Time}\ Da\ to\ db = \frac{\pi\ (Da^2 - db^2)}{4000 \times V \times S}$$

To calculate the endpoint (db) for facing from starting point (Da) to finishing point (db):

$$db = \sqrt{Da^1 - (1273{,}2 \times T \times V \times S)}$$

If db is minus, you have passed center.

V = Surface Speed (meters/minute)
S = Feed Rate (mm/revolution)
LOC = Length of cut (mm)
T = Time (min.)
π = 3.1416
D = Large Diameter (mm)
d = Small Diameter (mm)
1273,2 = $\frac{4000}{\pi}$

Note: The constant speed capabilities of the lathe are assumed in the above facing calculations.

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Optional Clamps

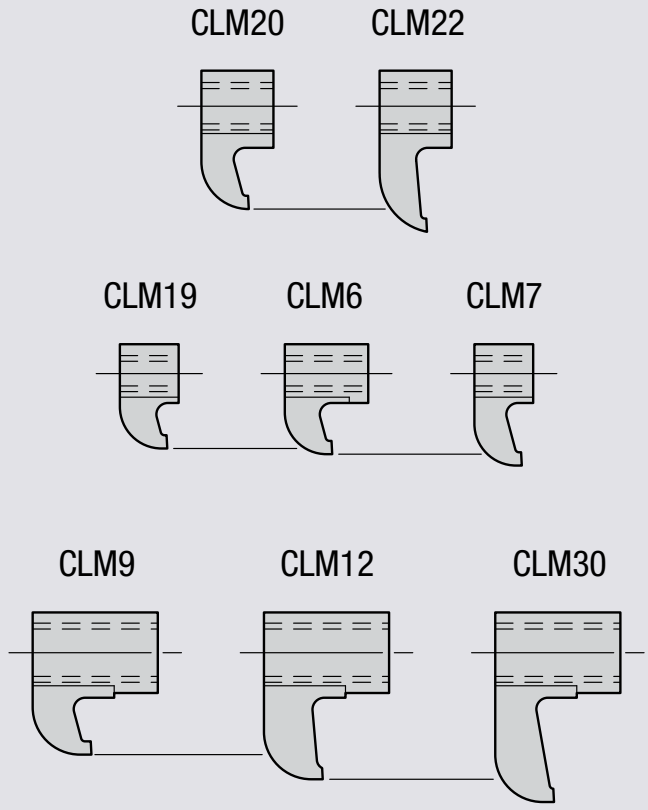
To give maximum flexibility and provide for maximum clamping advantage in any given cutting situation, there are alternative clamps available. The variation in these clamps is the reach. Barrel diameters are common.

A typical example of alternate clamp usage would be in holding an insert without a hole. In this case, the lock pin would be removed and the clamp substituted so that maximum top clamping capability may be applied.

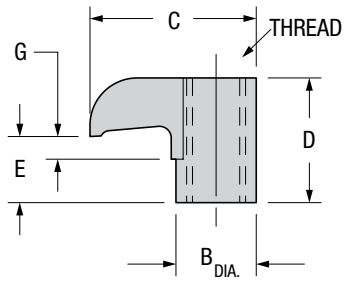
We have chosen as standard for each tool cataloged a clamp and differential screw combination for use with inserts with holes (pinlock). A longer reach clamp should be used when using top clamp alone. If conditions indicate, another combination would be advantageous. Please note as follows:

- Clamps CLM6, CLM7 and CLM19 are interchangeable. The difference is in the reach only.
- CLM9, CLM12 and CLM30 are all interchangeable, the difference being in the reach only.
- CLM20 and CLM22 are interchangeable, the difference being in the reach only.

Barrel diameters “B” and thread sizes are common. The reach “C”, height “D”, and “E” and “G” dimensions may be different. It is very important that sufficient clearance exist in the toolholder for the clamp to drop down far enough into the holder to attain clamping action on the insert.



Clamp Interchangeability



Order Number	B	C	D	E	G	Thread
CLM6	7,87	14,73	11,18	4,83	2,29	M5 x 0.8
CLM7	7,87	16,26	7,87	1,65	-	M5 x 0.8
CLM9	10,87	19,05	16,76	8,89	3,05	M8 x 1
CLM12	10,87	22,35	17,53	8,89	3,05	M8 x 1
CLM19	7,87	13,97	7,11	1,65	-	M5 x 0.8
CLM20	9,47	18,54	10,16	3,30	-	M6 x 1
CLM22	9,47	21,59	13,46	7,11	3,30	M6 x 1
CLM24	12,52	25,40	19,81	11,68	3,30	M10 x 1.25
CLM30	10,87	25,40	16,76	8,89	3,05	M8 x 1

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Greenleaf Advanced Whisker-Reinforced Ceramic Inserts

Greenleaf advanced whisker-reinforced ceramic inserts exhibit excellent wear and shock resistance at high surface speeds. These insert grades are very effective at machining nickel- and cobalt-based super alloys and other hard materials at metal removal rates up to 10 times greater than carbide.

The Ceramic Productivity Manual will help you to machine more effectively with WG-300®, WG-600® and WG-700™. For additional technical support, contact a Greenleaf representative at 1-814-763-2915.





Greenleaf Corporation is continually upgrading its products. For the most current information, please visit our web site at:

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What is a Whisker-Reinforced Ceramic?

Greenleaf WG-300®, developed by Greenleaf Corporation, is the first commercially available ceramic composite using the technology of whisker reinforcement. It can operate up to 10 times the speed used for uncoated carbide tools.

Greenleaf WG-600® is the first commercially available coated, whisker-reinforced ceramic composite. Greenleaf WG-600 offers up to 30% speed improvement and up to 3 times tool life over uncoated ceramics.

Greenleaf WG-700™ is the newest whisker-reinforced ceramic substrate. Featuring improved toughness and a unique high-speed coating, WG-700 is ideal for machining nickel- and cobalt-based super alloys and other difficult-to-cut materials. WG-700 offers high metal removal rates with exceptional tool life.

The basic concept involves reinforcing a hard ceramic matrix with extremely strong, stiff, silicon-carbide crystals, commonly called whiskers.

These whiskers are grown under carefully controlled conditions and, due to their high purity and lack of grain boundaries, approach the theoretical maximum strength obtainable. This strength is calculated to be in the order of 1 million psi (6,900 MPa) tensile!

The super-strong whiskers are dispersed into a matrix of fine-grained aluminum oxide where they act much like glass filaments do in fiberglass, for example, by adding tensile strength and improving the fracture toughness of the brittle matrix.

The increase in the fracture toughness of the material is such that inserts are now offered without hones as a standard, making them suitable for finish cuts on most forged nickel-based alloys without “smearing.”

A properly manufactured whisker-reinforced ceramic has outstanding thermal and mechanical shock resistance. It can withstand intermittent cut applications, such as in milling, without breakage.

WG-300® Fracture Surface

The fracture toughness of a whisker-reinforced ceramic is enhanced by the phenomenon of whisker “pull-out.” A close examination of the fracture surface at 3000x will reveal not only a clear indication of the whiskers randomly dispersed throughout the matrix, but also the obvious hexagonal holes where whiskers have actually been pulled out in the fracture process. A large amount of energy is required to pull the whiskers out. This greatly enhances the fracture toughness and the high predictability of the inserts.

Greenleaf WG -300® will not fail by catastrophic breakage unless grossly misapplied, but will be gradually consumed in a predictable wear pattern. This wear pattern will be unlike the wear modes of carbide tools. It is the subject of a later paragraph in this section and should be studied and clearly understood for successful results.

Figure 1



SEM Photomicrograph 3000x

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Physical Properties

Physical properties are only a rough indicator of cutting tool performance.Ceramic cutting tools should always be evaluated in actual service where the synergisms of material properties and cutting-tool engineering can be clearly seen.

Particular note should be made that “Modulus of Rigidity” or “Transverse Rupture Strength” is expressed according to the accepted laboratory procedures for ceramics.

Here, a 2" *(50,8 mm)* long sample is broken by a four-point bend test. It is more common to refer to the 9/16" *(14,3 mm)* long three-point test in the case of carbide, and some manufacturers use this test also for ceramics. Naturally, the T.R.S. values for ceramic on the 2" *(50,8 mm)* sample are appreciably lower than they would be on a 9/16" *(14,3 mm)* test bar.

Figure 2 – Physical Properties

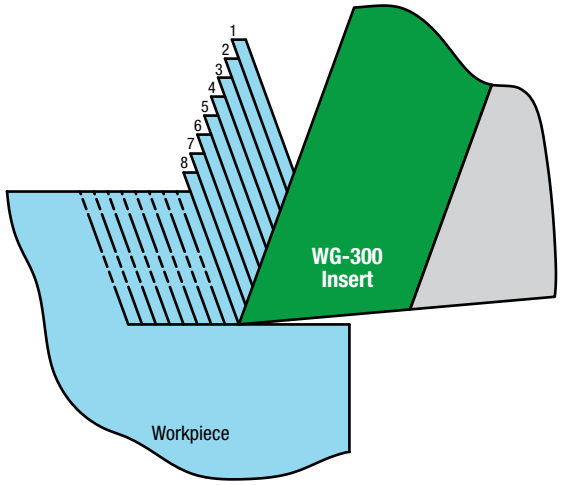
Microstructure	2 Phase Polycrystalline > 50% Alumina < 50% Silicon Carbide Whiskers
Density	= 3.74 g/cc
Melting Point	2040°C (3,700° F)
Hardness	≥ 94.4 RA
Modulus of Rigidity (E) / (4-Point Bend) } TRS = {	100,000 P.S.I.± 6,000 690 MPa ± 41
Young’s Modulus (E) **Modulus of Rigidity(G)**	= 57 X 10^6 P.S.I. = 23 X 10^6 P.S.I.
Poisson’s Ratio (M) $M = \frac{E}{2G} - 1$	= .23
Fracture Toughness *(Measures resistance of crack growth from stress)*	
Cemented Carbide	= 13.0
Hot Pressed Composite	= 3.8
WG Ceramics	= 10.0

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How to Use the Properties of Greenleaf Advanced Ceramics

During the metal-removal operation, material is displaced ahead of the tool by being forced through a "shear zone" and subsequently sliding over the rake face of the tool as a chip. This action has been studied by numerous researchers including "Piispanen and Merchant," who demonstrated the mechanism of chip formation, likening it to the sideways slide of a deck of cards, caused by the rake face of the tool. *(Figure 3)*

Figure 3 – Deck-of-Cards Principle

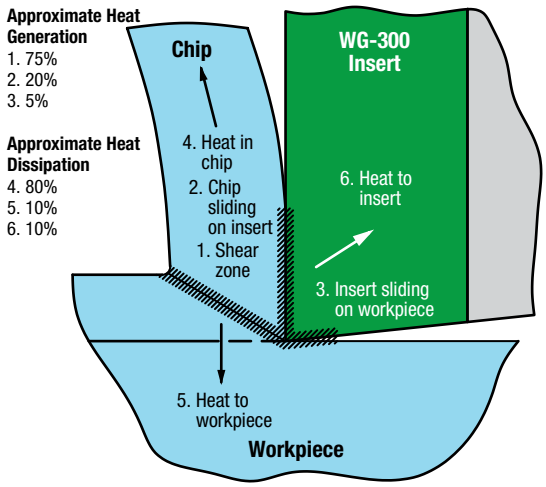


The chip is formed first by grain boundary distortion in front and below the shear plane, followed by grain boundary dislocation. This results in a chip that is always thicker than the layer of material being removed.

A large amount of shear stress is required to cause plastic deformation and shear to occur in the "shear zone," and this results in the generation of significant quantities of heat. In fact, as much as 75% of the heat generated during cutting is produced in this way. The other 25% comes from the sliding of the chip over the tool rake face and the contact of the flank of the tool with the workpiece. *(Figure 4)*

Most of the heat generated during metal cutting is dissipated by the chip carrying it away. As cutting speeds increase, the metal-cutting process becomes more adiabatic. In other words, the heat generated in the "shear zone" cannot be conducted away during the very short time in which the metal passes through this zone. We can benefit from the heat generation, temperature rise and softening effects in the "shear zone."

Figure 4 – Heat Dissipation in Ceramic Machining



The heat generated in the "shear zone" has been traditionally thought of as a negative factor since it is also associated with heat-related failure of cemented carbide cutting tools. This often leads to the need to slow down the cutting operation to a point where carbide inserts will give acceptable life.

Whisker-reinforced ceramics are able to withstand high temperatures while maintaining strength and hardness, and it has been shown that contrary to traditional methods of machining, we can, in fact, use the heat generated in the shear zone ahead of the tool to our advantage. There is an optimum speed outside the range of carbide tools where the heat generated lessens the cutting forces by softening the metal and aiding in the grain boundary dislocation.

This advantage can be very dramatic, sometimes moving the possible metal-cutting speeds from a few hundred feet per minute to thousands of feet per minute!

Such is the case with Greenleaf's whisker-reinforced ceramics when applied to most forged nickel-based alloys. Optimum speeds can be achieved with temperatures exceeding 1000° Celsius.

The excellent thermal shock resistance of whisker-reinforced ceramics results in a cutting material which can be used either dry, wet or even intermittently cooled without fear of catastrophic tool failure from thermal cracking.

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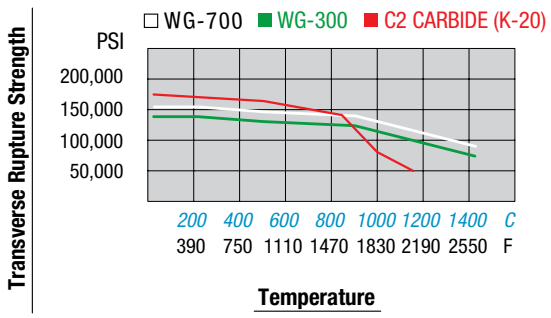
The outstanding hardness of Greenleaf whisker-reinforced ceramic inserts, combined with the high strength imparted by the reinforcing silicon-carbide whiskers, makes possible the machining of many materials previously workable only by grinding. Heat-treated alloy steels, die steels, weld overlays, and hard irons with interrupted cuts are just a few of the successful applications completed on a daily basis.

If your job is in the 45Rc to 65Rc range, chances are that Greenleaf's whisker-reinforced ceramic inserts can increase productivity and cut machining costs substantially.

Relative Strength at Elevated Temperatures

It is important to recognize that laboratory hardness and strength tests are conducted at room temperatures. Under actual cutting conditions where temperature at the tool/chip interface may reach over 1000° C, Greenleaf whisker-reinforced ceramics will retain high strength and hardness well beyond the point at which a tungsten-carbide material has softened, deformed or failed completely. Productivity advantages multiply quickly in this range of application.

Figure 5 – Relative Strength at Elevated Temperatures



Ceramic Application Guidelines

Rethink the process

The correct application of ceramic tooling on a CNC machine necessitates reprogramming of the part. Since we are doing this, we might just as well re-examine the entire process. Are we using the best geometry, largest radius, thickest insert, best tool path, etc.? When you have studied this application guide, you will be more aware of the variables and best approaches to the job using ceramic cutting tools.

Integrate the following tested methods into your programs:

Figure 6 – Ceramic Application Guidelines

1. Use a toolholder system designed for ceramic inserts.
2. Use the strongest insert shape possible.
3. Use the largest corner radius possible.
4. Use the correct edge preparation for the application.
5. Use the thickest inserts available for roughing.
6. Use a toolholder or boring bar with the largest possible cross section.
7. Consider heavy metal or carbide bars for boring applications.
8. Prechamfer on entry and exit whenever possible.
9. Keep toolholder overhang to a minimum.
10. ***Rethink the process***

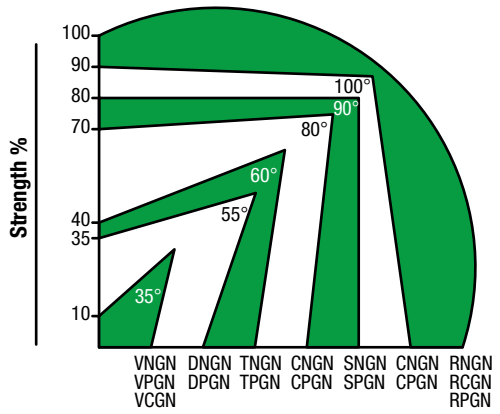
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Strength Comparison of Ceramic Inserts

Use the strongest insert shape

In declining order of corner strength, the strongest inserts are: Round, 100° Diamond, Square, 80° Diamond, Triangle, 55° Diamond, and 35° Diamond. Always use the strongest possible shape to maximize corner strength and metal-removal capability.

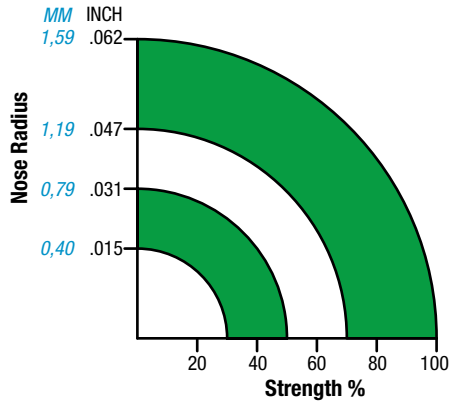
Figure 7 – Insert Shapes and Strengths



Use the largest corner radius possible

The larger the corner radius, the stronger the corner. Do not attempt to do all roughing operations with a small corner radius just because the finished fillet calls for a small radius. Use a round insert or large radius insert for roughing and change the tool for the final cuts.

Figure 8 – Relative Strength for Various Insert Radii

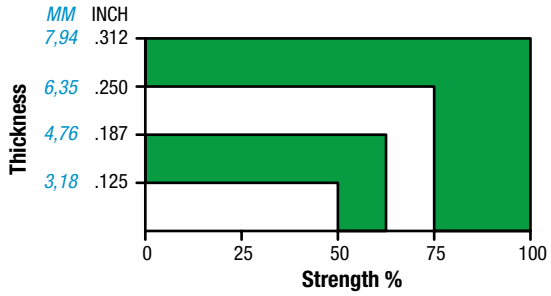


Use thick inserts for roughing

Increased insert thickness results in far better impact resistance, better heat dispersion, and longer tool life.

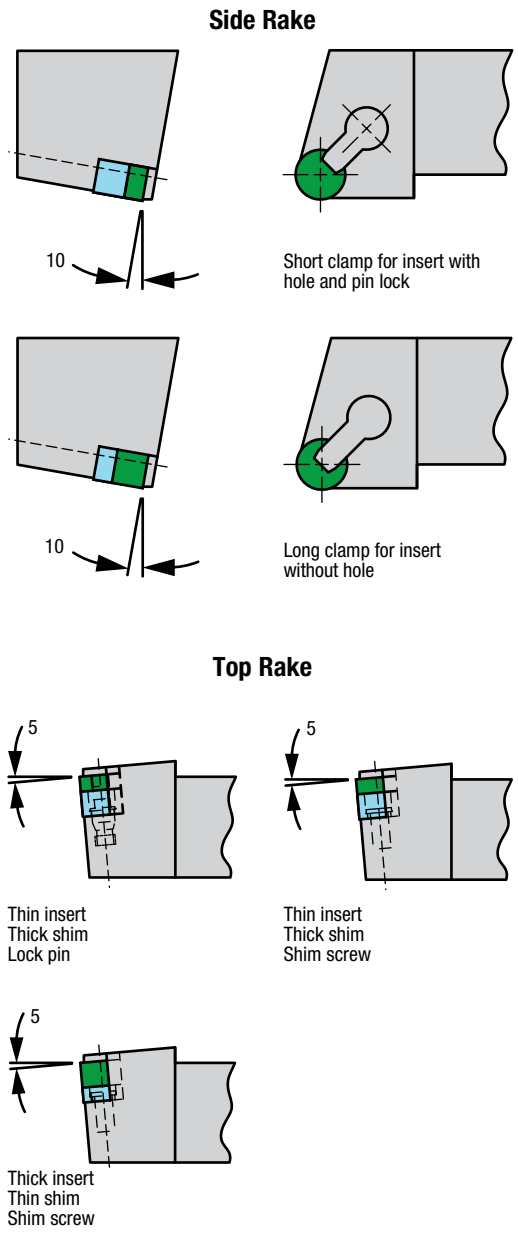
This adds to greater predictability of performance and less downtime.

Figure 9 – Relative Strength for Various Insert Thicknesses



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Figure 10 – Toolholder System



Use the Greenleaf toolholder system

The use of Greenleaf toolholders and accessories permits:

a) Either standard or thick inserts to be used in the same toolholder by changing shim seats.

b) The toolholders can be used for pinlock-style inserts by exchanging the shim screw for a tilt pin.

c) Alternative lengths of clamps are available with the holder being supplied standard with the large clamp to ensure good retention of ceramic inserts without holes.

d) In the case of negative-rake tooling, we have found that the normal carbide tool geometry of -5° top and side rake may be changed very advantageously to -5° top rake, and -10° side rake for materials under 45Rc hardness. Greenleaf tools for use with whisker-reinforced ceramics are illustrated in the Ceramic Toolholders in the Turning section of this catalog and have been designed to take advantage of this increased negative rake which will give longer tool life. The increased pressure associated with a greater negative rake is insignificant and not evident at the high velocity and temperatures at which these tools are used.

NOTE:
Greenleaf toolholders for v-bottom inserts are designed to take 7° side-clearance inserts as well as 11°.

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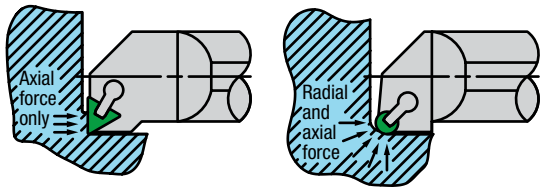
Use toolholder or boring bar with greatest cross sectional area

Stability of the tool and freedom from deflection are paramount to consistent performance. If the tool post will accept 1-1/4" *(32 mm)* shanks, do not be satisfied to take a 1" *(25 mm)* shank and shim it to suit. This is false economy.

Straight-edged inserts versus rounds

Long overhangs for tools are necessary when working with turrets in order to clear other tools. In these cases, straight-edged inserts should be applied to eliminate radial tool forces and avoid chatter.

Figure 11 – Straight-Edged Inserts vs. Round



Keep overhang to a minimum

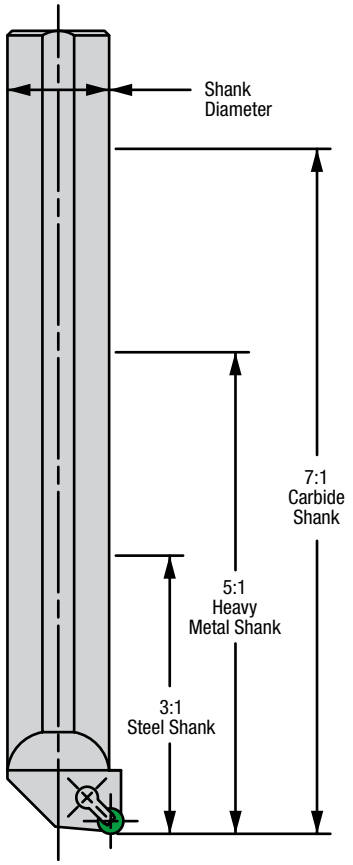
Any deflection will lead to vibrations, which are particularly damaging to ceramic tools. Unnecessary tool overhang is the principle cause of vibration. It should be noted, the force required to produce a particular deflection decreases by the cube of the overhang! That means that doubling the overhang will increase deflection eight (8) times if all other conditions are constant.

Boring bars, in particular, usually operate with much greater length-to-diameter ratios than turning tools. In this case, “heavy” metal or solid-carbide bars are often easily justified.

Solid-carbide boring bars have three (3) times the modulus of elasticity of a steel bar. This means that a carbide bar will only deflect 1/3 as much as a comparable steel bar under identical circumstances.

As a general rule, when machining nickel-based alloys, steel boring bars will give adequate performance at overhang-to-bar diameter ratios of up to 3:1. Special boring bars manufactured from “heavy” metals give an advantage over steel bars and can be used at ratios up to 5:1. Carbide boring bars extend this range to ratios up to 7:1.

Figure 12 – Shank Diameter-to-Bar-Length Ratio for Ceramic Inserted Boring Bars



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The Application of Greenleaf Advanced Ceramics

Feed and speed recommendations are expressed in the graph below *(Figure 13)*. This graph is based on empirical data gathered during extensive testing under shop conditions.

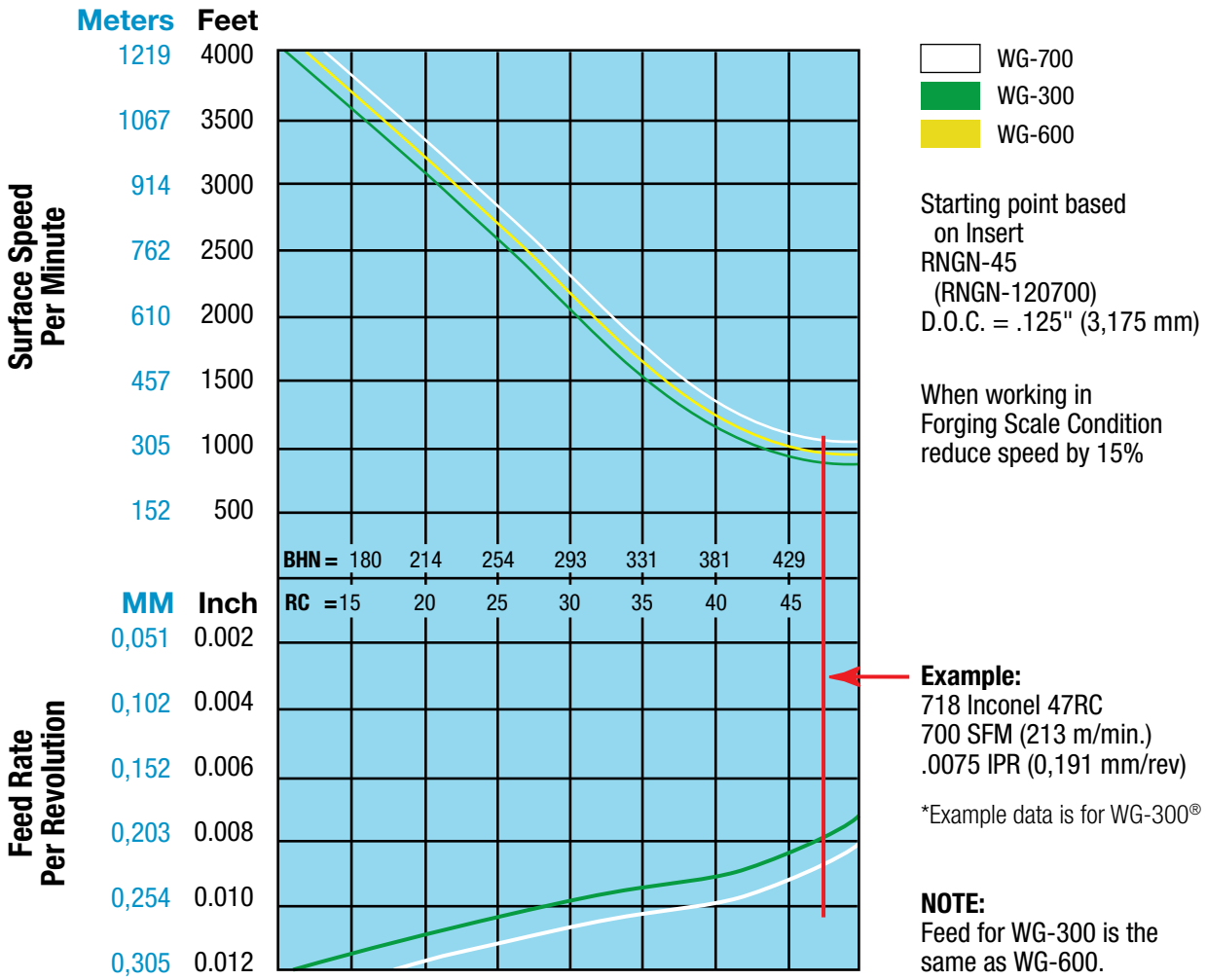
The most significant factors are the hardness of the material and the surface condition. It is on the basis of these parameters that the data are presented.

To achieve optimum cutting conditions, it is necessary to regulate not only the speed but also the feed. There must be a carefully balanced relationship between the speed and the feed. The higher temperatures required can be generated by a slower speed than the optimum, provided that the chip is thinned by reducing the feed.

Any reduction of speed from the recommended starting points without a corresponding decrease in feed results in a thicker, cooler chip and an increase in cutting forces. This may result in shortened tool life or failure by chipping and breakage.

It must be noted that thick chips provide a larger heat sink and tend to be cooler and stiffer, and that thin chips do not have sufficient heat absorbing capacity and tend to be too hot. For each metal hardness and surface condition, there is a speed and a feed at which the best temperature balance is obtained.

Figure 13 – Greenleaf Advanced Ceramics Machining Recommendations



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How to use Figure 13 graph:

1) Feed and speed are based on RNGN-45 (12 07 00) round inserts. When using inserts with weaker shapes such as triangles, etc., some reduction of feed will be required. *(Figure 21)*

2) **You must know the physical hardness of the material.**

3) The recommendations are based on an average depth of cut of .125" *(3,175 mm)*. Deeper depths will require some reduction of speed and feed, and shallower depths can be cut at elevated speeds and feeds. See *Figures 15 & 16.*

4) From the material hardness, move vertically downward to the curve and then horizontally to the left to read the recommended feed rate per revolution.

5) Whenever the recommended speed is not achievable on the machine tool, then the recommended feed must be reduced by the same percentage (%), i.e.
   Speed recommended – 2000 SFM (610 m/min.)
   Feed recommended – .010" I.P.R. *(0,254 mm)*
   Top speed on machine –
   1000 SFM (305 m/min.) = 50% of recommended speed then use feed of .005" I.P.R. *(0,127 mm)*

The feed and speed are based upon the ability of the ceramic insert to withstand high temperatures and to run with a chip thickness which results in heat being concentrated in the shear zone ahead of the tool. This will reduce cutting pressure and minimize wear. If the speed is reduced without a corresponding reduction in feed, this effect will be lost and performance will fall off due to chipping of the cutting edge from a colder chip.

General starting speeds should be eight times the uncoated carbide speeds and four times coated carbide speeds.

Compared to sialon materials, speed and then feed should be increased 25% to 50%.

Rule of thumb when cutting nickel-based cast material rather than forged material:

1. Increase speed from graph recommended by factor of 2x.
2. Decrease recommended feed to one half of value.
3. Maintain a depth of cut of less than .060" *(1,5 mm)* for an RNGN-45 (12 07 00) insert.
4. Use plentiful supply of coolant.

Aged and solution treated nickel-based cast alloys – use same parameters as forged materials, except less than .075 *(2 mm)* DOC for an RNGN-45 (12 07 00) insert.

Anticipated Tool Life

For programming purposes, it is useful to have a starting guideline for anticipated tool life. We present here some approximate values which are based upon actual experience at the maximum recommended depth of cut (1/4 of insert diameter) and at the speed given in the graph. It should be noted that these speeds are up to eight times those used with uncoated carbide tools. Even at the conservative starting values for tool life per corner given, the actual volume of metal removed per index also will be eight times that produced in the same period of time with carbide tools.

Another way of stating this is – five minutes of tool life with a Greenleaf advanced ceramic is equivalent, in work produced, to 40 minutes of life with a carbide tool! *In fact, a carbide tool will never last 40 minutes.*

Figure 14 – Anticipated Tool Life

Starting Points for Time in Cut

Round Insert	Life per Index
.250" *(6,3 mm)*	3 min.
.375" *(9,5 mm)*	4 min.
.500" *(12,7 mm)*	5 min.

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Speed and Feed vs. Depth of Cut for Round Inserts

The round insert behaves differently from a straight-sided insert as depth of cut is changed.

Because the chip produced by a round insert is crescent shaped and reduces in thickness toward the finished surface, as the depth is reduced, the thinning chip, combined with increased lead angle, gives a significant drop in pressure at the workpiece surface/tool interface. This means that both speed and feed can be increased without detriment to tool life as depth reduces.

Speed and feed should be increased by a like amount percentage (%) to achieve the best result.

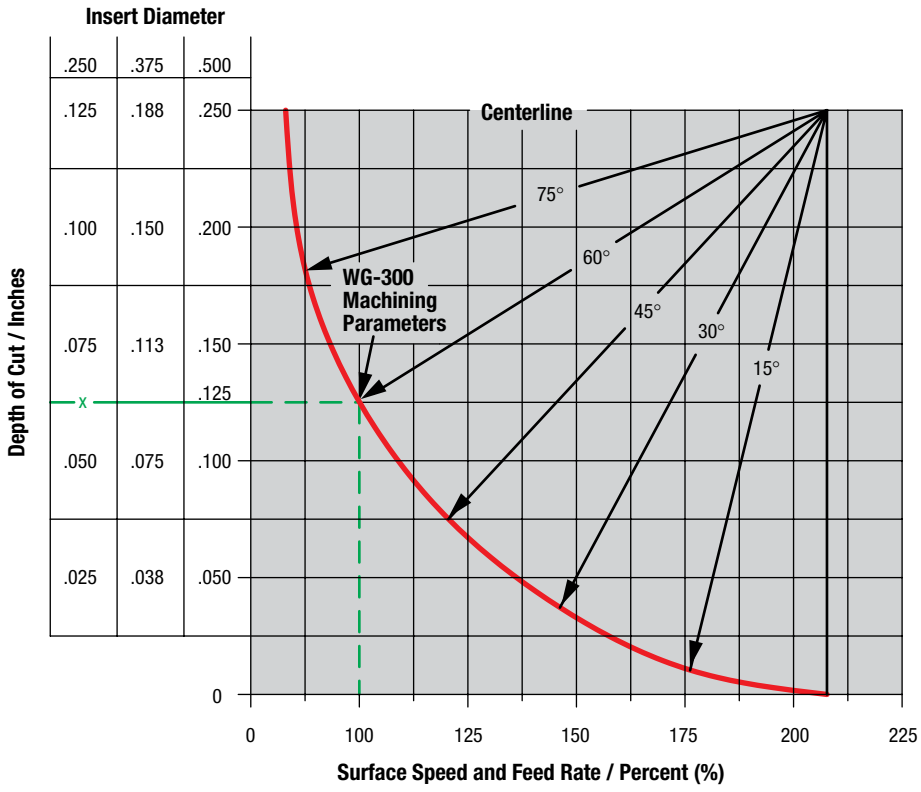
We can now refer to the graph ***Surface Speed and Feed Rate/Percent (%) Versus Depth-of-Cut of Radii***. *(Figure 15)*

1) It will be seen from reference to this chart that the speed/feed graph is set up on .125" *(3,18 mm)* depth of cut, using a .250" *(6,35 mm)* radius tool or .500" *(12,7 mm)* round insert. This results in a depth equal to the 60° mark (90° being half the diameter or radius) and gives a reasonably conservative starting point for most Inconel 718 applications. A slightly shallower depth at around the 45° line will usually give the best tool life in exchange for a small decrease in metal removal rates.

2) Finishing cuts are usually taken at depths of cut less than those set up as reference points on the graph. *(Figure 13)*

   When using round inserts, it will be possible to make substantial increases in both feed and speed beyond the values given in the graph if the depth of cut is less than "**X**" value.

Figure 15 – Surface Speed and Feed Rate/Percent (%) vs. Depth of Cut of Radii (IMPERIAL)



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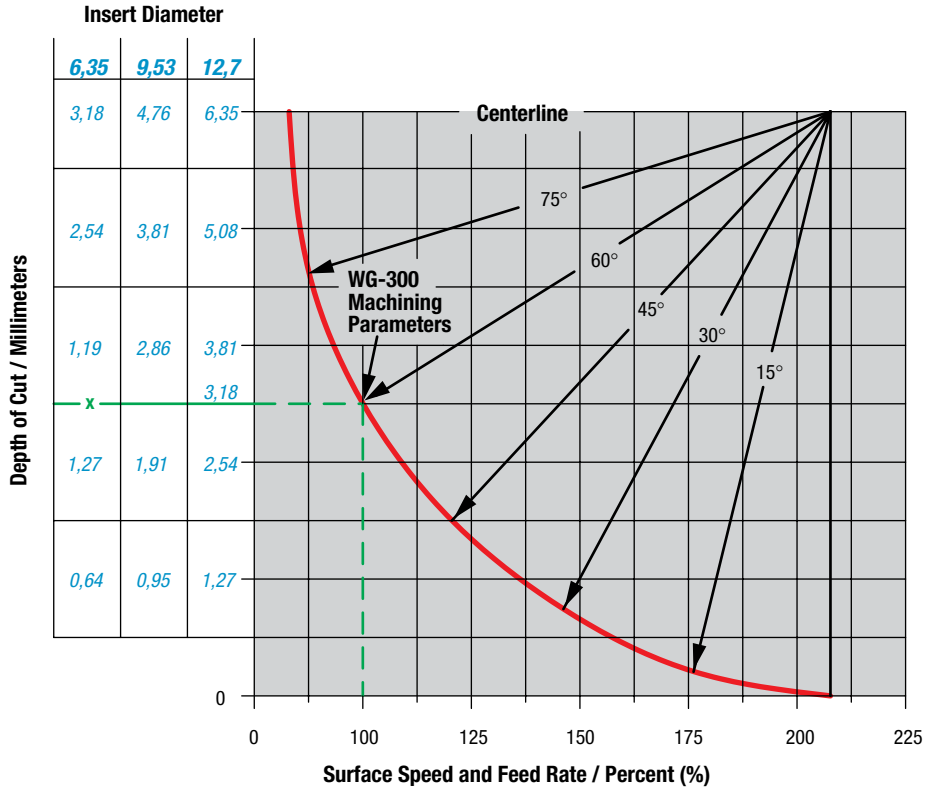
As always, the rule should be applied that feed and speed will be increased together and by the same percentage (%). Failure to regard this rule will result in cooler or hotter interface temperatures with corresponding drop-off of tool performance.

When taking a depth of cut that is less than the graph value for "X," refer to *Figures 15 and 16 (Imperial and Metric).* Select the insert diameter that best suits the application and provides the depth-of-cut capability that is closest to the graph value of "X," then adjust the speed/feed according to the chart.

For example:
Column 1 is for .250" *(6,35 mm)* round insert
or .125" *(3,18 mm)* radius.
Column 2 is for .375" *(9,53 mm)* round insert
or .188" *(4,76 mm)* radius.
Column 3 is for .500" *(12,7 mm)* round insert
or .250" *(6,35 mm)* radius.

1. Select approximate desired depth of cut
Example: .500" *(12,7 mm)* diameter round at .050" *(1,27 mm)* depth of cut is bottom box of column 3.
2. Follow the line to the right until it intersects the heavy curved line.
3. Follow the line vertically downward to the bottom scale and read value of 137% (midway between 125% and 150%).
4. You may increase the speed and feed values in the graph *(Figure 13)* by 37% for this cut.

Figure 16 – Surface Speed and Feed Rate/Percent (%) vs. Depth of Cut of Radii (METRIC)



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Lead-Angle Effect on Round Versus Straight-Edged Inserts

To emphasize the advantage of using round inserts, let us look at a comparison between the chip-thinning effect obtained at various depths on a round insert compared to the lead angle needed to get the same effect with a straight-edged insert.

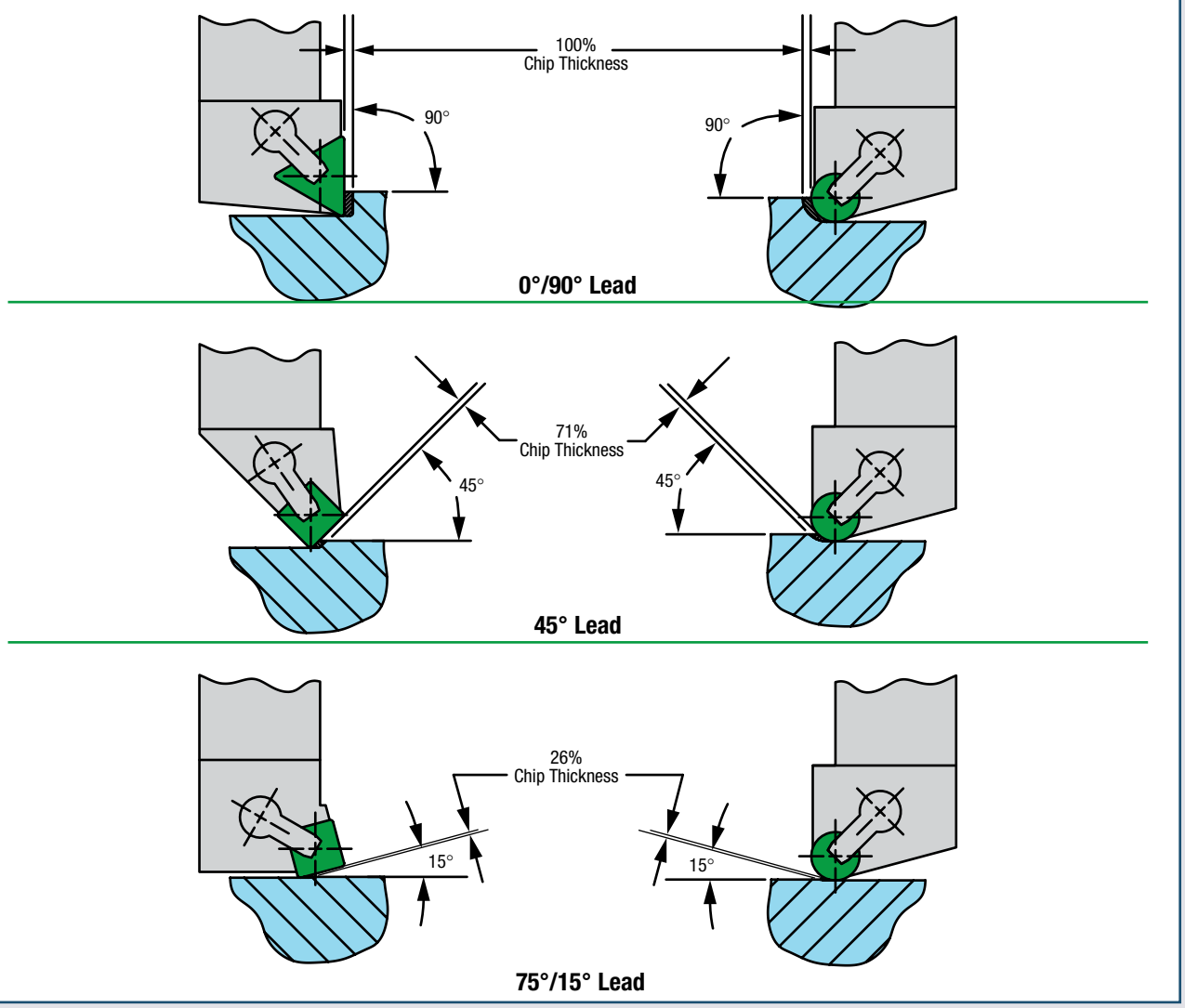
If we assume operations with lighter depths of cut, then a round insert engaged up to 45° or halfway along the available cutting edge and advancing at .010" *(0,25 mm)* per revolution will produce an actual maximum chip thickness of 71% or .007" *(0,18 mm)*.

The chip actually thins from this point gradually towards the finished surface. To thin the chip to .007" *(0,18 mm)* with a straight-edged insert requires a lead angle of 45°, which is about the maximum lead angle practical.

Beyond this point, the round insert can be used very easily at 30° or less. To get the same chip-thinning effect from a straight-edged insert requires 60° or more of lead angle which is just not practical.

In summary, the high lead-angle effect with corresponding reduction of pressure, especially at the depth-of-cut line, is more practical with round inserts.

Figure 17 – Lead-Angle Effect on Round vs. Straight-Edged Inserts and the Theoretical Chip Thickness



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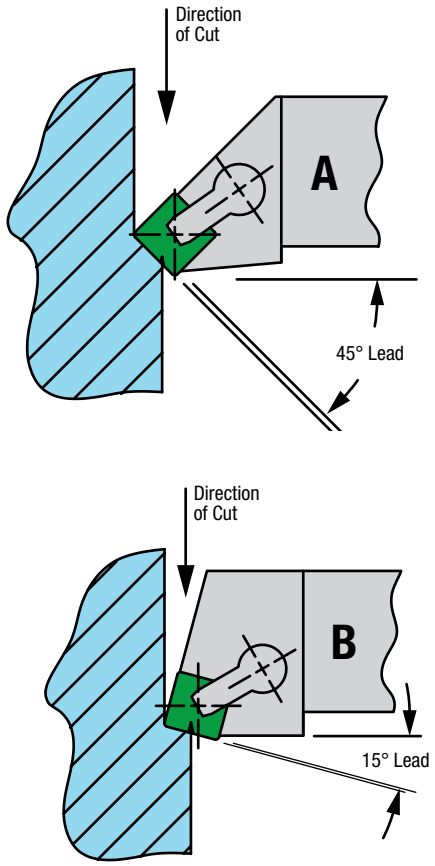
Lead-Angle Effect with Other Than Round Inserts

In the cutting of nickel-based alloys, the lead angle employed is of significance. Larger lead angles reduce chip thickness, improving tool life and surface finish.

Figure 18 shows the change in lead-angle effect. It may be necessary to design tooling which does not stand on traditional carbide values to get optimum performance.

It should be noted that example (A) will produce more pressure on the part piece and may not be feasible on thin sections.

Figure 18 – Lead-Angle Effect



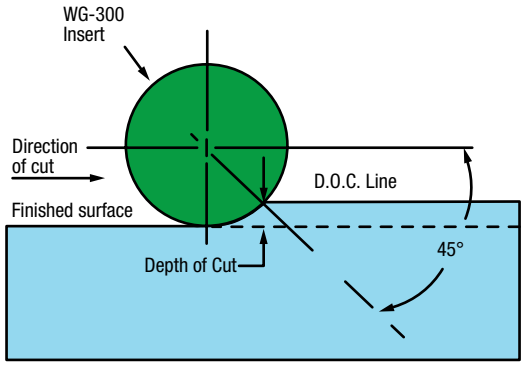
Recommended Depth of Cut for Round Inserts

For best results, there must be a planned relationship between the insert radius and the proposed depth of cut, if the notching effect at the depth-of-cut line is to be minimized.

It will be seen by reference to the illustration, *(Figure 19)* that there will be a sudden decrease in lead-angle effect beyond a given depth on a given insert radius. This point lies at the intersection of a line drawn at 45° from the center of the insert. The effect of the decreasing lead angle is increased cutting pressures. The deeper the cut with a round insert beyond this point, the greater the depth-of-cut notching.

It is often a clear advantage in nickel-based alloys to make light cuts with relatively large-diameter round inserts. Here are the depths of cut that produce the optimum relationship on given insert sizes.

Figure 19 – Recommended Depth of Cut for Round Inserts



Insert Radius		Optimum Depth of Cut	
Inches	***Millimeter***	**Inches**	***Millimeter***
.125	*3,18*	.037	*0,93*
.187	*4,76*	.052	*1,40*
.250	*6,35*	.073	*1,86*
.312	*7,94*	.092	*2,33*
.375	*9,53*	.110	*2,79*
.437	*11,11*	.128	*3,26*
.500	*12,70*	.147	*3,72*

Of course, depths lighter than those given will increase tool life at some penalty of metal removal rate. Refer back to *Figures 15 and 16* where we discuss the use of lighter depths of cut combined with increased feeds and speeds.

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Recommended Depth of Cut for Insert Nose Radii

It is very important in roughing operations with round inserts to leave the recommended amount of stock for finishing with straight inserts.

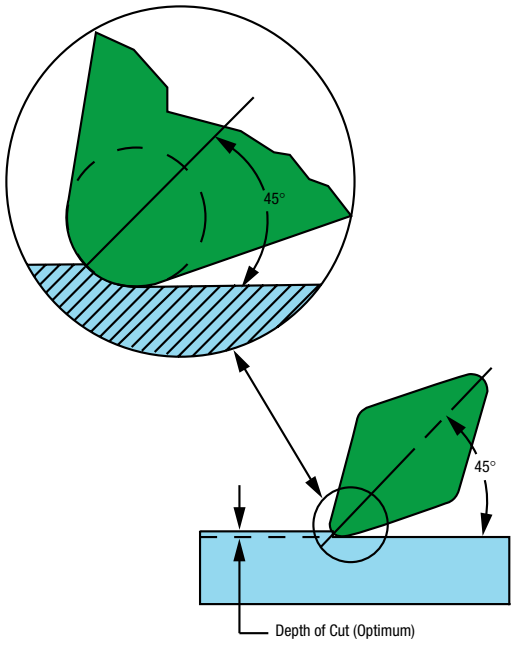
For maximum tool life when using straight-edged inserts with corner radii as opposed to round inserts, a similar effect as described with round inserts is obtained. In this case, the allowable depths of cut are related to the radius and not the insert size, assuming that the depth of cut being attempted is relatively light, such as in finishing operations.

The table to the right shows the *optimum* depth of cut at which maximum tool life (minimum notching) should start.

The accuracy for roughing therefore becomes more important, and the depth of recommended passes for finishing must be as illustrated in *Figure 20*:

A large radius, while having reduced notching tendency, will sometimes be impractical because of radius requirements on the workpiece. Larger insert radii may also cause the deflection of thin sections as a consequence of larger radial forces acting between the tool and the workpiece. A compromise between notching and these factors must often be made. However, it should be remembered that regardless of geometry, cutting force will be lower when using WG-300 high-speed techniques to plasticize the material.

Figure 20 – Recommended Depth of Cut for Insert Nose Radii



Insert Radius		Optimum Depth of Cut	
Inches	***Millimeter***	**Inches**	***Millimeter***
.015	*0,38*	.0046	*0,12*
.031	*0,80*	.0092	*0,23*
.048	*1,21*	.0139	*0,35*
.063	*1,59*	.0183	*0,47*
.094	*2,38*	.0275	*0,70*
.125	*3,18*	.0370	*0,93*

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Recommended Percentage (%) Reduction of Feed Per Revolution for Other Than Round Inserts (Except Grooving)

When applying inserts other than rounds, there are a number of variables present which have a direct effect on the ability of the insert to tolerate the cutting loads. These variables include the specific corner or nose radius of the insert, the included angle of the corner (i.e. Triangle, Square or Diamond shape), the lead angle of the cutting tool to be used, the depth of cut selected, and the part piece being machined due to entry and exit angles.

It is possible to look at all of the variables and then apply percentage (%) reduction factors to the recommended feed of the graph *(Figure 13)* to compensate for them.

In all cases the speed should be maintained as recommended.

Figure 21 – Feed Adjustment for Straight-Sided Inserts

Nose radius	1/64	1/32	3/64	1/16	3/32	1/8
ANSI designation	1	2	3	4	6	8
ISO designation	04	08	12	16	24	32
Inches	.015	.031	.047	.062	.094	.125
mm	*0,4*	*0,8*	*1,19*	*1,59*	*2,38*	*3,18*
Reduction percentage	**19%**	**16%**	**13%**	**10%**	**5%**	**2%**
DOC/inches	0-.050	.125	.250	.375	.500	.750
DOC/mm	*0-1,27*	*3,18*	*6,35*	*9,53*	*12,7*	*19,05*
Reduction percentage	**5%**	**8%**	**13%**	**16%**	**18%**	**20%**
Lead angle	0° & -5°	15°	30°	45°	60°	75°
Reduction percentage	**18%**	**17%**	**15%**	**12%**	**8%**	**5%**
Included angle	35°	55°	60°	80°	90°	100°
Reduction percentage	**17%**	**13%**	**10%**	**6%**	**4%**	**2%**
Part diameter/inches	0-5	10	20	30	40	50
Part diameter/mm	*0-127*	*254*	*508*	*762*	*1016*	*1270*
Reduction percentage	**18%**	**14%**	**10%**	**6%**	**2%**	**0%**

Select and add five reduction percentage (%) factors and subtract from feed rate of graph in *Figure 13*.

Example: CNGN 432 (120408)

Nose Radius 0.031 *(0,8 mm)*	=	16%
Assumed DOC .125 *(3,18 mm)*	=	8%
Lead -5°	=	18%
Included angle (80°)	=	6%
Assumed part dia. 20" *(508 mm)*	=	10%
		58%

58% reduction of feed rate recommended from graph *(Figure 13)*.

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Theoretical Surface Roughness vs. Feed and Insert Radius

Rethink the process

The quality of the finished surface is affected directly by the radius of the tool and the feed rate at which the tool is advanced. The larger the radius, the faster the tool may be fed for a given degree of surface finish. The finish is usually stated as surface roughness in micro inches or micro meters.

The chart can be used to determine the combination of tool radius and feed rate for various roughness measurements from 8 micro inches (0,2 micro meters) to 250 micro inches (6,3 micro meters). *Using less feed rate than necessary results in premature tool wear causing bad finish, taper, and size problems.*

Figure 22 – Theoretical Surface Roughness

Roughness average											
Micro inches (Ra)		8	16	32	63	80	100	125	150	200	250
Micro meter (µm)		*0,2*	*0,4*	*0,8*	*1,6*	*2,0*	*2,5*	*3,1*	*3,8*	*5,0*	*6,3*
	Nose radius	Feed rate per revolution									
Inches	.0156	.002	.0025	.004	.0055	.0065	.007	.0075	.008	.010	.011
mm	*0,40*	*0,05*	*0,06*	*0,10*	*0,14*	*0,17*	*0,18*	*0,19*	*0,20*	*0,25*	*0,23*
Inches	.0313	.003	.004	.0055	.008	.009	.010	.011	.012	.014	.016
mm	*0,79*	*0,08*	*0,10*	*0,14*	*0,20*	*0,23*	*0,25*	*0,28*	*0,30*	*0,35*	*0,41*
Inches	.0469	.0035	.005	.007	.0095	.0105	.012	.013	.015	.017	.019
mm	*1,19*	*0,09*	*0,13*	*0,18*	*0,24*	*0,27*	*0,30*	*0,33*	*0,38*	*0,43*	*0,42*
Inches	.0625	.004	.0055	.008	.011	.0125	.014	.015	.017	.020	.022
mm	*1,59*	*0,10*	*0,14*	*0,20*	*0,28*	*0,32*	*0,35*	*0,38*	*0,43*	*0,50*	*0,56*
Inches	.0938	.0045	.007	.009	.013	.015	.017	.019	.021	.023	.026
mm	*2,38*	*0,11*	*0,18*	*0,23*	*0,33*	*0,33*	*0,43*	*0,43*	*0,53*	*0,58*	*0,66*
Inches	.125	.0055	.008	.011	.016	.018	.020	.022	.024	.027	.031
mm	*3,13*	*0,14*	*0,20*	*0,23*	*0,41*	*0,45*	*0,50*	*0,56*	*0,60*	*0,69*	*0,79*
Inches	.1875	.007	.0095	.0135	.017	.021	.025	.027	.030	.034	.040
mm	*4,76*	*0,18*	*0,24*	*0,34*	*0,43*	*0,53*	*0,64*	*0,69*	*0,76*	*0,86*	*1,02*
Inches	.250	.008	.011	.016	.022	.025	.027	.031	.034	.040	.044
mm	*6,35*	*0,20*	*0,28*	*0,41*	*0,56*	*0,65*	*0,69*	*0,79*	*0,86*	*1,02*	*1,12*

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The Effect of Increased Clearance on Tool Life

Under normal tool wear circumstances, a tool is said to be "worn out" when the flank wear has developed to the point that surface finish has deteriorated outside of acceptable limits. This is determined when the width of the wear land has decreased clearance and increased heat and pressures in the tool workpiece interface area to the point that further use will lead to complete failure of the tool by severe chipping or catastrophic breakage. On nickel-based alloys, the depth-of-cut notch may become too severe before this flank wear has progressed to that limit.

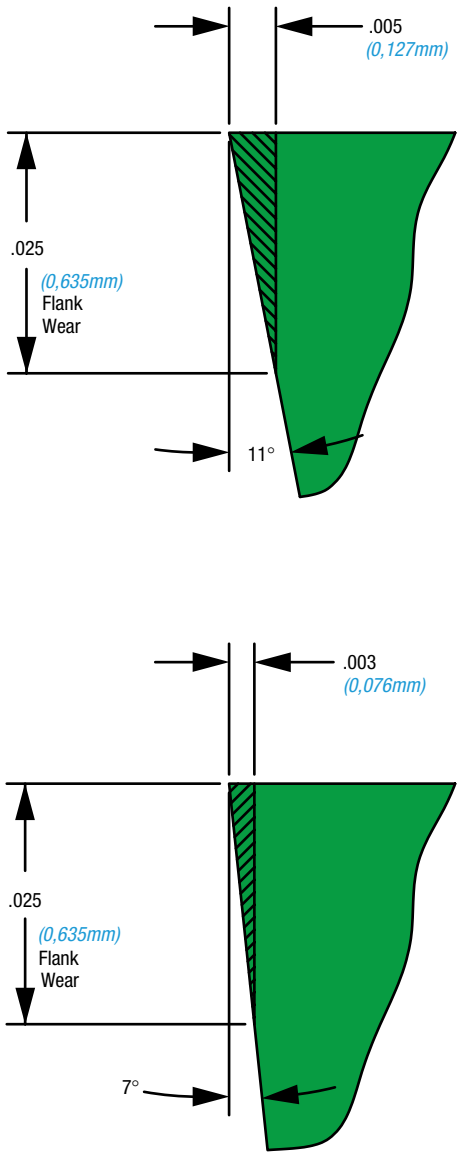
However, assuming that notching is under reasonable control, tool life, as judged by wear land development, can be prolonged by increasing the tool side clearance. With "normal" hot-pressed or cold-pressed ceramic and composites, this clearance is usually limited to about 7° since the materials are too brittle and friable to permit a larger angle. Greenleaf advanced whisker-reinfored ceramics do not suffer from this problem, and large clearances can be used because of the greater edge strength. To view the difference that, for example, an 11° clearance makes compared to a 7° clearance, refer to the illustration. *(Figure 23)*

It will be seen that with a 7° clearance angle, .003" *(0,07 mm)* of material will be worn from the insert to produce a .025" *(0,64 mm)* wear land, whereas .005" *(0,12 mm)* of material must be worn from an 11° clearance insert to produce the same amount of wear land. This will then equate to increased tool life between indexes.

It is recommended that tooling be carefully evaluated on all operations relative to using clearance angle inserts. In most cases, investments in new tools can be justified.

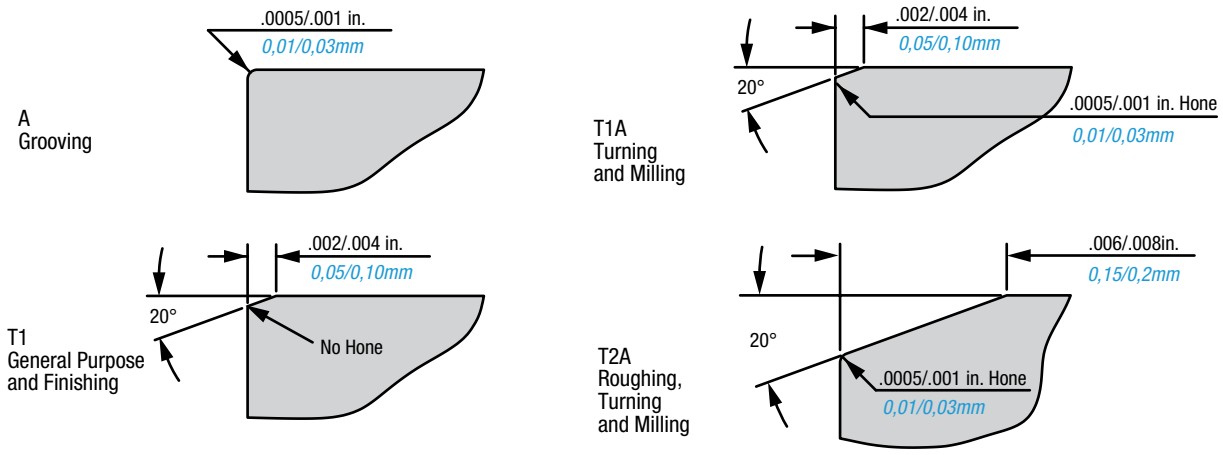
Remember, a Greenleaf tool is designed to take 7° side-clearance inserts as well as 11°.

Figure 23 – The Effect of Increased Clearance on Tool Life



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Figure 24 – Standard Edge Preparations



Edge Preparation For Nickel-Based Alloys

Greenleaf advanced whisker-reinforced ceramics have inherently strong cutting edges, and it is recommended to use them without hones, except when making heavy roughing cuts or in scale conditions. A sharp cutting edge is a clear advantage in finishing operations to avoid "burnishing" and "smearing."

For most nickel-alloy operations involving light roughing and finishing in clean material, the T1 edge preparation should be standard. *No hone is used.*

In ceramic tool applications, edge preparation is critical to tool life and surface integrity. Edge preparations are used to change the shear forces at the edge to compressive forces, thereby guarding against chipping and breakage.

If we use a wide negative land on a tool and use a very light feed rate, we have in fact changed the geometry of the tool by doing all of the cutting on the land itself. This is incorrect use of a negative land giving rise to a new set of problems. We highly recommend using a T1 edge preparation (.002"-.004" x 20°) *(0,05 mm-0,10 mm x 20°)* for increased strength with minimum "smearing" effect during finishing operations. (See *Figure 24* for more details.) It may be necessary to add a hone (T1A) when light scale conditions or minor interruptions are present.

For milling and roughing other than very heavy-duty machining, a T2A edge prep should be used (.006"-.008"x 20°+.0005" hone) *(0,15 mm-0,2 mm x 20°+ 0,013 mm hone)*.
For most aircraft-type work, T1 and T2A should be the only edge conditions required.

Remember; *never* use a honed edge unless it has been shown conclusively that a hone is required. This should be in very few applications. *Always* start by testing the T1 edge preparation.

The exceptions to the general stated rule would be:

Grooving

Because a grooving tool moves constantly forward into clean material, there is no notching problem in normal usage. Also, a grooving tool is usually a relatively fragile tool especially in the narrow-width grooves found in jet engine work.

For these reasons, we highly recommend that grooving tools do not have a negative land. This will keep cutting forces to a minimum.

For grooving use an "A" hone only.

Heavy Interruptions

In severely interrupted cuts, we need to keep the cutting edge in compression to avoid shear forces. This will reduce chipping and breakage. The chip width is smaller than the negative land width.

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Coolant

The recommendation to use flood coolant on whisker-reinforced ceramics may appear to be something of a paradox. “How to Use the Properties of Greenleaf Advanced Whisker-Reinforced Cermics”, page ATI30, introduces the concept that heat produced by the application of WG-300 plasticizes the metal in front of the cutting edge. This action is desirable and heat is used advantageously. However, it is also desirable to cool the whole operation by flooding it with coolants—thus, the paradox.

Whisker-reinforced ceramics are a good heat conductor compared to ordinary ceramic materials. The heat is pulled away from the tool/workpiece interface into the body of the insert where the coolant can help to maintain a lower tool temperature. We can lower the temperature of the chip with coolant after it has formed and make it more manageable.

Coolant will also help keep the part piece temperature stable to aid in size control and reduce distortion. Use coolant liberally at all times. Unlike ordinary ceramics, the whisker-reinforced grades will not suffer breakage or cracking from intermittent coolant use.

The coolant does not decrease the temperature in the interface area; however, coolant often doubles tool life.

It is important to use clean coolant. This is not a problem when a central coolant system is used. With a stand-alone machine, the coolant must be checked very closely. Water evaporates faster than oil at these high temperatures. Adding more coolant will increase the soluble oil content, which leads to smoking, less cooling effect and shorter tool life. Contamination of the coolant from any material such as cigarette butts, coffee, etc., has proven very detrimental and should be monitored.

High coolant pressure on nickel-based alloys is not as important as volume. A minimum of a 3/8" *(10 mm)* inside diameter pipe is recommended.

The coolant must be directed exactly on the cutting area without any interference from clamps, screws, or otherwise. Oil-based, water-soluble, emulsion-type coolants have proven to be the best.

The use of straight oils is to be avoided since the hazards of oil smoke and fire exist.

***Figure 25* – Coolant**



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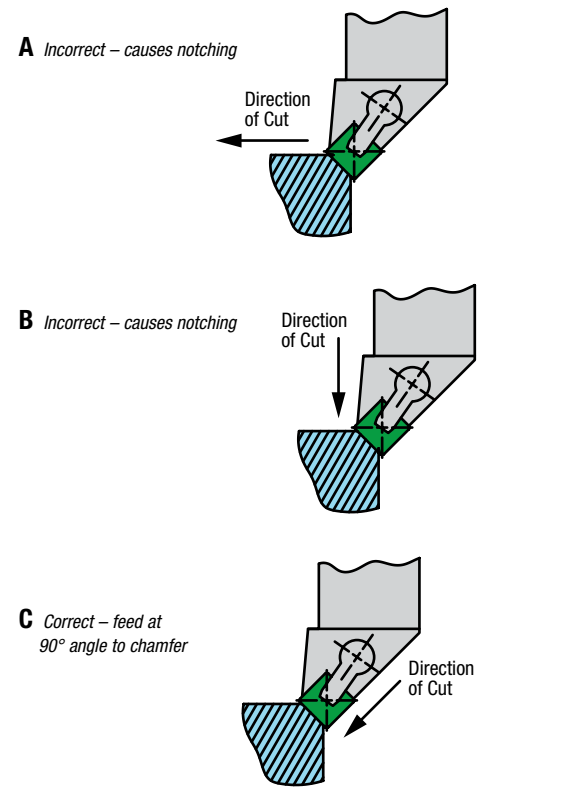
Notching and Correct Tool Path

Of all the precautions that can be taken to reduce or eliminate notching, none are as important as programming the most desirable tool path. It is very important that machine programmers, along with operators and tool engineers, are aware of the programming options. We will examine a series of circumstances that represent standard procedures for carbide tools but produce rapid failure in a notch-sensitive, ceramic material.

Pre-Chamfer Parts Whenever Possible

Pre-chamfering trues the part and ensures a progressive entry onto a true running surface. It also provides a regressive exit from the part and in both cases protects the cutting edge from damage. When using separate pre-chamfer operations as illustrated (Figure 26), the direction of feed is important to eliminate notching. Moving on a single axis, as in examples **A** and **B**, will cause notching. The direction should be at 90° to the chamfer as shown in example **C** to eliminate notching and increase tool life.

Figure 26 – Chamfering Techniques



The Chamfer Ramp Approach

In the illustration *(Figure 27)* which shows an actual operation on a jet engine rotor, we can see that feeding straight in will produce rapid notch wear. This notch will become a stress-concentration point leading to early failure.

A simple change in the programming of the part *(Figure 28)* can accomplish chamfering and facing of the part effectively in one continuous operation without any measurable difference in cutting time. This eliminates the separate pre-chamfer operation.

It is important that the program provide a “continuous move” around the part-piece edge. This will keep the material ahead of the cutting edge in a plasticized state, which is desirable for ceramic cutting methods. Another benefit is the elimination of the burr normally created with two operations, i.e. chamfer after or before the turning or facing operation.

Figure 27 – Straight Facing

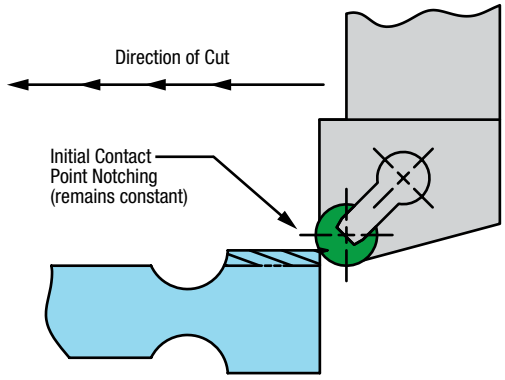
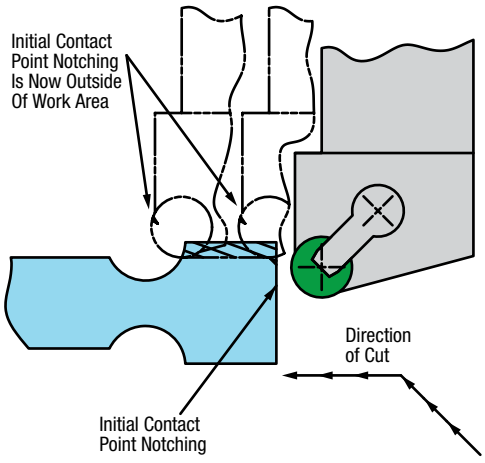


Figure 28 – Chamfering and Facing



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continued

The technique of generating a chamfer with the same tool used for the turning operation is valid and equally effective in terms of enhanced tool life with any shape of insert, any lead-angle tool and any given insert-corner radius.

In *Figure 29* we show a roughing operation using a square insert. Here we have programmed a 45° move to pre-chamfer the corner prior to the turning operation. This is done in one continuous motion with the 45° move transitioning into the straight turning. In this way, the section of insert in initial contact with the junction of two work-hardened surfaces is now outside the cut path. This will greatly reduce further notching tendencies.

The second example *(Figure 30)* shows a light finishing cut working on the radius of a tool. Once again, the 45° approach to the finish turned surface will reduce any notching effect initiated by the first contact. This programming approach can be used to leave a chamfer on the corner of the workpiece as well as either a radius or a sharp corner. *(See Figure 31)*

Chamfer advantages:

1. Increased tool life
2. No deburr time
3. Chips cannot hang up
4. Higher safety factor

Figure 29 – Producing a Sharp Corner

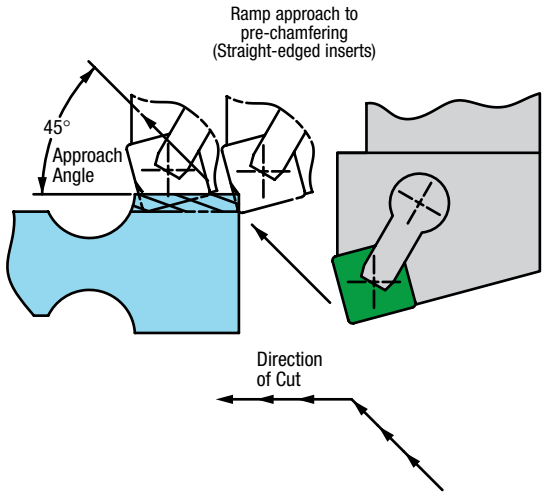


Figure 30 – Producing a Sharp Corner

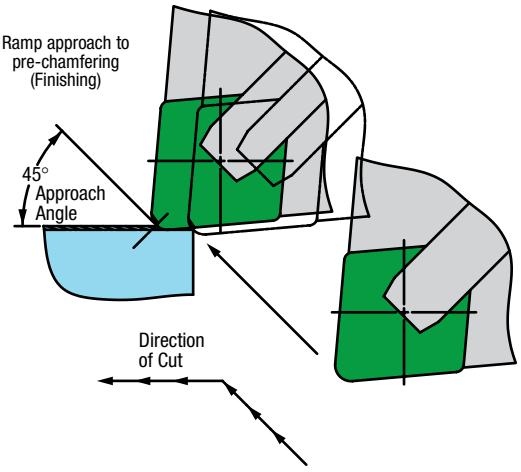
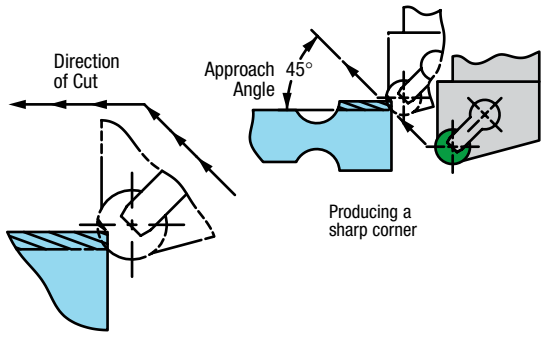


Figure 31 – Ramp Approach for Entry of Nickel-Based Alloys (Round Inserts)



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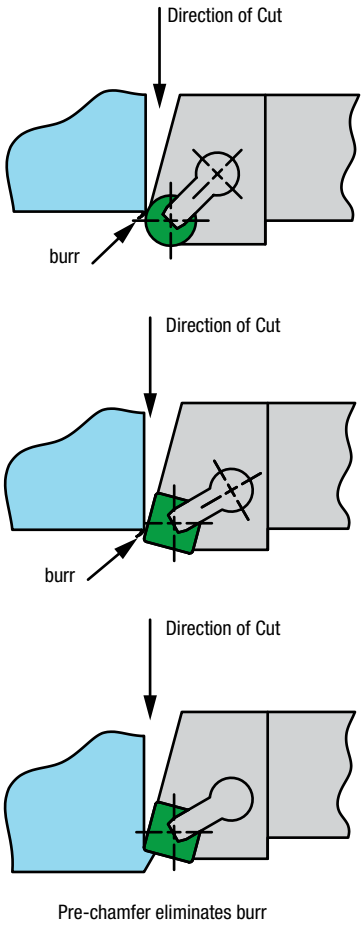
To Exit a Cut

Potential problems exist on exiting the cut if a chamfer preparation has not been made. If the exit is made on a sharp corner, on high-nickel materials in particular, a burr will result.

The burr will tend to constantly deflect or roll over and cause chipping or breakage of the cutting edge upon exit. In addition, the burr needs to be removed by a secondary operation.

The problem described tends to be more pronounced when cutting at high speeds since high heat is maintained ahead of the tool. This will mean that the material is in a more plastic condition and the rollover tendency is greater. Pre-chamfering helps correct this problem as shown. *(Figure 32)*

Figure 32 – Pre-Chamfer to Eliminate Burrs



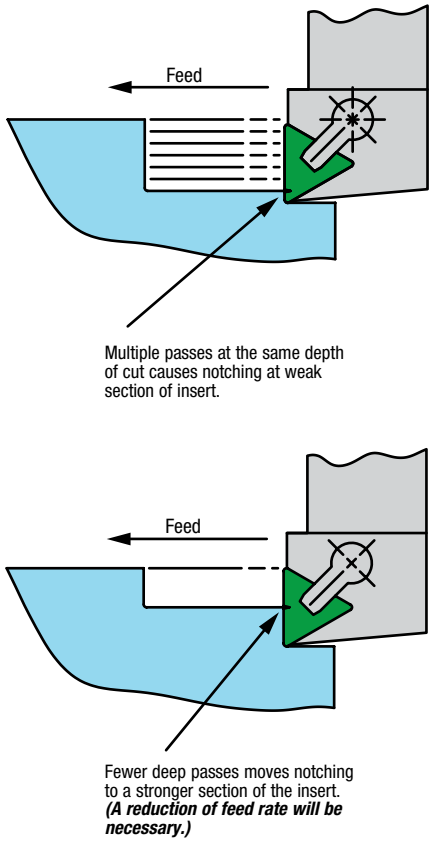
Programming Alternatives for Roughing Operations

Avoid or reduce multiple passes by taking deeper depths of cut

The strength of Greenleaf whisker-reinforced ceramics will enable much greater depths of cuts than other ceramic materials. For example, when turning with a Triangle or Diamond insert, take the greatest depth possible, even to the extent of 1/2 of the cutting edge. This not only reduces the number of passes required, it also will place any notch formed in a stronger section of the insert, leaving the tool radius area often unscathed and available for subsequent finish operations. *(Figure 33)*

A reduction of feed rate will be necessary in this case, and the feed rate recommendation chart should be used *(Figure 21)*.

Figure 33 – Rethink Depth of Cut



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Preserving Tool Life

When a large amount of stock has to be removed, it is often done by taking multiple passes at the same depth of cut. *(Figure 34)* This is not a good practice. A very rapid development of severe notching will result since the same point on the cutting edge is subjected to the depth-of-cut line. Consequently, many indexes are required, escalating costs due to downtime and tool costs.

Vary the depth-of-cut contact point at the workpiece/ insert interface. This can be best accomplished by two techniques:

Variation in the depth of cut from pass to pass

Gradually decrease the depth of cut per pass. This may take a very small amount of time but will be more than compensated for by increased tool life, less indexing of the insert, and less downtime. *(Figure 35)*

Ramping

Of all the techniques readily available on a CNC machine, "ramping" has proven to be the most important. By gradually feeding out while traversing the work, depth-of-cut notching can be, for all practical purposes, eliminated. The next cut is then programmed at a constant depth since the surface itself is now ramped. A similar effect is achieved. *(Figure 36)*

Figure 34 – Multiple Passes at the Same Depth of Cut

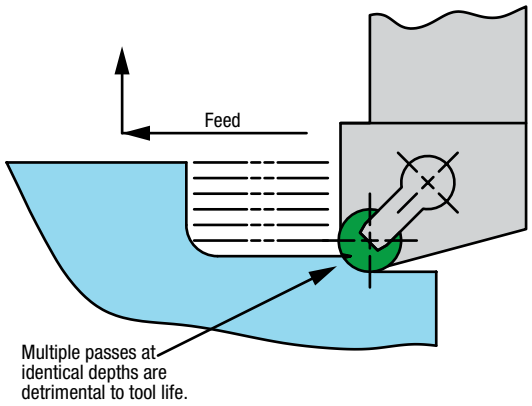


Figure 35 – Multiple Passes at Varying Depths of Cut

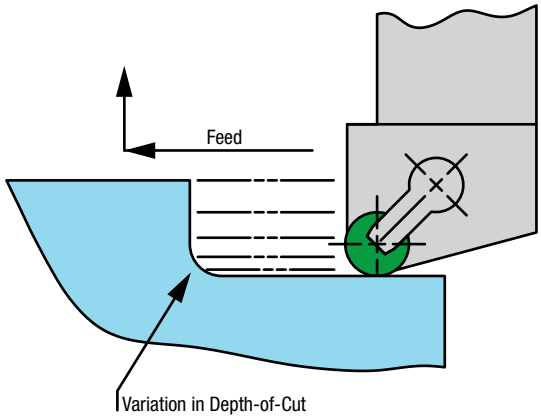
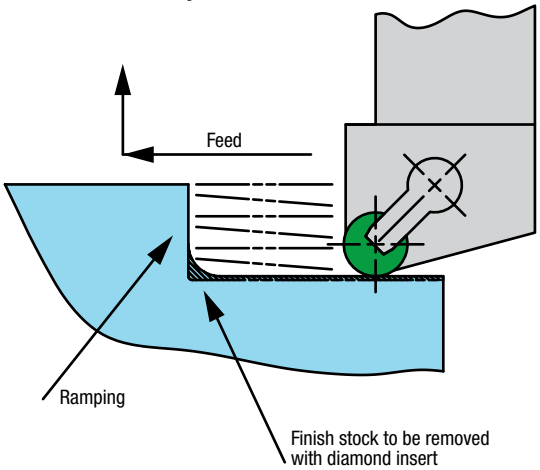


Figure 36 – Multiple Passes Using Ramping Technique



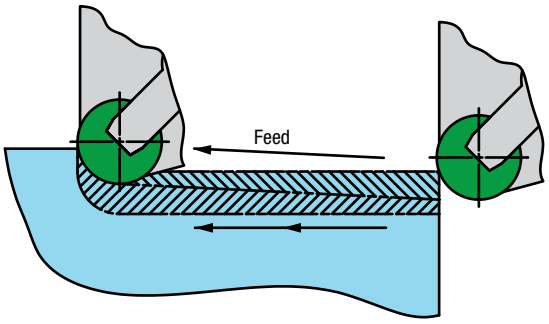
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Ramping with negative round inserts

The ramp **must** start out with a deep cut, then the depth of cut must diminish. This constantly lifts the insert higher and more out of the cut, creating a ramp. The second cut is programmed straight and in the same direction, effectively removing the ramped surface left by the first cut. *(Figure 37)*

Tool life on the first cut is longer than on the second since the damaged cutting edge from the work-hardened surface is lifted out of the cut. Tool life on the second cut is shorter since the damaged cutting edge at the depth-of-cut line is buried more and more as it continues cutting straight and the ramp gets higher. However, tool life in both described ramped cuts is longer than in straight cuts.

Figure 37 – Ramping/Negative Inserts/RNGN

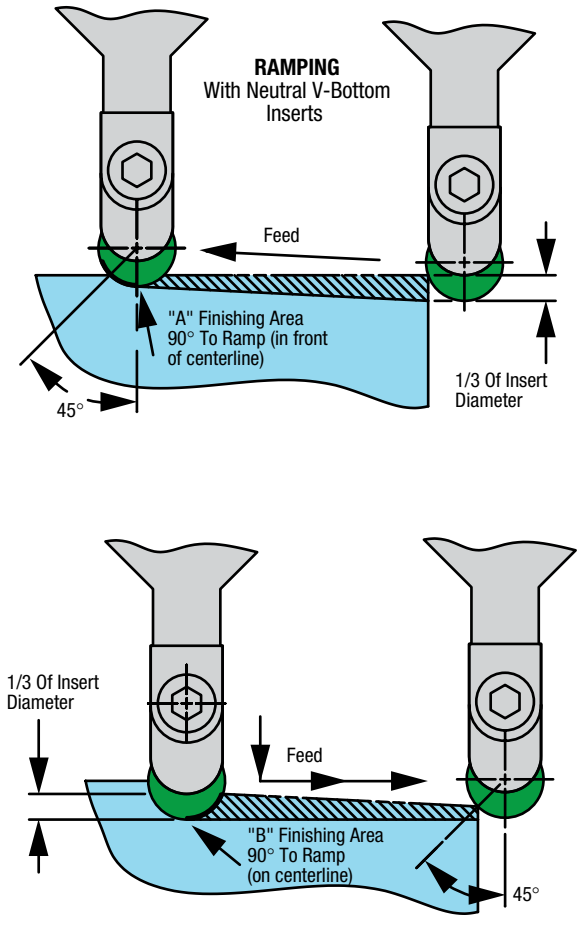


Ramping with positive round inserts

When using RPGN or RCGN inserts, ramping can be done in both directions without indexing *(Figure 38)*. Area “B,” which is the bottom of the inserts, is constantly lifted out of the cut on the first pass, and the insert finishes with area “A”. The second pass in the opposite direction will then use area “B” for finishing.

The above is not possible if the ramping is started from the lesser depth of cut then moves to the deeper depth of cut. Ramping is always better from a deep to a shallow depth.

Figure 38 – Ramping/Positive Inserts/RPGN-RCGN

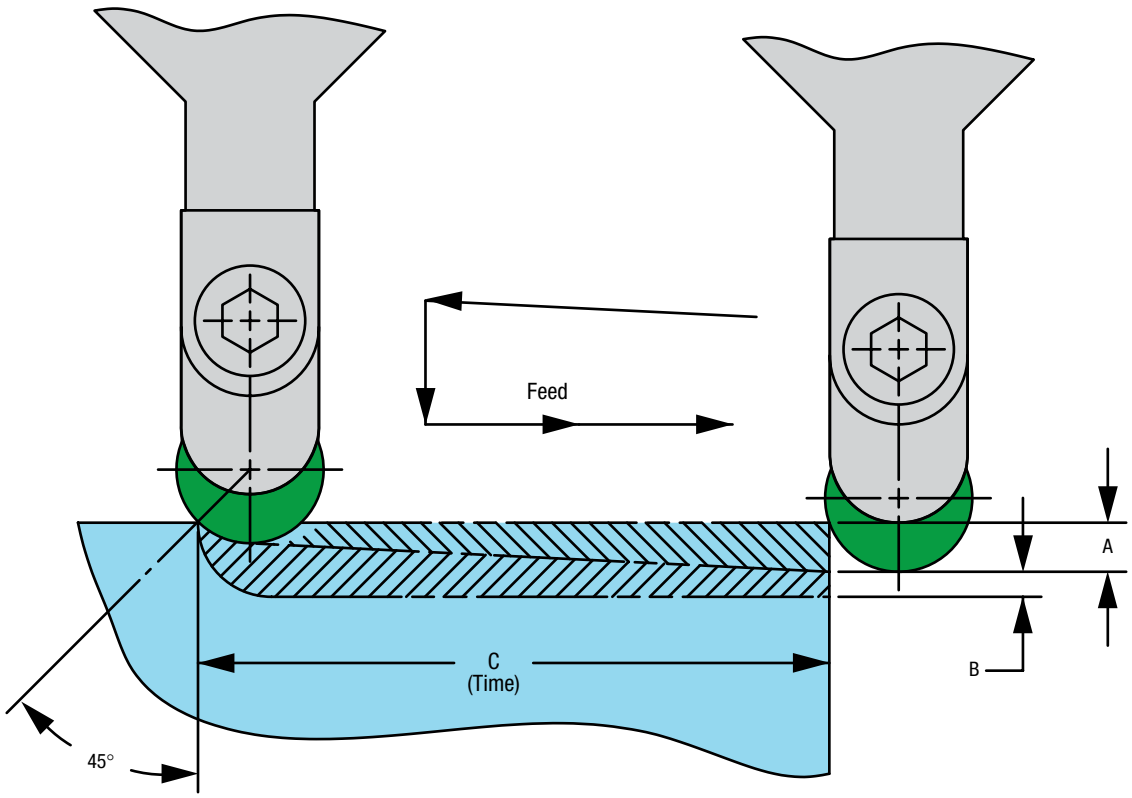


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To Optimize Tool Life in a Ramping Mode

The time “C” is a maximum value in minutes. The actual length of the cut represented by “C” will vary with part piece diameter. The smaller the diameter of the workpiece, the longer the length of cut. We suggest that time be limited to approximately five minutes for a .500" diameter *(12,7 mm)* insert. *(Figure 39)*

Figure 39 – Optimized Ramping Technique



DIAMETER		“A”		“B”		“C”
inches	*mm*	inches	*mm*	inches	*mm*	minutes
.250	*6,3*	.080	*2,0*	.040	*1,0*	3
.375	*9,5*	.120	*3,0*	.060	*1,5*	4
.500	*12,7*	.160	*4,0*	.080	*2,0*	5

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To Optimize Ramping Technique *(Figure 40)*

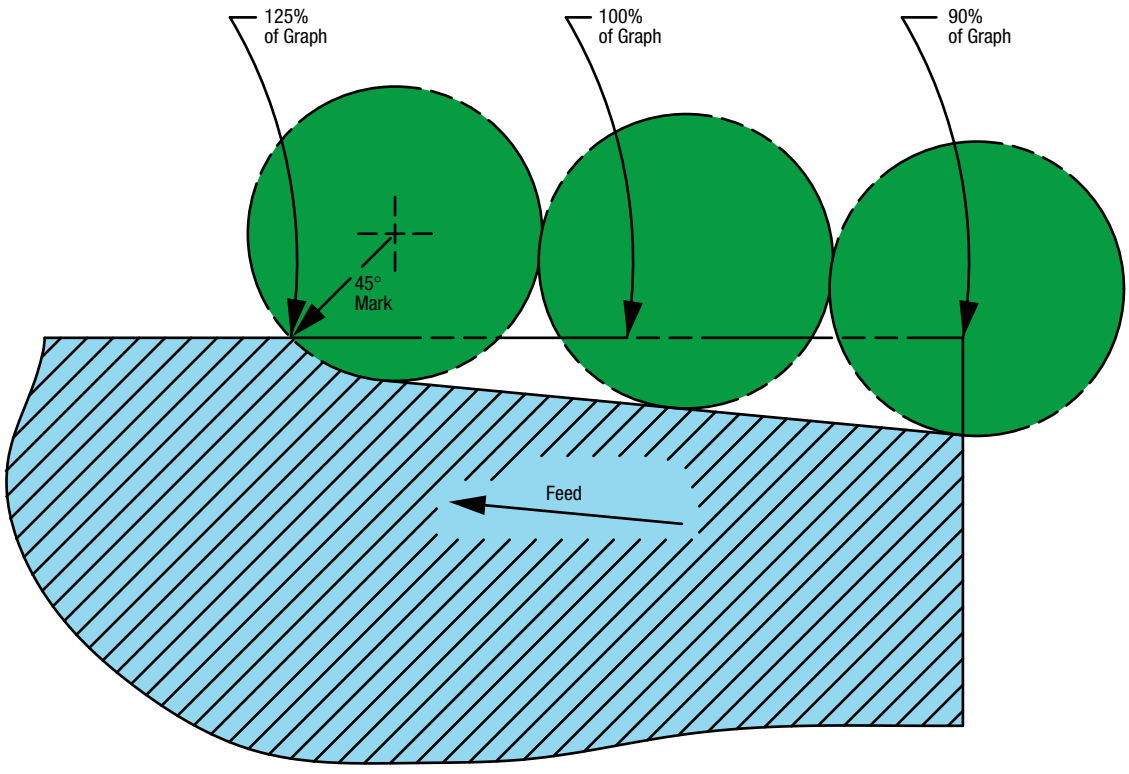
a) Using a .500 diameter *(12,7 mm)* round insert, select recommended feed and speed from graph *(Figure 13)*. This will equal 100% of feed, speed and a .125" *(3,18 mm)* depth of cut at the mid-point of the ramp.

b) Start the ramping cut at a depth of approximately 1/3 the diameter (.160") *(4,0 mm)* and select the appropriate speed and feed percentage (%). *(Figures 15 and 16)*

c) Proceed with ramping cut until the depth of cut is approximately .080" *(2,0 mm)*. This is the 45° mark on a .500" *(12,7 mm)* diameter round insert. During the cut, the feed and speed should be incrementally or continuously increased. At the conclusion of the cut, the parameters should be at the appropriate speed and feed percentage (%). *(Figures 15 and 16)*.

d) Cutting distance is measured in minutes and can be programmed for five minutes with a .500" diameter *(12,7 mm)* round insert. *(Figure 14)*

Figure 40 – Optimization of Ramping Technique with ½" (12,7 mm) Round Inserts



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To achieve the desired effect of a constantly changing depth of cut to eliminate notching, it is not necessary to think of ramping in terms of a straight line. For example, a wavy line achieves the same objective, perhaps more efficiently, by moving the hardened surface back and forth on the cutting edge. On both the first and second cuts, the material is gradually increased and then gradually decreased. *(Figure 41)*

Also illustrated are examples of plunging in and then ramping using a positive round insert or producing a ramp with a lead-angle tool using a straight-edged insert.

Figure 41 – Various Ramping Methods

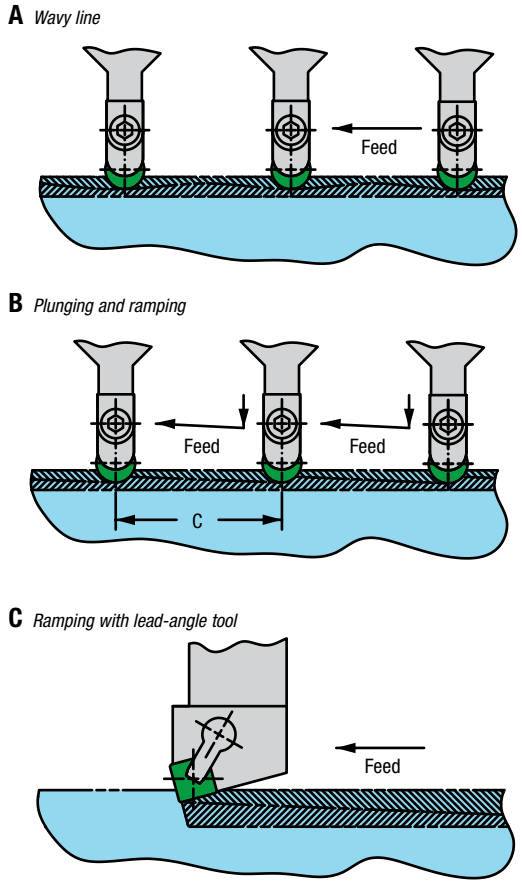
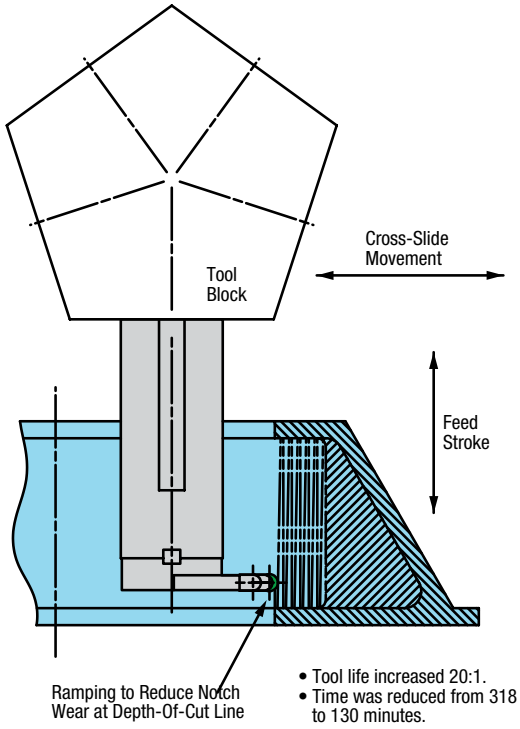


Figure 42 shows an operation boring a cavity on an Inconel 718 part on a Vertical Turret Lathe. As originally programmed, this operation required five tool indexes to bore out all of the material. Five times the tool returned to "home" position and was out of the cut.

By changing to a new program and converting from carbide to Greenleaf WG-300 with "ramping," the entire cavity was machined without a tool change. Productivity increased three (3) times and tool life increased by a factor of 20 to 1. Actual machine time was reduced from 318 minutes to 130 minutes.

Our files contain numerous cases of productivity gains of this magnitude by "ramping".

Figure 42 – Boring a Cavity with Ceramics



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Turning to a Shoulder

When rough or finish turning into a shoulder with high velocity techniques, it is most important to observe some basic rules.

With negative inserts in particular, it should be remembered that the chips are being pushed forward. As the shoulder is approached, the chips will be trapped, giving rise to an increase in tool pressure. *(Figure 43)* Also tool pressures increase as insert engagement increases near shoulders. This may result in tool breakage. *It is strongly recommended that the feed rate be reduced by about 50% when the tool is within .125" (3 mm) of the shoulder.* Reduction of the feed will tend to straighten out the chip as the chip temperature increases, reducing pressure on the insert cutting edge. ***This applies to any shape of insert.***

When the tool stops at the shoulder and then withdraws, a hard crystallized layer of material is left. This may produce a series of steps when a square insert is used or scallops when using a round insert. *(Figure 44)*

Very poor tool life will be experienced in any subsequent operation to finish machine these stepped or scalloped surfaces. The solution is to program the tool to continue moving up the shoulder face upon completion of each pass. This will remove the scallops or steps while the material is still hot ahead of the cutting edge and leave a more readily machinable surface for finishing.

Figure 43 – Chip Being Trapped Against Shoulder (increased engagement increases tool pressure)

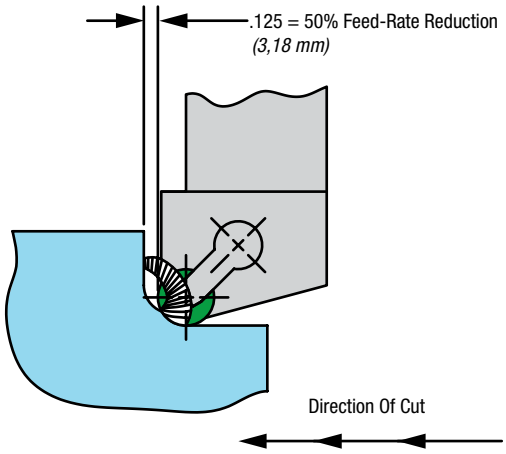


Figure 44 – Avoid Leaving Scallops at Shoulder

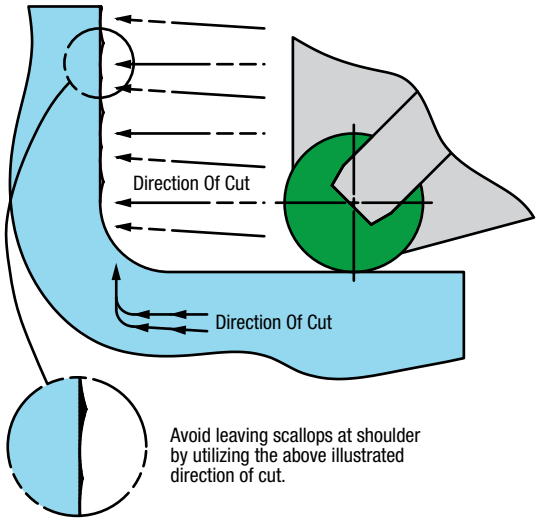
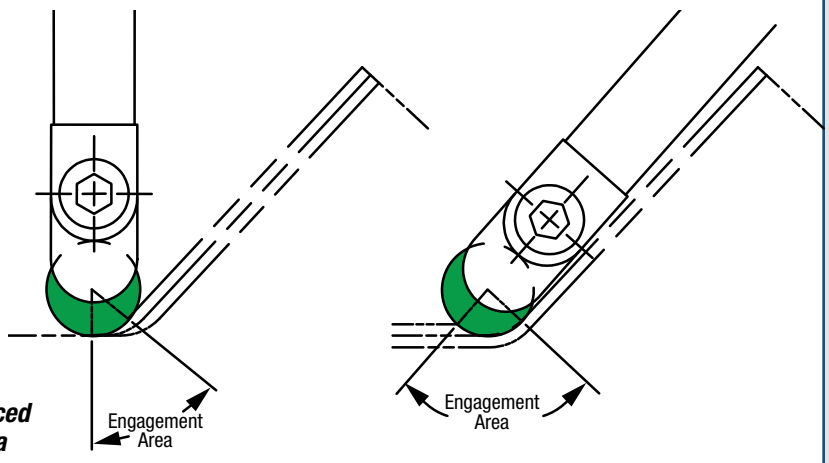


Figure 45 – Tool Engagement Angle

Maintaining a reduced engagement area as shown in *Figure 45* is preferred. If the increased engagement area is unavoidable, then a 50% feed reduction may be necessary.



Preferred - reduced engagement area

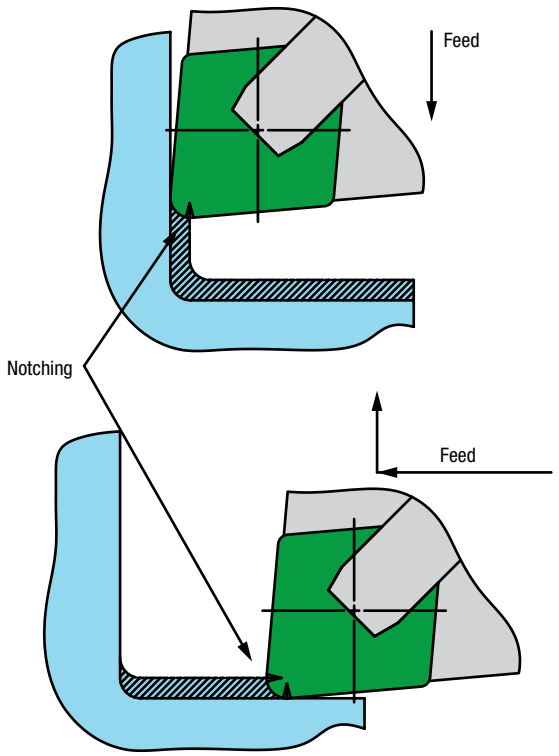
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Double Notching – Not Recommended for Notch-Sensitive Situations

It is quite common to program a cut in both directions in CNC machining using carbide inserts. This may have been a matter of convenience to avoid a tool change. It should be noted however, that this is a very undesirable method in notch-sensitive situations such as in high-velocity machining with ceramics.

Here, the tool was fed first from the top and then along the bottom and a blend was made in the radius area. The problem is obvious. Notching has occurred on both sides of the insert. During the second cut, material jams into the first notch causing chipping. Stress may generate a failure crack from notch to notch and break off the corner. *(Figure 46)*

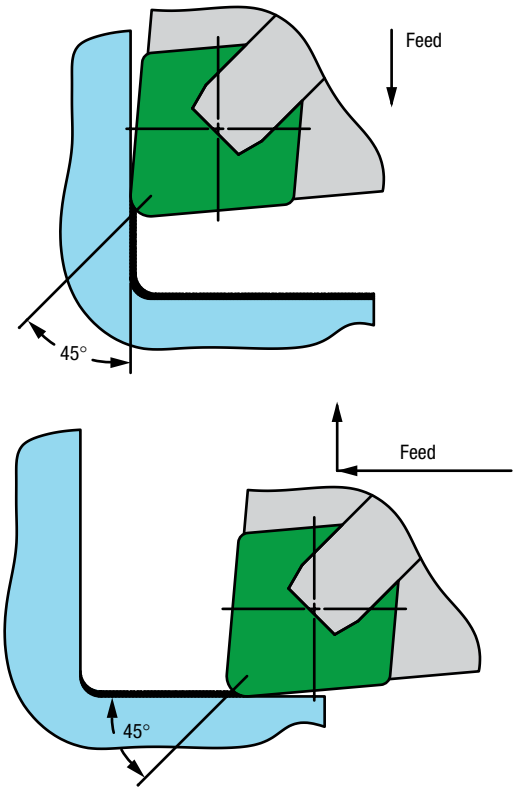
Figure 46 – Carbide Method Beware



Rethink the process

The correct procedure is to take more material off during the previous roughing application, then remove the amount of stock suitable for the nose radius of the insert *(Figure 20)* by staying below the 45° mark of the corner radius. This will minimize notching and allow a cut from both directions. *(Figure 47)*

Figure 47 – Ceramic Method



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Finishing a Fillet

Sound design criteria, especially on highly stressed parts such as jet engine components, calls for fillets or specific radii at the junction of most angles.

Problems encountered in finish machining of fillets can often be traced to the approach made in the rough-machine operations.

The amount of stock left for finishing and the shape and condition at the surface of this stock are affected greatly by the tool path and insert configuration used in roughing.

It is not uncommon for a programmer to call for a tool having the specific radius of the fillet and do the entire operation with this tool. This radius is usually small, therefore the tool is weak and must typically be indexed or changed to complete the operation.

There are a number of effective methods available to accomplish these corners, all of them superior to the common method of multiple passes with the weak radius tool.

Method 1 *(Figure 48)*

#1 – The material is roughed using a .500" *(12,7 mm)* diameter round insert. This leaves a .250" *(6,35 mm)* corner radius. In addition, stock for finishing has been left on both walls.

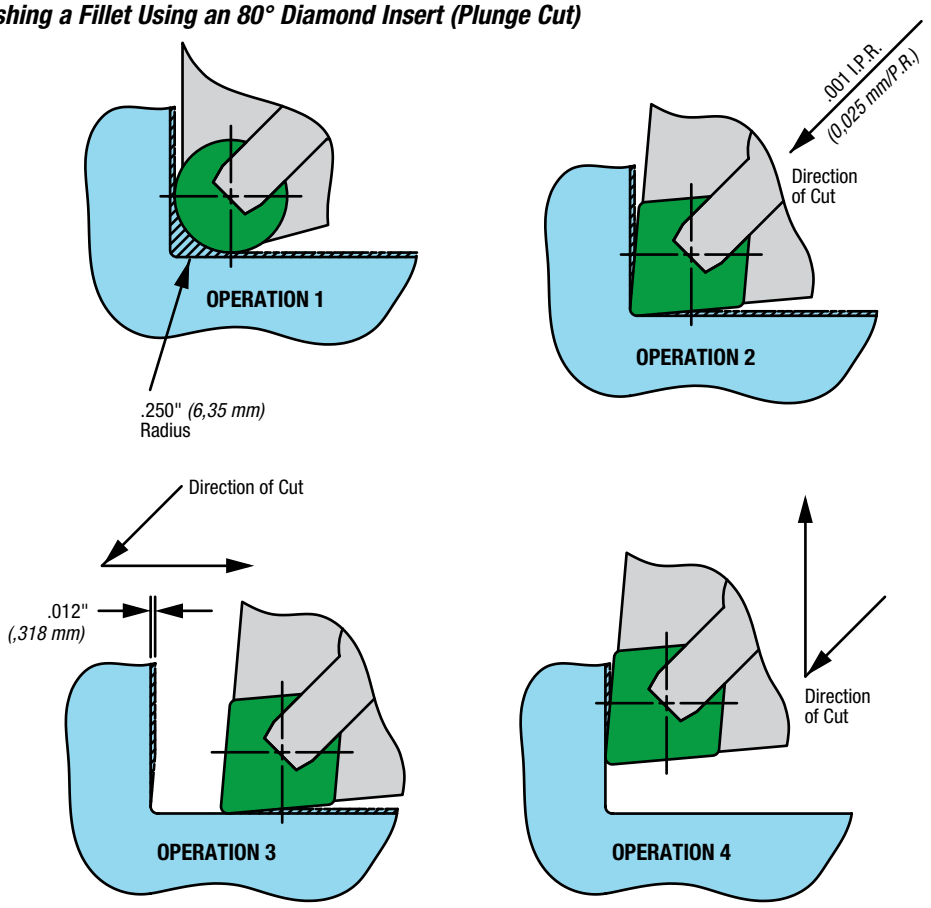
#2 – The finished radius is now generated by plunging the 80° Diamond-shaped insert finishing tool at 45° into the corner. This plunging operation spreads the effect of the work-hardened surface across the nose of the tool without notching it. In addition, the tool is supported by equalized forces on both sides. A clean, accurate radius is also produced.

#3 – The tool is then drawn across one of the faces to produce the finished surface. The long 5° reverse lead angle inherent in the 80° Diamond insert will produce a good finish without damage to the cutting edge.

#4 – The second wall is finished by turning the tool to the corner and feeding out in the other direction, again working on the long lead angle.

Method 1

Figure 48 – Finishing a Fillet Using an 80° Diamond Insert (Plunge Cut)

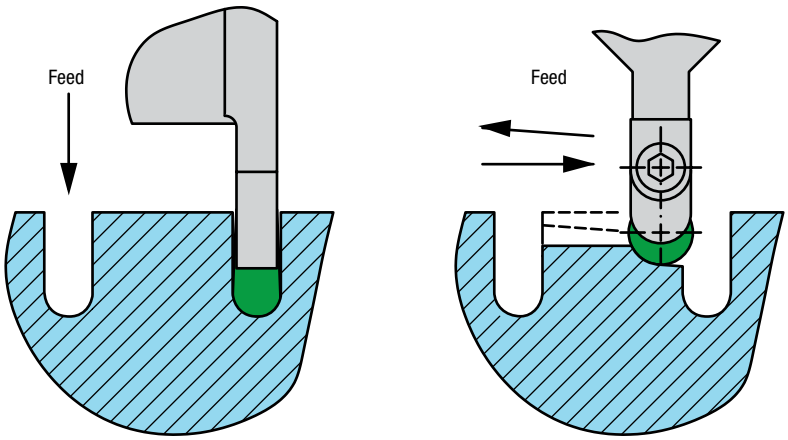


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Method 2

Figure 49 – Finishing a Fillet Using a Grooving Tool and a Round Insert

Very small radius fillets on parts are often produced with the fewest problems by using a grooving tool on the first operation. A grooving tool is self-stabilizing and always moving forward into clean material. This results in efficient machining without tool notching and produces an accurate corner radius. The remaining material is then removed by ramping cuts with a round insert.

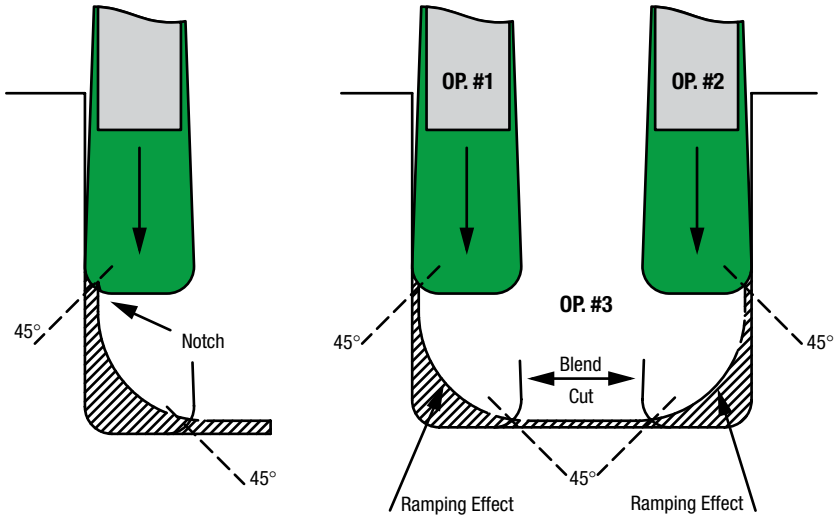


Method 3

Figure 50 – Turning to a Shoulder in Cavities with V-Bottom Grooving Inserts

This example shows the profiling of the groove or cavity using a V-bottom grooving insert. It is important to keep the finish stock very light on the sides so that the cut is below the 45° mark on the insert radius. This will vary with the radius needed. The larger the radius, the greater the stock can be. *(See Figure 20)*

In the corner itself, we use the "ramp" inherent in the radius left by the round insert used for roughing to reduce or eliminate "notching" of the tool. This is a further benefit of roughing with round inserts or profiling the corner in the program.



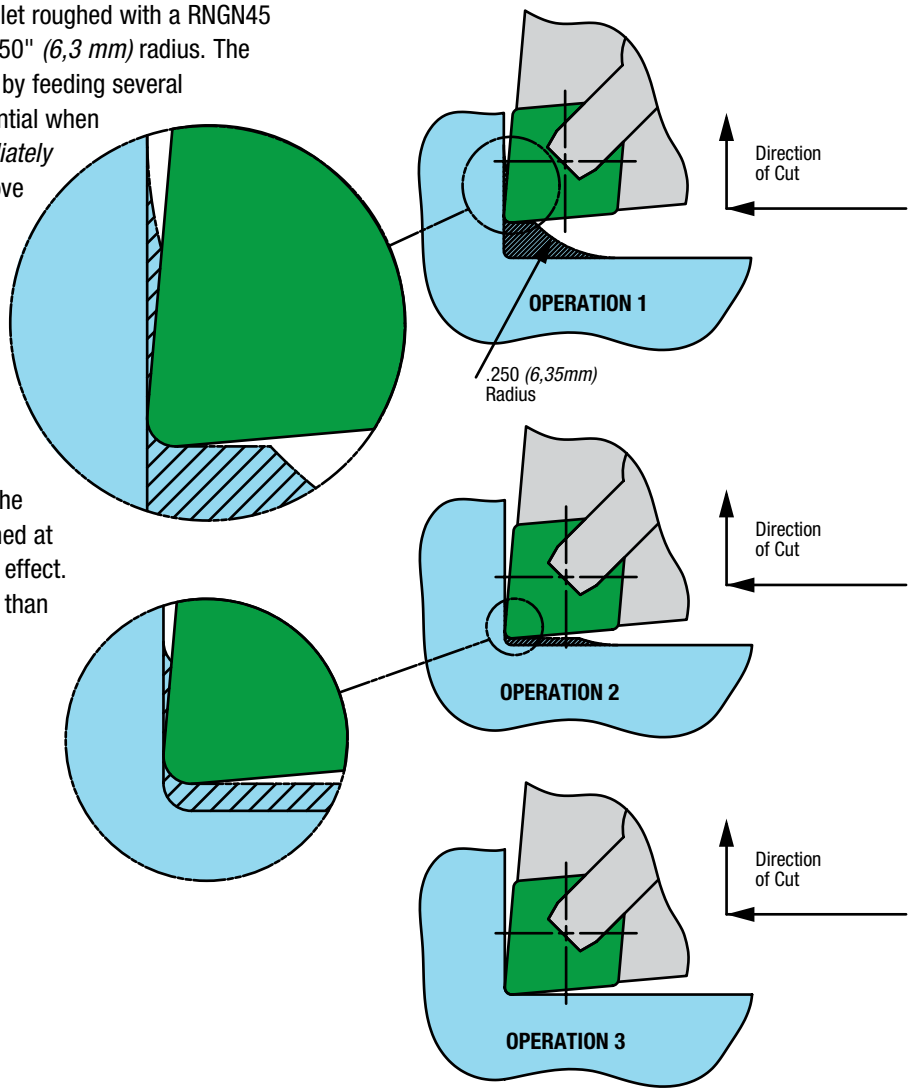
Watch the depth-of-cut line!

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Method 4

Figure 51– Ramping Effect on Shoulder Cuts

In this method, a CNGN452 (12 07 08) insert is shown in the finish operation on a fillet roughed with a RNGN45 (12 07 00) insert leaving a .250" *(6,3 mm)* radius. The finish operation is performed by feeding several times into the fillet. It is essential when the wall is reached to *immediately* raise the tool vertical to remove the scallop which would otherwise be left on the wall. This material will tend to cool and present a hardened, irregular surface needing a subsequent operation *(Figure 43)*. The finish passes described will tend to notch the tool and should be programmed at various depths to reduce this effect. The final pass should be less than the 45° line of the tool nose radius *(Figure 20)*.

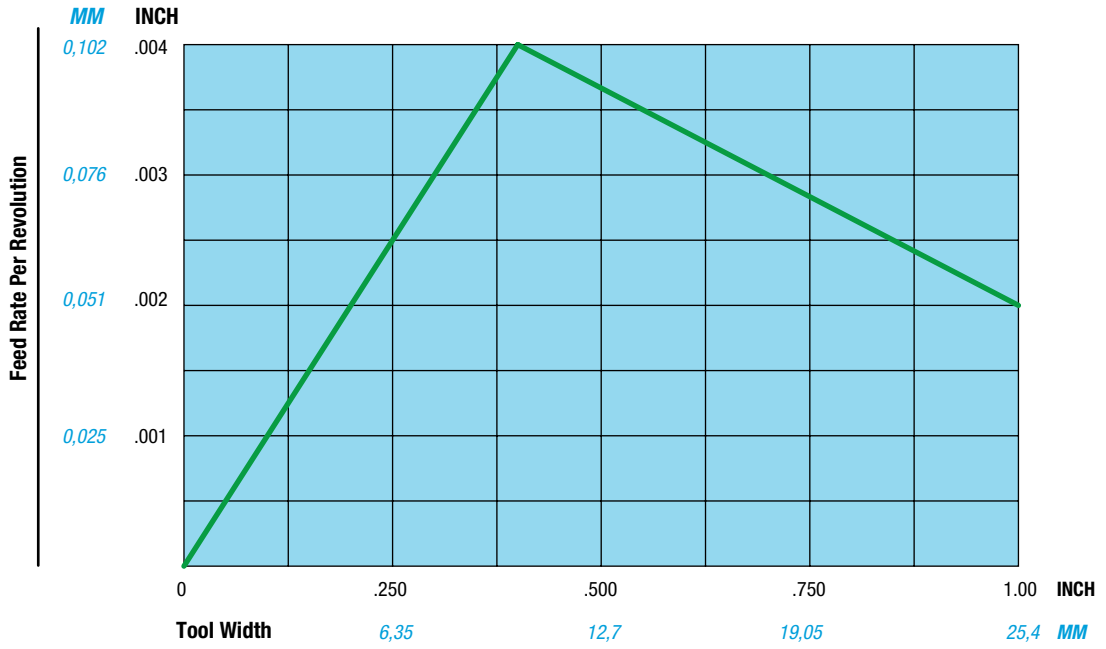


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Grooving

Feed and speed for grooving

Figure 52 – Grooving Feeds vs. Tool Width



Select the correct speed from the graph using material hardness as the basis. (*Figure 13*)

A good starting point for feed rates in grooving has been shown to be one percent (1%) of the tool width for widths up to .400" *(10 mm)*. For widths over .400" *(10 mm)* some reduction of this feed will be required. (*Figure 52*)

Case history

Material Rene 95
Part 19" *(483 mm)* diameter
Application .375" *(9,53 mm)* wide O.D. Grove
.500" *(12,7 mm)* deep
Surface speed per minute 400 feet *(122 meters)*
Feed rate per revolution 0.0035" *(0,09 mm)*

	Carbide	**WG-300®**
	Cost $	Cost $
Cycle time	35 min.	3.5 min.
Burden rate	@ $60/hr=$35.00	@ $60/hr.=$3.50
Insert cost	$15.00	$50.00
Sub total	$50.00	$53.50
Time saved	0	31.5 min.
	$= 0	@ $60/hr.= $31.50
Total cost	***$50.00***	***$22.00***

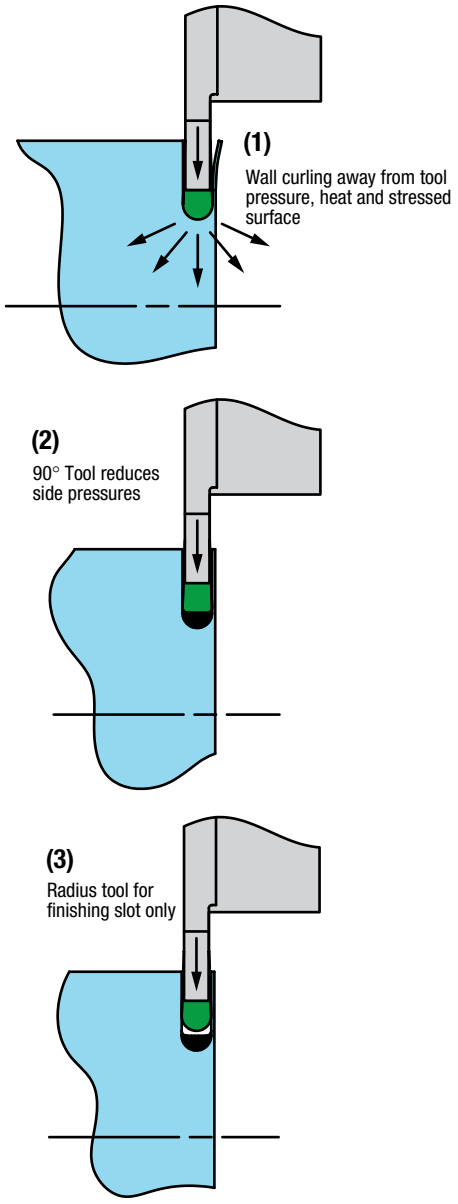
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Grooving Thin-Wall Sections

A problem may occur when attempting to machine deep grooves, leaving a thin wall standing. If the groove form calls for a radius in the root, then the heat and pressure generated by cutting the entire groove with the radius tool will cause the wall to curve away from the tool. *(Figure 53,1)* This is a combined reaction of the actual pressure and heat of the cut plus the formation of a stressed surface layer.

Good practice dictates roughing the groove with a straight-edged tool ***(2)*** and finishing the radius area only with the radius tool. ***(3)*** *(Figures 53, **2** and **3**)*

Figure 53 – Thin-Wall Grooving



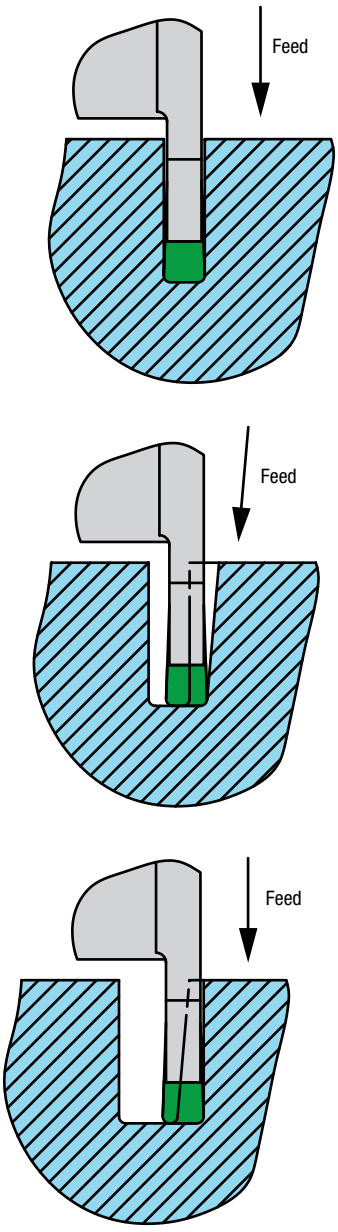
Machining Cavities with Grooving Tools

There are several proven approaches to the machining of cavities using grooving tools. All of the methods shown are satisfactory, however, Methods B and D are the most effective.

Method A *(Figure 54)*

The grooving tool is used to produce a groove in the normal manner by plunging straight into the work. The groove is then widened by using a ramping technique.

Figure 54 – Widening Cavity Techniques



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Method B *(Figure 55)*

Two grooves have been produced by plunging straight in. This allows both finished sidewalls and corner radii to be generated. The material between the grooves is removed with a round insert making a straight plunge cut to finish the cavity.

Method C *(Figure 56)*

The cavity is produced by a series of plunge cuts. In this case it is very important to keep the work-hardened surface of the previous cut working on the radius at or beyond the 45° mark to reduce notching. If this is disregarded, rapid notch wear will develop leading to the fracture of the insert corner.

Figure 55 – Additional Cavity Techniques

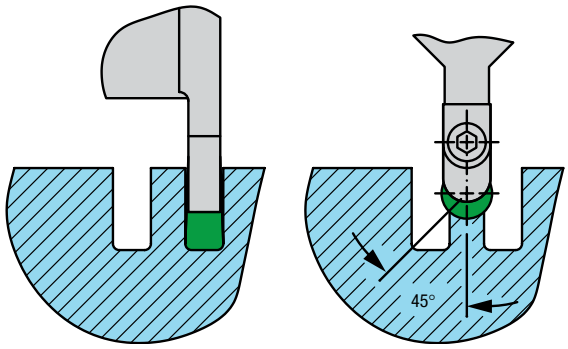
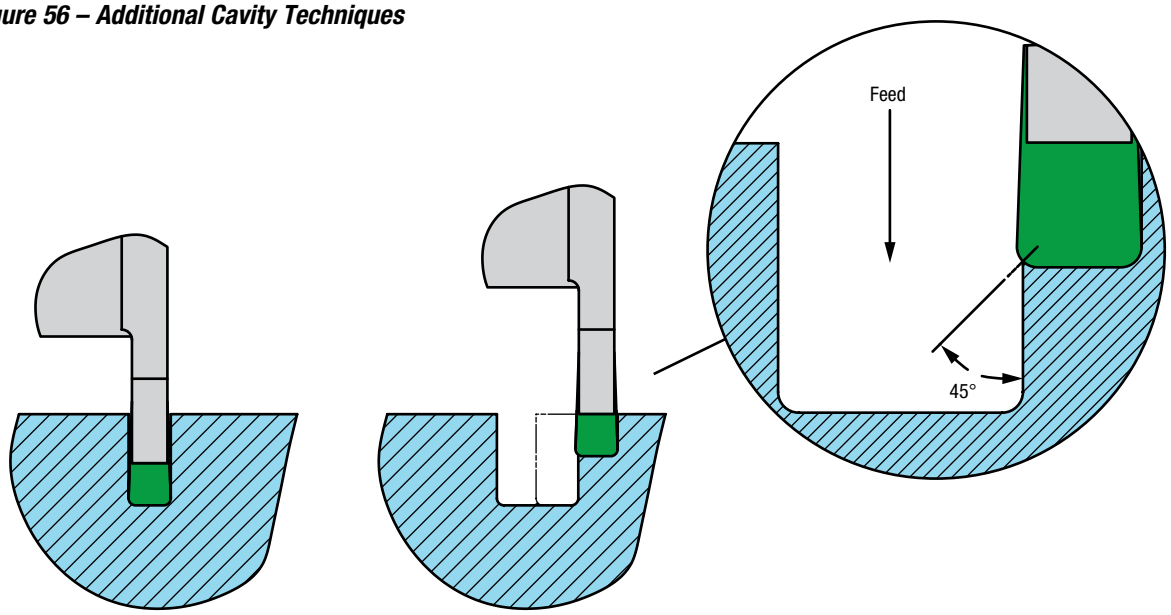


Figure 56 – Additional Cavity Techniques



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Method D *(Figure 57)*

The example shown in *Figure 57* is similar to *Figure 55*, except the cavity is wider and the material between the two grooves may be removed by a ramping operation with round inserts. This is an effective method of approaching a wide-cavity application.

Figure 57– Ramping in Cavities

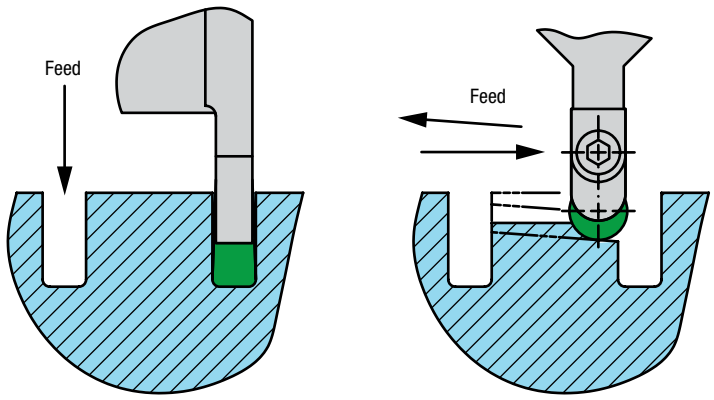
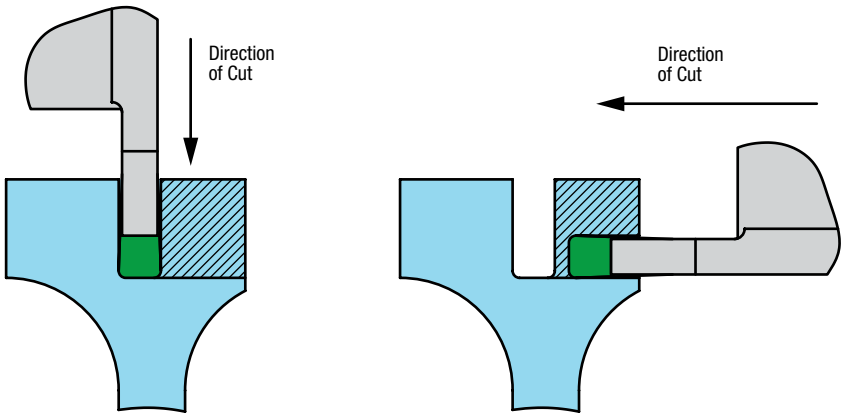


Figure 58 – Producing a Test Sample



Grooving Tools for Shoulder Cuts

It is possible to make shoulder cuts with grooving tools involving the removal of large amounts of material by producing a complete ring.

This technique is being applied in the production of large jet engine discs very effectively but requires special set-up. The method is illustrated in *Figure 58*.

In effect, two 90° opposing grooves are plunged into the part using a V-bottom grooving tool. This generates two clean walls and the required corner radius.

When the second groove breaks into the first one, a complete ring is produced which may be used for some other component. A fixture must be used to hold the ring as it parts from the main forging. It is worth constructing a special clamping fixture for such cases since the method itself is so economical.

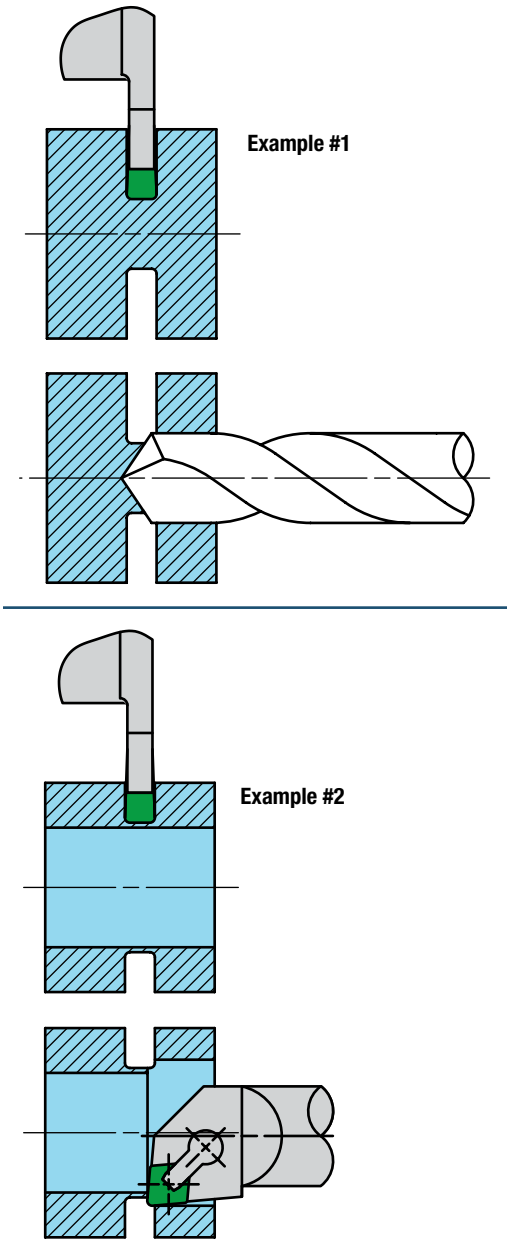
Rethink the process

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Cut-Off Operation with Ceramic Inserts

Using a whisker-reinforced ceramic grooving tool and then completing the cut-off with a drill or boring tool in a secondary operation is illustrated in *Figure 59*. This will eliminate tool breakage which would occur if attempting to totally cut off with a ceramic tool. This technique works best with smaller components where the cut-off piece can be captured on the drill or boring tool. There are other variations of this method.

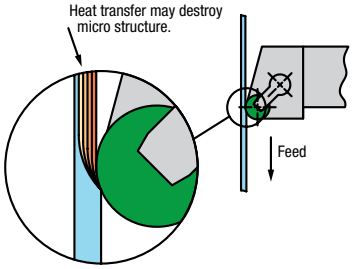
Figure 59 – Ceramic Inserts Used in Cut-Off Operations



Thin-Wall Applications

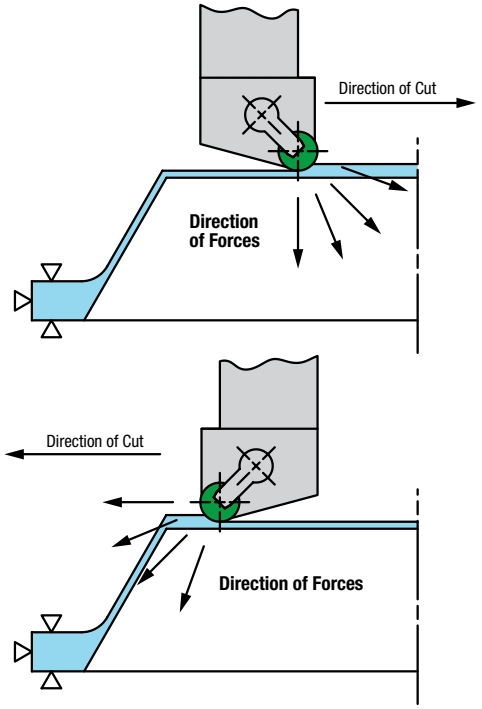
Many turbine components have very thin sections. Distortion of thin-wall parts can become a significant problem. Too much heat in the part due to excessive tool pressure and stress in the material surface due to deformed metal can be the cause of this distortion. In very thin walls, heat may penetrate an entire section causing microstructural damage in the material *(Figure 60)*. In these cases, the speed reduction necessary to limit heat penetration may dictate the use of carbide insert technology.

Figure 60 – Thin-Wall Heat Penetration



In certain situations, the direction of the cut may be of extreme importance. For example, a severe chatter/deflection problem was eliminated in the illustrated aircraft part by a change to facing from the center out. Facing in this way concentrated the resultant forces into a supported section of the part. *(Figure 61)*

Figure 61 – Cutting Direction Resultant Forces



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Thin-Wall Applications cont'd

It is important to note the following rules of good practice for thin-walled parts:

1. Reduce the tool nose radius while maintaining the largest radius for best tool life that does not cause distortion.
2. Reduce the lead angle so that the resultant force is directed into a strong or supported section of the part piece.
3. Reduce depth of cut.
4. Do not cause the tool to dwell excessively.
5. Reduce speed.
6. If necessary, change back to carbide for lower surface speed resulting in less deflection, less surface material distortion and less heat.

Rethink the process

Interrupted Cuts

Whisker-reinforced ceramics are inherently very strong and able to withstand interruptions provided the recommended speeds *(Figure 13)* are increased. Speed is all-important in the successful cutting of parts with interruptions.

Do not give in to the temptation to reduce speed.

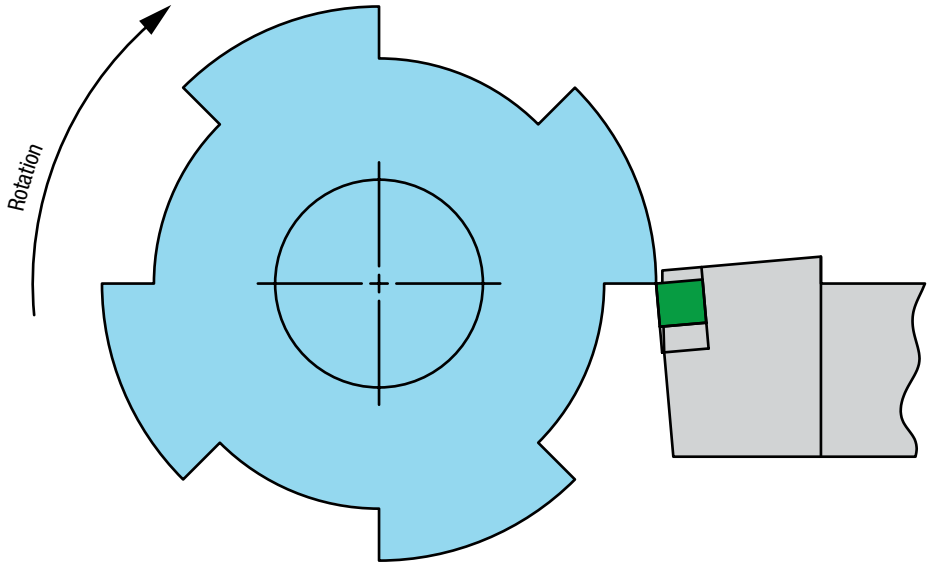
The amount of increase in the recommended speed for severely interrupted cuts can usually be calculated. It is necessary to increase the speed to get back into a temperature zone where the interruptions have lowered by virtue of the intermittent contact between tool and workpiece. First, calculate the circumference of the part and then subtract the sum total of the interruptions. This will give a smaller diameter value. Then increase the RPM so the smaller diameter value returns us to the originally recommended surface speed.

As a simple example *(Figure 62)*, if 50% of the material is taken away by voids or interruptions at the surface, 50% of the surface remains in contact with the tool compared to an uninterrupted part. In this case, double the surface speed to compensate.

A simple estimate will often suffice. Look at the part. Estimate the percentage of surface missing due to interruptions and then increase the speed by at least that amount.

Rethink the process

Figure 62 – Interrupted Cuts



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Edge Preparations for Interrupted Cuts

It is advantageous in interrupted cutting to ensure that the feed rate is less than the width of the negative edge preparation on the insert. This assures that the insert cutting edge is in compression at all times and not in shear, as would be the case if the feed exceeds the width of the land. For this reason the T2A or T7A edge preparation should be used.

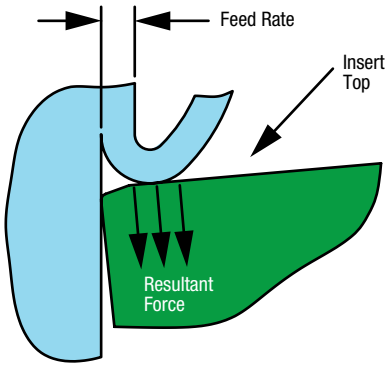
Feed rate must be reduced on severe interruptions to get more heat into a thinner chip. This will reduce the cutting pressures. If these rules are followed, few problems will be encountered on interrupted cuts. *(Figure 63)*

For interrupted cuts, the rules are:

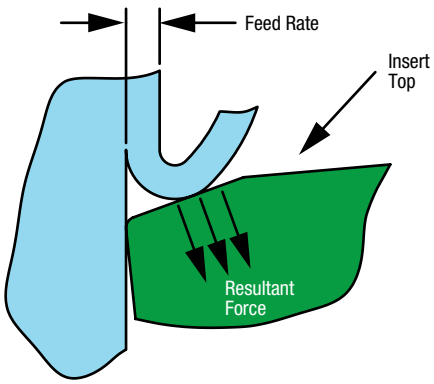
1. Select a larger edge preparation
2. Reduce feed rate
3. Increase recommended speed

Figure 63 – Edge Preparations

Uninterrupted Cuts



Interrupted Cuts



Surface Hardening

Incorrect tooling practices, worn tools, tools with too much hone, etc., can cause excessive surface hardening effects during the machining of nickel-based alloys, particularly in finishing.

It has been shown that cutting with the higher speeds and feeds will decrease (not eliminate) the work-hardening effect and will be an eventual factor in tool life due to notching of the tool at the depth-of-cut line.

If a tool is allowed to dwell without feed, the workpiece will be burnished or glazed and thereby work-hardened. Sharp tools are needed for light operations to avoid burnishing.

Greenleaf whisker-reinforced ceramics have the advantage of being available without hones to accomplish finishing cuts and has the edge strength to make this possible.

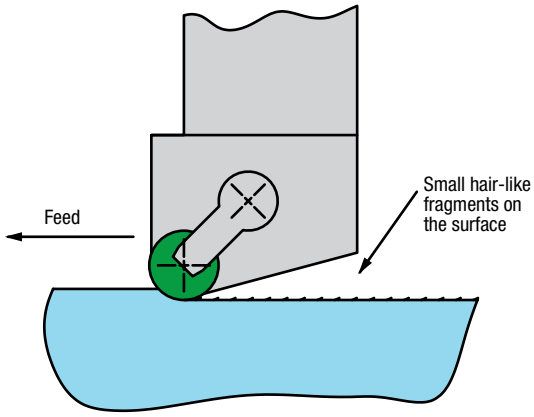
Smearing

Smearing can often be identified as small hair-like particles embedded into the finished surface. *(Figure 64)* This is caused by the nickel, being very gummy in nature, which is built up on the flank of the tool and then swept past a worn, chipped, or honed area of the insert under great pressure and is embedded or pressure-welded in small fragments into the finished surface.

Greenleaf advanced whisker-reinforced ceramics are strong enough that inserts are recommended and produced as standard without a hone. A clean, sharp edge is then presented to the part piece, reducing stress and eliminating the tendency to smear the material in finishing cuts.

Smearing will occur even with whisker-reinforced ceramics if the tool is allowed to wear excessively before indexing or if it chips or flakes due to side pressures caused by flank wear.

Figure 64 – Smearing

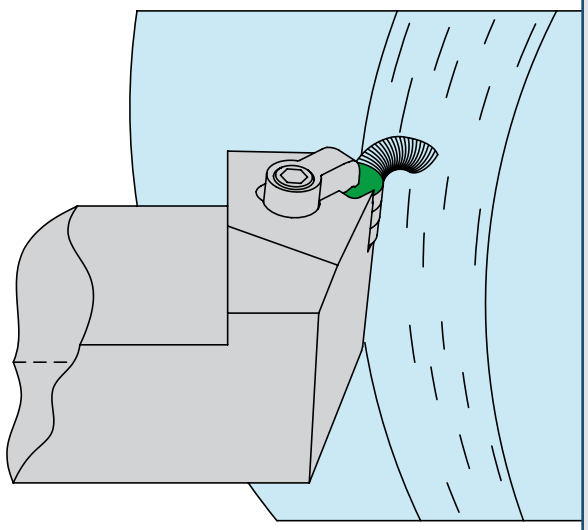


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Impingement

Conditions can arise where the chip is curled onto the finish surface immediately behind the tool. Under these circumstances, fragments of the hot, plasticized chip may adhere to the finished surface. *(Figure 65)* Every effort must be made to avoid this condition when cutting at ceramic speeds. Usually a change in tool geometry lead angle, tool radius, depth of cut, feed rate or some combination of these will redirect the chip away from the finished surface.

Figure 65 – Impingement



Boring Holes

With a quill feed machine, boring into a hole increases the spindle extension and as the tool becomes dull, the cutting forces increase *(Figure 66)*. The cutting conditions will deteriorate as the quill becomes progressively less rigid. The results are bores that are tapered and not concentric.

Additionally, chips may accumulate in the bottom of the bore and will eventually be re-cut, further worsening conditions.

It is often advantageous to back bore a hole *(Figure 67)*. This improves the spindle's stability as the insert wears while giving better size, finish and roundness to the bore with less chance of insert breakage and no chance of chip clogging.

Rethink the process

Figure 66 – Spindle Overhang Increasing

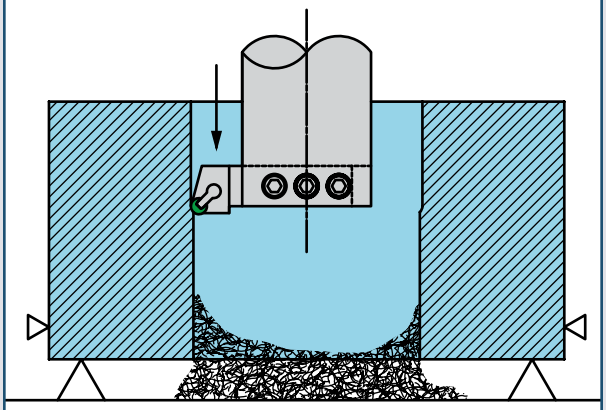
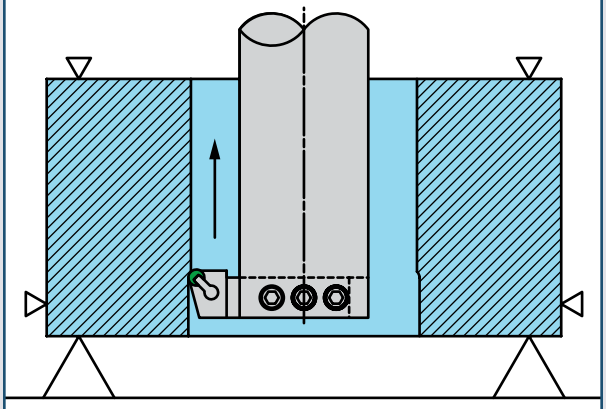


Figure 67 – Spindle Overhang Decreasing



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Wear Mechanisms

The normal wear patterns on Greenleaf advanced whisker-reinforced ceramic inserts are unlike the familiar wear patterns on carbide tools. Any attempts to analyze wear or failure mechanisms based upon that prior knowledge will result in ineffective utilization of the WG Ceramics material.

Flaking off of small pieces around the top periphery of the insert is the result of pressure caused by the development of flank wear. In **roughing operations** where surface finish is not of primary concern, this type of tool wear *(Figure 68)* is not usually detrimental to tool performance. In fact, as the tool flakes, a new sharp edge is produced and the tool may go on cutting for long periods in this flaked condition with satisfactory results. In finishing cuts, the flaking will be detrimental to the finish and may also lead to smearing.

At the moment of flaking, sparking can be seen mainly in an upward direction from the insert top surface. The high-temperature material now flowing over a rough top surface of the insert creates sparks. This is not a matter of concern for tool failure. We recommend that the feed rate be turned back 50% to finish the cutting operation.

Before the next operation, a tool inspection should determine whether or not the edge needs to be indexed. It is very important to use the insert to the maximum flaked condition in roughing before indexing or discarding the inserts. Do not make hasty judgment of the tool's ability to continue based upon this flaked appearance. Greenleaf whisker-reinforced ceramics are a completely different material. Continue to use the insert until some experience has been gained on where the limits actually lie in your operation.

Caution! *When sparks are visibly being carried along the cutting surface, then the insert cutting edge is chipped or broken severely enough that it is not able to cut anymore. This may cause catastrophic failure. Quick action to withdraw the cutting tool is recommended.*

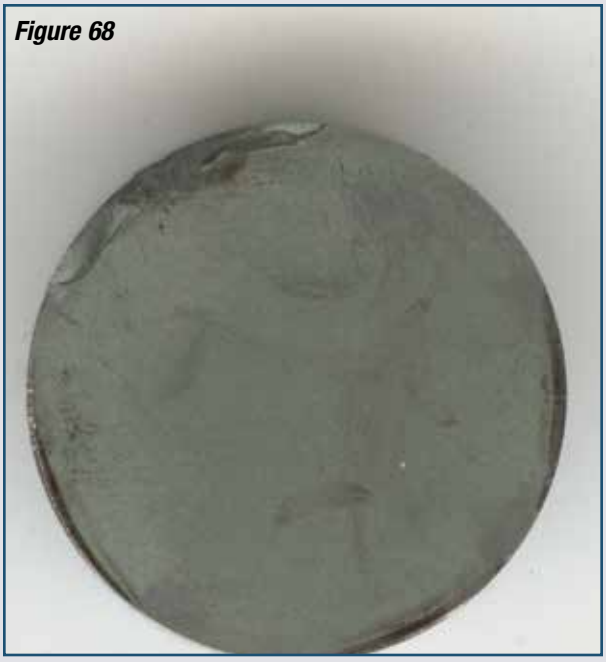
Unlike traditional ceramics, WG Ceramics does not fail by catastrophic breakage except under conditions of severe misuse. The most commonly observed wear/failure modes are chipping of the edge, flank wear, notching and flaking.

Flank wear is a normal progressive wear phenomenon present in all cutting tools. The magnitude of this wear and the speed at which it develops are the values by which tool life should be judged.

In nickel-based alloys, notching will occur at the depth-of-cut line under almost all circumstances. The ideal tool application would be one in which the notch wear was at an acceptable maximum at exactly the same time as flank wear had developed to an acceptable maximum. However, one wear phenomenon usually develops ahead of the other.

Notch wear should not extend past 1/3 of the thickness of the insert. Rapid notch wear or chipping of the insert is often the result of insufficient heat in the shear zone ahead of the tool. Increasing the speed or decreasing the feed or a combination of both can remedy this.

Figure 68



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Indexing of Inserts

If the following indexing practices are observed in the application of Greenleaf whisker-reinforced ceramics, the result may be two to three times more part production per insert than when following indexing practices for traditional ceramic or carbide tools. Tooling costs may be cut in half…or better.

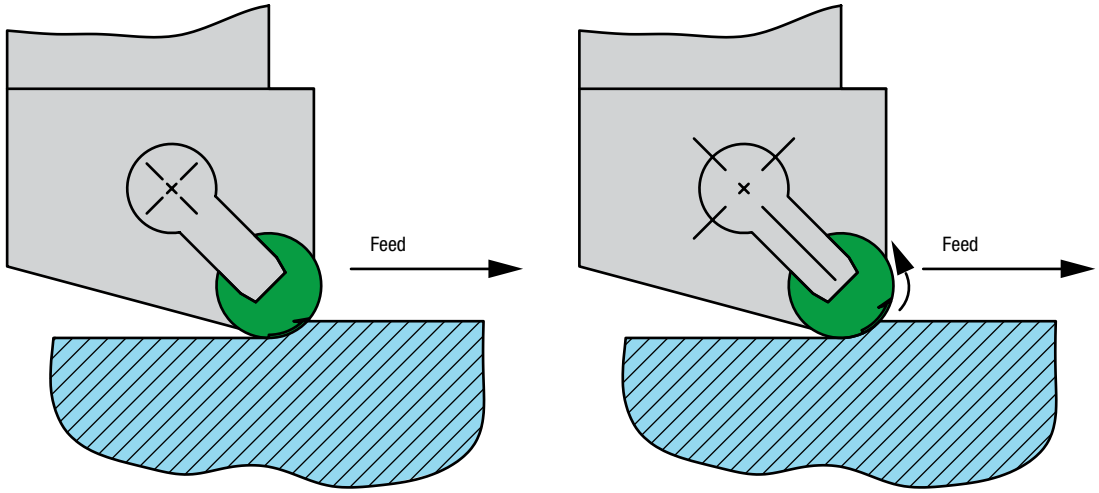
For Optimum Tool Life:

Method 1 *(Figure 69)*
When notching has reached the maximum depth of 1/3 the thickness of the insert, but the flank wear land is not at the maximum; index the inserts as illustrated so that the next notch is developed on an area where the wear land is now present. This is done by turning the insert away from the finished surface so that the notch is clear of the hardened surface layer, but the wear land is still inside the next cutting zone.

Method 2 *(Figure 70)*
When both notching and flank wear land have developed at an equal pace and both are at a determined maximum, index the insert's notch towards the finished surface so that the notch is just clear of the finished surface and adjacent to the start of the toolholder pocket.

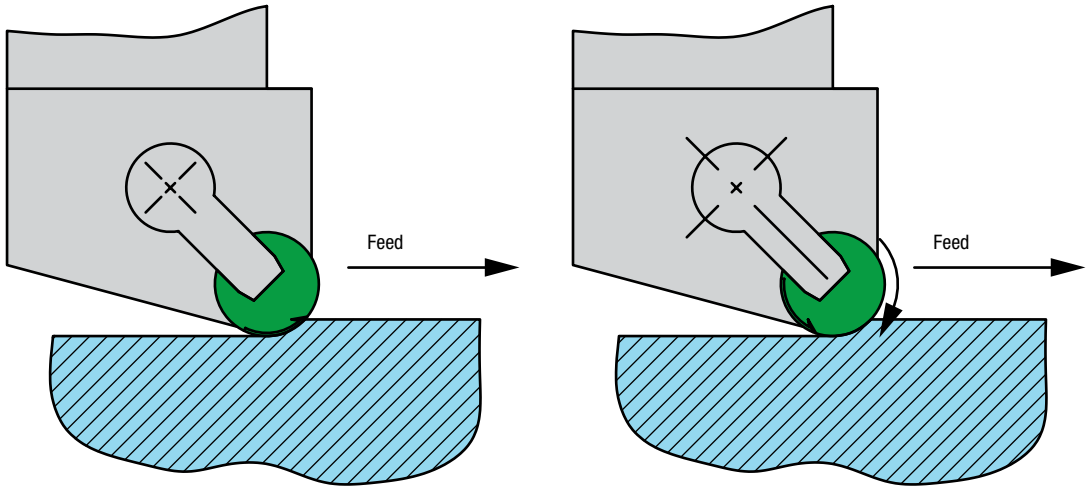
Method 1

Figure 69 – Indexing of Round Inserts (Due to Notching)



Method 2

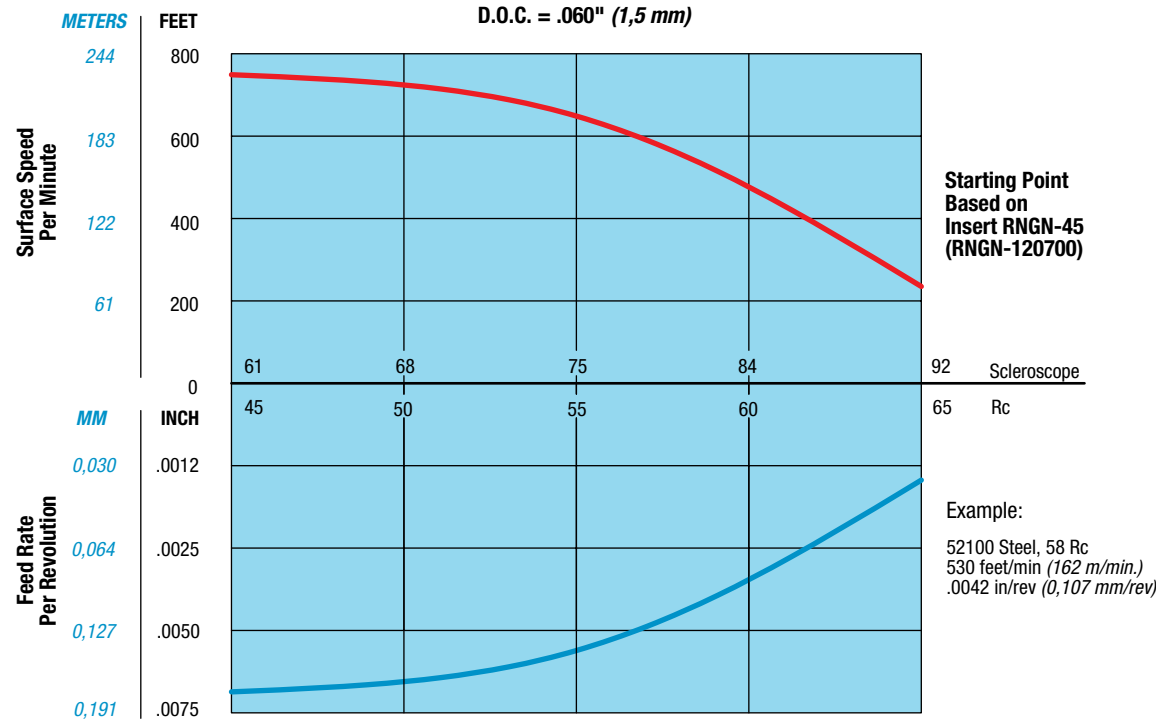
Figure 70 – Indexing of Round Inserts (Due to Notching and Wear)



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Turning Hard Materials 45-65 Rc

Figure 71 – Machining Recommendations for Hardened Materials



Greenleaf advanced whisker-reinforced ceramics are successfully used for the turning of hard materials other than nickel-based alloys in the range of 45-65 Rc. The outstanding hardness, combined with the high strength imparted by the reinforcing silicon carbide whiskers, makes possible the machining of many materials previously workable only by grinding. Some areas where the greatest savings have been shown are in the heat-treated alloy steels, die steel, weld overlays, hard facings and hard irons.

As in nickel-based alloys, speeds can be increased up to 8x those used for uncoated tungsten carbide tools and 4x those of coated carbide tools.

The above graph *(Figure 71)* gives starting points for speeds and feeds based upon material hardness. In hard turning the use of a light hone on the insert such as edge preparation T1A may help reduce chipping. ***Coolant should not be used.*** In this application we also recommend the use of an "ANSI" toolholder system which inherently has a five-degree double-negative rake.

If your job is in the 45 to 65 Rc range, chances are that Greenleaf whisker-reinforced ceramics can increase productivity and cut machining costs substantially.

Milling of Nickel-Based Alloys

Milling can be compared to interrupted machining in turning. Since each insert is in and out of the cut during each revolution, the desirable temperature ahead of the tool is not easily achieved and calls for increased surface speed, reduced feed per tooth or a combination of both. It can be surprising how much extra speed is needed in some operations to get the heat back compared to machining the same material continuously as in turning. The increase can be many times the turning speed.

If a cutter designed for carbide is employed, new problems can arise. Often carbide insert milling cutter designs do not incorporate safety features to prevent components from dislodging at high speeds.

The use of coolants is not recommended.

With milling, unlike turning, the chip can be generated from thin to thick as in conventional or "up" milling or thick to thin as in "climb" or "down" milling. It is highly recommended to use the climb milling technique to avoid high heat in a thin section of the chip which encourages chip welding and re-cutting of the chip, which in turn reduces tool life.

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To summarize, when milling with Greenleaf whisker-reinforced ceramics:

1. Increase the speed from the turning recommendations in *Figure 13* according to the width of cut.
2. Reduce the feed rate recommended for turning in *Figure 13* by about 50%. **Remember, this is feed per tooth, not per revolution of the milling cutter.**
3. Be sure to use a Greenleaf high-velocity milling cutter or a cutter designed specifically for use with ceramics at high surface speeds.

Recommended Speed Increase for Milling with Various Declining Widths of Cut

In a milling operation the width of cut has a direct bearing upon the temperature generated ahead of the inserts. As the width is decreased, so is the temperature since each insert now passes through air for a longer time than it actually cuts material.

Figure 72 shows the percentage of increase to the speeds given in the graph *(Figure 13)* for various declining widths of cut. The widths are also expressed as percentages of the cutter diameter so the chart can be applied to all cutter sizes.

At the very best, a milling insert can only be cutting 50% of each revolution if the path of cut is equal to the cutter diameter. For this reason, it will always be necessary to increase speed and reduce feed compared to the turning recommendations in *Figure 13* to achieve the same temperature range.

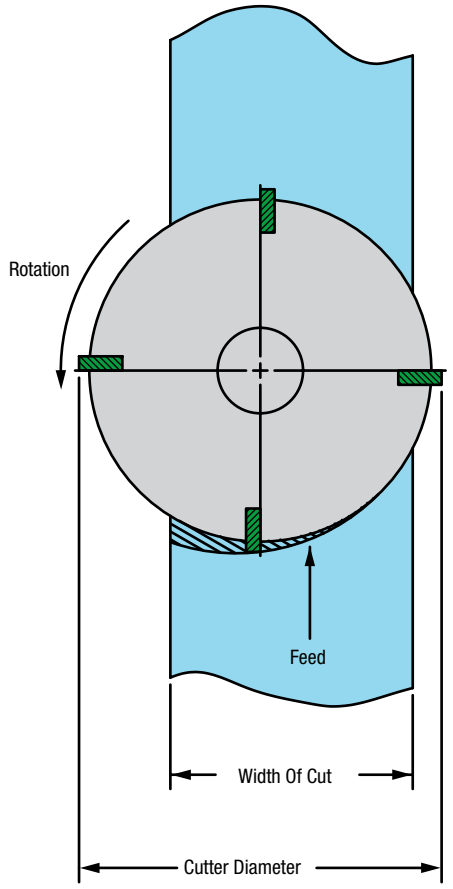
Example of a Ceramic Milling Application

The following data indicates outstanding success with a ceramic milling application:

Material..... *Waspaloy*
Condition..... *Forging*
Hardness..... *41 Rc*
Operation ..... *Rough and Finish Milling*
Cutter Diameter..... *3" (76 mm) WSRN-60003*
Number of Inserts *4*
Depth of cut (rough) ..... *0.050" (1,27 mm)*
Depth of cut (finish)..... *0.025" (0,64 mm)*
Insert ..... *RNGN 45 T2 (120700)*
Grade ..... *WG-300®*
Speed ..... *3144 SFM (958 m/min)*
Feed..... *64 ipm (1,6 m/min)*
Feed per tooth..... *0.004" (0,1 mm)*

This application resulted in an 80-to-1 reduction in the cutting time cycle over carbide.

Figure 72 – Recommended Speed Increase for Milling with Various Declining Widths of Cut



Width of Cut in Percentage of Cutter Diameter Engaged in Workpiece	Surface Speed in Percentage of Graph (Figure 13)
100%	125%
90%	150%
80%	220%
70%	280%
60%	340%
50%	400%
40%	460%

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Targeted Application Areas for Greenleaf Advanced Whisker-Reinforced Ceramics

The potential for applying whisker-reinforced ceramics extends considerably outside of the aircraft industry and involves categories of materials where little or no work has been done to date.

In order to provide you with a starting point for cost justification calculations, a rating list follows.

This list is extrapolated from carbide performance data published by leading users of the alloys listed. A sampling of the data gives us every reason to believe that it will work very well for WG-300® as a starting point. Here's how it works.

a.) In the Ceramic Productivity Manual, the graph *(Figure 13)* gives speeds and feeds for a given hardness value assuming the use of RNGN 45 (120700) inserts. The value represents 100% in that system.

b.) The following list gives a percentage rating for a number of materials where there is existing data. ***Note:*** *This is for forged (wrought) materials. Only the speed is to be considered at these new machinability values as a starting point with WG-300®. For values below 100%, speed, feed, depth of cut and time in cut must be reduced to the suggested rating.*

Starting Point from *Figure 13* for Various Materials

Alloy	#AMS	UNS#	% Rating
A-286	5726	S66286	115
A-286	5731	S66286	115
A-286	5732	S66286	130
A-286	5734	S66286	115
Astroloy	5882	N1307	120
Custom 450	5863	S45000	180
Custom 455	5617	545500	140
Greek Ascoloy	5616	S41800	250
Hastelloy B		N10001	
Hastelloy C	5750	N10002	180
Hastelloy D			
Hastelloy G		N06007	
Hastelloy N	5771	N10003	150
Hastelloy S	5711	N06635	180
Hastelloy W	5755	N10004	130
Hastelloy X	5754	N06002	130
Haynes 25	5759	R30605	85
Haynes 188	5772	R30188	85
Haynes 263		N07263	50
IN-100	5397	N13100	60
Incoloy 804		N06804	
Incoloy 825		N08825	
Incoloy 901	5660	N09901	130
Incoloy 901 Mod.	5661	N09901	115
Incoloy 903		N19903	120
Incoloy 925			100
Inconel 600	5665	N06600	140
Inconel 601	5715	N06601	140
Inconel 617	5887	N06617	100
Inconel 625	5666	N06625	115
Inconel 700			
Inconel 702		N07702	
Inconel 706	5702	N09706	115
Inconel 718	5662	N07718	100
Inconel 718	5663	N07718	100
Inconel 718	5664	N07718	140
Inconel 721		N07721	
Inconel 722	5717	N07722	115
Inconel X-750	5667	N07750	115
Inconel 751		N07751	
MP-35-N	5758	R30035	115
Monel 400		N04400	
Monel 401		N04401	
Monel 404		N04404	
Monel 502		N05502	
Monel K500		N05500	
Monel R405		N04405	
Nicocraly			
Nickel 200		N02200	
Nickel 201	5553	N02201	200
Nickel 205	5555	N02205	220
Nickel 211		N02211	

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Alloy	#AMS	UNS#	% Rating
Nickel 220		N02220	
Nimonic 75		N06075	
Nimonic 80		N07080	
Nimonic 90		N07090	
Nimonic 95			
Nimonic C-263	5886	N07263	30
Nitralloy 125			
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*AMS # = Aerospace Material Specification Number

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